

THE EAST AFRICAN TRADE AND TRANSPORT FACILITATION PROJECT (EATTF)



AFRICAN DEVELOPMENT BANK GROUP

PREPARATION OF A TRANSPORT FACILITATION STRATEGY FOR THE EAST AFRICAN COMMUNITY

FINAL REPORT



MAIN REPORT

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TABLE OF CONTENTS

1 Introduction	1-1
1.1 Background	1-1
1.1.1 Harmonisation of Standards and Specifications	1-1
1.1.2 Harmonisation of Environmental Regulations and Standards	1-1
1.1.3 Harmonisation of Vehicle Registration and Licensing	1-2
1.1.4 Harmonisation of Road Safety Laws and Regulations	1-2
1.1.5 Harmonisation of Overload Control Laws and Regulations	1-2
1.1.6 Harmonisation of Transport Sector Legal and Institutional Frameworks	1-2
1.2 Objectives of this Report	1-2
1.3 Organisation for this Report	1-3
2 Harmonisation of Standards and Specifications	2-1
2.1 Introduction	2-1
2.1.1 Background	2-1
2.1.2 Objectives and Methodology	2-1
2.2 Harmonisation of Roadway Geometric Design Standards	2-1
2.2.1 Current Geometric Design Standards in the EAC region	2-1
2.2.2 Road Functional Classification	2-2
2.2.3 Design Controls and Criteria	2-3
2.2.4 Elements of Design	2-6
2.2.5 Cross-Section Elements	2-9
2.2.6 Intersections	2-11
2.2.7 Speed Management	2-13
2.2.8 Pedestrian and Cyclists Facilities/NMT Facilities	2-16
2.2.9 Other road furniture	2-16
2.2.10 Impact of harmonisation and Implementation strategy	2-18
2.3 Harmonisation of Pavement and Bridge Design Standards	2-19
2.3.1 Introduction	2-19
2.3.2 Objectives	2-19
2.3.3 Pavement Design Standards Adopted by the EAC Member states	2-19
2.3.4. Potential Areas for Harmonisation and Improvement	2-20
2.3.5 Impact of Harmonisation and Implementation strategy	2-23
2.4 Harmonisation of Specifications for Road and Bridge Works	2-24
2.4.1 Specifications for Road Works Adopted by EAC Member states	2-24
2.4.2 Potential Areas for Harmonisation and Improvements	2-24

2.4.3	Impact of Harmonisation of Specifications for Road works	2-36
2.5	Harmonisation of Road and Bridge Maintenance Standards	2-36
2.5.1	Objectives	2-36
2.5.2	Maintenance Management Principles	2-36
2.5.3	Situational Analysis	2-37
2.5.4	Potential Areas for Harmonisation and Improvement	2-37
2.5.5	Road Maintenance Methods - Implementation	2-42
2.5.6	Environmental Protection	2-43
2.5.6	Consistent Monitoring and Evaluation	2-43
2.6	Harmonization of Road Traffic Signs, Signals and Markings	2-44
2.6.1	Objective	2-44
2.6.2	Current Practices and Proposals for Harmonization	2-44
2.6.3	Impact of harmonization and recommended improvements	2-47
2.6.4	Implementation road map	2-50
2.7	Harmonization of Vehicle Safety and Fitness	2-50
2.7.1	Objective	2-50
2.7.2	Existing Practice	2-50
2.7.3	Proposal for Harmonization: PMVI Framework	2-51
2.7.4	Impacts of Recommendations for Harmonization of PMVI	2-54
2.8	Harmonisation of Drivers Training and Testing	2-55
2.8.1	Objective	2-55
2.8.3	Proposal for Harmonization	2-55
2.8.4	Impacts of Proposed Recommendation on Harmonization	2-57
2.9	Harmonization of Vehicle Dimensions and Combinations	2-59
2.9.1	Objectives	2-59
2.9.2	Existing and Recommended Standards for Harmonization	2-59
2.10	Harmonization of Transportation of Awkward and Hazardous Loads	2-62
2.10.1	Objectives	2-62
2.10.2	Current Situation	2-62
2.10.3	Recommendations	2-64
3	Harmonisation of Environmental Regulations and Standards	3-1
3.1	Introduction	3-1
3.2	Objectives and Methodology	3-1
3.3	Review of National Environmental Policies	3-2
3.3.1	Burundi	3-2
3.3.2	Kenya	3-2

3.3.3	Rwanda	3-2
3.3.4	Tanzania	3-2
3.3.5	Uganda	3-3
3.3.6	Zanzibar	3-3
3.4	Review of Environmental Legislation Framework	3-3
3.4.1	Burundi	3-3
3.4.2	Kenya	3-4
3.4.3	Rwanda	3-4
3.4.4	Tanzania	3-4
3.4.5	Uganda	3-5
3.4.6	Zanzibar	3-5
3.5	Review of Existing Environmental Standards and Guidelines in the EAC	3-5
3.5.1	Environmental Standards	3-5
3.5.2	Environmental Impact Assessment (EIA) Guidelines	3-5
3.6	Convergences and Divergences of Environmental Standards and EIA Guidelines	3-7
3.6.1	Water Quality Standards	3-7
3.6.2	Discharge of Effluent Standards	3-7
3.6.3	Air Quality Standards	3-8
3.6.4	Noise Standards	3-8
3.6.5	Vibration Standards	3-8
3.6.6	Soil Quality Standards	3-8
3.6.7	Light Pollution Standards	3-8
3.6.8	Electromagnetic waves and microwaves	3-9
3.6.9	Hazardous substances and materials	3-9
3.6.10	EIA Guidelines	3-9
3.7	Proposals for Harmonisation of Environmental Standards and Regulations	3-9
3.7.1	Standards that have already been harmonised by the EAC	3-9
3.7.2	Harmonised standards from this study	3-9
3.7.3	The standards that have been developed	3-10
3.7.4	Environmental impacts assessment guidelines	3-10
3.8	Conclusions and Recommendations	3-10
3.8.1	General	3-10
3.8.2	Guidelines and Manuals for Environmental Assessment in Road Sector	3-11
3.9	Enforcement Plan	3-11
4	Harmonisation of Motor Vehicle Registration and Licensing	4-1
4.1	Introduction	4-1

4.2 Objectives and Methodology	4-1
4.3 Review of Motor Vehicle Registration Laws	4-1
4.3.1 Convergences in Motor Vehicle Registration	4-3
4.3.2 Divergences in Motor Vehicle Registration	4-3
4.3.3 Emerging Issues on Registration	4-3
4.4 Review of Motor Vehicle Licensing Laws	4-5
4.4.1 Convergences in Motor Vehicle Licensing	4-6
4.4.2 Divergences in Motor Vehicle Licensing	4-6
4.5 Review of Motor Operators' Licensing Laws	4-6
4.5.1 Convergences in Operators' Licensing Laws	4-6
4.5.2 Divergences in Operators' Licensing Laws	4-7
4.5.3 Emerging Issues on Fees/Charges	4-7
4.6 Conclusion and Recommendations	4-8
4.7 Form of Instrument	4-9
4.7.1 Structure of the Proposed Act	4-9
4.7.2 Reference Law, Objects and Reasons	4-10
4.7.3 Further Input from Professionals/Experts	4-10
5 Harmonization of Road Safety Laws and Regulations	5-1
5.1 Introduction	5-1
5.2 Objectives and Approach of the Study	5-1
5.3 Road Safety Situation in the EAC	5-1
5.3.1 Extent and Trend of Road Traffic Casualties	5-2
5.3.2 The Nature of the Problem and the Contributing Factors	5-3
5.3.3 Identified Risk Factors and Proposed Measures	5-4
5.4 Existing Road Safety Laws and Regulations	5-5
5.5 Identification of viable strategies, projects and actions	5-7
5.6 Regional Strategy for Tackling Prevalence of HIV/AIDS in Road Transport Corridors	5-8
5.7 A Framework for the Development of an East African Road Safety Master Plan	5-10
6 Harmonisation of Overload Control	6-1
6.1 Introduction	6-1
6.2 Objectives and Methodology	6-1
6.3 Development of a Common Training Curriculum for Weighbridge Personnel	6-1
6.3.1 Existing Situation in EAC Countries	6-1
6.3.2 Status in SADC and COMESA Regions	6-2
6.3.3 Observations from PADECO Study	6-3
6.3.4 Consideration of Views from Expert's and Task Force Meetings	6-3

6.3.5	Recommended Training Curriculum for the EAC Countries	6-3
6.3.6	Further Recommendations	6-5
6.4	Uniform Weighbridge Printout Certificates and Overload Reporting Formats	6-5
6.5	Framework for Interconnection of Weighbridges	6-8
6.6	Preparation of Legal Instrument for Implementing Overload Control	6-9
6.6.1	Overview	6-9
6.6.2	Conclusions	6-10
7	Harmonisation of Road Transport Sector Legal and Institutional Framework	7-1
7.1	Introduction	7-1
7.2	Objectives	7-1
7.3	Current Road Transport Legal Frameworks in the EAC	7-2
7.3.1	Road Infrastructure Legal Framework	7-2
7.3.2	Road Traffic Legal Framework	7-3
7.3.3	Vehicle and Driver Licensing Legal Framework	7-3
7.3.4	Road Transport Operator Licensing Legal framework	7-4
7.4	Current Road Transport Institutional Framework in the EAC	7-4
7.4.1	Policy making, planning and sector coordination	7-5
7.4.2	Road sector regulation, financing and development	7-6
7.4.3	Provision of Transport Services	7-6
7.4.4	Driving Configuration	7-6
7.5	Proposed Legal and Institutional Framework	7-7
7.5.1	Transport Policies	7-7
7.5.2	Institutional Structures	7-8
7.6	Recommendations for Harmonisation of Legal and Institutional Frameworks	7-8
7.6.1	Road Infrastructure Acts	7-8
7.6.2	Road Traffic Regulations and Safety Enforcement Laws	7-9
7.6.3	Road Transport Operator Licensing	7-9
7.6.4	Vehicle Registration and Licensing	7-9
7.6.5	Institutional Framework	7-9
7.6.6	Road Transport Services	7-10
7.6.7	Harmonization of Driving Side	7-10
8	Conclusion and Recommendations	8-1
8.1	Harmonisation of Standards and Specifications	8-1
8.1.1	Conclusions	8-1
8.1.2	Recommendations	8-3
8.2	Harmonisation of Environmental Regulations and Standards	8-6

8.2.1	Conclusions	8-6
8.2.2	Recommendations	8-6
8.3	Harmonisation of Vehicle Registration and Licensing	8-6
8.3.1	Conclusions	8-6
8.3.2	Recommendations	8-7
8.4	Harmonisation of Road Safety Laws and Regulations	8-7
8.4.1	Conclusions	8-8
8.4.2	Recommendations	8-8
8.5	Harmonisation of Overload Control Laws and Regulations	8-9
8.5.1	Conclusions	8-9
8.5.2	Recommendations	8-10
8.6	Harmonisation of Transport Sector Legal and Institutional Frameworks	8-10
8.6.1	Conclusions	8-10
8.6.2	Recommendations	8-11

APPENDICES

APPENDIX 1: List of Participants at Expert Group Meetings

APPENDIX 2: List of Participants at the 1st EAC Task Force Meeting

APPENDIX 3: List of Participants at the 2nd EAC Task Force Meeting

APPENDIX 4: Terms of Reference

ANNEXES

ANNEX A: Harmonisation of Standards and Specifications

ANNEX B: Harmonisation of Environmental Regulations and Standards

ANNEX C: Harmonisation of Vehicle Registration and Licensing

ANNEX D: Harmonisation of Road Safety Laws and Regulations

ANNEX E: Harmonisation of Overload Control Laws and Regulations

ANNEX F: Harmonisation of Transport Sector Legal and Institutional Framework

Acronyms

AIDS	Acquired Immunodeficiency's Syndrome
AMREF	The African Medical Research Foundation
ARV	Antiretroviral Drugs
ASANRA	Association of Southern Africa National Roads Authorities
AU	African Union
BAC	Blood Alcohol Concentration
BICO	Bureau for Industrial Cooperation
BRA	Burundi Revenue Authority
CBOCS	Cross Border Overload Control System
CDA	Coastal Development Authority
COMESA	Common Market for Eastern and Southern Africa
COTU	Central Organization for Trade Unions
CTLA	Central Transport Licensing Authority
DRSC	District Road Safety Committees
EAC	East African Community
EARSMP	East African Road Safety Master Plan
EATTFP	East African Trade and Transport Facilitation Project
ECA	Economic Commission for Africa
EDPRS	Economic Development and Poverty Reduction Strategy
EEZ	Exclusive Economic Zones
EIA	Environmental Impact Assessment
EIAR	Environmental Impact and Audit Regulations
EIS	Environmental Impact Statement
EMA	Environmental Management Act
EMCA	Environmental Management Coordination Act
EMP	Environmental Management Plan
ESA	Equivalent Standard Axle
FESARTA	Federation of East and Southern Africa Transporters Association
FHI	Family Health International
FORENWA	National Fund for Environment in Rwanda
Fy	Fiscal Year
GCM	Gross Combination Mass
GDP	Gross Domestic Product
GN	Government Notice
GNI	Gross National Income
GoK	Government of Kenya
GOU	Government of Uganda

GPS GVM	Global Positioning System
GVW	Gross Vehicle Weight
HDV	Heavy Duty Vehicle
HGV	Heavy Goods Vehicle
HIV/AIDS	Human Immunodeficiency Virus/Acquired Immune Deficiency Syndrome
HSWIM	High Speed Weighing in Motion
HVL	Heavy Vehicle License
IGAD	Inter-Governmental Authority for Development
IMT	Intermediate Means of Transport
JICA	Japan International Co-operation Agency
JTC	Joint Technical Committee
KeNHA	Kenya National Highways Authority
KeRRA	Kenya Rural Roads Authority
KRA	Kenya Revenue Authority
KRB	Kenya Roads Board
KRFB	Kenya Roads Fund Board
KURA	Kenya Urban Roads Authority
KWS	Kenya Wildlife Services
LFR	Local Forest Reserve
LGA	Local Government Authority
LHD	Left Hand Drive
LN	Legal Notice
LSWIM	Low Speed Weighing in Motion
M & E	Monitoring and Evaluation
MAP	Multi-country AIDS Program (World Bank)
MCT	Ministry of Communications and Transport
MINALOC	Rwanda Ministry of Local Government
MINATE	Ministry of Territorial Development, Environment and Tourism
MININFRA	Ministry of Infrastructure Rwanda
MLP	Model Legislative Provisions
MOFPED	Ministry of Finance, Planning and Economic Development
MOID	Ministry of Infrastructure Development
MOITC	Ministry of Information, Transport, and Communications
MoLG	Ministry of Local Government
MoR	Ministry of Roads
MoT	Ministry of Transport
MoU	Memorandum of Understanding

MoW	Ministry of Works, Dar es Salaam
MOWHC	Ministry of Works, Housing, and Communications
MOWTC	Ministry of Works, Transport, and Communication
MRALG	Ministry of Regional Administration and Local Government
MV	Motor Vehicle
NACC	National AIDS Control Commission
NACP	National AIDS Control Program
NARSC	National Road Safety Council
NEMA	National Environmental Management Authority
NEMC	National Environmental Management Council
NES	National Environment Secretariat
NFR	National Forest Reserve
NGOs	Non Governmental Organizations
NMT	Non-Motorised Transport
NRSA	National Road Safety Authority
NTB	Non-tariff barrier
OC	Overload Control
OECD	Organization for Economic Development
ONATRACOM	Rwanda State Bus Transport Company
OSBP	One Stop Border Post
PIARC	World Road Association
PMO-RALG	Prime Minister's Office-Regional Administrations & Local Government
PPP	Public Private Partnership
PSV	Public Service Vehicle
RAFU	Road Agency Formation Unit
REC	Regional Economic Community
REMA	Road Maintenance Levy Fund
RF	Road Fund
RFB	Road Fund Board
RMLF	Road Maintenance Levy Fund
RRA	Rwanda Revenue Authority
RSA	Road Safety Audit
RSMS	Road Safety Management System
RTC	Road Traffic Crash (' <i>Accident</i> ')
RTDA	Rwanda Transport Development Agency
RTI	Road Traffic Injury
RURA	Rwanda Utilities Regulatory Agency
SADC	Southern African Development Community

SARPCCO	Southern African Regional Police Chiefs Co-operation Organisation
SATCC	Southern Africa Transport and Communications Commission
SSA	Sub-Saharan Africa
SSATP	Sub Saharan Africa Transport Policy Program
STI	Sexual Transmitted Infections
SUMATRA	Surface and Marine Transport Regulatory Authority (Tanzania)
TABOA	Tanzania Bus Owners Association
TACAIDS	Tanzania Commission for AIDS
TANROADS	Tanzania National Roads Agency
TAORT	Tripartite Agreement on Road Transport
TCD	Traffic Control Devices
TLA	Transport Licensing Act
TLB	Transport Licensing Board (Uganda)
ToR	Terms of Reference
TRA	Tanzania Revenue Authority
UNRA	Uganda National Road Agency
URA	Uganda Revenue Authority
URFB	Uganda Road Fund Board
URT	United Republic of Tanzania
VCT	Voluntary Counselling and Testing
VETA	Vocational Education Training Authority
VOC	Vehicle Operating Costs
VRU	Vulnerable Road User
WB	The World Bank
WCC	Weighbridge Clearance Certificate
WG	Working Group
WHO	World Health Organization
WIM	Weighing-in-Motion
WRRTIP	World Report on Road Traffic Injury Prevention
ZRB	Zanzibar Revenue Board

EXECUTIVE SUMMARY

The objective of this report is to present the overall results of harmonisation proposals for six thematic areas considered under the above project and propose the way forward.

The Role of Road Transport in the East African Community

Over the last two decades road transport has become the most important surface transport mode for goods and passengers in the EAC member states as a result of structural problems in the rail transport mode. Currently all the five member states are linked by a network of roads as shown in the map below while only two partner states, namely Kenya and Uganda, have an active rail link. It is therefore important that in order to facilitate trade among the member states, a strategy be developed for facilitating the road transport system. The facilitation strategy aims at harmonising important areas of road transport such as infrastructure, operations as well as legal and institutional framework. Specifically this report presents harmonisation proposals in the aspects of design standards and specifications; environmental regulations and standards; vehicle registration and licensing; road safety regulations; overload control regulations, and transport sector legal and institutional frameworks.

Harmonisation of Design standards and specifications

Several subcomponents were identified to fall under this thematic area as follows:

- Harmonisation of road geometric design standards
- Harmonisation of road pavement and bridge design standards
- Harmonisation of specifications for road and bridge works
- Harmonisation of road and bridge maintenance standards
- Harmonisation of road signs, traffic signals and markings
- Harmonisation of vehicle safety and fitness
- Harmonisation of driver testing manual
- Harmonisation of vehicle dimensions and combinations
- Harmonisation of transportation of abnormal, awkward and hazardous loads

The harmonization of the above subcomponents for the EAC member states is essential for making it possible to have a reliable, efficient and safe road transport services in the EAC region. The main recommendations of this chapter are therefore drawn and presented under each of the above subcomponents.

Harmonisation of road geometric design standards

This section focuses on the harmonisation of road geometric design standards. A review of existing practices revealed that geometric road design practice in Burundi follows the French design standards while Rwanda used to follow French standards as well, but has of recent started to use American standards. In contrast, Kenya, Tanzania and Uganda use their own standards which were developed largely from the American and English practices. The study also found that Tanzania has adopted some design criteria from the geometric design standards of the Southern African Transport and Communications Commission (SATCC), which was also derived largely from the American and English practices. A critical review of the practice in the EAC member states found a

number of areas of commonality as well as areas unique to particular member states. Similarly, a review of international practice was also carried out with a view to comparing the existing practice in the EAC partner states and come up with potential areas for harmonisation and improvements for the EAC region.

In this regard, geometric design domains that were reviewed and for which recommendations were drawn upon include road classification and road reserve, terrain classification, design controls and criteria, design elements, cross-section elements, intersections, pedestrian facilities, speed management, road furniture and other facilities. The following are the specific recommendations of this part of the study.

Road functional classification: EAC member states should adopt road functional classes shown in Table E1 for design purposes.

Table E1: Proposed road functional classification for the EAC

Function	Class	Name conventions		Access control
Mobility roads	Class 1	International trunk roads National trunk road	Principal Arterial/ Freeway/ Expressway (2500 m spacing)	Full
	Class 2	National & Provincial roads Regional & District roads	Major arterial/Highway (800 spacing)	Full or partial
	Class 3	Regional & District roads Secondary roads	Minor arterial (600 m spacing)	Full or partial
Access roads	Class 4	District roads Secondary roads	Collector roads (50 m spacing)	Partial
	Class 5	Minor roads Local streets	Local streets (15 m spacing)	Unrestricted

Road reserve: EAC member states should plan to acquire incrementally more space for right of way in the range of 79 – 100 m so as to allow for future expansion of existing international and national routes to the freeway and expressways standards, and additional land at all designated places for rest areas.

Terrain classification: EAC member states should adopt terrain categories of flat with cross slope of 0 to 10 per cent, rolling with cross slope of more than 10 to 25 per cent, mountainous with cross slope of more than 25 to 60 per cent, and steep with cross slope of more than 60 per cent.

Design vehicle characteristics: EAC member states should adopt design vehicle characteristics shown in Table E2.

Table E2: Proposed design vehicle dimensions

Design vehicle type	Symbol	Dimension (m)				
		Length	Width	Height	MDTR*	Wheelbase
Passenger cars						
Passenger car	DV1	5.8	2.1	1.3	7.31	3.35
Buses						
Single unit bus	DV2	12.1	2.6	4.1	12.8	7.6
Articulated bus	DV3	18.3	2.6	3.4	12.1	6.7 + 5.9
Trucks						
Single unit truck	DV4	9.1	2.6	4.6	12.8	6.1
Semi-trailer	DV5	18.2	2.6	4.6	12.65	5.5+10.0
Rigid truck +drawbar trailer	DV6	22.0	2.6	4.6	12.0	4.6+8.2
Interlink (with a short truck tractor)	DV7	22.0	2.6	4.6	12.0	4.1+6.52**+7.94
Semi-trailer (long trailer)	DV8	21.0	2.6	4.6	13.7	6.1 & 12.8

*MDTR = Minimum Design Turning Radius

**distance between SU rear wheels and trailer front wheels

Driver performance: It is recommend that a driver perception reaction time of 2.5 seconds, driver eye height of 1.05 m , and object heights of 0.6 m and 1.08 m be adopted for sight distance/decision sight distance and passing sight distance measurement/design, respectively.

Passenger car equivalent (PCU) factors: It is recommend that member states adopt PCE factors shown in Table E3.

TableE3: Proposed values of passenger car equivalent (pcu) factors

Vehicle type	Terrain		
	Level	Rolling	Mountainous
Passenger cars	1.0	1.0	1.5
Light goods vehicles	1.0	1.5	3.0
Medium goods vehicles	2.5	5.0	10.0
Heavy goods vehicles	3.5	8.0	20.0
Buses	2.0	4.0	6.0
Motor cycles, scooters	0.5	1.0	1.5
Pedal cycles	0.5	0.5	NA

Design Hourly Volume (DHV): In the absence of field data for use in estimating K factors, the estimation of the 30th-highest Hourly Volume, DHV should be obtained by applying a factor of 0.15 and 0.10 to the ADT for rural highways and urban roads, respectively.

Design Speed: The recommended design speeds resulting from this study are shown in Table E4.

Table E4: Proposed design speed values

Road class		Design Speed (km/h)			
		Flat terrain	Rolling terrain	Mountainous	Steep
Mobility roads	Class 1	120	100	60	60
	Class 2	110	80	50	50
	Class 3	100	80	50	40
Access roads	Class 4	80	60	40	40
	Class 5	60	40	30	30

Projection of Future Demand: Projection of future traffic demand should be based on a period of 20 years for new roadway design and 10 years for reconstruction and rehabilitation.

Level of service: It is recommended that the EAC member countries adopt guidelines shown in Table E5 for the selection of design levels of service.

Table E5: Proposed guidelines for levels of service

Level of service for specified combinations of terrain and area type					
Function	Class	Level terrain	Rolling terrain	Mountainous terrain	Steep terrain
Mobility roads	Class 1	B	B	C	C
	Class 2	B	C	D	D
	Class 3	C	C	D	D
Access roads	Class 4	D	D	D	D
	Class 5	D	D	D	D

Access Control and Access Management: EAC member countries should put in place statutes, land-use ordinances, geometric design policies, and driveway regulations for managing and controlling access.

Stopping sight distance: The study recommends the adoption of a minimum stopping sight distance shown in Table E6 for the various design speeds.

Table E6: Stopping sight distance on level road

Design Speed (km/h)	30	40	50	60	80	100	110	120
SSD (m)	35	50	65	85	130	185	220	250

Passing sight distance: It is recommended to adopt a passing sight distance shown in Table E7 for the various design speeds.

Table E7: Passing sight distance on level road

Design Speed (km/h)	30	40	50	60	80	100	110	120
PSD (m)	200	270	345	410	540	670	730	775

Superelevation and Side friction: The study recommends adoption of maximum superelevation rates of 4% on roads in urban areas and 10% on roads in the rural areas as well as side friction factors with corresponding design speed shown in the Table E8.

Table E8: Side friction factors for different design speeds

Design speed (km/h)	Limiting value of <i>f</i>
30	0.17
40	0.17
50	0.16
60	0.15
70	0.14
80	0.14
90	0.13
100	0.12
110	0.11
120	0.09

Transition Design: The study recommends that the minimum length of transition curve should be based on consideration of driver comfort and shifts in the lateral position of vehicles and these two criteria should be used together to determine the minimum length of transition curve.

Gradients: The study recommends the adoption of a minimum grade of 0.5% and maximum grades shown in Table 9.

Table E9: Maximum gradients.

Terrain	Maximum gradient (%)
Flat	4
Rolling	4 – 8
Mountainous	7 – 12
Steep	12 - 18

Vertical curves: It is recommended that the minimum length standard for crest vertical curves should be based on the stopping sight distance, the height of the driver's eye measured from an eye height of 1.05 m, and the height of the object of 0.60 m to be seen over the crest of the curve. For sag curves, stopping sight distance should be based on the distance illuminated by the headlight height of 0.6 m.

Climbing lanes: It is recommended to use AASHTO requirements for climbing lanes.

Lane widths: The study recommends lane widths of 3.5 to 3.75 m for mobility road classes and 3.0 to 3.5 m for access roads classes.

Shoulder widths: The study recommends minimum shoulder widths of 2.0 m for mobility road classes, 1 to 3 in flat terrain, 1.0 to 1.5 m for roads in rolling and mountainous terrain, and 0.6 to 1.0 m for access roads classes.

Normal cross fall: A normal cross falls of 2.5% should be adopted for asphalt concrete surfaces (or 3% in areas where heavy rainfall is common), 2.5% for surface dressing surfaces, 3.0% for stone paved surfaces, and 4.0% for gravel and earth surfaces.

Headroom clearance: It is recommended to adopt a 5.5 m headroom under bridge structures, 7.0 m headroom under high-power cables and 6.0 m headroom under low-power cables.

Lateral clearance for vehicles passing under a bridge: The recommended minimum lateral clearance should be (i) 0.6 m on each side of a bridge for traffic volume of less than 400 veh/day, (ii) 1.0 to 1.2 m on each side of a bridge for traffic volume of 400 to 2000 veh/day, and (iii) the width of the approach roadway for traffic volume of over 2000 veh/day (and for bridges over 30 m span, the width should be increased by 1 m).

Emergency Escape Ramps: It is recommended that escape ramps be located wherever grades are of steepness and length that present a substantial risk of runaway trucks and topographic conditions permit construction.

Motorcycle Traffic: It is recommended that motorcycle exclusive cycle lanes be provided when the total volume of traffic exceeds the provided lane capacity, and the volume of motorcycles exceeds 20% of the total volume of traffic.

Intersection spacing: The study recommends that signalised intersection spacing should be at least 400 m in urban areas and 800 m in suburban areas for optimum two-way signal progression, and for unsignalised intersections the minimum distance should be at least 10 times the design speed in meters.

Warrants for turning lanes: The study recommends the use of AASHTO criteria for provision of turning lanes.

Warrants for grade separations and interchanges: It is recommended to adopt the AASHTO warrants for grade separation and interchanges.

Railroad – highway crossing: The decision to effect grade separation at a highway-rail crossing should be based on long-term, fully allocated life-cycle costs, including both highway and railroad user costs, rather than on initial construction costs.

Traffic Calming: the study recommends that the values shown in the figures E1 to E3 should be used for the design of speed humps and rumble strips for speed control on a roadway passing through inhabited areas.

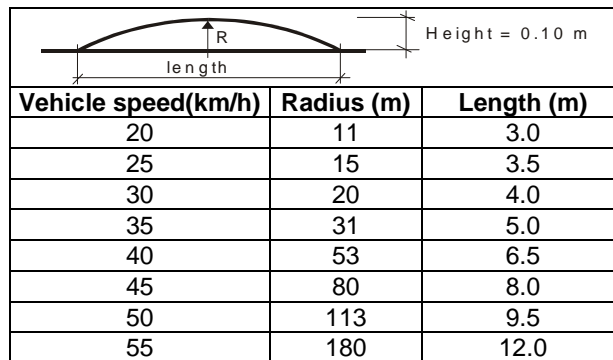


Figure E1: Detailed design of circular speed hump

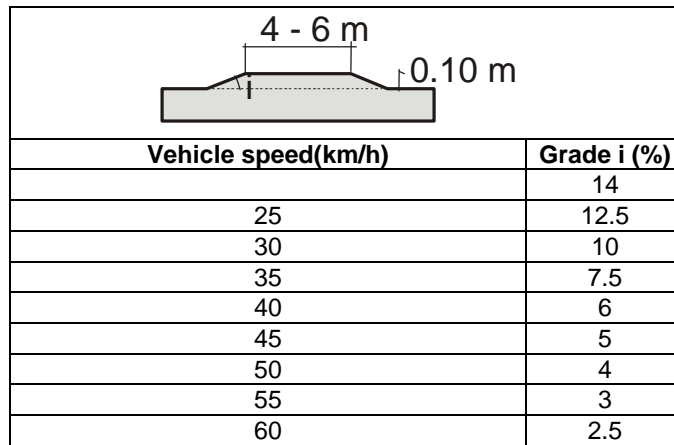


Figure E2: Detailed design of flat-topped speed hump

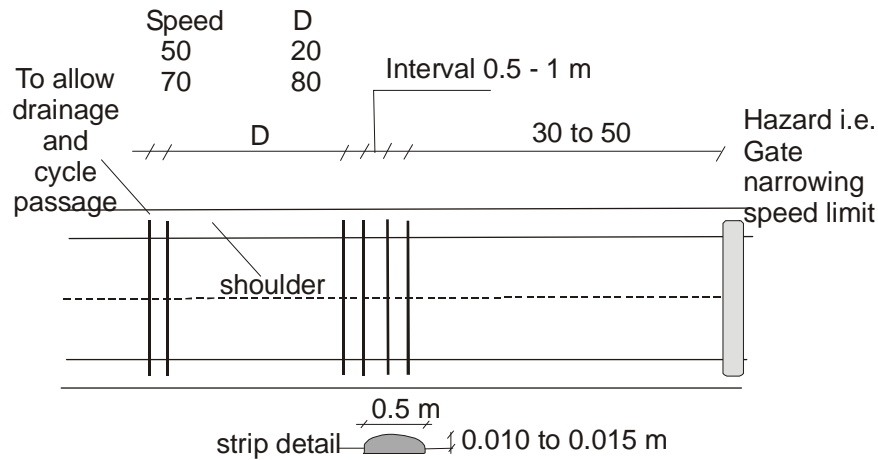


Figure E3: Detailed design of rumble strips

Footways: The study recommends the adoption of footway widths of 1 m as absolute minimum standard (two persons cannot pass each other), 1.8 m as desirable minimum (two persons can pass each other closely), 2.25 m for light volume (two persons can pass each other comfortably), and 3.5 m+ for heavy volume (space for three persons).

Cycle lanes: It is recommended that cycle lanes be provided as separate facilities or as combined cycle lanes and pedestrian footways if there is high-traffic and the combined flow of pedestrians and cyclists is more than 400 per day. Their design should adopt the width shown in, Table E10. Further, it is also recommend to adopt the minimum clearances shown in Table E11 for cycle lanes.

Table E10: Recommended widths for cycle facilities

Type	Minimum width (m)	Standard width (m)	Width for heavy usage (m)
Cycle lane (separate from carriageway)	2.0	2.5	3.5
Combined cycle lane and pedestrian footway	2.0	3.0	4.5
Cycle lane (one way)	1.5	2.0	2.5

Table E11: Recommended clearances for cycle facilities

Type	Recommended clearance [m]
Minimum overhead clearance	0.50
Clearance to wall, fence, barrier or other fixed object	0.50
Clearance to unfenced drop-off, e.g. embankment, river, wall	1.0
Minimum clearance to edge of traffic lane for speed limit of:	
50 km/h	0.50
80 km/h	1.00
100 km/h	1.50

Rest areas: The study recommends that major rest areas should be located at maximum intervals of 100 – 120 km, minor rest areas should be located at maximum intervals of 50 – 60 km, and truck parking bays should be located at maximum intervals of 30 – 40 km.

Implementation of the above recommendations will ensure uniform roadway geometric standards and hence the optimum balance between road infrastructure construction cost and road user cost will be obtained, considering road safety issues and natural and human environmental aspects in the EAC Region. Other impacts of the above harmonised regimes include improved efficiency of the road transport system by minimisation of road crashes and energy consumption. It should be noted that this study also revealed that the width, height, wheelbase and minimum turning radius dimensions of vehicles such as the 22 m Interlinks, which have recently been permitted to traverse EAC road network, conform to the respective dimensions of the design vehicles documented in the existing design manuals for EAC member countries and therefore will be accommodated by the existing intersections on the EAC road network. On the other hand, all countries will need to check whether headroom under bridge structures complies with the recommended value of 5.5 m and make improvements, if necessary. Additionally, it is proposed that the recommended standards be implemented in all new road designs, and road rehabilitation, reconstruction and widening projects.

Harmonisation of road pavement and bridge design standards

This study found that Kenya, Tanzania and Uganda are using their own design standards which are empirical-based pavement design methods that use catalogues of pavement structures and standard material specifications. The design manuals refer to the prevailing conditions in the respective countries and reflect EAC member countries’ experience gained in road pavement design over the last 40 years. Burundi and Rwanda have been using French and American standards for pavement design.

French design standards employ mechanistic pavement models to calculate stresses and strains, and utilise laboratory-based tests results to define pavement failure. Likewise, the current AASHTO design guide depends heavily on the characterization of the fundamental engineering properties of paving materials. It requires a number of input data in four major categories: traffic, material characterization and properties, environmental influences, and pavement response and distress models. The guide accounts for the environmental conditions that may affect pavement responses which, in turn, are determined by mechanistic procedures.

The empirical-based methods for pavement design have served well for several decades; nevertheless, many serious limitations exist for their continued use as primary pavement design methods in the EAC Region. These include:

Traffic loading: The maximum number of design traffic that is specified in the design manuals for Kenya, Tanzania and Uganda are 60, 50 and 30 million ESAs, respectively. As a result, the consequences of increased/new loading conditions and the effects of tyre types such as super

single or wide-based tyres and pressures cannot be fully considered in the empirical-based design methods.

Material properties: Today, there exist many new materials e.g. hot mix asphalt mixtures and Portland cement concrete mixtures whose fundamental material properties cannot be fully considered by empirical-based design methods.

This study makes recommendations which can be categorised as short-term and long-term. Short-term measures include the adoption of the proposed harmonised climatic zones; design period; traffic loading; subgrade characterisation; pavement materials codes and properties; new pavement design and rehabilitation methods for the purpose of improving the existing empirically-based pavement design practices. The harmonised regimes are summarised below:

Climatic zones: The study recommends the adoption of three climatic zones namely; wet, moderate and dry zones. A dry zone is as an area in which the number of months per year with higher rainfall than evaporation is less than 1 month. A moderate zone is as an area in which the number of months per year with higher rainfall than evaporation is 1 to 3 months, whereas a wet zone is as an area in which there are more than 3 months per year with higher rainfall than evaporation.

Design period: A design period of 20 years is recommended for the design of new pavement or reconstruction of those that have reached the end of their design life.

Design Loading: For purposes of pavement design it is recommended that heavy goods vehicle be defined as vehicle having a registered un-laden weight of 3 tonnes. It is further recommended that heavy vehicles be classified as medium goods, heavy goods, very heavy goods, and buses having seating capacity of more than 24 including the driver. Where a Medium Goods Vehicle (MGV) covers small and medium sized trucks including tankers up to 7 tons load, Heavy Goods Vehicle (HGV) covers Trucks above 7 tons load, and Very Heavy Goods Vehicles (VHGV) are articulated trucks with trailer or semi-trailer and tanker trailers. For the determination of design traffic loading, the study recommends that a value of $n = 4.5$ be used as a relative damage exponent as it represents the worst case scenario.

Subgrade: The subgrade is the foundation of the pavement structure whose strength has a marked effect on the pavement thickness and performance. The study makes recommendations on a number of factors that influence subgrade strength as follows:

Design depth: It is recommended that depths of 0.8 m and 1.2 m should be adopted as subgrade design depths for normal traffic load categories and heavy traffic loading, respectively.

Centreline soil survey: The study recommends a minimum of 2 subgrade strength tests per km for class 1 and 2 mobility roads, a minimum of 1 subgrade strength test per km for other roads and a minimum of 1 subgrade strength test per 2 km for gravel roads.

Characterisation of subgrade strength design value: It is recommended that the adoption of the statistical approach to estimating subgrade design strength value for a section be used, which takes the 90%-ile strength test value for a homogeneous section as the design value.

Subgrade class and improved layers: There is variation in the grouping of subgrade classes and warrants for improved subgrade layers in the manuals used in Kenya, Tanzania and Uganda. It is therefore recommended that Subgrade design classes should be categorized into three classes: S3, S7 and S15 where S15 is natural soils with nominal CBR value of minimum 15, S7 is natural soils with nominal CBR value of minimum 7, and S3 is natural soils with nominal CBR value of minimum

3. Improved subgrade layers should only be applied where subgrade strength values are S3 and S7.

Pavement Rehabilitation Design: The study recommends the adoption of the following methods: maximum deflection, structural number and mechanistic. The transient deflection method should be used where the existing pavement or overlay was constructed less than 3 years before the measurements, the deflection recovery (rebound) method can otherwise be used. The maximum deflection method should not be used as the only rehabilitation design method, but only to supplement other methods in a multi-analysis approach and should not be used unless all the following conditions prevail:

- distress originates from the subgrade, and
- the base course in existing pavement is a granular or lightly cemented type, i.e. not cement stabilised (extensively cracked cemented layers may be classified as granular layers), and
- there is remaining structural life in the existing pavement, and
- future design traffic is less than 10 million ESA.

The use of structural number method is based on empirical correlation between tested material properties and expected pavement performance. Laboratory tests and in-situ measurements are required to determine material strength, expressed as the material coefficient.

The South African mechanistic design should be used where a mechanistic method is applied. It should only be applied if the following information about the existing pavement is gathered:

- pavement type (test pit log and laboratory tests)
- pavement state (surface deflections: stiff/flexible)
- layer state (test pits: wet/dry/cracked)
- layer thickness (test pit log)
- layer moduli (laboratory tests)

Rigid Pavements: Taking into account the special advantages of concrete pavement, the study proposes that concrete pavements should be used on all heavily trafficked interurban and urban roads in the EAC Region. Further, it is recommended to adopt the Uganda Road Design Manual Volume 3 Part II: Rigid Pavement of 2010.

Super Singles: The study recommends that the use of super single tyres of 385 mm and conventional tyres of 315 mm as single tyres on legal axles and axle units should be banned forthwith from use in the EAC Region.

For the long term, the study recommends the adoption of the analytical pavement design method for the EAC Region. Application of the analytical approach should be based on experience, theory of pavement structures and materials behaviour. It should take into account climate, traffic, locally available materials, and other relevant factors. With such a method it will be possible to carry out structural analysis of pavements and predict their performance from the calculated parameters. However, in order for such a method to be successful attention should be paid to the methods of characterisation of the pavement layers and subgrade to meet the requirements of a theoretical models, calculation of parameters considered to have a primary influence on selected aspects of pavement performance and utilisation of these parameters in performance models to evaluate the structural adequacy of the pavement under consideration.

Bridge Design Standards: In recommending the increase in GVM, the PADECO Report assumed the use of British Standards (BS) for bridge design in the EAC Region. However, the continued application of BS which is superseded by the European Standards (EN Series) in the EAC member

countries will pose additional problems as BS becomes redundant. This study therefore recommends that EAC member countries should use Euro code 1, Part 2 final draft prEN 1991 - 2. Actions on structures - Part 2: Traffic loading on bridges. In the longer term, however, it will be desirable for the EAC Region to develop its own Bridge Design Standards.

The impacts of harmonising pavement and bridge design standards include the provision of suitable pavement structures that will meet functional and structural performance criteria through the service life of the pavement, and uniform and comfortable riding surfaces to all road users thus resulting in the provision of the same quality of service throughout the region.

Harmonisation of Specifications for Road and Bridge Works

The selection of materials for a road pavement design is based on a combination of availability of suitable materials, environmental considerations, method of construction, economics and previous experience. These factors need to be evaluated during the design in order to select the materials that best suit the conditions.

A review of the practice in the EAC Region revealed a number of areas of commonality as well as areas which are unique to particular countries. It was found that the specifications have particular reference to the prevailing conditions and reflect the EAC member countries' experience gained in road pavement design and construction. Generally, revision of a design manual and specifications is only possible when new technical information and performance data become available.

This study has outlined recommendations concerning potential areas for harmonisation and improvement on the existing specifications which are used by current empirical-based pavement design methods. Thus, the recommendations given cover requirements and specifications for earthworks and major materials. The materials are classified under the appropriate material codes according to their fundamental behaviour, into various categories with different classes according to their strength characteristics. They include natural materials, stabilised materials, crushed aggregate materials, and bituminous materials and seals.

The following materials codes are recommended for use by all member states; G15, G7, G3 and geo-textile and/or rock fill (DR) materials for earthworks; GW, G80, G60, G45, and G30 as natural gravel materials for pavement layers; CM, C0.7, C1.0, C1.5, C2 for stabilised pavement layers; CRS and CRR crushed aggregate for base course; AC20, AC14, AC10, DBM40, DBM30, LAMBS, FBMIX, BEMIX, PM80, PM60, PM30 for bituminous base course and asphalt concrete surfacing; as well as ST for surface dressing.

It can be stated that through harmonisation of specifications for road and bridge works optimum balance between road construction costs, , properties of availability materials, environmental considerations, construction method, and previous experience of the performance of materials under consideration can be achieved during materials selection and design for roadworks.

Harmonisation of Road and Bridge Maintenance Standards

The study also deals with a review of the existing road and bridge maintenance manuals with the aim of identifying areas for harmonisation and improvement in the EAC member states. The review was based on best practice and the strategy advocated for effective road and bridge maintenance management. The strategy comprises a management cycle, within which there is a requirement for management information system. Components considered in this cycle include setting up a policy framework which clearly defines the aims and objectives of highway management. The policy

framework is followed by defining standards for intervention on which the assessment of maintenance needs is based. Thereafter, the allocation of available resources is made in a systematic and equitable way in order to obtain the best value for money. This calls for the use of proper road and bridge maintenance managements systems. The implementation in terms of proper procurement procedures and supervision of works is another important component of the maintenance management cycle. Finally, performance monitoring and evaluation to assess the achievements is essential for subsequent revision and improvement of the entire system. It was found that road and bridge maintenance policies in all member states do not reflect road user needs in terms of defining clearly the level of service and economic benefits to be provided to road users. In this regard, the first step towards implementing the recommendations is to re-define the policy framework. This would require member states to commit themselves and spend time and resources to go through the process of reviewing the road and bridge maintenance policies.

This study recommends that the EAC member states carry out further evaluation of TANROADS Road Maintenance Management System (RMMS) and Bridge Management System for Tanzania (BMST) for possible improvement and adaptation. The review revealed that these two systems are operational at a very advanced stage. In addition, it is proposed that member states carry out detailed evaluation for subsequent improvement and adaptation of computerised road and bridge maintenance management systems. However, experience from elsewhere of implementing computerised systems suggests that not only are more staff required, but the required staff need skills that are not traditionally found within the implementing road agencies. In this case, road agencies in member states shall have to allocate more resources for staff recruitment, training and retraining. Other extra costs required for the implementation of the given recommendations include those for collection and updating of relevant data accompanied with procurement of required equipment. This might impact on other activities which are competing for the same resources.

Some of the benefits of implementing the above recommendations include improved asset management, improved contract and cost control, acquisition of better management information, uniform and consistent level of service and economic benefits across EAC member states.

Harmonisation of Road Signs, Traffic Signals and Markings

This section addresses the harmonisation of road signs, traffic signals and markings. For the purpose of this section traffic signs include road signs, traffic signals and markings which may collectively referred to as traffic control devices (TCD). A review of the existing and proposed legislations and manuals within the member states was carried out and compared with the best practices including the SADC Road Traffic Signs Manual. International conventions provide a framework for traffic signs and each Partner State has adopted a set of traffic signs to meet their current needs through their traffic law and/or traffic signs manual. Traffic signs regulations and manuals keep evolving to meet the needs of the travelling public. The harmonization of traffic signs in the EAC is essential to the safety and convenience of the public travelling on the road networks whether for trade, tourism, education or other purposes.

The main recommendation of this study in this area is to integrate the existing road traffic signs and road marking schedules of the member states and to adopt an all-white pavement marking system. To overcome the problem of vandalism the study recommends adoption of Full Fibreglass Traffic Signs System which has been demonstrated to be cheaper, durable, costs less in maintenance and have zero re-sale value in best practice countries. It is further recommended that each Partner State

develop and publish its road traffic signs manual to facilitate the harmonization of the more technical aspects of road signing as detailed in Annex A.

A prudent implementation of approved changes over a ten year period is recommended under budgetary constraints. The harmonized signing and design principles should be applied on all new and rehabilitation projects and in the course of maintenance of road signs. No special budget will be required if this approach is adopted. However, it is desirable to mobilize funds and implement posting speed limits on all paved rural roads and apply an all-white pavement marking to accelerate achievement of road safety benefits to quickly match practice with the provisions of the law.

There are no major differences in the regulations for operation of traffic signals in the member states. The meaning of the lights and sequencing are generally consistent and road users can quickly adapt to the slight differences that exist. However, de-legalizing of traffic signals based on only the red and green light (two lights system) allowed under the laws of Burundi and Rwanda but not practiced is desirable. The installation of two sets of signal heads per approach, one set on the near side of the approach and the other set at the far side of the approach is desirable especially on arterial road junctions. It is of utmost importance that junctions with similar traffic conditions be controlled in a uniform manner in the interest of consistency and developing respect for traffic signs. Signals should therefore be installed where an engineering study confirms that their installation is warranted. The process should be guided by competent professionals on the basis of current best practices preferably the guidance provided in SADC - Road Traffic Signs Manual. The practice of traffic police overriding control of traffic light signals should be strongly discouraged as it is serious health hazard.

The practice of developing school route plan, defining school zones and the necessary traffic signing around schools both in urban and rural areas is recommended for adoption by member states as means of providing for safety and convenience of school children when walking to school within school zones. The needs of physically challenged road users should also be provided through installation of appropriate warning signs when warranted and road design. Installation of blinking lights at pedestrian crossings on roads with heavy traffic and on hazardous road locations is recommended.

The EAC economies are among the fastest growing in Africa and soon some of the regional routes will have enough traffic to justify upgrading to freeway roadways. It is therefore recommend that the signing for freeways adopt the SADC-RTSM code and standards.

The adoption of the proposed sign shape and colour code will affect member states to different extents due to the slight differences in the current practice. This is reflected in the Table 16 of the respective chapter in Annex A presenting the status of the member states and actions they need to take upon the approval of the study's recommendations. Since only few signs will need to be replaced in the regulatory and warning groups (no parking, no stopping) and change in colour code is only for the guidance and information signs which are generally rarely installed, it is recommended that the change be implemented gradually. However, implementation for speed limit signs on all roads should be done according to the road map below to allow early realization of the expected safety benefits.

The proposed change to all-white pavement markings may cost the member states up to 828 million US Dollars if all paved roads are paved according to the recommended markings during the year 2014. The estimate is based on assumption that durable materials 5 to 10 mm thick and 100 mm wide lines shall be applied along the centreline and edge lines, remarking of all zebra crossings and lane delineation on all multilane roads at a rate of 4 to 6 US \$ per linear metre. If the project is

limited to replacing the yellow pavement marking lines only the estimated cost may be reduced to about US Dollars 340 million. However, it is to be noted that signing and marking of roads is generally poor across the member states and every effort should be made to secure the necessary funds not only for the pavement markings but also for widespread application of guidance and information signs to cater for convenient movement of people.

The study recommends the following roadmap for the implementation of the harmonisation and improvements in road signing and pavement marking system:

- Member states amend their regulations to conform with harmonization recommendations within one year,
- Each member state to develop and publish its road traffic signs manual and to up-date it's Highway Code according to the harmonized road traffic signs, markings and signals within two years.
- Member states implement all-white pavement marking system within two years. Funding for this activity should be coordinated through the EAC for effective, coordinated implementation. Implementation over a longer period may be considered on the grounds of the significant financial implication. In this case all-white pavement markings should be applied on all new projects and during scheduled repainting on existing roadways. However, this option will delay the achievement of the safety benefits.
- The harmonized signs and installation speed limit signs at the beginning of each road and at intervals of ten to fifteen kilometres along all paved roads within five years, and
- Each member state to ensure that training of drivers is done using the approved road signs schedule and an effective awareness campaign to inform road users regarding the changes is effectively implemented immediately after the amendment of the regulations.

The five year period for installation of retro-reflective signs and speed limit signs is adopted as part of the implementation of the UN Decade of Action for Road Safety (addressing the safer roads component) adapted in the framework for the development of the East African Road Safety Master Plan presented in Annex D. Member states should be allowed to maintain in their regulations road signs peculiar to their own country's usage and most appropriate language provided that such signs shall not constitute violation of the harmonized schedules. Areas recognized and preserved as historical/heritage sites e.g. Mji Mkongwe – Zanzibar should be exempt from all proposed changes.

Harmonisation of Vehicle Safety and Fitness

In all the EAC countries vehicle safety standards are captured in respective Road Transport and Road Traffic Acts. The Acts specify vehicle safety standards requirements and inspections that the authorities have to observe during the initial registration, road licensing, and operators licensing. However, the degrees of implementation and enforcement differ from country to country. In general the challenges facing most of the EAC countries are:

- *inadequate infrastructure and facilities to conduct technical inspections.*
- *lack of equipment and qualified personnel to conduct technical inspection.*
- *inadequate enforcement of mandatory technical inspections.*
- *rampant malpractices and corruption which hamper the effectiveness of the efforts that the governments are trying to institute.*

To reduce accidents caused by maintenance-related component and system failures this study recommends that all vehicles using public roads including government and military vehicles undergo

a mandatory PMVI. The vehicle categories for PMVI and the corresponding inspection frequency are shown in Table E12.

Table E12: Vehicle categories for PMVI and inspection frequency

	Vehicle category	Initial PMVI (since new)	Frequency (months)
	Private light vehicles (GVM < 3500 kg)	2 years	12months
	Passenger service vehicles (PSV < 8 people)	1 year	6 months
	Passenger service vehicles (PSV > 8 people)	1 year	6 months
	Commercial trucks (<3.5 tonne) and HGV (>3.5 Tonnes)	1 year	6 months
	Trailers	1 year	6 months
	Motorcycles and three-wheelers (private)	2 years	12 months
	Motorcycles and three-wheelers (taxi)	1year	6 months

It is further recommended that vehicles which pass the PMVI should be given a certificate and a sticker. The certificate should be put in the vehicle with other vehicle documents for police to inspect if needed at any time. The sticker should be placed at a prominent place, and should show: the vehicle registration number; the date when the next inspection is due and a code identifying the centre which the inspection was conducted. Vehicles which fail the PMVI should be allowed to rectify the problem and report back for re-inspection of the faulty item within two weeks. It is proposed that 20% of inspection fee should be charged for re-inspection. Full inspection should be conducted if the vehicle is not taken back for re-inspection within two weeks, in which case full inspection fee should be charged.

Vehicle systems and items that increase the likelihood of accident when they fail and those which increase the severity of casualties after the accident are the target for the recommended PMVI scheme. It is recommended that systems/items that cannot be visually inspected to assess their condition be tested by either special equipment which have been developed to internationally recognized standards specifically for that task, or by test driving the vehicle. Such systems/items should not be dismantled for the purpose of technical inspection. The full recommended groups of items for safety for the PMVI are:

- Group I: Vehicle documents and identification
- Group II: Items which affect control of vehicle (brakes, wheels and tyres, steering system, suspension system, driver seat)
- Group III: Items which impair driver view of the road: (windscreen, wipers and wiper washer, side and rear view mirrors, headlights and spotlights alignment)
- Group IV: Items which reduce visibility of the vehicle: (lights, reflectors, horn)
- Group V: Items which impairs built-in occupant protection: (seats and seat belts, body structure, doors, floor and steps)
- Group VI: Items which intrudes other road users safety: (oil leaks, noise, excessive smoke, sharp protrusions, mud guards)
- Group VII: Items which increase risk of further injuries after accident: (emergency exit, fuel system, battery security)
- Group VIII: Extra safety items for HGV and Trailers: (rear under run protection, cab mounting, trailer couplings, turntable and king pin, trailer parking brake, trailer lights and reflectors, twist-locks for securing containers)
- Group IX: Uncertified modifications: Any modification which falls into any of the I-VIII groups above such as:

This study has also recommended the minimum environment standards at the time of PMVI.

It is recommended that the operation of inspection facilities should be carried out by a private company and closely monitored by Government. The vehicle inspection quality and performance also need to be continuously monitored and the degree to which performance targets are met be assessed. Inspection frequency, fleet size and length of inspection should determine the number of testing facilities and minimum staffing requirements. Inspection manuals showing all the PMVI procedures and the pass/fail criteria for each item be developed before the exercise of inspection is established. The manuals should be accessible to the public to increase public confidence and transparency on the inspection scheme, as well as inform drivers and fleet operators on standards they are supposed to meet. Likewise, the inspection centers should be regulated and randomly audited in terms of inspection procedures and accuracy of equipment. The scheme should be designed in such a way that it would reduce opportunities for corrupt practices among vehicle inspectors.

The study further recommend that inspection staff attend a specialized course on vehicle technical inspection, and should be qualified to a specified standard of technical ability necessary in vehicle inspection. As such there is a need to develop a training curriculum on vehicle inspection covering technical inspection procedures, standards and specifications for vehicle safety items and systems, testing equipment, administration, and quality control. The pre-requisite for a vehicle inspector candidate should be a technician level in auto-mechanics or degree level in mechanical engineering.

Some of the proposed recommendations require immediate implementation and are pre-requisites for kicking-off the harmonization process for the PMVI in EAC member states. In that respect, the following need immediate action and have to be implemented as soon as possible:

Changes on Institution framework: The first major change is on the institution framework in each EAC member state. In this case the operation of PMVI scheme should be under the Government Regulatory agency for surface transport which will license the private operators and ensure vehicle inspection quality and performance of the PMVI scheme and operators.

Development of Training Curriculum for vehicle Inspectors: A training course on vehicle technical inspection should be designed as soon as possible to enable training of vehicle inspectors. The course should be hosted in an accredited technical institute and qualified candidates should be awarded certificates as Qualified Vehicle Inspectors. The curriculum for the course should be common throughout the EAC member states.

Training of Motor Vehicle Inspectors: Qualified personnel to a set standard of technical ability need to be trained in each country. Qualified inspectors are necessary in the PMVI scheme in order to make judgmental decisions on pass/fail criteria for items which are visually inspected. The pre-requisite for a vehicle inspector candidate must be a technician level in auto mechanics or degree level in mechanical engineering.

Development of Inspection Manuals: Inspection manuals showing all the PMVI procedures and the pass/fail criteria for each item should be developed before the exercise of inspection is established. The manuals should be accessible to the public to increase public confidence and transparency on the inspection scheme and to inform the drivers and fleet operators the standards they are supposed to meet.

Identification of Private PMVI Operators: Private operators of the PMVI facilities in each EAC member state should be identified as soon as possible to give adequate time for the private operators to establish facilities, equipment, personnel, and to prepare for the task. The PMVI facility

can be owned by the government, but as recommended it has to be operated by a private company. or a private company own and also operate the inspection facility. In both cases the government should ensure that the premises for the inspection and certification of vehicles have area which enables a safe and thorough inspection of vehicles of allocated categories, qualified personnel, and equipment which meet certified standards for the task. The government should monitor the performance of all operators and check on the quality of inspection and inspection facilities.

Harmonisation of Driver Testing Manual

The five EAC member states, Kenya, Uganda, Tanzania, Rwanda and Burundi had agreed to standardize road transport laws and regulations in the EAC in order to improve the efficiency of domestic, transit and cross-border road traffic. One of the things to be improved as part of this drive is the harmonisation of driver training and testing. Current shortfalls in the training systems around the world and in the EAC member states identified by the study include:

- Training mostly geared towards the passing of the driving test, rather than on producing safe and competent drivers.
- Defensive driving training and hazard perception skills, as an accident prevention strategy is not taught adequately.
- Most driving courses train basic vehicle handling skills and traffic codes and do not train new drivers on environmental factors that affect driving, complex perceptual skills to avoid risky driving situations, driver impairments, how to handle emergency situations, personal readiness and self awareness.
- In most driver training courses training instructors do not ensure that learners not only learn the rules, but also understand the reasons behind the rules.
- Good quality training of instructors is not emphasized.
- Quality control of instructors and driving schools is not adequate.

This study recommends the driver training syllabus and testing structures in EAC Countries for riders of motorcycles (capacity < 125 cc), and drivers for light vehicles (GVM < 3500 kg), Heavy Goods Vehicle (GVM > 3500 kg), and Passenger Service Vehicles (PSV).

Some of the proposed recommendations require immediate implementation and are pre-requisites for kicking-off the harmonization process in driver training and testing in EAC member states. In that respect, the following need immediate action and have to be implemented as soon as possible:

- Transfer the function of driver testing and licensing from law enforcement and tax collection institutions to an agency under the Ministry responsible for Transport.
- Development of Training Curriculum for Driver Trainers: A course on training of trainers should be designed to enable training of instructors. The course should be hosted in an accredited institute and qualified trainers should be awarded certificates as Qualified Driving Instructors. The curriculum for the course should be common throughout the EAC member states.
- Development of Training Curriculum for Driving Examiners: A course on training of driver examiners should be designed to enable training of instructors. The course should be hosted in an accredited institute and qualified examiners should be awarded certificates as Qualified Driver Examiners. The curriculum for the course should be common throughout the EAC member states.
- Training of Driver Trainers: All driving instructors should be trained and qualified as driving instructor and should be centrally registered by a recognized government authority.

- Training of Driving Examiners: All driving examiners should be properly trained and all examiners to be subjected to the same training.

Harmonisation of Vehicle Dimensions and Combinations

Standards and regulations on vehicle dimensions and combinations are essential from the safety aspects of vehicle and of other road users. It is important to ensure that characteristics of all vehicles using public roads are compatible with the geometric design of the road network. Non-regulated standards within a country or between countries which have cross-border freight transport are a potential hazard for safety of the vehicles, road infrastructure, and all road users.

COMESA, EAC and SADC have also started the process of harmonization of vehicle dimensions and have agreed on maximum vehicle dimensions, in terms of height, width and length of vehicles. In principle tripartite partner states have agreed to these vehicle dimensions limits at the regional level. However, few countries have passed national legislations to enforce these changes. The recommended standards and regulations for EAC in this report do not only look within EAC countries but form an integral part of a tripartite process of harmonization of transportation instruments.

Standards which are recommended for harmonization include:

- **Vehicle main dimensions:** overall length, width, and height for a rigid single vehicle (including trailer), articulate vehicle (or truck tractor), and for (any) combination of vehicles
- **Vehicle control dimension:** Minimum turning radius, wheelbase, front and rear overhangs, and maximum projections of carried loads at front and rear, and at the sides of the vehicle
- **Warning requirements for projecting loads**
- **Restrictions on vehicle combinations**
- **Vehicles exempted from the provisions** and their regulations when using public roads: These include agricultural and construction machinery.

Table E13 shows the existing vehicle dimensions standards in the EAC countries and the respective recommended standards for harmonization.

Table E13: Existing and recommended vehicle dimensions

Standard	Existing	Recommended
Maximum overall length of vehicles (m)	<u>Single Unit Vehicle (SU)</u> Tanzania (12.5), Kenya (11.0), Uganda (12.5), Rwanda (11.0), Burundi (12.0), Zanzibar (12.5)	12.5
	<u>Articulated Vehicle(semi-trailer & SU + trailer)</u> Tanzania (17.0), Kenya (17.4), Uganda (17.0), Rwanda (17.4), Burundi (17.4), Zanzibar (17.0)	17.4
	<u>Combination Vehicles (Interlinks)</u> Tanzania (22.0), Kenya (22.0), Uganda (22.0), Rwanda (18.0), Burundi (18.0), Zanzibar (22.0)	22.0
Maximum overall width of vehicles (m)	<u>Bus (wheel track >1.9 m) and Goods Vehicle</u> Tanzania (2.6), Zanzibar (2.6) <u>Refrigerated Truck</u> Burundi (2.65) <u>Any Other Vehicle</u> Tanzania (2.6), Kenya (2.65), Uganda (2.5), Rwanda (2.65), Burundi (2.5), Zanzibar (2.6)	2.65

Maximum overall height (m)	<u>Any Vehicle</u> Tanzania (4.6), Kenya (4.2), Uganda (4.0), Rwanda (4.2), Burundi (4.2), Zanzibar (4.6)	4.6
Minimum Turning Radius (m)	<u>Any Other Vehicle</u> Tanzania (12.65), Zanzibar (12.65) Kenya (12.5)	12.65
Maximum Wheel Base (m)	<u>Semi-trailer</u> Tanzania (10.0), Zanzibar (10.0)	10.0
	<u>Any Other Vehicle</u> Tanzania (8.5), Zanzibar (8.5)	8.5
Maximum Front Overhang (m)	<u>Semi-Trailer</u> Tanzania (1.8), Zanzibar (1.8)	1.8
	<u>Any Other Vehicle</u> ¹ Tanzania and Zanzibar [(smaller of 60% of WB or 5.8 – (0.5xWB))]; Kenya (= 60% of WB); Rwanda (smaller of 2.7m or 55% of WB) Where: WB = Wheel base	Small of 60% of WB or 5.8 – (0.5xWB))
Maximum Rear Overhang (m)	<u>Any Other Vehicle</u> Tanzania and Zanzibar (60% of WB) Kenya (60% of WB) Rwanda (smaller of 3.5 m or 0.65 x WB)	60% of WB
	² <u>Trailer</u> Tanzania and Zanzibar (50% of trailer body)	50% of trailer body
Projecting load limits (front and rear)	<u>Bus and Goods Vehicle</u> Tanzania (1.3), Zanzibar (1.30) <u>Any Other Vehicle</u> Tanzania (1.25), Kenya (1.8), Uganda (1.25), Rwanda (2.7F, 3.5R), Burundi (-), Zanzibar (1.25)	1.25
Projecting load limits (sides)	Tanzania (0.15), Kenya (0.15), Uganda (0.15), Rwanda (-), Burundi (-), Zanzibar (0.15)	0.15

¹Except semi-trailer or trailer with one axle or one axle unit

²Trailer other than semi-trailer with single axle or two axles with axle distance < 1.2m

On the warning requirements for protruding loads carried by a vehicle to warn other road users the study is recommending adopting the SADC regulations which was developed for use in its partner states. The SADC regulation is detailed, easier to apply and is much safer compared to the regulations which are used in the EAC countries. Tanzania and Zanzibar being members of SADC have already adopted the SADC regulation. It therefore recommended that this provision be adopted as the EAC standard.

SADC have also developed regulations on restrictions of certain combinations of vehicles to be used in the member states and the same regulations are in the ongoing process to be harmonized in the entire EAC-SADC-COMESA Region. In this regard it is also recommended to adopt the SADC regulation on restrictions on vehicle combinations. Furthermore, the Study conducted by PADECOⁱ offered recommendations to consider technological advances on vehicle combination such as *interlinks* which are widely used in some Southern African SADC countries and include them in the current regulations in EAC countries, provided the combination do not exceed dimensional, load or manoeuvrability limits.

The *interlink vehicle combinations* have two significant advantages over the equivalent 56-ton truck and trailer combination due to their two rotating connections being further apart, firstly they are more stable on the road and therefore improve road safety. And secondly, they are flexible and convenient because they can be unhooked and pre-loaded, and one tractor can operate several semi-trailers and therefore fleet utilization can be improved, whereas, the drawing vehicle in a truck-trailer combination cannot be utilized in such a manner.

Harmonisation of transportation of abnormal, awkward and hazardous loads

The review carried out showed that there are no existing standards within the EAC although there have been efforts towards this direction in SADC and COMESA. Draft concepts have been developed on the standards based on the South African existing standards. It was also found that there is no policy framework for treating the transportation of these goods within the EAC Region. However, due to the tripartite collaboration between the EAC, SADC and COMESA, there is a need for the EAC to harmonize standards for transportation of abnormal and awkward loads in line with the current harmonisation framework by SADC and COMESA, which formed the basis for the harmonisation by this study.

Review of the EAC member states policies, regulations and procedures for the conveyance of abnormal loads and dangerous goods shows variations in both policies and practices. The classification of such goods in terms of type, hazardousness and abnormality also differ. During the course of this task this study became aware of the SADC and COMESA harmonization processes in road transport infrastructure standards and institution arrangements in a number of areas including conveyance of abnormal and dangerous goods which started in 2010.

With the objective of speeding harmonization process in the three RECs and the fact that SADC and later COMESA/EAC/SADC Task force has already put substantial efforts to develop the same regulations this study recommends the adoption of the COMESA/EAC/SADC Draft Proposals on:

- Standards for the Conveyance of Abnormal Loads, and
- Administrative Guidelines for Granting of Exemption Permits for the Conveyance of Abnormal Loads
- COMESA/EAC/SADC Dangerous Goods Legislation

Dangerous chemicals and products are traded throughout the World by land, sea, and air transportation systems. It is important that classification, general packing requirements, marking, labelling, etc should not only comply with the regulations within a certain region by land transport, but globally and by all modes of transportation. The UN recognized that with different regulations in every country and for different modes of transport, international trade in chemicals and dangerous products would be seriously impeded, if not made impossible and unsafe. The UN Sub-Committee of Experts on the Transport of Dangerous Goods (UNSCETDG) is responsible for the *UN Recommendations on the Transport of Dangerous Goods - Model Regulation*, which are internationally accepted as the principal technical standards underpinning the air and sea dangerous goods codes, and are also used by many countries as the basis for their road and rail dangerous goods transport codes. *The UN Model Recommendations on Transportation of Dangerous Goods* is used by many countries around the world. The tripartite Task Force is currently preparing the administrative guidelines for the transportation of dangerous goods in the COMESA-EAC-SADC region.

Amongst other aspects, the Model Regulations cover principles of classification and definition of classes, listing of the principal dangerous goods, general packing requirements, testing procedures, marking, labelling or placarding, and transport documents. There are, in addition, special requirements related to particular classes of goods. With this system of classification, carriers, consignors and inspecting authorities will benefit from simplified transport, handling and control and from a reduction in time-consuming formalities. In general, their task will be facilitated and obstacles to the international transport of such goods reduced accordingly.

This study therefore recommends using UN recommended guidelines for harmonisation on transportation of dangerous goods in EAC countries. The tripartite Task Force has also recommended using UN Recommendations for the three RECs. The tripartite Task Force are preparing the administrative guidelines for the transportation of dangerous goods, which this study has also recommended to adopt.

In the last meeting at Kigali the Working Group recommended to engage a Consultant to develop a single regional permit (multi-country) with a clear institutional framework and approach for the purpose of issuing Abnormal Load permits. It was recommended that the study to develop single permit should include formula and methods of sharing of permit fees (between countries), route inspections and escorts required. The study should also develop a harmonised methodology for determining Load Equivalency Factors (LEFs) for determining mass fees for Abnormal Loads.

Harmonisation of Environmental Regulations and Standards

EAC members stated signed a protocol on Environment and Natural Resources Management in 2006 aimed at promoting the sustainable development and utilisation of their environment and natural resources. Negative environmental and socio-economic impacts resulting from road projects development include the loss of biodiversity, land degradation, involuntary resettlement, unintended induced development, deforestation, pollution of air, water and soil; road safety and human health problems. In order to minimise these impacts the planning, design, construction, operation and maintenance of road projects have to meet environmental regulations and standards.

All the five member states of the EAC have enacted framework legislation for the environment with Kenya, Tanzania and Uganda having similar environmental policies and framework laws. Rwanda's environmental policy is slightly different and Burundi does not have an environmental policy document yet. As for legislation, Kenya has advanced positively by creating a special superior court to handle environmental cases and Tanzania, has passed an environmental legislation that specifically addresses the road sector. Overall, all member states have made efforts to adopt environmental policies and enact framework laws that are generally in conformity with the international environmental instruments which they have ratified or signed.

No member state has developed the minimum number of environmental standards applicable to road works as found from the literature. Table E14 shows the standards that each country has managed to develop, Burundi and Zanzibar still use international standards and guidelines.

Table E14: Environmental standards categories

Country	Standard Category
Tanzania	Air Quality; Vehicle emission; Water Quality; Effluents and receiving waters; Noise; Soil
Uganda	Discharge of Effluent or Wastewater into Water or on Land; Management of Ozone Depleting Substances and Products; Management of soil quality; Noise and Control; Water Quality
Kenya	Quality for Sources of Domestic Water; Effluent Discharge into the Environment; Effluent Discharge into Public Sewers; Fossil Fuel Emission Control; Noise and Excessive Vibration Pollution Control Standards; Air quality (in draft form)
Rwanda	Light pollution; Noise; Water quality; Soil quality; Effluent discharge; Air quality
Burundi and Zanzibar	International Standards;

With exception of Burundi and Zanzibar, other EAC member states, namely Tanzania, Uganda, Kenya and Rwanda have also developed EIA guidelines with Tanzania, Kenya and Uganda having EIA guidelines specific to the road sector, and Rwanda with EIA guidelines for any project. The EAC has so far harmonised the following standards that are applicable to the road sector;

Air quality (EAC 13.040); Air quality in general (EAC 13.040.01); EAC: Ambient atmosphere (13.040.20); Stationary source emissions (EAC 13.040.40); Transport exhaust emission (EAC 13.040.50); Other Standards related to air quality (EAC 13.040.90); Water Quality in general (EAC 13.060.01). This study has in addition harmonised three environmental standards namely; noise standards, soil quality standards and effluents and receiving waters standards. The recommended way forward in this area includes:

- i. Creation of an environmental police unit and superior environmental courts,
- ii. Develop environmental standards to cover all susceptible activities in the road sector including EIA and SIA manuals and standards,
- iii. Member states should adopt EAC environmental standards and EIA guidelines for shared ecosystems in EAC in areas where they have been prepared and harmonised.
- iv. There should be an enforcement plan to enforce the harmonised and developed environmental standards.

Harmonisation of Vehicle Registration and Licensing

A review of the legislation applicable in the member states shows that there are many areas of convergence, as well as areas of divergence. Areas of divergence call for improvement and harmonisation in order to remove the hurdles which interfere with a smooth flow of transport and road services in the Community. Some areas of convergence may also need to be improved upon in order to be in line with current developments in the sector.

Areas of convergence that need attention concern vehicle licensing and registration authorities and the age of motor vehicles at first registration. Currently it seems that in all member states vehicle registration has become a source of revenue collection and is no longer an economic and safety regulation issue. As a result, it is currently handled by the respective national revenue authorities. Another convergent issue concerns the cut-off age for registration of imported used as these vary from 7-10 years across member states.

Areas of divergence in motor vehicle registration include, number and mode of appointment of staff; classification of motor vehicles; age of the applicant for registration; registration of a jointly owned motor vehicle; procedures for registration where a vehicle changes ownership; and suspension or cancellation of registration.

In vehicle licensing there is divergence in, exemption from registration; exemption from registration of foreign motor vehicles and the amount and collection of licence fees.

In the area of motor vehicle operators' licensing there are two areas of divergence. The first area is that not all member states have established road regulatory agencies to oversee road transport operations. The second is that due to special circumstances public passenger transport services are still provided by the government in one of the member states. There is also still a need for improvement in some areas of convergence like the lack of domestication of regional agreements and the enforcement of the law regulating operators. The recommended way forward in this area includes:

- Registration and licensing of motor vehicles should be done by each member state based on common agreed criteria or parameters,
- Revenue authorities should be designated as revenue collecting centres while actual registration and licensing is done by Ministries of Transport on the basis of safety and economic considerations.
- There should be sharing of data on motor vehicle registration and licensing among the Partner States;
- in addition to other requirements, only environmentally sound motor vehicles not older than 8 years should be registered and licensed in the region;
- prohibit charging of permit fees for motor vehicles of one Partner State entering another Partner State so as to accommodate the spirit of the EAC Protocol on Common Market;
- For this purpose it is recommended to have an Act of the Community as an instrument for making operational the above recommendations. The proposed law should be a bare framework while further details shall be prescribed in Regulations made by the Council of Ministers or a Minister in charge of transport in a respective Partner State.

Harmonisation of Road Safety Laws and Regulations

The EAC member states have fairly comprehensive policies and legislation governing road safety, but with the exception of Rwanda the enforcement of road safety laws was found to be weak. The study found out that the institutional set-up for road safety activities was fragmented, and the coordination framework in the form of respective national road safety councils/commissions was basically not operational. Systematic enforcement of road safety laws and restructuring of the road safety institutional set-up as well as coordination of all road safety activities are therefore priority areas. Few elements of road safety laws require harmonization. These include speed limits, blood alcohol content (BAC) limits for pedestrians and drivers, safety gears for cyclists, safety gears for motorists, limitation on the use of mobile phones for all road users, vehicle inspection, driver testing and licensing, and requirements for road safety audit of proposed and existing roads.

A number of strategies, projects and actions to manage the risk factors that contribute to road traffic injury were identified. These are in the areas of user behaviour, road infrastructure and urban planning, rescue and rehabilitation of road traffic injury victims, and the safety of vehicles. The management of interventions to achieve the desired goals requires the establishment of an effective institutional set-up which was included as one of the strategies.

The projected reduction of losses due to road traffic crashes in 2022 is around US \$ 5 billion. To achieve these benefits an investment of at least US \$ 2 billion is required for the first five years.). During this foundation phase, proposed road safety budget allocations with the resulting reduction in fatalities across the member states should be as shown in Table E 15.

Table E15: Proposed road safety budget allocations

Country	Burundi	Kenya	Rwanda	Tanzania- Mainland	Tanzania- Zanzibar	Uganda	EAC	Total
Budget Mil. US \$	60	205	50	250	10	230	5	810
Reduc. in Fatalities	1,700	7,000	1,500	8,700	250	8,000	NA	27,150

Review of the HIV/AIDS situation confirmed the need to harmonize the interventions addressing the epidemic particularly with regard to the long distance truck drivers and the communities interacting with them along the road transport corridors. The proposed strategy capitalises on and integrates what is already in place and consolidates and harmonises the interventions across the member states. It aims to provide an effective, efficient and consistent mechanism to deal with the epidemic. A planning period of ten years from 2012 to 2022 is adopted and the delivery of results in a number of specific outcome areas is as detailed in Annex E.

The development of EAC Road Safety Master Plan is proposed with the following features:

- i. A long term vision of a road transport system with a negligible probability of being killed or seriously injured as a result of a road traffic crash,
- ii. A short term vision of halving the number of forecasted fatalities and serious injuries in 2022,
- iii. A fifteen-year planning horizon divided into five-year phases: the foundation, the growth and the consolidation phases,
- iv. A foundation phase that focuses on a 20 percent reduction in the forecasted fatalities, an institutional setup to deliver effectively the road safety management functions and laying a foundation for all the elements of an effective road safety management system,
- v. A growth phase during which the applications of interventions are extended to the road network carrying 80 percent of the national traffic,
- vi. A consolidation phase during which interventions are applied on the entire road network and the national targets are devolved to the local level.

Harmonisation of Overload Control

The treaty for the EAC implores the member states to move towards harmonization of their regulations on overload control and weighbridges. To this end, the EAC Secretariat commissioned a study which came up with proposals for harmonisation of overload control in the form of a draft Act of the EAC legislature which was approved in a stakeholders' meeting in August 2011. This study has come up with the following; a common training curriculum for weighbridge personnel; uniform weighbridge printout certificates, and overload reporting formats across the EAC Region; a framework for interconnection of weighbridges in the Region with a regional data centre for monitoring the performance of weighbridges and storage of data. The additional input and recommendations resulting from this study have now been incorporated in the draft Act which was approved by the Council of Ministers in February 2012.

With regard to training curriculum, the consultant has grouped the range of skills needed for efficient and effective management of modern weighbridges as follow: transport environment; data management; legislation and regulations; weighbridge equipment; weighing operations; software operation; management reporting; staff management; operations management; maintenance management; and safety. The practical training component should be included in the proposed training curriculum, and should be taken after the theoretical part of the training is completed. The practical training should be conducted at Categories A or B Traffic Management Centres (weighbridge stations). Due to the multi-disciplinary nature of the weighbridge operations, the staff

should be categorized and trainees should attend modules which are only relevant to their professions and positions at the weighbridge stations.

Participants in the trainings must be employees of the road authorities from the respective EAC countries who are directly dealing with overload control. As such, each country has to ensure that it employs appropriate personnel for the various positions in the weighbridge station, and other staff who are dealing with overload control. In addition to that, participants in the trainings must possess at least a Certificate in Advanced Level Secondary School and be able to communicate in English. The proposed training syllabus is divided into nine modules as indicated in section 6.3 of the report, and the proposed training duration is four weeks.

With regard to management and operation of weighbridges, the Consultant is recommending a robust data management system and suggests the following; a list of the minimum information to be collected at each station, data verification system; weighbridge printout certificates and the format for overload control reports. With regard to weighbridge interconnectivity, the Consultant is recommending that only electronic weighbridges in the form of axle-unit or multi-deck weighbridges should be used for overload control along the EAC road corridors. The number and location of weighbridges as well as the type of information to be shared in the EAC Overload Control Management System have been identified. The mode of interconnection, the ICT platform, and the system for data capture and storage are also recommended.

The consultant finally recommends a legal instrument in the form of a regional Act along the lines of the draft EAC Vehicle Load Control Bill (2012).

Harmonisation of Transport Legal and Institutional Framework

The road transport legal framework is dictated, to a large extent, by the relevant transport policy of a given country. To guide improvement in transport service regulation, such a policy statement should endorse the primary role of market forces in determining price and service levels, with the role of government limited to ensuring that competitive conditions prevail, and that safety and environmental considerations are met. The four broad areas in which legislation is needed in road transport are; (i) road infrastructure, (ii) road traffic, (iii) vehicle and driver licensing, and (iv) road transport licensing & management.

The essential principles of road transport institutions include (i) good governance, (ii) separation of functions, (iii) system coherence and (iv) sector coordination. In addition to these principles, it is important that there should be a minimum overlap of duties between organizations and cost-effective methods should be used to carry out responsibilities. As a result, the transport sector has three main institutional types, namely; policy and legal institutions represented by the ministry of transport; regulatory/executive institutions represented by modal transport administrations/agencies, and finally institutions that provide transport services represented by transport service enterprises.

A review of the legal frameworks of the EAC states revealed that the framework laws in the road infrastructure areas are, to a large, extent similar. However, a number of areas in the legal framework still need to be harmonised as indicated below.

The framework laws in the road infrastructure areas are to a large extent already in harmony. All the EAC member states have created legal frameworks for the management and financing of roads with regard to maintenance and development activities. However, the legal framework in the areas of infrastructure, traffic regulations, safety enforcement, and vehicle registration and licensing need further harmonisation as follows;

- i. **Road Infrastructure;** road acts, **road** fund acts, axle load & maximum weights and private sector participation.
- ii. **Traffic Regulation and Safety enforcement:** maximum speed: driving on public roads, road signs, public transport and vehicle inspection.
- iii. **Vehicle registration and Licensing:** operator and driver licensing: road transport sector regulation, domestication of the provisions of the regional agreements, uniform system of registering and licensing of motor vehicles.

The institutional arrangements for road transport in the five member states are quite diverse as they serve different transport policies. There is a need for harmonisation, first to meet internal needs of the respective national transport policies, and also needs of the Region. The following aspects of road transport institutional framework need to be harmonised: separation of functions, road transport sector planning and coordination, separation of regulation and enforcement functions, creation of an organisation for regulatory impact analysis, road development and maintenance and road transport services. There is a need to create organisations in each member state to handle issues related to the level of service for public transport. Such organisations should define and outline ways to maintain Service Quality Levels concerning issues such as bus bodies, journey speed, headway of public transport vehicles and so forth.

1 INTRODUCTION

1.1 Background

This project is based on the contract signed on the 29th April 2010 between the East African Community and the Bureau for Industrial Cooperation (BICO) for provision of consultancy service for the preparation of a Transport Facilitation Strategy for the East African Community. The objectives for the assignment are:

1.1.1 Harmonisation of Standards and Specifications

- (i) Review existing documents/statutes and propose improvements to the same. The review shall include the following:
 - 1. Road Geometric Design standards
 - 2. Pavement & Bridge Design standards
 - 3. Specification for road and Bridge works
 - 4. Road and Bridge Maintenance standards
 - 5. Traffic signs including traffic signals, road signs and marking
 - 6. Safety and fitness of vehicles
 - 7. Driver training and Testing
 - 8. Dimensions of vehicles and vehicle combinations
 - 9. Transportation of abnormal, awkward and hazardous loads
- (ii) Identify areas of commonality which lend themselves to harmonization
- (iii) Propose and implement the incorporation of areas unique to particular countries into the harmonized regimes
- (iv) Give an indication of the impact of harmonization
- (v) Conduct stakeholder workshops to gain consensus on the harmonization of different regulations and standards

1.1.2 Harmonisation of Environmental Regulations and Standards

- (i) Review existing environmental regulations and standards and make recommendations for improvement and harmonization
- (ii) Collect stakeholder views and conduct workshops
- (iii) Facilitate expert group meetings to work on the harmonization process
- (iv) Preparation of detailed guidelines and manuals

1.1.3 Harmonisation of Vehicle Registration and Licensing

- (i) Review existing laws and regulations concerning vehicle registration and licensing and propose areas for improvements and harmonization.
- (ii) Collect stakeholder views on how to harmonize the regulations regionally
- (iii) Propose harmonized regulations and
- (iv) Conduct stakeholders' workshops to disseminate information on new regulations

1.1.4 Harmonisation of Road Safety Laws and Regulations

- (i) Review existing laws and regulations concerning road safety and propose areas for harmonization
- (ii) Identify viable strategies, projects and activities leading to the stemming of the problem of high incidence of accidents in the region
- (iii) Recommend a regional strategy for tackling prevalence of HIV/Aids in road transport

corridors

- (iv) Develop a framework for the preparation of an East African Road Safety Master Plan

1.1.5 Harmonisation of Overload Control Laws and Regulations and Road Transit Charges

- (i) Develop a common training curriculum for weighbridge personnel
- (ii) Set up uniform weighbridge printout certificates and overload reporting formats across EAC region
- (iii) Propose a framework for interconnection of weighbridges in the region with a regional data centre for monitoring the performance of weighbridges and storage of data, and
- (iv) Prepare an EAC legal instrument to be used by Partner States in implementing overload control regulations.

1.1.6 Harmonisation of Transport Sector Legal and Institutional Frameworks

- (i) Review existing laws and institutional structures and propose areas for improvements and harmonization.

This report is the third of the four contractual deliverables to be produced under the Transport Facilitation Strategy for the East African Community study. These are:

- Inception Report
- Working Papers (interim report)
- Draft Final Report (this document)
- Final Report

1.2 Objectives of this Report

The objectives of this report is to present the overall result of the Transport Facilitation Strategy study for the East African Community, addressing each of the six objectives of the Terms of Reference as outlined in section 1.1 above. The report is based on the six working papers that were produced as part of this project and are annexed to this report:

- **Standards and Specifications Study:** This study proposes the design standards for road geometry and pavement for all trunk roads in East Africa. It further proposes the specifications for road and bridge works as well as the standards for road maintenance. Other results in this study are standards for signs and markings, driver training and certification, vehicle safety and fitness, vehicle dimensions and combinations as well as the transportation of abnormal, awkward and hazardous loads.
- **Environmental Regulations and Standards Study:** This study reviews the current environmental policies, legislations and standards in the partner states. It further proposes harmonised standards in specific areas as well as development of environmental impact assessment guidelines.
- **Vehicle Registration and Licensing Study:** This study addresses issues associated with the registration and licensing of vehicles as well as operators in East Africa. It reviews the existing laws and regulations and proposes a new legal instrument (EAC act) to handle all issues of vehicle and operator licensing.
- **Road Safety Laws and Regulations Study:** This study has made an extensive review of the existing laws and regulations concerning road safety and contains proposals for improvement. It has also developed strategies, projects and actions to reduce road traffic injury in the region. A regional strategy for tackling the prevalence of HIV/AIDS in the

transport corridors as well as a framework for a road safety master plan has also been developed.

- **Overload Control Study:** This study deals with issues of overload control and complements earlier work done by EAC in this area. It contains a common training curriculum for weighbridge personnel and proposes a new format for reporting of weighbridge information. The study contains a proposal for an interconnection framework for all weighbridges and the associated data centre. Finally the study proposes some amendments to the current EAC overload control act.
- **Road Transport Sector Legal and Institutional Frameworks Study:** This study evaluates the existing legal and institutional framework for road transport in the partner states. It contains proposals for improvement and harmonisation of the legal and institutional framework.

The report is based on extensive data, collected during visits to partner states, expert workshops, interviews with key informants and the Task Force Committee. The detailed reports and their bibliographies from which the findings and recommendations presented here are extracted are appended.

1.3 Organisation for this Report

In addition the Executive summary and this Background, the Report consists of seven additional chapters:

- Chapter 2 summarises the result of the Standards and Specifications study. The full Standards and Specifications Study is appended as Annex A
- Chapter 3 summarises the result of the Environmental Regulations and Standards study. The full Environmental Regulations and Standards Study is appended as Annexes B1 and B2.
- Chapter 4 summarises the result of the Vehicle Registration and Licensing study. The full Vehicle Registration and Licensing Study is appended as Annex C
- Chapter 5 summarises the result of the Road Safety Laws and Regulations study. The full Road Safety Laws and Regulations Study is appended as Annex D
- Chapter 6 summarises the result of the Overload Control study. The full Overload Control Study is appended as Annex E
- Chapter 7 summarises the result of the Road Transport Sector Legal and Institutional Frameworks study. The full Road Transport Sector Legal and Institutional Frameworks Study is appended as Annex F
- Chapter 8 presents the conclusions and recommendations.

The table below provides references within the report to indicate where specific Tasks of the Terms of Reference (TOR) are addressed:

PREPARATION OF A TRANSPORT FACILITATION STRATEGY FOR THE EAST AFRICAN COMMUNITY

Terms of Reference Tasks		Report Reference
No	Description	
1	Harmonisation of Standards and Specifications	Chapter 2, Chapter 8., Annex A
2	Harmonisation of Environmental Regulations and Standards	Chapter 3, Chapter 8, Annex B1, B2 & B3
3	Harmonisation of Vehicle Registration and Licensing	Chapter 4, Chapter 8, Annex C
4	Harmonisation of Road Safety Laws and Regulations	Chapter 5, Chapter 8, Annex D
5	Harmonisation of Overload Control Laws and Regulations and Road Transit Charges	Chapter 6, Chapter 8, Annex E
6	Harmonisation of Transport Sector Legal and Institutional Frameworks	Chapter 7, Chapter 8, Annex F

2 Harmonisation of Standards and Specifications

2.1 Introduction

2.1.1 Background

The road transport facilitation component aims at making it possible to have reliable, efficient and safe road transport services in the EAC Region. This chapter summarises the results of the Harmonisation of Standards and Specifications. The full study is attached as Annex A and contains the following chapters:

1. Introduction
2. Harmonisation of roadway geometric design standards
3. Harmonisation of road pavement and bridge design standards
4. Harmonisation of specifications for road and bridge works
5. Harmonisation of road and bridge maintenance standards
6. Harmonisation of road signs, traffic signals and marking
7. Harmonisation of vehicle safety and fitness
8. Harmonisation of driver training and testing
9. Harmonisation of vehicle dimensions and combinations
10. Harmonisation of transportation of abnormal awkward and hazardous loads

2.1.2 Objectives and Methodology

The objectives of this chapter are to address the components mentioned above and recommend potential harmonisation regimes for the EAC Region based on the analysis of existing initiatives and current practices within the EAC Region as well as the state-of-the art and practices from around the world. In order to adequately address the TOR, the approach and methodology adopted for the project required the performance of the following activities:

- Visiting all the EAC member states to collect relevant documents and make initial contacts with the responsible officials.
- Preparation of an inception report and submission of the same to the EAC secretariat.
- Detailed documents review, situational analysis and preparation of draft working papers.
- Collection of experts' views and comments on the draft working papers through experts meetings. The meetings were held between 4th and 25th July 2011 in the respective capitals of the EAC member states.
- Incorporation of the experts' views into the draft working papers and submission of the resulting working papers to the EAC secretariat for comments.
- Presentation of the working papers at the Task Force meeting held from 19th - 23rd September, 2011 for review and comments as well as recommending the way forward.
- Incorporation of Task Force comments and preparation of the draft final report.
- Presentation of the draft final report at another Task Force meeting held in Mwanza, Tanzania from 7 to 11 May, 2012.
- Incorporation of the 2nd Task Force comments and preparation and submission of the final report.

2.2 Harmonisation of Roadway Geometric Design Standards

This chapter presents the main findings of the study for harmonisation of roadway geometric design standards. The full study report is presented in annex A chapter 2. The objective of this chapter is to

present recommendations on the roadway geometric design standards for the EAC region. The chapter therefore reviews and compares roadway geometric design standards within the EAC member states as well as applicable SADC and other international standards, and makes recommendations for the EAC region.

2.2.1 Current Geometric Design Standards in the EAC region

Geometric road design standards in Burundi and Rwanda are based on the French and American standards while Kenya, Tanzania and Uganda use their own standards which were developed largely from the American and English practices. Table 2-1 provides a summary of design standards that are used by EAC member states. It should also be noted that Tanzania has adopted some design criteria from the geometric design standards of the Southern African Transport and Communications Commission (SATCC), which were also derived largely from the American and English practices.

Table 2-1: Geometric Design Standards in the EAC Member states

Country	Geometric design standards	Year of latest version of standards	Remarks
Burundi	AFNOR (French design standards)	2006	This study reviewed 1) Se'tra (2006) Understanding the principal geometric design parameters for roads, 2) Se'tra (1998) The design of interurban intersection major roads: at-grade intersections, and 3) Directorate of roads (2000) National instruction on technical design requirements for rural motorways
Kenya	Kenya road design manual: Part 1: Geometric Design of Rural Roads	1979	A new design manual is currently under preparation but was not available for this study
Rwanda	French (AFNOR) and AASHTO geometric design standards	2006	This study reviewed 1) Se'tra (2006), 2) Se'tra (1998), 3) Directorate of roads (2000) National instruction on technical design requirements for rural motorways, and 4) AASHTO design guide (2011).
Tanzania (Mainland and Zanzibar)	Tanzania road geometric design manual (Draft): Part 1: Trunk and Regional Roads	2010	Draft manual to replace the 1989 design manual
Uganda	Uganda road design manual: Vol. 1: Geometric Design	2005	-

Based on the review and assessment of the above geometric design standards as well as applicable SADC and other international standards, it is proposed to harmonise all key areas that affect the geometry of both rural and urban roadways as presented below.

2.2.2 Road Functional Classification

Roads have two functions: to provide mobility and to provide land access. However, from a design standpoint, these functions are incompatible. For mobility, uninterrupted high speeds are desirable and variable or low speeds undesirable; for land access, low speeds are desirable and high speeds

undesirable. Given a functional classification, design criteria can be applied to encourage the use of the road as intended. Design features that can convey the level of functional classification to the driver include width of roadway, continuity of alignment, spacing of intersections, frequency of access points, building setbacks, alignment and grade standards, and traffic controls.

In accordance with the international practice, mobility roads include principal arterial roads that provide the highest level of mobility and the highest speeds over the longest uninterrupted distance. They also include multilane, two-lane two ways arterials, divided or undivided roads which connect or support, as directly as practicable the principal arterial systems. Lower classes of mobility roads provide less mobility and therefore balance both functions of mobility and accessibility, whereas access roads provide limited mobility and are the primary access to residential areas, businesses, farms, and other local areas.

This study found that all the EAC member states currently use the same road classification system with very slight changes in the definition of lower classes of roads i.e. access/minor roads. This classification is adequate for road administrative purposes. But each member state has its own road design classification system. It is therefore desirable to harmonise road classification system for design purposes based on the road function.

This study recommends that for design purposes the following functional classes as shown in Table 2-2. The table also shows the proposed spacing for the respective road classes as suggested by Africon Ltd (2011).

Table 2.2: Proposed functional classification of roads for the EAC

Function	Class	Name conventions		Access control
Mobility roads	Class 1	International trunk roads National trunk road	Principal Arterial/ Freeway/ Expressway (2500 m spacing)	Full
	Class 2	National roads Provincial roads Regional roads District roads	Major arterial/Highway (800 spacing)	Full or partial
	Class 3	Regional roads District roads Secondary roads	Minor arterial (600 m spacing)	Full or partial
Access roads	Class 4	District roads Secondary roads	Collector roads (50 m spacing)	Partial
	Class 5	Minor roads Local streets	Local streets (15 m spacing)	Unrestricted

Source: Adapted from Africon Ltd (2011).

Road reserve: The width of right-of-way for complete development of an arterial road is influenced by traffic demand, terrain, land use, cost, intersection design, and the extent of ultimate expansion. It is the summation of the various cross sectional elements: through roadways, roadside clear zones, side slopes, drainage facilities, utility appurtenances, and retaining walls. It should be based on the preferable dimensions of each element to the extent practical in developed areas.

Right of way widths provided for by design manuals for the EAC member states are within the right of way widths proposed for use in other countries. However, it was noted that the road reserve of 60 m recommended for international trunk roads is below the minimum right of way width required for freeways. It is recommended therefore, that the EAC member states should plan to acquire incrementally more space for right of way in the range of 79 – 100 m so as to allow for future expansion of existing international and national routes to the freeway and expressways standards. It

is further recommended that additional land should be acquired at all designated places for rest areas.

Terrain: Each EAC member state has adopted and defined different classes of terrain and the associated average ground slope. Kenya has three terrain types, Tanzania and Uganda have four. Interestingly, Tanzania combines hilly and mountainous terrains into one group in specifying design standards while the Uganda design manual uses only three terrain types to define the associated standards and the escarpment terrain is left out. On the other hand, the Trans-African Highway Network is classified into four (4) terrain categories of level, rolling, mountainous, and steep. The study therefore recommends to the EAC member states to adopt terrain categories of flat with cross slope of 0 to 10 per cent, rolling with cross slope of more than 10 to 25 per cent, mountainous with cross slope of more than 25 to 60 per cent, and steep with cross slope of more than 60 per cent.

2.2.3 Design Controls and Criteria

This section discusses those characteristics of vehicles, pedestrians and traffic that act as criteria for the selection of design parameters for various road functional classes.

2.2.3.1 Design Vehicle and Vehicle Characteristics

A Design Vehicle is defined as a selected motor vehicle with the weight, dimensions and operating characteristics used to establish highway design controls. For practical purposes all vehicles are classified by groups according to types and the design vehicle for each group is the vehicle with the largest physical dimension and turning radius. Since the dimensions of the design vehicles should take into account recent trends in motor vehicle sizes in the market and represent a composite of vehicles currently in operation, the vehicle dimensions study outlined in Section 2.8 has been taken into account. Thus, three groups of design vehicles are recommended namely (i) passenger cars (ii) buses and (iii) trucks. The truck class includes single unit trucks, truck tractors with semi-trailers, and rigid trucks with drawbar trailer and interlink. A summary of the recommended design vehicle dimensions is provided in Chapter 2 of Annex A.

Table 2-3: Proposed Design Vehicles for Harmonisation

Design vehicle type	Symbol	Dimension (m)				
		Length	Width	Height	Minimum design turning radius	Wheelbase
Passenger cars						
Passenger car	DV1	5.8	2.1	1.3	7.31	3.35
Buses						
Single unit bus	DV2	12.1	2.6	4.1	12.8	7.6
Articulated bus	DV3	18.3	2.6	3.4	12.1	6.7 + 5.9
Trucks						
Single unit truck	DV4	9.1	2.6	4.6	12.8	6.1
Semi-trailer	DV5	18.2	2.6	4.6	12.65	5.5+10.0
Rigid truck and drawbar trailer combination	DV6	22.0	2.6	4.6	12.0	4.6+8.2
Interlink (with a short truck tractor)	DV7	22.0	2.6	4.6	12.0	4.1+6.52*+7.94
Semi-trailer with long trailer	DV8	21.0	2.6	4.6	13.7	6.1 & 12.8

*distance between SU rear wheels and trailer front wheels

2.2.3.2 Driver performance

Driver Perception-Reaction is a parameter that assesses the driver's ability to handle the information presented during the execution of the driving task. The recommendation of this study is

that a driver perception reaction time of 2.5 seconds which is in line with the current practice in the EAC member states be adopted, as it is also in line with international best practice as evidenced by AASHTO design guide and French design standards.

Another related issue concerns the driver eye height values which also vary among the EAC member states, but with reasonable narrow ranges. The study proposes that the EAC member states adopt a driver eye height of 1.05 m for sight distance measurement. Besides, the study recommends object height values shown in Table 2-4 below.

Table 2-4: Proposed values of object height

Object height (m)		
Stopping sight distance	Decision sight distance	Passing sight distance
0.60	0.60	1.08

2.2.3.3 Traffic Characteristics

Traffic composition: Vehicles of different sizes and mass have different operating characteristics. It is not practical to design for a heterogeneous traffic stream, and for this reason, trucks and other vehicle types are converted to equivalent Passenger Car Units (PCUs). The number of PCUs associated with a single truck is a measure of the impedance that it offers to the passenger cars in the traffic stream. This study recommends to the EAC member states the adoption of the factors shown in Table 2-5.

Table 2-5: Proposed values of passenger car equivalent factors

Vehicle type	Terrain		
	Level	Rolling	Mountainous
	pcu		
Passenger cars	1.0	1.0	1.5
Light goods vehicles	1.0	1.5	3.0
Medium goods vehicles	2.5	5.0	10.0
Heavy goods vehicles	3.5	8.0	20.0
Buses	2.0	4.0	6.0
Motor cycles, scooters	0.5	1.0	1.5
Pedal cycles	0.5	0.5	NA

Design Hourly Volume (DHV): The traffic pattern on a road shows considerable variation in traffic volume during the hours of the day and throughout the year. The recommended design value currently being used by the EAC member states is the 30th hourly volume which is the highest hourly volume during the year. DHV can be estimated by computing AADT x K or ADT x K where K is estimated from the ratio of the 30th HV to the AADT from a similar site and in the absence of such factors the manual for Uganda estimates the 30th-highest DHV by applying the factors of 0.15 and 0.10 to the ADT for rural highways and urban roads, respectively. Other design manuals in the EAC region do not show factors that are used to compute the DHV. It is therefore proposed that field data should be used to determine the K factors for estimation of DHV. In the absence of such data the 30th-highest DHV should be estimated by applying a factor of 0.15 and 0.10 to the ADT value for rural highways and urban roads respectively.

Design Speed: The single most important factor in geometric design is the design speed. This was previously defined as the highest continuous speed at which individual vehicles can travel with safety on the road when weather conditions are favourable, traffic volumes are low and the design features of the road are the governing condition for safety. The current definition simply states that the design speed is the speed selected as the basis for establishing appropriate geometric elements for a section of road. In consideration of the existing practice in the EAC Region and the

international practice, the study recommends the use of design speed values shown in Table 2-6 for road classes that fall under the EAC Road Networks in the member states.

Table 2-6: Proposed Design Speed Values for Harmonisation

Road class		Design Speed (km/h)			
		Flat terrain	Rolling terrain	Mountainous	Steep
Mobility roads	Class 1	120	100	60	60
	Class 2	110	80	50	50
	Class 3	100	80	50	40
Access roads	Class 4	80	60	40	40
	Class 5	60	40	30	30

Projection of Future Demand: A highway might be designed for traffic volumes 50 years but the added cost of a 50-year design over a design with a 25-year life expectancy is appreciable, it may be imprudent to make a further investment providing capacity that will not be needed for at least 25 years. The construction cost savings could be used to construct another currently needed highway project. Traffic cannot usually be forecast accurately beyond 24 years on a specific roadway since there may be changes in the regional economy, population and land development along the roadway, which cannot be predicted with any degree of assurance. Further, the challenges of uncertainty of traffic volume forecast and funding constraints are much more pronounced in developing countries like ours in the East Africa. This study found that there was a great variation in the values of the period used to estimate the demand. As a result the study proposes that projection of future traffic demand should be based on a period of 20 years for new roadway design and 10 years for reconstruction and rehabilitation in the EAC member states.

Levels of Service: These are a qualitative measure of the effect of traffic flow factors, such as speed, travel time, interruptions, freedom to manoeuvre, driver comfort and convenience. The choice of the level of service is generally based on economic considerations. It is recommended that the EAC member states should adopt guidelines shown in Table 2-7 for the selection of design levels of service.

Table 2-7: Proposed Guidelines for Levels of Services

Level of service for specified combinations of terrain and area type					
Function	Class	Level terrain	Rolling terrain	Mountainous terrain	Steep terrain
Mobility roads	Class 1	B	B	C	C
	Class 2	B	C	D	D
	Class 3	C	C	D	D
Access roads	Class 4	D	D	D	D
	Class 5	D	D	D	D

Source: BICO

2.2.3.4 Non-Motorised Transport

To effectively plan and design pedestrian facilities, it is necessary to understand the typical pedestrian. Likewise, to provide adequately for bicycle traffic, the designer should be familiar with bicycle dimensions, operating characteristics and needs. These factors determine acceptable turning radii, grades, and sight distance. The study therefore recommends the adoption of a pedestrian speed of 1.2 m/s and adult typical bicycle performance criteria as shown in Annex A chapter 2. The criteria include cyclist speed range of 13-24 km/hr, coefficient of friction for braking of 0.32, and minimum lane width of 1.2 m and preferred lane width of 1.5 m for bicycle operation for the design of NMT facilities.

2.2.3.5 Access Control and Access Management

Regulation of public access rights to and from properties abutting the highway facilities is called access control. It is usually achieved through a number of controls which can be categorized as full control of access, partial control of access, access management, and driveway/entrance regulations. The principal advantages of controlling access are the preservation or improvement of service and the reduction of crash frequency and severity (AASHTO, 2011).

Access management addresses the basic questions of when, where, and how access should be provided or denied, and what legal or institutional changes are needed to enforce these decisions. In a broad context, access management is resource management, since it is a way to anticipate and prevent congestion and to improve traffic flow. Key elements of access management include defining the allowable access and access spacing for various classes of highways, providing a mechanism for granting variances when reasonable access cannot otherwise be provided, and establishing means of enforcing policies and decisions. These key elements, along with appropriate design policies, should be implemented through a legal code that provides a systematic and supportable basis for making access decisions.

It is therefore recommended that EAC member states put in place statutes, land-use ordinances, geometric design policies, and driveway regulations for managing and controlling access.

2.2.4 Elements of Design

2.2.4.1 Sight Distance

Sight distance is a fundamental criterion in the design of any road, be it urban or rural. It is essential for the driver to be able to perceive hazards on the road, and to have sufficient time in hand to initiate any necessary evasive action safely. On a two-lane two-way road it is also necessary for him or her to be able to enter the opposing lane safely while overtaking. The recommended values are based on the AASHTO practice.

Stopping Sight Distance: This is the distance required by a vehicle driven by a below-average driver at or near the design speed to stop before reaching a stationary object in its path. It is basically a sum of two distances namely; a brake reaction distance and a breaking distance. A brake reaction distance is the distance from the time the driver sights an object necessitating a stop to the time the brakes are applied, while a breaking distance is the distance required to stop the vehicle from the instance brakes are applied.

The brake reaction time corresponds to the perception reaction time which has been harmonised at a value of 2.5 seconds. The breaking distance is the distance to bring the vehicle to zero speed and depends on the brake force coefficient. Therefore the stopping sight distance can be determined as: $D = 0.278Vt + 0.039(V^2/a)$ where; t = brake reaction time, 2.5 sec; V = design speed, km/h; and a = acceleration rate of 3.4 m/s^2 . Table 2-8 gives the recommended minimum stopping sight distance for the various design speeds.

Table 2-8: Stopping sight distance on level road

Design Speed (km/h)	30	40	50	60	80	100	110	120
SSD (m)	35	50	65	85	130	185	220	250

Source: AASHTO, 2011

Passing Sight Distance: Passing sight distance is an important criterion that affects the capacity as well as the quality of service provided by the road. A heavily trafficked road requires a higher percentage of passing sight distance than a lightly trafficked road to provide the same level of service. Passing sight distance is calculated on the basis of a distance required for a successful overtaking manoeuvre and makes adequate provision for an aborted manoeuvre in the case of a truck attempting to overtake another truck. The minimum passing sight distance is the total of four components as presented in Annex A Chapter 2. Table 2-9 shows the recommended rounded passing sight distances for the various design speeds.

Table 2-9: Passing sight distance on level road

Design Speed (km/h)	30	40	50	60	80	100	110	120
PSD (m)	200	270	345	410	540	670	730	775

Source: AASHTO, 2011

2.2.4.2 Horizontal Alignment

Superelevation and Side friction: The most important factors affecting the design of the horizontal alignment are the rate of superelevation, side friction and the way they are distributed over a range of curves. In terms of harmonisation it is important to adopt similar values for these two parameters as they have impact on the operating conditions by determining the minimum and maximum curve radii and the cross sections around horizontal curves. Accordingly, this study recommends to the EAC member states the adoption of maximum superelevation rates of 4% on roads in urban areas and 10% on roads in the rural areas as well as side friction factors with corresponding design speed shown in Table 2-10.

Table 2-10: Side friction factors for different design speeds

Design speed (km/h)	Limiting value of <i>f</i>
30	0.17
40	0.17
50	0.16
60	0.15
70	0.14
80	0.14
90	0.13
100	0.12
110	0.11
120	0.09

Source: Uganda Design Manual (2005)

Distribution of superelevation and side friction: In addition, it is recommended that the distribution of superelevation and side friction over a range of curves should be such that superelevation and side friction are proportional to the inverse of the curve radius.

Transition Design: The design of the transition includes consideration of the changes of the alignment from tangent to circular as well as the cross section from normal to superelevated. The study recommends the use of an Euler spiral (clothoid) for the design of a spiral transition from tangent to curve and curve to tangent. A spiral transition curve give the driver a natural path that is easy to follow as a vehicle enters or leaves a circular horizontal curve and at the same time provides a suitable arrangement for affecting the superelevation runoff. The appearance of the road is also enhanced by the use of spiral transition curves, since this avoids noticeable breaks at the beginning of circular curves. These breaks are often made more pronounced by the superelevation

runoff. The maximum relative gradient between pavement edges (Table 2-11) will determine the minimum length for the runout and runoff, and hence the minimum length of the transition curves.

Table 2-11: Maximum relative gradient

Design Speed (km/h)	30	40	50	60	80	100	110	120
Maximum relative gradient	1:133	1:143	1:154	1:167	1:200	1:227	1:244	1:263

Additionally, the minimum length of transition curve should be based on consideration of driver comfort and shifts in the lateral position of vehicles and these two criteria can be used together to determine the minimum length of transition curve which can be computed as

$$L_{s,\min} = \sqrt{24(p_{\min})}R \text{ or } L_{s,\min} = 0.0214 \frac{V^3}{RC}$$

Where:

- $L_{s,\min}$ = minimum length of spiral, m
- p_{\min} = minimum lateral offset between the tangent and circular curve (0.20 m)
- R = radius of circular curve, m
- V = design speed, km/h
- C = maximum rate of change in lateral acceleration (1.2 m/s³)

2.2.4.3 Vertical Alignment

Gradients: Maximum grades vary, depending on the type of facility, and usually do not constitute an absolute standard. The effect of a steep grade is to slow down the heavier vehicles and increasing operating costs (beyond an ascending gradient of 2.5 % each additional percentage point of gradient leads to a 12% increase in fuel consumption compared and the extent to which any heavier vehicle is slowed depends on both the steepness and length of the grade). Maximum gradient guidelines range in complexity, with various countries considering some or all of the following factors: road classification, design speed and terrain. In Tanzania and Uganda, maximum grades are based on design speed and topography, and there is no much difference in the grades specified by the design manuals for the two countries.

To avoid standing water in side ditches, the minimum gradient for roads in cutting is recommended to be 0.5% for Kenya. It is further recommended to check for length of grades, or otherwise a climbing lane may be justifiable in some cases. For Tanzania, the draft guide proposed minimum grades on cut-sections to be 0.5% unless special drainage treatments are provided while the recommended minimum gradient in cuttings in order to avoid standing water in the road side ditches is 0.3% - 0.5% in Uganda. It is therefore recommended that a minimum grade of 0.5% and maximum grades shown in Table 2-12 be adopted by the EAC member states.

Table 2-12: Maximum gradients

Terrain	Maximum gradient (%)
Flat	4
Rolling	4 – 8
Mountainous	7 – 12
Steep	12 - 18

Vertical curves: Minimum lengths of crest vertical curves based on sight distance criteria generally are satisfactory from the standpoint of safety, comfort, and appearance. Therefore, this study recommends that the minimum length standard for crest vertical curves should be based on the stopping sight distance, the height of the driver’s eye measured from an eye height of 1.05 m, and

the height of the object of 0.60 m to be seen over the crest of the curve. For sag curves, stopping sight distance should be based on the distance illuminated by the headlight height of 0.6 m at night.

Climbing lanes: A review of the existing design guides for EAC member states indicated that each of the EAC member state is following different requirements for climbing lanes. The requirements were compared with those prescribed in the AASHTO (2011) guide and it was found that AASHTO requirements for climbing lanes are simple to use because they require data (i.e. traffic volumes and speed only) which can be easily obtained for site assessment and above all they include a safety criterion. It is therefore recommended to use the following AASHTO requirements for climbing lanes as presented in Annex A Chapter 2, i.e.

- i) Upgrade traffic flow rate in excess of 200 vehicles per hour
- ii) Upgrade truck flow rate in excess of 20 vehicles per hour
- iii) One of the following conditions exists:
 - A 15 km/h or greater speed reduction is expected for a typical heavy truck
 - Level of service E or F exists on the grade
 - A reduction of two or more levels of service is experienced when moving from the approach segment to the grade.
- iv) In addition safety considerations may justify the addition of a climbing lane regardless of grade or traffic volumes

2.2.5 Cross-Section Elements

2.2.5.1 Lane widths

A fundamental feature of a roadway cross-section is the width of a travel lane, which must be sufficient to accommodate the design vehicle, allow for imprecise steering manoeuvres, and provide clearance for opposing flow in adjacent lanes. It is therefore recommended that the following lane widths be adopted by the EAC member states:

- For mobility roads classes 1 to 3, lanes should be 3.5 to 3.75 m wide
- For access roads classes 4 to 5, lanes should be 2.5 to 3.5 m wide

2.2.5.2 Shoulders

In order to compare the shoulder widths for the EAC member states, shoulder width values were given in respect of the road design classes. It was found that there is a slight variation in widths between the countries, but almost all widths are within the ranges of widths specified by SATCC guide as well as AASHTO. It is therefore recommended to adopt the following; for mobility road classes 1 to 3 in flat terrain, minimum width for shoulders should be 2.0 m; for roads in rolling and mountainous terrain shoulders should be 1.0 - 1.5 m wide; and for access roads classes, shoulders should be 0.6 to 1.0 m wide as presented in Annex A Chapter 2.

2.2.5.3 Normal Cross Fall

Review of normal cross fall values showed that cross fall values for paved carriageway and unpaved roads are the same across the EAC member states. It was also found that Tanzania recommended 3.0% as a normal cross fall value for stone paved surfaces while Uganda recommended the same value for areas of intense rainfall. On the other hand, values recommended by AASHTO and SATCC were also reviewed and compared with ours. In view of the review findings, the study recommends the following normal cross fall values as presented in Annex A of Chapter 2.

- i) *2.5% for asphalt concrete surfaces (or 3% in areas where heavy rainfall is common)*

- ii) *Surface dressing surfaces* 2.5%
- iii) *Stone paved surfaces* 3.0%
- iv) *Gravel and earth surfaces* 4.0%

2.2.5.4 Typical Cross Section

Figure 2-1 presents typical cross sectional elements of a dual carriageway. Details of discussion and other related matters are given in Annex A Chapter 2.

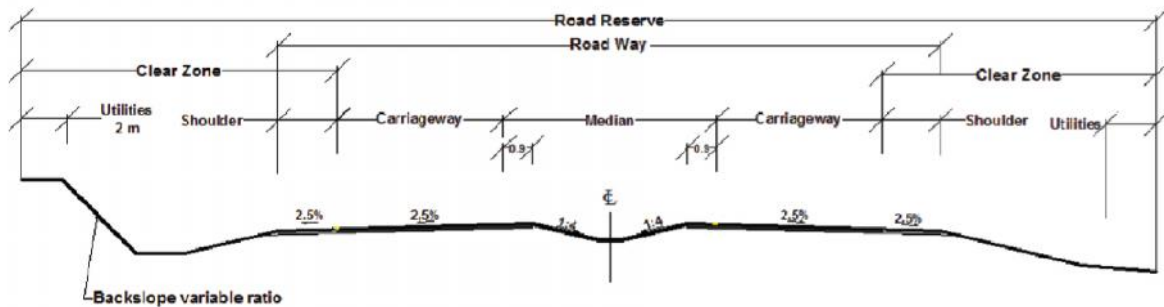


Figure 2-1: Typical cross sectional elements of a dual carriageway

2.2.5.5 Emergency Escape Ramps

Emergency escape ramps are not covered by the existing design manuals for the EAC members states. The design and construction of an emergency escape ramp at an appropriate location is desirable to provide a location for out-of-control vehicles, particularly trucks, to slow and stop away from the main traffic stream. Out-of-control vehicles are generally the result of a driver losing braking ability either through overheating of the brakes due to mechanical failure or failure to downshift at the appropriate time. Each grade has its own unique characteristics. Highway alignment, gradient, length, and descent speed contribute to the potential for out-of-control vehicles. For existing highways, operational concerns on a downgrade will often be reported by law enforcement officials, truck drivers, or the general public. A field review of a specific grade may reveal damaged guardrail, gouged pavement surfaces, or spilled oil indicating locations where drivers of heavy vehicles had difficulty negotiating a downgrade. For existing facilities, an escape ramp should be provided as soon as a need is established. Crash experience (or, for new facilities, crash experience on similar facilities) and truck operations on the grade combined with engineering judgment are frequently used to determine the need for a truck escape ramp. Often the impact of a potential runaway truck on adjacent activities or population centres will provide sufficient reason to construct an escape ramp.

It is recommended that an escape ramp or ramps, if the conditions indicate the need for more than one, should be located wherever grades are of steepness and length that present a substantial risk of runaway trucks and topographic conditions permit construction.

2.2.5.6 Motorcycle Lanes

There are two types of motorcycle track: restricted track and exclusive track. Restricted motorcycle track can be developed within the carriageway of an existing road. It is usually sited on the left side of the road, preferably between the kerbs and the parking lane. Some form of physical barrier or pavement markings defines the corridor set aside for the cyclists and route markings are necessary to define the route and reduce potential conflicts. However, at crossings and intersections, this kind of cycle track ceases as a separate mode and conflicts may occur with other forms of movement. An exclusive motorcycle track is a complete separate right-of-way established for the sole use of

cyclists. This kind of cycle track separates the cyclists from other motorists. This type of exclusive cycle track differs from the restricted cycle track in that it normally has a wide right-of-way and is not developed from existing carriageway of a wide road. It helps to separate conflicts at crossings and intersections with the provision of underpasses and other related facilities.

Thus, the following warrants are recommended for determining the need for an exclusive cycle lane: the total volume of traffic exceeds the provided lane capacity, and the volume of motorcycles exceeds 20% of the total volume of traffic as indicated in Annex A Chapter 2.

2.2.6 Intersections

2.2.6.1 The Distance between Intersections

For safe and efficient traffic flow, intersections should not be placed too close together. Drivers accelerating away from one intersection are not expecting to encounter traffic slowing for another intersection, for example. Also a queue of vehicles from one intersection that blocks another intersection, called spill-back, will cause congestion to propagate and cause extra delay. The design manuals for Tanzania and Uganda recommends that the minimum distance between consecutive junctions should preferably be equal to 10 times the major road design speed (km/hr). The manuals also indicate that the minimum spacing for signalised intersections is 400 m.

Since proper intersection spacing, particularly for signalized intersections, is critical for providing coordinated signal timing, optimal timing progression for two-way movements should allow travel time between intersections to be about half of the cycle length. This study's recommendation is that signal spacing should be at least 400 m in urban areas and 800 m in suburban areas for optimum two-way progression, and for unsignalised intersections the minimum distance should be at least $10 \cdot V_D$ meters.

2.2.6.2 Location

Intersections are safer in some locations than others. This aspect of location of intersection is not covered by the existing design manuals for the EAC member states. It is suggested that intersections should neither be on a horizontal curve if possible nor near a crest vertical curve.

2.2.6.3 Angle

The angle of intersection is important to traffic operations. A right angle intersection provides the most favourable conditions for intersecting and turning traffic movements. Specifically, a right angle (90°) provides (a) the shortest crossing distance for motor vehicles, bicycles, and pedestrians, and (b) sight lines which optimize corner sight distance and the ability of drivers to judge the relative position and speed of approach vehicles. Minor deviations from right angles are generally acceptable provided that the potentially detrimental impact on visibility and turning movements for large trucks can be mitigated. However, large deviations from right angles may decrease visibility, hamper certain turning operations, and will increase the size of the intersection and therefore crossing distances for bicyclists and pedestrians. This element of intersection design is not covered by the existing design manuals for EAC Member states. It is therefore suggested that the angles of existing intersections on EAC road network should be checked for possible implementation of retrofitting improvement strategies, if necessary.

2.2.6.4 Warrant for Turning Lanes

Turning lanes provide room for left-turning or right-turning vehicles to decelerate before their turns and/ or to queue while waiting to turn. They are particularly effective at reducing delay and collisions by getting those vehicles out of the way of through vehicles. At busy signalized intersections, dual

and triple turning lanes are used effectively to reduce the time that those vehicles need the right-of-way. Dual left-turn (left side driving) lanes are also used at some intersections. The drawbacks to using turning lanes include higher right-of-way costs and longer crossing distances for pedestrians.

A comparison of the criteria for installing turning lanes reveal that AASHTO criteria for installing turning lanes are simple and require data which is easily obtainable at site and can be directly applied for site assessment, whereas criteria that are currently used in Tanzania and Uganda require conversion of daily volumes into annual average daily volumes and information concerning passenger car equivalent units. It is therefore recommended to use AASHTO criteria for provision of turning lanes.

2.2.6.5 Warrants for grade separations and interchanges

With increasing traffic volumes, a point will be reached where all the options of temporal separation of conflicting movements at an at-grade intersection have been exhausted. The elimination of bottlenecks by means of interchanges can be applied to any intersection at which demand exceeds capacity and is not necessarily limited to arterials. Under these circumstances, it is necessary to weigh up the economic benefits of increased safety, reduced delay and reduced operating and maintenance cost of vehicles against the cost of provision of the interchange. The latter includes the cost of land acquisition and the cost of construction.

Generally, the justification of an interchange at a given location is difficult due to the wide variety of site conditions, traffic volume, highway types and interchange layouts. AASHTO (2011) provides six warrants that should be considered when determining if an interchange is justified at a particular site. The design guides for EAC also covers these warrants. Thus, it is recommended that the EAC member states use the AASHTO warrants and undertake benefit cost analysis for justification of grade separation.

2.2.6.6 Spacing of interchanges

If an interchange is warranted for any of the above listed reasons, interchange spacing is an additional consideration in the decision-making process. Interchange spacing has a pronounced effect on freeway operations. In areas of concentrated urban development, proper spacing usually is difficult to attain because of traffic demand for frequent access. Minimum spacing of arterial interchanges (distance between intersecting roads with ramps) is determined by weaving volumes, signal progression, and lengths of speed-change lanes. AASHTO (2011) gives a general rule of thumb for minimum interchange spacing of 1.5 km in urban areas, and 3.0 km in rural areas (between freeway-to-freeway interchanges and local roads interchanges). In urban areas spacing of less than 1.5 km may be developed by grade-separated ramps or by adding collector-distributor roads. This element of intersection design is not covered by the existing design manuals for the EAC member states. This study recommends a rule of thumb for minimum interchange spacing of 1.5 km in urban areas and 3.0 km in rural areas.

2.2.6.7 Railroad – Highway Crossing

A railroad-highway crossing, like any highway-highway intersection, involves either a separation of grades or a crossing at-grade. The geometrics of a highway and structure that involves the overcrossing or undercrossing of a railroad are substantially the same as those for a highway grade separation without ramps. The horizontal and vertical geometrics of a highway approaching a railroad grade crossing should be constructed in a manner that facilitates drivers' attention to roadway conditions. The decision to grade separate a highway-rail crossing is primarily a matter of economics. Investment in grade separation of a structure is long-term and impacts many users.

Such decisions should be based on long-term, fully allocated life-cycle costs, including both highway and railroad user costs, rather than on initial construction costs. It is recommended that such analysis should consider the following:

- 1) Eliminating train/vehicle collisions (including the resultant property damage and medical costs and liability).
- 2) Savings in highway-rail grade crossing surface and crossing signal installation and maintenance costs.
- 3) Driver delay cost savings.
- 4) Costs associated with providing increased highway storage capacity (to accommodate traffic backed up by a train).
- 5) Fuel and pollution mitigation cost savings (from idling queued vehicles).
- 6) Effects of any “spillover” congestion on the rest of the roadway system.
- 7) Benefits of improved emergency access.
- 8) Potential for closing one or more additional adjacent crossings.
- 9) Possible train derailment costs.

2.2.7 Speed Management

Speed management encompasses a range of measures aimed at balancing safety and efficiency of vehicle speeds on a road network. It aims to reduce the incidence of driving too fast for the prevailing conditions, and to maximize compliance with speed limits. Speed management aims to reduce the number of road traffic crashes and the serious injury and death that can result from them. Numerous practices have been implemented in urban areas to reduce speeds.

The design manuals for Tanzania and Uganda recommend the use of gates, humps, and rumble strips for speed control. Both manuals give the same design standards for gates, humps (circular and plateau/flat-topped), and rumble strips. As illustrated in Figure 2-2, it is recommended to observed the following principles when using rumble strips:

- Rumble strips should normally be in groups of 4 strips
- The height of the strips shall be no more than 10 – 15 mm
- The strip width should be 0.5 m

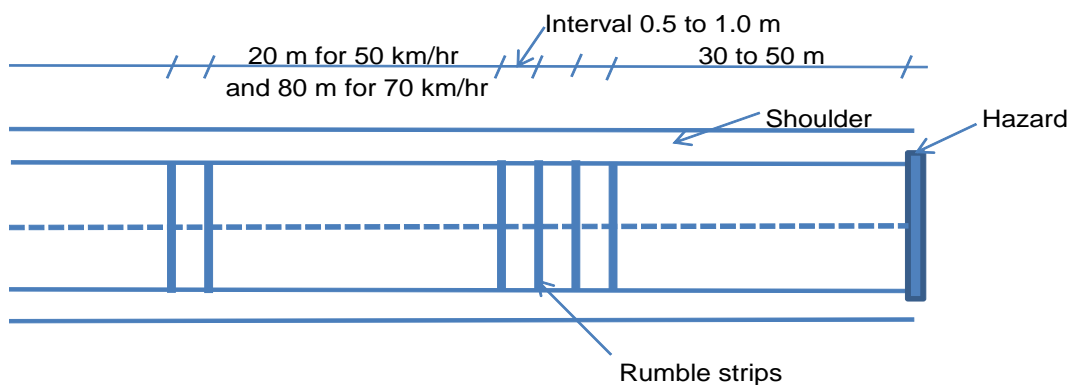


Figure 2-2: Design of rumble strips

- One set of rumble strips is usually enough within 50km/h sections
- The last or only strip should be located 30 to 50 m before the hazard
- Pre-warning sets can, if used, be located 20 to 80 m before the hazard depending on speeds
- Rumble strips should preferably have yellow thermoplastic lines across the top for better visibility
- Strips should continue across the full width of the carriageway, including the shoulders but

be terminated so that they do not interfere with drainage.

Road bumps are 75 – 100 mm high and 300 – 900 mm long and are typically used in parking lots and on private roads. To pass over road bumps without doing damage to the vehicle or causing discomfort, the driver must slow down almost to a complete stop. They are suitable for residential areas but are not acceptable and should not be used on national roads i.e. Trunk and Regional roads. Road humps are 75 – 100 mm high and 4.0 – 9.5 m long. They may be used on National Trunk Roads and Regional Roads where proven to be absolutely necessary. Road humps should not be used on International Trunk Roads. There are two main types of road humps i.e. circular, which are intended for traffic speed reduction only and flat-topped humps, which are intended for speed reduction and for use as a pedestrian crossing. Figures 2-3 and 2-4 illustrates the recommended standards for speed humps.

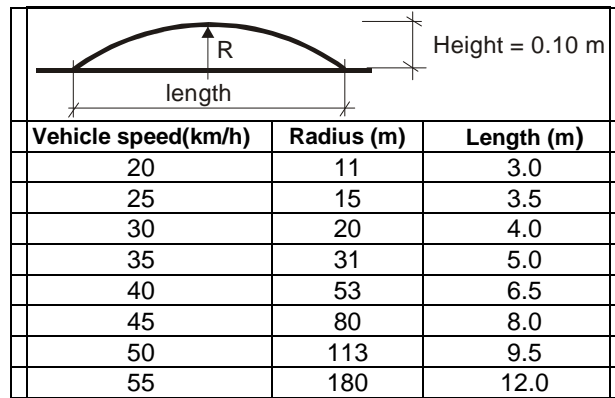


Figure 2-3: Detailed design of circular speed hump

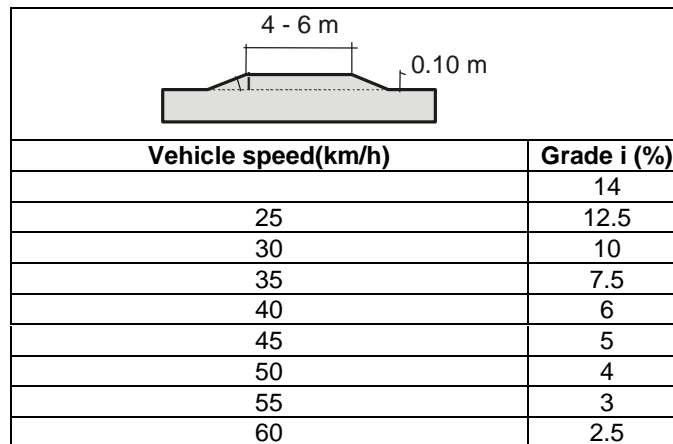


Figure 2-4: Detailed design of flat-topped speed hump

It is further recommended that speed control measures other than the speed humps and rumble strips should be tried on major roads to reduce vehicle speeds. Such measures may include narrowing of carriageway, raised zebra crossings, and use of combination of measures.

2.2.8 Pedestrian and Cyclists Facilities/NMT Facilities

2.2.8.1 Shoulders and footways

Both manuals for Tanzania and Uganda recommend a shoulder of 1.5 m wide for pedestrian in rural areas as pedestrian can walk on the road shoulders. The conventional view is that pedestrians in rural areas can walk on the road shoulders. The shoulder should be at least 1.5 m wide, though 1 m

is just acceptable if there are constraints. The surface must be well drained and be as smooth as the traffic lanes – if not, pedestrians may prefer to walk in the traffic lane. The implication of this is that low-cost chip seal shoulders may not be a good investment. Letting pedestrians use the shoulders is not entirely satisfactory, as there is nothing to protect the pedestrian from speeding traffic. This is of particular concern on high-speed and / or high volume roads. In these situations it is preferable to provide a separate footway several metres beyond the edge of the shoulder – and separated from it by a grass strip. The recommended criteria for the provision of footways are given in Table 2-13 but these should be used with caution since footways can be justified at lower pedestrian flows in some circumstances.

Table 2-13: Criteria for provision of footways

Location of footway	Average daily vehicle traffic	Pedestrian flow per day	
		Speed limit of 60 – 80 km/h	Speed limit of 80 – 100km/h
One side only	400 to 1,400	300	200
	> 1,400	200	120
Both sides	700 to 1,400	1,000	600
	> 1,400	600	400

Further, the recommended standard footway widths are:

- Absolute minimum: 1 m (two persons cannot pass each other)
- Desirable minimum: 1.8 m (two persons can pass each other closely)
- Light volume: 2.25 m (two persons can pass each other comfortably)
- Heavy volume: 3.5 m+ (space for three persons)

2.2.8.2 Pedestrian bridges and underpasses

The manual for Tanzania recommends dimensions for underpasses which are different from those documented by the manual for Uganda. Tanzania recommends a minimum height of 2.5 m and 3.0 m for short (< 15 m) and long (> 15 m) underpasses, respectively, while Uganda recommends heights of 2.3 m and 2.6 m for the respective underpasses. Moreover, Tanzania recommends a vertical clearance of 5.5 m (and absolute minimum of 5.2 m) for pedestrian bridge above the carriageway surface while Uganda recommends a clearance of 5.0 m. The recommended flights of stairs (between landings) is limited to 12 steps for the case of Tanzania while for Uganda the number of steps for flights of stairs (between landings) are limited to 20 steps (9 steps where there are significant numbers of disabled persons). It is recommended that the headroom under pedestrian bridges should be 5.5 m.

2.2.8.3 Cycle facilities

The conventional view is that cyclists in rural areas can use the shoulders, and this is acceptable provided that the combined volume of pedestrians and cyclists is low (<400 per day) and the shoulder is at least 1.5 m wide. But, with heavier flows, and especially if there is high-speed traffic and / or a high proportion of heavy goods vehicles, it will be better to provide a separate cycleway or a combined cycleway and footway. The design manuals for Tanzania and Uganda recommend similar dimensions for widths for cycle facilities and clearances to wall, fence, barrier or other fixed object. They specify minimum clearance to edge of traffic lane for various speed limits. It is also recommended to provide separate cycleway or combined cycleway and footway if there is high-traffic and the combined flow of pedestrians and cyclists is more than 400 per day. Cycle ways need to have a smooth surface with good skid resistance. It is recommended that cycleways of width shown in Table 2-14 be provided as separate cycleway or combined cycleway and footway if there

is high-traffic and the combined flow of pedestrians and cyclists is more than 400 per day. It is also recommended that minimum clearances shown in Table 2-15 be adopted for cycleways.

Table 2-14: Recommended widths for cycle facilities

Type	Minimum width (m)	Standard width (m)	Width for heavy usage (m)
Cycleway (separate from carriageway)	2.0	2.5	3.5
Combined cycleway and footway	2.0	3.0	4.5
Cycle lane (one way)	1.5	2.0	2.5

Table 2.15: Recommended clearances for cycle facilities

Type	Recommended clearance [m]
Minimum overhead clearance	0.50
Clearance to wall, fence, barrier or other fixed object	0.50
Clearance to unfenced drop-off, e.g. embankment, river, wall	1.0
Minimum clearance to edge of traffic lane for speed limit of:	
50 km/h	0.50
80 km/h	1.00
100 km/h	1.50

2.2.9 Other road furniture

Traffic control devices and other road furniture like guardrails and marker posts are intended to improve the driver's perception and comprehension of the continually changing appearance of the road and to control and guide traffic. Traffic control devices include traffic signs, road markings and traffic signals which are described and harmonised in Annex A6.

2.2.9.1 Marker posts

These are intended to make drivers aware of potential hazards. Only the draft design manual for Tanzania recommends the marker posts to be sited at 0.25 m outside the edge of the shoulder. It is recommended that this standard should be adopted by all member states.

2.2.9.2 Kilometre Posts

These are blocks or pillars of concrete set up beside major roads to show distances from that point to town centres or major settlements along the road. They show the distances to the destination and that of the origin placed in such a way that the road user will only immediately see the distance to the destination. Only the design manual for Tanzania included kilometre posts. It is recommended that kilometre posts should be installed along the whole road at an interval of 5 kilometres from each other and they should be placed in stagger thus forming a 10 km interval on each side of the road.

2.2.9.3 Road Reserve Marker Posts

Numerous unauthorised accesses tend to develop within the road reserve area. This unwanted development can be limited by providing proper demarcation of the boarder of the road reserve. Road reserve marker posts are recommended by the draft design manual for Tanzania. The posts are recommended to be erected on both sides of the road at intervals of 100 m from each other when traversing inhabited areas and at 300 m on other areas. Whenever new villages are formed along the roads, additional road reserve marker posts should be erected to meet the 100 m interval. It is recommended that road reserve marker posts should be erected on both sides of the road at intervals of 100 m from each other when traversing inhabited areas and at 300 m on other areas. Whenever new villages are formed along the roads, additional road reserve marker posts should be erected to meet the 100 m interval.

2.2.9.4 Rest Areas

Rest areas are of three types of rest areas: major, minor and truck parking bays. Major rest areas are designed for long rest breaks, offering a range of facilities and separate parking areas for heavy and light vehicles. These are designed to allow drivers to take rest and sleep breaks required under current driving hours regulations. Minor rest areas are designed for shorter rest breaks, and at a minimum should provide sufficient parking space for both heavy and light vehicles. While it is not anticipated that these stops will be used for long rest breaks/sleep opportunities, separate parking areas for heavy and light vehicles may be required at some locations. Truck parking bays areas are primarily designed to allow drivers of heavy vehicles to conduct short, purpose-based stops including load checks, completing logbooks and addressing associated operational needs. Tanzania design manual provides requirements which should be taken into account when planning for rest areas.

It is therefore recommended that major rest areas should be located at maximum intervals of 100 – 120 km, minor rest areas should be located at maximum intervals of 50 – 60 km, and truck parking bays should be located at maximum intervals of 30 – 40 km. additionally, planning for rest areas should take into account the following requirements, as elaborated in Annex A Chapter 2.

- a) Detailed rest area strategy
- b) Spacing intervals
- c) Proximity to a town
- d) Location
- e) Proposed Layout
- f) Pedestrian Access and Visibility
- g) Speed
- h) Access
- i) Minimum Signage Requirements
- j) Minimum Facilities
- k) Additional Facilities
- l) Cross-Border Compatibility

2.2.10 Impact of harmonisation and Implementation strategy

Implementation of the above recommendations will ensure uniform roadway geometric standards and hence the optimum balance between road infrastructure construction cost and road user cost is obtained, considering road safety issues and natural and human environmental aspects in the EAC Region. Other impacts of the above harmonised regimes include improved efficiency of the road transport system by minimisation of road crashes and energy consumption. It should be noted that this study also revealed that the width, height, wheelbase and minimum turning radius dimensions of vehicles such as the 22 m Interlinks, which have recently been permitted to traverse EAC road network, conform to the respective dimensions of the design vehicles documented in the existing design manuals for EAC member countries and therefore will be accommodated by the existing intersections on the EAC road network. On the flip side, all countries will need to check whether headroom under bridge structures complies with the recommended value of 5.5 m and make improvements, if necessary. Additionally, it is proposed that the recommended standards be implemented in all new road designs, and road rehabilitation, reconstruction and widening projects.

2.3 Harmonisation of Pavement and Bridge Design Standards

2.3.1 Introduction

This chapter presents the main findings of the proposed harmonisation of pavement and bridge design standards. The full study report is presented as Annex A Chapter 3.

2.3.2 Objectives

The principal objective of this chapter is to make recommendations about harmonisation of pavement and bridge design standards for the EAC Region such that the following can be achieved:

- Provision of safe and comfortable riding conditions to all road users.
- Provision of low cost of ownership (i.e. minimum whole life cost)

2.3.3 Pavement Design Standards Adopted by the EAC Member states

Burundi and Rwanda have been following French standards and recently American standards for pavement design while Kenya, Tanzania and Uganda use their own design standards, which are largely empirical-based methods. Table 2.16 provides a summary of design standards that are used by EAC member states.

Table 2.16: Pavement Design Standards in EAC Member States

Country	Design standard	Year of latest version	Remarks
Burundi	AFNOR (French design standards)	1997	-
Kenya	Road Design Manual. Part III, Materials and Pavement Design for New Roads	1987	A new design manual is currently under preparation
Rwanda	AFNOR (French design standards)	1997	Considers shifting to AASHTO)
Tanzania (Mainland and Zanzibar)	Pavement and Materials Design Manual	1999	-
Uganda	Road design manual: Volume 3: pavement design, Part I-IV	2010	-

A review of the documents listed in Tables 2.16 revealed a number of areas which are common and unique to particular EAC member states as well as areas which need further improvement. French design standards, which are followed by Burundi and Rwanda, combine the useful aspects of mechanics of materials and lessons gained from experimentation. They employ mechanistic pavement models to calculate stresses and strains, and utilise laboratory-based fatigue damage test results to define pavement failure. The knowledge derived from the observation of the behaviour of a real pavement is used to specify criteria to check subgrade strain values of the unbound layer and to tie in with the results of the mechanistic computation model. They therefore specify materials strength in terms of their resilient modulus values (MPa).

The design manuals have particular reference to the prevailing conditions in the respective countries and reflect EAC member countries' experience gained in road pavement design during the last 40 years. For Tanzania and Uganda, the manuals supersede the previous design guides of 1989 and 1994, respectively. Generally, revision of a design manual is only possible when new technical information and performance data become available.

2.3.4. Potential Areas for Harmonisation and Improvement

2.3.4.1 Environment

The environmental factors that significantly affect pavement performance are moisture and temperature. Both of these factors must be considered at the design stage of the pavement and need to be harmonised across the region. For the purpose of pavement design some of the Member states divide their countries into climatic zones. The study, however, found variations in the way the climatic zones are defined and sub-divided.

The study recommends a harmonised definition and division of climatic zones into three; wet, moderate and dry zones. A dry zone is as an area in which the number of months per year with higher rainfall than evaporation is less than 1 month. A moderate zone is as an area in which the number of months per year with higher rainfall than evaporation is 1 to 3 months, whereas a wet zone is as an area in which there are more than 3 months per year with higher rainfall than evaporation. It is further recommended to adopt the use of performance graded asphalt specifications which correspond to the maximum and minimum pavement temperatures of the climatic zone similar to what are found in Super-pave mix design.

2.3.4.2 Drainage

A review of the design manuals in the EAC region indicates that manuals for Tanzania and Uganda provide guidance concerning drainage. Drainage systems can be categorised as surface drainage or subsurface drainage system. Surface drainage encompasses all means by which surface water is removed from the pavement surface and right of way and includes adequate transverse and longitudinal slopes on both the pavement and shoulder to ensure positive run-off, longitudinal channels, culverts that conveys the surface water to the natural waterways. Subsurface drainage systems aim to keep the variation of moisture in the subgrade and pavement layers to a minimum at the same time reducing the amount of the same in the subgrade soil and pavement.

2.3.4.3 Traffic

One of the most important factors that affect Pavement design is traffic loading through the weight of the vehicle that is imposed on the pavement. Current practices in the member states vary and therefore there is need for harmonisation as indicated in Table 2-17.

Table 2-17: Consideration of Traffic Loading Factors

Factor	Practice in EAC Member states and Recommendations
Design period	A review of the design periods for new pavements in the EAC Member states revealed that design period varies from 10 to over 20 years. Kenya and Uganda allow stage construction while Tanzania does not and Burundi and Rwanda uses a minimum design period of 20 years. The study recommends a design period of 20 years for the design of new pavement or reconstruction of pavements that have reached the end of their design life. The main reason for this recommendation is that traffic forecasting beyond 20 years increases uncertainty in the forecast. With economic justification, design periods other than 20 years can be adopted on a case by case basis.
Heavy Vehicle Classification	A review of the design manuals found that there are variations in the definition of a Heavy Goods vehicle to be used for pavement design as well as in their design categories. The study recommends that a heavy goods vehicle be defined as vehicle having a registered un-laden weight of 3 tonnes. It further recommends that EAC should consider adopting heavy vehicle classifications of medium goods, heavy goods, very heavy goods, and buses having seating capacity of more than 24 including the driver. Where a Medium Goods Vehicle (MGV) covers small and medium sized trucks including tankers up to 7 tons load, Heavy Goods Vehicle (HGV) covers Trucks above 7 tons load, and Very Heavy Goods Vehicles (VHGV) are articulated trucks with trailer or semi-trailer and

	tanker trailers.
Determination of Design Traffic Loading	In determining the relative damage of the various axle loads there are variations in the exponent used across the Member states. This study recommend that a value of $n = 4.5$ be used as it represents the worst case scenario, for pavement design classes of up to 30 million ESA above which analytical methods of design should be adopted.

2.3.4.4 Subgrade

The subgrade is the foundation of the pavement structure whose strength has a marked effect on the pavement thickness and performance. A number of factors influencing subgrade strength were reviewed, compared and contrasted among EAC Member states. Table 2-18 summarises the study findings.

Table 2-18: Subgrade Characterisation and Design

Factor	Practice in the EAC Member states and Recommended Guidelines
Design depth	Design manuals for Tanzania and Uganda consider it as a design factor; nevertheless, there is variation in the general depth requirements. It is recommend that depths of 0.8 m and 1.2 m should be adopted as subgrade design depths for normal traffic load categories and heavy traffic loading, respectively.
Centreline soil survey	This design concept is addressed in Tanzania and Uganda design manuals. The study recommends that a minimum of 2 CBR strength tests per km for paved trunk roads, a minimum of 1 CBR strength test per km for other roads and a minimum of 1 CBR strength tests per 2 km for gravel roads should be adopted as a minimum materials CBR testing frequency for EAC member states.
Characterisation of subgrade strength design value	Kenya, Tanzania and Uganda use CBR as subgrade strength and there is variation in the way CBR design value is established, while French standards which is followed by Burundi and Rwanda characterises subgrade strength in term of modulus value. The study recommends the adoption of the statistical approach to estimating subgrade CBR design value for a section, which takes the 90%-ile CBR test value for a homogeneous section as the CBR design value.
Subgrade class and improved layers	There is variation in the grouping of subgrade classes and warrants for improved subgrade layers in the manuals used in Kenya, Tanzania and Uganda. It is therefore recommend that Subgrade design classes should be categorized into three classes: S3, S7 and S15 where G15 is natural gravel/soils with nominal CBR value of minimum 15, G7 is natural gravel/soils with nominal CBR value of minimum 7, and G3 is natural gravel/soils with nominal CBR value of minimum 3. Improved subgrade layers should only be applied where subgrade strength values are S3 and S7.

2.3.4.5 Pavement Materials

Under this design parameter, a number of factors were reviewed, compared and contrasted among EAC Member states. Following the detailed review, the study recommends codes for unbound and cemented and surfacing materials for EAC Member states, as indicated in the next chapter. It is worthy pointing out that in the UK, for instance, Dense Bitumen Macadam (DBM) can be used for roads carrying up to 80 msa, whereas a DBM thickness design for traffic loads in excess of 80 msa must include a 125 mm thick lower road base layer of Hot Rolled Asphalt (HRA), with DBM or Dense Tarmacadam (DTM) as the reminder of the road base material.

2.3.4.6 Pavement Rehabilitation Design

The study recommends the adoption of the following methods: maximum deflection, structural number and mechanistic. The transient deflection method shall be used where the existing pavement or overlay was constructed less than 3 years before the measurements, the deflection recovery (rebound) method can otherwise be used. The maximum deflection method should not be

used as the only rehabilitation design method, but only to supplement other methods in a multi-analysis approach and should not be used unless all the following conditions prevail:

- distress originates from the subgrade, and
- the base course in existing pavement is a granular or lightly cemented type, i.e. not cement stabilised (extensively cracked cemented layers may be classified as granular layers), and
- there is remaining structural life in the existing pavement, and
- future design traffic is less than 10 million. E80

The use of structural number method is based on empirical correlation between tested material properties and expected pavement performance. Laboratory tests and in-situ measurements are required to determine material strength, expressed as the material coefficient.

The South African mechanistic design shall be used where a mechanistic method is applied. It should only be applied if the following information about the existing pavement is gathered:

- pavement type (test pit log and laboratory tests)
- pavement state (surface deflections: stiff/flexible)
- layer state (test pits: wet/dry/cracked)
- layer thickness (test pit log)
- layer moduli (laboratory tests)

2.3.4.7 Rigid Pavements

The study reviewed a number of issues which deserve special attention for successful and sustainable application of cement concrete pavement construction. A wide range of technical aspects of concrete pavement design have been covered. It has been pointed out that the design of concrete pavements is not just a matter of considering key design inputs which influence thickness design but also the selection, specification and constructability of features of concrete pavements. Also, it has been indicated that concrete roads have been used successfully in some developing countries and there is great potential for their use in EAC. Taking into account the special advantages of concrete pavement, it is proposed that concrete roads should be used on all heavily trafficked interurban and urban roads in the EAC region.

2.3.4.8 Super Singles Tyres

The study found that the first generation of wide base tyres (385/65R22.5, 425/65R22.5) slightly increases the induced pavement damages. However, with the exception of 445/50R22.5, results on the performance of second generation of wide base tyres are still mixed in the sense that some studies have found 455/55R22.5 tyres to induce approximately the same pavement response or damage as the standard dual assembly while others have found that these tyres still cause greater fatigue damage, subgrade rutting, and HMA rutting (densification) compared to conventional dual-tire assembly when carrying the same load. Additionally, the 455/55R22.5 is noted to cause less HMA rutting (shear) and base shear failure potential than the conventional dual-tire assembly. This review, and more particularly studies by COST 334 and CSIR (2010), showed that replacement of single tyres on steering axles by wide base singles results in a reduction of pavement damage. Accordingly, CSIR (2010) give recommendations which need to be considered by the EAC. In line with the conclusion and recommendations drawn by CSIR (2010) and the studies reviewed in the previous sections, it is recommended that the use of super single tyres of 385 mm and conventional tyres of 315 mm as single tyres on legal axles and axle units should be banned forthwith. Additionally, it is recommended that:

- Because of the continued development of new and improved tires, it should not be concluded that all new generation of wide-base tires will increase pavement damage. Rather, EAC should initiate and sustain continued research and investigation into the immediate and prolonged effects of tires as they are developed. This includes analysis through mechanical models, measured pavement models, and field performance.
- Since the investigation of effects of wide base tires on pavements involve assessment of pavement responses in terms of stress, strain, and deflections, it is high time for the EAC member states to use analytical methods for the design of new or rehabilitation of pavements.

2.3.4.9 Application of Analytical Pavement Design Method in the Longer Term

Following the review of analytical pavement design methods, it is recommended that EAC member states should consider and start adopting an analytical pavement design method for the region. The method should be based on principles of mechanics, and the theory of material behaviour. It should be able to take into account local conditions of climate, traffic, available local materials, and other factors. With such a method it will be possible to carry out structural analysis of pavements and predict pavement performance from the calculated parameters. However, in order for such a method to be successful, member states will have to invest in capacities for characterisation of the pavement layers and subgrade materials which are a necessary input into the models used to calculate pavement response parameters. Annex A 3 provides details of the review and the resulting recommendations.

2.3.4.10 Bridge Design Standards

The EAC member states are currently using developed countries bridge design standards. The study found out that Burundi and Rwanda use French design standards while Kenya, Tanzania and Uganda use British design standards. It was further noted that the SADC region has its own bridge design standard, the SATCC code of practice for bridge design. It was also noted that BS design standards were withdrawn from use in the UK on 31st March 2010 and as a result UK is now using BS EN which is customised to Eurocodes. These are standards currently used across the European Union to deliver a common approach to design, whilst at the same time allowing the application of country specific construction requirements such as wind loads or earthquake resistance.

In recommending increase in GVM, the PADECO report assumed the use of BS in the EAC region. However, the continued application of BS standard which has been superseded by the European Standards (EN Series) in EAC member states is no longer tenable. The study therefore, recommends that EAC member states use Euro code 1, Part 2 final draft prEN 1991 - 2. Actions on structures and Part 2: Traffic loading on bridges. In the longer term, however, it will be desirable for the EAC region to develop its own Bridge Design Standards.

2.3.5 Impact of Harmonisation and Implementation strategy

The impacts of harmonising pavement and bridge design standards include the provision of suitable pavement structures that will meet functional and structural performance criteria through the service life of the pavement, and uniform and comfortable riding surfaces to all road users thus resulting in the provision of the same quality of service throughout the region. Additionally, it is proposed that the recommended empirical-based standards be implemented in all new road designs, and road rehabilitation and reconstruction projects in the shorter term, i.e. within 10 years and beyond this period analytical methods should be used in the EAC Region.

2.4 Harmonisation of Specifications for Road and Bridge Works

2.4.1 Specifications for Road Works Adopted by EAC Member states

It has been observed that specifications for Burundi and Rwanda are based on the French and American standards respectively, while Kenya, Tanzania and Uganda are using their own specifications derived from British standards. Table 2-19 provides a summary of design standards that are used by the EAC member states.

Table 2.19: Specifications for Road and Bridge Works in the EAC Member states

Country	Specification	Year	Remarks
Burundi	French (AFNOR) specifications		-
Kenya	Standard Specification for Road and Bridge Construction	1986	New standards and specifications are currently under preparation
Rwanda	French (AFNOR) specifications		Moved to AASHTO specifications
Tanzania (Mainland)	Standard Specification for Road works	2000	-
Tanzania (Zanzibar)	Standard Specification for Road works	2000	-
Uganda	General Specifications for Road and Bridge Works	2005	-

2.4.2 Potential Areas for Harmonisation and Improvements

There are a number of convergences and divergences in the requirements for earthworks, pavement layers of natural gravel materials, cemented layers, crushed aggregate base course, and bituminous layers in the existing Standards Specifications for EAC member states. In some cases, it was found that some test methods for materials have been replaced by new materials tests. Based on a detailed review and comparison of the requirements, the study recommends higher standard specifications for each of the above items. Chapter 4 of Annex A provides detailed comparison of the requirements and recommendations.

2.4.2.1 Earthworks

Table 2-15 shows the recommendation for earthworks material type used for the improved subgrade layers as detailed in the standards of the EAC member states. G15, G7, G3 and geo-textile and/or rock fill (DR) materials are the most common materials for earthworks. Specifications for Tanzania and Uganda give common compaction requirements for earthwork materials and threshold values of CBR, CBR swell, PI, maximum particle size and maximum layer thickness as requirements for earthworks while the specifications for Kenya specifies only compaction requirements for earthworks. Detailed comparative assessment of the requirements is provided in Annex A Chapter 4. It is recommended that all the EAC member states should adopt the requirements for earthworks given in the General Specifications for Road and Bridge Works, Uganda (2005).

2.4.2.2 Gravel Materials

Gravel materials are used widely throughout the EAC member states for various applications as pavement layers in flexible pavements, and also as a wearing course in engineered gravel roads. The general specifications for Tanzania and Uganda cover the requirements for GW, G80, G60, G45, G30, G25 materials. Such materials codes are missing in the general specifications for Kenya. The material properties for which the minimum and maximum requirements are set include grading, CBR, Atterberg limits, shrinkage limits, particle strength, and compaction. In comparison to the specifications for Kenya, the current specifications for Tanzania and Uganda cover a wide range of these materials properties. The requirements for G30 for Uganda differ from those of G25 for Tanzania in terms of CBR value and Atterberg limits. Since the specifications for Uganda are the

most updated and stringent ones, it is proposed to drop G25 material from the specifications for Tanzania. The specifications for Kenya, which are the oldest compared to others, provide different materials requirements for subbase, base course GW materials as compared to the same material requirements for Tanzania and Uganda. Detailed comparative assessment of the requirements for natural gravel materials is provided in Annex A Chapter 4. It is recommended that all the EAC member states should adopt the requirements for unbound gravel materials given in the General Specifications for Road and Bridge Works, Uganda (2005).

2.4.2.3 Chemically stabilised Materials

Stabilised materials are widely used in the EAC member states and currently have varying specifications. Table 2-20 shows the recommended specifications, for a detailed discussion and some more results see as Annex A Chapter 4.

Table 2-20: Materials requirements for cemented layers

Material properties	C2	C1.5	C1.0	C0.7	CM
Min CBR (%) for lime or liquid ionic stabilised material		80	60	45	30
After stabilisation					
Min UCS (MPa)	2.0	1.5	1	0.7	0.5
Before stabilisation					
Soaked CBR (%) at 95% MDD of BS-Heavy	Min 30	Min 30	Min 20	Min 20	No requirement
Plasticity Index (%)	Max 20	Max 20	Max 25	Max 25	Max 35
Aggregate strength TFV _{dry}	Min 50 kN	Min 50 kN	No requirement	No requirement	No requirement
Grading Modulus (GM)	Min 1.5	Min 1.5	Min 1.2	Min 1.0	No requirement
Organic Content	Max 0.5%	Max 0.5%	Max 1%	Max 1%	Max 25
Sulphate (SO ₃) content	Max 0.25%				
Max. particle size	½ of compacted layer thickness but not > 50 mm				

Adapted from Specifications for Uganda and Tanzania

When a stabilising agent is selected the following factors need to be considered:

- The physical composition and properties of the material, for example liquid limit, plasticity index (PI), clay content, and initial consumption of lime.
- The purpose of stabilisation, for example modification or cementation and whether rapid or slow increase in strength is required.
- The relative availability and cost of the different stabilising agents.

It is therefore *recommended to use the guidelines shown in Table 2-21 to select a stabiliser.*

Table 2-21: Selection of Stabilising Agent

% passing the 0.075 mm sieve BS 1377-2	Plasticity index (%) BS 1377: Part 2	Best suited stabiliser
Less than 25%	PI is less than 6 or PI x (% passing 0.075 mm) is less than 60	Cement only
	6 - 10	Cement preferred
	More than 10	Cement and/or lime
More than 25%	Less than 10	Cement preferred
	10 – 20	Cement and/lime
	More than 20	Lime preferred

Adopted from Specifications for Uganda and Tanzania

2.4.2.4 Crushed aggregate Base Course

This material is widely used in the EAC member states as the base course of choice. The recommended specifications are shown in Table 2-22, whereas Annex A Chapter 4 provides a detailed discussion about the practical considerations required to be taken into account when selecting and preparing crushed aggregate for base course.

Table 2-22: Specifications for crushed aggregate base course materials

(a) Materials requirements

Material Type	Requirements					
	Compaction	Max. PI	Max. LS	TFV	TFV: soaked/dry	Max. FI
CRS	98% of BS-Heavy	6	4	110kN	60%	35%
CRR	102% of BS-Heavy	NP	3	110kN	75%	35%

Adopted from: *General Specifications for Road and Bridge Works, Uganda (2005)*

(b) Grading requirements

Sieve size (mm)	Grading limits (% passing sieve)			
	CRS		CRR	
	Coarse type	Fine type	Coarse type	Fine type
50	100			
37.5	90 – 100	100	100	
28	75 – 95	90 – 100	87 – 97	100
20	60 – 90	65 – 95	75 – 90	87 – 97
10	40 – 75	40 – 70	52 – 68	62 – 77
5	29 – 65	29 – 52	38 – 55	44 – 62
2	20 – 45	20 – 40	23 – 40	27 – 45
1.18	17 – 40	15 – 33	18 – 33	22 – 38
0.425	12 – 31	10 – 24	11 – 24	13 – 27
0.075	5 – 12	4 – 12	4 – 12	5 – 12

Adopted from: *General Specifications for Road and Bridge Works, Uganda (2005)* and *Standard Specifications for Road Works, Tanzania (2000)*

2.4.2.5 Conventional Bituminous Materials

Bituminous materials are used widely in the EAC member states for various road construction activities mostly for spray applications and also for construction of asphalt structural layers. Table 2-23 shows the recommended specifications for these materials. The table shows the recommended specifications for priming and bituminous binders for bituminous base course and asphalt concrete surfacing, respectively. Further discussion of this is provided in Annex A of Chapter 4.

Table 2-23: Binder specifications for bituminous base and asphalt concrete surfacing

(a) Binder specifications for bituminous base course

Material Type	Requirements				
	Compliance standards	Aggregate for blinding	Application Rate	Temperature (°C)	
				Storage	Spraying
MC-30 cut-back bitumen	BS EN 12591:2000	Crushed rock or river sand (100% pass. 6.3 mm & not more than 10% passing 2.36 mm	0.4 – 2.7 l/m ² and 1.0 l/m ² for bidding purposes	60/40 ¹	45-60
MC-70 cut-back bitumen	BS EN 12591:2000			80/50 ¹	60-80
Invert bitumen emulsion	BS 432 or SABS 308			ambient	Ambient above 10°C

¹ Up to 24 hrs/Over 24 hrs

Adopted from: *General Specifications for Road and Bridge Works, Uganda (2005)*

(b) Binder specifications for asphalt concrete surfacing

Type of binder	Specifications
Penetration grade bitumen	BS EN 12591:2000
Performance Grade asphalt	SP-1 ^a
Cutback bitumen	BS EN 12591:2000
Bitumen emulsions, anionic	BS 434:1984
Bitumen emulsions, cationic	BS 434:1984

Adopted from: *General Specifications for Road and Bridge Works, Uganda (2005)*

In additional to these requirements, foam bitumen should meet the following requirements when tested using a 10 litre cylindrical bucket:

- The ratio between the volume of the bitumen in a foamed state and in an un-foamed state should be minimum 15.
- At least one of the following requirements should be met:
 - the time from the foam is ejected into atmospheric pressure until the volume has decreased to half its maximum volume should be minimum 15 seconds.
 - the ratio between volume of bitumen in a foamed state and in an un-foamed state should be minimum 7.5 after 15 seconds have elapsed since the foam was ejected into atmospheric pressure.

2.4.2.6 Modified bituminous binders

Bitumen-Rubber: It is recommended that all the EAC member states should adopt the following specifications for bitumen-rubber binder

- Base bitumen of 60/70, 80/100 or 150/200 penetration grade bitumen or a blend of any two or all three grades to provide a product with the required viscosity.
- Rubber be obtained by processing and recycling pneumatic tyres. It should be pulverised, free from fabric, steel cord and other contaminants. A maximum of 4% by mass of fine particle size calcium carbonate, or talc, may be added to the rubber crumbs to prevent the rubber particles from sticking together. At the time of use the crumbs should be free flowing and dry and comply with the requirements given in Table 2-24.

Table 2-24: Requirements for rubber particles for use in bitumen-rubber binder

Sieve analysis		Test Method
Sieve size (mm)	Percentage passing by mass	
1.18	100	BR6T (Sabita)*)
0.60	40-70	
0.075	0-5	
Other requirements		
Natural rubber hydro-carbon content	30% (minimum)	BS 903 Parts B11 and B12
Fibre length	6 mm (maximum)	-
Relative density (kg/m ³)	1100-1250	BR9T (Sabita)

*Southern African Bitumen and Tar Association

Adopted from specification for Uganda and Tanzania

Extender oils should be petroleum derived material of high aromaticity and are required to comply with specifications shown in Table 2-25.

Table 2-25: Requirements for extender oils

Property	Requirements
Flash point	180 ⁰ C
% by mass of saturated hydrocarbons	25% (max)
% by mass of aromatic, unsaturated hydrocarbons	50% (min)

Adopted from specification for Uganda and Tanzania

For a bitumen-rubber blend, the study recommends a distillate of hydrocarbon and bitumen-rubber blend, including extender oil and /or diluents, which comply with the requirements given in Table 2-26a. Further, the bitumen-rubber binder should comply with the requirements given in Table 2-26b.

Table 2-26: Requirements for bitumen-rubber blend

(a) Composition, reaction temperature and time

Property	Requirement
% rubber by mass of total blend	20%-24%
% extender oil by mass of total blend	6% (max)
% of diluent by mass of total blend	7% (max)
Blending/Reaction temperature	170 ⁰ C – 210 ⁰ C
Reaction time	0.5 - 2 hours

Adopted from specification for Uganda and Tanzania

(b) Test methods

Property	Requirements	Test Method
Minimum compression recovery: <ul style="list-style-type: none"> • after 5 minutes • after 1 hour • after 4 hours 	70% 70% 48-55%	BR3T (Sabita)
Ring-and-ball softening point	minimum 55 ⁰ C	BS EN 12591:2000
Resilience	13%-35%	BR2T (Sabita)
Dynamic viscosity (Haake at 190 ⁰ C)	20 35 cPas	BR5T (Sabita)
Flow (mm)	20 – 75	BR4T (Sabita)

Adopted from specification for Uganda and Tanzania

Homogeneous Cold Applied Modified Binders: It is recommended that the requirements given in Table 2-27 for cationic modified bitumen emulsion containing SBR or SBS solids should be used in the EAC member states.

Table 2-27: Requirements for cationic modified bitumen emulsion

Polymer modifier	Required properties, grade of base bitumen	Minimum modified binder content (%)	Minimum viscosity at 50 ⁰ C Saybolt Furol (sec.)	Maximum residue on sieving (g/100ml)	Particle charge	Sedimentation after 60 rotations
SBR	80/100	70	80	0.25	Positive	Nil
	150/200	65	70	0.25	Positive	Nil
SBS	80/100	70	80	0.25	Positive	Nil
	150/200	65	50	0.25	Positive	Nil
Test Method	-	ASTM D244	ASTM D244	SABS 548	SABS 548	SABS 548

Adopted from specification for Uganda and Tanzania

A volatile solvent flux content of up to 3% mass by mass of the bitumen may be added to enhance emulsion performance with regard to prevailing climatic conditions. Also, the study recommends that

the properties of the recovered modified bitumen using a rotary vacuum evaporation method or simple evaporation method to comply with the requirements in Table 2-28.

Table 2-28: Properties for recovered modified bitumen

Polymer modifier	Required properties				Elastic recovery (%)		
	Grade of base bitumen	Minimum Softening point (°C)	Minimum dynamic viscosity at 135°C (Pa.s)	Minimum ductility at 10°C (mm)		at 5°C (%)	at 50°C (%)
SBR						90 90	100 100
SBS	80/100 150/200	60 47	1.2 1.0	500 500	55 60	90 90	100 100
Test Method	-	ASTM D36	ASTM D4402	DIN 52013	DIN 52013	DIN 52013	TMH method B11
Note: Modified binder is bitumen plus polymer.							

Adopted from specification for Uganda and Tanzania

Homogeneous Hot-Applied Modified Binders: The study recommends that the requirements for any polymer other than the generic types listed in Table 2-29 used for the manufacture of homogeneous hot-applied modified binders should be indicated in the Special Specifications.

Table 2-29: Required properties for generic type of modified binders

Genetic type of modified binder	Required properties								
	Grade of Base bitumen	Minimum Softening point (°C)	Minimum dynamic viscosity at 135°C (Pa.s)	Minimum ductility at 10 °C (mm)	Minimum elastic recovery 10°C (%)	Maximum stability difference (°C)	Minimum adhesion		
							at 5°C (%)	at 50°C (%)	
Plastomer polymer	150/200	48	0.5	300	45	2	90		
Elastomer polymer	SBR	80/100	47	1.0	1000	55	2	90	100
	SBS	80/100	49	1.0	500	60	2	90	
	SBR	150/200	45	0.5	1000	55	2	90	
	SBS	150/200	47	0.5	500	60	2	90	100
Test Method	-	-	ASTM D36	ASTM D4402	DIN 52013	DIN 52013	DIN 52013	TMH 1 Method B11	

Adopted from specification for Uganda and Tanzania

Furthermore, where applicable the following details should also be indicated in the Special Specifications:

- Generic type (plastomer or elastomer) and type polymer.
- Grade base bitumen (80/100 or 150/200) required.

2.4.2.7 Aggregates for Bituminous Mixes

There are variations in the specifications used by the EAC member states in the production of asphalt mixes. Table 2-30 shows the recommended requirements for aggregates to be used in the mixes and tests for particle shape, aggregate strength, cleanliness, soundness and coating and stripping. A detailed discussion, including particle size distribution for the same can be found in Annex A, Chapter 4.

Table 2-30: Recommended specifications for bituminous base courses and asphalt concrete surfacing layers

Property	Requirement	Test Method
Cleanliness	A minimum value of 45 of sand equivalent of the fine aggregate Plasticity index be less than 4%	AASHTO T176 BS 1377-2
Particle shape	The flakiness index of the course aggregates be less than 25%	BS 812-105: 1989
Aggregate strength	TFV should be not less than 110 kN and wet/dry ratio not less than 75%	BS 812-111:1990
Absorption	Water absorption of course aggregates not exceed 2% by mass	BS 812-2:1995
Soundness	The sodium soundness be less than 12%	AASHTO T104
Coating and stripping test	The coating and stripping of the coarse aggregates be greater than 95%	AASHTO T182

Adopted from specification for Uganda

2.4.2.7 Mix Design Requirements for Asphaltic Mixes

Generally, the properties and performance of asphalt mixtures are influenced by the choice and properties of materials to be used in the mix and the employed mix design methods. The review has found that currently two mixture design methods that are used widely in the EAC member states are Marshall and Super-pave mix design methods. It is recommended to use these two methods in mix design with the attendant specifications. Annex A Chapter 4 contains a detailed discussion.

In accordance with these mix design methods, the study therefore recommends the adoption of the materials (binder and aggregate gradation) requirements, and Marshall Mix Design and Superpave Mix design requirements for asphalt concrete surfacing given in the General Specifications for Road and Bridge Works, Uganda (2005).

Mix design Requirements for hot mixed bituminous base and binder courses

Hot mixed bituminous courses in the existing specifications for EAC Member states are: DBM40 and DBM30 are common in Kenya, Tanzania and Uganda while LAMBS are specified for Tanzania and DBM courses (with 37.5 mm nominal size of aggregates) and binder course (with 25 mm nominal aggregate sizes) employing Superpave Mix Design Method are specified for Uganda. In view of the review, comparison and discussion about hot mixed asphalt base course design given in Annex A Chapter 4, it is recommended that the grading and design requirements for DBM employing Marshall Mix Design and Superpave Mix Design given in the General Specifications for Road and Bridge Works, Uganda (2005) should be adopted by all the EAC member states.

Mix design Requirements for penetration macadam base course

Penetration macadam base course is only specified in the specifications for Tanzania. Other EAC Member states have not included this type of base course in their specifications. Thus, the study recommends the materials and mix design requirements given in Table 2-31 for penetration macadam base course.

Table 2-31: Requirements for penetration macadam base course

Sieve size (mm)	Penetration macadam		
	PM80	PM60	PM30
Main fraction			
100	100	-	-
75	75-100	100	-
63	-	80-100	-
50	0-50	0-50	-
37.5	0-25	0-25	100
28	0-5	0-5	80-100
20	-	-	0-50
14	-	-	0-25
10	-	-	0-5
Key stone*			
50	100	-	-
37.5	85-100	100	-
28	0-50	85-100	-
20	0-25	0-50	100
14	0-5	0-25	85-100
10	-	0-5	0-55
6.3	-	-	0-25
5	-	-	0-10
Layer thickness (mm)	125	100	50
Bitumen type	Penetration grade 80/100 or 60/70		
Bitumen spray rate for bidding purposes (l/m ²)	3.5	3.5	2.5

Adopted from specification for Tanzania

Mix design Requirements for cold mixed bituminous base course

Unlike the penetration macadam base course, cold mixed bituminous base course has been specified in the specifications for Kenya, Tanzania and Uganda. Specifications for cold mixed bituminous base course for Tanzania and Uganda are similar. The study recommends specifications shown in Table 2-32 for mix design of FBMIX and BEMIX cold mixed bituminous base courses to the EAC member states.

Table 2-32: Specifications for cold mixed bituminous base courses

Sieve size (mm)	FBMIX (% passing)	BEMIX (% passing)
37.5	100	100
28	80-100	80-100
20	60-95	60-95
10	42-78	35-70
5.0	30-65	25-50
2.0	20-50	18-35
0.425	10-30	10-25
0.075	5-15	5-8
Properties of mixture and laboratory test method	FBMIX	BEMIX
Bitumen type	Foamed	Emulsion
Nominal consumption of bitumen (litres/m ³ of compacted material) for bidding purpose	90	90
Marshall stability tested at 400C (N), BS EN 12591:2000	6000	4500
Marshall flow tested at 400C (mm),	2-4	2-4

ASTM D 1559-89		
Minimum E-modulus tested at 290C by indirect tensile strength method or alternative approved methods (MPa), ASTM D 3967	1600	1200
Minimum moisture content at the time of laying (%)	Mix design moisture less 1.5% points	
Maximum moisture content at the time of laying (%)	Mix design moisture plus 0.5% points	
Minimum compacted field density (% of Marshall dry density)	96	

Adopted from specification for Tanzania and Uganda

Surface Dressings

Bituminous binders: In view of the technical advantages associated with the use of emulsions, the study recommends the use of emulsions in surface dressing operations for the EAC region.

Requirements for surface dressings: Review of the available specifications revealed that aggregates for surface dressing should consist of clean, tough, durable fragments of crushed stone free from any deleterious matter and comply with the requirements for grading, particle shape, aggregate strength, and average least dimension (ALD). It is recommended that the specifications given in Tables 2-33 and 2-34 for single and double surface dressings, respectively, should be adopted by the EAC member states.

PREPARATION OF A TRANSPORT FACILITATION STRATEGY FOR THE EAST AFRICAN COMMUNITY

Table 2-33: Requirements for single surface dressings

Chippings							
Sieve size (mm)		Chipping, nominal size of aggregates (% passing)					
		20 mm	14 mm	10 mm	7 mm		
25		100					
20		85-100	100				
14		0-30	85-100	100			
10		0-5	0-30	85-100	100		
6.3		-	0-5	0-30	85-100		
5		-	-	0-5	0-30		
2.36		-	-	-	0-5		
Fines: 0.425		<0.5	<1.0	<1.0	<1.0	<1.5	
Dust: 0.075		<0.3	<0.5	<0.3	<0.3	<1.0	
Nominal Sizes	Max flakiness index (FI)	TFV (kN)	Ratio TFV soaked to dry (%)	ALD	Binder hot spray rate (l/m ²)	Aggregate Spread rate	Test Method
20	20	For AADT>1000:160 For AADT<1000:120	75	11 – 15	1.80	19 kg/m ²	BS812:105.1 & BS812:111
14	25			8 – 10	1.50	14 kg/m ²	
10	25			5 - 6.5	1.10	11 kg/m ²	
7	30			2 – 4	0.80	7 kg/m ²	

Adopted from specification for Tanzania and Uganda

PREPARATION OF A TRANSPORT FACILITATION STRATEGY FOR THE EAST AFRICAN COMMUNITY

Table 2-34: Requirements for double surface dressings

Chippings						
Sieve size (mm)	Chipping, nominal size of aggregates (% passing)				ALD	Test Method
	20 mm	14 mm	10 mm	7 mm		
25	100					
20	85-100	100				
14	0-30	85-100	100			
10	0-5	0-30	85-100	100		
6.3	-	0-5	0-30	85-100		
5	-	-	0-5	0-30		
2.36	-	-	-	0-5		
Fines: 0.425	<0.5	<1.0	<1.0	<1.5		
Dust: 0.075	<0.3	<0.5	<0.3	<1.0		

Nominal Size of aggregate (mm)	Max flakiness index (FI)	TFV (kN)	Ratio TFV soaked to dry (%)	ALD	Nominal rates of application		Test Method
					Binder spray rate (l/m ²)	Aggregate Spread rate	
20	20	For AADT>1000:160 For AADT<1000:120	75	11-15	1.8 for AADT<200	19 kg/m ²	BS812:105.1 & BS812:111
					1.5 for AADT 200-1000		
					1.2 for AADT>1000		
14	25			8-10	1.4 for AADT<200	14 kg/m ²	
					1.1 for AADT 200-1000		
					1.0 for AADT>1000		
10	25	5-6.5	1.2 for AADT<200	11 kg/m ²			
			1.0 for AADT 200-1000				
			0.9 for AADT>1000				
7	30	2-4	0.9 for AADT<200	7 kg/m ²			
			0.8 for AADT200-1000				
			0.7 for AADT>1000				

Adopted from specification for Tanzania and Uganda

Sand Seals and Slurry: The specifications for Kenya, Tanzania and Uganda give almost similar specifications for binder for sand seals and slurry with regard to its type and required properties, and this is particularly so for the case of specifications for Tanzania and Uganda. Likewise, specifications for Tanzania and Uganda recommend crusher dust or clean river sand free from lumps of clay or any other deleterious matter as aggregate for sand seal, and it should comply with the requirements in the table below. The study, therefore, recommends the requirements given in Tables 2-35, 2-36 and 2-37 for binders and aggregates for sand and slurry seals to the EAC member states. Additionally, aggregate for slurry seals should be approved crusher sand obtained from a parent rock having a TFV value of not less than 110 kN or a mixture of such crusher sand and an approved clean natural sand, where the mixture does not contain more than 25% of natural sand.

Table 2-35: Recommended binders for sand and slurry seals

Sand Seal	MC 800 cut back bitumen MC 3000 cut-back bitumen Spray-grade cationic emulsion (65% or 70% of net bitumen) Spray-grade anionic emulsion (65% or 70% of net bitumen)
Slurry Seal	MC 800 cut back bitumen MC 3000 cut-back bitumen Spray-grade cationic emulsion (65% or 70% of net bitumen) Spray-grade anionic emulsion (65% or 70% of net bitumen)

Adopted from specification for Tanzania and Uganda

Table 2-36: Grading limits requirements for sand seal

Sieve size (mm)	Percentage passing sieve (% by mass)	
	Natural river sand	Crusher dust
10	100	100
5	85 – 100	85 – 100
1.18	20 – 60	20 – 80
0.425	0 – 30	-
0.300	0 – 15	-
0.150	0 - 5	0 – 30

Adopted from specification for Tanzania and Uganda

Table 2-37: Grading limits requirements for slurry seal

Sieve size (mm)	Percentage passing sieve (% by mass)	
	Fine type	Coarse type
10		100
5	100	85-100
2	90-100	50-90
1.18	60-90	32-70
0.425	32-60	20-44
0.150	10-27	7-20
0.075	4-12	2-8

Adopted from specification for Tanzania and Uganda

2.4.3 Impact of Harmonisation of Specifications for Roadworks

The member countries do have specifications of their own. These proposed specifications are intended to provide the EAC members states Road Agencies with a quick reference to the use of specifications roadworks. It is intended that the provisions of these standards be a reference and not the final authority and as such the proposed specifications do not have a direct impact on the performance of existing road pavements. It is advised that member states should be making reference to the proposed specifications in the design, maintenance and rehabilitation of roads that form the regional trunk road network for uniform performance of this network. It can be stated that through harmonisation of specifications for road and bridge works optimum balance between road construction costs, properties of availability materials, environmental considerations, construction method, and previous experience of the performance of materials under consideration can be achieved during materials selection and design for roadworks.

2.5 Harmonisation of Road and Bridge Maintenance Standards

2.5.1 Objectives

This chapter presents the main findings of the harmonisation of road and bridge maintenance standards study. The study report is presented in Chapter 5 of Annex A. It presents a general review of road and bridge maintenance problem as well as maintenance principles. It goes further to present the road and bridge maintenance situation and practices for all East African member. Most importantly, the chapter suggests areas of harmonisation and improvement.

2.5.2 Maintenance Management Principles

Almost all countries the world over are confronted with acute shortage of resources and genuine competing demands for the same from various development and social service programmes. Consequently, not all road sections that need maintenance or rehabilitation can be funded. Under such budget constraints, an agency responsible for road maintenance should be able to prepare road maintenance programmes based on the following questions:

- Which treatments and for which road sections have the highest pay-off?
- Which road sections can be funded under the given budget constraints?
- What are the effects of various budget levels on long term road network condition and the associated agency and user costs?
- What is the optimum budget level which would keep the road network at the desired level of serviceability?

To answer these questions, a proper Road Maintenance Management System (RMMS) which is capable of looking into the future and predict the network condition under different maintenance strategies is essential. In addition, not only that the RMMS must be able to select cost-effective maintenance programmes but also it must have the ability to optimise maintenance expenditures under budget constraints. Such tools help to decide when, where and what should be done to keep the roads in economically efficient condition.

However, it is not only the problem of road maintenance prioritisation under budget constraint that has to be solved. There should be a proper communication between road administration and decision makers. This is mainly due to the fact that decision makers want to be sure that funds allocated for the road maintenance are used properly. For proper management and adequate fulfilment of the decisions made in the road sector, the following should be in place:

- An established and up kept legal and institutional framework
- A clear definition of the role of the Ministry and the role of the Road Administration

- A policy framework for the entire road sector
- Stable funding for longer term
- Proper managerial process or procedure for road maintenance
- Improvement in the overall management of road maintenance activities
- Competence-based education and training of human resources in the road sector.

2.5.3 Situational Analysis

Review of institutional arrangement indicates that all member states have put in place similar institutions for carrying out road and bridge maintenance. In each partner state there is a ministry that deals with road and bridge maintenance at policy and coordination level.

Each partner state has established an executive agency that is responsible for day to day management of road and bridge maintenance activities. A slight difference can be observed concerning the responsibilities of the established agencies. While agencies established in 4 member states are responsible for roads only, the Rwanda Transport Development Authority (RTDA) also deals with other modes of transport.

In addition, each partner state has established a body that deals with funding of road and bridge maintenance. Differences in terms of sources of funds and distribution criteria between different classes of roads are observed from one country to another.

However, it has been observed that the road maintenance policies in all member states do not reflect road user needs in terms of defining clearly the level of service and economic benefits to be provided to road users. Furthermore, in all partner states, there is no mention of the need to have similar level of service across all EAC member states.

It has also been observed that EAC member states are at different levels of Road Maintenance Management System (RMMS) and Bridge Management System (BMS) development and utilisation. In addition, countries which have attempted to develop these systems use diverse principles and criteria in terms of data collection methods, maintenance standards, determination of road and bridge maintenance plans and programmes and execution of road and bridge maintenance activities. This results into different road and bridge condition and hence different level of service and economic benefits which road users get from one partner state to another.

Insofar as implementation phase is concerned, all EAC Member states are phasing out the force account methods. However road maintenance contracts that have been introduced in most countries are based on a schedule of unit rates and measured quantities. In addition, Tanzania has introduced performance based contracts which have not performed very well so far. Furthermore, it was found that Kenya is developing standards for the performance based contracts.

2.5.4 Potential Areas for Harmonisation and Improvement

The review has identified the following harmonization and improvement issues:

2.5.4.1 Policy Framework

A harmonised policy framework shall set uniform objectives in terms of the level of service which the road users should receive across the EAC member states This shall include specification of level of comfort and economic benefits.

It is proposed here that in all member states the road and bridge maintenance policy should reflect the customer (road users) needs. The policy should include, inter alia, the following goals:

- Support the socio-economic goals at national and EAC level.

- Provide a minimum Level of service to the road users across EAC member states
- Provide Safe roads
- Minimise the sum of road agency and user costs
- Minimise damage to the environment

2.5.4.2 Data to be collected.

It has already been noted that a highway maintenance management information system lies at the heart of the management cycle. However, data collection is very expensive. In this regard, the cost of data acquisition and storage is likely to be the most expensive aspect of implementing and operating a highway management system. It is therefore essential that appropriate data design is undertaken to ensure that the data to be collected for a particular purpose within the highway management cycle is relevant, appropriate, reliable and affordable. Three guiding principles should be considered when deciding which data to collect. These principles are:

- Collect only the data needed;
- Collect data at the lowest level of detail sufficient to make appropriate decisions; and,
- Collect data only when they are needed.

It is therefore recommend that surface condition and structural evaluation should be done through roughness measurements using Vehicle Mounted Bump Integrator (VMBI) and Dynamic Cone Penetrometre (DCP) measurements, respectively. Previous studies have shown that these methods provide relatively accurate results at reasonable cost. In so far as traffic is concerned, it is proposed that manual classified traffic counts and axle load measurements should be carried out regularly. Table 2-38 presents the proposed data collection regime for road maintenance.

Table 2-38: Proposed Data Collection Regime for Road Maintenance

S/N	Assessment/ Purpose	Data Item	Frequency	Responsibility
1	Road Inventory	Road Network Physical Elements	Once-off exercise (verification after 5 yrs)	Executive Agency
2	Ride Quality	Roughness	Annually	Executive Agency
3	Functional Evaluation	Surface Distress	Annually	Executive Agency
4	Structural Capacity	Mechanical Properties	Every 3 years	Executive Agency
5	Usage (Traffic)	Traffic Volume	Annually	Executive Agency
		Traffic Loading	Every 3 Years	Executive Agency

2.5.4.3 Road Surface Riding Quality

The harmonization of road maintenance standards should be able to address the cross border riding quality in order to fulfil the functional requirement of the travelling public. This entails the adoption of uniform and consistent intervention levels for road surface maintenance within EAC member states. It is therefore recommended that road surface intervention levels be based on economic analysis and aim at keeping the road network in good condition with specified target roughness of not more than 4.0 m/km IRI.

2.5.4.4 Pavement Structural Capacity

It is a fact that roads deteriorate with time. The harmonization of road design standards will result in having roads with same initial load carrying capacity across borders. However, the amount and quality of maintenance the roads receive should also aim at keeping their load carrying capacity consistent from one road section to the other and from one country to another. This requires uniform and consistent intervention levels for structural maintenance of the roads.

It is therefore recommended that assessment of structural capacity should be based on maintaining strong pavements with specified minimum modified structural number of 3.0. This is a critical level of structural capacity for roads carrying heavy traffic.

2.5.4.5 Principles of Road Maintenance Management Systems

The harmonization process should result into provision of economic and technical efficiency across the region. It is therefore essential that the basis for decision making on investment choices should be consistent and uniform across all EAC countries. It is suggested here that each partner state should develop or adapt a Road Maintenance Management System (RMMS) able to support decisions on the selection of cost-effective maintenance programmes and capable of optimisation of maintenance expenditures under budget constraints.

This study recommends that the Road Maintenance Management Systems (RMMS) should be based on economic analysis (Life Cycle Cost and Benefit Analysis) aiming at minimising the sum of agency and road user cost while maintaining a certain minimum level of service to the road users. Experience has shown that economic based methods result in improved road network condition, over time, at a relatively low budget. HDM4 can be a very useful tool as support software for Road Maintenance Management Systems. In this regard Member states should evaluate, for possible adaptation, the TANROADS Road Maintenance Management System which is at a very advanced stage.

2.5.4.6 Bridge Maintenance System

Bridges are part of road transport infrastructure. They therefore need to be properly maintained for effective and smooth movement of goods and people through the road network. In this regard, bridge managers must make decisions pertaining to maintenance and improvements that take into account both funding and overall needs of the highway system.

However, the review carried out in this study indicates that most EAC member states have not done much in development and utilization of Bridge Maintenance Systems. At the moment Tanzania is relatively advanced in this aspect. It has developed comprehensive bridge inventory, inspection and maintenance procedures. Additionally, TANROADS has developed a computerised Bridge Maintenance System known as TANBRIDGEMAN.

Consequently, the following sections propose bridge maintenance programme, data collection regime and data evaluation as borrowed from the Bridge Management System for Tanzania (BMST).

2.5.4.7 Bridge Maintenance Programme

The maintenance programme should be designed to include prevention of deterioration and damage, prompt detection of deficiencies and early accomplishment of maintenance and repairs to prevent interruptions of operations or limitations/restriction of bridge use.

Elements of Bridge Maintenance Programme

- **Inspection:** Continuous, rigorous inspections are necessary for effective maintenance programme.
- **Maintenance:** This is the recurrent day-to-day periodic or scheduled work that is required to preserve or restore a bridge to such a condition that it can be effectively utilised for its designed purpose
 - Routine maintenance: includes adjusting bearings, complete repainting, repairing potholes, filling cracks and sealing concrete.

- Major maintenance approaches rehabilitation in that it might include the replacement of bearings, readjustment of forces such as cables, replacement of joints, fatigue crack repair, water way adjustment and other specialised activities not performed very often.

2.5.4.8 Data Collection for Bridge Maintenance

Effective support of bridge management decision making requires timely and quality data about bridge condition. The Data collection regime for bridge maintenance is presented in Table 2-39.

Table 2-39: Proposed Data Collection Regime for Bridge Maintenance

S/N	Assessment/ Purpose		Data Item	Frequency	Responsibility
1	Bridge Inventory		Historical and physical information of each bridge	Once-off exercise (verification after 5 years)	Executive Agency
2	Inspection	Informal	Observation of any damage, and obvious abnormalities such as impact damage to superstructures, bridge supports or parapets, flood damage or insecure expansion plates, erosion, scour, change of river course, formation of islands in the riverbed etc.	Not fixed	Executive Agency
		General	Visual control and assessment of all bridge elements with no material investigation. It involves thorough check of all bridge elements, e.g. approaches, potholes and related damage, settlement of the pavement, erosion, excessive vegetation, any obstructions or missing signs, cracks, spalling deflections etc.	Annually	Executive Agency
		Major	Thorough visual inspection of the entire structure supplemented by detailed measurements and material investigations. These may include both destructive and non-destructive tests such as rebound hammer test, covermeter tests, taking core samples, steel samples where possible, soil samples, stone samples etc for laboratory testing	Once in 3 years	Executive Agency
		Special	Visual inspection combined with measurements, material investigations and determination of the remaining carrying capacity of the bridge	Not fixed – done to investigate damage discovered during major inspection that needs further investigation	Executive Agency

2.5.4.9 Damage Evaluation

Degree of Damage: The degree of damage is used to quantify specific damage by indicating the extent and severity of the damage. The Bridge Management System for Tanzania (BMST) gives four characters to indicate different levels of damage as follows:

- 1** Minor damage or defects that might require any remedial action within the next 10 years
- 2** Average or slight damage or defects that require remedial action within 3 – 10 years.
- 3** Serious damage or defects that require remedial action within 1 – 3 years
- 4** Critical damage or defects that require immediate remedial action within 0 -1 year

The above characters enable the inspector to indicate the seriousness of the damage observed and the timing for their repair based on experience and professional judgement.

Consequences of Damage: These indicate the impact if the damage is not repaired in time. Again, the Bridge Management System for Tanzania considers four effects as follows:

- C:** Damage or defect that affects carrying capacity
- T:** Damage or defect that affects traffic safety
- M:** Damage or defect that affects maintenance cost
- E:** Damage or defect that affects environment/aesthetics

Assessment of damage is done by combining the degree and consequence of the damage and may result into final assessment as C1, C2, C3 or C4 for damages that affect the carrying capacity (C) of the bridge. Similarly, for damages that affect traffic safety (T) the assessment would be T1, T2, T3 or T4. On the other hand, the final assessment may be M1, M2, M3 or M4 and E1, E2, E3 or E4 for damages that influence maintenance (M) and environment (E), respectively.

It is proposed here that, rather than re-inventing the wheel, further evaluation of the Bridge Management System for Tanzania (BMST) should be done by individual EAC member states before the final decision of adapting the system is made.

2.5.5 Road Maintenance Methods - Implementation

Generally, there are two methods of carrying out road maintenance. These are force account (in-house) and contracting out to the private sector. All EAC member states are phasing out the force account methods. However, in most countries, road maintenance contracts that have been introduced are based on a schedule of unit rates and measured quantities. Nonetheless, it was noted that Uganda is going back to force account because of lack of local contractors' capacity to carry out maintenance works.

Many countries around the world have introduced new ways of contracting out road maintenance by using performance specified contracts. Experience has shown that these methods reduce maintenance costs and improve road conditions. Unfortunately, improper implementation of these schemes can produce adverse effects. In this regard, countries should allow ample time to go through a learning curve through pilot short term performance contracts before embarking fully on long term contracts. This would provide the opportunity for road administration to gain sufficient experience and improve their ability to prepare and monitor such contracts. In addition, sufficient time should be allowed for the local contractors to acquire sufficient capacity and qualifications to manage these new road maintenance contracts. Tanzania has introduced performance based contracts which have not performed very well so far. In addition, it was found out that Kenya is developing standards for the performance based contracts.

This study's recommendation is that Member states should continue with a traditional method of contracting out road maintenance based on a schedule of unit rates and measured quantities. However, a gradual approach of introducing performance based contracts should be adopted, starting with short-term pilot contracts with simple performance standards such as control of potholes and cracks and cleaning of the drainage system.

2.5.6 Environmental Protection

As with road construction activities, road maintenance can contribute to soil erosion, disturbance of water flows, chemical pollution, traffic disruption, noise, dust, and other impacts on surrounding communities and natural life. In this regard, an appropriate level of analysis, which is project specific, should be undertaken to determine the likely effects of the maintenance works on the environment. Mitigation measures should be outlined for all environmental issues identified. This requirement should be included in the bid documents so that potential bidders are aware and can submit realistic proposals.

It is therefore recommended that bid documents and road maintenance contracts should include clauses which require contractors to prepare environmental management plan outlining mitigation measures for all environmental issues identified. Clauses for use in Road Maintenance activities should include, inter alia, work-site installations, preparation and supply of gravel materials in pit or quarry, material disposal after cleaning ditches and other drainage facilities, tree planting, minimizing occupational health and safety risks.

2.5.6 Consistent Monitoring and Evaluation

Effective highway management requires that policies, standards and the effectiveness of programmes are reviewed on a regular basis. This can only be possible if a feedback mechanism, which is done through monitoring and evaluation, is in place.

The study recommend that member states should develop a comprehensive, harmonised and up to date database which would facilitate information sharing across EAC member states. This would assist in determining whether the programme was achieved according to specified standards and, most importantly, assess the effectiveness of the programme in terms of meeting the specified level of service and economic benefits to the road users. The results of this evaluation shall form a basis for review of policies and maintenance standards.

2.6 Harmonization of Road Traffic Signs, Signals and Markings

2.6.1 Objective

The objective of this section is to make recommendations for the “Harmonisation of Road Signs, Traffic Signals and Markings” as spelt out in the ToR. The recommendations are presented for road signs, traffic signals and pavement markings. The issues of pedestrians with special needs including school children and the physically challenged as well as traffic calming and implementation framework were considered to be very important and accordingly recommendations are included in this report. The chapter summarizes the results of a review of the traffic signs legislation and recommended practices in the member states and recommends areas requiring harmonization and modernization. The study report is presented in Chapter 6 of Annex A.

2.6.2 Current Practices and Proposals for Harmonization

2.6.2.1 Road signs

The review shows that generally there are no major variations in the use of road signs across the Member states. This is a result of following international conventions. To ensure greater uniformity in the installation of road signs and the road signs schedules the following are recommended.

- The guidance on mounting and placement by partner state manuals should be more explicit to reduce differences and achieve greater convenience of road users. Guidance for sign placement and sign plate sizes for roads with different design speeds should be given in the road sign manuals. Recommendations on placement and plate sizes for road signs are included in Annex A.6
- The member states regulatory, warning, guidance and information signs schedules are generally similar and are therefore integrated to form a basic road signs schedule recommended for use across the EAC member states.
 - Proposed schedules for regulatory, warning, guidance and information signs are included in Annex A.6.
 - It is recommended that speed limit sign be posted at the beginning of all rural roads and at intervals of 10 to 15 km to remind drivers and to facilitate enforcement.
 - Signs which do not conform to the recommended colour code should be replaced by approved signs.
 - When required any of the member states may adopt additional signs provided they adhere to the colour and shape codes.
 - Recommended best practice to use as guide is the current edition of the SADC Road Traffic Signs Manual (SADC-RTSM).
- The proposed shape and colour code for the different road sign categories is presented in Tables 2-40 and 2-41.

Table 2-40: Shape and colour code: Permanent regulatory signs

Group	Shape	Border	Background	Symbol
Control	Varies	Red	Varies	Usually white
Command	Circular; Rectangular	White	Blue	White
Prohibit	Circular	Red	White	Black
Reservation	Rectangular	White	Blue	White
End of Restriction	Circular	Gray	White	Gray

Table 2-41: Shape and colour code: temporary regulatory signs

Group	Shape	Border	Background	Symbol
Control	The same as permanent sign	Same as permanent sign		
Command		Black	YELLOW	BLACK
Prohibit		Red		
Reservation		Black		
End of Restriction		Same as permanent sign		

- Shape and colour code: Warning signs
 - The shape of warning sign is triangular, the apex pointing up
 - The border is red
 - The background
 - White for permanent sign
 - Yellow for a temporary sign
 - The symbol is black
- Code for guidance signs (Table 2-42)
 - Shape - rectangular
 - Size – Depends on amount of text, and lettering size which depends on the design speed
 - Direction signs: Border is white, background is green and lettering white
 - Direction to tourist attractions: Border is white, background is gray and letters or symbol is white
 - Facilities: No border, gray background and white letter/symbol

Table 2-42: Code for guidance signs

Group	Description	Border	Background	Symbol
Location	Place names	Blue	White	Black
Direction	Direction signs	White	Green	White
Tourism/services	Tourist attractions, Services and facilities	White	Gray	White
Local direction	Destination within urban areas	Gray	White	Black
Diagrammatic	Warning of change in road layout	Red	White	Black

- Shape and colour code: information signs
 - Shape: Rectangular
 - Border colour : White for the main signs, black for the supplementary signs
 - Background: Green when it is a primary sign and white if providing supplementary information to a primary sign
 - Size: supplementary information sign must have the same width as the primary sign
- Visibility requirements: Retroreflective materials should be used in all road traffic signs to ensure similar levels of visibility day and night.
- Road signs management
 - Road authorities should adopt management practices that will ensure consistent application and maintenance of road signs at all relevant locations at all times. In particular specifications for the construction of road traffic signs should adopt the use of materials that are less susceptible to vandalism and construction practices that discourage vandalism.
 - This study recommends the use of a Full Fibreglass Traffic Sign System (FFTSS) which replaces steel sign poles and panels by fibreglass. Research and Development as well as practice for over one decade in best practice countries has shown the FFTSS to be less expensive, lighter, more durable, has lower maintenance costs and less susceptible

to vandalism. Since the material currently has zero resale value in the region this is an effective way forward to overcome the problem of vandalism.

- The use of reinforced concrete sign posts to overcome the problem of vandalism is to be discouraged since the heavy post increases the probability of injury should a vehicle collide with it.

2.6.2.2 Road markings

The use of pavement markings, with the exception of the yellow line, in the member states is generally similar. The following recommendations aim at achieving greater consistency, visibility and economy:

- All pavement markings shall be white in colour (i.e. adopt all-white pavement marking system). The application of white line is cheaper and has better retroreflectivity compared yellow line under similar conditions. Advantages and the impact of this recommendation are elaborated in section 2.6.3.
- When circumstances are such that installation of road studs is necessary to ensure visibility, they should be used to supplement pavement markings. In particular road studs should be used on the entire (EAC) regional road network.
- To ensure harmonized application of pavement markings, recommended line spacing, thickness and other details are provided in Annex A.6. The recommendations are based on the best of current practices in the member states and best practices.

2.6.2.3 Traffic Signals

The review and consultation with experts in the member states revealed no major differences in the regulations and practices for operation of traffic signals in the member states. The meaning of the lights and sequencing are generally consistent and road users can quickly adapt to the slight differences that may arise as a result of choices in the order of movements and where the signals are placed. The following practices are recommended for greater clarity and consistency:

- Traffic signals based on only the red and green light (two lights system allowed in the law of two member states) is undesirable and should be disallowed.
- The installation of two sets of signal heads per approach, one set on the near side of the approach and the other set at the far side of the approach is desirable especially on arterial road junctions.
- Pedestrian signals to include sound when pedestrians are permitted to cross as an aid to those who are visually challenged.
- Indication of the red time remaining before change to green should be provided on all signals. The remaining green time before change from green to amber for vehicles or the change from green man to flashing green man for pedestrians may also be indicated.
- It is of utmost importance that junctions with similar traffic conditions be controlled in a uniform manner in the interest of consistency and developing respect for traffic signs. Signals should therefore be installed where an engineering study confirms that their installation is warranted. The process should be guided by a competent professional on the basis of current best practices.

2.6.2.4 Traffic signs for school zones, pedestrian crossings, pedestrians with special needs and hazardous locations

The needs of school children are usually provided for by road signs showing a young and an older scholar or the signs for children. However, driver response to the warning signs and yielding to pedestrians at zebra crossing is very low across the member states. The needs of the physically challenged are rarely considered in the design and maintenance of roads. Roads sections with frequent crashes are seldom remedied. To address these issues consistently across the member states the following are recommended:

- For school zones
 - The practice of developing school route plan, defining school zones and the necessary traffic signing around schools both in urban and rural areas is recommended for adoption by member states as means of providing for safety and convenience of school children when walking to school within school zones. The road signing should always include a 30 km/hr speed limit and a “SCHOOL” secondary sign with appropriate traffic calming measures.
- For physically challenged pedestrians and drivers
 - The proposed warning signs schedule includes signs to signify the presence of physically challenged road users (challenged vision, hearing & mentally retarded).
 - The design of the facilities to take into account the specific needs of the physically challenged to ensure universal access of the road space.
 - The positioning of red, yellow and amber (vertically or horizontally) to always be consistent to help those with colour blindness.
- For crossings where pedestrians suffer delay due to drivers’ failure to yield right of way
 - Provide an overhead sign informing drivers of the presence of a pedestrian wishing to cross and requiring them to yield the right-of-way. The sign should be provided with light which blinks in the presence of a pedestrian wishing to cross.
- For hazardous road locations
 - All hazardous road locations should be provided with appropriate hazard markers. On the approaches to the hazardous location road authorities should install appropriate warning sign. For known black-spots blinking hazard lights be installed on the approaches.
 - Tight curves should be provided with reflective or lighted markers to improve visibility during the night.
- Use of appropriate technology
 - Member states are encouraged to use solar power to overcome current problems of variable availability of electric power supply.

2.6.2.5 Signing for traffic calming

The need for traffic calming across the member states is being met without the benefit of a systematic approach involving both the professionals/providers and the public. Often the traffic signing is not adequate and hence the measures are not visible to the road users and hence safety and vehicle suspension life are compromised. It is therefore recommended to harmonize the planning, signing and design of traffic calming measures. The process should involve the stakeholders to minimize negative impacts.

2.6.3 Impact of harmonization and recommended improvements

The adoption of the proposed sign shape and colour code will affect member states to different extents due to the slight differences in the current practice. This is reflected in the Table 2.43 which presents the status of the member states or actions they need to take upon the approval of the recommendations. Since only few signs will need to be replaced and change in colour code for the guidance and information signs will affect Burundi, Kenya and (for some of the signs in this group) Uganda It is recommended that the change be implemented gradually. However, implementation for signs in the regulatory group (especially the installation of speed limit signs) should be done according to the road map below to allow early realization of the expected safety benefits.

Table 2.43: Impact of adopting the recommended signs colour code

Partner State	Regulatory signs: Control and Command groups	Regulatory signs: Other Groups	Warning signs	Guidance signs	Information signs
Burundi	Her proposal for a new highway code (dated January 2011) generally conforms to the recommendations of this report on signs coding.				
Kenya	Current code is the same as the recommended code	To adopt reservation signs group code.	Current code is the same as recommended code	To adopt the recommended colour code	To adopt the recommended colour code
Rwanda	Rwanda is in the process of implementing the coding following her adopting the SATC – RTSM signing system.				
Tanzania	Adopted the SATC-RTSM system and has published her version of simplified road signs manual. Signing on the trunk roads generally conforms to the recommended system. However, there are signs which do not conform to the recommended code on local roads.				
Uganda	Current code is the same as the recommended code	To adopt reservation signs group code.	Current code is the same as recommended code	To adopt the recommended colour code	To adopt the recommended colour code

It is estimated that it will cost all member states a total 828 million US Dollars to apply all-white durable pavement markings on all paved roads during the year 2014. The estimate is based on assumption that durable materials 5 to 10 mm thick and 100 mm wide lines shall be applied along the centreline and edge lines, remarking of all zebra crossings and lane delineation shall be applied on multilane roads. If the project is limited to replacing the yellow pavement marking lines only the estimated cost may be reduced to about US Dollars 200 million. The distribution of the costs across the member states is shown in Annex A.6.

The decision to apply durable, Retroreflective all-white pavement may be supported by the following benefits:

- Under similar circumstances white pavement marking has higher visibility (retroreflectivity) than yellow markings.
- At an equal initial luminance value (say, 100 millicandelas per square metre per lux [mcd/m²/lux]), white lines have service lives that are longer than yellow lines by 42 percent. (As an example, white lines have service life of 36 months versus 24 months service life for yellow lines, under similar traffic volume, surface materials etc). This is a strong incentive for an all-white pavement marking on the basis of cost saving.
- Retroreflective pavement markings have been shown to reduce the number of traffic crashes occurring under darkness under normal weather (dry weather) by about eleven percent. Since fatal crashes are more likely to occur under darkness than injury or property damage crashes, the safety gains are considerable (a loss of at least 60 million US Dollars in crash costs are expected to be saved annually across the member states).
- Use of durable markings increases the service life of pavement markings and thus a lower annual maintenance budget shall be required for the pavement marking systems.

On the legal side, Rwanda and Tanzania are members of SADC and are therefore expected to follow the SADC-RTSM. However, the SADC-RTSM systems allows for national variants in signs and markings among member countries. Given the economic and safety advantages of an all-white pavement markings member states are urged to adopt the system sooner rather than latter when the cost of change will be even higher.

2.6.4 Implementation road map

The study recommends the following roadmap for the implementation of the harmonization and improvements in road signing, marking and signals:

- Member states amend their regulations to conform with harmonization recommendations within one year,
- Each partner state to develop and publish its road traffic signs manual and to up-date it's Highway Code according to the harmonized road traffic signs, markings and signals within two years.
- Member states implement all-white pavement marking system within two years. Funding for this activity should be coordinated through the EAC for effective implementation,
- The harmonized signs and installation speed limit signs at the beginning of each road and at intervals of ten to fifteen kilometres along all paved roads within five years, and
- Each Partner state to ensure that training of drivers is done using the approved road signs schedule and an effective awareness campaign to inform road users regarding the changes is effectively implemented immediately after the amendment of the regulations.

The five year period for installation of retro-reflective signs and speed limit signs is adopted as part of the implementation of the UN Decade of Action for Road Safety (addressing the safer roads component) adapted in the framework for the development of the East African Road Safety Master Plan presented in Chapter Five and elaborated in Annex D. Member states should be allowed to maintain in their manuals road signs peculiar to their own country's usage and most appropriate language provided that such signs shall not constitute violation of the harmonized schedules. Areas recognized and preserved as historical/heritage sites e.g. Mji Mkongwe – Zanzibar should be exempt from all proposed changes.

2.7 Harmonization of Vehicle Safety and Fitness

2.7.1 Objective

The objective of this chapter is to:

- review the vehicle inspection practices around the world,
- review the proposed COMESA-EAC-SADC framework and standard on vehicle inspection,
- study the existing situation on use of vehicle, accident statistics, framework and standards for vehicle inspection in EAC countries, and
- recommend the framework and minimum standards for periodic motor vehicle inspection (PMVI) for harmonization in EAC countries.

This chapter presents main findings of the harmonisation of vehicle fitness and safety study. The study report is presented in Chapter 7 of Annex A.

2.7.2 Existing Practice

There are two categories of motor vehicle inspection that are used to check vehicle compliance for safety and environment. These are:

- *Type approval inspection* for new and used imported vehicles and
- *Technical (roadworthy) inspection* for in-service vehicles.

Type approval is granted to a product that meets a minimum set of regulatory, technical and safety requirements while technical motor vehicle inspection aims at checking the roadworthiness of the vehicle during its life. Technical inspections can be categorized as *Regular or Periodic Motor Vehicle Inspection (PMVI)* and *Irregular or Random Motor vehicle Inspection (RMVI)*.

With regard to PMVI practices around the world it was found that there is an extensive variety in the frequency of PMVI. With regard to the organisations by which the inspections are conducted, it appears that many countries use a model in which the inspections are conducted by private inspection centres that are supervised by a governmental authority.

The standard and specifications for vehicle roadworthiness for the SADC region has been under development for the past few years. Initially the South African standard for testing vehicles was used as a basis for developing the SADC standard. The draft standard for SADC countries which was prepared by the SADC Panel of Expert on Road Transport was upgraded as a tripartite draft standard in 2009¹.

2.7.2.1 Current Situation in EAC Member states

In all EAC countries vehicle safety standards are captured in respective Road Transport and Road Traffic Acts. The Acts specify vehicle safety standards requirements and inspections that the authorities have to observe during the initial registration, road licensing, and operators licensing. However, the degree of implementation and enforcement differ from country to country. In general the challenges facing most EAC countries are:

- Inadequate *infrastructure and facilities* to conduct technical inspections.
- Lack of *equipment and qualified manpower* to conduct technical inspection.
- Inadequate *enforcement* of mandatory technical inspections.
- *Malpractices and corruption* are rampant and hamper the effectiveness of the efforts that the governments are trying to institute

¹ COMESA/EAC/SADC (2010). The Testing of Vehicles for Roadworthiness.

2.7.3 Proposal for Harmonization: PMVI Framework

The proposed framework has been achieved through a review of good practices around the world in high, middle, and low income countries. Other analyses conducted to supplement the proposal include:

- Trend on advanced vehicle safety systems
- The current situation in EAC countries on vehicle inspections and in particular the problems on infrastructure (facilities and equipment), human capacity, legislation and enforcement, malpractices and corruption, and the vehicle fleet.
- The standard and inspection specifications proposed for COMESA/EAC/SADC countries

2.7.3.1 Periodic Motor Vehicle Inspection (PMVI): It is recommended that:

- All vehicles using public roads including government and military vehicles undergo a mandatory PMVI.
- The categories for compulsory PMVI should include: Private light vehicles (GVM < 3500 kg); Light passenger service vehicles (PSV up to 8 passengers); Passenger service vehicles (PSV > 8 passengers); Heavy goods vehicles (HGV) and their trailers; Private motorcycles and three-wheelers; Taxi motorcycles and three-wheelers.
- Initial Inspection and Frequency
- It is recommended that the frequency should be as indicated in Table 2-44.

Table 2-44: The recommended inspection schedule for different categories of vehicles

Vehicle category	Initial PMVI (since new)	Frequency (months)
Private light vehicles (GVM < 3500 kg)	2 years	12 months
Passenger service vehicles (PSV < 8 people)	1 year	6 months
Passenger service vehicles (PSV > 8 people)	1 year	6 months
Commercial trucks (<3.5 tonne) and Heavy goods vehicles (>3.5 Tonnes)	1 year	6 months
Trailers	1 year	6 months
Motorcycles (private)	2 years	12 months
Motorcycles (taxi)	1 year	6 months

The fees schedule for different categories of vehicles is based on fees schedule in the region (Kenya, Rwanda, Botswana). The recommended fees in USD are shown in Table 2-45.

Table 2-45: Recommended fees for PMVI

Vehicle category	Inspection Fee (USD)
Private light vehicles (GVM < 3500 kg)	15
Passenger service vehicles (PSV < 8 people)	15
Passenger service vehicles (PSV > 8 people < 30 people)	20
Passenger service vehicles (PSV > 30 people)	30
Commercial vehicles (<3.5 tonne)	20
Heavy goods vehicles (>3.5 Tonnes, 2 axles)	30
Heavy goods vehicles (>3.5 Tonnes, 3 and more axles)	40
Trailer (1 axle)	10
Trailer (2 and more axles)	15
Motorcycles (private)	5
Motorcycles (taxi)	5

It is recommended that vehicles which pass the PMVI should be given a certificate and a sticker. It is further recommended that:

- The certificate should be put in the vehicle with other vehicle documents for police to inspect if needed at any time.
- The sticker should be placed at a prominent place. The sticker should show: the vehicle registration number; the date when the next inspection is due and a code identifying the centre which the inspection was conducted.

Vehicles which fail PMVI should be allowed to rectify the problem and report back for re-inspection of the faulty item within two weeks. It is further recommended that 20% of inspection fee should be charged for re-inspection. Full inspection should be conducted if the vehicle is not taken back for re-inspection within two weeks, in which case full inspection fee should be charged.

2.7.3.2 Recommended Minimum Standard for Technical Inspection in PMVI

Vehicle systems and items that increase the likelihood of accident when they fail and those which increase the severity of casualties after the accident are the target for the recommended PMVI scheme. These are categorized as shown in Table 2-46.

Table 2-46: Candidate vehicle systems for safety inspection

	System/Item that increase chances of accident and severity of injuries when they fail	Obvious system/item
1	Systems/item that <i>impair the driver's control of direction and/or speed</i> of the vehicle	Steering, tyres, brakes, insecure driver's seat.
2	Systems/items that <i>impair the driver's view</i> of the road	Windscreen, wipers and wiper washer, side and rear view mirrors, headlights.
3	Systems that <i>impair the visibility</i> of the vehicle from other road users	Lights, horn.
4	Components/items that intrudes into other users' road space or undue danger or nuisance	Oil leaks, sharp projections, excessive smoke, excessive noise, body modification
5	Components/items that <i>impair the built-in occupant protection</i>	Missing or broken seat belts, insecure seats, weakened body structure
6	Components/items that <i>increase the risk of further injury</i> to the occupants and other road users after an accident	Insecure fuel tank, inoperative emergency exits, battery security

It is recommended that systems/items that cannot be visually inspected to assess their condition be tested by either equipment which have been developed to internationally recognized standards specifically for that task, or by test driving the vehicle. Systems/items should not be dismantled for the purpose of technical inspection.

The recommended groups of items for technical testing are listed below. The detailed list of systems under each group can be found in Annex A Chapter 7.

- **Group I:** Vehicle documents and Identification
- **Group II:** Items which affect control of vehicle (Brakes, wheels and tyres, steering system, suspension system, driver seat)
- **Group III:** Items which impair driver view of the road: (Windscreen, wipers and wiper washer, side and rear view mirrors, headlights and spotlights alignment)
- **Group IV:** Items which reduce visibility of the vehicle: (Lights, reflectors, horn)
- **Group V:** Items which impairs built-in occupant protection: (Seats and seat belts, body structure, doors, floor and steps)
- **Group VI:** Items which intrudes other road users safety: (Oil leaks, noise, excessive smoke, sharp protrusions, mud guards)

- **Group VII:** Items which increase risk of further injuries after accident: (Emergency exit, fuel system, battery security)
- **Group VIII:** Extra safety items for HGV and Trailers: (Rear under run protection, cab mounting, trailer couplings, turntable and king pin, trailer parking brake, trailer lights and reflectors, twist-locks for securing containers)
- **Group IX:** Uncertified modifications: Any modification which falls into any of the I-VIII groups above such as:

2.7.3.3 Recommended Minimum Environment Standards for Inspection

The recommended minimum environment standards at the time of PMVI are listed below:

- Spark Ignition Engines (Petrol, LPG, and CNG Engines): Carbon monoxide (CO); Hydrocarbons (HC); On board diagnostic-II (OBDII) condition; Fuel tank cap; Noise and A/C refrigerant.
- Compression Ignition Engines (Diesel and Biodiesel Engines): Particulate Matter (PM); Fuel tank cap; Noise; and A/C refrigerant.

2.7.3.4 Supervision and Organization of PMVI

The study recommends that the institution framework for operating PMVI scheme has to be under the Ministry or Department responsible for road transport and that the scheme be continuously monitored and the degree to which performance targets are met assessed. Finally inspection frequency, fleet size and length of inspection determine the number of testing facilities and minimum staffing requirements.

2.7.3.5 Quality Management

It is recommended that inspection manuals showing all the PMVI procedures and the pass/fail criteria for each item should be developed before the exercise of inspection is established. These manuals should be accessible to the public so as to increase public confidence and the transparency of the inspection scheme and to inform the drivers and fleet operators the standards they are supposed to meet. The inspection centres should be regulated and randomly audited in terms of inspection procedures and accuracy of equipment and the PMVI scheme should be designed in such a way as to reduce opportunities for corrupt practices to vehicle inspectors.

2.7.3.6 Vehicle Inspectors

It is further recommended that inspection staff should attend a specialized (tailored) course on vehicle technical inspection and environment standards and should be qualified to a set standard of technical ability necessary in vehicle inspection. As such there is need to develop a training curriculum on vehicle inspection covering technical inspection procedures, standards and specifications for vehicle safety items and systems, testing equipment, administration, and quality control. The pre-requisite for a vehicle inspector candidate should be a technician level in auto mechanics or degree level in mechanical engineering.

2.7.3.7 Inspection Fees

It is recommended that a cost-benefit study should be conducted to establish inspection fees for different categories of the vehicles. The objective of charging an inspection fee is to make the inspection facilities sustain their operation costs.

2.7.3.8 Facilities and Equipment

It is recommended that the premises for the inspection and certification of vehicles must have an area which enables a safe and thorough inspection and has sufficient lighting to enable good

visibility of the vehicle being inspected and the equipment used in the inspection process. Furthermore the facility should comply with Occupational Safety and Health requirements. It is further recommended that the centre should have offices for administrative works and document storage. The list of recommended equipment and tools required is shown in Chapter 7 Annex A.

2.7.3.9 Management and Ownership of Inspection Facilities

The study recommends that the ownership of the PMVI facilities and management of operations of inspections be under private companies.

2.7.4 Impacts of Recommendations for Harmonization of PMVI

In summary, the following activities need to be initiated immediately after the agreements by the member states on the harmonization of PMVI:

- **Changes on Institution framework:** In this case the operation of PMVI scheme should be under the *Government Ministry or Department* responsible for road transport which will ensure vehicle inspection quality and performance of the PMVI scheme and operators.
- **Development of Training Curriculum and training of vehicle Inspectors:** The course should be hosted in an accredited technical institute and the curriculum for the course should be common throughout the EAC member states.
- **Development of Inspection Manuals:** Inspection manuals showing all the PMVI procedures and the pass/fail criteria for each item should be developed before the exercise of inspection is established.
- **Identification of Private PMVI Operators**

2.8 Harmonisation of Drivers Training and Testing

2.8.1 Objective

The objective of this chapter is to develop common training manuals for driver training to be used in EAC countries, and methods and procedure for testing drivers. The full study report is contained in Chapter 8 of Annex A.

2.8.2 Existing situation

Evaluation studies on the effectiveness of the tradition methods of training and testing drivers, and the subsequent methods which replaced traditional methods have both been evaluated in some countries. Among them are the USA, some European and Asian countries, and in South Africa. Among the shortfalls in the training systems which have been identified includes:

- Short periods on driver training courses
- Much of the course duration is spent teaching basic vehicle handling skills;
- Primary motivation of many participants is to learn enough to get a driver's license, and participants are relatively unmotivated regarding safety;
- Training is mostly geared towards passing the driving test, rather than teaching the student to become safe and competent drivers. This is especially for countries where driver training establishments are privately owned;
- Defensive driving training and hazard perception skills, as an accident prevention strategy is not taught adequately;
- Most driving courses train basic vehicle handling skills and traffic codes and do not train new drivers on environmental factors that affect driving, complex perceptual skills to avoid risky driving situations, driver impairments, how to handle emergency situations, personal readiness and self awareness;
- In most driver training courses training instructors do not ensure that learners not only learn the rules, but also understand the reasons behind the rules;
- Good quality training of training instructors is not emphasized;
- Quality control of instructors and driving schools is not adequate.

2.8.3 Proposal for Harmonization

2.8.3.1 Institutional Arrangement

The study recommend that the proposed legislations for the formation of Driver and Vehicle Examination and Licensing Agencies in EAC countries be accelerated to facilitate the proposed improvements on the quality of driving schools, instructors, and examiners for driver candidates. it is further recommended that drivers of PSV and HGV should take a compulsory refresher training course before renewing the licenses in order to update on technological changes and to increase road safety awareness.

2.8.3.2 Driver Training

Based on extensive consultation and the inputs of stakeholders and experts from the Member states, it is proposed to categorise driver training into three main groups: Basic Driver Training for light motor vehicles (LMV); Professional Driver Training (PSV and HGV); Compulsory Basic Training (motorcycle riders, capacity <125cc).

- **Basic Driver Training (LMV):** The Basic Driver Training course is for new drivers for light motor vehicles (GVM less than 3.5 tonnes). The recommended minimum requirements for this course are; a minimum age of 18 years and the ability to read and write. The Basic Driver Training focuses on the following five main areas of driver competence namely: knowledge, driving laws,

rules and vehicle operation; control of the vehicle; control in traffic situations; recognizing, managing and avoiding risks; and driving in a social context. The recommended syllabus for Basic Driver Training consists of 14 modules and is discussed in Chapter 8 of Annex A.

- **Professional Driver Training for PSV and HGV:** PSV and HGV are driven by professional drivers. It is recommended that the minimum requirements for one to attend the Professional Drivers Training be: ability to read and write; hold a valid basic driver license (for LMV); have a minimum driving experience of 3 years in LMV and have a minimum age of 21 years. The training is formulated in such a way as to provide additional knowledge and skills, among others, on: Manoeuvring of heavy vehicles; driver responsibilities and Road traffic act; customer care (PSV); eco-driving; procedure for handling breakdowns; vehicle loading and overloading control regulations and vehicle dimension regulations. The recommended syllabus for theoretical and practical parts for Professional Driver Training indicating objectives of each module and expected output is shown in Chapter 8 of Annex A.
- **Compulsory Basic Training for Motorcycle (Engine Capacity < 125 cc):** Motorcycles riders must attend a Compulsory Basic Training (CBT) before riding in public roads. The recommended minimum requirements to attend the CBT are: ability to read and write and a minimum age requirement of 16 years. The recommended Compulsory Basic Training for motorcycle riders has been largely adopted from South Africa's K53 driver licensing system, and the European Motorcycle Test. The recommended syllabus to be used for the training is shown in Annex A Chapter 8.

2.8.3.3 Driver Testing Standards

It is recommended that testing for all licenses should include: Theory test; Pre-trip inspection test and practical test (Yard test and on-road test). The candidate should pass all parts of the above tests to get a licence.

- **Theory Tests:** This study is recommending that the theory test be given for all license classes. For the Basic Driver Training the theory test should be of a written type and should contain at least 50 questions. The questions should be of multiple choice types with the maximum time to conduct the test of one hour. Questions on the theory part should be based on: road signs, signals and markings; defensive driving and basic mechanical questions. The candidate must pass the theory test before he/she can take the practical test.

For Professional Drivers (PSV and HGV) it is recommended that the theory test be of written type and should contain at least 100 questions of multiple choice type. The maximum time to conduct the test should be 2 hours. Questions on the theory questions should be based on similar areas as for the Basic Driver License test with additional questions on eco-driving, Vehicle loading and dimensions control and Vehicle breakdown and emergency. The candidate must pass the theory test before he/she can take the practical test.

For Motorcycle Rider Candidates (capacity < 125 cc): it is recommend that the test be of written type and should contain at least 50 questions of multiple-choice type. The maximum time to conduct the test should be 50 minutes. The type of question should be similar to those of the Basic Driving License with additional questions in the area of safety and balance.

- **Pre-Trip Inspection test:** The objective of pre-trip inspection is to examine the vehicle for roadworthiness prior to practical test. In this test the examiner will inspect the vehicle for roadworthiness and that the vehicle is fit for the yard test and on-road test. It is therefore recommended that for both the basic and professional licenses the examiner should request the applicant to enter the vehicle and operate the lights, direction indicators, wipers, horn, hand

brake, and inspect if the seat belts are functioning. The examiner will also inspect the exterior of the vehicle to examine tyres, side mirrors, doors and other parts of the vehicle for roadworthiness and security. The examiner should discontinue the test if the vehicle is found to be not roadworthy. For a motorcycle, the examiner shall instruct the applicant to mount the motorcycle and to start the engine. The examiner shall instruct the applicant to operate the lights, direction indicators and horn. Should any of the items be inoperative, the motorcycle will be considered not roadworthy and the examiner shall discontinue the test.

- **Practical Tests:** For motor vehicles this study is recommending two practical tests namely the yard test and the road test. In the yard test the driver is instructed to carry out a number of manoeuvres which are detailed in Annex A chapter 8. For the Basic driver license and the professional license the manoeuvres are basically the same except that for the basic driver license the driver is required to carry out parallel parking and three-point turn.

The practical test for motorcycles should consist of only a yard test, which includes a starting procedure and a driving skill test. The test shall commence after the pre-trip inspections has been completed. It is therefore recommended that the following manoeuvres should be conducted for candidates of motorcycle riders: Starting procedure; Speed management; Moving off/Turns (left); Lane change (right); Incline start; Turning speed judgment (left and right); Emergency stops (stop 1 and stop 2) and Emergency swerve (left and right).

2.8.3.4 Assessment of Candidates

- **Theory Test:** It is recommended that the minimum pass marks for theory test for applicants of licenses to drive LMV should be 50%, whereas those for PSV, HGV and motorcycles should be 70%.
- **Practical Tests:** It is **recommended** that the assessment of practical driving tests should be based on the number of faults the candidate makes during the test. Faults should be in two categories: minor faults and serious faults. Any single serious fault should lead to a failure in practical test by the candidate, and if the candidate makes more than five minor faults or if repeating the same fault at least 3 times he/she should fail the practical test.

2.8.3.5 Further Recommendations

- All driving instructors should be trained and qualified as driving instructor and should be centrally registered by a recognized government authority.
- The government authority should set standards for driving schools and all qualified schools should also be centrally registered. Candidates for driver testing should be checked if they have attended registered schools to be given an appointment for testing.
- Driving schools should be privately owned but closely monitored by the government to ensure that the standards of training are maintained and the schools use approved driver training manuals.
- Driving examiners should be properly trained and all examiners to be subject to the same training.
- Driving examiners be subject to frequent supervision and assessment to ensure that the tests are conducted in accordance with the regulations.

2.8.4 Impacts of Proposed Recommendation on Harmonization

Some of the proposed recommendations require immediate implementation and are pre-requisites for kicking-off the harmonization process in driver training and testing in EAC member states. In that respect, the following need immediate action and have to be implemented as soon as possible.

- ***Transfer the function of driver testing and licensing from law enforcement and tax collection institutions to an agency under the responsible Ministry of Transport.***

- ***Development of Training Curriculum for Driver Trainers:*** The course should be hosted in an accredited institutes and the curriculum for the course should be common throughout the EAC member states
- ***Development of Training Curriculum for Driving Examiners:*** The course should be hosted in an accredited institutes The curriculum for the course should be common throughout the EAC member states
- ***Training of Driving Examiners:*** All driving examiners should be properly trained and all examiners to be subjected to the same training.

2.9 Harmonization of Vehicle Dimensions and Combinations

2.9.1 Objectives

The objectives of this task are:

- To review standards and regulations on vehicles dimensions and combinations in the member states, SADC, and COMESA regions and identify dimensional parameters and vehicle combinations which are regulated
- Identify areas of differences and commonality within the member states and in SADC and COMESA.
- To propose harmonized standards and regulations to be used in all EAC member states.

This chapter presents the main findings of the harmonisation of vehicle dimensions and combinations study. The full study report is presented in Chapter 9 of Annex A.

2.9.2 Existing and Recommended Standards for Harmonization

Standards which are recommended for harmonization include:

- Vehicle main dimensions: overall length, width, and height for a rigid single vehicle (including trailer), articulate vehicle (or truck tractor), and for (any) combination of vehicles.
- Vehicle control dimension: Minimum turning radius, wheelbase, front and rear overhangs, and maximum projections of carried loads at front and rear, and at the sides of the vehicle.
- Warning requirements for projecting loads
- Restrictions on vehicle combinations
- Vehicles exempted from the provisions and their regulations when using public roads: These include agricultural and construction machinery.

2.9.2.1 Vehicle Dimensions

Table 2-47 shows existing vehicle dimensions standards in EAC countries and recommended standards for harmonization.

Table 2-47: Existing and Recommended Vehicle Dimensions (meters)

Parameter	Existing Standards	Recommended Harmonized Dimensions
Maximum overall length of vehicles (m)	<u>Rigid vehicle</u> Tanzania (12.5), Kenya (11.0), Uganda (12.5), Rwanda (11.0), Burundi (12.0).	12.5
	<u>Articulate vehicle</u> Tanzania (18.5), Kenya (17.4), Uganda (17.0), Rwanda (17.4), Burundi (17.4).	18.5
	<u>Combination vehicles</u> Tanzania (22.0), Kenya (22.0), Uganda (22.0), Rwanda (18.0), Burundi (18.0).	22.0
Maximum overall width of vehicles (m)	<u>Bus (wheel track >1.9 m) and Goods vehicle</u> Tanzania (2.6)	2.65
	<u>Refrigerated truck</u> Burundi (2.65)	
Maximum overall height of vehicles	<u>Any other vehicle</u> Tanzania (2.6), Kenya (2.65), Uganda (2.5), Rwanda (2.65), Burundi (2.5),	2.5
	<u>Any vehicle</u> Tanzania (4.6), Kenya (4.2), Uganda (4.0), Rwanda (4.2), Burundi (4.2).	4.6

Minimum Turning Radius	<u>Any other vehicle</u> Tanzania (13.1), Kenya (12.5)	13.1
Maximum Wheel Base	<u>Semi-trailer</u> Tanzania (10.0),	10
	<u>Bus-Train</u> Tanzania (15.0)	15.0
	<u>Any Other Vehicle</u> Tanzania (8.5),	8.5
Maximum Front Overhang	<u>Semi-Trailer</u> Tanzania (1.8)	1.8
	<u>Any other Vehicle</u> Tanzania ¹ a Kenya (= 60% of WB); Rwanda (smaller of 2.7m or 55% of WB) Where: WB = Wheel base	¹ a
Maximum Rear Overhang	<u>Any Other Vehicle</u> Tanzania (60% of WB) Kenya (60% of WB) Rwanda (smaller of 3.5 m or 0.65 x WB)	60% of WB
	² <u>Trailer</u> Tanzania (50% of trailer body)	50% of trailer body
Projecting load limits (front and rear)	<u>Bus and goods vehicle</u> Tanzania (1.3) <u>Any other vehicle</u> Tanzania (1.25), Kenya (1.8), Uganda (1.25), Rwanda (2.7F, 3.5R), Burundi (-)	1.25
Projecting load limits (sides)	Tanzania (0.15), Kenya (0.15), Uganda (0.15), Rwanda (-), Burundi (-)	0.15

¹For vehicles where the distance from the front end of the vehicle to the backrest of the driver's seat at rearmost position is less than 1.7 m:

$a = \text{smaller of } 60\% \text{ of WB or } [6.2 - (0.5 \times \text{WB})]$;

For Driver's seat position more than 1.7 m:

$a = \text{smaller of } 60\% \text{ of WB or } [5.8 - (0.5 \times \text{WB})]$;

²Trailer other than semi-trailer with single axle or two axles with axle distance < 1.2m

The increase of transportation of high-cube ISO shipping containers in the region has posed a problem that the maximum height shoots to 4.5 m when the high-cube container is loaded to a standard semi-trailer. Tanzania and some SADC countries have changed the standard for maximum height to 4.6 m to accommodate standard semi-trailers loaded with high-cube ISO containers. South Africa and the Task Force panel of experts for the tripartite (COMESA-EAC-SADC) is studying the effect of raising maximum height on vehicle stability before considering raising the standard height.

Hence, the standard which needs immediate attention is the *maximum overall height* of the vehicle. Reasons for limiting the height of the vehicle (including cargo) are to allow enough clearance to infrastructures that cross above the road and vehicle stability issues. The recommended EAC standard for maximum height is 4.6 m. Hence with exception of Tanzania, other EAC countries whose standard is lower than 4.6 m have to check the overhead structures in the regional trunk road networks in their countries to make sure that the minimum vertical clearances of overhead structures such as bridges, pedestrian overpasses, and utility lines are above 4.6 m plus recommended allowances.

2.9.2.2 Warning requirements for projecting loads

All EAC countries have a regulation on the warning required for protruding loads carried by a vehicle to warn other road users. SADC developed a regulation on the same for its member states to adopt.

The SADC regulation is detailed, easier to apply and is much safer compared to the regulations which are used in EAC countries (see Chapter 9 of Annex A). Tanzania and Zanzibar have already adopted the SADC regulation. Hence it is recommended that this provision be adopted as EAC standard.

2.9.2.3 Restrictions on Vehicle Combinations

Tanzania and Zanzibar follows SADC regulations² for restrictions on certain combination of vehicles. SADC have developed regulations to be used in the member states, and the regulations are in the ongoing process to be harmonized in the entire EAC-SADC-COMESA region. It is recommended that SADC regulation on restrictions on vehicle combinations be adopted as EAC regulation. Further, more studies to be conducted on recent developments in Longer Combination Vehicle (LCV) which do not comply with the maximum length of combination of vehicles but are safer and can better manoeuvre on a typical road than the tradition truck-trailer combination.

² *Guidelines on Harmonization of Vehicle Regulations. Dimensions of Vehicles. SADC. 2009*

2.10 Harmonization of Transportation of Awkward and Hazardous Loads

2.10.1 Objectives

This section presents the findings of the harmonisation of transportation of abnormal loads and dangerous goods. The full study report is presented in Chapter 10 of Annex A.

The objectives of this component of the study were to review and subsequently propose a harmonized regime on the transportation of abnormal loads and dangerous goods in the EAC region. To complete this task the following tasks were required as per ToR:

- Review of existing documents/statutes and proposals for improvements to the same,
- Identification of areas of commonality which lend themselves to harmonization
- Propose and implement the incorporation of areas unique to particular countries into the harmonized regimes
- An indication of the impact of harmonization
- Conduct of a stakeholder workshops to gain consensus on the harmonization of different regulations and standards

2.10.2 Current Situation

EAC Countries: Review of EAC countries policies and procedures for the conveyance of abnormal loads and dangerous goods showed that there are no common and detailed procedures across the EAC member states. The classification of such goods in terms of type, hazardousness and abnormality differ. The common approach taken in the conveyance of these goods involves reporting to mandated authorities, which differ from country to country, for the load to be assessed for transporter to be charged and instructed on the markings and escorting requirements.

COMESA and SADC: In the Meeting of the Tripartite Summit on 22 October 2008 in Kampala, Uganda, leaders of Member States of SADC, the Common Market for Eastern and Southern Africa (COMESA) and the East African Community (EAC) agreed on important milestone towards continental integration as envisaged by the African Union (AU). According to the final communiqué, the historic Tripartite Summit agreed on a programme of harmonization of inter-regional infrastructure programmes as well as institutional arrangements on the basis of which the three RECs would foster cooperation. One of the components of joint implementation of inter-regional infrastructure program as well as institutional arrangements is on the conveyance of abnormal and dangerous loads within the three RECs. The Summit resolved to immediately start working towards merging the three trading blocs into a single REC with the objective of fast-tracking the attainment of the African Economic Community.

During the course of this task BICO became aware of the SADC and COMESA harmonization processes in road transport infrastructure standards and institution arrangements in a number of areas including conveyance of abnormal and dangerous goods which started in 2010. Since all EAC countries have multiple memberships within the three RECs, it became obvious that this study should adopt the draft tripartite Task Force Study to smoothen and speed up the harmonisation process in the three RECs.

BICO was invited to participate in the last two tripartite Task Force Working Group Meetings in Uganda (4-5 July 2011) and Rwanda (29-31 May 2012). From the draft standards, regulations and guidelines it was noted that substantial progress has been made by the tripartite Task Force to come up with proposals for harmonized standards and regulations for the transportation of abnormal loads and dangerous goods. The draft guidelines for transportation of abnormal loads were initially adopted from South Africa by SADC. On transportation of Dangerous goods the tripartite Task

Force has adopted the use of UN model Recommendations on Transportation of Dangerous Goods in the three RECs. The Task Force is currently preparing the administrative guidelines for the transportation of dangerous goods in the tripartite region.

In the last meeting in Kigali the Working Group recommended to engage a consultant to develop a single regional permit (multi-country) with a clear institutional framework and approach for the purpose of issuing Abnormal Load permits. The study to develop single permit should include formula and methods of sharing of permit fees (between countries), route inspections and escorts. The study shall map current country based institutional frameworks, formulae and methods used by COMESA/EAC/SADC member states in managing Abnormal Loads Permits. The study shall also develop a harmonised methodology for determining Load Equivalency Factors (LEFs) for determining mass fees for Abnormal Loads.

UN Recommendations on Transportation of Dangerous Goods: United Nations (UN) recognized that with different regulations in every country and for different modes of transport, international trade in chemicals and dangerous products would be seriously impeded, if not made impossible and unsafe. The UN Sub-Committee of Experts on the Transport of Dangerous Goods (UNSCETDG) is responsible for the ***UN Recommendations on the Transport of Dangerous Goods - Model Regulation***³, which are internationally accepted as the principal technical standards underpinning the air and sea dangerous goods codes, and are also used by many countries as the basis for their road and rail dangerous goods transport codes.

Dangerous goods may be pure chemical substance or manufactured articles (eg, ammunition, fireworks). The transport hazards that they pose are grouped into nine classes, which may be subdivided into divisions and/or packing groups. The most common dangerous goods are assigned a UN number, a four digit code which identifies it internationally: less common substances are transported under generic codes such as "UN1993: flammable liquid, not otherwise specified". So every country in the world uses the same number for that specific consignment of dangerous goods. These can be found in dangerous goods publications volumes for road and rail and the IATA for movement by air.

UNSCETDG prepared the model regulations which aim at presenting a basic scheme of provisions that will allow uniform development of national and international regulations governing the various modes of transport; yet they remain flexible enough to accommodate any special requirements that might have to be met. UN expects that governments, intergovernmental organizations and other international organizations, when revising or developing regulations for which they are responsible, will conform to the principles laid down in these Model Regulations, thus contributing to worldwide harmonization in this field.

Furthermore, the new structure, format and content should be followed to the greatest extent possible in order to create a more user-friendly approach, to facilitate the work of enforcement bodies and to reduce the administrative burden. Although only a recommendation, the Model Regulations have been drafted in the mandatory sense in order to facilitate direct use of the Model Regulations as a basis for national and international transport regulations.

Amongst other aspects, the Model Regulations cover principles of classification and definition of classes, listing of the principal dangerous goods, general packing requirements, testing procedures, marking, labelling or placarding, and transport documents. With this system of classification, carriers, consignors and inspecting authorities will benefit from simplified transport, handling and

³ <http://www.unece.org>

control and from a reduction in time-consuming formalities. In general, their task will be facilitated and obstacles to the international transport of such goods reduced accordingly.

2.10.3 Recommendations

2.10.3.1 Adoption of COMESA/EAC/SADC Tripartite Task Force Draft Proposal on Conveyance of Abnormal Loads and Dangerous Goods

With the objective of speeding up the harmonisation process in the three RECs and the fact that SADC and later COMESA/EAC/SADC task force has already put substantial efforts to develop the same regulations it is recommend that this study adopt the COMESA/EAC/SADC draft proposals on:

- Standards for the Conveyance of Abnormal Loads, and
- Administrative Guidelines for Granting of Exemption Permits for the Conveyance of Abnormal Loads
- COMESA/EAC/SADC Dangerous Goods Legislation

2.10.3.2. Adoption of UN Recommendation Guidelines on Transportation of Dangerous

Dangerous chemicals and products are traded throughout the world by land, sea, and air transportation systems. It is important that classification, general packing requirements, marking, labelling, etc should not only comply on the regulations within a certain region by land transport, but globally and by all modes of transportation.

It is therefore recommended to use UN Recommended Guidelines for harmonisation of transportation of dangerous goods in EAC countries. The tripartite Task Force has also recommended using UN Recommendations for the three RECs. The Task Force is preparing the administrative guidelines for the transportation of dangerous goods, which this study also recommends their adoption.

3 Harmonisation of Environmental Regulations and Standards

3.1 Introduction

Roads are economically and socially beneficial to any nation, but roads which are poorly planned and constructed can have adverse effects on human health and the environment. Negative environmental and socio-economic impacts resulting from road projects development include the loss of biodiversity, land degradation, involuntary resettlement, unintended induced development, deforestation, pollution of air, water and soil; road safety and human health problems. Therefore in order to minimise these impacts the planning, design, construction, operation and maintenance of a road project have to meet environmental regulations and standards. An environmental standard is a policy guideline that regulates the effect of human activity on the environment. The different environmental activities have different concerns and therefore different standards.

The Treaty for the Establishment of the East African Community (EAC), in Article 112, calls for the member states to cooperate in all issues of Environment and Natural Resources (ENR) management. The Treaty requires the member states to cooperate to preserve, protect and enhance the quality of the environment and to ensure sustainable utilization of shared natural resources. Moreover, Article 151 (1) mandates the member states to undertake to conclude such protocols as may be necessary in each area of co-operation which shall spell out the objectives, scope of, and institutional mechanisms for co-operation and integration. Acting under the powers envisaged in this Article the EAC states have concluded a Protocol on Environment and Natural Resources Management. This chapter presents a proposal for harmonisation of environmental policies, laws, standards and regulations for the road sector in the EAC.

3.2 Objectives and Methodology

The harmonization of environmental regulations and standards was guided by terms of references (ToR) which had the following objectives:

- Review existing environmental regulations and standards,
- Collect stakeholder views and conduct workshops,
- Facilitate expert group meetings to work on the harmonization process, and
- Prepare detailed guidelines and manuals.

To achieve the above objectives the study assessed the road project in its life cycle which essentially includes: planning, feasibility, design, construction, operation and maintenance. Activities that are undertaken during these stages have various impacts on the environment. The study was carried out in three phases, namely inception phase, detailed phase and phase 3 which is the preparation and production of detailed guidelines and manuals. In all these phases the study adopted a broad approach which includes a desk study, interviews and focus group discussions, expert meetings and stakeholders' meetings. The following sections present the review findings, areas of convergence and divergence, harmonization of the environmental standards and regulations and the proposals for manuals and guidelines for environmental standards and EIA in EAC.

3.3 Review of National Environmental Policies

3.3.1 Burundi

Unlike the other Partner States, Burundi does not have a policy document on the environment although there is a piece of legislation on the environment which was enacted in 2000. This law is reviewed in sub-section 3.4.1 of this document.

3.3.2 Kenya

National Environment Action Plan (NEAP 2009-2013) framework: The overall goals and objectives of NEAP are to provide a broad framework for the coordination of environmental activities by all actors i.e. the private sector and the Government to guide the course of development activities. It is a step towards integrating the environment and development for better management of resources.

There are several environmental principles addressed by the Plan such as the principle of sustainability, polluter-pays principle, and the precautionary principle. Others are the principles of public participation, access to justice, and international cooperation.

3.3.3 Rwanda

Rwanda is also endowed with a variety of policies some of which have a direct bearing on the road sector.

Environmental Policy: The Policy was formulated in 2003, and it culminated into the enactment of the Environmental Organic Law No. 04/2005 of 08/04/200 (2005). The Policy is tailored on similar spirit of the EAC Protocol mentioned above.

Transport Sector Policy 2008: According to this Policy the transport sector must aim at sustainable development that takes into account the transverse questions such as gender equality, environmental protection, job creation, fight against the HIV/AIDS pandemic and other sexually transmitted diseases. In a way, the Policy revisits some of the areas and matters raised in the EAC Protocol on the environment.

Rwanda Vision 2020: The Vision rests on infrastructural development, entailing improved transport links, energy and water supplies, and emphasizes that at all times, these will be affected by a number of cross-cutting issues including, gender equality and sustainable environmental and natural resource management.

3.3.4 Tanzania

Goals and objectives of the National Environment Policy (1997): This Policy document seeks to provide a framework for making fundamental changes in the policy that are needed to bring environmental considerations into the mainstream of decision-making in Tanzania. It seeks to provide policy guidelines, plans and give guidance on the determination of priority actions, and provides for monitoring and regular review of policies, plans and programmes. Besides, the Policy further provides for sectoral and cross-sectoral policy analysis in order to achieve compatibility among sectors and interest groups, and exploits synergies among them.

Environmental Principles: The Policy, like the Kenyan, embraces the cardinal environmental principles contained in the EAC Protocol, including the environmental principles of sustainability, polluter-pays principle, precautionary principle, principle of public participation in the development of policies, plans and processes for the management of the environment, principle of access to justice,

principle of intergenerational equity and intra- generational equity, principle of international cooperation, principle of common but differentiated responsibilities, equity and human rights.

The national policies on forest and wildlife restrict the carrying out of development projects including road construction in forest reserves and national parks unless EIA has been carried out.

3.3.5 Uganda

National Environment Management Policy (NEMP) 1994 was developed as a follow-up on the recommendations of the National Environment Management Action Plan, 1994. The Policy shares almost the same overall goals and objectives with the policy documents in the other Partner States. These are sustainable social and economic development, which maintain or enhance environmental quality and resource productivity on a long-term basis that meets the needs of the present generation without compromising the ability of future generations to meet their own needs and integrates environmental concerns in all development policies, planning and activities at national, district and local levels, with full participation of the people.

Environmental Principles: Like the policy documents in Kenya and Tanzania, the NEMP also subscribes to similar environmental principles which are fully contextualized in Part II of the National Environmental Act, Cap 153 of Uganda. Among the principles highlighted in the Policy are the principles of sustainability, polluter-pays principle, public participation principle, precautionary principle, clean environment, and international cooperation.

3.3.6 Zanzibar

Zanzibar Environmental Policy, 2002: This is a relatively new Policy which was promulgated hardly four years before the EAC Protocol was drafted. The policy draws lessons from the Environmental Management and Sustainable Development Act which was enacted in 1996, six years before the Policy was promulgated. The review of the Policy demonstrated that this document, like the others, embraces the environmental principles and all other values geared towards sound environmental management practices. To this extent, the document is similar to other policy documents reviewed herein above.

Conclusively, the review of the policies in this part was meant to underscore Partner States' commitment to protection and sustainable management of the environment and natural resources while undertaking infrastructural developments in the region.

3.4 Review of Environmental Legislation Framework

3.4.1 Burundi

The applicable law is the Environment Code, Act No. 1/010 of June, 2000. This is a relatively recent legislation compared to the environmental legal frameworks applicable in other Partner States like Uganda which was enacted in 1995. Like any other environmental legislation, this law is fairly comprehensive covering almost all aspects of environmental and natural resources management, such as, environmental principles, management of forests, energy, water resources, soil erosion and land use, desertification, public inquiry/participation, management of wetlands, wildlife, legal institutions etc.

The Environmental Code, being a principal legislation, empowers either the Minister or the President to make regulations in form of Ministerial Ordinances or Presidential Decrees respectively.

3.4.2 Kenya

The principal legislation is the Environmental Management and Coordination Act, 1999. The general principles mentioned in the policy are reflected in Part II of the Act which provides that every person in Kenya is entitled to a clean and healthy environment, and has the duty to safeguard and enhance the environment. The Act provides redress to a person alleging infringement of a right to health by applying to the High Court for redress and the High Court may make such orders, issue such writs or give such directions as it may deem appropriate to prevent any act or omission deleterious to the environment, require any ongoing activity to be subjected to an environment audit, compel persons responsible for environmental degradation to restore the degraded environment as far as practicable to its immediate condition prior to the damage and provide compensation for any victim of pollution, and the cost of beneficial uses lost as a result of an act of pollution.

3.4.3 Rwanda

The Rwandan framework legislation is the Organic Law (NO. 04/2005 of 08/04/2005). Under this law, every person has the duty to protect, conserve and promote the environment. The State has the responsibility of protecting, conserving and promoting the environment. This law, like the others reviewed before, alludes to a number of principles advocated by Rwanda Policy. The Act contains specific environmental doctrines such as sustainable development which is defined as an effective method of using the environment with an aim of exploiting it to support the present, and plan for future generations. Every person in Rwanda has the fundamental right to live in a healthy and balanced environment. The precaution principle is important so as to protect or reduce the disastrous consequences on environment (Article 7). So is the polluter-pays principle: Every person who demonstrates behaviour or activities that cause or may cause adverse effects on the environment is punished, or is ordered to make restitution (Article 7(3)). Similarly, every person has the right to be informed of the state of the environment and to take part in the decision-taking strategies aimed at protecting the environment (Article 7(4)).

3.4.4 Tanzania

Tanzania has enacted the Environmental Management Act, 2004. The Act states that every person living in Tanzania shall have a right to clean, safe and healthy environment; gives right to bring an action on the environment for an act or omission which is likely to cause harm to human health or the environment; restates the following principles of environment and sustainable development: the precautionary principle; polluter-pays principle; principle of eco-system integrity; principle of public participation in the development policies, plans and processes for the management of the environment; principle of access to justice; principle of inter-generational equity and intra-generational equity; principle of international co-operation in the management of environmental resources shared by two or more states (s.4 and 5).

There is also the Roads Act 2007 which was enacted in 2007 to replace the old colonial legislation titled the Highways Act, 1932. In terms of environmental management this Act states in Section 30 that the road authority entrusted with the duties of developing, managing and maintaining the public roads under its jurisdiction shall comply with the prescribed guidelines, regulations or any other written law relating to environmental protection and waste disposal. The Act, in a nutshell, enjoins all road authorities to comply with environmental laws and guidelines when executing road projects under their jurisdiction.

3.4.5 Uganda

Uganda has the National Environmental Act, Cap.153. The Act recapitulates all the general principles contained in its Policy partly as follows: to assure all people living in the country have the fundamental right to an environment adequate for their health and well-being; to encourage the maximum participation by the people of Uganda in the development of policies, plans and processes for the management of the environment; to use and conserve the environment and natural resources of Uganda equitably and for the benefit of both present and future generations, taking into account the rate of population growth and the productivity of the available resources; to conserve the cultural heritage and use the environment and natural resources of Uganda for the benefit of both present and future generations; to establish adequate environmental protection standards and to monitor changes on the quality of the environment; to require prior environmental assessments of proposed projects which may significantly affect the environment or use of natural resources; to ensure that the true and total costs of environmental pollution are borne by the polluter; to promote international cooperation between Uganda and other states in the field of the environment.

3.4.6 Zanzibar

Like all the Partner States of the EAC, Zanzibar which is part of the United Republic of Tanzania has a specific environmental framework titled the Environmental Management for Sustainable Development Act, 1996. This Act, like the others reviewed above, is tailored along the lines of international legal instruments and the principles enshrined in the EAC Protocol on Environment and Natural Resources. Part II of the Act addresses general environmental obligations whose purposes include matters related to priority environmental public works; right to a clean and health environment and duty to maintain it; principles for sustainable development of renewable natural resources; and principles for conservation and recovery of non- renewable natural resources.

3.5 Review of Existing Environmental Standards and Guidelines in the EAC

3.5.1 Environmental Standards

The minimum environmental quality standards applicable to road works are in relation to: water quality standards; discharge of effluent; air quality (including vehicle emission standards); noise standards; vibration standards; soil quality standards; control of noxious smells standards; light pollution standards; electromagnetic waves and microwaves; hazardous substances and materials; and any other environmental quality standards.

With the exception of Burundi and Zanzibar, other countries within the community, namely Tanzania, Uganda, Kenya and Rwanda have environmental standards which these countries have developed for themselves. It is important to note that there is no member state that has fulfilled the minimum environmental standards applicable to road works as found from the literature review. Burundi and Zanzibar should adopt and use standards and guidelines from the international standards.

3.5.2 Environmental Impact Assessment (EIA) Guidelines

A review of the documents and best practices elsewhere has identified six steps to be followed in carrying out the EIA for road projects. The identified steps are as follows; Environmental Assessment Process, Project Planning and Pre-feasibility Phases, Feasibility Study and Preliminary Design Phases, Construction Phase – Supervision and Monitoring, Traffic Operations, and Road Maintenance and Decommissioning. In all these phases/steps, the guidelines for Socioeconomic

and Cultural Impact Assessments and Compensation and Resettlement Plans are followed and adhered to. The description of the Socioeconomic Impact Assessment and Compensation and Resettlement Plans are Annex B3. A summary of the available EIA guidelines across the EAC member states is as follows;

With exception of Burundi and Zanzibar, other EAC member states, namely Tanzania, Uganda, Kenya and Rwanda have EIA guidelines. While Tanzania, Kenya and Uganda have EIA guidelines specific to the road sector, Rwanda has EIA guidelines for any project. Though Tanzania and Uganda have EIA guidelines for the road sector, the EIA guidelines however, differ in terms of names. The EIA guidelines for Tanzania are termed Road Sector Environmental Assessment and Management Guidelines, while the one in Uganda has been named Environmental Impact Assessment Guidelines for Road Projects.

A brief description of the EIA guidelines for each country in the EAC and those EAC guidelines for shared ecosystems is given in Annex B2. Table 3-1 below summarizes the available environmental quality standards in EAC. However, it should be noted and taken into account that this description does not include Burundi and Zanzibar as they don't have any EIA guidelines.

Table 3-1: Existing Environmental Quality Standards in EAC

Country	Standard Category
Tanzania	<ul style="list-style-type: none"> • Air Quality • Vehicle emission • Water Quality • Effluents and receiving waters • Noise • Soil
Uganda	<ul style="list-style-type: none"> • Discharge of Effluent or Wastewater into Water or on Land • Management of Ozone Depleting Substances and Products • Management of soil quality • Noise and Control • Water Quality
Kenya	<ul style="list-style-type: none"> • Quality for Sources of Domestic Water • Effluent Discharge into the Environment • Effluent Discharge into Public Sewers • Fossil Fuel Emission Control • Noise and Excessive Vibration Pollution Control Standards • Air quality (in draft form)
Rwanda	<ul style="list-style-type: none"> • Light pollution • Noise • Water quality • Soil quality • Effluent discharge • Air quality
Burundi	<ul style="list-style-type: none"> • International Standards
Zanzibar	<ul style="list-style-type: none"> • International Standards

Detailed descriptions of the available standards for each country in the EAC in terms of what each standard includes together with their numerical values are given in Annex B2.

Kenya: EIA is a planning and management tool for proposed road projects which is used to predict the environmental consequences or impacts of any development project with a view to recommending mitigation measures. EIA ensures that the potential adverse environmental impacts

are foreseen and addressed at an early stage in the project planning and design. The possible environmental consequences of projects include ecological, economic, cultural, aesthetic, health and safety, social, and amenity impacts. A detailed description of EIA guidelines is presented in Annex B2.

Rwanda: In Rwanda the EIA is guided by the National Policy on EIA. The Constitution of the Republic of Rwanda, adopted in June 2003, ensures the protection and sustainable management of the environment and encourages rational use of natural resources. The steps followed are; screening, scoping and terms of reference, environmental impact study and report, submission of EIA report to the Authority, EIA report review and decision-making. A detailed description of EIA guidelines is in Annex B2.

Tanzania: The EIA guidelines in Tanzania have been developed following its life cycle approach meaning that guidelines follow different phases of the road project. The details of the guidelines are provided in Annex B2.

Uganda: In Uganda the EIA guidelines follow the screening, environmental impact review, environmental impact assessment, review of EIR report and EIS. A detailed description of the EIA guidelines for Uganda is provided in Annex B2.

Transboundary Environmental Assessment Guidelines for Shared Ecosystems in East Africa: EAC guidelines for shared ecosystems in EAC has the stages on Preparation of Project Brief, Screening and Scoping, Trans-boundary Environmental Assessment Study (TEAS), Review of the Environmental Assessment Statement, The Public Hearing, Decision Making, Monitoring, Auditing and Enforcement. The detailed description of EIA guidelines for shared ecosystems in EAC is in Annex B2.

Strategic Environmental Assessment (SEA): Apart from EIA, Tanzania, Uganda, Kenya and Rwanda all have Strategic Environmental Assessment (SEA). The concept of sustainable development requires EIA to be expanded beyond projects level. SEA is the assessment of impacts of policies, plans, programmes which are higher than the project level. It involves impacts identification and analysis of development programs or policies in order to establish potential cumulative effects on the environment over the long-term.

3.6 Convergences and Divergences of Environmental Standards and EIA Guidelines

The study has established the areas of convergence and divergence for environmental standards in the EAC partner states. The following section analyzes each environmental standard and the areas where there is convergence and divergence for the same across the Community.

3.6.1 Water Quality Standards

With the exception of Uganda, Burundi and Zanzibar, other countries in the EAC, namely Tanzania, Kenya and Rwanda, have water quality standards. While in Tanzania the water quality standards are for drinking water and include microbiology, physical and chemical parameters, in Kenya water quality parameters are for six categories; quality standards for sources of domestic water, standards for effluent discharge into the environment, standards for effluent discharge into public sewers, microbiological quality guidelines for wastewater used in irrigation, standards for irrigation water, and quality standards for recreational waters. The numerical values for water quality standards are detailed in Annex B2.

3.6.2 Discharge of Effluent Standards

Only Tanzania, Uganda, Kenya and Rwanda have standards for discharge of effluents into the environment. While in Uganda effluents are discharged into land or water, in Tanzania and Kenya

the standards apply to discharge them into water bodies only. Moreover, Uganda and Tanzania have defined what is meant by wastewater pollution while there is no such definition in Uganda. The divergence here is on the definition and its application, whether on water bodies only or both on water bodies and on land, and on the type of pollutants. The definition of this terminology and their numerical values for discharge effluent are given in Annex B2.

3.6.3 Air Quality Standards

It is only Tanzania and Rwanda that have air quality standards. Other countries in the EAC, namely Uganda, Kenya, Burundi and Zanzibar either do not have standards at all, or have standards in draft form. The country with a standard in draft form is Kenya while other countries do not have any. In Tanzania, the air quality standards are both for ambient air quality standards and stationary sources. In this category, there are also vehicle exhaust emission standards. The areas that the study has identified to be divergent are on the definition of the terminology, numerical values, type of pollutants and different categories of vehicle emission. Kenya has standards for petrol powered vehicle emission and diesel powered vehicle emission. The detailed descriptions of the air quality standards which also include vehicle emission standards are given in Annex B2.

3.6.4 Noise Standards

Four countries in the EAC, namely Tanzania, Uganda, Kenya and Rwanda have established standards for noise. Kenya has indicated a need for standards for both noise and excessive vibration. However, only the noise standards have been developed. The areas of divergence are the definition of noise pollution and the areas affected by the noise. While in Tanzania the numerical values are for different land use categories, in Kenya it is named zones while in Uganda there is no mention of the facility. The other area for divergence is on the numerical values for zones, land use categories. Another area of divergence is the definition of the time frame for day and night for the maximum noise level permitted. The detailed description of noise and vibration pollution standards for different categories in different EAC countries is given in Annex B2.

3.6.5 Vibration Standards

This review has found that there is no member state in the EAC that has established the standards for vibration though Tanzania has the standard in draft form. In the development of the environmental standards manual and guidelines, the study has borrowed from best practices elsewhere but has also used the ISO and WHO guidelines.

3.6.6 Soil Quality Standards

Three countries of the EAC, namely Tanzania, Uganda and Rwanda have soil quality standards. The rest of the member states of Kenya, Burundi and Zanzibar do not have any standards for soil quality. While in Tanzania the soil quality standards are for soil contaminants in agriculture and habitat. The standards limit the contaminants of the soil. In Uganda the standards are for the management of soil quality mainly for the agricultural practice. The observation is that the Uganda's standards are not purely standards for soil quality but for soil properties. The divergence here is that the way soil quality has been defined in Tanzania is different from Uganda. Moreover, the types of pollutants and numerical values to be considered in two countries are different. The detailed descriptions of soil quality standards for different countries are given in Annex B2.

3.6.7 Light Pollution Standards

There is only one country in the EAC that has got standards for light pollution.

3.6.8 Electromagnetic waves and microwaves

The review has established that there is no any country in the EAC that has established standards for electromagnetic waves and microwaves. In the development of the environmental standards manual and guidelines, the study has adopted from best practices elsewhere but has also used the ISO and WHO guidelines.

3.6.9 Hazardous substances and materials

The study has found that there is no country in the EAC that has explicitly established standards for hazardous substances although Tanzania has established standards for ionizing radiation substances. Therefore, in the development of the environmental standards manual and guidelines, the study has adapted from Tanzania the best practices elsewhere, and has also used the ISO and WHO guidelines.

3.6.10 EIA Guidelines

This review has established that EIA guidelines for Tanzania, Kenya and Uganda are quite elaborate and focused with regard to the road sector. The convergent point is that the EIA guidelines for Tanzania, Uganda, Kenya and Rwanda include policy and legal frameworks as well as an institutional framework of their respective countries. The divergent point observed is that the EIA processes for different countries are different. While the EIA processes in Tanzania, Kenya and Uganda take into account the different phases of a road project, the EIA processes in Rwanda are general. Moreover, the EIA processes for Uganda also include the guidelines for socio economic and cultural impacts assessments, compensation and resettlement. Overall, the EIA processes for Rwanda are not as elaborate as those for Tanzania, Kenya and Uganda. In addition, Uganda has established environmental police units to enforce environmental standards and regulations.

3.7 Proposals for Harmonisation of Environmental Standards and Regulations

3.7.1 Standards that have already been harmonised by the EAC

EAC has harmonized some of the environmental standards in its Catalogue of East African Standards of 2010. The following environmental standards have been harmonised by the EAC, and as such, have not been considered for harmonisation in this study. They will have to be referred to, anytime when they are to be applied to the road sector. The standards are;

- EAC 13.040 Air quality
- EAC 13.040.01 Air quality in general
- EAC 13.040.20 Ambient atmosphere
- EAC 13.040.40 Stationary source emissions
- EAC 13.040.50 Transport exhaust emission
- EAC 13.040.90 Other Standards related to air quality
- EAC 13.060.01 Water Quality in general

3.7.2 Harmonised standards from this study

The study has harmonised three environmental standards. These include noise standards, soil quality standards, effluents and receiving waters standards. It appears that there is a difference in terms of definition/terminology of the standards across the EAC countries. There is therefore a need to harmonise the definition/terminology for different standards. Another general aspect is that there is a need to harmonise the scope of standards for different countries within the EAC. The detailed descriptions of these standards are in Annex B2.

3.7.3 The standards that have been developed

This study has developed two environmental standards, namely vibration and electromagnetic waves standards. For vibration, the aspects of the standards that have been looked at are daily exposure limit period, daily exposure limit value, daily exposure action value while for waves the items looked at are effective dose limit, effective dose limit in a single year and equivalent dose limit, in the lens of the eye, in the skin, in the hands and feet.

3.7.4 Environmental impacts assessment guidelines

After reviewing the EIA guidelines, the consultant identified six potential areas for harmonisation. The areas for harmonisation have followed the life cycle approach of the road project. The identified areas for harmonisation are the environmental impact assessment process, project planning and pre-feasibility phases, feasibility study and preliminary design phases construction phase, supervision and monitoring traffic operations, and road maintenance and decommissioning.

The environmental impact assessment process: Under the environmental impact assessment process, the harmonisation was carried out on objectives, functions, steps in the environmental assessment process and the roles and responsibilities of the road authority.

Project planning and pre-feasibility phases: The areas harmonised included environmental registration and project brief, environmental screening, scoping of the EIA study, terms of reference for environmental experts and preliminary environmental impact assessment.

Feasibility study and preliminary design phases: The harmonisation for feasibility study and preliminary design phases focused on the EIA study, environmental management plan (EMP), compensation and resettlement plan (CRP), road safety audit (RSA), submission of environmental impact statement, review of the EIS and EIA certificate.

Construction phase—supervision and monitoring: The construction phase of the project required harmonisation in the following areas; environmental follow-up activities, pre-construction activities, environmental supervision, environmental compliance monitoring, meetings and communication, final inspection and handing over of sites, self-auditing and control auditing.

Traffic operations and road maintenance: The harmonisation for this phase of the road project was carried out on the environmental monitoring and follow-up, the road authority's environmental auditing, control auditing, environmental management in road maintenance, environmental management of vehicles, and traffic operations.

After harmonizing the EIA guidelines for different countries in EAC, the study then prepared the guidelines and manuals for environmental assessment, management and standards to be applicable for road sector in EAC. The details of these guidelines are in Annex B3.

3.8 Conclusions and Recommendations

3.8.1 General

Based on this review, the following are recommended;

- The two member states of Burundi and Rwanda should sign the Convention for Prevention of Marine Pollution by Dumping of Marine Wastes and other Matters.
- Environmental policies in the EAC member states should be revised to advocate for the establishment of superior environmental national courts or tribunals.
- Environmental rights should be removed from preambles of constitutions and placed in substantive parts of the same so that they are litigious.

- Environmental laws should establish courts or tribunals to litigate specifically on environmental matters, and simplify the litigation procedures in such courts.
- Member states should enact comprehensive environmental regulations and set standards to cover all areas susceptible to activities in the road sector, and this function should be done in collaboration with agencies or institutions on standards.
- Member states should adopt EAC environmental standards and EIA guidelines for shared ecosystems in EAC in areas where they have been prepared and harmonised. Member states should amend their national environmental laws and constitutions to generally accommodate the recommendations made in this study.
- The prepared guidelines and manuals are on environmental assessment (at project level of road), management and standards (at operational level) the details of which are found in Annex B3. The EIA guidelines recommend the use of environmental police unit to enforce environmental laws and regulations.
- There should be an enforcement plan to enforce the harmonised and developed environmental standards.
- It is therefore recommended that a socioeconomic impact assessment of all road projects in the EAC be conducted, and put in place a community-driven development plan to implement compensation and resettlement.

3.8.2 Guidelines and Manuals for Environmental Assessment, Management and Standards in Road Sector

Two levels of guidelines have been prepared, namely guidelines at the road project level where environmental assessment and activities to be followed during different phases of road projects have been described in details. In the second level of guidelines, consideration has been given to the road facility which is in operational. At this level the road operator which for EAC is road authority in a partner state, is supposed to follow the guidelines that are describing the general environmental management and protection of the road as a facility. However for the road projects that will be of trans-boundary in nature, the Trans-boundary Environmental Assessment guidelines for shared ecosystems in East Africa (EA) as have been prepared by EA should apply. The details of guidelines and manuals for environmental assessment, management and standards to be applicable in road sector in EAC are in Annex B3.

3.9 Enforcement Plan

In order to implement the harmonized and developed environmental standards in the EAC, an enforcement plan is recommended. The proposed plan will involve the following actions whose details are in Annex B2;

Table 3-2: Enforcement Plan for Environmental Standards

1. Discovering Violations	2. Notice of Violation (NOV)
3. Response by Facility	4. Orders (Compliance Agreements)
5. Dispute Resolution Provisions	6. Supplemental Environmental Projects
7. Impact of Fund Availability	8. Community Involvement in Enforcement Actions
9. Publicizing Enforcement Actions	

4 Harmonisation of Motor Vehicle Registration and Licensing

4.1 Introduction

Road transport provides an affordable means of transport to people and goods from one member state of the EAC to another. Thus, roads are very important in both rural and urban areas in East Africa. Thus, roads and the motor vehicle are the main stay of livelihood in the Community both in urban, rural and interregional movements.

Chapter 15 of the Treaty for the Establishment of the East African Community (EAC) advocates cooperation in infrastructure and transport services. Article 90 (Roads and Road Transport) provides that the member states shall, inter alia;

- Harmonize the provisions of their laws concerning licensing, equipment, markings and registration numbers of vehicles for travel and transport within the Community,
- Ensure that common carriers from other member states have the same opportunities and facilities as common carriers in their territories in the undertaking of transport operations within the Community,
- Ensure that the treatment of motor vehicle operators engaged in transport within the Community from other member states is not less favourable than that accorded to the operators of similar transport from their own territories.

These objectives will be fully realized if there is a single and common law on vehicle registration and licensing applicable in all the Member states, as proposed in Annex C.

4.2 Objectives and Methodology

The specific objectives of the study on Harmonisation of Motor Vehicle Registration and Licensing were to carry out the following:

- Review existing laws and regulations concerning vehicle registration and licensing and propose areas for improvements and harmonization.
- Collect stakeholders' views on how to harmonize the regulations regionally
- Propose harmonized regulations and
- Conduct stakeholders' workshops to disseminate information on new regulations

To achieve these objectives, the study adopted a participatory methodology, which included the following:

- A desk study, where the existing laws and regulations concerning motor vehicle registration and licensing applicable in the member states were reviewed.
- Interviews and meetings through which information on the performance of current laws and regulations was gathered from experts and stakeholders in the sector.
- Analysis of data and information to yield a proposed legal instrument that will harmonise all the areas of divergences that were found in the existing laws and regulations.

4.3 Review of Motor Vehicle Registration Laws

A summary of the review of motor vehicle registration laws applicable in the member states is presented in Table 4-1. The review of these laws enabled the consultant to determine the areas of convergence/divergence.

Table 4-1: Summary of the Review of Motor Vehicle Registration Laws in the EAC

Country	Matters considered under the relevant law(s)
Burundi	<p>Principal Law: Act No. 1/04 of 2009 on Domestic Road Transport</p> <ul style="list-style-type: none"> • Registration process (Part III, Chapter III) • Creation of a vehicle data base accessible to all public service departments (Article 68) • Environmental and safety requirements of imported vehicles (Article 135) • Registration of motor vehicle garages (Article 138) • Roadworthiness (Article 61) and penal sanctions (Part VI) • The full implementation of the Act is operationalised by regulations in the form of Ministerial Ordinances or Presidential Decrees made by the Minister in charge of the transport portfolio and the President respectively.
Kenya	<p>Principal Law: Road Traffic Act, Cap 403 of the Laws of Kenya</p> <ul style="list-style-type: none"> • Registration officers and their functions; currently registration is under KRA (ss.3 and 5). • Prohibition of use of vehicles without registration certificates (ss.6(1) and 6(4)) • Classification of motor vehicles (s.4) • Application for registration of motor vehicles and related matters (ss. 6(2), (5), (6) & (7)) • Procedures for registration of motor vehicles (ss. 6(8) and 10) • Certificate of registration and identification marks (ss. 12 and 13) • Presumption and change of ownership (ss. 8 and 9) • Exemption from registration (s. 11); offences and penalties (s. 14) • The full implementation of the Act is operationalised by regulations in the form of subsidiary legislation and traffic rules.
Rwanda	<p>Principal Law: Presidential Decree No. 85/01 (Traffic Police and Road Traffic) Part. 5</p> <ul style="list-style-type: none"> • Chapter 1: Vehicle registration (Article 121, 122 and 123); • Chapter 2: Vehicle registration certificate (Article 124) • Chapter 3: Registration numbers, distinctive sign and identification marks • Chapter 4: Renewal of plates and registration certificates • Chapter 5: Placing and legibility of registration plates and distinctive signs • Chapter 7: Traffic of vehicles registered outside Rwanda • Chapter 10: Taxes
Tanzania	<p>Principal Law: Road Traffic Act 1973 Cap 168 R.E. 2002</p> <ul style="list-style-type: none"> • Officers and their main functions (ss.4-7) • Registration of motor vehicles and related matters (Part II, ss. 8-17) which includes: <ul style="list-style-type: none"> ➢ Classification of motor vehicles (s. 9) & application for registration of vehicles (s. 10) ➢ Procedure of registration of motor vehicles (s. 11) ➢ General certificate of registration (s. 12) ➢ Certificate of registration to be carried in the vehicle/trailer (s. 13) ➢ Identification marks (s. 14) and exemption from registration (s. 17) ➢ Presumption of ownership and need for notice of change of ownership (ss. 15 & 16). • Offences and penalties (ss. 8(2), 11(3), 13(2), 14(5), 18 and 113) • Power to make regulations (s.114)
Uganda	<p>Principal Law: Traffic and Road Safety Act 1988 Cap 361 of the Laws of Uganda</p> <ul style="list-style-type: none"> • Officers and their main functions (Part II ss.3 - 9) • Prohibition of use of motor vehicles without registration certificates (ss.10) • Classification of motor vehicles (s. 11) & application for registration of vehicles (s. 12) • Procedure of registration & deregistration of vehicles (s. 13(1) –(3), (5), (6) & s.14) • Identification marks and related matters (s. 13 (4), (7) & (8)) • Presumption of ownership (s.9) & exemption from registration (s. 32) • Offences and penalties (s. 33) and power to make regulations (s.34)
Zanzibar	<p>Principal Law: Road Transport Act No. 7 of 2003</p> <ul style="list-style-type: none"> • Registration under the Zanzibar Revenue Board instead of the Minister/Director of Transport . • Registration process similar to that of Tanzania Mainland (Part IV)

4.3.1 Convergences in Motor Vehicle Registration

For historical reasons, the areas of convergence especially among the three founder Member states of the Community are many and, indeed, some of the provisions look like a replica of each other. The core areas of convergence within all the Partner States include the following:

- Appointment/Designation of Registrar of motor vehicles
- Compulsory registration of motor vehicles
- Conditions for registration
- Assignment/Issue of registration marks
- Change of ownership/change of motor vehicle particulars
- Registration of Government, Consular or International Organization Vehicles
- Exemption from registration
- Creation of offences and penalties
- Revenue Authorities acting as Registrars
- Absence of provisions on data sharing

4.3.2 Divergences in Motor Vehicle Registration

In spite of the similarity of the legislation in the Partner States, there are still many areas of divergence which are worth consideration for purposes of harmonization. Common areas of difference include the following:

- Registration authorities and the Ministries to which they belong
- Appointment of other (subordinate) officers
- Classification of registered motor vehicles
- Restriction of motor vehicle ownership based on age
- Conditions for registration
- Title of documents for registration
- Number of owners of registered motor vehicles
- Change of ownership of motor vehicle
- Suspension of registration
- Use of IT in motor registration

4.3.3 Emerging Issues on Registration

4.3.3.1 Registration Authorities

There is a glaring divergence among the Member states in the law and practice on motor vehicle registration. Whereas the law in Burundi, Kenya, Uganda and Zanzibar invests this function in Ministries responsible for transport, in practice this function is discharged by revenue authorities, while in Tanzania and Rwanda the function statutorily lies with Ministries responsible for finance and it is rightly carried out by revenue authorities. Table 4-2 below illustrates this position.

The registration by revenue authorities may be justified by the advantages which they enjoy over the Ministries responsible for transport. Presently, revenue authorities have competent and highly trained personnel on registration of motor vehicles. They are also endowed with adequate financial and technological resources including IT. Further, historically, revenue authorities have always carried out this function under the defunct East African Customs (Management and Tariff) Act, 1952 and now under the EAC Customs Management Act, 2004 which requires Customs Department to collect and account for Government taxes and revenue on international trade, motor vehicle importation being one of them.

Table 4-2: Comparative Provisions on Statutory Motor Vehicle Registration Authorities

Name of Country	Legal Framework	Statutory Designated Registration Authority	Statutory Ministry in Charge	Current Registering Authority
Burundi	Act No 1/04 of 2009: Article 67	Officer: transport services	Ministry responsible for transport	Burundi Revenue Authority
Kenya	Traffic Act, Cap 403: Section 3	Registrar of Motor Vehicles	Ministry responsible for transport	Kenya Revenue Authority
Rwanda	Decree No. 85/01 Traffic Police and Road Traffic: Article 121	Tax Department	Ministry responsible for finance	Rwanda Revenue Authority
Tanzania	Road Traffic Act Cap 168: Section 3	Registrar of Motor Vehicles	Ministry responsible for finance	Tanzania Revenue Authority
Zanzibar	Road Transport Act 2003, Section 3	Director for Transport	Ministry responsible for transport	Zanzibar Revenue Authority
Uganda	Traffic and Road Safety Act, Cap, 361 Section 4	Chief Licensing Officer of Motor Vehicles	Ministry responsible for transport	Uganda Revenue Authority

Nevertheless, there are disadvantages as well. As revenue collectors, the authorities may, primarily, be concerned with revenue collection rather than safety or roadworthiness of the vehicles they register. And this may sometimes be done in total disregard of the law on safety. Also they may disregard the impact of the registration and licensing regime on transport efficiency. At the same time a comparative study in other 15 commonwealth countries shows that registration of motors is normally done by Ministries in charge of transport and not revenue. So, registration is not a revenue function only but safety as well.

It is thus recommended for Member states ' consideration that revenue authorities should only be tasked to collect revenue from the registration and licensing process while the actual registration and licensing function remains with the Ministries in charge of transport after consideration of safety issues and other related matters.

4.3.3.2 Age of Motor Vehicles

To avoid dumping and ameliorate environmental hazard caused by old age motor vehicle emissions, Member states recommended different cut-off age for registration of motor vehicles imported in the region. Burundi recommended 7 years, Kenya has 8 years' law in place, Rwanda and Uganda also recommended 8 years while Tanzania has a 10 years' regulation. For motor vehicles older than this age they are charged an extra fee during registration. To promote harmonisation in the region 8 years old age is recommended for new registration of imported vehicles. Meanwhile, registered vehicles should undergo regular testing and inspection in approved

testing centres in order to comply with vehicle fitness and fuel emission standards recommended in Chapters 2 and 3 of this study.

4.4 Review of Motor Vehicle Licensing Laws

Motor vehicle licensing laws in all five Member states are closely related to vehicle registration laws in that for a registered motor vehicle to be used on a public highway it has to be licensed first. Table 4-3 below summarises the licensing matters considered under the relevant laws.

Table 4-3: Summary Review of Motor Vehicle Licensing Laws in EAC

Country	Matters considered under relevant Law(s)
Burundi	<p>Principal Law: Act No. 1/04 of 2009 on Domestic Road Transport</p> <ul style="list-style-type: none"> • Licensing is done by the Burundi Revenue Authority. • Licensing requirement is provided for under regulations made by the Minister responsible for finance. • The licensing fee is calculated on the basis of engine capacity. • The licensing fee is payable on an annual basis.
Kenya	<p>Principal Law: Road Traffic Act, Cap 403 of the Laws of Kenya Part III</p> <ul style="list-style-type: none"> • The registrar of motor vehicles is in charge of both licensing and registration. • Motor vehicles and trailers to be licensed (s. 15) and dealers' general licence • Condition for the issue of license (s. 17 & 17A) and fee and duration of licence (s. 19) • Subsidiary legislation under section 119 (1) includes the following: <ul style="list-style-type: none"> ➢ Authorisation permits (R. 7A); manner of carrying vehicle licence and vehicle certificates (RR. 8 & 8A); vehicles exempted from licensing R. 9; Duration of licences and fees payable under the rules.
Rwanda	<p>Principal Law: Presidential Decree No. 85/01 (Traffic Police and Road Traffic) Part. 5</p> <ul style="list-style-type: none"> • Motor licensing is mandatory in Rwanda and it is carried out by the Rwanda Revenue Authority (RRA) upon registration of the motor vehicle. • Chapter 7 provides for licensing of vehicles registered outside Rwanda. • Article 132 outlines the conditions for transit vehicles.
Tanzania	<p>Principal Law: No principal law but vehicle licensing is covered under regulations.</p> <ul style="list-style-type: none"> • Road Traffic Regulations 2001 (GN No. 177/2001): Provision of licensing per se appears in part IV of the regulations. • Road Traffic Vehicle Clearance Regulations 2000 • Road Traffic (foreign vehicles) Exemption for Registration Order 1999
Uganda	<p>Principal Law: Traffic and Road Safety Act 1988 Cap 361 of the Laws of Uganda</p> <ul style="list-style-type: none"> • Appointment of Chief Licensing Officer (s. 4(2)) • Definition of a licensing year (s. 7) • Licensing for possessing a motor vehicle (s. 16) • Issuance of a licence (s. 18) • Failure to renew a licence (s. 21) • Change of classification of a licence (s. 23) • Dealers' vehicle licence • Offences and penalties (s. 34)
Zanzibar	<p>Principal Law: Road Transport Act No. 7 of 2003 Part IV</p> <ul style="list-style-type: none"> • Section 35 prohibits use of any motor vehicle unless it is licensed under the Act. • Procedure for application of a road licence (s. 36) • Licences are issued by the Zanzibar Revenue Authority for a period of 1 year. • A license can be refused on the basis of the conditions in section 38.

4.4.1 Convergences in Motor Vehicle Licensing

As far as vehicle licensing is concerned, all the statutes (laws) in the EAC member states converge on the following areas. This convergence is highlighted either in the parent legislation or in the rules/regulations made under the parent legislation.

- Designation of licensing authorities
- Appointment of staff to licensing authorities
- Prohibition of use of unlicensed/annually registered vehicles
- Dealers' general licences
- Surrender of vehicles licences
- Application for new vehicle licences
- Classification of motor vehicles for purposes of licensing
- Exemption from licensing
- Display of vehicle licences
- Penalties
- Making of rules/regulations

4.4.2 Divergences in Motor Vehicle Licensing

Divergence features in, among others, the following areas:

- Some parent legislation lack provisions on motor vehicle licensing
- Exemption from licensing
- Grant of dealers' general licences
- Failure to renew vehicle licence
- Law on motor vehicle licensing spread between parent and subsidiary legislation.

4.5 Review of Motor Operators' Licensing Laws

Traditionally, road transport services in the three Member states of Kenya, Tanzania and Uganda have always been regulated in order to prevent undue competition with other modes of transport, especially, the railway mode. Operators' licensing is still a common and dominant feature in the provision of road transport services in the entire region of East Africa.

Regulating service providers is done both for economic and social reasons, such as, ensuring provision of better but less costly services, improved safety, creating a fair level ground for effective competition and ensure compliance with traffic laws and regulations. A summary of the respective country laws is shown in table 4-4 below.

4.5.1 Convergences in Operators' Licensing Laws

Areas of convergence include, inter alia, the following;

- Grant of licences
- Conditions for grant of licences
- Lack of domestication of regional agreements on commercial operators
- Monitoring and enforcement of operators' laws.

Table 4-4: Summary Review of Motor Operator Licensing Laws in EAC

Country	Issues regulated under the Law
Burundi	<p>Principal Laws: Act No. 1/04 of 2009 on Domestic Road Transport</p> <ul style="list-style-type: none"> • Licences under this Acts apply only to domestic transport • They also apply to both the carriage of goods and passengers (Article 3) • Conditions for grant of an operator licence (Article 25, chapter V Part III) • Access to domestic carrier profession (Article 73 chapter V; Article 74 and 75) • International operators are covered by bilateral or multilateral agreements
Kenya	<p>Principal Laws: Transport Licensing Act Cap 404; Road Traffic Act, Cap. 403 Part XI; Traffic Rules L.N.84/1993 as amended; Transport Licensing Regulations L.N. 98/1976.</p> <ul style="list-style-type: none"> • TLA, Cap 404 establishes the Transport Licensing Board (TLB) in the MoT. • Part III of Cap 404 prescribes the conditions attached to licences issued by TLB • Traffic Rules under Cap 403 provide technical specifications for public service vehicles • TLB's licensing functions have now been transferred to KRA since 1995 • Licensing of goods vehicles by TLB was abolished since 2006
Rwanda	<p>Principal Law: Law No. 39 of 2001 creating RURA</p> <ul style="list-style-type: none"> • Before a licence is issued, RURA requires the applicant to have adequate finance • RURA also seeks to protect users from anti-competitive practices • RURA has enacted regulations under law 39 that regulate foreign truck operators • Rwanda runs a public transport company providing passenger services countrywide
Tanzania	<p>Principal Laws: Transport Licensing Act Cap 317, 1973 Surface and Marine Transport Regulatory Authority Act, 2001 The Transport (Road Passenger) Licensing Regulations 2007 The Passenger Vehicles (Technical Safety & Quality) Rules, 2007</p> <ul style="list-style-type: none"> • Every operator must obtain a road service licence from SUMATRA • Section 31(1) provides the licence conditions under Cap 317 • SUMATRA is empowered to attach any other conditions to the licence as it may think fit. • Licensing of goods vehicles abolished and substituted by annual registration
Uganda	<p>Principal Law: Traffic and Road Safety Act 1988 Cap 361 of the Laws of Uganda</p> <ul style="list-style-type: none"> • The Act establishes a licensing authority namely the Transport Licensing Board (TLB) • Section 72 describes the organisation of public passenger transport • Licences granted by the Board and may remain in force for 5 years • Section 84 regulates the goods operator licences
Zanzibar	<p>Principal Law: Road Transport Act No. 7 of 2003 Part V Commercial Motor Vehicles Regulations, 2004 L.N. 46 of 2005</p> <ul style="list-style-type: none"> • The Act establishes the Road Transport Board • Licences are granted upon compliance with statutory conditions • Licences remain in force for a period not exceeding 3 years

4.5.2 Divergences in Operators' Licensing Laws

Notable areas of divergence in this area are;

- Absence of independent operator regulatory transport agencies
- Government provision of transport services in one Partner State.

4.5.3 Emerging Issues on Fees/Charges

The review of the laws on registration and licensing gave rise to two crucial issues on fees and charges which Member states must resolve.

4.5.3.1 Collection of Fees/Charges

In the course of registering and licensing motor vehicles Partner States collect fees and charges from applicants and persons entering another Partner State. The fees and charges are not harmonised in the region as depicted in Table 4-5 below.

Table 4-5: Fees/Charges Collected Under Road Traffic Laws

S/N.	Type of fee/charge	Burundi	Kenya	Rwanda	Tanzania (Mainland)	Zanzibar	Uganda
1.	Foreign vehicle entrance/permit fee	✓	✓	✓	✓	✓	✓
2.	Transit/Road Toll	x	✓	✓	✓	x	✓
3.	Registration card/initial registration fee	✓	✓	✓	Included in taxes	✓	✓
4.	Number plate fee	✓	✓	✓	✓	✓	✓
5.	Driver licensing/permit fee		✓	✓	✓	✓	✓
6.	Operator licensing fee	✓	Fuel levy	✓	✓ (on PSVs)	✓	Fuel levy
7.	Annual registration/licensing fee	✓	Fuel levy	Fuel levy	✓		Fuel levy

Of concern, is the entry or permit fee which is collected when a motor vehicle (commercial and sometimes, private) enters the territory of another Partner State. The rate differs from one Partner State to another and land locked States like Burundi have strong reservations against it. This fee seems to be an unnecessary barrier which hinders smooth flow of transport services in the region and it is accordingly recommended for abolition.

4.5.3.2 Modality for Collection of Annual Registration/Licensing Fees

There is diversity among Member states in the manner this fee is collected. In Burundi, Tanzania, and Zanzibar the fee is collected annually based on the engine capacity of the motor vehicle while in Kenya, Rwanda and Uganda the same is collected as fuel levy. Member states should agree on a common modality of collection after conducting a study to determine the most profitable mode to Member states in terms of revenue collection.

4.6 Conclusion and Recommendations

Based on the desk review of the various laws applicable in the Member states and coupled with the experts' views gathered in meetings held in all the Member states and buttressed by the Task Force views, a legal instrument on motor vehicle registration, licensing and operators' licensing is, accordingly, recommended. The instrument should canvass among others, the following:

- registration and licensing of motor vehicles should be done by each Partner State based on common agreed criteria or parameters;

- the designation of revenue authorities as revenue collecting authorities while actual registration and licensing is done by transport Ministries after consideration of safety issues.
- the use of ICT in motor vehicle registration and licensing;
- the creation of data base and sharing of data on motor vehicle registration and licensing among the Member states ;
- create an EAC road transport sector regulators' forum for sharing of experiences and effective implementation of the provisions of the legal instrument;
- the grant and use of friendly ICT identification marks on registered and licensed motor vehicles;
- in addition to other requirements, only environmentally sound motor vehicles not older than 8 years should be registered and licensed in the region;
- prohibit charging of permit fees for motor vehicles of one Partner State entering another Partner State so as to accommodate the spirit of the EAC Protocol on Common Market;
- incorporate the provisions of the Road Tripartite Agreement of 2001 on commercial operators after reviewing Article IV;
- The proposed law should be a bare framework while further details shall be prescribed in Regulations made by the Council of Ministers or a Minister in charge of transport in a respective Partner State.

4.7 Form of Instrument

The form of instrument recommended is an Act of the Community as previously recommended by similar studies carried out by the EAC, such as, the Study on the Legal Framework for Introducing One Stop Border Post, 2010. This Study recommended the passage of the East African Community One Stop Border Posts Act, 2010 which carries with it the principles of supranationality and subsidiarity. The principle of supranationality implies that the proposed Act will take precedence over similar national laws in the member states on matter pertaining to its application. National laws on registration and licensing of motors will remain in force to the extent that they are not in conflict with the provisions of the proposed Act. It follows, therefore, that wherever the provisions of the proposed Act are in conflict with those of the national laws, the provisions of the Act will take precedence over those of the national laws. The principle of subsidiarity means that all matters not specifically provided for in the proposed Act shall continue to be regulated by the national laws.

4.7.1 Structure of the Proposed Act

The proposed Act has the following parts:

- Part 1 Preliminary Provisions: This part deals with the short title of the Act, its application and commencement date; and the interpretation of the terms/words used in the Act.
- Part II Administrative Provisions: This part deals primarily with the appointment of registrars of motor vehicles in the member states and other officers, keeping of registers and data bases for registered and licensed motor vehicles and sharing of data among the member states.
- Part III Registration of Motor Vehicles and Trailers: Essentially, this part contains the key provisions on the registration of motor vehicles in each member state, conditions for registration, classification of motor vehicles and assigning of identification marks to registered motor vehicles.
- Part IV Construction and Use of Motor Vehicles: This part is concerned with issues related to sale or supply and use of motor vehicles on the roads in the region unless they conform to the prescribed requirements. It also imposes an obligation on any person who uses a motor vehicle on the roads unless the equipment attached to the motor vehicle is roadworthy.

- Part V Testing of Motor Vehicles and Issuance of Roadworthiness Certificates: Primarily this part seeks to ensure that all motor vehicles registered in each member state are roadworthy. Therefore, all motor vehicles must be tested by competent authorities before certificates of roadworthiness, which would, in turn, qualify them for registration, are issued.
- Part VI Licensing of Motor Vehicles and Trailers: This part imposes, among other things, a requirement that all motor vehicles be licensed, a procedure for application for licensing, conditions for licensing and carriage of licences in motor vehicles.
- Part VII Licensing of Public Service and Goods Vehicles: In this part licensing of operators of public service and goods vehicles is dealt with. National transport regulator agencies shall be responsible for executing this function. Classification of licences, conditions for licensing and procedures of application for licences, granting and cancellation of licences, etc. are all dealt with in this part.
- Part VIII Licensing of Drivers of Commercial Motor Vehicles: This part makes provisions for drivers who drive commercial motor vehicles in the region. They will have to be specially licensed after undergoing training in approved centres. So, not every driver will be allowed to drive a commercial vehicle under the proposed Act.
- Part IX Enforcement and Institution of Proceedings: This part carries the traditional provisions on enforcement of the law. It generally seeks to invest the police in each member state with the powers to enforce the Act, including institution of criminal proceedings against suspected offenders under the Act.
- Part X Miscellaneous Provisions: This part provides for other general matters not covered in the other parts, including the licensing of conductors. More importantly, it invests the Council of Ministers with the powers to make regulations for the better enforcement of the provisions of the proposed Act.

4.7.2 Reference Law, Objects and Reasons

In the proposed Act, there is an Appendix which contains the sources from which the provisions in the proposed Act are derived. In addition, the Appendix contains the objects and reasons why the provisions are included in the proposed Act. The proposed Act is informed by similar provisions from road traffic legislation applicable in several commonwealth countries, including Antigua and Barbados, Kenya, Uganda, Ghana, India, Ireland, Hong Kong, Malawi, Malaysia, Sierra Leone and Zambia.

4.7.3 Further Input from Professionals/Experts

Road traffic legislation, like the proposed Act, should be a product of joint and shared expertise from different professions. To this end, it is suggested that before the EAC enacts the proposed Act input from various professionals in the member states should be sought. The professionals may include finance/tax experts, road engineers, environmentalists, insurers, traffic police officers, road safety engineers, experts in standards, just to mention a few.

5 Harmonization of Road Safety Laws and Regulations

5.1 Introduction

Loss of human lives in road crashes in all the East African Community member states has become critical challenge to the achievement of development goals due to the associated loss of life and property. Harmonization of the road safety laws and reduction of risk factors in traffic would facilitate safe transport across the Community and minimise the losses resulting from traffic crashes. This chapter presents a review of road safety situation in the partner states, reviews its regulation and proposes harmonization of road safety laws. A number of road safety strategies and projects are proposed and a strategy for tackling the prevalence of HIV/AIDS in the region is presented. The chapter concludes by presenting a comprehensive framework for the development of an East African Road Safety Master Plan to serve as a tool for guiding the member states in their efforts to improve road safety. The details of the study are presented in Annex D.

5.2 Objectives and Approach of the Study

The objectives of the study were to:

- Review the existing laws and regulations related to road safety and propose areas for harmonization,
- Identify viable strategies, projects and activities for reducing the high incidence of crashes in the region,
- Recommend a regional strategy for tackling the prevalence of HIV/AIDS in road transport corridors, and
- Develop a framework for the preparation of an East African Road Safety Master Plan.

To achieve these objectives, the study adopted a broad approach which involved the following:

- A desk study where legal and policy documents, country strategies, road crash data and international literature on road safety were collected and reviewed. The areas reviewed included road safety situations in the member states, causes of road crashes, institutional setup and capacity to implement road safety interventions.
- A desk study on HIV/AIDS status in the partner states coupled with an extensive consultation of stakeholders to confirm policies and strategies in place to contain the pandemic.
- Gathering un-documented information on the road safety subsector through interviewing experts and stakeholders.
- To validate the information gathered, the Consultant conducted stakeholder and expert workshops in each of the 5 member states as well as in Zanzibar. The stakeholders ranged from ministries responsible for road transport and health as well as local government authorities, transport service providers, experts in the fields and other beneficiaries.
- The analysis of the information to determine weaknesses and areas of convergence and divergence followed by the development of strategies, actions to reduce incidence of traffic crashes and their consequences, a strategy for tackling the HIV/AIDS pandemic within the transport sector and a framework for the Road Safety Master Plan of the East African Community.

5.3 Road Safety Situation in the EAC

East African countries like the other countries in Sub-Saharan Africa have relatively high rates of casualties resulting from road traffic crashes. About 28,500 people died in road crashes in the EAC

member states in 2010. Annual monetary loss due to road traffic crashes exceeds US \$ 1.7 billion. The distribution of casualties resulting from road injury across different road user groups in the member states is very similar. The human, road environment and vehicle as contributing factors to the occurrence of road crashes have similar representation in the traffic crash reports of the member states. Governments in the member states have initiated actions to improve road safety but the actions have not been implemented consistently due to weak coordination and inadequate budget and capacity. It is therefore recommended that an effective road safety management system be developed. Establishment of an autonomous adequately resourced (in terms of staff and funding) road safety agency (board or authority) in each partner state to lead and coordinate road safety is considered essential and therefore recommended. It is also recommended that the member states invest adequately in interventions in order to accelerate road safety work. The experience of Rwanda suggests that this is possible provided there is strong political will.

5.3.1 Extent and Trend of Road Traffic Casualties

In 2007, there were 8,699 fatalities and 45,712 persons injured due to road crashes in the East African Community according to police reports. At that time, the total population of the member states was around 127,108,000. However, police records are known to include only a fraction of casualties due to road crashes and reports on death causes gives a better picture as shown in Table 5-1.

Table 5-1: Number of fatalities from road crashes in the EAC*

Member state	Number of fatalities	Rate per 100,000 population	Ranking of RTI as a cause of death
Burundi	1,786	29.5	13 th
Kenya	7,801	28.2	10 th
Rwanda	1,638	24.2	15 th
Tanzania	9,029	29.6	12 th
Uganda	8,192	34.7	12 th

Source: World Life Expectancy (www.worldlifeexpectancy.com)

*Based on reports of causes of death rather than police reports

Road traffic system risk for the member states expressed in terms of fatalities reported to the police per 10,000 registered vehicles is shown in Figure 5-1. The figure shows that Kenya's road traffic system risk is lower than that of Rwanda, Uganda and Tanzania. However, given the varying definition of a RTI fatality and higher vehicle ownership, this may not be the case. The data reported for Burundi was not from police records like the other partner states therefore not presented in Figure 5-1.

The RTI fatality trend shown in Table 5-2 is generally increasing in all the member states, with the exception of Rwanda. Unfortunately the trend is the same all developing countries experiencing rapid motorization with rare exceptions. The estimate of fatalities per 100,000 population presented in Table 1 and the trend in Table 2 as well as Figure 5-1 suggests that the condition in Uganda is comparatively serious and calls for serious action.

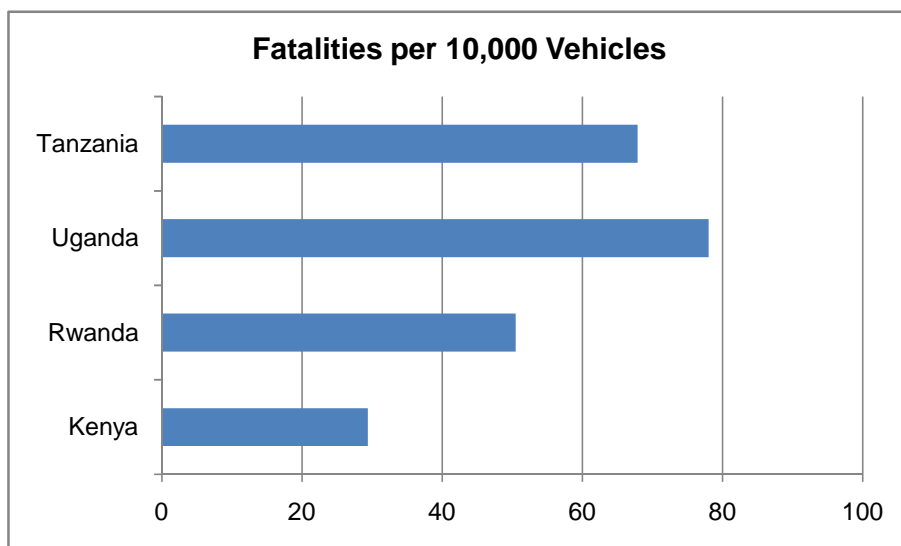


Figure 5-1: Road traffic system risk expressed in fatalities per 10,000 registered vehicles
 Source: Police RTI fatalities data

Table 5-2: RTI fatality trends across the member states

Country		RTI fatality trend
Burundi		Data not available (but estimated at about 8 per cent)
Kenya		Generally increasing at about 7 per cent per year (but experienced a reduction by 20 per cent in 2004 / 2005 following the introduction of new regulations for PSVs)
Rwanda		Increasing up to 1997/99 but decreased by 7 per cent per year from 2002 to 2005
Uganda		Increased at about 20 per cent from 2008 to 2010. Generally the increase is in the range of 8 to 9 per cent each year
Tanzania	Mainland	Increasing at about 8 per cent per year (in the last 10 years)
	Zanzibar	Increasing at about 7 per cent annually from 2002 to 2007

Source: Based on Traffic Police Departments' data and the literature

5.3.2 The Nature of the Problem and the Contributing Factors

It is important to identify the road users involved in RTC and the rate of fatalities in order to determine priority areas. The distribution of fatalities by road user groups across the member states (from 2006 to 2007) is shown in Figure 5-2. Generally, the proportion of pedestrians and passengers killed in all the five countries is high, ranging from 70 per cent for Tanzania to 80 per cent for Kenya. For Rwanda, it is 52 per cent because the number of motorcyclists and cyclists is large (34 per cent). The general conclusion is that road safety work needs to focus on improving the safety of passengers (mainly in PSVs) and the vulnerable road users. In many parts of the road network, segregation of modes is not common and pedestrians, pedal-cyclists, motor-cyclists, buses, trucks and passenger cars compete for road space, thereby creating serious safety problems.

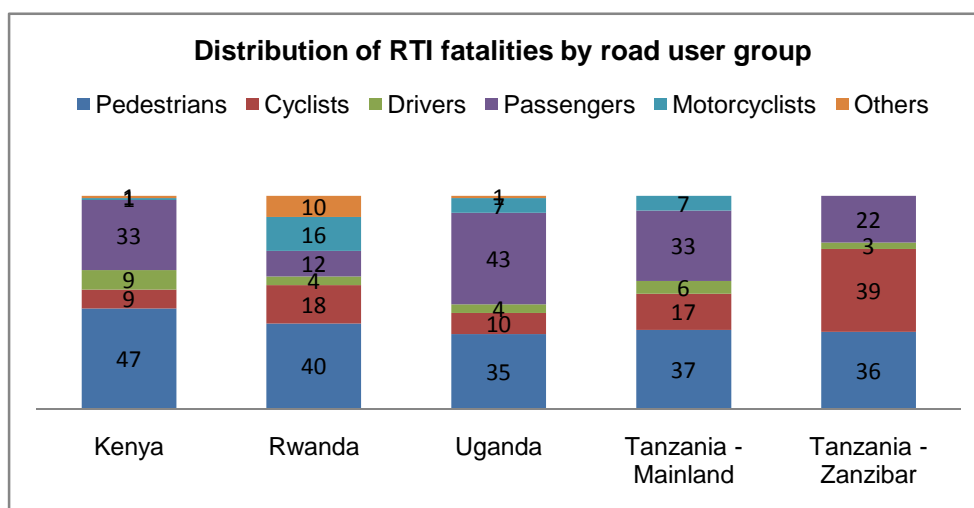


Figure 5-2: Distribution of vehicles by category across the member states

*Motorcyclists include those who operate three-wheel motorized vehicles.

5.3.3 Identified Risk Factors and Proposed Measures

Table 5-3 presents the most important risk factors and the corresponding mitigation measures.

Table 5-3: Identified risk factors and proposed mitigation measures

Risk Factor	Proposed Measure
Driving under influence of alcohol and/or drugs	<ul style="list-style-type: none"> Amend legislations in all the member states so that the BAC limits are as follows: 0.05 g/dL (50mg/100millilitres) for general driving population, 0.02 g/dL (20mg/100 millilitres of blood) for motorcycle riders and young drivers and 0.00 g/dL (0.00 mg/100 millilitres) for drivers of PSV, Carry out a sustained information campaign coupled with enforcement. Carry out information campaign on drugs to be avoided when driving.
Speed	<ul style="list-style-type: none"> A general rural maximum speed limit of 100 km/hr and urban speed limit of 50 km/hr on single carriageways and 60 Km/hr for dual carriageways be adopted. Systematic enforcement of speed limits should be done. ICT should be used to overcome the inconsistencies in enforcement of speed limits.
Road Infrastructure	<ul style="list-style-type: none"> Establish the practice of RSA for new and existing roads. Ministries responsible for infrastructure and road fund boards (RFB) should provide guidance and promote good practices that provide for the safety of all road users. The member states should provide segregated facilities on all mobility roads.
Vehicle roadworthiness	<ul style="list-style-type: none"> The member states should implement a modern vehicle inspection system and should require regular vehicle inspection for all vehicles.
Riding motorcycles without wearing helmets	<ul style="list-style-type: none"> All motorcycle riders should be told to wear helmets on all classes of roads. Carry out information campaigns, enforcement and evaluation to ensure 100% compliance. Harmonize helmet standards across the member states. Discourage use of non-standard helmets. Provision of disposable head covers for passengers for health reasons.
Seat belts and child restraints	<ul style="list-style-type: none"> Harmonize legislations so that all vehicle users are required to wear seat belts, Increase enforcement and information campaigns, and Introduce legislations for child restraint and take measures to increase availability of child restraint seats.
Pre-hospital care	<ul style="list-style-type: none"> The member states should study how best to improve the pre-hospital services (ambulances and first aid) for crash victims and implement the most effective system.

Hospital trauma services	<ul style="list-style-type: none"> Health insurance systems should provide sufficient resources to medical facilities so they can handle all RTI victims. Arrange for the compensation of RTI victims hit by drivers who do not stop or without insurance cover for their victims
Para-transit transport in urban areas	<ul style="list-style-type: none"> Governments should study transport needs of major cities, and develop appropriate public transport. Ensure that only properly trained and licensed drivers drive PSVs. Establish and enforce crashworthiness standards for PSVs.
Land use/transport planning	<ul style="list-style-type: none"> Land use and transport planning for urban areas should focus on the provision of NMT routes properly integrated with streets and segregated from high speed traffic.
Un-licensed drivers and riders, driver behaviour	<ul style="list-style-type: none"> Implement an effective driver training, testing and licensing system. Carry out information campaign and step up enforcement to ensure compliance by driving schools and individual drivers.
Use of mobile phones when driving	<ul style="list-style-type: none"> The member states that permit use of mobile phones while driving should legislate against the practice. Carry out information campaigns and enforcement.

5.4 Existing Road Safety Laws and Regulations

All the member states have road policies embedded in their transport policy documents. Tanzania has published a separate road safety policy while Uganda is in the process of preparing one. Kenya has a road safety strategy and a very comprehensive integrated transport policy. In all partner states there are comprehensive legislations governing road safety although they need updating. During the study Burundi was in the process of updating its road safety law. However, with the exception of Rwanda, enforcement of road safety laws is very weak. In all the member states the institutional set-up for road safety activities is fragmented and the coordination framework in the form of a National Road Safety Council/Commission is not operational. Systematic enforcement of road safety laws and restructuring of the road safety institutional set-up to facilitate the setting up of common targets and coordination of the implementation are top priority areas. Detailed examination of the existing laws is presented in Annex D of this report. Table 5-4 gives a summary of the areas that require harmonization or updating.

Table 5-4: Summary of areas for harmonization and improvement

	Issue	Practice	Recommendation
1	Road safety leadership and coordination	Coordination is weak because of the legally weak lead agency.	<ul style="list-style-type: none"> Each member state to legally assign one ministry the responsibility to lead and to coordinate road safety work through a National Road Safety Authority/Agency.
2	Road safety funding	Inadequate and erratic allocation of funds to road safety work.	<ul style="list-style-type: none"> Provide sustainable funds for road safety activities. The funds should be protected legally.
3	Blood alcohol content when driving	<ul style="list-style-type: none"> 80 mg to 100 mg of alcohol per 100 ml of blood allowed – this is too high. Some of the member states 	Harmonize permissible BAC as follows: <ul style="list-style-type: none"> PSV drivers maximum: 0.00 mg/100 ml of blood. Motorbike riders and young drivers (below 25 years of age) a maximum of 20 mg/100 ml of blood.

		restrict drivers of PSVs to zero alcohol blood content while driving while others do not.	<ul style="list-style-type: none"> All other drivers should be allowed a maximum 50 mg/100 ml of blood.
4	Speed limits	Speed limits by vehicle class and road type.	<p>Legislate maximum speeds as follows:</p> <ul style="list-style-type: none"> On dual carriageways: 110 km/hr rural, 60 km/hr urban. On single paved carriageways: 100 km/hr – rural, 50 km/hr – built-up areas, including settlements. Gravel roads: 60 km/hr – rural, 30 km/hr urban. School and residential zones : 30 km/hr PSVs and HGVs: 80 km/hr.
5	Driver licensing and vehicle inspection	Improperly trained/licensed drivers and poorly maintained vehicles.	<ul style="list-style-type: none"> Harmonize the deduction of points, penalties and permit a suspension and cancellation system. Harmonize vehicle inspection laws and modernize vehicle inspection systems. Harmonize driver training, testing and licensing. Special attention be given to motorbike drivers / riders.
6	Use of helmets by motorcyclists	<ul style="list-style-type: none"> The laws are not comprehensive. Low helmet wearing rates for hygienic and awareness reasons. 	<ul style="list-style-type: none"> Amend helmet laws so that every rider and passenger of a bicycle or motorcycle is required to wear approved helmets. For health reasons, provide for the wearing of smart head covers which are disposable. Require the covers to be provided by the riders and disposed of in accordance with environmental regulations.
7	Use of mobile phones by drivers while driving	Some of the member states prohibit using mobile phones while driving, while others allow.	<ul style="list-style-type: none"> Harmonize legislations: prohibit the use of mobile phones by drivers, riders, cyclists and pedestrians while on public roads.
8	Use of ICT in enforcement of road safety laws	The use of ICT in the member states is very low and the laws are not comprehensive.	<ul style="list-style-type: none"> Legalize the use of cameras for detecting speed limit violation and red-light running.
9	Driving hours	Service hours for intercity PSVs are restricted in Tanzania.	<ul style="list-style-type: none"> Service hours for PSVs should be harmonized - allow 24 hours service for intercity buses in all Member states Enforcement of driver working hours for PSVs should be harmonized (maximum 8 hours within 24 hours as required by labour laws).
10	Use of seatbelts and child restraints	Inconsistent legislations and low wearing of seatbelts in the member	<ul style="list-style-type: none"> Harmonize legislations: drivers and all passengers be required by law to wear seat belts.

		states and unavailability of child restraint seats.	<ul style="list-style-type: none"> Introduce legislations for child restraint seats and take measures to increase their availability
11	Safer roads	Inconsistencies in design and traffic control. Limited practice of treating hazardous road locations and road safety audit (RSA).	<ul style="list-style-type: none"> Harmonize RSA laws – require RSA for the proposed and existing roads and traffic management projects. Introduce law require road authorities to identify and rectify hazardous road locations.

5.5 Identification of viable strategies, projects and actions to stem the high incidence of road traffic injury in the region

This section presents strategies, projects and actions to manage the identified risk factors contributing to road traffic injury on the member states road networks. The strategies address the risk factors in the areas of user behaviour, road infrastructure and urban planning, rescue and rehabilitation of road traffic injury victims and the safety of vehicles. The management of interventions to achieve the desire focus on results is essential and therefore the establishment of effective institutional set-up was included as a foundation strategy. The proposed strategies are presented in Table 5-5.

Table 5-5: Strategies to manage road traffic crashes in member states

S/N	Identified weakness / Risk factor	Proposed strategy
1	Rampant violation of road safety regulations	Harmonize/improve legislations, systematic information campaigns and enforcement
2	Lack of funding, capacity and ineffective coordination of road safety work	Institutional reform and capacity building for an effective road safety management system Appoint lead ministries which will work through a National Road Safety Agency to provide leadership and coordination
3	Low quality and poor access to road safety data	<ul style="list-style-type: none"> Improve the quality and accessibility to road safety data Develop a common road crash information system for all partner states
4	Lack of knowledge of the social impact of crashes and effectiveness of interventions	Systematic road safety research and regional and international collaboration
5	<ul style="list-style-type: none"> Improperly trained, unlicensed drivers contributing to crashes Defective vehicles contributing to crashes 	<ul style="list-style-type: none"> Improve driver training, testing and licensing system Improve vehicle inspection and certification system
6	Unsafe behaviour in traffic (all road users) due to inadequate road safety knowledge or inappropriate attitude.	Provide road safety education in schools
7	Unsafe and inadequate para-transit services in urban areas	Improve public transport supply and safety
8	High involvement of VRUs in traffic crashes	Improve: <ul style="list-style-type: none"> Land use planning: include NMT routes Road network management
9	Poor RTI victim rescue, first aid and access to emergency medical services	Improve pre-hospital and hospital trauma management services
10	Increasing use of motorcycles and involvement of riders in fatal and serious injury crashes	Improve rider training and reduce infrastructural risk factors

5.6 Regional Strategy for Tackling Prevalence of HIV/AIDS in Road Transport Corridors

A review of the HIV/AIDS situation across the member states showed the need to harmonize the interventions for fighting the epidemic, particularly with regard to the long distance truck drivers and the communities interacting with them along the road transport corridors. The strategy provides a coordinated platform for implementing interventions that give effect to the recognition of the severity of the HIV/AIDS epidemic along transport corridors.

A number of gaps were identified that need to be adequately dealt with to enable member states to effectively address the epidemic. Gaps identified include:

- i. Lack of adequate and comprehensive prevention, treatment, care and support services for TB/STI/HIV/AIDS along transport corridors
- ii. Lack of local development plans that address HIV/AIDS along transport corridors
- iii. Lack of a common HIV/AIDS behaviour change communication framework across Member states
- iv. Inadequate integration of HIV/AIDS activities within the transport sector
- v. Lack of HIV/AIDS policy specific to the transport sector
- vi. Local communities along the transport corridor lack adequate resources (financial, opportunities and capabilities) to improve their livelihoods
- vii. Lack of a coordination structure to oversee the implementation of HIV/AIDS activities along transport corridors
- viii. Lack of adequate data on HIV/AIDS activities been implemented in transport corridors
- ix. Lack of data on HIV infection rates specific to transport corridors
- x. Inadequate resources to effectively implement the strategy and effectively harmonize HIV/AIDS interventions along transport corridors
- xi. Inadequate capacity of actors in implementing HIV/AIDS integration into the transport sector at local and national level
- xii. Inadequate capacity of local partners to respond to the harmonization of HIV/AIDS among Member states
- xiii. Inadequate capacity at the Ministries of Transport in Member states to operationalise sectoral HIV/AIDS Strategic plans.

On the basis of the above gaps the study proposes a strategy that capitalises on and integrates what is already in place and consolidates and harmonize the interventions across the Member states to provide an effective, efficient and consistent mechanism to deal with the pandemic. A planning period of ten years from 2012 to 2022 is adopted. The strategy is intended to design and support the delivery of results in key areas presented in Table 5-6.

Table 5-6: HIV/AIDs Strategy areas and proposed actions

Strategy Area	Action to be undertaken
1. Ensuring accessibility of HIV/AIDS health services	<ul style="list-style-type: none"> • Increase the number of facilities that could offer long distance truck workers and the surrounding communities with TB/STI/HIV/AIDS services • Ensure that the facilities are located at all cross boarder sites, weighbridges, custom points, off loading spots and all major “hot spots” • Consider the pattern of utilization health services along transport corridors and ensure that facilities providing TB/STI/HIV/AIDS services are open 24 hours • Adapt the use of the “Wellness Centre” concept in scaling up

	<p>access to health services on transport corridors</p> <ul style="list-style-type: none"> • Develop Standard Operating Procedures for the “Wellness Centres”, which should include the provision of health services and recreation facilities
2. Provision of comprehensive TB/STI/HIV/AIDS services	<ul style="list-style-type: none"> • Ensure that health facilities including “Wellness Centres” provide comprehensive and integrated TB/STI/HIV/AIDS services • Ensure that STI screening and treatment is included in the HIV/AIDS package and is provided free of charge • Integrate TB services in HIV/AIDS service centres • Develop a minimum package for HIV and AIDS related services to be provided in all health facilities along the corridor to include voluntary HIV counselling and testing, screening and treatment of sexually transmitted infections and other opportunistic infections, prevention measures especially availability of condoms and information, education and communication programs and the management of TB and other illnesses • Male circumcision should be one of the services offered at the Wellness Centres and health facilities as an important measure in the prevention of HIV • Enforce trucks to have a first AID kit that will have condoms and gloves as a protective measure
3. Mainstreaming HIV/AIDS interventions into local development plans	<ul style="list-style-type: none"> • Advocate for the integration of HIV/AIDS interventions along the transport corridor into local development plans • Link up of HIV/AIDS interventions along the transport corridor with the Health system at the local levels
4. Harmonization of key HIV/AIDS care and treatment policies and protocols	<ul style="list-style-type: none"> • Harmonization of STI treatment protocol • Harmonization of HIV/Hepatitis B virus and Hepatitis C virus Co-infection treatment protocol • Harmonization of Palliative/Home based care protocol • Harmonization of the treatment of Opportunistic infections other than TB
5. Development of a regional HIV/AIDS Communication Strategy	<ul style="list-style-type: none"> • Carry out a behaviour assessment survey along the transport corridor to establish appropriate communication messages • Develop communication messages and materials that take into account linguistic differences
6. Integration of HIV/AIDS in the transport sector	<ul style="list-style-type: none"> • Develop HIV/AIDS policy for the transport sector in the respective countries • Integrate HIV/AIDS prevention activities in construction bidding documents
7. Economic empowerment and HIV vulnerability reduction along the transport corridors	<ul style="list-style-type: none"> • Mobilize economic empowerment models into HIV/AIDS agenda • Ensure that HIV/AIDS interventions along the transport corridor address the economic vulnerability of local communities along the transport corridors
8. Setting up a coordination structure	<ul style="list-style-type: none"> • Appoint a HIV/AIDS focal person in the respective countries to be housed in the Ministry of Transport • Developing a reporting system in the respective countries that will be linked to the Health Directorate at EAC.
9. Commitment in addressing the epidemic among Member states	<ul style="list-style-type: none"> • Undertake sensitization seminars among key implementing partners and stakeholders • Ensure that HIV/AIDS activities/ services along the transport corridor are adequately addressed in National HIV/AIDS strategic Plans
10. Monitoring and Evaluation	<ul style="list-style-type: none"> • To utilize GLIA M & E framework to capture progress made along the corridor in addressing the epidemic

	<ul style="list-style-type: none"> • Put in place an M&E unit within the Ministry of Transport in the respective countries to track progress made in curbing the epidemic • To allocate adequate resources to the M & E units to facilitate undertaking of assigned activities • Carry out bio-behavioural surveillances as baseline and thereafter after every 3 years • Link up the Wellness centres and health facilities operating along the corridor to the HIV/AIDS national surveillance systems in the respective countries
11. Resource Mobilization	<ul style="list-style-type: none"> • Integrate HIV/AIDS intervention along the transport corridors into National HIV/AIDS Strategic Plans • Undertake national resource mobilization for HIV/AIDS activities along the transport corridor • Undertake regional initiatives to mobilize resources from Global Fund, PEPFAR, World Bank, and bilateral and multilateral development partners • Each Partner State should ensure that a percentage of funds set aside for HIV/AIDS interventions in the road construction/rehabilitation sites along the transport corridor is channelled towards supporting the “Wellness Centres” in their respective countries
12. Fostering Public-Private Sector Partnership	<ul style="list-style-type: none"> • Mobilize the involvement of the private sector in undertaking HIV/AIDS interventions along transport corridors • Develop a network of actors from the private sector (NGO local and international and donor agencies) to share technical skills and experiences from working in transport corridors • Build up partnership with the private sector clinics and pharmacies to provide comprehensive access to HIV/AIDS related health services
13. Capacity building	<ul style="list-style-type: none"> • Train partners and stakeholders working along the transport corridor to adequately understand the interrelationship between HIV/AIDS and the transport sector • Train partners and stakeholders to adequately respond to the proposals of harmonization of the strategy • Train staff from the Ministry of Transport responsible for the operationalisation of sectoral HIV/AIDS strategic plans

5.7 A Framework for the Development of an East African Road Safety Master Plan

Considering the UN Decade of Road Action launched in May 2011, the World Report on Prevention of Road Traffic Injury published by the WHO in 2004 and the WB’s guidelines for implementing the recommendations of the World Report on Prevention of Road Traffic Injury and taking into account the viable strategies for stemming the high incidence of road traffic injury, a framework for the development of an East African Road Safety Master Plan with the following features is proposed:

- 1) A long term vision of a road transport system with a negligible probability of a person being killed or seriously injured as a result of a road traffic crash.
- 2) A short term vision that is consistent with the UN Decade of Road Safety Action: namely to half the number of forecasted fatalities and serious injuries by 2022. This is visualized in Figure 5-3.
- 3) A fifteen year planning horizon divided into five year phases: the foundation, the growth and the consolidation phases.
- 4) A foundation phase that focuses on targeted information campaign on the high risk sections of the network to achieve 20 per cent reduction in the forecasted fatalities, streamlining the

institutional setup so as to carry out effectively road safety management functions and laying a foundation for all the elements of an effective road safety management system with a strong emphasis on professional capacity building through learning by doing, sustainable funding and strong coordination. Table 5-8 presents the outputs of the institutional management functions for the foundation phase while Table 5-9 presents priority road safety interventions.

- 5) A growth phase during which application of interventions is extended to the road network carrying 80 per cent of the national traffic. Annex D presents the recommended priority areas.
- 6) A consolidation phase during which interventions are applied to the entire road network and the national targets are devolved to the local level. It is expected that during this phase the ambition to have fewer number of fatalities each succeeding year is realized.
- 7) The projected reduction of losses due to road traffic crashes in the year 2022 is around US \$ 5 billion. To achieve these benefits, at least US \$ 2 billion is required for the first five years. This investment is less than ten percent of the expected losses due to road traffic crashes. The proposed budget for the foundation phase is shown in Table 5-10.
- 8) Depending on the capacity for road safety action the first five years' budget may be distributed as shown in Table 5-11. The distribution is proportional to the number of lives expected to be saved. The cost items and proposed allocations are listed in Annex D.
- 9) The budget for subsequent years should reflect the developed capacity to implement road safety interventions over a wider road network.
- 10) The budget is spread over several ministries and is basically a first estimate to be adapted by the implementing agencies according to their capacity and available financial allocations.

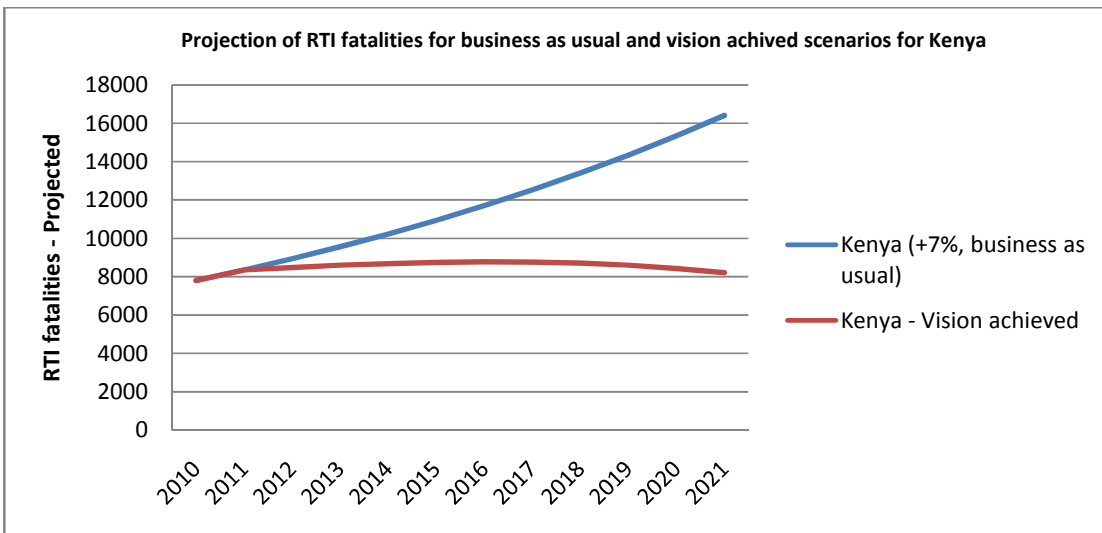


Figure 5-3: Kenya - Forecasted RTI fatalities: business as usual and vision achieved scenarios*

*Similar situation is forecasted for the other partner states except for Rwanda which has achieved a decreasing trend.

Table 5-8: Foundation phase - outputs for institutional management functions

Institutional management functions	Outputs
Results focus	1. Agree on national target for the next five years
Coordination	<ol style="list-style-type: none"> 1. A lead ministry for road safety work is appointed and an agency with a clear authority to lead and coordinate road safety work and adequate control of resources is established. 2. Clear allocation of responsibilities and targets among the sectors and the requirement to be accountable to the lead ministry through the road safety agency on road safety work is completed. 3. Preparation and implementation of a rolling action plan effected.
Secure adequate funding for road safety work	<ol style="list-style-type: none"> 1. Sustainable fund for road safety work established – e.g. road safety fund or specific allocation from RFB. 2. Reasonable allocation for road safety work in respective ministries and road authorities achieved.
Build capacity for road safety work	<ol style="list-style-type: none"> 1. Determine required professional positions for road safety work in the lead ministry, agency and the sectors. 2. Capacity building plan completed and implementation started.
Promote road safety work	<ol style="list-style-type: none"> 1. Road safety seen as a core government and community business and political will secured. 2. Sufficient targeted information campaigns to achieve significant behaviour change and reduction in total fatalities carried out.
Legislation	<p>Legislation completed:</p> <ol style="list-style-type: none"> 1. Institutional reform especially formation of Road Safety Authority/Agency legalized 2. Harmonization of road safety laws 3. Legislate for the implementation of proposed strategies 4. Updating penalties for offences
Monitoring and evaluation	<ol style="list-style-type: none"> 1. Upgrading of national road traffic crash data collection and analysis system commissioned 2. Framework for monitoring and evaluating performance of road safety work across the sectors established 3. Performance review at the end of year 2 and every year thereafter to monitor performance of each agency and sector and to identify areas that require strengthening to achieve desired results
Research, knowledge transfer/international cooperation	<ol style="list-style-type: none"> 1. Priorities in road safety research identified and approved 2. Framework for carrying out and funding of road safety research developed and approved 3. Regional (EAC, SADC) and International cooperation initiated

Table 5-9: Foundation phase - interventions and intermediate outcomes

Intervention	Output/intermediate outcome
Highest priority for tangible results	
Speed management /enforcement along selected corridors	<ul style="list-style-type: none"> • National speed limit set for rural roads and awareness campaign carried out • A mobile speed enforcement team (using radar) for every 50 to 100 km road section commissioned • Complete a plan for speed enforcement by camera at critical locations
BAC enforcement	<ul style="list-style-type: none"> • BAC law revised and awareness campaign carried out • BAC enforcement teams deployed on strategic locations
Seat belt wearing	<ul style="list-style-type: none"> • Seat belt law harmonized and publicized • Seat belt enforcement teams commissioned (one team for every 50 – 100 km)
Standard helmet wearing	<ul style="list-style-type: none"> • Law for wearing standard helmet harmonized and publicized • Enforcement teams riding motorbikes commissioned on strategic road sections
Targeted campaigns on selected themes	<ul style="list-style-type: none"> • Campaign themes identified and content designed • Campaigns carried out
Recovery, emergency medical services and rehabilitation	<ul style="list-style-type: none"> • National response system, coordination centre and pilot response units established • Publicize national universal emergency access number • Build capacity of health providers to manage RTI trauma along targeted corridors and cities
Road infrastructure	<ul style="list-style-type: none"> • High risk locations or sections treated • Comprehensive installation of speed limits signs and other road signs and furniture on the regional and national network • Provision of segregated paths for pedestrians and other NMT on mobility roads (i.e. along arterial roads especially in built up areas and settlements along the routes)
Intermediate priority: Preparatory work done during the phase. Implement as much as capacity allows	
Road safety education	<ul style="list-style-type: none"> • Review of current situation and action plan completed
Harmonize driver licensing	<ul style="list-style-type: none"> • Law harmonized • Driver licensing system developed and approved • Targets and action plan developed and approved • Achievable targets implemented
Harmonize vehicle licensing, inspection and certification	<ul style="list-style-type: none"> • Law harmonized • Vehicle inspection system developed and approved • Targets and action plan developed and approved • Achievable targets implemented
Improve land use planning and road network management	<ul style="list-style-type: none"> • NMT friendly urban planning project implemented • Safe system road network management projects (for cities and corridors) project implemented in targeted corridors and cities
Improve public transport supply and safety	<ul style="list-style-type: none"> • Reviews, action plan and consultation with stakeholders completed

Table 5-10: Proposed budget for the foundation phase

Member State	Burundi	Kenya	Rwanda	Tanzania Mainland	Tanzania Zanzibar	Uganda	EAC Secretariat	Total
Budget in mil.US \$	60	205	50	250	10	230	5	810
Fatalities to be prevented by 2022	1,700	7,000	1,500	8,700	250	8,000	NA	27,150

Figure 5-4 presents the scenario of costs and benefits under the business as usual and the strategy implemented cases. The proposed interventions are expected to reduce of crash costs by 20% at the end of the first five years, thereby giving a benefit/cost ratio of 2. A bigger benefit/cost ratio is expected for the growth phase.

Table 5-11: Distribution of the budget for the foundation phase

	Year 1	Year 2	Year 3	Year 4	Year 5	Total
EAC Secretariat	500,000	1,500,000	500,000	2,000,000	500,000	5,000,000
Burundi	8,679,245	14,339,623	12,377,358	12,159,030	12,444,744	60,000,000
Kenya	29,582,325	48,875,146	42,186,968	41,488,751	42,866,810	205,000,000
Rwanda	7,229,457	11,944,320	10,309,834	10,139,201	10,377,189	50,000,000
Tanzania - Mainland	36,076,006	59,603,836	51,447,522	50,596,038	52,276,598	250,000,000
Tanzania - Zanzibar	1,443,040	2,384,153	2,057,901	2,023,842	2,091,064	10,000,000
Uganda	33,189,926	54,835,529	47,331,720	46,548,355	48,094,470	230,000,000
Total	116,699,999	193,482,607	166,211,303	164,955,217	168,650,874	810,000,000

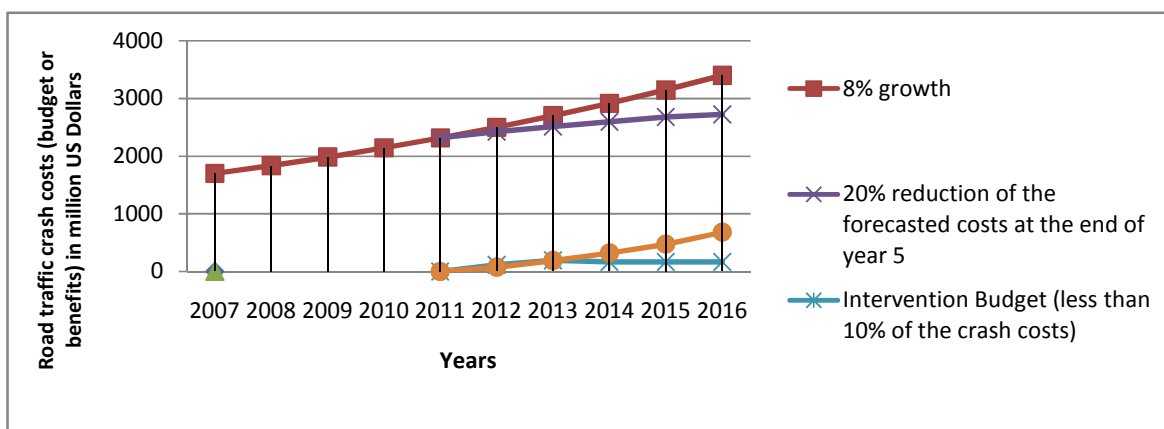


Figure 5-4: Crash costs at 8% annual fatality growth (business as usual option) and 20% reduction due to interventions

6 Harmonisation of Overload Control

6.1 Introduction

The importance of efficient transit transport systems for East Africa cannot be over-emphasized; transportation and transaction costs are key determinants of competitive and comparative advantages that impact on the economies of the countries in the EAC. The drive towards harmonization of motor vehicle overload control in the EAC, COMESA and SADC is underscored in several regional agreements developed by the same organisations. At the level of the EAC, the Treaty implores the Member states to move towards harmonization of their regulations on overload control and weighbridges. Of prime importance is Article 90 which requires Member states to, among other things, adopt common rules and regulations governing the dimensions, technical requirements, gross weight and load per axle of vehicles used in the trunk roads within the Community.

This chapter proposes a common training curriculum for weighbridge personnel, uniform printout certificates and reporting formats, a framework for interconnection of weighbridges, and legal instruments. The study itself is presented in Annex E.

6.2 Objectives and Methodology

This chapter is a result of the fifth objective of the study under the Terms of Reference (ToR) for the Preparation of a Transport Facilitation Strategy for the EAC which constitutes the thematic area - Harmonisation of Overload Control Regulations. The thematic area has four objectives as per ToR, namely to:

- develop a common training curriculum for weighbridge personnel
- set up uniform weighbridge printout certificates and overload reporting formats across the EAC Region
- propose a framework for interconnection of weighbridges in the region with a regional data centre for monitoring the performance of weighbridges and storage of data, and
- prepare an EAC legal instrument to be used by Member states in implementing overload control regulations.

Each objective is separately reported on in each of the following sections. To achieve these objectives, the study adopted a broad approach which included the following:

- A desk study, where policy and legal documents, regulations and international literature on overload control were collected and reviewed. The areas reviewed included overload control and weighbridges situation in member states, training on overload control and weighbridges and legal frameworks.
- Interviews and meetings were organised to get views and recommendations of experts and stakeholders in the sector. The consultant conducted stakeholders and expert workshops in each of the 5 member states and Zanzibar.
- Analysis and synthesis of the information to arrive at recommendations.

6.3 Development of a Common Training Curriculum for Weighbridge Personnel

6.3.1 Existing Situation in EAC Countries

Kenya and Tanzania have manuals for weighbridge operation whose contents have been summarized in the full report in Annex E. The manuals for both countries are almost similar in content and structure of presentation. They are used for in-house training of staff as well as a guide for operations and as a reference material to the weighbridge staff. The manuals give various

explanations in simple terms on:

- Rules and regulations for the use of heavy vehicles on public roads;
- An understanding of the weighbridge operations;
- Technical features of equipment;
- Procedures of supervision and maintenance of the various types of weighbridges;
- Overload fees calculations, appeals, and court processes.

Uganda has no training programs for weighbridge staff and do not have manuals for weighbridge operations. Other EAC countries (Burundi, Rwanda, and Zanzibar) have not yet started overload control in road transport, although Rwanda and Burundi have weighbridges for customs control at the border. It is therefore recommended that the weighbridge operation manuals from TANROADS and KeNHA be a starting point in the formulation of training curriculum for EAC member states as they include most aspects of the information required in the operation of a traditional weighbridge station.

6.3.2 Status in SADC and COMESA Regions

Limited success at the regional level in the implementation of the SADC/COMESA proposals on vehicle overload control and the trend on increasing investment in the region prompted Sub-Saharan Africa Transport Policy Program (SSATP) to initiate projects to study vehicle overload control in the Region. The study observed lack of adequate training and variation on the type and standard of training in eastern and southern Africa countries which affects the quality and competence of weighbridge staff and the consequent inefficiency and ineffective operation of weighbridges. Furthermore, it recommends upgrading the quality of weighbridge infrastructure and operations in the member states.

The study also observed increase in the complexity of management, operation and maintenance of modern weighbridge technologies and further recommends that weighbridges should be operated by properly trained personnel who have collective range of skills of managerial, supervisory, technical, legal and mechanical nature. The study provided a general guidance on various aspects of training for overload control personnel which can be customized to suite each SADC country.

The study grouped the range of skills needed for efficient and effective management of modern weighbridges as follow: *transport environment; data management; legislation and regulations; weighbridge equipment; weighing operations; software operation; management reporting; staff management; operations management; maintenance management; and safety.*

Due to the multi-disciplinary requirements on the suggested training, the study further suggested categorization of weighbridge staff according to the skills. However, in doing so it cautioned that in small weighbridge stations with few personnel staff may be required to perform all functions in the office. The categories suggested are: law enforcement staff; operational staff; administrative staff; maintenance staff; and management.

The study recommends that practical training be included in the proposed training curriculum, and should be taken after the theoretical part of the training is completed. The practical training should be conducted at Categories A or B Traffic Management Centres (weighbridge stations). Also due to the multi-disciplinary nature of the weighbridge stations, the staff should be categorized and trainees should attend modules which are only relevant to their professions and position at the weighbridge station. After theoretical training the participants should attend practical training in operating weighbridge facilities. At the end of training the participants be certified and accredited as competent to undertake overload control in weighbridge facilities. The proposed theoretical training

is divided into eight modules, each showing the targeted personnel and duration of teaching. The summary of the syllabus, objectives and goals for each module are in the main report in Annex E

6.3.3 Observations from PADECO Study

A study by PADECO (2011) recommended that there should be standardized categories of Traffic Management Centres (TMC) in the EAC Region. The proposed TMC categories are:

- Category A: Full Traffic Control Centre (FTCC)
- Category B: Type 1 Traffic Control Centre (TCC 1)
- Category C: Type 2 Traffic Control Centre (TCC 2)
- Category D Lay-by Control Centre (LCC)

It is recommended that the functioning of different categories of TMC to be included in the training syllabus despite the fact that they have yet to be implemented in all EAC countries at the present time.

6.3.4 Consideration of Views from Expert's and Task Force Meetings

The draft curriculum for the training of weighbridge staff was presented and discussed at expert's meetings which were held in all the EAC countries during July 2011, and the Task Force Meeting which was held in Dar es Salaam from 19th – 23rd September 2011. During the discussions many issues were raised and clarified. The following were recommended to be included in the syllabus. *Work ethics and professionalism; units and unit's conversion; environment awareness; and background to the EAC, SADC, and COMESA regional economic communities.*

6.3.5 Recommended Training Curriculum for the EAC Countries

6.3.5.1 Aim and outcome of the training

The main objective of the training is to ensure that weighbridge operations are carried out efficiently at high standards and in a consistent manner throughout the Region. The training will be tailored to prepare weighbridge staff to perform their duties efficiently by providing knowledge and skills to:

- understand the importance of overload control and adhere to legislative requirements
- understand the legal obligations and duties of an operator
- understand basic terms associated with the operation of a weighbridge
- make accurate measurements
- understand the working principles of the equipment and how the accuracy of the measurement may be affected
- complete measurement tickets, associated documentation and charge consistent fees and penalties to offenders.

6.3.5.2 Recommended Training Syllabus

The proposed training syllabus is divided into nine modules which are arranged as follows:

- Module 1: Introduction (*background, transport corridors, road transport, and overload control*)
- Module 2: Legislations and Regulations on Overload Control
- Module 3: Vehicles Dimensions, Combination, and Axle Configurations
- Module 4: Traffic Management Centres and Weighbridge Equipment
- Module 5: Screening and Weighing Operations
- Module 6: Administrative Procedures and Prosecutions
- Module 7: Introduction to types of weighbridge software
- Module 8: Environmental pollution, Workplace safety, Customer service, Work ethics and Professionalism
- Module 9: Practical Training

The full syllabus showing the topics in each module and categories of staff which are compulsory to attend are attached as Appendix.1.

6.3.5.3 Prerequisites for Attending Training

The training is designed for weighbridge staff in the EAC countries. Participants to the training must be employees of the Road Authorities from the respective EAC countries who are directly involved in with overload control. Hence, each country has to ensure that it employs appropriate personnel for the various positions in the weighbridge station and other staff who are dealing with overload control. For countries where weighbridge operations are privatised, the government has to ensure that weighbridge operators have the appropriate qualifications and that they must attend the proposed course whose main objective is to harmonise weighbridge operations in the region and ensure that they are performed in a consistent manner and at very high standards. In addition to that, participants to the training must possess at least the following:

- Certificate in Advanced Level Secondary School (Form Six) or Diploma in relevant field.
- ability to communicate in English (that is, speak, write, and read).

6.3.5.4 Evaluation of participants

The knowledge and skills attained by the participants will be evaluated by:

- Assignments (20%)
- Tests (20%)
- Practical Training (20%)
- Final examination (40%)

Participants will be required to write a practical training report which shall be evaluated for final grading. The report shall be in the form of a paper, e.g., on how to improve a certain aspect of the screening, weighing or administrative operation. The overall performance of the participants will be graded and successful candidates who are in the position of operators will be given certificates as Qualified Weighbridge Operator.

6.3.5.5 Locations for Training and Accreditation

The selection of locations to host training facilities within EAC will depend on:

- The locations to be **near Category A or B Traffic Management Center**: This will provide full range of Traffic Management and overload control equipment for the participants to train and experience during Practical Training
- **Logistics**: The training locations should be easier to be reached by participants from all EAC countries.

The training facilities must have a high quality standard and should be accredited by the appropriate education body of the hosting countries. This will also ensure that certified participants are recognized weighbridge operators and are competent and can work in any weighbridge facility in the world.

6.3.5.6 Training Duration

The total duration of training should be 4 weeks. The recommended syllabus for theoretical training of the modules shall take 14 training days (3 weeks), and practical training is recommended to be conducted for 4 days. Two (2) days are reserved for continuous assessment tests and the final examination which will be conducted after the practical training. Participants will be required to write a report on the daily activities conducted during the practical training period.

6.3.6 Further Recommendations

The following are also recommended based on the above proposal;

- There should be a common Weighbridge Operation Manual which should be used in all the EAC countries and during the training of staff.
- At the beginning of its operation, the training facility should conduct training after every 2 months to clear the backlog of untrained staff. This will also enable the management to plan training for their staff comfortably without paralysing operations in weighbridges. Priority should be given to weighbridge equipment operators.
- There should be refresher training courses for each staff after every two years. This is important to enable staff to catch up with new technologies, network with colleagues from partner states and learn new tricks from transporters to overload.

6.4 Uniform Weighbridge Printout Certificates and Overload Reporting Formats

Having reviewed the existing practices in EAC and ESA, coupled with input from review of international literature on the state-of-the-art and practice, a summary of recommendations with regard to data collection and verification, printout certificate and report formats is shown in Table 6-1. The arguments behind the recommendations and detailed information can be found in Chapter 3 of Annex E.

Table 6-1: Summary of recommendations on data, printout certificate and reporting formats

SN	Issue	Recommendation
1	Data/ information to be collected at weighbridges	<ul style="list-style-type: none"> • Sequence number; Date and time of weighing; • Weighbridge station; Region/province and country • Vehicle registration number(s); • Owner’s company name and address; • Permit number (for abnormal loads); • Origin; Destination; • Vehicle axle configuration; • Permissible axle/axle unit masses/GVM; • Actual axle/axle unit masses/GVM; • Commodity transported; Off loading (Yes/No); • Action take (allowed to proceed, charged for overload, detained, etc) • Name of scale operator; Signature;
2	Data verification	<ul style="list-style-type: none"> • The computer software should incorporate checks for invalid data as well as warnings for unrealistic ones (e.g. very high percentage of overloads) • Pick lists (drop down menus) should be used to ensure uniform spelling of various data items such as axle configuration, action taken, commodity, origin, destination and region
3	Weighbridge printout certificate	<ul style="list-style-type: none"> • A uniform weighbridge printout certificate in Figure 6-1 is recommended for use across the EAC Region. The data is automatically printed out on A5 size paper; whether manually entered into the computer or automatically captured
4	Overload control reports and formats	<p>The following statistics and reports (in the form of tables and figures) should be calculated from the overload control data and be shared among weighbridge stations which would be able to access them at a central database:</p> <ul style="list-style-type: none"> • Vehicles weighed, overloaded and charged per month and per annum • Vehicles weighed, overloaded and charged per weighbridge • Daily and hourly weighing statistics • Average overloads • Maximum overloads

SN	Issue	Recommendation
		<ul style="list-style-type: none">• Distribution of vehicle overloads• Transport operator statistics• Vehicle class statistics• E80 statistics; Commodity statistics


 THE EAST AFRICAN COMMUNITY COUNTRY* <u>WEIGHBRIDGE PRINTOUT CERTIFICATE</u>							
Weighbridge Station:			Region:		Date:	Time(hrs):	
Owner of Vehicle:							
Address of Owner of Vehicle:							
Types of Cargo:			Origin:		Destination:		
Transport Permit No. :							
Vehicle Registration Nos.		Vehicle:		Semi trailer:		Trailer:	
Axle Configuration+:							
Axle No.	Axle Group	Load measured (Scale reading) (kg) (a)	Allowed Load (kg) (b)	Discretion Allowance (kg) 5% of (b) (c)	Adjusted Load (kg) (a - c) (d)	Overload (kg) (d-b) (e)	Overload Fee (currency) (From e)
1	Axle Group 1						
2	Axle Group 2						
3	Axle Group 3						
4	Axle Group 4						
5	Axle Group 5						
Sum of Axles - Fees (currency)							
Gross Vehicle Mass (GVM)							
Amount to be Paid^ (currency)							
Action Taken:							
Name of Weighbridge Operator:					Signature:		
Remarks:							
Notes:							
* Relevant country's name to appear here							
# For abnormal loads							
+ Axle configuration e.g.1-22 (2 axle groups), 1-22-222 (3 axle groups), 1-22+2-22 (4 axle groups)							
^ Higher of either sum of axles or GVM fee							

Figure 6-1: Recommended uniform weighbridge printout certificate for EAC region

6.5 Framework for Interconnection of Weighbridges for Monitoring, Storage and Sharing of Data

Table 6-2 is a summary of recommendations which were made after having taken an inventory of the existing weighbridges in the EAC countries, having reviewed the interconnectivity of weighbridges within member countries, and also after reviewing existing literature. The arguments behind the recommendations and detailed information can be found in Chapter 4 of Annex E.

Table 6-2: Summary of Recommendations on weighbridges and interconnectivity

SN	Issue	Recommendation
1	Selection of type of weighbridge	<ul style="list-style-type: none"> • Only electronic weighbridges should be used for overload control along the EAC road corridors. • Only axle-unit and multi-deck weighbridge scales should be used along the EAC road corridors. The actual type of weighbridge should be decided on the basis of the volume of heavy vehicles expected to be weighed in a day i.e. multi-deck scale (>500 heavy vpd) and Axle-unit scale (<500 heavy vpd). Other factors such as experience with equipment already in use, manufacturer's guarantee, maintenance, calibration and operation complexity should also be considered. In the final analysis, the choice of weighbridge facility should be decided upon by carrying out a full life-cycle analysis of the <i>status quo</i> versus the proposed option. • WIMs and mobile/portable scales should be used for screening purposes to reduce the number of trucks that need to be weighed at fixed weighbridges
2	Number and location of weighbridges	<ul style="list-style-type: none"> • The recommended number of weighbridges and their locations on the EAC corridors is based on an optimum spacing of 500 km and other strategic considerations. The following weighbridges are recommended on the corridors: <ul style="list-style-type: none"> ○ Kenya (Mariakani, Athi River, Gilgil, Malaba*) ○ Uganda (Malaba*, Masaka, Katuna*) ○ Tanzania (Vigwaza, Nala, Mwendakulima, Rusumo*) ○ Rwanda (Gatuna*, Kanyaru*, Rusumo*, Kigali) ○ Burundi (Kanyaru*, Bujumbura) • Individual countries may wish to have more weighbridges for internal use but transit trucks may only be subjected to overload weighing at the above stations • Weighbridges shall be installed at all of the following border points: Rusumo, Gatuna/Katuna, Kagitumba/Mirama Hills, Mutukula, Malaba, Busia, Namanga, Lunga lunga/Horohoro, Taveta/Holili, Sirari/Isebania, Gasenyi/Nemba, Ruhwa, Kanyaru/Akanyaru, Kobero/Kabanga, Mugina/Manyovu
3	Interconnection of weighbridges and information sharing	<ul style="list-style-type: none"> • There shall be established an EAC Overload Control Management System for data storage, analysis and sharing between the various weighbridge stations on the EAC road corridors. The system shall be hosted at a centre to be decided by the EAC. • There shall be internet connection at each weighbridge station and a Local Area Network (LAN) within the station. Wireless connection through satellite dishes is recommended for weighbridges located in remote areas. Power should also be guaranteed using strong UPS and consideration should be given to solar power in isolated areas. • Each station should be part of the networked computers of other stations within the region forming a Wide Area Network (WAN). • In order for all data in each weighbridge to be accessible, a server-based system is recommended where data accumulated at each weighbridge site is replicated at the central server on an ongoing

SN	Issue	Recommendation
		<p>basis. The input data as opposed to calculated data will be replicated for analysis centrally.</p> <ul style="list-style-type: none"> • Data storage at each weighbridge station should be database driven. Weighbridge technologies that support data storage through database technologies such as SQLServer and MySQL are preferable. • Based on the type of system being recommended, customization of TRAFMAN weighbridge program as used in Kwa Zulu Natal is recommended in place of a completely new program. Professional database analysis and design will also be required. • A network design that will depict how the network backbone should be will be needed. Besides, there is a need to establish what data should be shared, secured means of data communication, how should the authentication be carried out, etc. • When new border facilities are being planned, provision should be made for not only locating the weighbridge within the customs area but, also, for sharing the weighbridge facility between the adjacent countries in a one-stop border post (OSBP) arrangement. • Two weighbridges are permissible at the OSBP using one for traffic flowing in one direction and the other for the traffic flowing in the opposite direction. • Weighbridges should be electronically linked to Customs at border posts so that outputs can be electronically viewed at Customs through access to the Overload Control Management System. • All offices handling transit goods such as weighbridges, customs, and immigration should be operational 24 hours, 7 days a week.

* OSBP

6.6 Preparation of Legal Instrument for Implementing Overload Control

6.6.1 Overview

The drive towards harmonization of motor vehicle over-load control in the EAC, COMESA and SADC is underscored in several regional agreements developed by the same organisations. At the level of the EAC, the Treaty implores the Member states to move towards harmonization of their regulations on overload control and weighbridges. Of prime importance is Article 90 which requires Member states to among other things, adopt common rules and regulations governing the dimensions, technical requirements, gross weight and load per axle of vehicles used in the trunk roads within the EAC. The bottom-line of Article 90 is the passage of a common or harmonized legislation regulating over load control in the Region.

The approach towards harmonization of transport related legislation including overload control at international or regional levels can be pursued in several ways. These include legal transplantation, legal harmonization and legal unification. Legal transplantation is a process whereby laws and legal institutions developed in one country are adopted by another country. This process is not common in the transport sector mainly because transport is one of the areas where national specificities are very present. Legal harmonization relates to a group of countries agreeing on a set of objectives and targets and lets each country amend its internal laws to fulfil the agreed objectives. This method was not recommended in this study in view of the previous developments made so far and given the fact that the current trend in the EAC is to move towards enacting uniform laws (Acts) in the Region.

Legal unification, which was preferred in this study, involves a group of countries agreeing on replacing their national rules and adopt a unified set of rules agreed on at the interstate level. In the

transport sector this type of harmonization is particularly used in the cases of harmonization of technical standards, as is the case in the present study. Accordingly, an EAC Act has been proposed based on the recommendations drawn below.

6.6.2 Conclusions

In recognition of other equally important and related studies to the current, such as the Study for the Harmonization of Vehicle Overload Control in the East African Community, August 2011 (by PADECO) and the Study on the Legal Framework for Introducing One-Stop Border in East African and the Rusumo Post, March 2010 (by CDC Pty) coupled with other previous developments made in the Region it is the conclusion and recommendation of this study that a legal instrument in the form of a regional Act be enacted to facilitate the process of harmonization in the region in the following specific areas;

- recognition of the EAC “Legislative Assembly” as the organ responsible for enacting EAC legislation/laws;
- identification of “national road authorities” as competent persons to initiate civil action for payment of overloading fees;
- inclusion in the legal instrument provisions on conditions for carriage of abnormal and awkward load;
- interconnectivity of weighbridges in Member states;
- mutual recognition of print-out certificate among Member states;
- data management and sharing among weighing stations at the national and regional levels;
- training of authorised officers and operators of weigh bridges and other related staff;
- format of a print-out certificate as a schedule to the Act.

The draft East African Community Vehicle Load Control Bill, 2012 which was presented by the EAC Secretariat to the Council of Ministers on 17 February, 2012 incorporates in its provisions all the recommended areas above. They feature in the proposed Act or they will be enacted as rules or regulations to be made under the Act.

7 Harmonisation of Road Transport Sector Legal and Institutional Framework

7.1 Introduction

A move from the existing road transport standards and regulations to a new set of harmonised standards and regulations requires a thorough investigation of legal and institutional issues to ensure that the expected benefits are not undermined by unexpected barriers. An important contribution of a thorough legal and institutional analysis is to specify any such legal and institutional issues which may hinder progress, and to motivate the will of politicians and professionals at the appropriate levels towards overcoming them. This chapter presents the conclusions and recommendations of the study on the harmonisation of the Legal and Institutional framework. The report of the study is presented as Annex F.

7.2 Objectives

The specific objectives of the study on Transport sector Legal and Institutional Frameworks was to achieve the following:

- Review the existing road transport policies, laws and institutional structures, from each member state and propose areas for improvement and harmonisation. The criteria for determining the soundness of any existing law or policy is whether or not it allows the road sub-sector to perform its functions optimally.
- To assess the prevailing legal and institutional issues that may present organisational barriers to successful implementation of harmonisation of road transport in the East African Community area.
- To investigate the needs of and prospects for wider institutional reforms to encourage the implementation of harmonisation of road transport in East Africa.

To achieve these objectives, the study adopted a broad approach which included the following:

- Did a desk study, by which documents and literature on the transport sector were collected and reviewed. The areas reviewed include the legal and institutional frameworks, safety and environment, transport policies, planning and financing. Others were the provision of transport services, sector regulation and private sector participation.
- Administer interviews and hold meetings through which information on the performance of road transport was gathered from experts and stakeholders in the sector. The stakeholders ranged from sector ministries, local government authorities, transport service providers and other beneficiaries.
- Carried out an analysis of data and information to yield legal and institutional shortcomings regarding the provision of road transport services, legal, institutional and social barriers with regard to harmonisation and the various areas of convergences and divergences.

7.3 Current Road Transport Legal Frameworks in the EAC

There exist several legal and institutional arrangements in place that serve the interests of transportation systems in the EAC member states. These arrangements are founded on national transport policies which in turn reflect the economic and social aspirations of the individual countries.

A road transport legal framework is a set of rules and regulations that create a conducive environment for establishing good management practices for the road transport sector. It determines the roles and provides authority for each stakeholder to act by setting out all the legislation for the regulation of the sector and gives each stakeholder the necessary powers for a

range of activities. The road transport legal framework is dictated to a large extent by the relevant transport policy of a given country. To guide improvements on transport service regulations, such a policy statement should endorse the primary role of market forces in determining price and service levels, with the role of government limited to ensuring that competitive conditions prevail and that safety and environmental considerations are met.

The four possible broad areas in which a legislation is needed in road transport are; (i) road infrastructure, (ii) road traffic, (iii) vehicle and driver licensing, and (iv) road transport licensing & management.

7.3.1 Road Infrastructure Legal Framework

Important issues to be covered here include the functional classification of various roadway types, acquisition and management of right of way, responsibility for construction and maintenance, and responsibility for financing, vehicle sizes and weights, and the extent to which these are based on economic criteria and encourage efficient use of roads. Table 7-1 summarises the relevant infrastructure legal issues in the member states.

Table 7-1: Road Infrastructure Legal Framework in Member States

Country	Legislation
Burundi	<ol style="list-style-type: none"> 1. Act No.1/04 of February 2009 (LOI N°1/04) 2. Law No 1/06 of 10/09/2002 on Financial Resources of The National Roads Fund 3. Decree No. 100/117 of 27 October 2001 On Statutes Of The National Roads Fund 4. Ordonnance Ministerielle No 720/70
Kenya	<ol style="list-style-type: none"> 1. Kenya Roads Act, 2007 2. Kenya Roads Board Act, 2000 3. Road Maintenance Levy Fund, 1994 4. Public Road Toll Act, 407. 5. Public Procurement and Disposal (PPP) Act
Rwanda	<ol style="list-style-type: none"> 1. Rwanda Roads Act, 2009 2. Road Maintenance Fund (Law no. 52 of 2006)
Tanzania	<ol style="list-style-type: none"> 1. The Roads Act, 2007 2. The Road and Fuels Tolls Act (Cap 220), Revised 2006 3. Executive Agencies Act, 1997 4. PPP Act, 2010 5. Regulations for Weights, 2001
Uganda	<ol style="list-style-type: none"> 1. Roads Act 1949 (Cap 358) 2. Uganda National Roads Authority Act, 2007 3. The Uganda Road Fund Act, 2008

The legal framework concerning infrastructure in the member states has comprehensive legislations in the aspects of road management and financing. As a result, each country has a road management agency and a roads fund. Burundi and Rwanda have not yet developed their own design standards and are currently using the French and AASHTO standards respectively. With regard to the infrastructure financing issue, currently only Tanzania and Kenya have adopted legal frameworks that allow the private sector to invest in infrastructure through the use of PPP framework contracts. On axle load control all member states have recently agreed on a common value for the maximum GVW and axle load under the draft EAC Vehicle Load Control Bill, 2012.

7.3.2 Road Traffic Legal Framework

Road Traffic Legal Framework covers the rules for proper movement of traffic on roads including the status of signs and signals. It defines the responsibility of motor vehicle operators, rights and duties of other road users, and the authority to investigate traffic violations and accidents. In addition, matters of general rules of behaviour, traffic accident reporting and information systems as well as penal provisions are also included. Most countries base these provisions on the UN Convention on Road Traffic (also known as the Vienna Convention, 1968) and the UN Convention on Road Signs and Signals (1968). Table 7-2 shows the relevant statutes in the member states that cover these issues.

Table 7-2: Road Traffic Legal Framework in Member states

Country	Legislation
Burundi	<ul style="list-style-type: none"> Act No.1/04 of February 2009 (LOI N°1/04)
Kenya	<ul style="list-style-type: none"> Road Traffic Act 1975, Cap 403
Rwanda	<ul style="list-style-type: none"> Presidential Decree n° 85/01 (Traffic Police and Road Traffic)
Tanzania	<ul style="list-style-type: none"> Road Traffic Act, 1973 Road Traffic & Safety Bill (2010 Draft)
Uganda	<ul style="list-style-type: none"> Traffic and Road Safety Act No. 15, of 1998

The current road traffic legal framework in the member states is adequate in the sense that it meets the requirements of the current transport policies as well as the operational requirements of most road users. However, some aspects of the legal framework need to be harmonised in the aspects of road signs and markings as well as the issue of which side of the road to drive on.

7.3.3 Vehicle and Driver Licensing Legal Framework

Important issues under this area concern establishing clear responsibilities for administering driver and vehicle licensing/inspection. Other important components include motor vehicle registration and licensing requirements, motor vehicle inspection requirements and equipment standards of motor vehicles and trailers. The dimensions, weights and loading of motor vehicles are also included in this statute. The statute includes also the provision of dangerous and abnormal loads.

In driver licensing, the issue to be clarified include driver licensing requirements and procedures, qualification requirements for driver examiners, including refusal, suspension and revocation of driving licences. Other issues include driver licence registration, driver training schools, qualification requirements for driving schools and certification of driving instructors. Table 7-3 shows the minimum requirements for this item.

Table 7-3: Vehicle and Driver Licensing Legal Framework in Member States

Country	Legislation
Burundi	<ul style="list-style-type: none"> Act No.1/04 of February 2009 (LOI N°1/04)
Kenya	<ul style="list-style-type: none"> Road Traffic Act 1975, Cap 403
Rwanda	<ul style="list-style-type: none"> Presidential Decree n° 85/01 (Traffic Police and Road Traffic)
Tanzania	<ul style="list-style-type: none"> Road Traffic Act, 1973 Road Traffic & Safety Bill (2010 Draft)
Uganda	<ul style="list-style-type: none"> Traffic and Road Safety Act No. 15, of 1998

From Table 7-3 it can be seen that the same law in each country governs the operations of motor vehicles on the road as well as vehicle and driver licensing. Overall, there is convergence among

the laws of the five member states in this area. The minor areas of divergence have been pointed out in Chapter 4.

7.3.4 Road Transport Operator Licensing Legal framework

Important issues that are covered under this area include the conditions for issuing the licence and the reasons for refusal, suspension and revocation of licences. Other areas covered include licence fees, appeal procedures, planning of routes and terminals, and control of terminals. Monitoring of services, reporting of offences, enforcement of license regulations and penal provisions are also part of this legal framework. Table 7-4 shows the acts in the member states under this legal framework.

Table 7-4: Road Transport Operator Licensing Legal Framework in Member States

Country	Legislation
Burundi	<ul style="list-style-type: none"> Act No.1/04 of February 2009 (LOI N°1/04) Burundian Environmental Code LOI n°1/010 du juin 2000
Kenya	<ul style="list-style-type: none"> Transport Licensing Act, 1979, Cap 404
Rwanda	<ul style="list-style-type: none"> Law 39/2001 creating RURA
Tanzania	<ul style="list-style-type: none"> Transport Licensing Act, 1973 Surface and Marine Transport Regulatory Authority (SUMATRA) 2001
Uganda	<ul style="list-style-type: none"> Traffic and Road Safety Act No. 15, of 1998

7.4 Current Road Transport Institutional Framework in the EAC

Since the mid-1980s, transport sector institutions in the EAC states have been undergoing structural reforms. This has been primarily in the sectors of road transport, rail and air transport, but has touched on shipping fleets, ports and terminals as well. It was during this period that the public-private partnership concept became a viable alternative in the implementation of infrastructure projects, as well as in transport service provision and operations. As a result, governments have withdrawn from micromanagement and operations of many transport sector services. Overregulation and central management have been successfully replaced in the past two decades with deregulation along with autonomous transport regulatory administration. State-owned companies have been successively privatized, and the services have been increasingly outsourced to the private sector while the administration took over the role of the clients.

The primary target of restructuring and redefining the roles is to establish an enabling environment for efficient sector operations. An enabling environment provides the legal basis for imposing the right mix of obligations and incentives. Within this arrangement, the private sector functions as a service provider and state agencies exercise regulatory and supervisory functions. Supervisory institutions must have sufficient capabilities and independence to undertake basic planning, administer regulations, and guide the development of the industry.

Individual member states have developed a range of transport sector organization structures to suit their particular political, social and economic conditions. While there is no optimal structure that enjoys universal support, organization structures have been developed following certain principles that ensure (a) good governance, (b) separation of functions, (c) coherence, and (d) sector coordination, to ensure effective sector management.

The ongoing reforms in the EAC member states have resulted into road transport organisations that exhibit a similar pattern. This common pattern shows a minimum overlap of duties between organizations, and an attempt to adopt cost-effective methods to carry out responsibilities. The transport sector is composed of three primary elements:

- Policy and legal institutions: the ministry of transport;
- Regulatory/executive institutions: modal transport administrations/agencies;
- Institutions that provide transport services: transport service enterprises

Table 7-5; shows the institutional framework for road transport in the member states.

Table 7-5: Road Transport Institutional Framework in Member States

	ORGANISATIONS FOR POLICY AND COORDINATION	AGENCIES FOR SECTOR REGULATION, DEVELOPMENT & MAINTENANCE	TRANSPORT SERVICES
	Policy Making Planning & Coordination	Regulation & Enforcement Infrastructure Development. & Maintenance. Financing	Transport Services
BURUNDI	Ministry of Transp. Works & Equipment • Directorate of Internal Transport • Directorate of External Transport	Police Department Ministry of Land-plan & Environment Burundi Revenue Authority Roads Office Road Fund Board Burundi Revenue Authority	Private sector operators
KENYA	Ministry of Transport Directorate of Transport • Ministry of Roads	TRB Traffic Police Dept. NEMA NARSC MV Inspection Dept.	KeNHA KeRRA KURA KRA KRFB Private Sector Operators
RWANDA	Ministry of Infrastructure • Ministry of Local Government • RTDA	RURA National Police Kigali City Council District Authorities RTDA Road Maintenance Fund Rwanda Revenue Authority	ONATRACOM & Private Sector Operators
TANZANIA	Ministry of Transport (Mainland) Ministry of Infrastructure & Communication (Zanzibar) • Ministry of Works • Prime Minister's Office Regional Administration and Local Govt.	SUMATRA and TRA Traffic Police Department MoW, Safety & Environment Division TANROADS and 132 Local Gov. Authorities Road Fund Board	Private Sector Operators
UGANDA	Ministry of Works & Transport • Ministry of Works & Transport • Ministry of Local Government • Urban & District LGAs • Ministry of Lands, HUD	National Environment Management Authority Transport Licensing Board National Road Safety Council Uganda National Police Uganda National Road Agency Urban & District LGAs Uganda Road Fund Board	Private Sector Operators

The existing organisations for road transport management in the five member states clearly show the pattern mentioned earlier in terms of their main activities. The main groupings are;

7.4.1 Policy making, planning and sector coordination

In all the five member states there is one ministry responsible for transport policy, including the road transport policy. In Tanzania and Uganda the Ministries of Works and Works & Transport respectively are still involved in policy-making in the road transport sector. It is hoped that this overlap will end soon, leaving only one organisation responsible for policy formulation and development for the whole of the transport sector including road transport.

Planning and coordination are in most cases handled by agencies and departments under the ministry of transport which is the ministry responsible for policy making. However, in Kenya there is still a ministry of roads which handles road transport planning while in Tanzania, Rwanda and Uganda the ministries responsible for local governments still play a part in road transport planning and sector coordination.

7.4.2 Road sector regulation, financing and development

Organisations charged with these functions are responsible for carrying out the ministry's policies as per the policy objectives. The main activities fall under regulation and enforcement; infrastructure development, maintenance and financing. The infrastructure development and maintenance function is the one that is the most harmonised across the member states through the road development and maintenance agencies. Kenya has three specialised executive agencies each for national highways, rural roads and urban roads respectively. In the remaining countries there is only one road executive agency handling national classified roads while the local government authorities handle rural and urban roads.

Tanzania has created an executive agency, Surface and Marine Transport Regulatory Agency (SUMATRA), for regulating economic and safety aspects of road transport. This agency works in cooperation with the national traffic police, the revenue authority, and the environment and safety division of the ministry of transport. There is still some overlap in certain areas which hopefully will be eliminated in due course. Rwanda has also enacted a model regulatory agency RURA which works in cooperation with the national police in the regulation of road transport. The remaining member states have not created a road transport regulatory agency, and this role is still played by a multiplicity of organisations in the ministry of transport, usually in cooperation with the national police.

The financing of road transport activities is also harmonised across the member states with the national roads fund boards funding road maintenance activities and the ministries of finance funding road development.

7.4.3 Provision of Transport Services

The provision of transport services is also harmonised at the institutional level in all the member states in such a way that the services are provided by the private sector. Only Rwanda still operates a state owned bus transport company, ONATRACOM, to provide services to rural communities.

7.4.4 Driving Configuration

The existing situation in the member states is that, three countries of Kenya, Tanzania and Uganda drive on the left while Burundi and Rwanda drive on the right. In addition, apart from the Democratic Republic of Congo (DRC), other strategic trading partners of Burundi and Rwanda are in the EAC and COMESA, and all drive on the left. As a result the issue of driving configuration is a candidate for harmonisation under the legal and institutional framework thematic area as it may lead to improved transport links between Burundi, Rwanda and their strategic trading partners.

- However, harmonisation of driving configuration is not as straightforward as are other aspects in the legal framework because of lack of agreement on whether to drive on the right or left. The issue of whether the harmonised driving configuration should involve driving on the left or right is, strictly speaking, not a question of technology but it is political, and involves issues of national sovereignty.
- From the existing literature and views by stakeholders and experts whom were consulted during this project, the following can be concluded;

- Driving with opposite side controls has a greater potential for accidents as demonstrated by studies in both Canada and U.K. Unfortunately the accident data in the EAC member states do not show this type of information. The principal cause of this increase in accident rates is the presence of a blind spot as a result of the driver being located at the far side from the centreline.
- Drivers' perception about the difficulty of driving a LHD vehicle in a RHD environment was such that the majority did not find any difficulty at all. The drivers also felt that there were no significant increases in the severity of accidents that are caused by driving with opposite side controls.
- Based on a study in Rwanda, significant travel savings can be achieved by harmonising the driving side.
- Apart from the Democratic Republic of Congo (DRC) and Burundi, Rwanda's key neighbouring countries of Uganda, Tanzania and Kenya, which form the majority of the East African Community, and share the bulk of trade and commerce with Rwanda, all drive on the left-hand side. Harmonisation of driving laws with the surrounding EAC and other COMESA countries may lead to improved transport links among these strategic trading partners.

7.5 Proposed Legal and Institutional Framework

A review of the existing situation has revealed areas that need significant attention if harmonisation of the legal and institutional framework is to be achieved. A summary of these areas is presented and discussed below.

7.5.1 Transport Policies

A transport legal framework outlines the roles of and provides the authority for each stakeholder to act by setting out all the legislation for the regulation of the sector, and gives each stakeholder the necessary powers for a range of activities. The first step in establishing an improved legal framework for road transport is to review road transport policy and how it fits in with broader policy aspects, especially aspects concerning road infrastructure and other modes of transport. The next step is to review the existing road transport regulations to identify those that are inconsistent with regulatory objectives and to define the need for new or alternative regulations.

Therefore, in order to have a harmonised legal and institutional framework for the road transport sector, member states should undertake to evolve coordinated, harmonised and complementary transport policies. This is in line with the provisions of the 1999 EAC treaty especially Article 89, whose ultimate objective is to have a common transport policy for the EAC member states. The following proposals should be implemented in order to keep the harmonisation process moving in the right direction;

- All current national transport policies should acknowledge and recognise the need to comply with current commitments of their membership in the EAC. This means that they should outline plans on how their respective governments will implement the commitments they have assumed.
- The process of policy development and implementation should be speeded up. The slow process of policy development in some member states undermines the relevance of the policy documents. While the policy is being developed, officials are constrained from embarking on new programmes and initiatives, as there is an understandable tendency to await the outcome of the policy process.
- It was found that in some states' policies are not yet formalized. That means policy proposals have not been translated into appropriate legislation and programmes. In the absence of a legislative mandate, transport ministries are constrained in requesting for additional funds to implement new or expanded programmes.

- Some states' policies are out of date, and as a result can no longer guide the government's sector programmes and reforms. It is therefore recommended that policy documents should be dynamic and have well established review processes.

7.5.2 Institutional Structures

While there is no universally accepted model for institutional arrangement in the transport sector, transport policies are expected to guide the most appropriate form of institutional structure. Based on principles of good governance, separation of functions, coherence, and sector coordination, the resulting institutional structure will constitute the following organisations;

- **Ministries of Transport:** This is the body that creates an enabling environment for balanced sector growth. Its principal interest is to preserve the autonomy and commercial orientation of the various modes of transport including road transport. The ministry is the custodian of the National Transport Policy (NTP) with responsibilities for policy formulation, policy review, and the associated legal framework for sector operations. This responsibility extends to the coordination of all transport policy making structures, and the management of the policy-making process.

The ministries of transport also have the responsibility of regulating the work of its executive agencies through performance agreements, approval of their business plans as well as appointment of their respective heads.

- **Modal Executive/Regulatory Agencies:** The modal executive agency functions in the following way; the executive agency typically carries out the ministry's activities aimed at meeting specific sector policy objectives. A typical agency in this category is the road construction and maintenance agency whose objective is to construct and maintain infrastructure facilities as per the transport policy.

The transport regulatory agency likewise, applies the policies and regulations developed by the ministry to assure the public that transport services are reliable and cost-effective. The regulatory agency enforces laws and ensures compliance with the regulations governing service provision. The regulatory/executive agency must be independent from the ministry in daily operations in order to separate policy from regulation functions. The minister retains the power to overrule the agency over any of its actions through an appeals procedure.

- **Transport Service Enterprises:** Depending on the mode, the enterprises may have to report in time the progress in meeting service objectives and shortcomings concerning safety and deviation from regulations. If they do not operate in line with the regulations, they may be penalized and, in the last resort, lose their license to operate. The operating enterprises have the option to appeal to the minister.

7.6 Recommendations for Harmonisation of Legal and Institutional Framework for Road Transport in the EAC

There are a number of areas in the legal framework which are candidates for harmonisation so as to improve cross-border transport. These areas include the following:

7.6.1 Road Infrastructure Acts

The following areas in these acts need harmonisation:

- **Road Acts:** These need functional classification of roads with their resulting legal dimensions of carriageway and shoulder widths. Further amendments to the road acts are required to allow for the use of harmonised design standards and specifications that will result from this study.
- **Road Fund Acts:** Harmonisation is required in the areas of transit tolls and overloading fees or fines. A review of the principal sources of the road funds should be carried out to make sure that contribution from the respective sources are balanced across the Region.

- **Axle Load and Maximum Weights:** There is a need to harmonise the laws regarding the GVM as well as the maximum axle loads, including the enforcement in terms of weighbridge operations. Relevant sections of the road acts should be amended to allow for the adoption and use of the proposed EAC bill on overload control and management.
- **Private Sector Participation:** There is a need to harmonise the framework legislation that provides for the participation of the private sector in road infrastructure investments.

7.6.2 Road Traffic Regulations and Safety Enforcement Laws

In order to effect smooth cross-border operations a number of areas, some of which result from this study, need to be harmonised:

- **Maximum speed:** There is a need to harmonise the speed limits for the various classes of roads; the penalties and fines for non-compliance with the speed limits.
- **Driving on Public Roads:** The two member states of Burundi and Rwanda drive on the right hand side while the rest drive on the left. This is an area that should be harmonised as soon as possible.
- **Road Signs:** The road signs currently in use in the EAC states differ, and so need to be harmonised for improved safety and operational efficiency.

7.6.3 Road Transport Operator Licensing

- **Public Transport:** There is a need to improve laws and regulations that govern the quality and level of service of public transport across the Region for both urban and inter-city services.
- **Vehicle Inspection:** For safe operations the vehicles plying the EAC roads, vehicles have to be in good mechanical condition. There is therefore a need to harmonise the vehicle inspection laws and procedures for all passenger vehicles as well as all other commercial vehicles.
- **Operator and Driver Licensing:** There is a need to have uniform laws regarding driver training and licensing as well as the licensing of operators of public transport.
- **Road Transport Sector Regulation:** There is a need for a framework law to cater for economic regulation of the road transport sector with regard to its economic efficiency. Such a regulation will concern market entry in order to eliminate distortions in user choice of transport modes (NMT and IMT services) and promote stakeholder consultation in the setting of tariffs and other prices.

7.6.4 Vehicle Registration and Licensing

- Domesticate the provisions of the regional agreements especially the Tripartite Agreement on Road Transport.
- Develop a uniform system of registering and licensing motor vehicles based on common parameters.

7.6.5 Institutional Framework

The institutional arrangements for road transport in the five member states are quite diverse as they serve different transport policies. There is a need for harmonisation, first to meet the internal needs of the respective national transport policies, and also the needs of the Region. The following areas of road transport institutional framework need to be harmonised:

- **Separation of Functions:** Policymaking and regulatory/service institutions. There is a need to harmonise the separation of functions between policy-making organisations and regulatory as well as service providing organisations. In all the member states the organisations responsible for the road transport policy should be different from those regulating the transport sector as well as those providing the transport services. However, the legal framework should provide for participation of all road sector organisations in the policy making process. This will make it easier to ultimately develop one common transport policy for the Region.

- **Road Transport Sector Planning and Coordination:** One department/unit within the ministry responsible for transport in each of the five member states should have the responsibility of coordinating of all issues related to road transport. This department should also include a knowledge centre where all documentation on road transport policies, operations, statistics and information are deposited. The same department should be responsible for the strategic planning of the whole road network and should coordinate the implementation of all network development plans.
- **Separation of Functions: Regulation and Enforcement:** It is desirable that in all the five member states the regulation function is separated from the enforcement function. Currently some organisations carry out both functions of regulation and enforcement, while in some other member states this is already separated. There is a need to harmonise this area in such a way as to separate regulation from enforcement. Secondly, all road transport function should be under one regulator; licensing, safety, overloading, level of service, route entry etc.
- **Creation of an Organisation for Regulatory Impact Analysis:** Currently there are a number of regulatory decisions being proposed and implemented, ranging from axle load limits to installation of speed governors. The impact of these decisions is not being rigorously analysed to determine their bearing on service levels or on overall policy objectives. It is therefore proposed to create an organisation in each member state to be tasked with the analysis of the impact of the various regulatory decisions.
- **Road Development and Maintenance:** All five member states have created similar institutions for carrying out road development and maintenance. However, there are slight variations in the day to day operations of these organisations, mainly in their level of independence from parent organisations and therefore political interference. It is therefore proposed to harmonise the structures and the operations of road development and maintenance organisations so that they exercise the same level of independence.

7.6.6 Road Transport Services

There is a need to create organisations in each member state to handle issues of the level of service for public transport. Such organisations should define and outline ways of maintaining Service Quality Levels, concerning issues such as bus bodies, journey speed, headway of public transport vehicles etc.

7.6.7 Harmonization of Driving Side

The issue of which side of the road to drive on is becoming more pressing as Rwanda is soon to implement advanced comprehensive road signage strategy.

- To collect and collate past accident and traffic data, and to conduct additional surveys for the study as deemed appropriate;
- To assess the techno-economic and financial feasibility of switching driving side;
- To determine the local, regional and institutional constraints and operational modalities for switching the driving side;
- To recommend appropriate policy guidance on switching the driving side.

The accident records currently available in Rwanda do not provide information on accidents potentially caused by RHD vehicles. Globally, very few studies have been conducted to address safety issues related to driving with opposite-side controls. Notable among them are:

- Study on safety of RHD vehicles in British Columbia, Canada;
- Dangers and Solutions of LHD HGVs in the UK

However, as pointed out above, harmonisation of driving configuration is not as straightforward as are the other areas of the legal framework because driving configuration (driving on the left or right side of the road) strictly speaking is not a question of technology but it is political and involves issues of national sovereignty. As a respective state chooses her trading partners, she may have to decide to switch her driving side in order to minimize costs associated with trading with partners who drive on the opposite side of the road. This is the path that Rwanda seems to be following.

8. Conclusion and Recommendations

8.1 Harmonisation of Standards and Specifications

The purposes of harmonisation of standards and specifications were first to identify areas of commonality which lend themselves to harmonization, and secondly to propose and implement the incorporation of areas unique to particular countries into the harmonized regimes. Finally, it was required to give an indication of the impact of harmonization and to conduct stakeholder workshops to gain consensus on the harmonization of different regulations and standards.

8.1.1 Conclusions

8.1.1.1 Harmonisation of Road Geometric Design Standards

The main findings were that geometric road design practice in Burundi follows the French design standards while Rwanda used to follow French standards as well, but has of recent started to use American standards. In contrast, Kenya, Tanzania and Uganda use their own standards which were developed largely from the American and English practices. The study also found that Tanzania has adopted some design criteria from the geometric design standards of the Southern African Transport and Communications Commission (SATCC), which was also derived largely from the American and English practices. Further, the study revealed that the width, height, wheelbase and minimum turning radius dimensions for vehicles such as the 22 m Interlinks vehicles, which has recently been permitted to traverse EAC road network, conform to the respective dimensions for the design vehicles documented in the existing design manuals for EAC member states and therefore will be accommodated by the existing intersections on the EAC road network.

8.1.1.2 Harmonisation of Road Pavement Bridge Design Standards

The study found that Burundi is currently using French standards for pavement design while Rwanda has already shifted from French standards to American standards, namely AASHTO. On the other hand Kenya, Tanzania and Uganda are using their own design standards which are largely empirical-based methods. The empirical-based methods for pavement design have served well for several decades; nevertheless, many serious limitations exist for their continued use as primary pavement design methods in the EAC Region.

8.1.1.3 Harmonisation of Specifications for Road and Bridge Works

A review of the practice in the EAC Region revealed a number of areas of commonality as well as areas which are unique to particular countries. It was found that specifications for Burundi and Rwanda are based on the French (AFNOR) and American standards (AASHTO) respectively, while Kenya, Tanzania and Uganda use their own specifications. A critical review of the specifications followed by Kenya, Tanzania and Uganda showed that the majority of material specifications and test procedures are governed by strict procedures that have mainly been derived from British (BS), European, South African, and American (ASTM/AASHTO) standards.

The specifications have particular reference to the prevailing conditions and reflect the EAC member countries' experience gained in road pavement design during the last 40 years. Generally, revision of a design manual and specifications is only possible when new technical information and performance data become available.

8.1.1.4 Harmonisation of Road and Bridge Maintenance Standards

The study has presented the findings concerning harmonisation of road and bridge maintenance standards. This was done after detailed review of existing road and bridge maintenance manuals

and current practices in EAC partner states. Furthermore, the analysis was based on best practice and the strategy advocated for effective road and bridge maintenance management. It was observed that EAC member states are at different levels of Road Maintenance Management System (RMMS) and Bridge Management System (BMS) development and utilisation. In addition, countries which have attempted to develop these systems use diverse principles and criteria in terms of data collection methods, maintenance standards, determination of road and bridge maintenance plans and programmes and execution of road and bridge maintenance activities. This results into different road and bridge condition and hence different level of service and economic benefits which road users get from one partner state to another. Consequently, resulting potential areas for harmonisation and improvement along with corresponding recommendations have been presented.

8.1.1.5 Harmonisation of Road Signs, Traffic Signals and Markings

The issues of pedestrians with special needs including school children and the physically challenged as well as traffic calming and implementation framework were considered to be very important and accordingly recommendations are included in this subcomponent.

8.1.1.6 Harmonisation of Vehicle Safety and Fitness

With exception of Rwanda and Kenya, other EAC countries do not have modern facilities for periodic motor vehicle inspection (PMVI), and the capacities or centralized locations of the facilities which the two countries have are not adequate to cover the vehicle fleets in their countries.

The proposed framework for PMVI for EAC countries in this study has been achieved through a review of good practices around the world and Eastern and Southern Africa (Rwanda, Kenya, and Botswana). Other analyses conducted to supplement the proposal include:

- Trend on advanced vehicle safety systems
- The current situation in EAC countries on vehicle technical inspections and in particular the problems on infrastructure (facilities and equipment), human capacity, legislation and enforcement, malpractices and corruption, and the vehicle fleet.
- The PMVI standards and framework proposed for COMESA/EAC/SADC countries
- Uncontrolled practices of vehicles modification in EAC countries

The study also proposes changes on institutional framework for PMVI to ascertain the quality of PMVI. It recommends that PMVI to be under the authority in the ministry dealing with road transport and safety instead of law enforcement authority. Furthermore, PMVI should be privately operated and monitored by the authority in the ministry responsible for road transport and safety.

8.1.1.7 Harmonisation of Driver Testing Manual

Evaluation studies on the effectiveness of the tradition methods of training and testing drivers, similar to those used in EAC member states have both been evaluated in several countries. This study finds the importance of including the following elements in the training of new drivers which are inadequately covered in the tradition systems of teaching new drivers:

- defensive driving training and hazard perception skills, as an accident prevention strategy is not taught adequately
- environmental factors that affect driving
- skills to avoid risky driving situations
- driver impairments
- eco-driving

- how to handle emergency situations, personal readiness and self awareness before and during driving.

The study also proposes changes on institutional framework for testing drivers and monitoring of driving schools and instructors in order to ascertain the quality and uniformity of driver training and testing. It recommends that driver testing and quality monitoring of driving school to be under the authority in the ministry dealing with road transport and safety.

8.1.1.8 Harmonisation of Vehicle Dimensions and Combinations

The proposed standards and regulations for harmonization for vehicles dimensions and combination in EAC have been achieved through the following:

- Existing infrastructures, standards and regulations in EAC member states
- Tripartite Summit agreement on road transport harmonization in COMESA-EAC-SADC region
- Technological developments in emerging Longer Combination Vehicles in developed countries which can operate in existing road infrastructures in the member states and which can make freight transport much safer and more efficient than the tradition longer combination vehicles.

Some of the proposed standards have exceeded the existing standards in some EAC member states. In this case the countries affected should conduct a survey on road infrastructure to confirm that the proposed EAC standard will be accommodated.

8.1.1.9 Harmonisation of Transportation of Abnormal, Awkward and Hazardous Loads

Review of EAC countries policies and procedures for the conveyance of abnormal loads and dangerous goods showed that there are no common and detailed procedures across the EAC member states. The classification of such goods in terms of type, hazardousness and abnormality also differ.

During the course of this task BICO became aware of the SADC and COMESA harmonization processes in road transport infrastructure standards and institution arrangements in a number of areas including conveyance of abnormal and dangerous goods which started in 2010. Since all EAC countries have multiple memberships within the three RECs, it became obvious that this study should adopt the draft tripartite Task Force Study to smoothen and speed up the harmonisation process in the three RECs.

8.1.2 Recommendations

8.1.2.1 Harmonisation of Road Geometric Design Standards

The specific recommendations of this study to the EAC member countries are as follows.

- Adopt two main classes of road; mobility road classes 1, 2, and 3, and access road classes 4 and 5.
- Plan to acquire incrementally more space for right of way up to values ranging between 79 – 100 m so as to allow for future expansion of existing international and national routes. In additional land should be acquired at all designated places for rest areas.
- Adopt terrain categories of flat with cross slope of 0 to 10 per cent, rolling with cross slope of more than 10 to 25 per cent, mountainous with cross slope of more than 25 to 60 per cent, and steep with cross slope of more than 60 per cent.
- Adopt the use field data to estimate K factors for estimation of DHV and in the absence of such factors the 30th-highest DHV should be estimated by applying 0.15 and 0.10 to the ADT for rural highways and urban roads, respectively.

- Put in place statutes, land-use ordinances, geometric design policies, and driveway regulations for managing and controlling access.
- Adopt the use of lane widths of 3.5 to 3.75 m for mobility road classes and 2.5 to 3.5 m for access roads classes. On such roads also adopt minimum shoulder widths of 2.0 m for mobility road classes 1 to 3 in flat terrain, 1.0 to 1.5 m for roads in rolling and mountainous terrain shoulders, and 0.6 to 1.0 m for access roads classes.
- A normal cross fall of 2.5% should be adopted bitumen surfaces or 3% in areas where heavy rainfall is common, 3.0% for stone paved surfaces, and 4.0% for gravel and earth surfaces.
- Adopt 5.5 m as headroom under bridge structures, 7.0 m as headroom under high-power cables and 6.0 m under low-power cables.
- Adopt the AASHTO requirements for climbing lanes, and use escape ramps to be located wherever grades are of steepness and length that present a substantial risk of runaway trucks and topographic conditions permit construction,
- Provide motorcycle exclusive cycle lanes when the total volume of traffic exceeds the provided lane capacity, and the volume of motorcycles exceeds 20% of the total volume of traffic.
- Signalised intersection spacing should be at least 400 m in urban areas and 800 m in suburban areas for optimum two-way progression, and for unsignalised intersections the minimum distance should be at least $10 \cdot V_D$ meters,
- Adopt footway widths of 1 m as absolute minimum standard (two persons cannot pass each other), 1.8 m as desirable minimum (two persons can pass each other closely), 2.25 m for light volume (two persons can pass each other comfortably), and 3.5 m+ for heavy volume (space for three persons),
- Provide separate cycleway or combined cycleway and footway if there is high-traffic and the combined flow of pedestrians and cyclists is more than 400 per day

8.1.2.2 Harmonisation of Road Pavement and Bridge Design Standards

- Short-term measures which are aimed at improving the existing empirically-based pavement design practices in the EAC Region include the adoption of the following proposals:
 - harmonised regimes of climatic zones,
 - design period and traffic loading,
 - subgrade characterisation and pavement materials codes and properties,
 - ban the use of super single tyres of 385 mm and conventional tyres of 315 mm as single tyres on legal axles and axle units.
 - use of Euro code 1, Part 2 final draft prEN 1991 for bridge design
- Long term measures include the development of a Bridge Design Standard for the EAC and the adoption of an analytical pavement design method for the EAC region.

8.1.2.3 Harmonisation of Specifications for Road and Bridge Works

The study recommendations cover the requirements and specification of earthworks and major materials. The materials are classified under the appropriate material codes according to their fundamental behaviour, into various categories with different classes according to their strength characteristics. They include natural materials, stabilised materials, crushed aggregate materials, and bituminous materials and seals.

It is further recommended to use S15, S7, S3 and geo-textiles and/or rock fill (DR) materials for earthworks; GW, G80, G60, G45, and G30 as natural gravel materials for pavement layers; CM, C0.7, C1.0, C1.5, C2 for stabilised pavement layers; CRS and CRR crushed aggregate for base course; AC20, AC14, AC10, DBM40, DBM30, LAMBS, FBMIX, BEMIX, PM80, PM60, PM30 for bituminous base course and asphalt concrete surfacing; as well as ST for surface dressing.

8.1.2.4 Road and Bridge Maintenance Standards

Concerning road and bridge maintenance standards recommendations were made in the areas of institutional arrangements for road and bridge maintenance as well as existing road and bridge maintenance policies, operational procedures and practices. Of particular significance, rather than re-inventing the wheel, Member states have been advised to carry out further evaluation of TANROADS Road Maintenance Management System (RMMS) and Bridge Management System for Tanzania (BMST) for possible improvement and adaptation. The review revealed that these two systems are operational at a very advanced stage.

8.1.2.5 Harmonisation of Road Signs, Traffic Signals and Markings

The main recommendation concerning this theme is to integrate the existing road traffic signs and road marking schedules of the member states and to adopt all-white pavement marking system. To overcome the problem of vandalism it is recommended to adopt a Full Fibreglass Traffic Signs System which has been demonstrated to be cheaper, durable, costs less in maintenance and have zero re-sale value in best practice counties. It is further recommended that each Partner State develop and publish its road traffic signs manual to facilitate the harmonization of the more technical aspects of road signing as provided in this chapter.

A prudent implementation of approved changes over a ten year period is recommended under budgetary constraints. The harmonized signing and design principles should be applied on all new and rehabilitation projects and in the course of maintenance of road signs. No special budget will be required if this approach is adopted. However, it is desirable to mobilize funds and implement posting speed limits on all paved rural roads and apply an all-white pavement marking to accelerate achievement of road safety benefits to quickly match practice with the provisions of the law.

8.1.2.6 Harmonisation of Vehicle Safety and Fitness

On the vehicle safety subcomponent, recommendations have been made with regard to the framework and minimum standards for periodic motor vehicle inspection (PMVI) for the EAC member states. Other recommendations concern infrastructure (facilities and equipment), inspection schedules and fees for vehicle classes, human capacity, legislation and enforcement, and ownership of PMVI facilities have also been made.

8.1.2.7 Driver Training and Testing

On the issues of driver training and testing, recommendations have been made on the training syllabus for a common training manual in EAC countries for driver training for different classes of vehicles as well as common methods and procedures for testing drivers of different categories. In short, the study recommends the driver training syllabus and testing structures in the EAC for riders of motorcycles (capacity < 125 cc), drivers of light vehicles (GVM < 3500 kg), heavy goods vehicles (GVM > 3500 kg) and passenger service vehicles (PSV).

8.1.2.8 Vehicle Dimensions and Combinations

On vehicle dimensions and combinations, the study has made recommendations on standards and regulations which should be used by EAC member states. It is further proposed that each EAC member state conduct a survey on the road infrastructure where the proposed standards exceeds the existing limits and recommend appropriate measures to be take.

8.1.2.9 Harmonisation of Transportation of Abnormal, Awkward and Hazardous Loads

On the issue of the transportation of abnormal, hazardous and awkward loads, the recommendation is that the EAC member states adopt the current harmonisation framework by COMESA and SADC and the use of UN Recommendations on Transportation of Dangerous Goods.

8.2 Harmonisation of Environmental Regulations and Standards

The objectives of harmonising environmental regulations and standards were first to review the existing regulations and standards in order to determine whether there were any gaps, divergences or convergences across the Partner States. The second objective was to prepare detailed guidelines and manuals.

8.2.1 Conclusions

All Partner States have adopted environmental policies and regulations which differ slightly especially with respect to road transport. The areas of divergences include the following: ratification of international environmental conventions, existence of superior national courts or tribunals, comprehensive environmental standards and regulations and Environmental Impact Assessment.

8.2.2 Recommendations

- Burundi and Rwanda as beneficiaries of the Convention should sign the Convention on Prevention of Marine Dumping.
- Environmental policies in the Partner States should be revised to advocate for the establishment of superior environmental national courts or tribunals, and establish institutions for the enforcement of environmental laws. The EIA guideline recommends the use of environmental police unit to enforce the environmental laws and regulations, but each Partner State must consider the local factors.
- Partner States should enact comprehensive environmental regulations and set standards to cover all areas susceptible to activities in the road sector and this function should be done in collaboration with agencies or institutions on standards,
- This study has recommended environmental standards for use in the EAC in the areas of water quality, air quality, noise pollution, discharge of effluent, soil quality, vibration and electromagnetic waves
- There should be an enforcement plan for the harmonised and newly developed environmental standards, and it is further recommended that a socioeconomic impact assessment should be carried out for any road project in EAC and should put in place a community-driven development plan to implement compensation.
- Partner States should amend their environmental/standards, guidelines and manuals to comply with the harmonised minimum standards, guidelines and manuals recommended and or prepared in this study. For the projects of Transboundary in nature, the EIA guidelines for shared ecosystems developed for EAC should apply.

8.3 Harmonisation of Vehicle Registration and Licensing

The objectives of the study on Harmonisation of Vehicle Registration and Licensing was first to carry out a review of existing laws and regulations concerning vehicle registration and licensing and propose areas for improvements and harmonization. Once this was done, then the next objective was to propose the harmonised new regulations.

8.3.1 Conclusions

Motor Vehicle Registration: There are many areas of commonality in vehicle registration among the member states. These include the appointment of registrars of motor vehicles, and conditions for registration as well as the assignment of registration marks. Other areas of commonality include change of ownership of motor vehicle particulars, registration of governments' and foreign organizations' vehicles, exemption from registration, offences & penalties, and revenue authorities acting as registrars.

In spite of the similarities of the legislation among the member states, there are still many areas of divergence which are worthy consideration for purposes of harmonization of the law on registration of motor vehicles in the Region. The common areas of differences include the registration authorities, classification of registered motor vehicles, registration process, and title of documents for registration.

Motor Vehicle Licensing: In as far as vehicle licensing is concerned, all the statutes in the EAC member states seem to converge on the following areas: licensing authorities, ownership and use of motor vehicles, dealers' general licences, application for new vehicle licences, classification of motor vehicles for purposes of licensing, penalties and the making of rules & regulations.

Divergence issues in motor vehicle licensing include the following: some parent legislation lack provisions on motor vehicle licensing, exemption from licensing, grant of dealers' general licences, failure to renew a vehicle licence, as well as presentation of the law on motor vehicle licensing is spread between parent and subsidiary legislation.

Convergences and divergences in operator licensing are in the following areas; conditions for grant of licences, lack of domestication of regional agreements, monitoring and enforcement of operators' laws, absence of independent regulatory transport agencies and government provision of transport services in one member state.

8.3.2 Recommendations

A legal instrument on motor vehicle registration, licensing and operators' licensing is, accordingly, recommended. This instrument should canvass among others, the following:

- Registration and licensing of motor vehicles should be done by each member state based on commonly agreed criteria or parameters.
- National revenue authorities should be designated as revenue collecting authorities only while the actual registration and licensing is done by ministries in charge of transport after consideration of safety and economic issues. Further, Partner States should agree on a common modality of collecting licensing fees after conducting a study to determine the most profitable mode.
- A central data base should be created for the purpose of sharing data on motor vehicle registration and licensing among the member states;
- In addition to other requirements, only environmentally sound motor vehicles should be registered and licensed in the Region;
- There should be no permit fees charged for motor vehicles of one member state travelling in another member state so as to accommodate the spirit of the EAC Protocol on Common Market
- The proposed law should be a bare framework while further details shall be prescribed in regulations made by the Council of Ministers or a minister in charge of transport in a respective member state.

8.4 Harmonisation of Road Safety Laws and Regulations

The objectives of harmonisation of road safety laws and regulations were; first to review the existing laws and regulations concerning road safety, and propose areas for harmonization. The second objective was to identify viable strategies, projects and activities leading to the stemming of the problem of high incidence of accidents in the Region. The third objective, was to recommend a regional strategy for tackling the prevalence of HIV/AIDS in road transport corridors, and the last was to develop a framework for the preparation of an East African Road Safety Master Plan.

8.4.1 Conclusions

All the member states have fairly comprehensive policies and legislation governing road safety. There is even a road safety strategy in one of the member states. However, with the exception of Rwanda, enforcement of road safety laws is weak, and in all member states the institutional set-up for road safety activities is fragmented, and the coordination framework in the form of a national road safety council/commission is not operational. There is therefore an urgent need to systematically enforce road safety laws, and restructure the road safety institutional set-up so as to facilitate the setting up of common targets and coordinate implementation.

A number of strategies, projects and actions to manage the identified risk factors contributing to road traffic injury on member states' road networks were identified in the aspects of user behaviour, road infrastructure and urban planning, rescue and rehabilitation of road traffic injury victims, and the safety of vehicles. The management of interventions to achieve the desired focus on results is essential, and therefore the establishment of an effective institutional set-up was included as one of the strategies.

Review of the HIV/AIDS situation across the member states confirmed the need for harmonizing the interventions addressing the epidemic, particularly with regard to the long distance truck drivers and the communities interacting with them along the road transport corridors. The proposed strategy capitalises on and integrates what is already in place, and consolidates and harmonises the interventions across the member states to provide an effective, efficient and consistent mechanism to deal with the epidemic. A planning period of ten years from 2012 to 2022 is adopted.

A framework for the development of an East African Road Safety Master Plan is proposed with the following features:

- A long term vision of *a road transport system with a negligible probability of being killed or seriously injured as a result of a road traffic crash*
- A short term vision that is consistent with the UN Decade of Road safety action, namely to half the number of forecasted fatalities and serious injuries by 2022.
- A fifteen year planning horizon divided into five-year phases: the foundation, the growth and the consolidation phases.
- A foundation phase that focuses on targeted information campaign on the high risk sections of the network to achieve 20 percent reduction in the forecasted fatalities, streamlining the institutional setup to deliver effectively the road safety management functions and laying foundation for all the elements of an effective road safety management system with a strong emphasis on professional capacity building through learning by doing, sustainable funding and strong coordination.
- A growth phase during which the application of interventions is extended to the road network carrying 80 percent of the national traffic.
- A consolidation phase during which interventions are applied on the entire road network, and the national targets are devolved to the local level. During this phase ambition to have fewer number of fatalities each succeeding year is realized.

8.4.2 Recommendations

It is recommended to build an effective road safety management system and invest adequately in interventions to accelerate road safety work so that the increasing trend of fatalities is reversed in the next ten to 15 years.

Member state governments should designate a lead ministry for road safety work and establish a road safety authority/agency reporting to the lead ministry. The mandate of the road safety agency/authority shall be to provide leadership and coordinate activities within the sub-sector.

The legislation on road safety interventions especially on speed, blood alcohol content, fastening of seatbelts and wearing of helmets need harmonization and should be internationally benchmarked.

Professionals in the road safety sector are challenged to prepare project write-ups based on the proposed strategies and follow through their implementation on the basis of the particular situation in each member state while benchmarking their plans internationally.

There is a need for a regional strategy since in each of the EAC states there is still room for improvement and harmonization, despite having an ongoing programme to curb the spread of HIV,. The following strategies have been identified as suitable:

- Ensuring accessibility of health services including availability of comprehensive TB/HIV/AIDS/STI services
- Mainstreaming of HIV/AIDS interventions along the transport corridor into local development plans.
- Harmonization of key policies and protocols among the member states.
- Implement an evidence-based behaviour and social change communication strategy
- Strive to have responsible transport ministries design and implement the HIV/AIDS sector response.
- Members working in the transport corridor should work with local communities to improve not only income levels, but also skills and capacities to enable the local communities make independent sexual choices.
- There is a need to provide an institutional framework that will facilitate coordination, information- sharing and building synergies among programmes.
- Public-private partnership is needed since no single sector, be it for-profit private sector, not-for-profit private sector or government agencies of the public sector, has all the skills and resources needed to make impact on its own.
- Capacity building should focus on enhancing the understanding of the interrelationship between HIV/AIDS and the transport sector at national levels and at the local implementation levels.

It is recommended that a legally mandated lead agency with authority to provide strong leadership in national policy issues, including the setting of national targets, coordination, sufficient funds and their allocation is appointed.

8.5 Harmonisation of Overload Control Laws and Regulations

The objectives of harmonising Overload Control Laws and Regulations were to; firstly develop a common training curriculum for weighbridge personnel, secondly set up uniform weighbridge printout certificates and overload reporting formats across the EAC Region; thirdly, propose a framework for interconnection of weighbridges in the Region with a regional data centre for monitoring the performance of weighbridges and storage of data; and finally incorporate these into an EAC legal instrument to be used by member states in implementing overload control regulations. The draft legal instrument approved by the Council of Ministers in February 2012 clearly takes into board the findings and recommendations of this study.

8.5.1 Conclusions

The common training curriculum will ensure that weighbridge operations are carried out efficiently and at high standards, and in a consistent manner throughout the Region. The training will be tailored to prepare weighbridge staff to perform their duties by providing relevant knowledge and skills.

The proposed EAC Overload Control Management System and associated services, and weighbridge specifications will improve the performance of weighbridges and efficiency of overload control. In addition, a regional Act will result in improved overload control.

8.5.2 Recommendations

The following recommendations are made in relation to the weighbridge personnel training curriculum:

- The weighbridge operation manuals from TANROADS and KeNHA are good starting points in the formulation of a training curriculum for the EAC member states as they include most aspects of the information required in the operation of traditional weighbridge stations.
- Practical training should be included in the proposed training curriculum. The practical part should be taken after the theoretical part of the training has been completed, and should be conducted at Categories A or B Traffic Management Centres (weighbridge stations).
- Due to the multi-disciplinary nature of the weighbridge stations, the staff should be categorized and trainees should attend modules which are only relevant to their professions and positions at the weighbridge stations.
- The functioning of different categories of Traffic Management Centres (TMC) should be included in the training syllabus despite the fact that they have yet to be implemented in all the EAC countries at the present time.
- The following is recommended to be included in the training syllabus: work ethics and professionalism; units and unit conversion; environmental awareness; and background to the EAC, SADC, and COMESA regional economic communities.
- There should be a common Weighbridge Operation Manual which should be used in all the EAC countries.
- There should be refresher training courses for each staff after every two years. This is important to enable staff to catch up with new technologies and tricks from transporters who overload.

Detailed recommendations, in relation to the management and operation of weighbridges, have been made on the following:

- The development of an EAC Overload Control Management System
- The overload data to be collected, how it is to be verified and shared
- A unified weighbridge printout certificate and reports format
- The type of weighbridges to be used and their locations along the EAC corridors and border posts
- The mode of interconnection of the weighbridges and the necessary ICT platforms.

Finally, a regional Act on overload control is recommended.

8.6 Harmonisation of Transport Sector Legal and Institutional Frameworks

The objectives of this section are to review existing laws and institutional structures, and propose areas for improvement and harmonization.

8.6.1 Conclusions

The first step in establishing an improved legal framework for road transport is to review road transport policy and how it fits in with all aspects concerning road infrastructure and other modes of transport. Therefore, in order to have a harmonised legal and institutional framework for the road transport sector, member states should undertake to evolve coordinated, harmonised and complementary transport policies. This is in line with the provisions of the 1999 EAC treaty especially Article 89, whose ultimate objective is to have a common transport policy for the EAC

member states. The following proposals should be implemented in order to keep the harmonisation processing moving in the right direction;

While there is no universally accepted model for institutional arrangement in the transport sector, the transport policies are expected to guide the most appropriate form of institutional structure. Based on principles of good governance, separation of functions, coherence, and sector coordination, the resulting institutional structure will be made of the following organisations; ministries of transport, modal executive/regulatory agencies and transport service enterprises.

8.6.2 Recommendations

All current national transport policies should acknowledge and recognise the need to comply with current commitments of their membership to the EAC. This means that they should outline plans of how their respective governments will implement the commitments they have assumed.

The process of policy development and implementation should be speeded up, since slowness in the process of policy development in some member states undermines the relevance of the policy documents. While the policy is under development, officials are constrained from embarking on new programmes and initiatives as there is an understandable tendency to await the outcome of the policy process.

It was found that in some states, policies are not yet formalized, that is, policy proposals have not been translated into appropriate legislation and programmes. In the absence of a legislative mandate, transport ministries are constrained in requesting for additional funds to implement new or expanded programmes.

Some states' policies are out of date, and as a result can no longer guide the governments' sector programmes and reforms. It is therefore recommended that policy documents should be dynamic and have well established review processes.

The recommended areas for harmonisation in the road infrastructure include road acts, road fund acts, axle load and maximum weights, and private sector participation.

In road traffic regulations and safety enforcement laws, a number of areas need to be harmonised in order to effect smooth cross-border operations namely: maximum speed, driving on public roads, and road signs.

As for road transport operator licensing, it is recommended that the following aspects be harmonised; public transport regulation, vehicle inspection, operator and driver licensing, road transport sector regulation, and vehicle registration and licensing.

The following areas of road transport institutional framework need to be harmonised:

- **Separation of Functions:** There is a need to harmonise the separation of functions between policy-making organisations and regulatory as well as service providing organisations. In all the EAC member states the organisations responsible for road transport policy should be different from those regulating the transport sector as well as those providing transport services.
- **Road Transport Sector Planning and Coordination:** Within the ministry of transport of each member state, one department should have the responsibility of coordinating all issues related to road transport. This department should also include a knowledge centre where all documentation on road transport policies, operations, statistics and information will be deposited. The same department should be responsible for the strategic planning of the whole road network, and should coordinate the implementation of all network development plans.

- **Separation of Functions: Regulation and Enforcement:** It is desirable that in all the five member states the regulation function is separated from the enforcement function. Currently some organisations carry out both functions of regulation and enforcement while in some member state, this is already separated. There is a need to harmonise this area in such a way that would help separate regulation from enforcement. In addition, all road transport functions should be under one regulator; licensing, safety, overloading, level of service, route entry etc.
- **Creation of an Organisation for Regulatory Impact Analysis:** Currently there are a number of regulatory decisions being proposed and implemented, ranging from axle load limits to installation of speed governors. The impact of these decisions is not being rigorously analysed to determine their impact on service levels or on overall policy objectives. It is proposed that an organisation be created in each member state to be tasked with the analysis of the impact of various regulatory decisions.
- **Road Development and Maintenance:** All five member states have created similar institutions for carrying out road development and maintenance. However, there are slight variations in the day to day operations of these organisations mainly in their levels of independence from their parent organisations, and therefore political interference. It is therefore proposed to harmonise the structure and therefore the operations of road development and maintenance organisations so that they can exercise the same level of independence.
- **Road Transport Services:** There is a need to create organisations in each member state to handle issues related to the level of service for public transport. Such organisations should define and outline ways of maintaining service quality levels concerning issues such as bus bodies, journey speed, headway of public transport vehicles etc.

APPENDIX 1

List of Participants at Expert Group Meetings

Appendix 1: Experts Workshops

PREPARATION OF THE EAST AFRICAN TRANSPORT FACILITATION STRATEGY

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PREPARATION OF THE EAST AFRICAN TRANSPORT FACILITATION STRATEGY

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PREPARATION OF THE EAST AFRICAN TRANSPORT FACILITATION STRATEGY

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**PREPARATION OF THE EAST AFRICAN TRADE AND TRANSPORT FACILITATION STRATEGY
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PREPARATION OF THE EAST AFRICAN TRANSPORT FACILITATION STRATEGY

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APPENDIX 2

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**PREPARATION OF AN EAST AFRICAN TRANSPORT STRATEGY &
ROAD SECTOR DEVELOPMENT PROGRAMME
EAC TASK FORCE REVIEW MEETING
19TH SEPTEMBER TO 23RD SEPTEMBER 2011
BLUE PEARL HOTEL-DAR ES SALAAM, TANZANIA**

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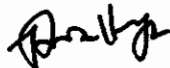
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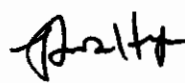
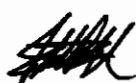
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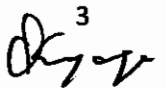
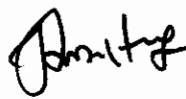
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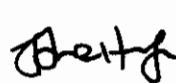

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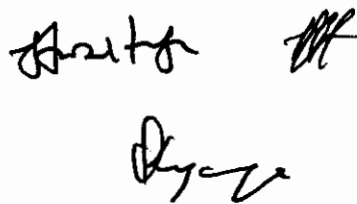
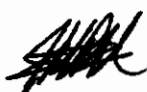


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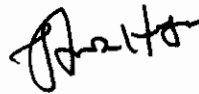
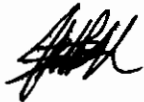
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APPENDIX 3

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APPENDIX 4

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Dear Sir,

**RE: THE EAST AFRICAN TRADE AND TRANSPORT FACILITATION PROJECT
(EATTFP)**

THE TRANSPORT FACILITATION PROJECT

Reference is made to the above subject matter and the Contract signed between your firm and EAC dated 19th April 2010.

As you may recall during the negotiations of the Contract, EAC indicated that one of the components, the Axle Load Harmonization, is also being conducted through separate financing from JICA. This state of affairs came about after the Council of Ministers directed EAC to fast track the Axle Load component given prevailing sensitivities brought about by disparities of the limits among Partner States. EAC was therefore compelled to have the component as a stand alone project and seek alternative funding even as the broader Transport Facilitation Project was under procurement.

Given that the component is still part of your TOR and the need to avoid duplication of effort, we would like to inform you that EAC has decided to rationalize the study by providing clear apportionment of what each consultancy will do. We believe that this will provide the needed synergy to take the whole component to full completion. In this regard, your scope of activities have been adjusted as follows:


AICC Building, Kilimanjaro Wing (5th Floor)

- i) Develop a common training curriculum for weighbridge personnel;
- ii) Set up uniform weighbridge printout certificates and overload reporting formats across EAC region;
- iii) Propose a framework for the interconnection of weighbridges in the region with a regional data centre for monitoring the performance of weighbridges and storage of data;
- iv) Prepare an EAC legal instrument to be used by the Partner States in implementing overload control regulations. Such an instrument shall be either a Protocol or a regional Act, depending on which option would be most appropriate.

As can be discerned, your consultancy will concentrate on legal and capacity building issues while the JICA study will deal mainly with technical and regulatory issues. The legal instrument that you will produce will have the technical inputs as annexures.

Please note that the arrangement proposed above will in no way affect the financial status of your Contract with EAC. You are requested to give your comments so as to enable us set up a suitable collaborative platform for the two studies.

Please accept, Sir, the assurances of my highest considerations.


Alloys Mutabingwa
Deputy Secretary General
(Planning and Infrastructure)
For: **Secretary General**



EAST AFRICAN COMMUNITY

TERMS OF REFERENCE FOR THE PRAPARATION OF A TRANSPORT FACILITATION STRATEGY FOR THE EAST AFRICAN COMMUNITY

1. GENERAL INTRODUCTION

The East African Community (EAC) is a Regional Economic Community established in 1996 with its Partner States currently being Kenya, Uganda, Tanzania, Rwanda and Burundi and its Secretariat based in Arusha, Tanzania. The EAC operations are governed by the Treaty for the establishment of the East African Community that was signed by the Summit of the Heads of States in 1999 and come in force in 2000.

In November 2006, the Summit of EAC Heads of State admitted the Republics of Rwanda and Burundi to the EAC. The formal admission into the Community has been effective after the signing of the Accession Treaties by the two countries in July 2007.

The EAC aims at widening and deepening cooperation among the Partner States in, among others political, economic and social fields for their mutual benefit. To this extent, the EAC countries established a Custom Union in March 2004 and are working towards the establishment of Common Market by 2010, subsequently a Monetary Union by 2012 and ultimately a Political Federation of the East African States.

As a part of its efforts in achieving the above objectives, the EAC has strived to enhance trade among the Partner States and with outside world, thereby improving the region's economy and competitiveness. The East African Trade and Transport Facilitation Project is a multi-national/multi sector program to support trade growth in the region through an effective Customs Union, reliable, efficient and safe road transport services. This will enhance faster transit time, promote trade facilitation, remove non - tariff barriers and simplification and harmonization of customs formalities. To achieve these objectives there is need for support to the following components:

- a. Support to the customs union implementation
- b. Support to transport facilitation

2. PROJECT DESCRIPTION

The Transport Facilitation component of the (EATTFP) project involves the implementation of the Tripartite Agreement on Road Transport, signed by the Partner States in 2001 and ratified in 2004. Activities will include provision of consultancy services, report reviews and stakeholder workshops. The thematic areas will include, among others, review and regional harmonization of the following:

- i) Road traffic acts, traffic signs and markings, driver testing manuals, overload control and highway safety measures

- ii) Environmental standards relating to road programmes
- iii) Standards and specifications for roads and bridges
- iv) Registration and licensing of vehicles
- v) Axle load regulations, road transit charges within the EAC region

The component will also support designing and implementing an institutional framework for implementation of the activities listed above. The responsibilities fall under the Joint Technical Committee as defined to the Tripartite Agreement, to be made up of experts drawn from the Partner States.

3. OBJECTIVES OF THE STUDY

The Study will aim to achieve the objects outlined under the sub-components below:

- 3.1 Harmonization of Standards and Specifications
- 3.2 Harmonize environmental regulations and standards
- 3.3 Harmonization of Vehicle Registration and Licensing
- 3.4 Harmonization of Road Safety Regulations
- 3.5 Harmonization of Axle Load and Overload Control Regulations and Road Users and Transit Charges
- 3.6 Harmonization of Transport Sector Legal and Institutional Frameworks

4. SCOPE OF CONSULTANCY SERVICES

The EAC shall be the Executing Agency of the Study with the assistance of her Partner States. The EAC will have the overall responsibility for execution, administration and co-ordination of the Study.

The Consultant shall perform all planning, engineering, financial, economic, social and environmental analyses, field investigations and related services as described herein with due care and diligence to attain the objectives of the study.

4.1 Harmonization of Standards and Specifications

- i) Review existing documents/ statutes and propose improvements to the same. The review shall include but not limited to the following:
 - a) Design standards, Maintenance Manuals and specifications for roads and bridges
 - b) Traffic signs including traffic signals, road signs and marking
 - c) Safety and fitness of vehicles
 - d) Dimensions of vehicles and vehicle combinations
 - e) Transportation of abnormal, awkward and hazardous loads

- ii) Identify areas of commonality which lend themselves to harmonization
- iii) Propose and implement the incorporation of areas unique to particular countries into the harmonized regimes
- iv) Give an indication of the impact of harmonization
- v) Conduct stakeholder workshops to gain consensus on the harmonization of different regulations and standards

4.2 Harmonize Environmental regulations and standards

- i) Review existing environmental regulations and standards and make recommendations for improvement and harmonization
- ii) Collect stakeholder views and conduct workshops
- iii) Facilitate expert group meetings to work on the harmonization process
- iv) Preparation of detailed guidelines and manuals

4.3 Harmonization of Vehicle Registration and Licensing

- i) Review existing laws and regulations concerning vehicle registration and licensing and propose areas for improvements and harmonization.
- ii) Collect stakeholder views on how to harmonize the regulations regionally
- iii) Propose harmonized regulations and
- iv) Conduct stakeholders' workshops to disseminate information on new regulations

4.4 Harmonization of Road Safety Laws and Regulations

- i) Review existing laws and regulations concerning road safety and propose areas for harmonization.
- ii) Identify viable strategies, projects and activities leading to the stemming of the problem of high incidence of accidents in the region
- iii) Recommend a regional strategy for tackling prevalence of HIV/Aids in road transport corridors
- iv) Develop a framework for the preparation of an East African Road Safety Master Plan

4.5 Harmonization of Overload Control Laws and Regulations and Road Transit Charges

- i) Review existing laws and regulations concerning Overload Control and propose areas for harmonization and improvements to be similar across EAC, COMESA and SADC regions
- ii) Review the existing charges/fees/fines and methods of charging for axle overloading in the region and come up with harmonized strategies to be similar COMESA, EAC and SADC regions
- iii) Review the existing axle load and gross vehicle weight limits for various vehicle combinations for the region and harmonize them to be similar across COMESA, EAC and SADC regions
- iv) Develop harmonized calibration standards for weighbridge equipment
- v) Develop a common training curriculum for weighbridge personnel
- vi) Set up uniform weight bridge printout certificates and overload reporting formats across EAC region

4.6 Harmonization of Transport Sector Legal and Institutional Frameworks

- (i) Review existing laws and institutional structures and propose areas for improvements and harmonization

5.0 TRAINING OF COUNTERPART STAFF

No training of counterpart staff is envisaged in this particular project

6.0 REPORTING

The Consultant shall prepare and submit the following reports. All reports shall be in official language of EAC, which is English language and prepared on metric size paper: -

- (i) **Inception Report:** This report submitted in twelve (12) hard copies and twelve (12) soft copies on CD ROM's in PDF format shall give a brief description of staff deployment, methodology employed in undertaking the assignment, programmes of works of all major activities, summary of initial findings, problems, and details of works to be executed and such comments deemed necessary. The consultant shall submit the Inception report to the Client at least two (2) weeks before presentation of the same to the panel of Stakeholders comprising of EAC Secretariat, Task Force Team and, High Level Standing Committee on East African Road network Project, 60 days after the effective date.
- (ii) **Interim Reports:** This report in twelve (12) hard copies and twelve (12) soft copies on CD ROM's in PDF format shall be submitted by the Consultant at bi-monthly intervals (every two months) after the submission of the Inception Report and shall detail all work performed during the reporting period, problems encountered and proposed solutions thereof.
- (iii) **Draft Final Report:** This report in twelve (12) hard copies and twelve (12) soft copies on CD ROM's in PDF format at the end of the 10th month of commencement shall summarize the outputs in terms of findings, analyses' results, and recommendations,

and shall contain all supporting materials. The consultant shall submit the Draft Final report to the Client at least two (2) weeks before presentation of the same to the stakeholders' workshop at the end of the 10th month.

- (iv) **Final Report:** This report in fourteen (14) hard copies and fourteen (14) soft copies on CD ROM's in PDF format at the end of 12th month of the commencement of the assignment shall constitute fully publicized documents. These reports in fourteen (14) hard copies and fourteen (14) soft copies on CD ROM's in PDF format with drawings, plans and maps, which incorporate all revisions, deemed necessary arising from comments received from the draft final reports and translated documents and stakeholders' workshop. The consultant shall submit the Final report to the Client at least two (2) weeks before presentation of the same to the stakeholders' workshop at the end of the 12th month.

7.0 DATA, SERVICES AND FACILITIES TO BE PROVIDED BY CLIENT

(a) To be provided by the Client

- (i) The employer/client through Partner States will provide liaison with the Government Ministries and Departments, Cities, Town and District Councils in order to introduce the consultant to them. However, the Consultant shall be fully responsible for collecting data and information from these agencies, and paying for them where required.
- (ii) The employer/client through Partner States will make available the documentations relevant to the assignment, that have been carried out by or for the Employer and Partner States and any other relevant data available in Government Ministries and Departments, Cities, Town and District Councils, which are necessary for the proper execution of the assignment under the contract.

The Employer/Client will assist the Consultant to:

Obtain formal consent from outside authorities or persons having rights or powers in connection with the assignment,

Obtain ministerial orders, sanctions, licenses and permits in connection with the assignment,

Register a non – Member state firm and senior staff with the appropriate professional boards in Member states. Any associated fees or costs will be borne by the consultant.

(b) To be provided by the Consultant

- (i) The Consultant shall be responsible for arranging all necessary office and living accommodation, transportation, equipment and supplies, surveys, investigations, secretarial services, related to the performance of the works.
- (ii) The consultant shall be responsible for the printing of all reports, drawings, map, etc.
- (iii) All reports and documents relevant to the project, maps, field survey notes, computer programs and electronic data, etc. shall become the property of the East African Community. The Consultant shall provide the originals of maps, plans and all drawings with final documents.

8.0 DURATION OF ENGAGEMENT

The Consultant shall commence provision of services within 30 calendar days of the effective date of the contract. The effective date shall be the date of signature of consultancy contract agreement and completed within twelve calendar months (12) from the date of the commencement of services.

The following tentative time schedule shall be observed in carrying out the study.

	Activity	Month	Responsibility
(I)	Effective date of Contract	M	EAC
(II)	Commencement of Services	M+1	Consultant
(iii)	Inception Report & S/Workshop	M+2	Consultant
(iv)	Draft Final Report & S/Workshop	M+10	Consultants
(vii)	Comment and approval by the Client	M+11	EAC
(viii)	Final Report & S/Workshop	M+13	Consultant

10.0 THE TEAM COMPOSITION

(a) Qualifications of Key Professional Personnel

In order to fulfill his/her obligations, that the Consultant shall provide qualified key staff for the assignment and shall prepare a work programme, and a corresponding manning schedule, showing the timing of activities and the corresponding staff input required for execution of the services. The Consultant shall employ only such key staff whose CVs have been approved by the Client. In addition to the key personnel, the Consultant shall determine the backstopping and or support staff necessary for the successful execution of the assignment. The Consultant must submit with the proposal, CVs and copies of highest education certificates for all key staff including the duration in man-months during which the staff will be deployed under the contract.

The following key professional staffs are considered necessary for carrying out the study and shall constitute the project team and shall possess a minimum academic qualification at Degree Level in their field of expertise.

No	Professional	Minimum Experience (years)
1	Team Leader (Highway Engineer /Transport Economist)	20
2	Highway Engineer	15
3	Transport Economist	15
4	Axle Load Expert	15
5	Legal Expert	15
6	Road Safety Engineer	12
7	Environmental Expert	10
8	Social Scientist	10

1. Highway Engineer/Transport Economics (Team Leader):

- (i) Must be a Registered or Chartered Engineer/Transport Economist
- (ii) Must have not less than 20 years experience of working in similar capacity of managing consultancy teams working on studies
- (iii) Should have undertaken at least five (5) projects that are similar to the assignment in the past 10 years
- (iv) Must be able to communicate ideas freely and easily
- (v) Must be a holder of a Postgraduate degree in Highway Engineering/Transportation Engineering/Transport Economics are pre-requisite for the post
- (vi) Must have at least 5 years working experience in Sub Saharan Africa

2. Highway Engineer

- (i) Must be a Registered or Chartered Civil Engineer
- (ii) Must have at least 15 years of cumulative experience related to road design, construction and maintenance.
- (iii) Must have experience as a Highway Engineer in at least five (5) similar projects in the past 8 years
- (iv) Must be a holder of a Postgraduate degree in Highway Engineering
- (v) Must be fluent in both written and spoken English Language
- (vi) Must be able to communicate ideas freely and easily
- (vii) Must have at least 5 years working experience in Sub Saharan Africa

3. Transport Economist

- (i) Must have at least 15 years of cumulative experience related to road transport planning and economics
- (ii) Must have experience as a Transport Economist in at least five (5) similar projects in the past 8 years
- (iii) Must be a holder of a Postgraduate degree in transport Economics
- (iv) Must be fluent in both written and spoken English Language
- (v) Must be able to communicate ideas freely and easily
- (vi) Must have at least 5 years working experience in Sub Saharan Africa

4. Axle Load Expert

- (i) The Axle Load Expert shall be a Registered or Chartered Civil /Mechanical Engineer
- (ii) Must have not less than 15 years of cumulative experience related to axle load management, analysis and designs
- (iii) Must have specific experience of working as a Axle Load control and management expert for at least five (5) years
- (iv) Must be a holder of a Postgraduate degree in Civil /Mechanical Engineering
- (v) Must be fluent in both written and spoken English Language
- (vi) Must be able to communicate ideas freely and easily
- (vii) Must have at least 5 years working experience in Sub Saharan

5. Road Safety Expert

- (i) The Road Safety Engineer shall be a Registered or Chartered Highway Engineer
- (ii) Must be a holder of a Postgraduate degree in Highway Engineering
- (iii) Must have at least 15 years of cumulative working experience related to Road Safety Management and design of interventions
- (iv) Must have carried out an Road Safety Audit of at least five (5) projects as a Road Safety Engineer within the past 8 years
- (v) Must have at least 5 years working experience in Sub Saharan Africa
- (vi) Must be fluent in both written and spoken English Language

6. Legal Expert

- (i) The Legal Expert shall be a Registered or Chartered Lawyer
- (ii) Must have not less than 15 years of cumulative experience versed in international law, customs laws, international treaties and conventions and laws governing international transport and trade.
- (iii) Must have specific experience of working as a Legal Expert for at least five (5) years
- (iv) Must be a holder of a Postgraduate degree in Law
- (v) Must be fluent in both written and spoken English Language
- (vi) Must be able to communicate ideas freely and easily
- (vii) Must have at least 5 years working experience in Sub Saharan Africa

7. Environmental Expert

- (i) The Environmental Expert shall be a Registered or Chartered Environmentalist
- (ii) Must be a holder of a Postgraduate degree in Environmental Management or related discipline
- (vii) Must have at least 15 years of cumulative working experience related to environmental management
- (viii) Must have carried out an EIA of at least five (5) projects as an environmentalist within the past 8 years
- (ix) Must have at least 5 years working experience in Sub Saharan Africa.
- (x) Must be fluent in both written and spoken English Language

8. Social Scientist

- (i) The Social Scientist shall be a Registered or Chartered Sociologist with recognized Institution
- (ii) Must have experience of not less than 10 years in carrying out social impact studies and resettlement plans
- (iii) Must have experience as a Social Scientist on at least three (5) similar projects in the last 8 years
- (iv) Must be a degree holder of a Postgraduate degree in Social Sciences
- (v) Must be fluent in both written and spoken English Language.
- (vi) Must be able to communicate ideas freely and easily
- (vii) Must have at least 5 years working experience in Sub Saharan Africa.

10 PAYMENT TERMS TO THE CONSULTANT

- 10.1 The Consultant shall quote the cost of his/her staff and other costs as he/she deems to be required. He /she shall summarize his/her total costs and accompany the same with a staff schedule showing the Consultant's involvement.
- 10.2 The costs shall be quoted to cover the Consultant's performance of his/her duties described in paragraph 4 in accordance with the following:
- (a) Remuneration, subsistence and allowances for his personnel
 - (b) Transportation of key personnel
 - (c) Cost of production and printing reports as described in paragraph 6 including secretarial expenses
 - (d) Local travel expenses
 - (e) Shipment of personal effects, reports, documents etc; and
 - (f) Other costs which must be specified by the Consultant.
- 10.3 Payments will be made for undertaking the assignments described in these Terms of Reference to cover fees for approved personnel and reimbursables
- 10.4 An advance of 20% of the total cost net of provisional sums may be provided for mobilization costs against an acceptable Bank guarantee
- 10.5 Payments shall be made according to the detailed schedule as follows: -
- 1. Advance payment on commencement date against the submission of Bank Guarantee. : 20% of costs
 - 2. Lump sum amount upon submission of the Inception Report : 10% of costs
 - 2. Lump sum amount upon submission of the Interim Report. : 25% of costs
 - 3. Lump sum amount upon submission of the Draft Final Report. : 25% of costs
 - 4. Lump sum amount upon submission of the Final Report : 20% of costs
- 10.6 The Bank Guarantee shall be released when the total payments reach fifty (50%) percent of the Lump sum amount
- 10.7 The fees will remain fixed for the whole of the Contract duration
- 10.8 Reimbursable will be made against submission of acceptable documentary evidence
- 10.9 No other payments will be made to the Consultant under this contract

11.0 General Obligation

The Consultant's remuneration shall be deemed to cover his liabilities, travel costs and support his head office staff and all his obligations other than additional services not covered by these terms of reference.

11.7 No other payments will be made to the Consultant under this contract.

12.0 General Obligations

The Consultants' remuneration shall be deemed to cover their liabilities, travel costs and support of their head office staff and all their obligations other than additional services not covered by these terms of reference.

13.0 LEAVE

Not applicable.

LOCATION MAP OF EAST AFRICA
EAST AFRICAN COMMUNITY ROAD NETWORK PROJECT
 (Including Proposed Additional Road Links)



Note:
 1. This Map is not to scale. It should therefore not be used for any other purpose other than purposes of reflecting the general alignment of the East African Road Network Corridors.

2. The additional road links are in dotted lines in colours similar to the Corridors of their alignment.

- 1. ————— Mombasa-Malaba-Katuna Corridor
- 2. ————— Dar-es-Salaam-Dodoma-Isaka-Mutukula-Masaka Corridor
- 3. ————— Biharamulo-Mwanza-Musoma-Sirari-Lodwar-Lokichogio Corridor
- 4. ————— Nyakanazi-Kasulu-Sumbawanga-Tunduma Corridor
- 5. ————— Tunduma-Iringa-Dodoma-Arusha-Namanga-Moyale Corridor
- 6. - - - - - Sections/Links connecting with East Africa neighbours; those of interregional connectivity

Mozambique