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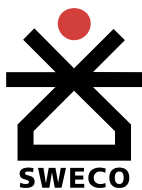
# REVIEW OF THE IMPLEMENTATION STATUS OF THE TRANS AFRICAN HIGHWAYS AND THE MISSING LINKS

## VOLUME 2: DESCRIPTION OF CORRIDORS

*Final Report*

**SWECO International AB, Sweden  
Nordic Consulting Group AB, Sweden**

Stockholm, August 14<sup>th</sup> 2003



In Association With:  
**BNETD, Ivory Coast  
UNICONSULT, Kenya**



## **REPORT LAYOUT**

The amount of information collected under this project is quite large. Major efforts have been made to concentrate the presentation in this Draft Report to the most relevant aspects but the volume remains substantial. In order to make the material as accessible as possible we have opted to organize the presentation in four separate volumes as follows:

### **Volume 1, Main Report**

In this volume the major aspects of the TAH scheme are presented, divided into subject matters rather than geographic corridors (although corridor information in summary form is included in Volume 1).

### **Volume 2, Description of Corridors**

This volume contains the detailed description of the 9 TAH corridors, based on information collected at country, REC and regional levels.

### **Volume 3, Way Forward**

This volume contains the background and presentation of what needs to be done to the Trans African Highways and the conditions for the road traffic and transport using the network. It also formulates a vision for the future and suggests a Work Programme for the coming years.

### **Volume 4 Appendices**

In this volume background information, detail survey data, etc are presented.

It is only thanks to the kind co-operation and support from a great number of people in Ministries, Highway Administrations, RECs, ECA and last but not least the African Development Bank that it has been possible to produce this report within the short time-span available for the field work activities. For that the Team is most grateful.

The study has been carried out by an international group of consulting firms comprising SWECO and NCG of Sweden, Uniconsult of Nigeria and BNEDT of Cote d'Ivoire. The work was carried out by two teams. The members of the Anglophone team were Messrs Kisslig, Mbau, and Sedin. The francophone team comprised Messrs Biagone, Meyer, and Vasur. Mr Sedin has been the Team Leader.

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**ACRONYMS**

ADB	African Development Bank
CEMAC	Communauté Economique et Monétaire d'Afrique Centrale
CEN-SAD	Community of Sahel and Saharan States
CLRT	Comité de Liaison de la Route Transsaharienne
COMESA	Common Market for Eastern and Southern Africa
EAC	East African Cooperation
ECA	Economic Commission for Africa
ECCAS	Economic Community of Central African States
ECOWAS	Economic Community of West African States
GIS	Geographic Information System
NEPAD	New Partnership for Africa's Development
OAU	Organization of African Unity
REC	Regional Economic Community
SADC	Southern Africa Development Committee
SATCC	Southern Africa Transport and Communications Commission
Sida	Swedish International Development Agency
TAH	Trans African Highways
TRLC	Trans Saharan Road Liaison Committee
UEMOA	Union Economique et Monetaire Ouest-Africaine
UMA	Union du Maghreb Arabe
UNTACDA	United Nations Transport and Communications Decade

## FIELD INVENTORY

The main objective for the collection of the existing conditions of various road links was to find the relevant information for a description of a road link and the level of standard for comparison reason with other road links.

Information about the status of the Trans African Highways has been collected by country-visits, investigating reports and site visits on some road links. The quality of information varied substantially between the countries visited. Whereas in some countries information could be found in road databases, other information was given by recording from individual memories. Another source of information was the availability of studies and reports, like feasibility studies, inventory reports, pavement management systems etc.

Whenever time was available and possibility was found, a site visit to the actual road link was carried out, in order to judge about the reliability of received information, mostly regarding the condition of the pavement structure.

The criteria for the assessment within the limits of this report have been chosen in a simplified manner, resulting in a form, which was presented to all interviewed persons. Some information was collected for comparison reason, other information should give indications about the readiness and capacity to maintain existing road infrastructures. Still other information will help to define recommendations for international and regional development of road infrastructure uniformity for road users.

Some of the parameters are self-instructing, others had to be defined as follows:

- **Type of Road.** Illustrates the road class within the country, which the Trans African Highway link belongs to.
- **Type of pavement.** 3 different types are considered: (a) paved roads include surfacing consisting of asphalt concrete, surface treatment like surface dressing, cape seal or similar, cement concrete; (b) road with gravel surfacing; (c) earth roads with no surfacing.
- **Condition of pavement.** It is referred to the structural condition rather than to the riding comfort. Factors like amount and type of cracking, rutting, heaving, loss of stone are parameters which affect the condition of a road pavement and its remaining life expectancy.
- **Alignment standard.** The criteria for the alignment standard is the type of terrain, resulting in varying design speed and construction and maintenance cost.

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- **Design speed.** Indicating the correlation between the alignment standard and terrain type.
- **Travel speed.** This will give an indication about the relevance in the condition of the road. The non-physical barriers are not considered in this information.
- **Road parameters.** Information is searched for about the physical widths for carriageway, shoulders and road reserves.

Paved width means the width between the road markings, excluding edgestrips, alternatively the total width of a gravelled surface.

Road reserve is the legal width, which can be used for road facilities.

- **Number of bridges.** Whenever available an approximate figure about bridges on a special section is recorded. The definition of a bridge may vary, e. g. from a length of 6 m or 10 m.
- **Load limit / Total weight for heavy vehicles.** This information is vital for the assessment of uniformity along the road link, for heavy vehicles travelling between different countries.
- **Traffic flow.** Traffic composition is asked for, especially the number of heavy vehicles, which affects the structure and the cross-section of a road.
- **Truck companies opinions.** Whenever possible a judgement by road users about the road standard is asked for.
- **Status of planning.** Various planned inputs like rehabilitations, reconstructions, design etc for certain road sections shall be listed.
- **Estimated cost to reach design standard.** If road conditions are not considered as good, or alignment standard does not correspond to the standard of road type, the Road Authority's estimation is recorded to bring the road section to the proper standard.

Furthermore information about design, construction, planning facilities and similar are recorded, like design standard used in country, country specific construction specifications, availability of laboratory facilities, etc.

All collected information are presented in Volume 4 – Appendices.



## **1 HIGHWAY 1 - CAIRO - DAKAR**

### **1.1 DESCRIPTION OF THE CHARACTERISTICS OF THE CORRIDOR**

The Cairo-Dakar Trans African Highway goes along the African north and west coasts. The Dakar-Lagos Highway constitutes the continuation of the coastal highway. A peculiarity is that it is included in some, but not in all, of the documents defining the Trans African Highways. It has a total length of 8636 km and runs through Egypt, Libya, Tunisia, Algeria, Morocco, Mauritania and Senegal, see map 1.1. Several other Trans African Highways connect to it: the Cairo-Gabarone in Cairo, the Tripoli-Windhoek in Tripoli, the Trans Saharan in Algiers and the Trans Sahelian in Dakar. It has an important divergence of its characteristics ranging from a totally missing link in Mauritania to motorways in many of the other countries traversed.

Apart from the missing section Nouadhibou-Nouakchott in Mauritania, 569 km, the rest of the corridor, 8067 km, exists in paved condition and is in many sections being extended to motorway standard.

A subset of the Cairo-Dakar Highway is the Nouakchott-Tripoli Highway. It constitutes a functional definition in that it is a project of the Arab Maghreb Union which comprises Algeria, Libya, Morocco, Mauritania and Tunisia. The spur from Rabat to Tanger constitutes an important part and a possible future fixed connection to Europe.

The conditions of the terrain vary considerably. Long sections are in deserts while other sections, primarily in Morocco and Algeria, are in difficult mountainous terrain.

### **1.2 PHYSICAL CONDITION**

The length and the main characteristics of the highway are shown in table 1.1 and on map 1.1. All detailed information from the inventory phase is summarised in sheets presented in Volume 4. Extracts from these sheets are shown in tables and illustrated in maps presented country wise.



Map 1.1 Cairo – Dakar Corridor, Link number 1

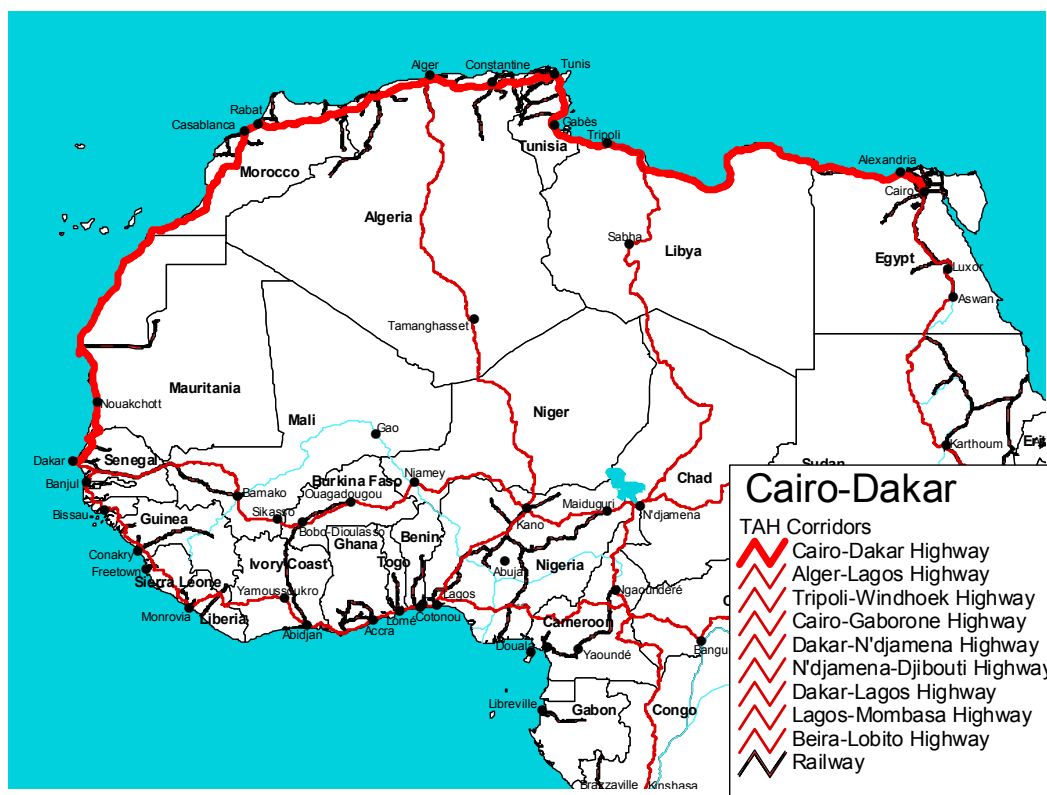


Table 1.1 Cairo - Dakar Corridor, Link number 1

Section	Type				Condition		
	length km	paved km	gravel km	track km	good km	fair km	poor km
Egypt	720	720	0	0	720	0	0
Libya	1869	1869	0	0	1376	493	0
Tunisia	750	750	0	0	750	0	0
Algeria	1341	1341	0	0	1291	50	0
Morocco	2822	2822	0	0	1386	1436	0
Mauritania	773	204	0	569	204	0	569
Senegal	361	361	0	0	266	95	0
<b>Total Cairo-Dakar</b>	<b>8636</b>	<b>8067</b>	<b>0</b>	<b>569</b>	<b>5993</b>	<b>2074</b>	<b>569</b>

**1.2.1 Egypt**

Map 1.2.1 Trans African Highways in Egypt

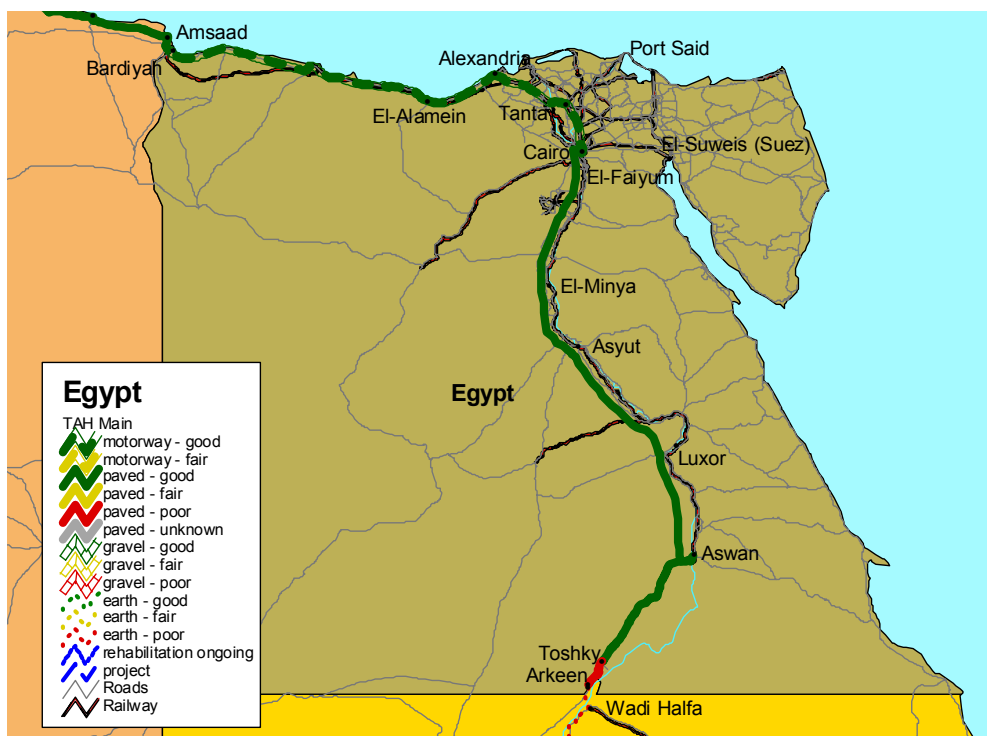


Table 1.2.1 Cairo - Dakar Highway in Egypt

Egypt	length	Type			Condition			construct ed	main- tain- ed	Road parameters (existing or in ongoing improvement)				Traffic flow	
		paved	gravel	track	good	fair	poor			paved width	shoulder gravel	shoulder paved	total width	total	heavy vehicles
Section	km	km	km	km	km	km	km	year	year	m	m	m	m	ADT	%
Cairo-Alexandria	220	220			220				2002	2*10,5		2*2	25	16000	7
Alexandria-El-Alamein	100	100			100			1980	2002	2*7,5		2*2	19	6000	7
El-Alamein-Amsaad	400	400			400			1980	2002	2*7,5		2*2	19	2000	7
<i>Summary Egypt</i>	720	720	0	0	720	0	0								

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The road link belonging to the current Trans African Highway between Cairo and the Libyan border contains sections with varying road standard. Starting from Cairo, the first section from Cairo to Alexandria, with length 220 km, is a 6-lane dual carriageway. The second section from Alexandria to the Libyan border, with length 500 km, is a 4-lane dual carriageway. The traffic lanes are 3,5 m wide for the 6-lane section and 3,75 m for the 4-lane section.

The entire link has been maintained recently with an overlay and represents good pavement condition.

In Egypt the road structures are designed for axle load limits of 10 tons for single axle and 16 tons for narrow dual axles.

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**1.2.2 Libya**

Map 1.2.2 Trans African Highways in Libya

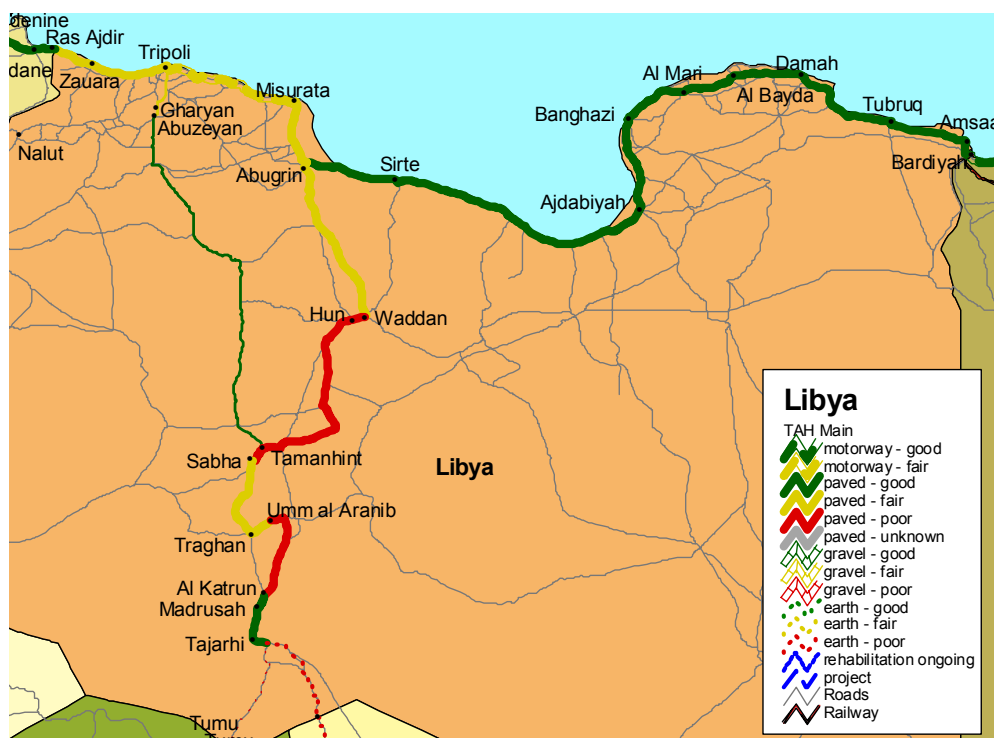


Table 1.2.2 Cairo - Dakar Highway in Libya

Libya	Type			Condition						Road parameters (existing or in ongoing improvement)				Traffic flow	
	length	paved	gravel	earth	good	fair	poor	construct ed	main- tained	paved width	shoulder gravel	shoulder paved	total width	total	heavy vehicles
Section	km	km	km	km	km	km	km	year	year	m	m	m	m	ADT	%
Amsaad-Al Bayda	475	475			475					7,5	2*0,5	2*1	9,5		
Al Bayda-Banghazi	201	201			201					7,5	2*0,5	2*1	9,5		
Banghazi-Ajdabiya	161	161			161					2*7,5	2*0,5	2*1,5	18		
Ajdabiya-Abugrin	539	539			539					7,5	2*0,5	2*1	9,5		
Abugrin-Misurata	110	110				110				7,5	2*0,5	2*1	9,5	1000	20
Misurata-Tripoli	214	214				214		69/75		2*7,5		2*1,5	18	2600	23
Tripoli-Ras Ajdir	169	169				169				7,5	2*0,5	2*1	9,5		
<i>Summary Libya</i>	<i>1869</i>	<i>1869</i>	<i>0</i>	<i>0</i>	<i>1376</i>	<i>493</i>	<i>0</i>								

**Volume 2 – Description of Corridors**

The Trans African Highway through Libya is part of a well developed road network, following the coast from the Egypt to the Tunisian border. The Cairo-Dakar Highway in Libya consists of 375 km road sections with dual carriageway and 1494 km with single carriageway. Between Abugrin and Tripoli, a section of 324 km, the road follows the Tripoli – Windhoek Highway, which is described in chapter 3.

The standard cross-section in Libya is 7,5 m carriageway and 2 times 1,5 m unpaved shoulders. Information about the condition of the road has been given as good to fair.

**1.2.3 Tunisia**

Table 1.2.3 Cairo - Dakar Highway in Tunisia, see also Map 1.2.4

Section	Type				Condition			construct- ed year	main- tained year	Road parameters (existing or in ongoing improvement)				Traffic flow	
	length	paved	gravel	track	good	fair	poor			paved width	shoulder gravel	shoulder paved	total width	total	heavy vehicles
	km	km	km	km	km	km	km			m	m	m	m	ADT	%
Ras Ajdir-Medenine	97	97			97										
Medenine-Gabès-Skhira	141	141			141										
Skhira-Sfax	97	97			97										
Sfax-Msaken	95	95			95										
Msaken-Tunis	143	143			143										
Tunis-Medjez El Bab	45	45			45										
Medjez El Bab-Jendouba	85	85			85										
Jendouba-Border	47	47			47										
<i>Summary Tunisia</i>	750	750	0	0	750	0	0								

Tunisia was not visited, and detailed information about the road parameters are not known. Generally, the condition of the roads is good.

Along the entire Cairo-Dakar Highway, Tunisia has planned a motorway. The implementation status is shown in the table below. The alignment does not entirely correspond to the existing road shown above, therefore the length of the different sections can vary. See map 1.2.4.

Sections	Length [km]	Status
Ras Ajdir-Medenine	110	Corridor is defined
Medenine-Gabès	73	Corridor is defined
Gabès-Sfax	137	Corridor is defined
Sfax-Msaken	112	Completed
Msaken-Tunis	148	Completed
Tunis-Bizerte	66	Completed
Bizerte-Border Algeria	175	Will be taken in service in January 2003
Total	821	
Completed	501	
Planned	320	

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**1.2.4 Algeria**

Map 1.2.4 Trans African Highways in Tunisia and Algeria

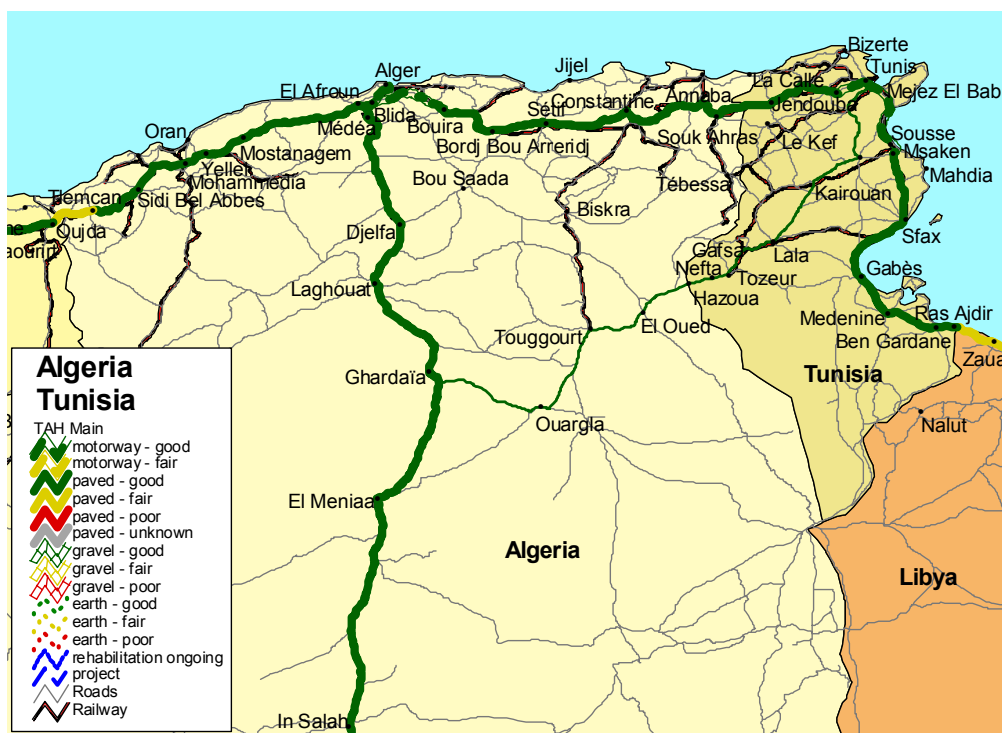


Table 1.2.4 Cairo - Dakar Highway in Algeria

Algeria	Type				Condition			Road parameters (existing or in ongoing improvement)						Traffic flow	
	length	paved	gravel	track	good	Fair	poor	construct ed	main- tained	paved width	shoulder gravel	shoulder paved	total width	total	heavy vehicles
	km	km	km	km	km	Km	km	year	year	m	m	m	m	ADT	%
Border-Constantine	239	239			239										
Constantine-Sétif	131	131			131										
Sétif-Bouira	185	185			185										
Bouira-Lakhdaria	44	44			44										
Lakhdaria-El Afroun	105	105			105										
El Afroun-Mascara	408	408			408										
Mascara-Sidi Bel Abbès	89	89			89										
Sidi Bel Abbès-Tlemcen	90	90			90										
Tlemcen-Border	50	50				50									
<b>Summary Algeria</b>	<b>1341</b>	<b>1341</b>	<b>0</b>	<b>0</b>	<b>1291</b>	<b>50</b>	<b>0</b>								

Note: Road parameters and traffic figures see text.

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The road link between Tunisia and Morocco along the coast is entirely paved and to a great extent in a good physical condition. The traffic is very high, especially in the vicinity of the bigger cities on the coast.

Algeria is about to construct a dual carriageway crossing the entire country along its coast. The total length of the motorway amounts to almost 1'200 km. As of 2002, some 50 km in the outskirts of Alger are already realized, and 100 km east of Alger and around Constantine are in construction. Preliminary projects are completed for sections with a total length of 530 km, and studies are currently underway for a length of 270 km. Completion of the motorway is planned for 2015.

The total cost for the motorway is estimated to 4 – 5 billion USD on a time period of 10 years. Construction costs per km amount to 2 MUSD in flat terrain but can rise up to 12 MUSD in mountainous terrain where bridges and tunnels are required. Currently, the works proceed around Constantine to a cost of approximately 3,8 MUSD/km. The annual maintenance cost for the motorway on its entire length is estimated to 32,4 MUSD.

The motorway is a dual carriageway consisting of 4 lanes with a width of 7 or 7,50 m and shoulders of 2,50 or 3 m each.

The data of the national road network is collected in a database. Currently, data for 44'000 km road is included. The next step in development is the linking of the data with maps.

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**1.2.5 Morocco**

Map 1.2.5 Trans African Highways in Morocco



Table 1.2.5 Cairo - Dakar Highway in Morocco

<i>Morocco</i>		Type			Condition					Road parameters (existing or in ongoing improvement)				Traffic flow	
Section	length	paved	gravel	track	good	Fair	poor	construct ed	main- tained	paved width	shoulder gravel	shoulder paved	total width	total	heavy vehicles
	km	km	km	km	km	Km	km	year	year	m	m	m	m	ADT	%
Border-Oujda	26	26				26				7				800	
Oujda-Fès	347	347			347					7				4000	
Fès-Meknès	60	60			60			1999		2*7		2*2,5	19	3300	
Meknès-Rabat	138	138			138			1999		2*7		2*2,5	19	4600	
Rabat-Tanger	251	251			251			2002		2*7,5		2*3	21	5000	
Rabat-Casablanca	97	97			97			1987		2*7,5		2*3	21	12000	
Casablanca-Settat	68	68			68			2001		2*7		2*2,5	19	10000	
Settat-Marrakech	169	169			169					7				8000	
Marrakech-Agadir	256	256			256					7				5000	
Agadir-Guelmim	190	190				190				6-7				3000	
Guelmim-Laâyoune	429	429				429				6-7				1000	
Laâyoune-Dakhla	464	464				464				6-7				1000	
Dakhla-Border	327	327				327				6				300	
<i>Summary Morocco</i>	2822	2822	0	0	1386	1436	0								



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The Cairo-Dakar corridor goes along the coast and passes the cities of Oujda, Fès, Meknès, Rabat, Casablanca, Marrakech, Agadir, Laâyoune, and finally Dakhla before reaching the border with Mauritania. From Rabat there is a branch heading to Tanger. As the link passes all the main cities of Morocco, the corridor is very important in a national context. The road is entirely paved.

On the long run it is planned to construct a dual carriageway Oujda – Taza – Fès – Meknès – Rabat – Casablanca – Settât – Marrakech – Agadir, with a total length of 1'055 km, and Rabat – Tanger with a length of 240 km. The table below shows the status of the different sections as of August 2002. Completion of the motorway network is planned for 2015.

Sections	Length [km]	Status
Oujda-Taza	186	Corridor is defined
Taza-Fès	145	Preliminary study
Fès-Rabat	184	Completed in 1999
Rabat-Asilah	208	Completed
Asilah-Tanger	32	In construction
Rabat-Casablanca	76	Completed in 1987
Casablanca-Settât	71	Completed in 2001
Settât-Marrakech	174	Preliminary study, completion planned in 2007
Marrakech-Agadir	219	Preliminary study level
Total	1'295	
Completed	539	
Under Construction	32	
Planned	724	

The dual carriageway consists of 4 lanes with a width of 7 or 7,50 m and shoulders of 2,50 or 3 m each. The axle load limit is 13 tons.

The corridor from Agadir to the Mauritanian border (1'518 km) consists of a two lane road with a paved width varying between 6 and 7 m. The rehabilitation of this road and an enlargement to 7 m on its entire length is planned for 2004.

The total cost for rehabilitation of the above mentioned sections, both single and dual carriageways, is estimated to 1,68 billion USD (price base 1992, feasibility study UMA). The annual maintenance cost for the motorway on its entire length is estimated to 28 MUSD. Currently, the construction cost amounts to 1,4 – 2,5 MUSD / km, depending on the terrain. An annual sum of 200 MUSD is available from state budget for the road sector, of which about half is used for maintenance.

The road administration runs a GIS database comprising a digitalized primary road network of 70'000 km and all kinds of road data. The physical data is updated based on a visual inspection once a year, and evenness parameters are measured once every 5 years.

**1.2.6 Mauritania**

Map 1.2.6 Trans African Highways in Mauritania

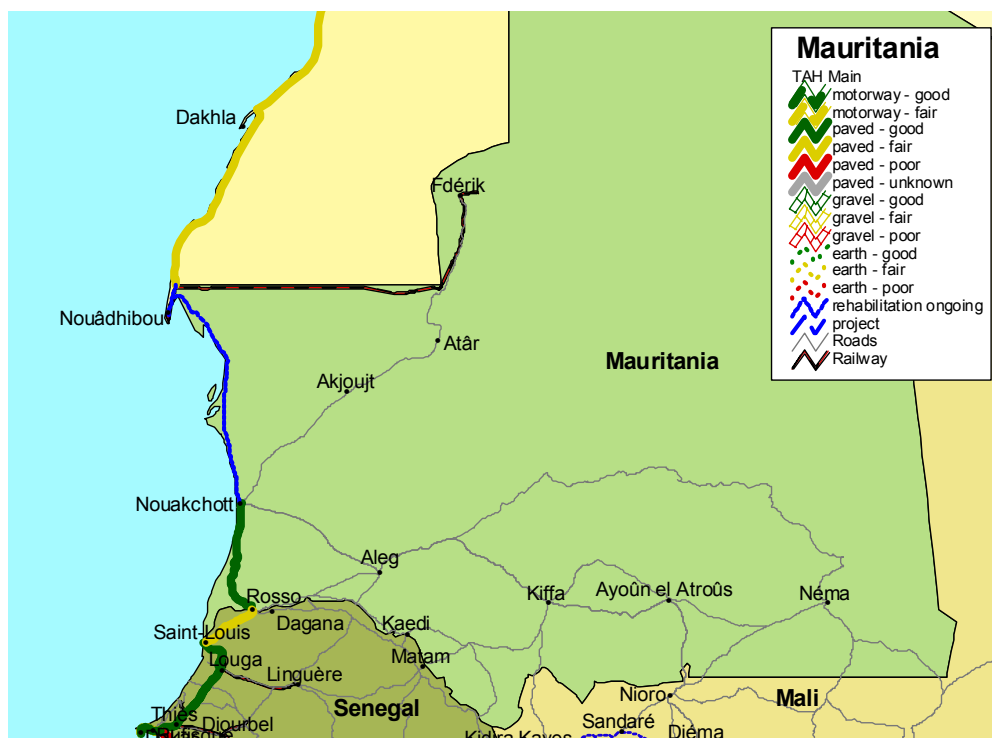


Table 1.2.6 Cairo - Dakar Highway in Mauritania

Mauritania	Type			Condition						Road parameters (existing or in ongoing improvement)				Traffic flow	
	length	paved	gravel	track	good	fair	poor	construct ed	main-tained	paved width	shoulder gravel	shoulder paved	total width	total	heavy vehicles
	km	km	km	km	km	km	km	year	year	m	m	m	m	ADT	%
Border-Nouâdhibou	40			40			40								
Nouâdhibou-Nouakchott	529			529			529							10	
Nouakchott-Rosso	204	204			204			1952	1992	6		2*1,5	9	500	
Rosso Bridge															
<i>Summary Mauritania</i>	773	204	0	569	204	0	569								

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The Cairo-Dakar corridor enters Mauritania in the north of the country, in Nouâdhibou and traverses the entire country along its coast via Nouakchott to Rosso, located at the river Senegal, which is the boundary to Senegal. In a national context, the corridor represents the main link connecting Mauritania's economic centre Nouâdhibou with its capital Nouakchott and with the southern neighbour Senegal.

The crossing of the river Senegal is currently made by ferry. The construction of a bridge is considered, and a joint Mauritanian and Senegalese funding request to the Japanese Development Aid has been presented.

The existing link between Nouâdhibou and Nouakchott has a length of ca 529 km and consists of an earth track in very poor condition and of a sandy beach, which is often used as highway at low tide. When the tide is rising, the vehicles move to the earth track. However, the earth track is currently transformed into a paved road with two lanes and a paved width of 6 m. Completion is foreseen for 2005. With its construction a substantial increase of traffic is expected. Presently, only 5-10 vehicles daily do the trip. Some illustrations are given in Pictures 1.1 – 1.4.

The road from Nouakchott to Rosso at the river Senegal has a length of 204 km and is entirely paved and in good condition. Thus, by 2005 the road from the southern to the northern border of Mauritania will be entirely paved, in accordance with current planning and standards.

According to Mauritania's Ministry of Transport, the branch from Nouakchott eastwards to Aleg-Kiffa-Ayoûn-Nioro-Diéma in Mali, on the Dakar-N'djamena corridor, is an important feeder for the Trans African Highway Network. This branch will be entirely constructed, paved and rehabilitated by the end of 2003.

The total road network managed by the state has a length of 10'300 km. 2'190 km thereof are paved. For maintenance of these roads, 6,25 MUS\$ will be available for 2002. For 2003 10 MUS\$ are estimated to be necessary.

The applied standards for rehabilitation or construction of roads comprise a paved width of 6 m, a design axle load of 13 tons per axle, and a design speed of 80 km/h.

Within the Direction of the Public Services, a Road Management Bureau is being installed as of end of 2002. One of the Bureau's main tasks will be the planning of the maintenance activities. Therefore, a road database will be created, enabling the collection and management of road characteristics and the conditions along the roads.

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Pictures 1.1 and 1.2: Link from Nouakchott towards Nouâdhibou, ca 10 km north of Nouakchott. On Picture 1.1 the paved road from Nouakchott ends, and Picture 1.2 shows the sand beach beside the road, which is often used as transport facility.



Picture 1.3: Bypass road in Nouakchott.



Picture 1.4: Road from Nouakchott to Rosso, ca 10 km south of Nouakchott.

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**1.2.7 Senegal**

Map 1.2.7 Trans African Highways in Senegal



Table 1.2.7 Cairo - Dakar Highway in Senegal

<i>Senegal</i>	Type				Condition			Road parameters (existing or in ongoing improvement)						Traffic flow	
	length	paved	gravel	track	good	fair	poor	construct ed	main- tained	paved width	shoulder gravel	shoulder paved	total width	total	heavy vehicles
	km	km	km	km	km	km	km	year	year	m	m	m	m	ADT	%
Rosso Bridge-Saint Louis	95	95				95	0								
Saint Louis-Thiès	196	196			196										
Thiès-Dakar	70	70			70										
<i>Summary Senegal</i>	361	361	0	0	266	95	0								

The Cairo - Dakar – Highway goes southwards along the coast from Rosso at the river Senegal via St-Louis and Thiès to Dakar. The length of the road amounts to 361 km and it is entirely paved. The road is in good condition.

According to UEMOA, the road from Mauritania to Dakar constitutes the continuation of the coastal road named CU1.

**Volume 2 – Description of Corridors****1.3 ROAD TRAFFIC AND SAFETY****1.3.1 Volume and Composition of Road Traffic Flows**

The road traffic for the countries visited is shown in the table below.

Section	Total [ADT]
<i>Egypt:</i>	
Cairo-Alexandria	16000 <sup>1)</sup>
Alexandria-El Alamein	6000 <sup>2)</sup>
El Alamain-Amsaad	2000 <sup>3)</sup>
<i>Libya:</i>	
Misratah-Tripoli	2600
Remaining sections	Not available
<i>Algeria:</i>	
Border-Alger-border	>4500
<i>Morocco:</i>	
Border-Oujda	800
Oujda-Taza	2500
Taza-Rabat	3000-5000
Rabat-Tanger	4000-6000
Rabat-Casablanca	12000
Casablanca-Marrakech	6000-10000
Marrakech-Agadir	2000-6000
Agadir-Dakhla	1000-2000
Dakhla-Nouâdhibou	300
<i>Mauritania:</i>	
Nouâdhibou-Nouakchott	5-10
Nouakchott-Rosso	400-700

Note:

- 1) traffic increases to 30 000 vehicles per day during summer
- 2) traffic increases to 15 000 vehicles per day during summer
- 3) traffic increases to 5 000 vehicles per day during summer

### **1.3.2 Road Security and Safety**

The road safety and security situation is poor or very poor in most of Africa. The fatality rate per registered vehicle in Africa is 8-50 times higher than in the industrialised world although the road safety situation differs substantially from country to country. While the Central African Republic had a fatality rate of 339 persons per 10 000 vehicle in 1995, the fatality figure for Namibia was 9 in 1996.

There are a number of reasons for the poor road safety record of Africa. A rapid increase in the number of vehicles combined with poor road standard, lack of training, education and information in the road safety field. It has also proven difficult to establish the kind of multi-sectoral, inter ministerial institutional structures needed for successful road safety activities. For a more detailed discussion of the road safety situation in Africa see the presentation under Highway 3 Tripoli-Windhoek.

The problems along the Cairo-Dakar Highway in the road safety field reflects most of the more general problems mentioned above.

## **1.4 MANAGEMENT OF THE CORRIDOR**

Except for the UEMOA involvement in road planning and classification in Senegal, the only sub regional community which has taken an active part in the definition and the coordination of the corridor is the Arab Maghreb Union (UMA). In 1995 UMA commissioned consultants to study the so called L'Autoroute de l'Unité from Nouakchott to Tripoli. This was intended to define the alignment of an eventual motorway network tying the five countries together. The study included also the coordination of border crossings as well as proposals for common technical norms and standards. Apart from the political and economic objectives of fostering Maghreb integration and economic cooperation and development, an important contributing factor for this initiative was certainly also the national road sector priorities of Morocco, Algeria and Tunisia. The need for high capacity, high speed roads essentially along the coast had made itself strongly felt in all these three countries and it thus became quite natural to coordinate these emerging networks. Although the motorways play an important role, it should be pointed out that not all the sections are intended to be extended to motorway standards in the foreseeable future.

Following the completion of the study and agreement thereupon, the implementation has been a national responsibility. It can be noted that the Cairo-Dakar Trans African Highway follows the well established connections between the capitals and incorporates the road sector priorities of the countries concerned.

On the national level the road administrations are set up along conventional patterns. The economic development of the countries varies as does the extent and sophistication of the road networks, and hence also the resources and the tools at the disposition of the road administrations. It is noteworthy that in countries with an important motorway program, such as Morocco and Algeria, the responsibility for the motorways is being shifted to specialized agencies, Autoroutes du Maroc and Agence Nationale des Autoroutes respectively. These are intended to gradually develop into financially self sustaining and self financing entities. Revenue is to be raised through tolls, which is already the case in Morocco and which is planned in Algeria as the network expands.

Seen in a Trans African Highway perspective the priority is to complete the network so that there is uninterrupted road connection from Cairo to Dakar. For this there are two investments necessary. One is the border crossing between Senegal and Mauritania at Rosso, across the Senegal river. This is presently handled by barge. A bridge, 900 m long, is being planned and discussions about Japanese financing are ongoing. The other priority investment is the road from Nouadhibou to Nouakchott in northern Mauritania, a distance of 529 km. Presently, there is no road at all and the land connection is by either a track in poor condition or by driving on the beach, taking into account the conditions caused by ebb and tide. In any case this is an arduous journey which requires specialized vehicles. Designs for a 6 m wide paved road with 2\*1.5 m shoulders is ready, financing is secured and works are scheduled to start before the end of 2002 with completion of the whole section foreseen for 2005.

The priorities and strategies in Tunisia, Algeria and Morocco are very much geared towards extending and completing the motorway networks. These are national priorities to handle growing traffic volumes and to avoid growing congestion along the main economic and transport corridors. As these coincide with the Trans African Highway there is thus no divergence between the national and the sub regional objectives in this respect. Another priority, in all the countries, is that of maintenance generally, of the whole network.

## **1.5 FUNDING**

In Algeria the annual expenditure on the national road network amounts to about 250 MUSD. Of this roughly half is spent on maintenance which allows about 5000 km, out of a total network of 100,000 km to be treated annually. It should be noted however that the network is very unevenly used, with some 90% of all traffic taking place on 9000 km of the network. Thus the present maintenance funding, even if more has been requested and with increased resources expected in the future, is not considered to be seriously insufficient. Roughly the other half of the budget, some



125 MUSD, is spent on expanding the east-west motorway system. This is an expensive undertaking, costing about 4-5 MUSD/km and has thus been progressing at a rate of about 25 km/year. As the total motorway program amounts to 800 km, it is hoped to increase the funding by a factor of five, i.e. to some 650 MUSD, in the future which would allow for more than 100 km of completed motorways per year. In order to make such increases possible, a road fund has recently been set up, with resources coming from a special fuel tax of about 0.6 US cents/l, aiming at covering the maintenance of the roads.

In Morocco the situation is in many respects quite similar. The total road budget is of the same order of magnitude, 210 MUSD/year. The motorway program is somewhat larger, with about 1,000 km as priority but the terrain conditions are easier with lower km costs, 1.5-2.5 MUSD/km, which has allowed for the construction of 30-40 km of motorways per year. The maintenance situation, with an annual budget of around 100 MUSD, is considered to be under control for the main and most important roads.

With a total network of about 10,000 km, of which 2,000 km paved, and an annual maintenance budget of about 6 MUSD, the maintenance efforts in Mauritania seem to be severely under funded. The foreseen 2003 investment budget of 65 MUSD is grant financed and foreseen for the Nouhadibou to Nouakchott road construction.

## **1.6 TRADE AND TRANSPORT FACILITATION**

### **1.6.1 Agreements and Protocols**

Tunisia, Algeria and Morocco and have all signed the TIR convention. However, Algeria has suspended its application since 1982 and hence its relevance in the sub region is limited.

### **1.6.2 Customs and Border Crossings**

The main and basic factor affecting the Cairo to Dakar Trans African Highway as an effective regional trading corridor is the fact that land border between Algeria and Morocco remains closed.

### **1.6.3 Non-Physical Barriers**

The problem of multiple controls on the roads, both official and non official, that so much affects the countries in West Africa, seem to be essentially at hand also in Senegal and in Mauritania. Hence, also the solutions to this problem are basically the same, i.e. a political will and intervention from the highest levels in order to affect the underlying causes of this situation. In the remaining countries the seriousness of

these problems, if existing, seem to occur on a much reduced scale.

### **1.7 MISSING LINKS**

As described above, the only missing link for the Cairo-Dakar Trans African Highways is the highway section between Nouadhibou and Nouakchott, which is presently under construction with completion foreseen for 2005. The planned bridge between Mauritania and Senegal across the Senegal River will much improve the traffic conditions between the two countries, but its absence does not constitute a missing link since the barge connection is working. For the functioning of the corridor one might also define the closed border between Morocco and Algeria as a missing link.

### **1.8 CONCLUSIONS**

Among the Trans African Highways Cairo-Dakar has to a very limited degree the character and objective of other Trans African Highways, of opening up regions or tying them together. Instead, it is very much a putting together of existing, or soon to exist, important national roads to form the Cairo-Dakar Highway. This has influenced the concept and management of the corridor. Since there has been a continuous physical road connection, with the exception of the presently missing links, even before the Trans African Highways concept, the need for coordination and international management of the corridor has been quite limited. The study which was done by UMA was a most important contribution to the Cairo-Dakar Highway but essentially it was aimed at coordinating the expansion of the motorway systems in the sub-group of countries concerned.

It was indicated to the mission that the overall concept of Trans African Highways has played a most limited, if any, role at all for the decisions about the roads in the corridor. This is also reflected in the opinion about a future possible African Highway Bureau to coordinate and supervise road questions of a Trans African character. Such a set up was generally not considered useful and necessary. The earlier experience as well as a general reluctance to create additional structures with not clearly defined objectives and responsibilities were the main reasons for the lack of support. There was however interest expressed in generally following the developments in the road sector in Africa, but this should not necessarily take the form of a permanent institution focussed mainly on the Trans African Highways. Other forms could be envisaged, such as more informal sub regional gatherings and, less frequent, all African road congresses or the like.

## **2 HIGHWAY 2 - ALGIERS – LAGOS**

### **2.1 DESCRIPTION OF THE CHARACTERISTICS OF THE CORRIDOR**

This corridor with the Trans Saharan Highway (see map 2.1) constitutes the oldest of the Trans African Highways. It was officially initiated through a resolution by ECA in 1962 which foresaw that the possibilities of improved transports through the Sahara be studied. The idea behind was to open up vast areas of the Sahara and to promote the integration of Africa on a continental scale. Since then impressive results have been achieved in constructing a highway from the Mediterranean to the Gulf of Guinea. The main alignment, from Algiers through Niger to Lagos in Nigeria, a distance of more than 4500 km, is paved on about 85% of the length and with more pavement works presently underway.

Construction started in the early 70's with the completion, to a 7 m wide paved road, of the El Golea-In Salah section in Algeria which was completed in 1974 and which was extended in 1978 to Tamanrasset. On the section from Tamanrasset to the Niger border (400 km), some 100 km of pavement works are about to be completed and with another 300 underway. In Niger, with a total length of 985 km, about 655 km are paved, but with some sections, mainly Zinder to the Nigerian border, in very poor condition and with the remainder as a basic earth track. In Nigeria finally, 1200 km, the Trans Saharan Highway is subsumed into the paved national highway network and passes through major cities such as Kano, Kaduna and Ibadan with roads of varying standards and with about 500 km as motorways.

The Trans Saharan Highway is linked to several other Trans African Highways; in Algiers to Cairo-Dakar, in Kano in Nigeria to Dakar-N'djamena and in Lagos to Dakar-Lagos and Lagos-Mombasa.

It has also branches which provide connections to Tunisia, Mali, Niamey in Niger, and Chad. These sections together amount to 3600 km. From an organizational / administrative point of view these can be seen as integral parts of the Trans Saharan Highway concept, and they are therefore also included in the following sections. Map 2.1 gives an overview of the Trans Saharan Highway and its branches.

In summary, the Trans Saharan Highway as an idea to enable road traffic from Algiers to Lagos has made tremendous progress in the last 30 years, especially after taking into consideration the limited resources of the concerned countries. Road connection is now possible, although the middle sections present problems and are appropriate for only specialized vehicles.

**Volume 2 – Description of Corridors****2.2 PHYSICAL CONDITION**

The length and the main characteristics of the highway are shown in the table 2.1 and on map 2.1. All detailed information from the inventory phase is summarised in sheets presented in Volume 4. Extracts from these sheets are shown in tables and illustrated in maps presented country wise.

The section from Algiers to Lagos in Nigeria is considered as the main road of the Trans Saharan Highway. The section from the Tunisian port of Gabès to Ghardaïa on the main road, the connection from Tamanrasset towards Gao and Bamako, the branch from Gao to Niamey as well as the branch from Zinder to Nguigmi on the border to Chad are all classified as feeder roads.

The Trans Saharan Road Liaison Committee (CLRT) as coordinating committee for the Trans Saharan Road does not distinct main road and feeders, but consider all the branches as integral part of the Trans Saharan Road.

Tables 2.1 Algiers – Lagos Corridor. Link number 2

Section	Country	Function	Length paved road [km]	Length earth track [km]	Total length [km]
Algiers-Blida-Ghardaïa	Algeria	Main	625		625
Gabès-Gafsa-Hazoua	Tunisia	Feeder	299		299
Hazoua-Ghardaïa	Algeria	Feeder	503		503
Ghardaïa-Tamanrasset	Algeria	Main	1'291		1'291
Tamanrasset-In Guezzam	Algeria	Main	160	238	398
In Guezzam-Agadès-Zinder-Magaria	Niger	Main	655	330	985
Magaria-Kano-Ibadan-Lagos	Nigeria	Main	1'193		1'193
Tamanrasset-Timiaouine	Algeria	Feeder	80	300	380
Timiaouine-Gao-Bamako	Mali	Feeder	1'191	655	1'846
Gao-Labbezanga	Mali	Feeder		210	210
Labbezanga-Niamey	Niger	Feeder	208	47	255
Zinder-Nguigmi	Niger	Feeder	650		650

Country	Function	Length paved road [km]	Length earth track [km]	Total length [km]
Algeria	Main	2'076	250	2'326
	Feeder	583	300	883
Tunisia	Feeder	299		299
Mali	Feeder	1'191	865	2'056
Niger	Main	655	330	985
	Feeder	858	47	905
Nigeria	Main	1'193		1'193
Total Algiers-Lagos	Main	3'924	580	4'504
Total Gabès-Ghardaïa	Feeder	802		802
Total Tamanrasset-Gao-Bamako	Feeder	1'271	955	2'226
Total Gao-Niamey	Feeder	208	257	465
Total Zinder-Nguigmi	Feeder	650		650

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Map 2.1      Algiers - Lagos Corridor. Link number 2



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**2.2.1 Algeria: Algiers-Ghardaïa-In Salah-Tamanrasset-In Guezzam-Assamaka**

Map 2.2.1 Trans Saharan Highway in Algeria and Tunisia



Table 2.2.1 Trans Saharan Main Corridor in Algeria

Algeria	Type				Condition					Road parameters (existing or in ongoing improvement)				Traffic flow	
	length	paved	gravel	track	good	fair	poor	construct ed	main- tained	paved width	shoulder gravel	shoulder paved	total width	total	heavy vehicles
Section	km	km	km	km	km	km	km	year	year	m	m	m	m	ADT	%
Algiers-Blida	47	47			47									20000	20
Blida-Médéa	41	41			41					7		2*1-2	10	10000	20
Médéa-Laghouat-Ghardaïa	537	537			537					7		2*1-2	10	8000	20
Ghardaïa-El Meniaa (El Goléa)	237	237			237					7		2*1-2	10	1500	20
El Meniaa (El Goléa)-In Salah	396	396			396			71-74		7		2*1-2	10	1500	20
In Salah-Tamanghasset	658	658			578	80		74-78		7		2*1-2	10	1000	60
Tamanghasset-In Guezzam	398	160		238	120	120	40	2002		7		2*1-2	10	100	60
In Guezzam-Assamaka	12			12											
<b>Summary Algeria Main</b>	<b>2326</b>	<b>2076</b>	<b>0</b>	<b>250</b>	<b>1836</b>	<b>200</b>	<b>52</b>								

The total length of the main Algerian section amounts to 2'326 km. The most northern part from Alger to Blida is a dual carriageway on a length of 47 km. The highway is in good condition. The remaining part of the Algerian section to Tamanrasset (1'869 km) is entirely paved and in good condition except some 80 km between In Salah and Tamanrasset, which are in poor condition. The traffic flow on this section amounts to more than 20'000 Veh/d in the outskirts of Algiers and decreases gradually down to 1'000 Veh/d towards Tamanrasset, with 20-60% heavy traffic.

The section between Tamanrasset and In Guezzam, 398 km, consisted of a paved road on a length of 60 km and of a marked earth track on the remaining length. Based on the conclusions of a feasibility study, the government decided in 2001 a progressive rehabilitation without pavement on a length of 170 km, corresponding to several sections estimated as most deteriorated and difficult for the traffic. The rehabilitation works are currently performed. In 2002, the government decided to pave 100 km out of these 170 km and is awaiting for further funding in order to pave the entire section. The works proceed with approximately 40 km per year. The rehabilitation cost amounts to 120'000 USD / km. No refurbishment is planned for the missing link between In Guezzam and the border to Niger, 12 km.

The Algerian road network consists of 104'000 km, 25% of which are national roads. In 2002, the entire maintenance budget for this network amounts to 120 MUSD for routine maintenance and for the pavement works of the periodical maintenance. The cost of pavement works done as part of periodical maintenance is approximately between 25'000 – 50'000 USD / km. For the Algiers - Lagos corridor, costs for periodical maintenance are 50'000 USD / km, but increase further south towards Tamanrasset to up to 120'000 USD / km, due to long transports of bitumen, building materials and water from the Algerian ports, which can constitute up to 7% of the cost.

The traffic crossing the border is approximately 100 Veh/day. About 60 of them are heavy trucks.

The road parameters for the Trans Saharan Road in Algeria are a paved width of 7 m and shoulders of 1,5 m, giving a total width of 10 m.

**2.2.2 Niger: Assamaka – Arlit – Zinder - Magaria**

Map 2.2.2 Trans Saharan Highway in Niger

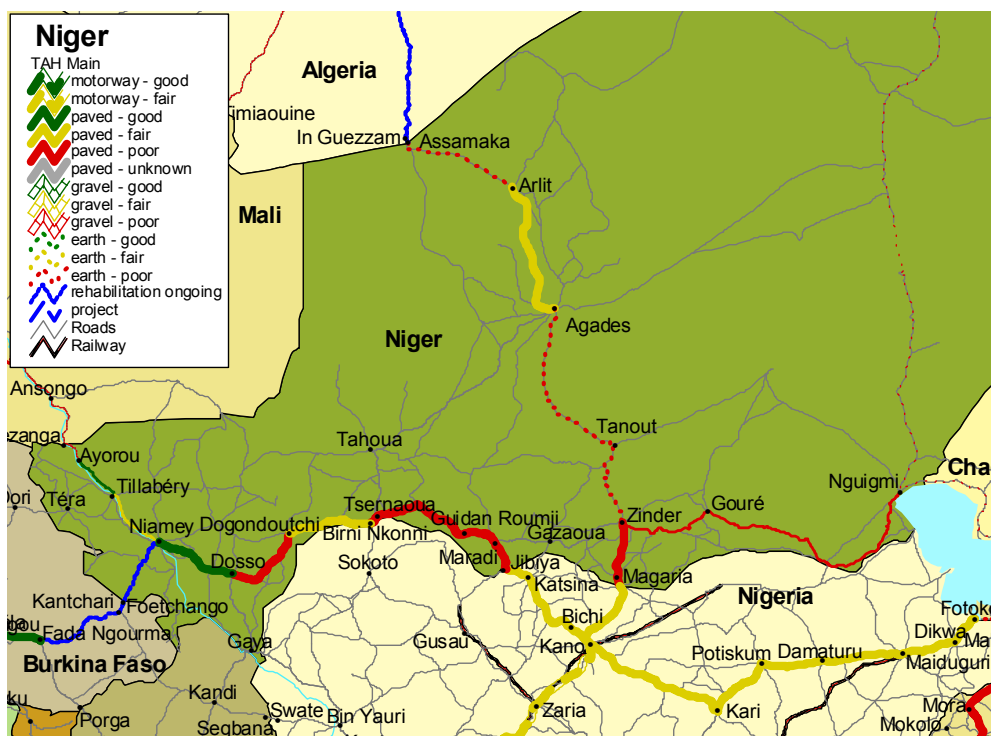


Table 2.2.2 Trans Saharan Main Corridor in Niger

Section	length km	Type			Condition					Road parameters (existing or in ongoing improvement)				Traffic flow	
		paved km	gravel km	track km	good km	fair km	poor km	construct ed year	main- tained year	paved width m	shoulder gravel m	shoulder paved m	total width m	total ADT	heavy vehicles %
Assamaka-Arlit	200			200										30	30
Arlit-Agadez	243	243			95	108	40	1980		6		2 x 1	8	267	50
Agadez-Tanaout-Zinder	431	301		130		301	130			6		2 x 1	8	259	20
Zinder-Magaria	111	111					111			6		2 x 1	8	411	2
<i>Summary Niger Main</i>	<b>985</b>	<b>655</b>	<b>0</b>	<b>330</b>	<b>95</b>	<b>409</b>	<b>281</b>								



The Niger section of the Algiers - Lagos Highway between the borders of Algeria (Assamaka) and Nigeria (Magaria) has a length of 985 km. In the contribution to the evaluation of UNTACDA II made by ECA it was assumed that the border crossing of the Algiers - Lagos link between Niger and Nigeria is at Kongolam. However, according to the Trans Saharan Road Liaison Committee and the Nigerian Road Administration, the Algiers - Lagos Highway crosses the border at Magaria and continues towards Kano in Nigeria.

From Assamaka (Algerian-Niger border) to Arlit, the road consists of a marked earth track, which is practicable in good weather conditions. The feasibility studies comprising the rehabilitation of the link are concluded, and funding is sought for completion of the required technical studies. Between Arlit and Agadez, the road is paved but in a fair condition. Between Agadez and Zinder, 130 km are not paved. 36 km thereof are currently being paved, and studies for the remaining part need to be updated. The remaining section to the border with Nigeria is entirely paved but in poor condition. The CLRT has indicated a sum of 9'600 mio FCFA (14 MUSD) for periodical maintenance of the section between Zinder and the border to Nigeria.

The road parameters for the Trans Saharan Road in Niger are a paved width of 6 m and shoulders of 1 m, giving a total width of 8 m. The appropriate construction standard for the link between Assamaka and Arlit remains to be defined.

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**2.2.3 Nigeria: Magaria – Kano – Kaduna – Ilorin – Ibadan - Lagos**

Map 2.2.3 Trans Saharan Highway in Nigeria

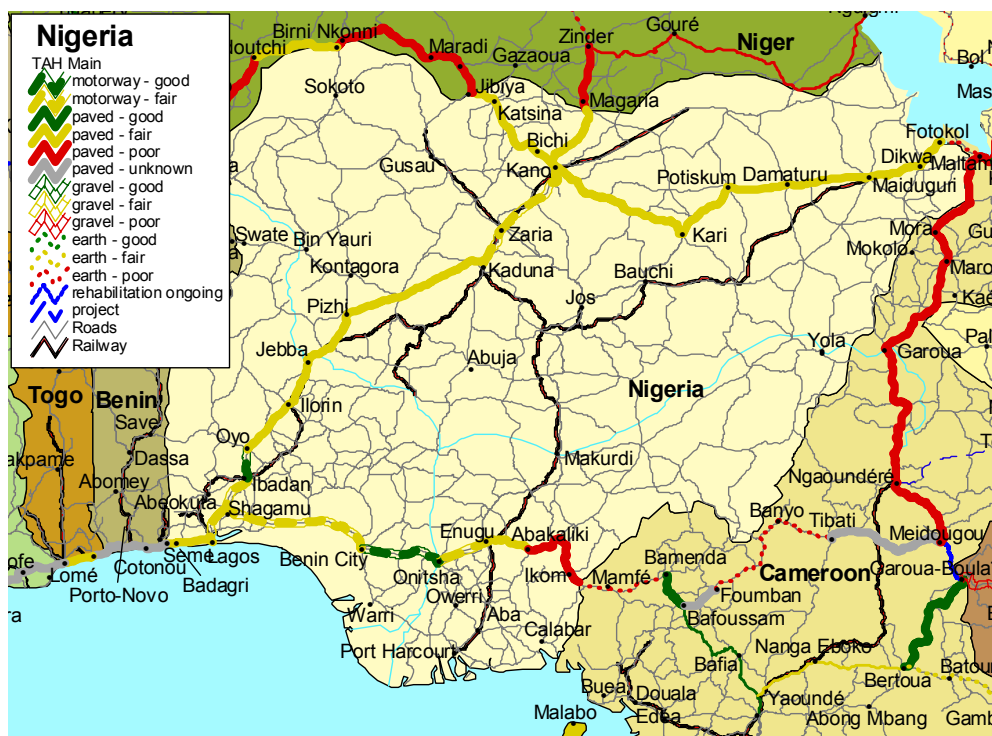


Table 2.2.3 Trans Saharan Main Corridor in Nigeria

Nigeria Section	Type				Condition					Road parameters (existing or in ongoing improvement)				Traffic flow	
	length	paved	gravel	track	good	fair	poor	construct ed	maintained	paved width	shoulder gravel	shoulder paved	total width	total	heavy vehicles
	km	km	km	km	km	km	km	year	year	m	m	m	m	ADT	%
Niger border-Jigawa SB	42	42				42				7,3		2,75	12,8	4249	15
Jigawa SB-Kano SB	34	34				34				7,3		2,75	12,8	1073	15
Kano SB-Kano	80	80				80				7,3		2,75	12,8	13267	15
Kano-Kaduna SB	105	105				105				2*7,3		2*3,75	22,2	9635	15
Kaduna SB-Kaduna	125	125				125				2*7,3		2*3,75	22,2	3795	15
Kaduna by-pass	24	24				24				2*7,3		2*3,75	22,2		
Kaduna-Kwara SB	366	366				366				7,3		2,75	12,8	3087	15
Kwara SB-Jebba-Oyo SB	154	154				154				7,3		2,75	12,8	1745	15
Oyo SB-Oyo-Ibadan	127	127			127			2002		2*7,3		2*3,75	22,2	4941	15
Ibadan-Lagos	136	136				136				2*7,3		2*3,75	22,2	16194	33
<b>Summary Nigeria</b>	<b>1193</b>	<b>1193</b>	<b>0</b>	<b>0</b>	<b>127</b>	<b>1066</b>	<b>0</b>								

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The total length of the road in Nigeria amounts to 1'193 km, which is approximately 100 km less than indicated in the documents from ECA. This may depend on the altered corridor in vicinity of the border to Niger, and to some new sections of motorways that have recently been opened. Currently, the sections Kano - Kaduna (254 km) and Oyo – Ibadan – Lagos (263 km) are of motorway standard with dual carriageways.

The condition of the roads is generally fair except the newly constructed motorways, which are good.

The current unit costs for road constructions are shown in the table below.

	Unit cost [MUSD/km]
Construction of a new dual carriageway	2,10
Construction of a new single carriageway	0,75
Widening to a dual carriageway	1,25
Rehabilitation	0,35

Periodic maintenance is not specifically programmed for, but roads are rehabilitated or reconstructed when necessary. This has been and continues to be a problem and indicates to a certain degree the deficiency in the administration of the Nigerian roads.

#### **2.2.4 Tunisia / Algeria: Tunis / Gabès – Hazoua - Ghardaïa**

The road from the Tunisian port of Gabès is considered as a feeder and has a length of totally 802 km. The road is in a good condition. According to ECA's definition of the Trans Saharan road, the Tunisian branch starts in Tunis.

**2.2.5 Algeria / Mali: Tamanrasset – Timiaouine – Gao - Bamako**

Map 2.2.5 Trans Saharan Highway (Main and Feeders) in Algeria, Mali and Niger

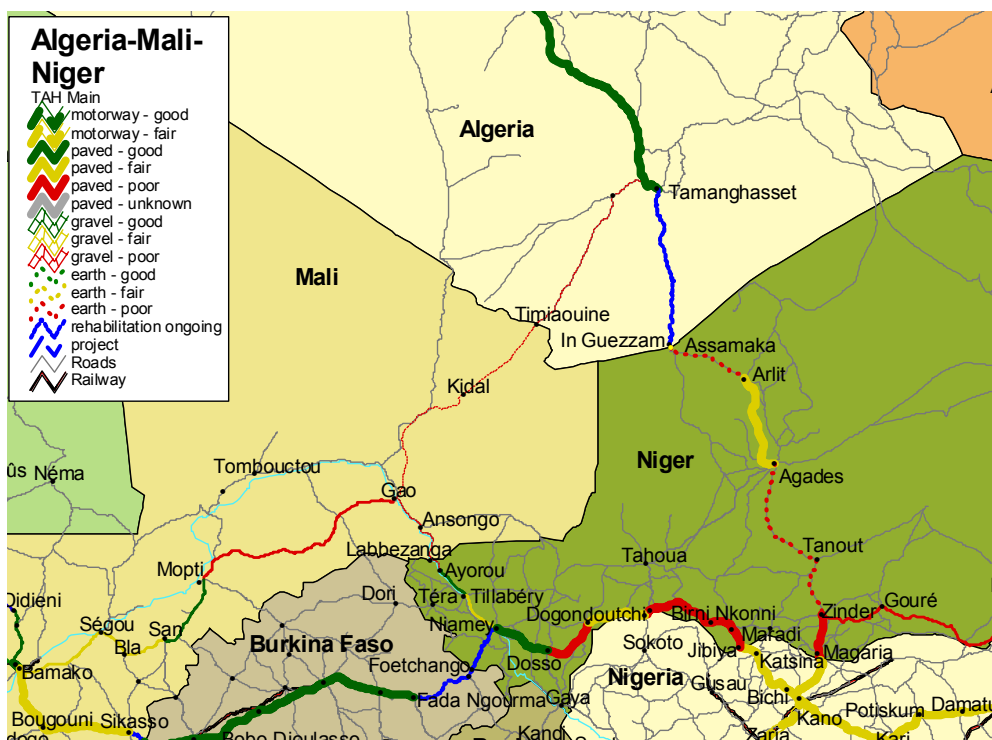


Table 2.2.5 Trans Saharan Feeder Corridor Tamanrasset - Bamako

Section	length km	Type			Condition			Road parameters (existing or in ongoing improvement)						Traffic flow		
		paved km	gravel km	track km	good km	fair km	poor km	construct ed year	main- tained year	paved width m	shoulder gravel m	shoulder paved m	total width m	total ADT	heavy vehicles %	
Tamanrasset-Timiaouine	380	80		300											30	40
Timiaouine-Kidal	300			300											30	
Kidal-Gao	355			355			355								50	
Bridge in Gao																
Gao-Mopti/Sévaré	556	556									7		2x1,5	10		
Mopti/Sévaré-San	201	201			80	121				97-02	7		2x1,5	10	200	
San-Ségou	199	199				79	120			97-99	7		2x1,5	10	1000	
Ségou-Bamako	235	235				235		1977	1996		7		2x1,5	10	1500	
<b>Summary Tamanrasset-Bamako</b>	<b>2226</b>	<b>1271</b>	<b>0</b>	<b>955</b>	<b>80</b>	<b>435</b>	<b>1031</b>									

The total length of the designated road from Tamanrasset to Bamako is 2'226 km. Between Tamanrasset and Gao, the link is missing on a length of approximately 955 km, it is however possible to pass with appropriate vehicles during good weather

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conditions. The part between Gao and Bamako, 1'191 km, is entirely paved.

On the section Tamanrasset-Kidal, a feasibility study was made in 1995. An earth road was proposed and the most suitable alignment was defined. However, as the current traffic flow is less than 30 veh/d, no further evaluation and design has yet been carried out.

From Kidal to Gao, economic and technical studies have been made for a new paved road. However, no construction is yet planned. In Gao, a new bridge over the river Niger will be constructed in 2003-2004. Financing has been secured.

On the Gao-Bamako branch, the section from Gao to Mopti is reported to be in poor condition. Periodic maintenance is programmed for 2003-2004. The remaining section from Mopti to Bamako is in fair or good condition, and periodic maintenance would be required on the section between Ségou and Bamako.

**2.2.6 Mali / Niger: Gao – Labbezanga - Niamey**

Table 2.2.6 Trans Saharan Feeder Corridor Gao - Niamey

Section	Type				Condition					Road parameters (existing or in ongoing improvement)				Traffic flow	
	length	paved	gravel	track	good	fair	poor	construct ed	main- tained	paved width	shoulder gravel	shoulder paved	total width	total	heavy vehicles
	km	km	km	km	km	km	km	year	year	m	m	m	m	ADT	%
Gao-Ansongo	95			95			95			7		2x1,5	10	25	52
Ansongo-Labbezanga	115			115			115			7		2x1,5	10	19	47
Labbezanga-Ayorou	47			47										59	
Ayorou-Tillabéri	88	88			88			1997						137	22
Tillabéri-Niamey	120	120			59		61	1973	1993					199	13
<i>Summary Gao – Niamey</i>	<i>465</i>	<i>208</i>	<i>0</i>	<i>257</i>	<i>147</i>	<i>0</i>	<i>271</i>								

In the review form ECA the link from Gao in Mali to Niamey in Niger is considered as a feeder road to the Algiers - Lagos link. According to the CLRT, this link is currently not included in the Trans Saharan Highway. However, the section Gao-Niamey is included in UEMOA's second priority road network. The section between Gao and Niamey has a length of 465 km.

The road consists of an earth track from Gao over the border (Labbezanga) to Ayorou. The road Ayorou to Niamey is paved. The condition is reported to be good from Ayorou until 61 km before Niamey. The condition of the remaining section to Niamey is poor.

The paving of the road between Gao and Ayorou is programmed to be achieved 2005. The rehabilitation of the road on the last 61 km before Niamey is expected to be performed in the period 2005-2010.

**Volume 2 – Description of Corridors****2.2.7 Niger: Zinder - Nguigmi**

Table 2.2.7 Trans Saharan Feeder Corridor Zinder-Nguigmi

Section	Type				Condition					Road parameters (existing or in ongoing improvement)				Traffic flow	
	length	paved	gravel	track	good	fair	poor	construct ed	main- tained	paved width	shoulder gravel	shoulder paved	total width	total	heavy vehicles
	km	km	km	km	km	km	km	year	year	m	m	m	m	ADT	%
Zinder-Gouré	166	166					166								
Gouré-Diffa	281	281					281								
Diffa-Nguigmi	148	148					148								
<i>Summary Zinder-Nguigmi</i>	<i>595</i>	<i>595</i>					<i>595</i>								

This link is also considered as a feeder road of the Dakar-N'djamena Highway. The condition of the paved road between Zinder and Nguigmi is very poor, and a feasibility study in order to rehabilitate this link has been elaborated.

The CLRT opts for a continuation of the road north of Lake Chad from Nguigmi to N'djamena. This section has a length of approximately 650 km and is an earth track. At least the section from Bol to N'djamena (ca 250 km) is included in Chad's road sector planning.

**2.2.8 Summary of planned activities according to UEMOA**

The table below shows the planned works and cost estimates.

Table 2.2.8: Planned works according to UEMOA

Section	km	Object	Amount [Mio USD]	Prio- rity UEMOA	Financing institutions	Status	Realisation
In Guezzam-Arlit	200	Reconstruction and paving	35	3			
Agadez-Zinder	130	Reconstruction and paving	16	3			
Zinder-Magaria	111	Rehabilitation of paved road	15	2			
Gao-Sevaré	556	Periodic maintenance	36	1	IDA	Studies current	2004-2006
Ségou-Bamako	240	Periodic maintenance	17	1	IDA/FAD	Studies required	2005-2008
Gao-Labbezanga	210	Reconstruction and paving	42	1	FED9/PIR/PIN	Studies completed	2002-2005
Labbezanga-Ayorou	47	Reconstruction and paving	10	1	FED9/PIR	Studies completed	2002-2005
PK61-Niamey	61	Rehabilitation of paved road	9	2		Studies required	

**Volume 2 – Description of Corridors****2.3 ROAD TRAFFIC AND SAFETY****2.3.1 Volume and Composition of Road Traffic Flows**

As is obvious from the general description above, the different parts of the Trans Saharan Highway have very different characteristics. In its northern and southern sections it forms part of the highway networks of the densely populated areas of Algeria and Nigeria. In the central and southern parts of Algeria and in Niger it traverses very sparsely populated, mainly desert, areas. This is clearly reflected in the use of the corridor where traffic levels vary from close to 10,000 vehicles/day in Nigeria and northern Algeria, with considerably more on the motorways, with down to a couple of hundred at most on the sections in between.

Table 2.3.1: Road traffic along Algiers-Lagos Highway.

Section	Total [ADT]	Heavy Vehicles [%]
<i>Algeria:</i>		
Alger-Médéa	>20'000	25-30
Médéa-Djelfa	3'000-4'500	25-30
Djelfa-In Salah	1'000-3'000	25-30
In Salah-Tamanrasset	1'000	60
Tamanrasset-Assamaka	100	60
Tamanrasset-Timiaouine	30	40
<i>Niger:</i>		
Assamaka-Arlit	30	
Arlit-Magaria	100-400	
Labbezanga-Ayourou	30-40	
Ayourou-Niamey	100-700	
<i>Mali:</i>		
Timiaouine-Kidal-Gao	30-50	
Gao-Bamako	200-1'500	
Gao-Labbezanga	15-30	
<i>Nigeria:</i>		
Magaria-Kano	1'000-10'000	15
Kano-Kaduna	3'000-10'000	15
Kaduna-Ibadan	3'000-5'000	15
Ibadan-Lagos	12'000	15

### **2.3.2 Road Security and Safety**

The road safety and security situation is poor or very poor in most of Africa. The fatality rate per registered vehicle in Africa is 8-50 times higher than in the industrialised world although the road safety situation differs substantially from country to country. While the Central African Republic had a fatality rate of 339 persons per 10 000 vehicle in 1995, the fatality figure for Namibia was 9 in 1996.

There are a number of reasons for the poor road safety record of Africa. A rapid increase in the number of vehicles combined with poor road standard, lack of training, education and information in the road safety field. It has also proven difficult to establish the kind of multi-sectoral, inter ministerial institutional structures needed for successful road safety activities. For a more detailed discussion of the road safety situation in Africa see the presentation under Highway 3 Tripoli-Windhoek.

The problems along the Algiers - Lagos Highway in the road safety field reflects most of the more general problems mentioned above.

## **2.4 MANAGEMENT OF THE CORRIDOR**

### **2.4.1 Institutional Arrangements**

A committee (Trans Saharan Road Liaison Committee, CLRT) was established in 1966 in order to study and implement the Trans Saharan Highway, as well as to find the necessary financial resources. The membership originally comprised Algeria, Tunisia, Mali and Niger but was to eventually also include Chad and Nigeria. The committee consisted of the road directors of the member countries and had at its disposal a permanent secretariat, located in Algiers and headed by a secretary-general. It has been continually functioning since its inception and held its 39th session in the spring of 2002. It is the only such coordinating committee for any of the nine Trans African Highways that has proven viable and long living.

The reasons for the success of the CLRT are many, but one important element has certainly been the dominant role of one member, Algeria. Not only was most of the highway situated on its territory, but Algeria has also provided the secretary general and the premises for the secretariat. Another contributing factor seems to have been the simplicity and lightness of the organization with the secretariat consisting of basically one experienced highway official within the road administration which also provided the necessary support functions such as creating the necessary contacts with the international funding institutions, with the member states of the CLRT and with the Algerian road administration. Thus, although an annual membership fee is an



obligation, the occasional non payment of the fees by some member states has not jeopardized its existence. The work is organized around the twice yearly meetings of the committee, prepared and called by the secretariat. Some of the original functions such as the coordination of alignments and standards have been met after more than thirty years. Others, like obtaining of financing from international financing organizations have proven difficult, since these matters are handled in direct negotiations with governments. However, there have been successes in financing of studies. Thus, the emphasis of the activities have shifted over the years towards training, exchange of information and best practices and generally to provide a forum for the highway officials of the member countries to meet regularly. The framework has thus been broadened to road related problems generally, dealing not only with strictly Trans Saharan Highway questions. It should be noted that no REC has been directly and actively involved in the planning or management of this corridor.

#### **2.4.2 Road Sector Operations**

Beyond the planning and coordinating role that CLRT has played and plays, the actual responsibility for and management of the constituent sections is with the countries in which they are situated. Thus, the Trans Saharan Highway in each country makes part of that country's national road network and is in principle not treated differently from the other roads of those networks, although at different times the priorities have differed. One interesting arrangement has been the involvement of the private sector in Niger. It is the section between Arlit and Agadez, 243 km, for which the uranium mining company in Arlit was given a concession to build and maintain the road. Its justification and "raison d'être" lies with the company's need to transport the ore on roads appropriate for its heavy trucks. The concession terminated in 2001, and the maintenance was thereby transferred to the state.

#### **2.4.3 Strategy and Priorities**

The objectives of the Trans Saharan Highway have been expressed in various ways which, in addition to the more immediate ones such as improving communications and integration of the sub region, also include more general objectives such as the improvement of the living conditions of the populations concerned, stimulation of trade, promotion of African unity. The strategy and priorities to achieve the objectives have largely been based on considerations of economy and national integration. It is thus quite natural that it is the sections with the least potential traffic, i.e. south of Tamanrasset and in Niger and Mali, which have been relatively less developed. This is not to say that other considerations have played no part in setting priorities for the works, but it rather points to the fact that in the end road construction and the existence of all weather roads is but one of the conditions of a more general development. This is also concluded in a study from CLRT's

secretariat where it is noted that the development in the border areas still remains limited and that the road has encouraged the exchanges with the capitals of the respective countries, rather than between the countries. In order for that to happen the report foresees a number of other regional development and commercial measures.

However, looking forward it is obvious that, from the objectives of the Trans Saharan Highway, what needs to be done is to complete the missing links. In reality this is not simple and straightforward given the characteristics of traffic and costs, as well as efficient use of resources. The concept of missing links and possible actions and priorities is further described in section 2.7 below.

## **2.5 FUNDING**

Apart for some studies for which CLRT has been instrumental in arranging grant financing from international organizations, all funding for the roads included in the Trans Saharan Highway follow normal national road funding procedures, in the respective countries. In this respect there are two distinct groups. In the one there is Algeria and Nigeria which have domestic resources available and even if they make use of development financing for the road sector, their discretionary power to decide investment priorities is considerable. Road sector investments in each country amount to about 120 MUS\$ annually. Thus the importance on the overall funding of any Trans Saharan Highway investment will be very limited, especially since in these countries the only major work left are between Tamanrasset and the Niger border where the construction is presently underway, and, in the longer run, the link to Timiaouine on the Mali border.

With respect to recurrent maintenance funding Algeria is in a relatively good situation with annual recurrent maintenance budgets of around 120 MUS\$ and the maintenance of the Algerian section of the Trans Saharan Highway has thus no significant funding importance. In Nigeria the situation for maintenance funding has been extremely difficult for the last three years with only a fraction of actual maintenance requirements being funded. The result has been that practically no maintenance has been carried out. The reasons for this is that there has been a decision to fundamentally revamp the funding mechanisms, but the implementation has been slow with practically no financing as a result. This affects the whole road network and not only the Trans Saharan Highway sections.

Mali, Niger and Chad, which form the other group, have a quite different funding situation with the major part, up to 90%, of the road sector expenditures being funded by bilateral or multinational development agencies. The domestic participation is earmarked mainly for routine maintenance. The sections which need investments in order for the Highway to be complete as envisaged are considerable, both absolutely and even more in relative terms. Therefore the inclusion of these

works into any investment program will require a convincing argument that these links have a higher priority than other possible road investments and a sufficiently high rate of return in order to get the approval of the development agencies.

## **2.6 TRADE AND TRANSPORT FACILITATION**

### **2.6.1 Agreements and Protocols**

For the countries belonging to ECOWAS, in principle the agreements reached within that organization are applied. In reality, the same limitations to the applicability as described for the Trans Sahelian Highway (chapter 7.6) also limit their relevance here. The conventions and agreements are not recognized, or only partly so. Therefore various other agreements and arrangements, often internally not consistent, are used instead.

There are also a number of bilateral agreements signed between the member countries of the CLRT which cover international transport and transit of goods and passengers, tariffs, the creation of bilateral customs commissions, etc. Although they all aim towards the abolition of non tariff barriers and the creation of an economic free zone, their application and importance have been spotty.

### **2.6.2 Customs and Border Crossings**

In the ECOWAS area the same descriptions and comments as given in chapter 7.6 apply. For Algeria's borders with Mali and Niger the problems reported have to do with an excessively rigorous and narrow interpretation of the regulations which causes problems and delays on the border crossings. Also the fact that Algeria in 1992 suspended the application of the TIR convention has not helped.

### **2.6.3 Non-Physical Barriers**

As far as the non-physical barriers are concerned, the ECOWAS region is subject to the same problems as in other parts of west Africa, with an excessive number of controls and check points, both legal and illegal, which slows down traffic while extorting money from trucks and buses.

In Algeria the situation is reported to be radically different. There are controls but their purpose and character differ in that they are related to the security situation and not primarily to extorting money from the road users.

## 2.7 MISSING LINKS

Although the whole of the Trans Saharan network is passable for certain types of vehicles but not during all weather conditions it is relevant to identify as missing links those sections which consist of desert tracks. The table below summarizes them.

Table 2.7: Missing links

Algiers-Lagos Highway		Type				Upgrading to recommended minimum standard	
Section	Country	length	paved	gravel	track	description	cost
		km	km	km	km		M US\$
Tamanrasset-In Guezzam	Algeria	238			238	new road	30
In Guezzam-Assamaka	Algeria	12			12	new road	2
Assamaka-Arlit	Niger	200			200	new road	24
Agadez-Zinder	Niger	130			130	new road	15
<b>Summary</b>		<b>580</b>	<b>0</b>	<b>0</b>	<b>580</b>		<b>71</b>

The total cost of replacing these missing links, a total of 630 km, by paved roads with the same standard as for the major part of the existing network, i.e. 7 m paved with shoulders 2\*1.5 m, is roughly estimated at 71 MUSD . This then represents the necessary investments to arrive at a complete network as defined above.

In reality however it is neither likely nor economically justified to proceed at a paved solution in one step. The terrain and traffic conditions are such that a gradual improvement appears much preferable. The alignments go through desert terrain which is partly flat and hard, providing excellent driving conditions, and thus investments would not be needed along the whole alignment but be limited to certain difficult sections. Such an option is considered fully feasible but has not been studied in detail so the cost estimates given here are of a very preliminary nature.

## 2.8 CONCLUSIONS

As an engineering undertaking the Trans Saharan Highway has been a great achievement and had a great impact. It has opened up vast areas of Sahara which up till the 70's were without modern land connections to the coasts. The impact has been most important in Algeria where the region of Tamanrasset has benefited from an all weather, all year round road to the capital and the Mediterranean coast. Thus the integrating effects intended by the Trans African Highways has been clearly achieved in Algeria. With respect to the integrating effect on the African continental level the outcome is not so clear. In Nigeria the Trans Saharan Highway is subsumed into the national network which is very important nationally and locally. It connects some of the main population centres of the country. But, even the notion of these roads being part of the Trans Saharan Highway is often not recognized. In Niger it

passes through areas with relatively low economic activity and low population density and far from the capital of Niamey. It has been observed that up till now the main outcome of the Trans Saharan Highway has been to reinforce the links to the capitals of each country, rather than bringing the countries closer together.

It appears from many comments that the expected objectives of increased international trade and integration have not yet been fully met. It is difficult to substantiate this since the objectives of the Trans Saharan Highway were expressed in rather general and political terms, which do not allow any precise measurements. It is true however that some of the expected effects such as the use of the port of Djenjen in Algeria as an important sub regional transit node has not yet been realized. Nor is there any appreciable amount of international traffic as shown in section 2.3 above. The trade between the countries is on a rather low level. It is estimated that just about 1% of Algeria's total trade is with Africa outside of the Maghreb area. Total trade crossing the borders to Niger in 1997 and 2001 amounted to about 131,000 tons, of which 25% originated from Libya and 75% from Algeria and Tunisia. The trade between Niger and the Maghreb area corresponds thus to approximately 10 heavy trucks per day. This number underestimates the total trade since there is probably quite some informal trade going on which is not captured by the statistics, but it gives an appreciation of the small volumes involved.

The picture given above is to a certain extent the result of the Trans Saharan Highway not being complete, with sections missing or in poor shape. It is likely that trade and traffic would increase with improved roads. In this category the provision of gas stations and vehicle repair facilities as well as hotels and restaurants more frequently along the road would be important. However, this would not be sufficient. A study done by the CLRT shows that a number of other interventions are necessary in order to increase trade and further integration. Many concern the environment and prerequisites for trade in general. Among these are better exchange of commercial information through the regional chambers of commerce, establishment of local bank offices, improved telecommunications, reduced customs tariffs and import duties, etc. Another, most important subject is that of non physical barriers. As noted earlier, the excessive number of controls and payments that road traffic has to bear in sub Saharan West Africa is an important constraint to trade. Although this subject has been thoroughly studied and its negative effects described, there are no credible fast solutions, save a concerted intervention from the highest political levels. The same situation does not exist in Maghreb but the complicated and time consuming border crossing procedures are seen as an obstacle. Several measures have therefore been proposed. Among them are making the border controls generally less complicated, simplify the required documents by harmonizing the information requested, coordinate the vehicle regulations and to publish a guide for border crossing transports.

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The Trans Saharan Highway is unique among the Trans African Highways in that it has had a continuously operating bureau, since 1964, the CLRT. The reasons for its longevity and success are many:

- the lightness of the structure with a very small secretariat;
- the meetings every six months of the Committee, comprised by the road directors of the member countries and CLRT's secretary-general, which has provided a natural and welcome forum to discuss professional issues not necessarily linked exclusively to the Trans Saharan Highway but also including more general questions;
- the participation of a strong and committed stakeholder, Algeria, which has permitted the Committee to survive periods of occasional non payment of dues by some member countries;
- the personalities and qualifications of the chairmen and secretaries general.

Also, the Committee has been able to extend its focus according to needs, from dealing at the beginning with coordination of alignment and basic studies to attack gradually more general questions such as development of professional competencies, exchange of experiences, etc. In summary, it has proven itself to have been a useful and appropriate tool in the definition and development of the Trans Saharan Highway.

Regarding the question of a possible recreation of a Trans African Highway Bureau, there has been a generally rather sceptical attitude. The main issues pertaining to the further expansion of the Trans Saharan Highway are those of funding for which the countries are responsible. These needs have to be weighed against others in the sector in the context of the national budget and which thus would not benefit much of an Africa wide coordination. Those questions which require a more general approach are seen as having been handled quite adequately by the CLRT. There is a feeling that more possibilities to exchange ideas and experiences would be useful and welcome. Such meetings need not however be centred around a Trans African Highway link but should rather have a sub regional focus since there are in all countries other roads which are considered at least as important as the Trans Saharan Highway links. This development towards a more general discussion of road sector problems is the direction in which CLRT has developed and for the southern members both ECOWAS and UEMOA provide opportunities for such meetings. It is not clear to the officials, with whom the TAH consultant mission has discussed this matter, what the objective of a Trans African Highway Bureau would be and more generally whether such an organization would be useful and viable given past experiences. Thus a solution which builds on already existing structures is seen as preferable to creating a new organization.

### **3 HIGHWAY 3 - TRIPOLI - WINDHOEK**

#### **3.1 DESCRIPTION OF THE CHARACTERISTICS OF THE CORRIDOR**

The Tripoli – Windhoek Corridor as originally indicated by ECA, see map 3.1, collides in some parts with the intentions of development plans for some countries. As for example in Libya, where interest is directed towards Niger instead of Chad. This simply because the Chad link is not safe due to robber activities in the mountain area in Chad. Besides, the road link from Libya through Chad to N'djamena is not included in Chad's priority road network. In several countries along the Tripoli-Windhoek Highway the development corridors are mainly located in a west-east direction, from the coast towards the landlocked countries. The complementary Trunk Route Network in north-south direction, proposed by SADC, deviates from the location of the Trans African Highway in the northern part of Angola. It also includes a trunk route from Windhoek to Cape Town, which is not included in the TAH network yet.

#### **3.2 PHYSICAL CONDITION**

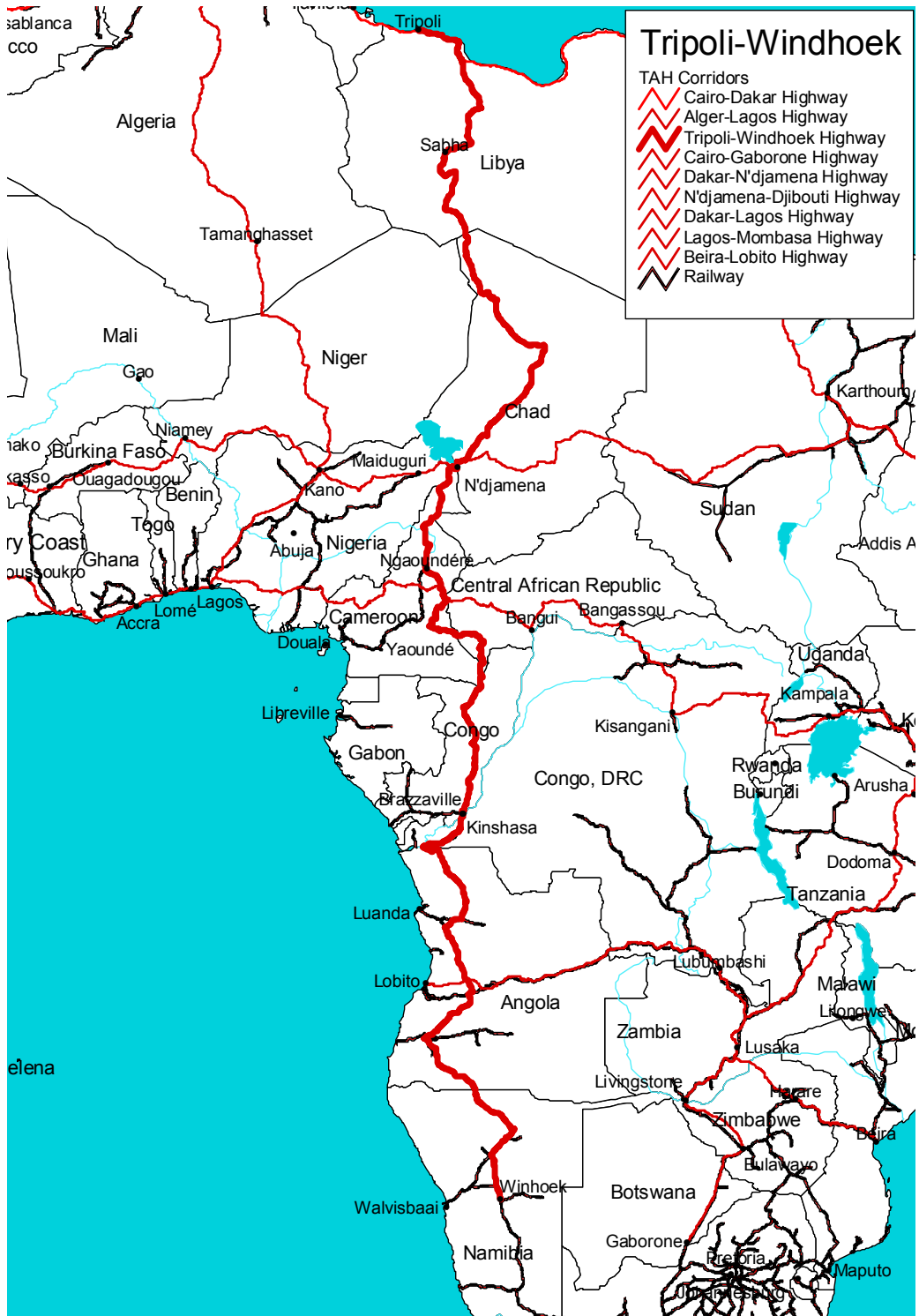
The Tripoli - Windhoek Corridor starts in Tripoli in Libya and connects many countries in north-south direction. It passes from Libya through Chad alternatively Niger, Cameroon, Central African Republic, Congo, Democratic Republic of Congo, Angola, Namibia and continues to South Africa.

The road link has been investigated by country-visits in five of the eight countries. The remaining countries, Cameroon, Congo and Angola are described with information collected from other sources, i. e. SADC in Maputo for Angola and neighbouring countries as well as CEMAC and ECCAS for Cameroon and Congo.

All information from the inventory phase is summarised in sheets presented in Volume 4. Extracts from these sheets are shown in table 3.2 and illustrated in maps represented country wise.

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Map 3.1 Tripoli - Windhoek Corridor. Link number 3





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Table 3.1 Tripoli - Windhoek Corridor. Link number 3

Section	Type				Condition		
	length	paved	gravel	track	good	fair	poor
	km	km	km	km	km	km	km
Libya	1551	1371	0	180	90	766	695
Chad	1930	88	0	1842	53	68	1809
Cameroon	1517	1305	0	212	260	212	1045
CAR	447	0	0	447	0	91	356
Congo	1071	514	0	557	0	0	756
DR Congo	362	362	0	0	158	0	204
Angola	2001	1568	60	373	200	1328	473
Namibia	733	733	0	0	733	0	0
<b>Total Tripoli-Windhoek</b>	<b>9612</b>	<b>5941</b>	<b>60</b>	<b>3611</b>	<b>1494</b>	<b>2465</b>	<b>5338</b>

The following sub-chapters describe the status of the highway in each country. The definitions of the various parameters are given under “Field Inventory” at the beginning of this Volume.

**3.2.1 Libya**

Map 3.2.1 Trans African Highways in Libya



Table 3.2.1 Tripoli – Windhoek Highway in Libya

Libya	Type				Condition					Road parameters (existing or in ongoing improvement)				Traffic flow	
	length	paved	gravel	track	good	fair	poor	construct ed	main- tained	paved width	shoulder gravel	shoulder paved	total width	total	heavy vehicles
	km	km	km	km	km	km	km	year	year	m	m	m	m	ADT	%
Tripoli-Misurata	214	214	0	0	0	214	0	69/75		2*7,5		2*1,5	18	2600	23
Misurata-Abugrin	110	110	0	0	0	110	0	1975		7,5	2*0,5	2*1	9,5	1000	20
Abugrin-Wadden	282	282	0	0	0	282	0	1975		7,5	2*0,5	2*1	9,5	1000	20
Wadden-Sabha	365	365	0	0	0	0	365	1970		7,5	2*0,5	2*1	9,5	1000	20
Sabha-Um al Aranib	160	160	0	0	0	160	0	1980		7,5	2*0,5	2*1	9,5	500	20
Um al Aranib-Al Katrun	150	150	0	0	0	0	150	1975		6		2*0,5	7	600	20
Al Katrun-Tajarhi	90	90	0	0	90	0	0	2002		7,5	2*0,5	2*1	9,5	600	20
Tajarhi-Chad frontier	180	0	0	180	0	0	180	0						2400	20
<b>Summary Libya</b>	<b>1551</b>	<b>1371</b>	<b>0</b>	<b>180</b>	<b>90</b>	<b>766</b>	<b>695</b>								

The Trans African Highway link within Libya starts in Tripoli and follows the Cairo-Dakar link for approximately 320 km. From Abugrin the TAH-link turns southwards towards the Nigerian / Chad border.

The entire link contains 1551 km. 214 km represent a dual carriageway, the rest a single carriageway. Except for a link of 150 km length the cross-section contains a carriageway of 7,5 m or 2x7,5 m and 2 times 1,5 m paved shoulders.

All road sections except the section from Tajarhi to the border to Chad (180 km) have a paved surfacing. 766 km (48 %) represent a pavement with fair condition, whereas 515 km (32 %) are in poor condition. The section from Al Khatrun to Tajarhi, 90 km, is at present under construction, scheduled for opening for traffic at the end of 2002 and has been recorded as in good condition. The section from Tajarhi to the border to Chad is missing.

The sections with poor pavement condition, 515 km, are planned for or are undergoing reconstruction. The reason for having no sections in good condition, is the result of the maintenance policy in the past, which did not include any periodic maintenance. Efforts have now been made to investigate the entire network and to establish a Pavement Management System, which then will provide inputs for a more long-term planning of all maintenance needs.

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**3.2.2 Chad**

Map 3.2.2 Trans African Highways in Chad

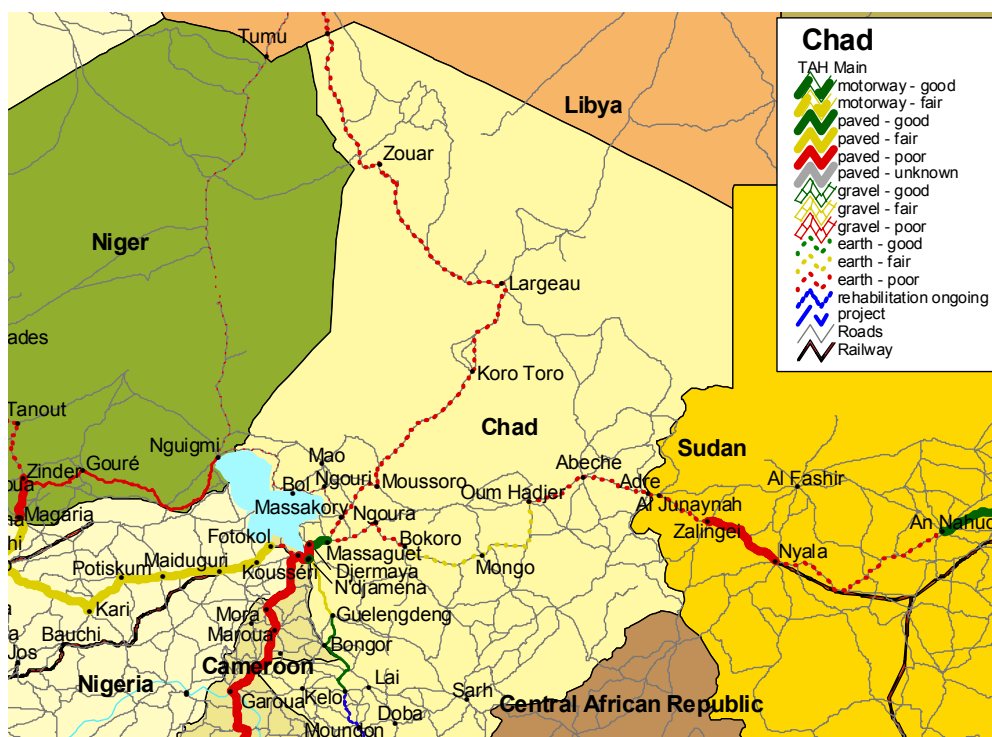


Table 3.2.2 Tripoli – Windhoek Highway in Chad

Chad Section	Type				Condition			Road parameters (existing or in ongoing improvement)						Traffic flow	
	length	paved	gravel	track	good	fair	poor	construct ed	main- tained	paved width	shoulder gravel	shoulder paved	total width	total	heavy vehicles
	km	km	km	km	km	km	km	year	year	m	m	m	m	ADT	%
Libyan border-Zouar	450	0	0	450	0	0	450								
Zouar-Faya (Largeau)	525	0	0	525	0	0	525								
Faya (Largeau)-Moussoro	665	0	0	665	0	0	665								
Moussoro-Massakori	134	0	0	134	0	0	134								
Massakori-Massaguet	68	0	0	68	0	68	0							150	
Massaguet-Djermaya	46	46	0	0	46	0	0		2000	7		2*1	9	400	
Djermaya-N'djamena	35	35	0	0	0	0	35		1991	6		2*1	8	600	
N'djamena-Kousséri	7	7	0	0	7	0	0	1986	1991	7		2*1	9	800	
<i>Summary Chad</i>	1930	88	0	1842	53	68	1809								

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The corridor from Libya towards N'djamena in Chad is merely marked in the desert, but no road exists. An earth track (*terre moderne*) starts in Massakori, going to Massaguet (68 km), where it joins the N'djamena-Djibouti Highway. The road from Massaguet to N'djamena is under rehabilitation on a length of 35 km between Djermaya and N'djamena.

**3.2.3 Cameroon**

Map 3.2.3 Trans African Highways in Cameroon



Table 3.2.3 Tripoli – Windhoek Highway in Cameroon

<i>Cameroon</i>		Type			Condition					Road parameters (existing or in ongoing improvement)				Traffic flow	
Section	length	paved	gravel	track	good	fair	poor	construct ed	main- tained	paved width	shoulder gravel	shoulder paved	total width	total	heavy vehicles
	km	km	km	km	km	km	km	year	year	m	m	m	m	ADT	%
Kousséri-Garoua	479	479	0	0	0	0	479								
Garoua-Ngaoundéré	296	296	0	0	0	0	296								
Ngaoundéré-Meidougou	172	172	0	0	0	0	172								
Meidougou-Garoua Boulai	98	98	0	0	0	0	98								
Garoua Boulai-Bertoua	260	260	0	0	260	0	0	2001		7		2*1,5	10		
Bertoua-Gamboula	212	0	0	212	0	212	0								
<i>Summary Cameroon</i>	<i>1517</i>	<i>1305</i>	<i>0</i>	<i>212</i>	<i>260</i>	<i>212</i>	<i>1045</i>								

As Cameroon was not visited, the information below was obtained at CEMAC and at ECCAS.

The road from Kousséri on the border to Chad down to Ngaoundéré has a length of 775 km and is paved. The road between Ngaoundéré and Garoua Boulai with a length of 270 km will shortly be rehabilitated. The tendering for detailed design,

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environmental impact assessment and economic studies was foreseen for 2002, with funding from FED9 (Fonds Européen de Développement, 9). The continuation from Garoua Boulai to Bertoua with a length of 260 km has recently been rehabilitated and was taken into service in 2002.

The condition of the road from Bertoua to Gamboula on the border to the CAR is fair.

**3.2.4 Central African Republic (CAR)**

The road from the border town of Gamboula to Berberati (91 km) and further down to Salo (191km) is an earth track in fair condition. Between Salo (CAR) and Ouésso (DRC) on a distance of approximately 400 km there is no road.

Table 3.2.4 Tripoli – Windhoek Highway in the CAR

Section	Type				Condition					Road parameters (existing or in ongoing improvement)				Traffic flow	
	length	paved	gravel	track	good	fair	poor	construct- ed	main- tained	paved width	shoulder gravel	shoulder paved	total width	total	heavy vehicles
	km	km	km	km	km	km	km	year	year	m	m	m	m	ADT	%
Gamboula-Berberati	91	0	0	91	0	91	0								
Berberati-Salo	191	0	0	191	0	0	191								
Salo-Bomassa	165	0	0	165	0	0	165								
<i>Summary CAR</i>	447	0	0	447	0	91	356								

### 3.2.5 Congo

Map 3.2.5 Trans African Highways in Congo and DR Congo

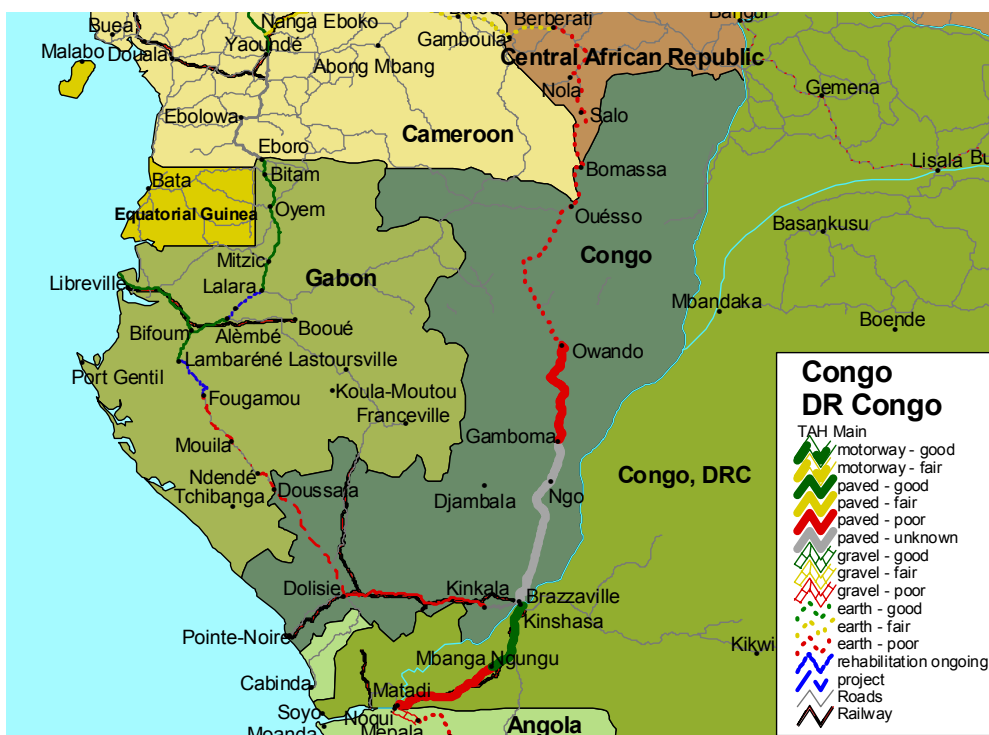


Table 3.2.5 Tripoli – Windhoek Highway in Congo

Congo	Type			Condition			Road parameters (existing or in ongoing improvement)							Traffic flow		
	length	paved	gravel	track	good	fair	poor	construct ed	main- tained	paved width	shoulder gravel	shoulder paved	total width	total	heavy vehicles	
	km	km	km	km	km	km	km	year	year	m	m	m	m	ADT	%	
Bomassa-Ouesso	235	0	0	235	0	0	235									
Ouesso-Owando	322	0	0	322	0	0	322									
Owando-Gamboma	199	199	0	0	0	0	199									
Gamboma-Ngo	74	74	0	0	n/a	n/a	n/a									
Ngo-Brazzaville	241	241	0	0	n/a	n/a	n/a									
Summary Congo	1071	514	0	557	0	0	756									

South of Ouesso there is a earth track down to Gamboma, a distance of more than 500 km. Brazzaville lies further 315 km south of Gamboma.



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The traffic between Congo and the DR Congo is currently made by ferry between Brazzaville and Kinshasa. A bridge project exists, but the two countries have not decided yet if the bridge shall be designed for both cars and railway or only for cars. Funding is not yet available.

The road section from Kinshasa to Matabi on the border to Angola is paved and has a length of 362 km. The first part of the section from Kinshasa to Mbanza Ngungu has recently been rehabilitated. The remaining section to Matabi will be rehabilitated soon, and in 2005 the entire section is expected to be in a good physical condition.

Table 3.2.6 Tripoli – Windhoek Highway in DR Congo

<i>DR Congo</i>	Type				Condition			Road parameters (existing or in ongoing improvement)				Traffic flow			
	length	paved	gravel	track	good	fair	poor	construct ed	main-tained	paved width	shoulder gravel	shoulder paved	total width	total	heavy vehicles
Section	km	km	km	km	km	km	km	year	year	m	m	m	m	ADT	%
Kinshasa-Mbanza Ngungu	158	158	0	0	158	0	0	2000		7		2*1,5	10	1000	70
Mbanza Ngungu-Matadi	204	204	0	0	0	0	204			7		2*1,5	10		
<i>Summary DR Congo</i>	362	362	0	0	158	0	204								

**3.2.7 Angola**

Map 3.2.7 Trans African Highways in Angola



Table 3.2.7 Tripoli – Windhoek Highway in Angola

Angola	Type				Condition					Road parameters (existing or in ongoing improvement)				Traffic flow	
	length	paved	gravel	track	good	fair	poor	construct ed	main- tained	paved width	shoulder gravel	shoulder paved	total width	total	heavy vehicles
	km	km	km	km	km	km	km	year	year	m	m	m	m	ADT	%
Noqui-Mepala	60	0	60	0	0	0	60						10-13	24	
Mepala-M'banza Congo	79	0	0	79	0	0	79								
M'banza Congo-Negage	294	0	0	294	0	0	294								
Negage-Lucula	194	194	0	0	0	194	0			6				318	
Lucula-Dondo	120	120	0	0	0	120	0			6				954	
Dondo-Alto Hama	340	340	0	0	0	340	0			6				822	
Alto Hama-Huambo	70	70	0	0	0	70	0			6				971	
Huambo-Cacula	320	320	0	0	0	320	0			6				306	
Cacula-Lubango	94	94	0	0	0	94	0			6				500	
Lubango-Ondjiva	390	390	0	0	200	190	0			6-7.5				305	
Ondjiva-Oshikango	40	40	0	0	0	0	40			6				115	
<i>Summary Angola</i>	2001	1568	60	373	200	1328	473								

The TAH-link through Angola has been recorded from information received from SADC in Maputo.

From the border crossing to DRC at Noqui, the road link starts with a section of gravel road with 60 km length, followed by an earth track to Negage with a length of 373 km. The remaining sections through Angola consist of 1568 km paved road, of which 200 km (13 %) are in good condition, 1328 km (85%) in fair condition and 40 km (2 %) in poor condition.

The information about the pavement condition is from the year 1998.

The paved sections have a carriageway width of 6 m. No information was available for the quality and width of shoulders.

The corridor, according to information from ECA, deviates in the northern part of Angola from the Trunk Route Network proposed by SADC. Instead of following the Trunk Route number 05 through Luanda, the Trans African Highway is directed south-east on a secondary road net and connects the paved network at Negage, 473 km from the border crossing.

**3.2.8 Namibia**

Map 3.2.8 Trans African Highways in Namibia

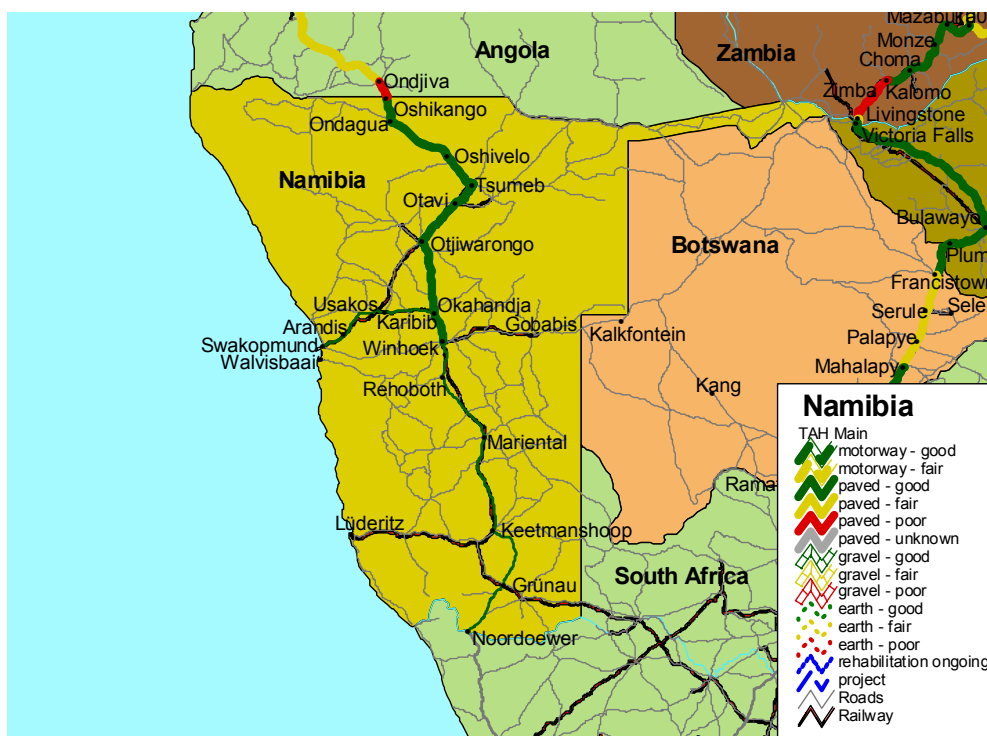


Table 3.2.8 Tripoli – Windhoek Highway in Namibia

Namibia <i>Angola frontier-Windhoek</i>	Type				Condition			Road parameters (existing or in ongoing improvement)						Traffic flow	
	length	paved	gravel	track	good	fair	poor	construct ed	main- tained	paved width	shoulder gravel	shoulder paved	total width	total	heavy vehicles
Section	km	km	km	km	km	km	km	year	year	m	m	m	m	ADT	%
Oshikango-Ondangwa	60	60	0	0	60	0	0	1985		6,8		2*2,5	11,8	1460	10
Ondangwa-Oshivelo	146	146	0	0	146	0	0	1961	2001	6,8		2*2,5	11,8	940	15
Oshivelo-Tsumbe	101	101	0	0	101	0	0	1969	1981	6,8		2*2,5	11,8	720	25
Tsumbe-Otavi	63	63	0	0	63	0	0	1960		6,6		2*2	10,6	750	19
Otavi-Otjiwarongo	118	118	0	0	118	0	0	1966	1998	6,8		2*2,5	11,8	940	16
Otjiwarongo-Okahandja	174	174	0	0	174	0	0	1964		7,4		2*2,5	12,4	1150	14
Okahandja-Windhoek	71	71	0	0	71	0	0	1958	1975	7,4		2*2,5	12,4	3930	8
<i>Summary Namibia</i> <i>(Angola frontier-Windhoek)</i>	<i>733</i>	<i>733</i>	<i>0</i>	<i>0</i>	<i>733</i>	<i>0</i>	<i>0</i>								

The TAH link through Namibia corresponds entirely to the Trunk Route Network, proposed by SADC.

Starting at the border crossing to Angola at Oshikango, the highway connects development corridors, which are located in west-east direction and which have been

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described by SADC in 2001. The TAH connects the Trans Caprivi Corridor at Otavi, the Trans Kalahari Corridor at Windhoek and the Gariiep Development Area in the south of Namibia .

The road network in Namibia contains the following:

Total 42 000 km National roads (Trunk roads, Main roads, District roads)

Bituminous roads 5 500 km

Gravel roads 24 500 km

Earth roads 12 000 km

The Road Authorities objectives for Maintenance operations are to keep trunk road network always in maintainable condition.

A general observation is ruling for Namibia: although many of the road sections were constructed in early 1960's with surface treatment as surfacing, most of the sections could be kept in good condition due to the application of an overlay at the right time. Also the deterioration factors for the pavements are advantageous due to dry climate conditions and normally sufficient good sub-soil conditions. Sections, which at present are not in good condition, are being reconstructed or planned for reconstruction, including also a widening of the cross-section to SATCC-standard, viz. carriageway 7,4 m and shoulders 2x2,5 m. That brings the entire TAH-link up to a good standard, with the only exception: many bridges and culverts still have the old width of 6,6 m and are not planned for widening yet. Some bridges are not designed for the current traffic load and have to be reconstructed.

The total length of the Tripoli-Windhoek Highway through Namibia is 733 km. All the roads included in the TAH are classified as good, with some sections currently being reconstructed.

The TAH link as indicated by ECA ends at Windhoek. A future extension of the corridor to Cape Town has at this stage been considered. The characteristics of the remaining sections within Namibia are also described in the following map and table.

Section	Type				Condition					Road parameters (existing or in ongoing improvement)					Traffic flow	
	length	paved	gravel	track	good	fair	poor	construct- ed	main- tained	paved width	shoulder gravel	shoulder paved	total width	total	heavy vehicles	
	km	km	km	km	km	km	km	year	year	m	m	m	m	ADT	%	
Windhoek-Rehoboth	87	87	0	0	87	0	0	1961	1989	7,4	2*2,5		12,4	2160	8	
Rehoboth-Mariental	174	174	0	0	174	0	0	1963	0	6,1	2*1,5		9,1	910	14	
Mariental-Keetmanshoop	221	221	0	0	221	0	0	1960	1991	6,1	2*1,5		9,1	520	25	
Keetmanshoop-Grunau	157	157	0	0	157	0	0	1968	0	6,6	2*1,5		9,6	483	31	
Grunau-Noordoewer	147	147	0	0	147	0	0	1970	0	6,7	2*1,5		9,7	230	24	
<i>Summary Namibia (Windhoek-South African fr.)</i>	786	786	0	0	786	0	0									

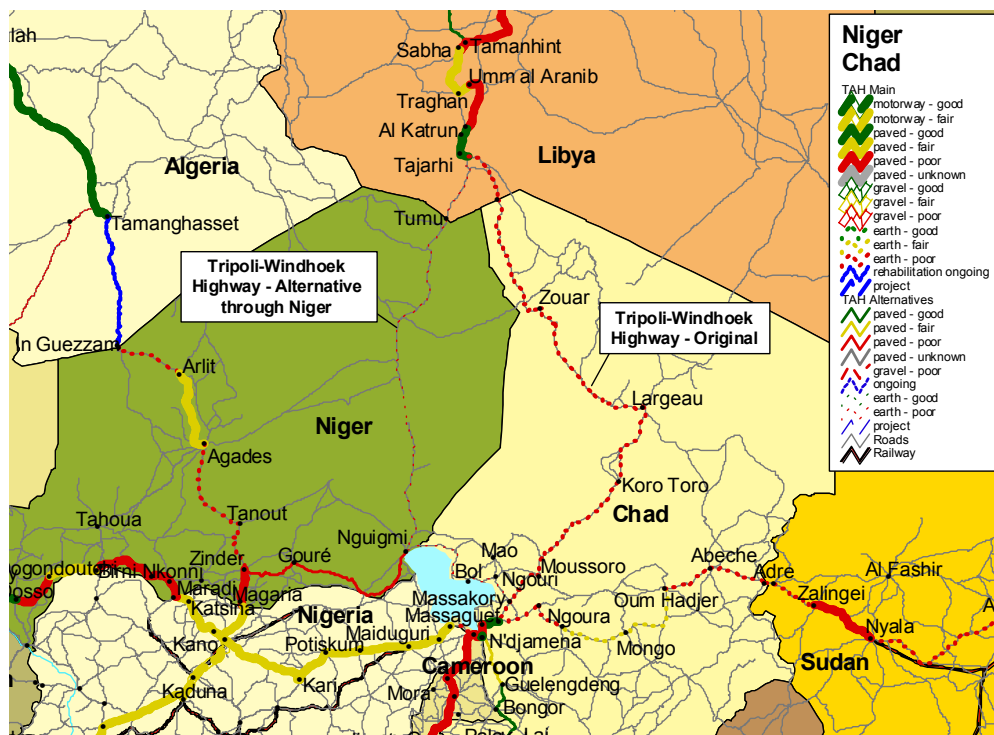
**3.3 ALTERNATIVE ALIGNMENTS**

Along the Tripoli-Windhoek Highway corridor there are a few alternative alignments, which could be of interest. These alternatives are briefly presented below as well as on Maps 3.3.1 - 3.3.4.

**3.3.1 Alternative Alignment in Niger**

Libya lays efforts in providing a paved road link to the Gulf of Guinea. They promote an alternative alignment through Niger, west of the original TAH alignment in Chad, see Map 3.3.1.

Map 3.3.1 Original and alternative alignment of the Tripoli-Windhoek Highway through Chad and Niger.



The last link in Libya from Tajarhi to the border to Niger will be completed soon. A detailed design for a continuation through Niger as far as Nguigmi has been completed. The only remaining subject is a problem area of 280 km with moving sand.

The length of the Niger link to Nguigmi is 1266 km. To connect with the original TAH-link through Chad, a link of approximately 340 km should be added from the junction north of Nguigmi in Niger to Mouzarak in Chad.

Comparison from Al Katroum (Libya) to N’djamena (Chad): via Niger 2090 km, via

Chad 2283 km. The difference in length amounts approximately to 190 km or 9 %.

**3.3.2 Alternative Alignment in Chad and Cameroon**

The Tripoli – Windhoek Highway corridor crosses into Cameroon from Chad at Kousséri and heads south, passing the towns of Garoua, Ngaoundéré, Garoua Boulaï and Bertoua. Chad is especially keen on a reliable link from N’djamena down south to Ngaoundéré, where a connection to the railway to Douala, most important port in Central Africa, is available. The route from N’djamena to Ngaoundéré via Garoua (Cameroon) has proven to be problematic with respect to the physical condition of the road, which traverses an area with particularly difficult geotechnical conditions, and particularly with respect to the frequent occurrence of harassments by Cameroon’s security authorities along the route. In order to create an alternative route, Chad, Cameroon and the European Union as funding institution have agreed on the construction of a new link heading straight southwards from N’djamena to Guelengdeng, Bongor, Kélo, Moundou and crossing the border to Cameroon in Touboro. The link continues in Cameroon to Ngaoundéré. The full road will be in service in 2005. It will be paved and have a variable width, between 6 and 7 m. Thus, by 2005, this alternative corridor will be available between N’djamena and Ngaoundéré in addition to the original corridor through Cameroon, see Map 3.3.2.

Map 3.3.2 Original and alternative alignment of the Tripoli-Windhoek Highway through Chad and Cameroon.





**Volume 2 – Description of Corridors****3.3.3 Alternative Alignment in Central Africa (Cameroon, CAR, Gabon, Congo)**

From Bertoua, the Highway heads eastwards and enters the CAR at Gamboula. After passing Berberati, it goes southwards along the river Sangha, which constitutes the border between Cameroon and RCA and, further south, with Cameroon and the DRC. The total length from Bertoua to Brazzaville is 1730 km, of which 815 km are unpaved and 400 km, in the border area between CAR and Congo, are entirely missing.

There is an alternative corridor that could serve as a link between Cameroon and the Republic of Congo, Brazzaville, see Map 3.3.3. The corridor goes from Bertoua to Yaoundé, capital of Cameroon, continuing southwards to Gabon and Congo and joining the road from Pointe-Noire to Brazzaville. The total length of this alternative corridor amounts to approximately 2100 km, of which about 1600 km are paved, and about 500 km are unpaved.

Map 3.3.3 Original and alternative alignment of the Tripoli-Windhoek Highway through Congo and Gabon.



In Cameroon, the road from Bertoua to Yaoundé, length 348 km, is entirely paved. The continuation towards Gabon via Ebolowa to the border river Ntem has a length of 300 km and is paved. The construction of a bridge linking Cameroon and Gabon over the river Ntem is foreseen to start at the end of 2002.



The alternative corridor crosses Gabon from the north to the south, and it therefore constitutes a natural backbone of the national road system. The road starts in Eboro on the border river Ntem. As mentioned above, the construction of a bridge linking Cameroon and Gabon over the river Ntem is foreseen to start at the end of 2002. The road from Eboro to Oyem-Mitzic-Lalara with a length of 276 km is paved. The road from Lalara to Alèmbé (97 km) is currently rehabilitated. The continuation from Alèmbé to Bifoun and Lambaréné is also paved on a length of 170 km. From Bifoun, a paved feeder with a length of 166 km goes to Libreville. The road from Lambaréné to Figamou is currently under construction, with opening foreseen in 2003. The remaining road down to the Congolese border is an earth track. Rehabilitation and paving on the entire length of 240 km is planned, and some studies have been started. A fully paved road link from Cameroon through Gabon to Congo is expected to be completed by 2006.

In Congo, the road from the border Gabon and Congo to Dolisie (223 km) is an earth track, and it is unknown whether a rehabilitation of the road is planned. The road from Dolisie to Brazzaville (456 km) is paved, condition unknown.

The alternative corridor via Gabon has the advantage that the capitals of Cameroon (Yaoundé) and Gabon (Libreville) would be integrated in the Trans African Highway network, and that the very important ports of Douala (Cameroon) and Pointe-Noire (Congo) would get closer to the Trans African Highway and therewith to the landlocked countries such as the CAR and Chad.

The corridor suggested by ECA transverses very sparsely populated areas. The area where the missing link needs to be constructed is very marshy and vastly covered by thick forests and mangrove. There are many water courses to cross, and suitable building materials are not readily available. In addition, the construction of a road will have a major environmental impact. An all year practicable road link on the alignment suggested by ECA will therefore not be realised within the short and medium terms.

It is therefore proposed to replace the present link with the link via Yaoundé and Gabon down to the Pointe-Noire – Brazzaville road, defining this as the Trans African Highway.

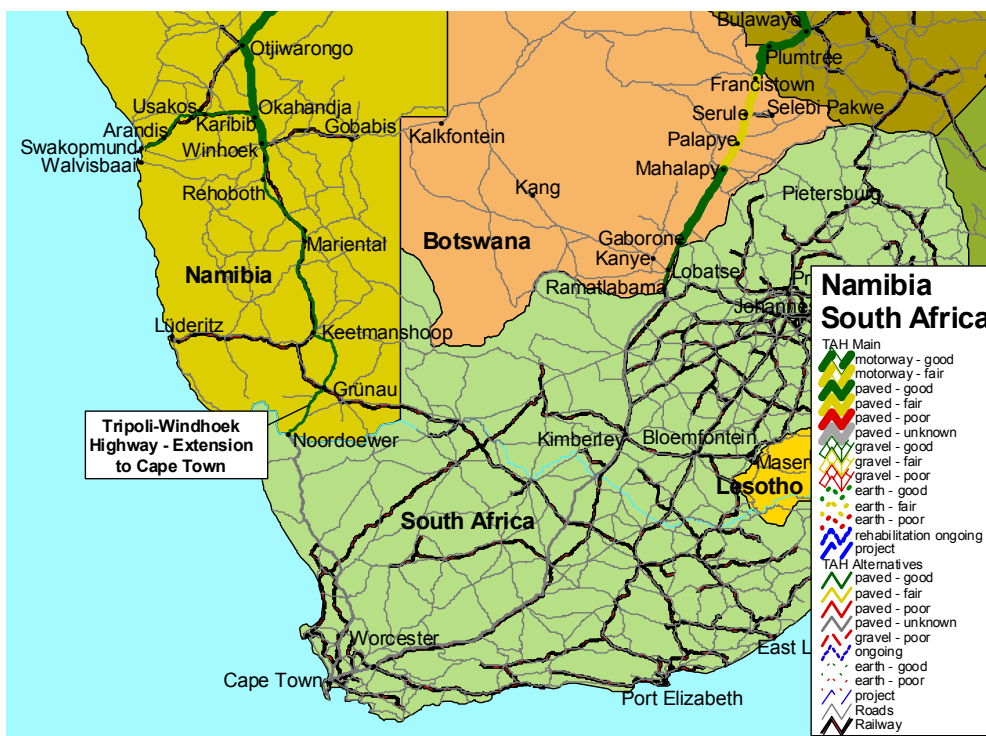
ECCAS has defined a community road network, which was approved and ratified by the member countries. The realisation of this is considered to be of the highest priority. The community road network comprises both the corridor proposed by ECA and the corridor through Gabon to Brazzaville. The bridge over the river Congo to Kinshasa is also included.

**3.3.4 Extension of the Tripoli-Windhoek Highway to Cape Town**

The TAH network was designed when South Africa was ruled by the Apartheid regime. As consequence, no roads in South Africa were included in the TAH network, even though the continuation of the Tripoli-Windhoek and the Cairo-Gaborone corridors into South Africa would have been logic.

It is therefore suggested to lengthen the Tripoli-Windhoek corridor from Windhoek to Noordoewer on the Namibian / South African border and further south to Cape Town, see Map 3.3.4. The additional branch has a total length of 1500 km.

Map 3.3.4 Tripoli-Windhoek Highway – Extension to Cape Town.



### **3.4 ROAD TRAFFIC AND SAFETY**

#### **3.4.1 Road Traffic**

Figures about road traffic were available for a few countries only.

##### ***Libya***

Traffic figures provided by the Road Authority are rounded figures and represent rough estimations only. The dual carriageway near Tripoli carries a daily traffic of 2600 vehicles. The lowest traffic was observed on the section from Wadden to Sabha, where the traffic drops to 500 vehicles per day. The road is in poor condition and an alternative road link is available. The southern section towards the border to Niger, which above was described as an alternative, is planned for traffic of 2400 vehicles per day in 2022. On all road links the percentage of heavy vehicles is estimated to be 20 %.

The legal axle load limit for road users is 10 tons for single axle and 16 tons for narrow dual axles.

##### ***Angola***

Traffic figures for Angola represent the year 1970. From little traffic in the north to DRC, 24 vehicles per day, the traffic increases towards the centre of Angola, between Dondo and Huango to 900 vehicles per day and drops again towards the Namibian border in the south to 115 vehicles per day. No information is available about the composition of the traffic.

##### ***Namibia***

Traffic figures from 2001 indicate a flow of 1500 vehicles per day in the northern part, dropping to approximately 700 vehicles at Otavi, increasing again to 4000 vehicles at Windhoek and dropping again to 230 vehicles per day towards the South African border. The part of heavy vehicles varies from 10 to 30 %, being lowest around Windhoek.

#### **3.4.2 Road Security and Safety**

##### ***3.4.2.1 Road Safety***

Generally speaking the road safety and security situation is poor or very poor in most of Africa. At a Conference on Road Safety in Africa in (Accra, Ghana) 2000 a report was presented reviewing the road safety situation in Africa and providing ideas of

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action programmes and plans at country and sub-regional levels as well as for Africa as a whole.

According to the above mentioned report:

- The fatality rate per registered vehicle in Africa is 8-50 times higher than in the industrialised world. In the early-mid 1990s some African countries experienced annual road fatalities per 10 000 vehicle ratio exceeding 300, which is exceedingly high by any standard;
- Germany, Denmark, Canada and Malawi had in the early 1990s around 100 road fatalities per million people. The difference between the countries was a 100 times higher fatality rate per 10 000 vehicle in Malawi;
- The number of road accidents continues to increase steadily in the 1970-early 1990s in Africa. During the same period the number of road accidents decreased in the industrialised world.

The dark picture of the situation in the road safety field painted by the figures above is aggravated by the fact that accident statistics in Africa are unreliable and under-recording of accidents is common.

In this context it should also be pointed out that the road safety situation differs substantially from country to country. While the Central African Republic had a fatality rate of 339 persons per 10 000 vehicle in 1995, the same figure for Namibia was 9 (1996). The Namibian figure is very low for Africa but does not compare well with similar figures for some parts in e.g. Europe. There are a number of reasons for the poor road safety record of Africa. A rapid increase in the number of vehicles combined with poor road standard, lack of training, education and information in the road safety field.

In the institutional field it has proven that the road safety activities should not be organised as “stand-alone” activities. The nature of the work requires inputs in a number of different fields (training and information, road design, traffic rules, enforcement of regulations, etc) which requires both co-ordination and co-operation between different government bodies, educational institutions and private sector organisations. Some kind of Road Safety Board or Council at national level seems to be the preferred structure to deal with these issues. But, it has proven difficult to establish and also sustain the kind of multi-sectoral, inter ministerial institutional structures needed for successful road safety activities. Another problem in the institutional field has been the funding of road safety activities. One alternative for a sustainable revenue base could be the special road user charge for road safety work, as introduced in Botswana. Another alternative is the initiative taken by the Road Fund in Ethiopia to set aside a portion (3%) of its revenue to finance the activity of a national road safety council now being established.

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In order to improve upon the situation co-ordinated efforts are required in the following fields:

- Training, education and information are important fields of road safety work. In particular school children and people learning to drive must be educated and trained in the basic principles of road safety. From a practical point of view the “training of trainers” (e.g. teachers and driving instructors) is the required basic activity in this field. As passengers and pedestrians are two very vulnerable groups of road users the above mentioned training and educational activities need to be supplemented with information campaigns of different type.
- Accident data collection, compilation and analysis need to be improved
- Enforcement of traffic rules and regulations, in particular speed limits in towns as most of the road accidents take place in urban areas.
- Research is required in a number of accident related areas and the result of such research must be used to formulate specific measures in the road safety field. Furthermore, experience and knowledge acquired in other parts of the world should be collected, assessed, analysed and used in the road safety field.

The problems along this Trans African Highway in the road safety field represents fairly well the more general problems mentioned above. While there is little or no road safety information available related directly to this particular Trans African Highway, there is information available for some of countries intersected by the Highway. The fatality rate varies from 339 fatalities per 10 000 vehicles in the Central African Republic to 9 in Namibia.

#### *3.4.2.2 Road Traffic Security*

There are different types of security problems encountered by the road traffic in Africa.

- Major security problems (large scale robbery, armed attacks etc.) often encountered in periods of conflict between and within countries.
- The lack of or poor availability of telecommunication services, fuel, repair facilities, accommodation, food, drinking water, etc. along the roads constitutes another group of risks.

The first type of security concerns is at present experienced only in DR Congo but has also been common in the Central African Republic over the years. The second type of problems is more prevalent and must be considered to be a constraint on road traffic along the least well-developed sections of the Highway. The first type of security problems could on the whole not be considered to be a major deterrent to normal road transport anywhere along the extent of this highway.

The Government of Libya is at present trying to resolve some of these problems for roads through the desert, with the help of water well being drilled at 100 km intervals along this Highway. The idea is not only to provide the road users with potable water but also to encourage the settlement of people that over time could provide simple repair facilities, accommodation, food and telecommunication services.

### **3.5 MANAGEMENT OF THE CORRIDOR**

#### **3.5.1 Responsibility for and Management of the Highway**

The management and coordination of this corridor at a multinational level is that provided for by the REC's of the sub regions, i.e. ECOWAS, Cen-Sad, COMESA, SADC, CEMAC and ECCAS. The REC's have taken an active role in the planning and programming of the road networks of the member countries. Each of the RECs, as well as the individual member countries, has their own set of high priority roads. These priorities have however, not be established in isolation but rather after consultations and discussions with all parties involved at both national and sub-regional levels. It is apparent that the work on determining the core network of road connections has involved the whole of the main networks and has not in any way been directed exclusively towards the Trans African Highways.

Although the work done by RECs provides the framework for the development and investments in the road sector, it is the responsibility of each country to manage the implementation, including funding, contracting, supervision and maintenance. The very high degree of dependence on outside funding, with the exception of Libya, the donors have had an important, if indirect, influence on the condition and future development of the Tripoli-Windhoek Highway.

#### **3.5.2 Road Sector Operations**

As mentioned above the actual road operations are handled by the road administrations of the individual countries. The system for road management varies somewhat from country to country. Some countries, like Libya, retain the more traditional set up with a Department of Roads forming an integral part of the central government set-up and with funding provided under the consolidated central government budget. A number of the other countries have started the process of creating semi-independent organizations for the management of roads and the funding of at least parts of the road activities. This reform process is strongly supported by the RECs and has been fully carried out in Namibia. In many other cases the reform process has only just started or is only partially implemented, like in Zambia, which was one of the early reformers with a National Roads Board established in 1994, which administrates and manages a Road Fund. However, the

management of the trunk road network (of which the Trans African Highways form a part) remains a responsibility of the Roads Department of the Ministry of Communication and Transport.

The trends in the operational field (road design, construction and supervision) are a bit more consistent in the sense that in most countries there is a clear move to employ the services provided by the private sector, through consultants and contractors for the design, construction, rehabilitation and maintenance activities. There is still some force account activities going on but the trend is towards a steady increase in the private sector involvement in this field.

### **3.5.3 Strategy and Priorities**

The strategies employed and priorities established for the TAH network of highways amounts to a combination of strategies and priorities established at both national and REC levels. In the case of the Tripoli-Windhoek Highway this means the positions taken by ECOWAS, COMESA, SADC, CEMAC and ECCAS on the whole also are shared by the individual member countries. This means that the national priorities tend to coincide with, or to be closely related to, those formulated by the RECs, which is also the case for this Highway.

## **3.6 FUNDING**

### **3.6.1 Corridor Programming**

The Northern sections of the Tripoli-Windhoek Highway are included in the ECOWAS sub-regional network of high priority roads. Similarly, the highway forms part of ECOWAS, CEN-SAD, COMESA SADC, CEMAC and ECCAS long term plans for key roads in the development of the sub-regional road networks.

### **3.6.2 Sources of Financing**

In the countries of the Tripoli-Windhoek Highway the funding of road sector activities is arranged along the following main lines:

- a) External assistance sources for road construction, rehabilitation (and to some degree also for period maintenance purposes);
- b) Central government financing of counterpart funds and the construction, rehabilitation and period maintenance work not covered under the different external assistance programmes;
- c) Road Fund for road maintenance in general and a routine maintenance in particular.

Although these three main sources of funding are all employed in the countries concerned their actual importance and availability varies greatly from country to country. Libya and Namibia are funding their respective road networks with little or no external assistance inputs, although the funding mechanisms employed differ. In Libya the road sector funds are provided through the consolidation of the central government, while the semi-independent Road Fund provides the same function in Namibia. For the other countries the external assistance inputs play an important, sometime crucial role in the funding of road sector activities.

A common condition in all countries is the fact that the funds made available to the road sector are inadequate to meet maintenance and rehabilitation requirements.

## **3.7 TRADE AND TRANSPORT FACILITATION**

Trade facilitation, harmonisation of customs procedures and road transport regulations has been an important field of work for ECOWAS for more than two decades. A number of Protocols, Decisions, Resolutions and Directives relating to trade and transport have been produced over the years. The ambition and scope of these agreements in the trade area are both ambitious and extensive. The problem is that relatively little of what has been agreed upon has actually been implemented.

### **3.7.1 Customs and Custom Procedures**

Although the long-term objective of ECOWAS is to establish a custom union, the revenue generated by customs is an important source of revenue for many West African countries. A fully-fledged custom union may therefore take time to negotiate and implement. In the more short-term, the aim of the Community is to harmonise custom procedures and the handling of goods at ports and border crossings. The existing system requires that all goods imported into the ECOWAS area is cleared



for customs in the country of destination. There are facilities for goods produced in the ECOWAS area to be provided with an ECOWAS certificate of custom waiver, but such certificates are only issued on a product-to-product basis after a careful scrutiny by ECOWAS. Furthermore, Libya does not charge any custom duties for goods produced in Africa. However the basic rule is that customs are paid for goods imported into a country.

Harmonisation of customs and efficient custom operations and transit arrangements has therefore remained the main tasks of ECOWAS as further discussed below.

### **3.7.2 Trade and Transport**

Simple custom services combined with efficient transit arrangements form important parts of any trade facilitation regime. Little has however been achieved in this field over the years. A case in point is the important West African Convention on Interstate Road Transit (ISRT). This convention which was approved already in 1982 (with supplementary agreements in 1992) has not been implemented as intended. The actual situation (August 2002) is described in a draft ECOWAS document<sup>1</sup> as follows

“In practically every country numerous roadblocks are maintained by police, customs, gendarmes and other officials. They inspect the goods or pretend to do so and inevitably all types of little or not so little contributions are expected from the driver. Custom agents want to see the goods, count and inspect them, new documents are produced and paid for and waiting periods accumulate.”

The cost of these non-physical barriers are substantial both in money and time. Preliminary estimates indicate that the negative impact for the 14 member state of ECOWAS had reached 80-100 million US\$ in 1999, on an annual basis. Following this background it is hardly surprising that the cost of transporting a container from a port in West Africa to one of the land-locked countries in the interior is about three times as expensive as the freight from Europe to the port.

ECOWAS is actively working to remove these non-physical barriers and a number of specific measures are now being prepared for early implementation as outlined below.

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<sup>1</sup> **Removing Barriers to Transit Goods in West Africa**

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An Action Plan is under preparation which will outline concrete actions in the following three high priority areas:

- Joint border posts;
- Observer function (to monitor the actual situation on the road and at border crossings);
- Common regulatory framework for custom operations.

A public opinion campaign is being prepared with external assistance to help removing barriers to transit goods in West Africa.

In addition to the above-mentioned activities there are also plans to assess the usefulness of establishing a common system for transit charges, basically for heavy vehicles (possibly within the context of a Integrated Transportation Study). Based on the experience from Southern Africa the introduction of a Transport Protocol is also being considered, basically to speed up the introduction and implementation of the numerous protocols, decisions and agreements already passed by ECOWAS.

Although the situation, in regard to non-physical barriers, seems to be less pronounced in at least parts of the SADC area the problems are far from resolved. The problem is basically the same, as in most other RECs, that basically sound policy decisions are not implemented at operative levels. The difficulties experienced in translating protocols and decisions into consistent laws, regulation and procedures at country level has made SADC try to approach the problems in the trade and transport facilitation field in a bottom-up fashion. Instead of starting with a decision at a ministerial meeting the approach has been to start at the working levels with a description and analysis of the problems encountered. Then this is followed by concrete efforts by working groups consisting of specialists from both the public and private sectors to work out concrete solutions to the problems. Only when agreements of a concrete nature have been arrived at would, according to this approach, the necessary bilateral or trilateral agreements be codified in a suitable agreement at ministerial level.

A pilot project has recently been initiated along the above described lines. The Trans-Kalahari Highway covers about 1 800 km from Walvis Bay in the west to the Johannesburg/Pretoria area in the East. The Highway runs basically in a west-easterly direction through Namibia, Botswana and western South Africa. At the time of the feasibility study of this highway through Kalahari in the mid 1990s the assumption was that this new, short route from Walvis Bay to Gauteng would attract a steady increase in traffic once the missing links through Kalahari had been completed. This has not been the case (the current traffic is only 38% of the expected traffic).

In early 2002 a pilot project – The SADC Transit System on the Trans-Kalahari - aimed at improving the transit conditions along the highway was initiated. This project is a joint effort involving both the public and private sectors. The Walvis Bay Corridor Group, a private sector initiative, provides the secretarial services required. As a part of this effort SATCC and the Southern African Custom Union through its Transport Liaison Committee carried out a study to determine the causes of the under-utilisation of the Trans-Kalahari Highway and prepared recommendations on how to improve the utilisation of the Highway. The study was a joint effort involving senior staff of the Ministries of Transport in Namibia, Botswana and South Africa.

Based on the findings and recommendations of the above study a Memorandum of Understanding was prepared covering the three Governments concerned and it was signed in September 2002.

### **3.8 MISSING LINKS**

A missing link should fulfil the criteria of either to be none-existing as road with all-weather standard or with standard far below the minimum standard for the current traffic flow. Neglected road maintenance does not qualify for being a missing link. Thus poor sections with acceptable, yet too narrow road width are not listed as missing links. Gravel roads are included in the list of missing links, as they are ment to be upgraded sooner or later to fulfil the requirements of an international road.

In this sense missing links are observed in following countries:

Libya	180 km	None-existing or earth tracks
Chad	1842 km	None-existing or earth tracks
Cameroon	212 km	Earth track or impassable during rainy season
Central African Republic	447 km	None-existing or earth tracks
Congo	557 km	None-existing or earth tracks
Angola	433 km	Earth tracks or poor gravel
<b>Total missing links</b>	<b>3671 km</b>	

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Details about missing links are given below:

Table 3.8: Missing links

Section	Country	length km	Type			Upgrading to recommended minimum standard	
			paved km	gravel km	track km	description	cost M US\$
Tajarhi-Chad border	Libya	180			180	new road	
Libyan border-Zouar	Chad	450			450	new road	135
Zouar-Faya (Largeau)	Chad	525			525	new road	160
Faya (Largeau)-Moussoro	Chad	665			665	new road	200
Moussoro-Massakori	Chad	134			134	new road	40
Massakori-Massaguet	Chad	68			68	new road	20
Bertoua-Gamboula	Cameroon	212			212	new road	65
Gamboula-Berberati	CAR	91			91	new road	30
Berberati-Salo	CAR	191			191	new road	60
Salo-Bomassa	CAR	165			165	new road	60
Bomassa-Ouésso	Congo	235			235	new road	60
Ouésso-Owando	Congo	322			322	new road	100
Noqui-Mepala	Angola	60		60		improvement	12
Mepala-M'banza Congo	Angola	79			79	new road	25
M'banza Congo-Negage	Angola	294			294	new road	90
<b>Summary</b>		<b>3671</b>		<b>60</b>	<b>3611</b>		<b>1112</b>

### 3.9 CONCLUSIONS

This is the longest Corridor with some 9'600 km of TAHs. Another characteristic of this corridor is that it traverses sparsely populated areas (deserts and tropical forests) with modest economic activities, which generate only limited volumes of road traffic. The main exception to this general picture of low traffic volumes are found in the extreme north and south of the corridor (Libya and Namibia) which contains sections of the TAH with average daily traffic figures of up to a few thousand vehicles. The corridor has also a very big proportion of its TAH network consisting of missing links. There is as much as 3'700 km of such missing links or about 40% of the TAHs in the Tripoli-Windhoek corridor. Furthermore, the corridor also contains a number of alternative alignments, which are under active discussions in the countries and RECs concerned. These alternatives are found in Chad, Cameroon, Central African Republic and Congo. One alternative shifts the alignment into Gabon, a country at present not forming part of the Tripoli-Windhoek corridor.

War and civil disturbances, in combination with difficult terrain and climatic conditions have deterred the maintenance, rehabilitation and development of the TAHs in big parts of the central and southern sections of the corridor. Management

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of the network and co-operation between the countries forming part of the corridor, including the possibilities to secure adequate funding in the road sector, suffer in a situation like this. The same goes for traffic movements as well as for road construction and maintenance activities in the affected areas and countries. Only with peace and improved security conditions will it be possible to generate funding and other resources needed for the up-keep and development of the road sector. This applies to the TAH network as well as the road sector in general.

## **4 HIGHWAY 4 - CAIRO - GABORONE**

### **4.1 DESCRIPTION OF THE CHARACTERISTICS OF THE CORRIDOR**

This corridor is the longest among the TAH Corridors, covering a total distance of 8'861 km between Cairo and Gaborone, see map 4.1. After the introduction of majority rule in South Africa it could be argued that the southernmost point should be Cape Town rather than Gaborone, which would end in a total length of 10 228 km.

This corridor consists of sections with very differing conditions with respect to pavement condition, road standards, traffic volumes and loads, etc.

#### **4.1.1 Northern Sections**

Starting up north the corridor forms part of the extensive and well maintained road network of Egypt, with high traffic volumes, particularly in the vicinity of Cairo. The TAH part of this Egyptian network stops abruptly 5 km north of the border with Sudan. On the Sudanese side of the border the TAH consists of a poor earth road along the Nile valley, an area with limited population and economic activities. Only closer to Khartoum does the road improve to asphalt standard. The link towards Ethiopia has recently been rehabilitated but traffic volumes are small. The road from the border to Addis Ababa and further South to the border with Kenya is under rehabilitation and forms part of a major Ethiopian effort to improve the road network in the West of the country.

#### **4.1.2 Central Sections**

While the TAH on the Ethiopian side is constructed to asphalt standard, the standard at the Kenyan side is a gravel road in need of rehabilitation. Traffic volumes are very low and do not pick-up until closer to Nairobi, where the Highway is constructed to asphalt standard, as is the Nairobi-Arusha section. South of Arusha the quality of the road is poor. Both traffic volumes and the quality of the Highway picks up at Iringa and the Highway remains an important artery through Zambia.

#### **4.1.3 Southern Section**

The corridor through Zimbabwe is limited to the Victoria falls-Bulawayo-Plumtree section. The Highway is of adequate standard, with basically tourist traffic. Inside Botswana the corridor coincide with the important North-South road running parallel

with the Eastern border.

#### **4.1.4 Importance of the Corridor**

The importance of the TAH network in Eastern and Southern Africa tend to be to connect the ports of the Atlantic and the Indian Ocean with the landlocked countries of the continent (i.e. east-westerly or west-easterly connections). This corridor breaks, at least to some extent, this pattern.

The Cairo-Gaborone Highway provides in the south an important transport route for export and import through the South African and Namibian ports. It also handles regional trade between South Africa and the countries to the North.

In the central sections of the Highway growing volumes of industrial goods produced in Kenya is reaching its neighbours. In 2001 COMESA replaced EU as the main market for Kenyan exports and a substantial part of this export was transported on the TAH network, including the Cairo-Gaborone Highway.

Further to the north Ethiopia and Sudan are expanding and improving their road network to the neighbouring countries. This forms part of a concerted effort to develop new transport corridors to ports, like for instance Port Sudan. The Cairo-Gaborone Highway plays an important role in these efforts.

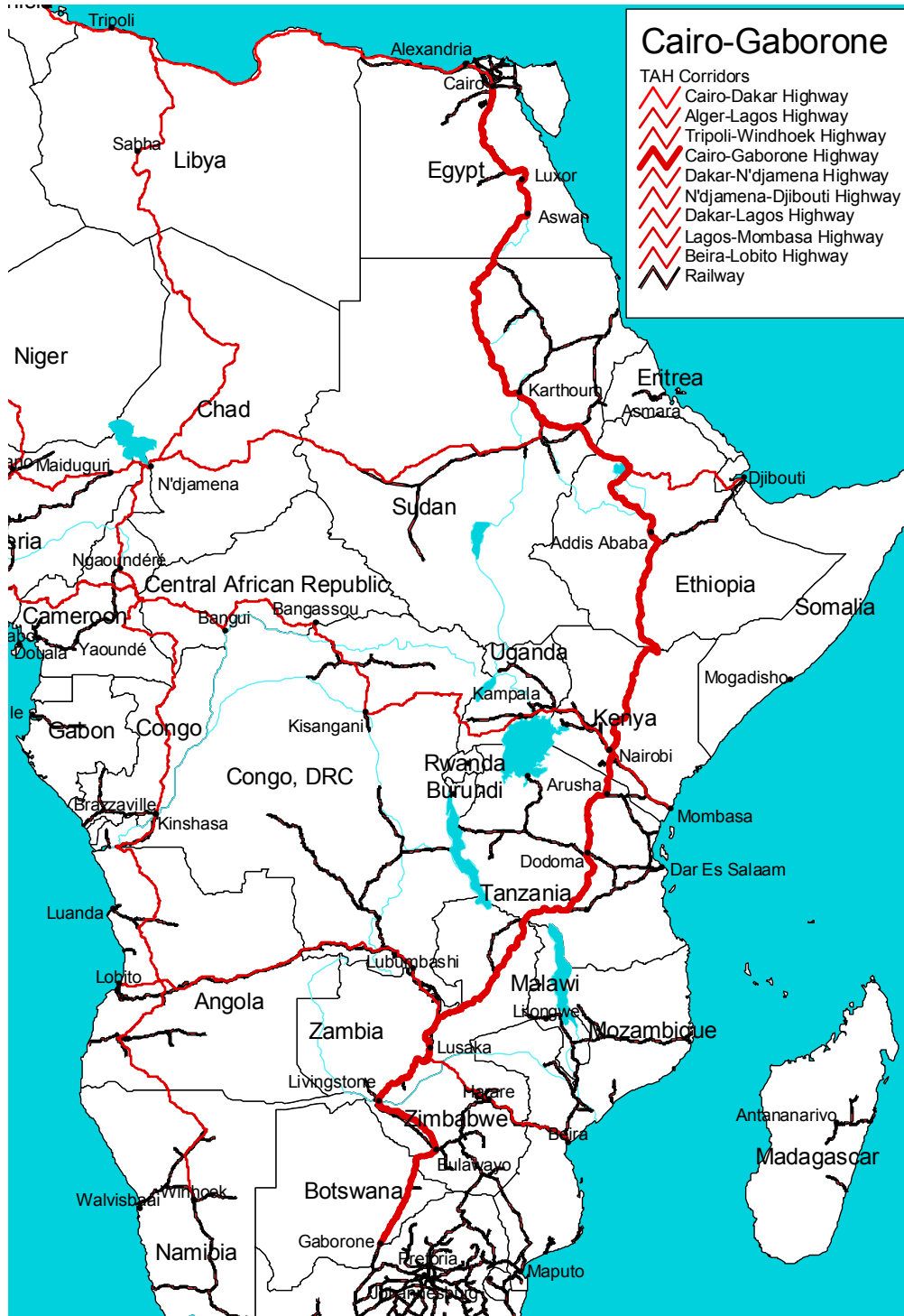
## **4.2 PHYSICAL CONDITION**

The Cairo-Gaborone Corridor, as indicated by ECA, starts in Cairo in Egypt and passes Sudan, Ethiopia, Kenya, Tanzania, Zambia, Zimbabwe and ends in Gaborone in Botswana. The road link has been investigated by country-visits in six of the eight countries. The remaining two countries, i. e. Zimbabwe and Botswana, are described with information collected from reports and / or Regional Transport Authorities.

All information from the inventory phase is summarised in sheets presented in Volume 4. Extracts from these sheets are shown in table 4.1 and illustrated in maps presented country wise.

**Volume 2 – Description of Corridors**

Map 4.1 Cairo – Gaborone Corridor, Link number 4





**Volume 2 – Description of Corridors**

Table 4.1 Cairo – Gaborone Corridor, Link number 4

Section	Type				Condition		
	length	paved	gravel	track	good	fair	poor
	km	km	km	km	km	km	km
Egypt	1140	1135	0	5	1035	0	105
Sudan	1321	808	80	433	380	508	433
Ethiopia	1692	1507	185	0	767	0	925
Kenya	938	419	519	0	77	520	341
Tanzania	1216	681	60	475	150	108	958
Zambia	1496	1496	0	0	1188	152	156
Zimbabwe	538	538	0	0	519	0	19
Botswana	520	520	0	0	285	235	0
<b>Total Cairo-Gaborone</b>	<b>8861</b>	<b>7104</b>	<b>844</b>	<b>913</b>	<b>4401</b>	<b>1523</b>	<b>2937</b>

The following sub-chapters describe the status of the highway in each country. The definitions of the various parameters are given under “Field Inventory” in the beginning of this Volume.

**4.2.1 Egypt**

Map 4.2.1 Trans African Highways in Egypt

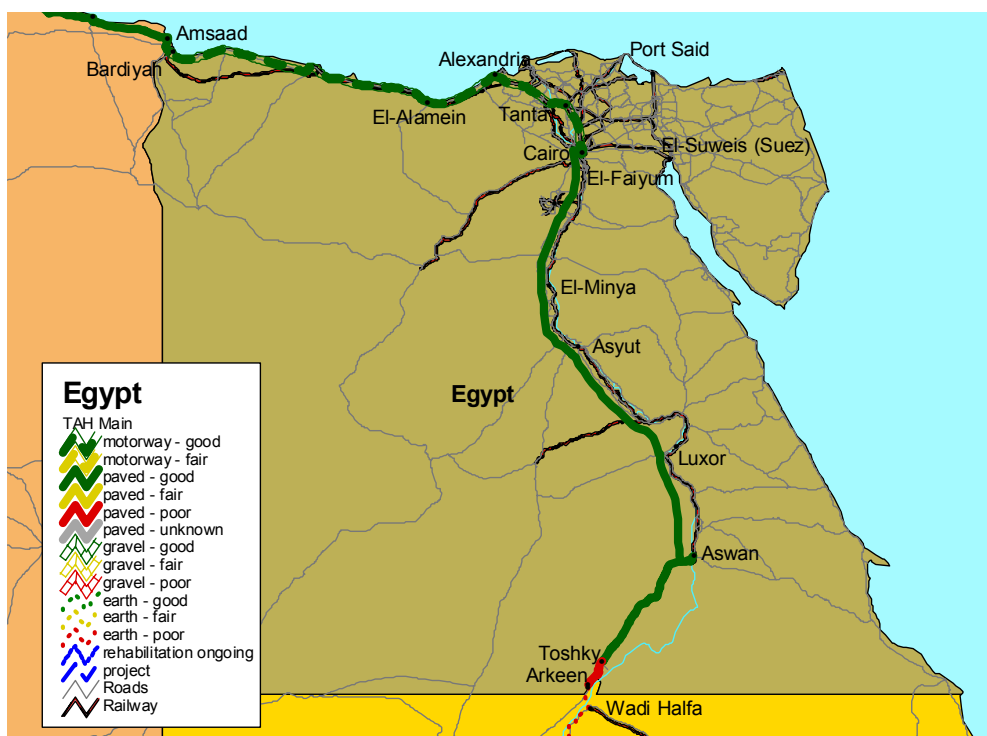


Table 4.2.1 Cairo - Gaborone Highway in Egypt

Section	length km	Type			Condition			construct ed year	main- tain- ed year	Road parameters (existing or in ongoing improvement)				Traffic flow	
		paved km	gravel km	track km	good km	fair km	poor km			paved width m	shoulder gravel m	shoulder paved m	total width m	total ADT	heavy vehicles %
Cairo-Asyut	350	350	0	0	350	0	0	1993		7,5	2*1,5	2*2,5	15,5	5000	10
Asyut-Aswan	500	500	0	0	500	0	0	2003		7,5	2*1,5	2*2,5	15,5		
Aswan-Toshky	185	185	0	0	185	0	0	1982	1997	7,5	2*1,5	2*2,5	15,5	2000	5
Toshky-Arkeen	100	100	0	0	0	0	100	1982					8	20	20
Arkeen-Wadi Halfa	5	0	0	5	0	0	5								
<i>Summary Egypt</i>	<i>1140</i>	<i>1135</i>	<i>0</i>	<i>5</i>	<i>1035</i>	<i>0</i>	<i>105</i>								

The road network in Egypt comprises 44 000 km (end of 2000), compared with 15 298 km in 1981. The section included in the TAH-link between Cairo and Gaborone, contains 1140 km, of which 1135 km are paved.

The original TAH-link follows the old main road along the western side of the Nile between Cairo and Aswan, connecting each village and town with each other. Construction work for a new desert road started 1993 and is scheduled to be completed in the beginning of 2003. This new link, located further west in the desert, will naturally replace the former part of the Trans African Highway, and thus has been subject to the inventory work.

The main part of the entire link between Cairo and the Sudan border indicates good standard regarding the pavement condition, i. e. 1035 km of 1140 km. 100 km of the link is in bad condition and 5 km are none-existing.

The cross-section for the part of the link assessed as “good” coincide with internationally accepted standard, viz. 7,5 m carriageway and 2 times 2,5 m paved shoulders. The design speed is adapted to the speed limit for urban roads. The poor section of the paved part (100 km) is scheduled for resealing next year (2003). There are no further plans for improvements or rehabilitation, including the missing 5 km towards the Sudan border.

In Egypt the road structures are designed for axle load limits of 10 tons for single axle and 16 tons for narrow dual axles.

**Volume 2 – Description of Corridors**

**4.2.2 Sudan**

Map 4.2.2 Trans African Highways in Sudan



Table 4.2.2 Cairo - Gaborone Highway in Sudan

Sudan Section	Type				Condition					Road parameters (existing or in ongoing improvement)				Traffic flow	
	length	paved	gravel	track	good	fair	poor	construct ed	main- tained	paved width	shoulder gravel	shoulder paved	total width	total	heavy vehicles
	km	km	km	km	km	km	km	year	year	m	m	m	m	ADT	%
Wadi Halfa-Ghaba	433	0	0	433	0	0	433								
Ghaba-Omdurman	310	310	0	0	310	0	0	90-00	2001	7		2*1,5	10		
Omdurman-Khartoum	15	15	0	0	0	15	0			7		2*1,5	10		
Khartoum-Wad Medani	186	186	0	0	0	186	0		2001	7		2*1,5	10		
Wad Medani-Gedaref	227	227	0	0	0	227	0		2001	7		2*1,5	10		
Gadaref-Doka	70	70	0	0	70	0	0			7		2*1,5	10	563	78
Doka-Galabat	80	0	80	0	0	80	0	2002					10	212	87
<i>Summary Sudan</i>	<i>1321</i>	<i>808</i>	<i>80</i>	<i>433</i>	<i>380</i>	<i>508</i>	<i>433</i>								

The first section of the Cairo-Gaborone Highway through Sudan follows the Nile river between the Egypt border and Ghaba, changing from the eastern to the western bank of the river. From Ghaba, the Highway consists of a paved road to Omdurman north of Khartoum. The Highway continues via Khartoum and along the Blue Nile to Wad Medani. From there the Highway forms a part of the Port Sudan road to Gedaref. From Gedaref to the Ethiopian border at Galabat, the link consists of one paved section of 70 km length and one unpaved section of 80 km length but which is under upgrading to paved standard.

The total length of the Cairo-Gaborone Highway link within Sudan amounts to 1321 kilometres, of which 433 km (33 %) are earth track and 80 km (6 %) gravel road. The paved section 808 km or 61 %, is either in good condition for 380 km (47 %) and fair for 428 km (53 %).

Most sections with paved surface have recently been maintained (period maintenance), but 3 sections require a more thorough rehabilitation.

All sections with paved or gravel surfaces have cross-sections with a total width of 10 m. The paved sections are divided into carriageway 7 m and paved shoulders 2 times 1,5 m. The road structures are designed for axle load limits of 10 tons for single axle and 16 tons for narrow dual axles.

4.2.3 Ethiopia

Map 4.2.3 Trans African Highways in Ethiopia

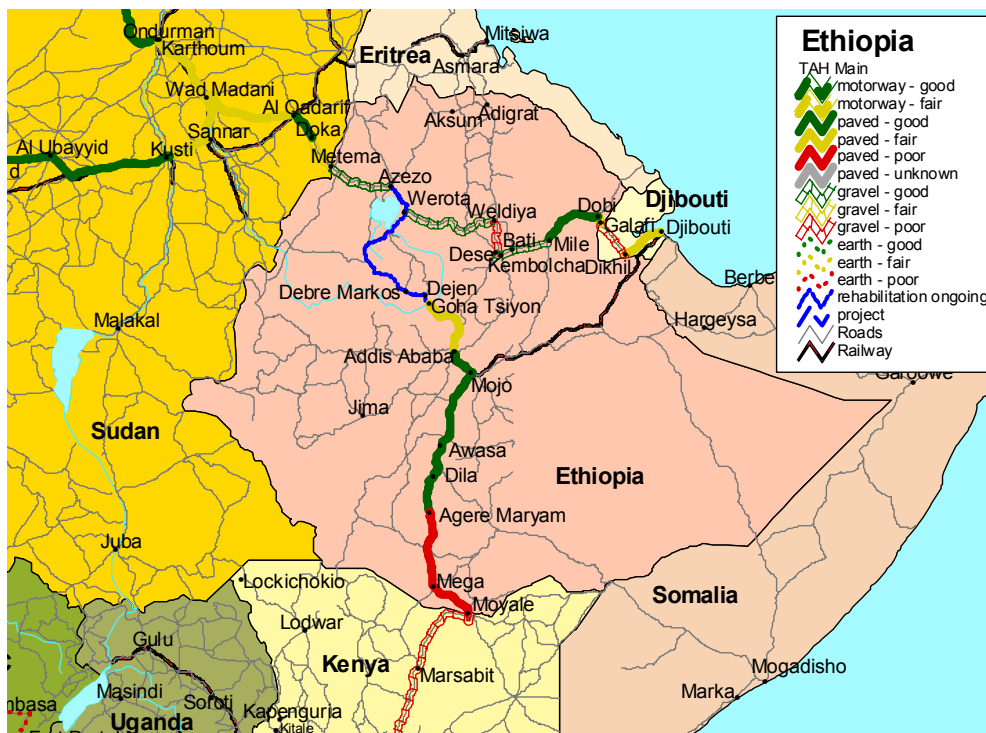


Table 4.2.3 Cairo - Gaborone Highway in Ethiopia

Ethiopia	Type				Condition						Road parameters (existing or in ongoing improvement)				Traffic flow	
	length	paved	gravel	track	good	fair	poor	construct ed	main- tained	paved width	shoulder gravel	shoulder paved	total width	total	heavy vehicles	
	km	km	km	km	km	km	km	year	year	m	m	m	m	ADT	%	
Galabat-Azèzo	185	0	185	0	185	0	0	2002		7		2*1	9	107	71	
Azèzo-Merawi	208	208	0	0	0	0	208	2005		7	2*1,5		10	271	48	
Merawi-Debre Marcos	220	220	0	0	0	0	220	2005		7	2*1,5		10	270	69	
Debre Marcos-Dejen	72	72	0	0	0	0	72			7	2*1,5		10	214	64	
Dejen-Goha Tsiyon	40	40	0	0	0	0	40			7	2*1,5		10	214	64	
Goha Tsiyon-Addis Ababa	180	180	0	0	95	0	85			7	2*1,5		10	771	73	
Addis Ababa-Mojo	75	75	0	0	75	0	0	1999		7,3		2*1,5	10,3	5648	24	
Mojo-Awasa	203	203	0	0	203	0	0	2001		7		2*1,5	10	1156	77	
Awasa-Dila	89	89	0	0	89	0	0	1970	1999	6	2*0,5		7	842	80	
Dila-Agere Maryam	120	120	0	0	120	0	0		2003	6	2*0,5		7	570	78	
Agere Maryam-Mega	193	193	0	0	0	0	193			6	2*0,5		7	492	22	
Mega-Moyale	107	107	0	0	0	0	107			6	2*0,5		7	105	79	
<b>Summary Ethiopia</b>	<b>1692</b>	<b>1507</b>	<b>185</b>	<b>0</b>	<b>767</b>	<b>0</b>	<b>925</b>									

**Volume 2 – Description of Corridors**

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The Ethiopia Road Authority is struggling with a road network of class A roads, which has exceeded the life expectancy or has been damaged by a traffic volume which the road links were not designed for.

The Cairo-Gaborone Highway sections in Ethiopia represent varying standards regarding the width of the road and the pavement standard. The entire road link has a length of 1692 km, of which 185 km have gravel standard.

The situation could be summarised as follows:

- From the Sudan border, the highway starts with a recently constructed gravel section of 185 km;
- Up to Addis Ababa the road consists of paved sections, which at present are in poor condition, but are being rehabilitated or reconstructed. The total length of 720 km to Addis Ababa contains at present only 95 km with good standard. 428 km are being reconstructed under a programme to be completed in 2005. Another section with 197 km is at present rehabilitated. The road width is intended to be widened to 7 m carriageway and 2 times 1,5 m unpaved shoulders, viz. 10 m travelled way;
- The alignment standard in the sections through rolling terrain appears hazardous. The combination of high percentage of heavy vehicles, steep grades without climbing lanes, unpaved shoulders and short sight distances increase the risk for accidents when overtaking. Narrow curves in other parts, e. g. in downhill sections with good visibility, invites to higher speeds than the narrow curves are designed for;
- From Addis Ababa to the Kenya border the Highway consists of a paved section of 687 km, out of which 200 km are classified as poor. Although the traffic volume is higher than north of Addis Ababa, the road width is narrower along approximately 400 km, viz. 6,0 m paved carriageway and 2 times 0,5 m unpaved shoulders. The section with poor pavement condition is not included in any maintenance plan for the near future.

The road structures are designed for axle load limits of 10 tons for single axle and 16 tons for narrow dual axles.

**Volume 2 – Description of Corridors**

**4.2.4 Kenya**

Map 4.2.4 Trans African Highways in Kenya

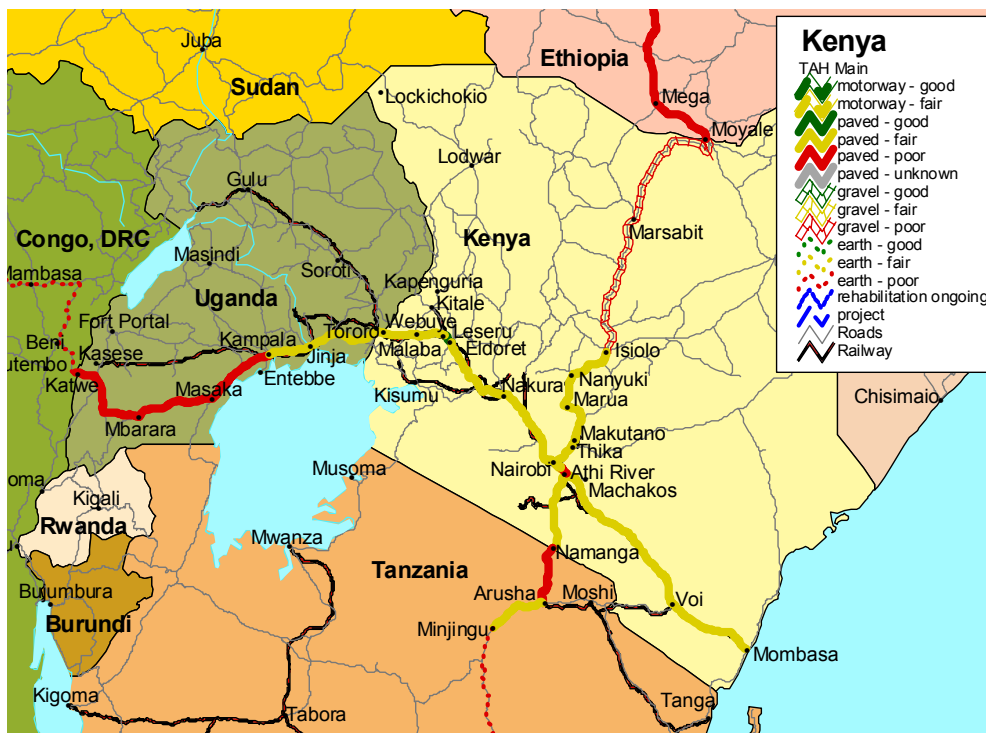


Table 4.2.4 Cairo - Gaborone Highway in Kenya

Kenya	Type				Condition					Road parameters (existing or in ongoing improvement)				Traffic flow	
	length	paved	gravel	track	good	fair	poor	construct ed	main- tained	paved width	shoulder gravel	shoulder paved	total width	total	heavy vehicles
	km	km	km	km	km	km	km	year	year	m	m	m	m	ADT	%
Moyale-Marsabit	249	9	240	0	0	131	118			8			8		
Marsabit-Isiolo	279	0	279	0	0	98	181			8			8	19	58
Isiolo-Nanyuki	80	80	0	0	0	80	0			6	2*1		8	721	18
Nanyuki-Marua	57	57	0	0	0	57	0		2001	6		2*1	8	1178	19
Marua-Makutano	53	53	0	0	0	53	0			6,5		2*1,5	9,5	4228	27
Makutano-Thika-Nairobi	56	56	0	0	0	40	16			2*6,5	2*1,5	2*1,5	19	15269	14
Nairobi-JKIA Turn off	14	14	0	0	0	14	0			2*6,5	2*1,5	2*1,5	19	6997	3
JKIA Turn off-Athi River	11	11	0	0	0	0	11			6,5		2*1,5	9,5	7276	16
Athi River-Namanga	139	139	0	0	77	47	15		2000	6	2*1		8	393	15
<i>Summary Kenya</i>	<i>938</i>	<i>419</i>	<i>519</i>	<i>0</i>	<i>77</i>	<i>520</i>	<i>341</i>								



**Volume 2 – Description of Corridors**

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The Cairo-Gaborone Highway through Kenya has a total length of 938 km. 419 km (45 %) are of paved standard; the rest, 519 km (55 %) are of gravel standard. The sections with paved surfaces represent all classes of pavement condition. 77 km are in good condition, 291 km in fair condition and 42 km in bad condition. A general observation about the pavement condition is that the pavement is suffering from inadequate bearing capacity, caused either by overloaded trucks or worn out pavement layers and sub-grade material. The poor pavement conditions could also be measured in the low travel speed, which has been recorded as 50 to 60 km/h for road sections with speed limits of 100 km/h.

The cross-section on most links contains a 6-6,5 m carriageway and 2 times 1 m shoulder. All sections are being treated in some way, some sections are being rehabilitated, and some sections are proposed for feasibility studies. The road structures are designed for axle load limits of 10 tons for single axle and 16 tons for narrow dual axles.

4.2.5 Tanzania

Map 4.2.5 Trans African Highways in Tanzania



Table 4.2.5 Cairo - Gaborone Highway in Tanzania

<i>Tanzania</i>		Type			Condition			Road parameters (existing or in ongoing improvement)						Traffic flow	
Section	length	paved	gravel	track	good	fair	poor	construct ed	main- tained	paved width	shoulder gravel	shoulder paved	total width	total	heavy vehicles
	km	km	km	km	km	km	km	year	year	m	m	m	m	ADT	%
Namanga-Arusha	104	104	0	0	0	0	104	1950	1998	6,5		2*1	8,5	281	17
Arusha-Minjingu	108	108	0	0	0	108	0	1989	1998	6,5		2*1	8,5	439	30
Minjingu-Dodoma	306	0	60	246	0	0	306			6,5			6,5		
Dodoma-Iringa	229	0	0	229	0	0	229			6,5			6,5	86	30
Iringa-Igawa	210	210	0	0	0	0	210	1970	1991-3	6,5		2*1,2	8,9		
Igawa-Mbeya	150	150	0	0	150	0	0	1970		6,5		2*1,2	8,9	810	31
Mbeya-Tunduma	109	109	0	0	0	0	109	1970		6,5		2*1,2	8,9	733	31
<i>Summary Tanzania</i>	1216	681	60	475	150	108	958								

**Volume 2 – Description of Corridors**

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The status of the road link forming part of the Cairo-Gaborone Highway in Tanzania, could in many sections be described as deteriorated beyond repair. Most sections of the Highway were built during the period 1950-1970. Out of the entire section of 1216 km between the Kenya and the Zambia border, only 150 km (22%) of the 681 km paved road sections could be classified as being in good pavement condition. The remaining 427 km of the paved length is in fair or poor condition. The rest of the Highway consists of earth (475 km) or gravel road sections (60 km) of poor or very poor standard.

The cross-section for the paved links consists of a carriageway with 6,5 m width and shoulders varying between 1 and 1,2 m width. No information has been available about the legal axle-load limit for heavy vehicles.

4.2.6 Zambia

Map 4.2.6 Trans African Highways in Zambia

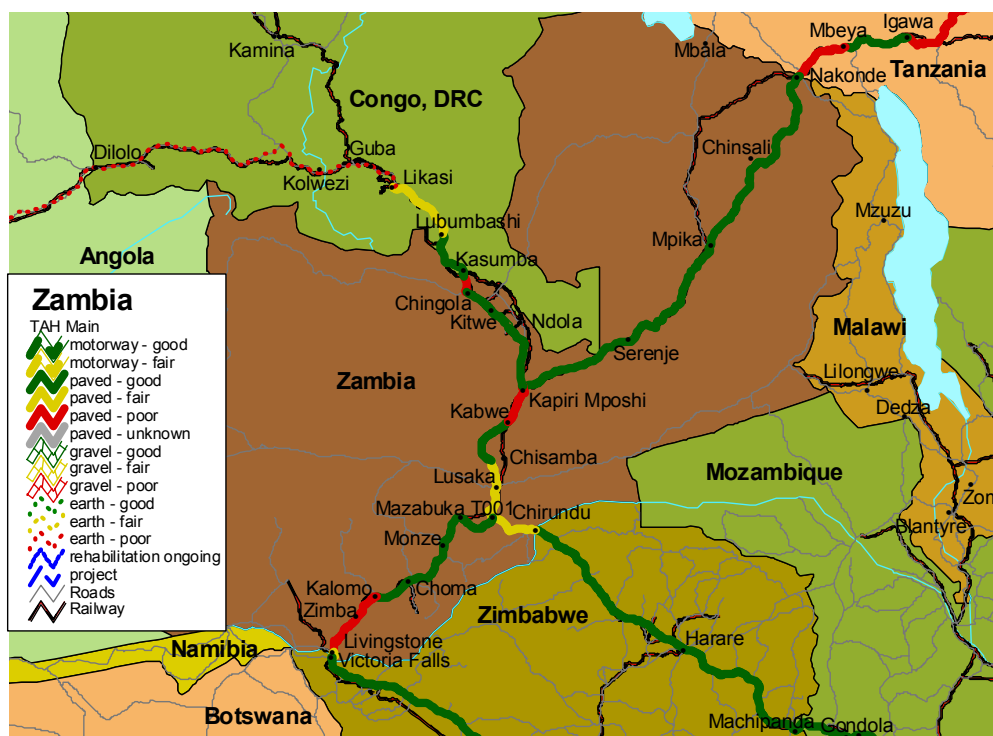


Table 4.2.6 Cairo - Gaborone Highway in Zambia

Zambia Section	Type				Condition			Road parameters (existing or in ongoing improvement)						Traffic flow	
	length km	paved km	gravel km	track km	good km	fair km	poor km	construct ed year	main- tain- ed year	paved width m	shoulder gravel m	shoulder paved m	total width m	total ADT	heavy vehicles %
Nakonde-Chinsali	206	206	0	0	206	0	0		2001	8	2*1		10	260	47
Chinsali-Mpika	170	170	0	0	170	0	0		2001	8	2*1		10	260	47
Mpika-Serenje	238	238	0	0	238	0	0		2001	8	2*1		10	419	40
Serenje-Kapiri	190	190	0	0	190	0	0		2000	8	2*1		10	568	32
Kapiri-Kabwe	68	68	0	0	0	0	68		1975	6	2*1		8	1513	25
Kabwe-Chisamba	92	92	0	0	92	0	0		1995	6	2*1		8	1893	31
Chisamba-Lusaka	47	47	0	0	0	47	0		1995	6	2*1		8	3138	46
Lusaka-T001	56	56	0	0	0	56	0	1976	1995	9	2*1		11	5362	13
T002-Mazabuka	69	69	0	0	69	0	0	1965	1999	6	2*1		8	738	20
Mazabuka-Monze	62	62	0	0	62	0	0	1965	1999	6	2*1		8	857	20
Monze-Choma	99	99	0	0	99	0	0	1965	1985	7	2*1		9	848	20
Choma-Kalomo	62	62	0	0	62	0	0	1965	1985	7	2*1		9	420	20
Kalomo-Zimba	50	50	0	0	0	0	50	1965	1985	7	2*1		9	399	20
Zimba-Livingstone	76	76	0	0	0	38	38	1965	1985	6	2*1		8	366	20
Livingstone-Victoria Falls	11	11	0	0	0	11	0	1965	1985	6	2*1		8	434	20
Summary Zambia	1496	1496	0	0	1188	152	156								

**Volume 2 – Description of Corridors**

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The road network in Zambia is generally of high age, originally from the 1960's. Efforts have been made to bring all road sections belonging to the highest road class, to maintainable standard. The entire road length of the Cairo-Gaborone Highway covers 1496 km, all paved. 152 km (10 %) is in a fair and 156 km (10 %) in poor condition. The rest (80%) is classified as good.

The width of the carriageway varies between 6 to 7 meters for older sections and 8 meters for recently rehabilitated ones. The shoulder width is 1 m, unpaved. According to the law, vehicles are not allowed to cross the edge line between the carriageway and the shoulder, which makes it almost impossible for two trucks to meet with normal speed on a narrow carriageway of 6 meters.

**4.2.7 Zimbabwe**

Map 4.2.8 Trans African Highways in Zimbabwe and Botswana

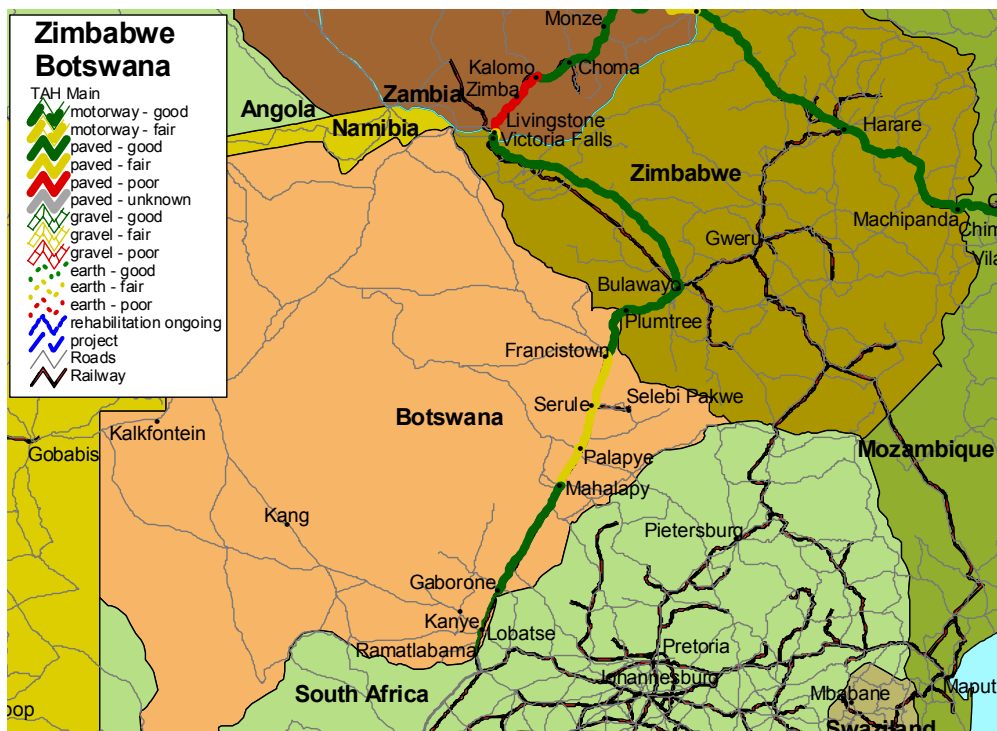


Table 4.2.8 Cairo - Gaborone Highway in Zimbabwe

<i>Zimbabwe</i>		Type			Condition			Road parameters (existing or in ongoing improvement)						Traffic flow	
Section	length	paved	gravel	track	good	fair	poor	construct ed	main- tained	paved width	shoulder gravel	shoulder paved	total width	total	heavy vehicles
	km	km	km	km	km	km	km	year	year	m	m	m	m	ADT	%
Victoria Falls-Bulawayo	448	448	0	0	429	0	19			7				2366	19
Bulawayo-Plumtree	90	90	0	0	90	0	0			12,5				1541	16
<i>Summary Zimbabwe</i>	<i>538</i>	<i>538</i>	<i>0</i>	<i>0</i>	<i>519</i>	<i>0</i>	<i>19</i>								

Information about the length and condition of the Cairo to Gaborone link through Zimbabwe has been provided by SADC in Maputo. The link starts at Victoria Falls and passes Bulawayo and Plumtree at the Botswana border. The entire road of 538 kms is paved and only 19 km are in poor condition.

**Volume 2 – Description of Corridors****4.2.8 Botswana**

As the road network does not end in Gaborone, information has been collected as far as to the border crossing to South Africa at Ramatlabama. Based on information received from SADC in Maputo the road link could be described as covering in total 643 km, all paved. 408 km (63 %) are in good condition, whereas 235 km (37 %) are in fair condition. The width of the carriageway has been noted as 6,7 m throughout the entire link.

Table 4.2.9 Cairo - Gaborone Highway in Botswana

<i>Botswana</i> <i>Plumtree-Gaborone</i>		Type			Condition					Road parameters (existing or in ongoing improvement)				Traffic flow	
Section	length	paved	gravel	track	good	fair	poor	construct ed	main- tained	paved width	shoulder gravel	shoulder paved	total width	total	heavy vehicles
	km	km	km	km	km	km	km	year	year	m	m	m	m	ADT	%
Plumtree-Francistown	90	90	0	0	90	0	0			6,7				523	38
Francistown-Palapye	163	163	0	0	0	163	0			6,7				1368	35
Palapye-Mahalapye	72	72	0	0	0	72	0			6,7				2010	33
Mahalapye-Gaborone	195	195	0	0	195	0	0			6,7				757	37
<i>Summary Botswana</i>	520	520	0	0	285	235	0								

The TAH link as indicated by ECA ends at Gaborone. A future extension of the corridor to Cape Town has at this stage been considered.

Table 4.2.10 Cairo - Gaborone Highway – extension to South Africa

<i>Botswana</i> <i>Gaborone-South African fr.</i>		Type			Condition					Road parameters (existing or in ongoing improvement)				Traffic flow	
Section	length	paved	gravel	track	good	fair	poor	construct ed	main- tained	paved width	shoulder gravel	shoulder paved	total width	total	heavy vehicles
	km	km	km	km	km	km	km	year	year	m	m	m	m	ADT	%
Gaborone-Lobatse	73	73			73					6,7				2438	23
Lobatse-Ramatlabama	50	50			50					6,7				1098	29
<i>Summary Botswana</i> <i>Gaborone-South African fr</i>	786	786	0	0	786	0	0								

### 4.3 ROAD TRAFFIC AND SAFETY

#### 4.3.1 Volume and Composition of Road Traffic Flows

##### *Egypt*

The main part of the Cairo-Gaborone Highway in Egypt carries traffic volume between 2000 and 5000 vehicles per day on the average. A moderate part of the traffic flow consists of heavy vehicles (5 to 10 %). The southernmost 100 km section of the TAH in Egypt carries very little traffic (approximately 20 vehicles per day). This reflects the fact that there is no transit traffic across the border to Sudan, partly due to the missing links in both Egypt and Sudan.

A visit to the new desert road indicated a hazardous vertical alignment. Theoretically the vertical radii may correspond to the speed limit of 100 km/h. In reality only a few vehicles are travelling within the legal speed limit, which means too short stop or sight distance for overtaking.



Photo 4.3.1-1

Trans African Highway south of Cairo



**Volume 2 – Description of Corridors**

Improving of traffic safety facilities is on-going. This work includes among others:

- Installation of metallic barriers;
- Paving of gravel shoulders;
- Installing further weighing stations;
- Construction of free rest houses.

Overload problems: Penalty fee 10 pounds (2,2 USD) per ton (which drivers pay gladly).

***Sudan***

The only traffic figures available are related to the N'djamena-Djibouti Trans African Highway, just south of Khartoum with an average traffic volume of about 3000 vehicles per day (20 % of which are heavy vehicles). There are problems with overloaded trucks. Legal axle weights are 10/16/22, tons but only total vehicle weight is measured.

***Ethiopia***

The traffic on the recorded road link has a characteristic of moderate total volume, but very high percentage of heavy vehicles, 50 to 80 %. The total traffic volume has been recorded to the following approximate numbers:

- 300 vehicles per day, north of Addis Ababa;
- 500 to 800 vehicles per day, south of Addis Ababa;
- 6000 vehicles per day near Addis Ababa.

Obstacles like bridges with too low bearing capacity or with damaged structures are interfering with a safe traffic flow. It has also been observed that railing in connection with bridges are not constructed with adequate length to protect vehicles from a hazardous drive off the road.

Unpaved shoulders result in pedestrians using the carriageway rather than the shoulders, thus causing hazardous manoeuvres for vehicles meeting other vehicles.

**Volume 2 – Description of Corridors**



Photo 4.3.1-2 + 3

Trans African Highway 4, north of Addis Ababa



Photo 4.3.1-4

Damaged bridge south of Addis Ababa

Overload is a huge problem. When controlled, the total weight is measured, axle load is calculated from the total weight and the number of axles. In reality one axle can reach 15 tons. ERA controls and issues ticket for overload, which has to be cleared with the police. Penalty fines 25 Birr/ton (3 USD/ton), which is the same amount as 20 years ago.

### ***Kenya***

The traffic volume on the Cairo - Gaborone Highways varies considerably from section to section. North of Nairobi the traffic volume is recorded to approximately 15 000 vehicles per day, south of Nairobi to about 7000 vehicles per day. Further to the north and towards the Ethiopia border the traffic drops from 720 vehicles per day to 20 on the last 500 km. From Nairobi towards the Tanzania border, the traffic drops from 7300 to 400 vehicles per day.

### ***Tanzania***

The traffic along the Cairo-Gaborone Highway is rather moderate, reaching the highest figure in the south (Mbeya) with 800 vehicles per day, and in Arusha with 440 vehicles per day. The percentage of heavy vehicles reaches approximately 30% on most sections.

***Zambia***

The total traffic volume on the Cairo-Gaborone Highway link has been recorded to 300 vehicles per day in the north and 400 vehicles in the southern part of the country. North of Lusaka the traffic increases to 3200 vehicles and south of Lusaka the corresponding figure is 5400 vehicles per day. The percentage of heavy vehicles is approximately 30 to 50 % in the northern part and about 20 % in the southern part of the country.

***Zimbabwe***

Traffic figures from 1995 indicate a moderate traffic volume of 2400 vehicles per day north of Bulawayo and 1500 vehicles per day south of Bulawayo towards the Botswana border. The percentage for heavy vehicles is recorded to 16-19 %.

***Botswana***

Traffic figures were provided for the year 1995. The traffic flow towards the border crossing to Zimbabwe is much lesser than on the Zimbabwe side, approximately 500 compared to 1500 vehicles per day on the Zimbabwean side. The last link towards the border crossing to South Africa carries 1100 vehicles per day. A high percentage of heavy vehicles have been recorded, viz. between 30 and 40 %.

**4.3.2 Other Modes of Transport**

There is only modest levels of modal competition along the Cairo-Gaborone Corridor. In the north there is both rail and river transport along the Nile and there is also rail transport in Zambia and Zimbabwe, but on a modest scale only.

**4.3.3 Road Security and Safety*****Road Safety***

The road safety and security situation is poor or very poor in most of Africa. The fatality rate per registered vehicle in Africa is 8-50 times higher than in the industrialised world although the road safety situation differs substantially from country to country. While the Central African Republic had a fatality rate of 339 persons per 10 000 vehicle in 1995, the same figure for Namibia was 9 in 1996.

There are a number of reasons for the poor road safety record of Africa. A rapid increase in the number of vehicles combined with poor road standard, lack of training, education and information in the road safety field. It has also proven difficult to establish the kind of multi-sectoral, inter ministerial institutional structures needed for successful road safety activities. For a more detailed discussion of the road safety situation in Africa, please see the presentation under Highway 3

### Tripoli-Windhoek

The problems along the Cairo-Gaborone Corridor in the field of road safety reflects most of the more general problems mentioned above. While there is little, or no, road safety information available related directly to this particular Trans African Highway, there is information available for some of countries intersected by the Highway. The fatality rate varies from 195 fatalities per 10 000 vehicles in Ethiopia to 17 in Zimbabwe. For most of the countries of the Cairo-Gaborone Highway the fatality rate were between 110 (Tanzania) and 39 (Zambia in the mid 1990s).

#### ***Road Traffic Security***

There are different types of security problems encountered by the road traffic in Africa in general and the TAH's in particular.

- Major security problems (large scale robbery, armed attacks etc.) often encountered in periods of conflict between and within countries;
- The lack, or poor availability, of telecommunication services, fuel, repair facilities, accommodation, food, drinking water, etc. along the roads constitutes another group of risks.

Security concerns of the first type are at present experienced only in DR Congo but has also been common in the Central African Republic over the years. The second type of problems is more prevalent and must be considered to be a constraint on road traffic along the least well developed sections of the Highway. While the first type of security problems could, on the whole, not be considered a major deterrent to normal road transport along this highway. This does not mean that there are no problems, rather that they are more in the nature of “normal” criminality. Possible exceptions to this are the area on the border between Kenya and Ethiopia and where cattle rustling and traditional fights between tribes at time spill over in road robbery.

## **4.4 MANAGEMENT OF THE CORRIDOR**

### **4.4.1 Responsibility for and Management of the Highway**

The management and coordination of this corridor at a multinational level is provided for by the REC's of the sub regions, i.e. COMESA, SADC and EAC. The Cairo-Gaborone Highway also had its own multi-lateral Highway Authority established at Bangui in the early 1980s. This Authority was given substantial powers, but functioned only for a limited period and was disbanded at the end of the 1980s.

The RECs have taken an active role in the planning and programming of the road networks of the member countries. Each of the RECs, as well as the individual member countries, has their own set of high priority roads. These priorities have however, not been established in isolation but rather after consultations and discussions with all parties involved, at both national and sub-regional levels. There is thus a high degree of agreement as to the main international road network in each of the sub-regions. It is apparent that the work on determining the core network has involved all main roads and has not in any way been directed exclusively towards the Trans African Highways.

Although the work done by RECs provides the framework for the development and investments in the road sector, it is the responsibility of each country to manage the implementation, including funding, contracting, supervision and maintenance. There is very high degree of dependence on outside funding, with the possible exception of the Highway sections in Kenya. The donors have had an important, if indirect, influence on the condition and future development of the Cairo - Gaborone Highway.

#### **4.4.2 Road Sector Operations**

As mentioned above the actual road operations are handled by the road administrations of the individual countries. The systems for road management varies somewhat from country to country. Some countries, like Zimbabwe, retain the more traditional set up with a Department of Roads forming an integral part of a ministry (Ministry of Works) and with most of the funding provided under the consolidated central government budget. Other countries have started the process of creating semi-independent organizations for the management of roads, and the funding of at least parts of the road activities. This reform process is strongly supported by the RECs but not fully implemented in most countries. A case in point is Kenya and Zambia which both have semi-independent Road Funds, while the road management operations remain within the responsible ministry.

The trends in the operational field (road design, construction and supervision) are a bit more consistent in the sense that in most countries there is a clear move to employ the services provided by the private sector. This includes assigning consultants and contractors for the design, construction, rehabilitation and maintenance activities. There is still some force account activities going on, e.g. in Kenya, but the trend is towards a steady increase in the private sectors' involvement in this field.



### **4.4.3 Strategy and Priorities**

The strategies employed and priorities established for the TAH network of highways amounts to a combination of strategies and priorities established at both national and REC levels. In the case of the Cairo-Gaborone Highway this means the positions taken by COMESA, EAC and SADC. The national priorities tend to coincide or to be closely related to those formulated by the RECs, and that is also the case for this Highway.

There are major improvements and rehabilitation requirements along the extent of the Highway as well as a maintenance backlog. The more specific measures planned to meet these requirements in the individual countries concerned could be summarized as follows.

#### ***Egypt***

The Ministry of Transport has decided to introduce the BOOT system (Build, Own, Operate and Transfer) within the road sector of Egypt through a law of 1996. One of the potential BOOT road links is a project from Fayoum to Assuit, consisting of a 260 km road running parallel to the existing Cairo-Gaborone Highway, but further away from the Nile river.

#### ***Sudan***

According to Sudans National Highway Authority there exist a firm opinion about priorities in the regional and national development of the road network.

- First priority:                      Route Port Sudan via Gadaref to Ethiopia.
- Second Priority:                    Nile route from Wadi Halfa via Khartoum, Rabak to  
Nimule at Uganda frontier.
- Third route:                        Lagos – Mombasa, connecting to the Nile route.

A maintenance Master Plan has been prepared and is used for the 2000-2010 period. A PMS (Pavement Management System) was developed and introduced in 1994.

***Ethiopia***

There is a rehabilitation and upgrading program under implementation covering 2540 km of trunk roads at an average cost of 220 000 USD/km.

The general objectives of ongoing improvements to regional transport links are:

- to facilitate the continuing development of Ethiopian foreign trade, including trade with Djibouti;
- to provide infrastructure that will permit the efficient delivery of food aid for the recurrent food crises which Ethiopia experiences;
- to lessen the dependence on the port of Djibouti for exports and imports of the country by improving the road access to alternative outlets to the sea.

In the field of maintenance Djibouti and Ethiopia are taking steps to improve their road maintenance capabilities and to ensure that maintenance is adequately funded. Continuing donor support for these activities is likely to be required.

***Tanzania***

A rehabilitation project for the road section from Arusha in Tanzania to Ashi river in Kenya is under preparation, as a regional project with the active support of ECA and the African Development Bank.

In addition to the ongoing rehabilitation and improvement programme which at present does not cover any section of the Cairo-Gaborone Highway a Road Maintenance Management System (RMMS) is under implementation.

**4.5 FUNDING****4.5.1 Corridor Programming**

The Cairo-Gaborone Highway is included in the sub-regional network of high priority roads as defined by COMESA, SADC and EAC .



#### **4.5.2 Sources of Financing**

In the countries of the Cairo-Gaborone Highway the funding of road sector activities is arranged along the following main lines:

- a) External assistance sources for road construction, rehabilitation (and to some degree also for period maintenance purposes);
- b) Central government financing of counterpart funds and the construction, rehabilitation and period maintenance work not covered under the different external assistance programmes;
- c) Road Fund for road maintenance in general and a routine maintenance in particular.

Although these three main sources of funding are all employed in the countries concerned their actual importance and availability varies greatly from country to country. The road sector activities in Kenya are highly depending on locally generated funds, with the Road Fund playing an important role for the upkeep of the Kenyan road network (the level of external assistance to improvement and rehabilitation projects is far below requirements). For the other countries external funding sources play a central role in the road sector.

A common condition in all countries is the fact that the funds made available to the road sector is inadequate to meet maintenance and rehabilitation requirements, although the situation varies considerably from country to country. Ethiopia has a major rehabilitation programme ongoing with external assistance but is falling behind in the field of period maintenance. At the same time the Road Fund is collecting more money than the different road authorities can spend, due to the lack of implementing capacity. Kenya has a huge rehabilitation and periodic maintenance backlog, while Zambia is collecting enough funds to maintain its network of main roads. The overall picture is one of shortage of funds and a considerable dependence on external assistance particular in the fields of rehabilitation and periodic maintenance. Routine maintenance activities appears better financed along the extent of the Cairo-Gaborone Highway, particular where there is access to Road Fund and Toll Road revenues.

### **4.6 TRADE AND TRANSPORT FACILITATION**

#### **4.6.1 Road Sector**

The main problem in the road sector is poor maintenance standard, a fact aggravated by high axle-loads resulting from the common over-loading of trucks. This inability

of the countries to properly control the total weight and axle-load of heavy vehicles have serious consequences for the whole road transport industry.

#### **4.6.2 Non-Physical Barriers**

There are progress in this field, but slow progress. Simplifications have been introduced in the field of custom procedures and handling, partly thanks to the introduction of computerised systems. However, the developments seem to be of the “two step forward, one step backward” kind. Although, the number of standard documents have been reduced and new are introduced, for instance the one Road Customs Transit Document now in use replaces 13 old ones. The reason given for this is that as traders and transporters try to avoid paying custom duties by utilising loopholes in existing regulations or outright fraud the customs authorities tend to counter such attempts with the help of new documents and/or control procedures, complicating the clearing process.

There are also major unresolved problems in this field. One has to do with the handling of customs bonds that at present functions as a fragmented system. Now each country through which transit goods pass, requires each their own bond. Work is now in progress to establish a Regional Customs Bond Guarantee that would be accepted by all corridor countries.

One simple measure, which would considerably reduce the waiting time at borders, would be to increase the number of hours the border post is open. Such extended opening hours have been temporarily introduced in e.g. Zambia in conjunction with the import of emergency food, with very good results.

The experience gained under the SADC pilot project “Transit System on the Trans-Kalahari” and described in some detailed in the presentation of Highway 3 above (Tripoli-Windhoek Highway) could be applied to at least some of the non-physical barriers experienced along the Cairo-Gaborone Highway.

#### **4.7 MISSING LINKS**

A missing link should fulfil the criteria of either to be none-existing as road with all-weather standard or with standard far below the minimum standard for the current traffic flow. Neglected road maintenance does not qualify for being a missing link. Thus poor sections with acceptable, yet too narrow road width are not listed as missing links. Gravel roads are included in the list of missing links, as they are meant to be upgraded sooner or later to fulfil the requirements of an international road.

In this sense missing links are observed in following countries:

***Egypt***

The only missing link is the southern 5 km towards the Sudan border. No plans exist to connect the neighbouring countries with their missing links.

***Sudan***

Considering the ongoing work on some sections, the only missing link found in Sudan is the section between the Egypt border and Ghaba, a section with a length of 433 km. A feasibility study has recently been completed for this link and a detail design is scheduled to be available during the year 2003.

***Ethiopia***

In physical terms, Ethiopia has no missing link along the described Trans African Highway, although some sections are in poor condition and require extensive rehabilitation inputs. However, the gravel section with a length of 185 km is in this context recorded as a missing link.

***Kenya***

Despite the ongoing activities with road rehabilitation, feasibility studies etc in Kenya, two sections are considered to be none-existing due to poor standard, lack of interest and consequently lack of maintenance inputs. These two sections are connecting the paved road section at Isiolo with the Ethiopia border, a link of 519 km with gravel standard in mainly poor condition

A Pre-Feasibility Study has been carried out (dated December 2000) and a Feasibility Study is proposed.

***Tanzania***

Similar to Kenya, there are two sections, which can hardly be used by common vehicles, due to the low standard and the very poor condition. Between Minjingu and Iringa, a section of 535 km, the road standard is an earth track. Vehicles avoid these sections, choosing rather the road towards Dar es Salaam, which results in an excess trip of approximately 300 km.

***Zambia, Zimbabwe and Botswana***

No missing link has been recorded in these countries.

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Details about the missing links are given below.

Table 4.8

Cairo-Gaborone Highway	Country	length	Type			Upgrading to recommended minimum standard	
			paved	gravel	track	description	cost
Section		km	km	km	km		M US\$
Arkeen-Wadi Halfa	Egypt	5			5	new road	2
Wadi Halfa-Ghaba	Sudan	433			433	new road	130
Sudan frontier-Azèzo	Ethiopia	185		185		improvement	20
Moyale-Marsabit	Kenya	240		240		new road	70
Marsabit-Isiolo	Kenya	279		279		new road	85
Minjingu-Dodoma	Tanzania	306		60	246	new road	90
Dodoma-Iringa	Tanzania	229			229	new road	70
<b>Summary</b>		<b>1677</b>	<b>0</b>	<b>764</b>	<b>913</b>		<b>467</b>

#### 4.8 CONCLUSIONS

The Cairo-Gaborone TAH constitutes an important corridor for road transport movements in the eastern part of Africa. The different TAH sections are serving major population and production centres from Cairo to Gaborone. The total length of Trans African Highways forming part of this corridor amounts to nearly 9 000 km. There are only a few major missing links and the total extent of such links amounts to about 20% of the total length of the Cairo-Gaborone TAHs. For about a third of the missing link kms there are alternative alignments made up of fairly high class, paved roads.

The highest level of traffic is found in Egypt, particular in the vicinity of Cairo. However, all major capitals in the corridor generate average daily traffic figures of 4000-5000 vehicles or above. Most of that traffic is local to its character but there is also a fair level of long-distance, international movements of passengers and freight along the corridor, particular in the central and southern sections of the corridor. There are also indications that the trans-border traffic in this part of the corridor is growing.

The management of the TAHs functions reasonably well in the corridor. There is a perennial shortage of funding, although basic maintenance requirements are on the whole catered for (basically because the primary road network, to which the TAHs belong, in most countries are given priority in the distribution of maintenance funds between the different categories of roads).

Well functioning RECs also contribute to the quality of management.

## **5 HIGHWAY 5 - DAKAR – N'DJAMENA**

### **5.1 DESCRIPTION OF THE CHARACTERISTICS OF THE CORRIDOR**

This corridor, also called the Trans Sahelian Highway, runs from Dakar to N'djamena, covering a distance of about 4500 km in 7 countries, Senegal, Mali, Burkina Faso, Niger, Nigeria, Cameroon and Chad (see map 5.1). Its alignment is largely determined by the five capitals that it transverses, Dakar, Bamako, Ouagadougou, Niamey and N'djamena. Consequently, it constitutes a natural and main road link in the sub region and which is composed by the main east west highways in the countries concerned, with the exception of Nigeria and Cameroon where it has a relatively lesser importance. It intersects with four other Trans African Highways, in Dakar with the Lagos-Dakar and the Cairo-Dakar Highways, in Kano in northern Nigeria with the Trans Saharan Highway and in N'djamena with the Tripoli-Windhoek Highway. From N'djamena the continuation eastward constitutes the N'djamena-Djibouti Trans African Highway link. The Trans Sahelian Highway also provides the main connection to the highways, which lead to the coast and the ports in West Africa. During the field visits the study team has visited Mali, Burkina Faso, Nigeria and Chad, including the Regional Economic Commissions (REC) headquartered there, which has provided the main source of information about the countries not visited.

Running parallel to the highway in long sections between Dakar and Bamako is the Senegal-Mali railway. This is a 1200 km long, single track, meter gauge non electrified line, which was taken into service in the late 1800's. Its main activity is freight but it also carries passengers. It has played and continues to play an important role by providing the only year round access to Dakar from Mali, as the roads from Bamako to the border with Senegal are presently in a shape which does not allow them to be usable under all conditions. The railway is presently being privatized and it is foreseen that this will lead to investments, modernization and increased efficiency.

The topography of the region does not represent any major difficulties with generally flat terrain with few rivers to bridge. There are a few links which are not yet paved. These concern the area in eastern Mali from the border to Senegal eastwards to Bamako as well as the approach to N'djamena. The sections in Mali are presently being constructed to paved standards or have firm programming with funding secured. Apart from those sections, about 640 km, the remaining 3850 km of the road is at present a paved two lane highway, generally 7 m wide with 1-1.5 m shoulders on each side. Except from where it runs through major agglomerations, traffic is

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rather modest at about 1000 vehicles par day, of which about 40% heavy vehicles, i.e. far from raising any concerns about capacity.

Map 5.1 Dakar – N’ djamena Corridor. Link number 5



Table 5.1 Dakar – N’ djamena Corridor. Link number 5

Section	Type				Condition		
	length km	paved km	gravel km	track km	good km	Fair Km	poor km
Senegal	801	756	0	45	327	0	315
Mali	904	394	0	510	266	374	375
Burkina Faso	862	862	0	0	753	0	109
Niger	837	837	0	0	136	103	598
Nigeria	972	972	0	0	0	972	0
Cameroon	113	28	0	85	0	0	113
Chad	7	7	0	0	7	0	0
<b>Total Dakar-N'djamena</b>	<b>4496</b>	<b>3856</b>	<b>0</b>	<b>640</b>	<b>1456</b>	<b>1449</b>	<b>1591</b>

## **5.2 PHYSICAL CONDITION**

The length and the main characteristics of the highway are shown in table 5.1 and on map 5.1. All detailed information from the inventory phase is summarised in sheets presented in Volume 4. Extracts from these sheets are shown in tables and illustrated in maps presented country wise.

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**5.2.1 Senegal**

Map 5.2.1 Trans African Highways in Senegal



Table 5.2.1 Dakar – N’djamena Highway in Senegal

Senegal	Type				Condition			Road parameters (existing or in ongoing improvement)						Traffic flow	
	length	paved	gravel	track	good	fair	poor	construct ed	main- tained	paved width	shoulder gravel	shoulder paved	total width	total	heavy vehicles
	km	km	km	km	km	km	km	year	year	m	m	m	m	ADT	%
Dakar-Diam Niadio	41	41	0	0	41	0	0								
Diam Niadio-Mbour	42	42	0	0	0	0	42								
Mbour-Kaoloack	106	106	0	0	106	0	0								
Kaolack-Kaffrine	60	60	0	0	0	0	60								
Kaffrine-Tambacounda	213	213	0	0	0	0	213								
Tambacounda-Kedougou	233	233	0	0	233	0	0								
Kedougou-Saraya	61	61	0	0	0	0	61								
Saraya-Falémé	45	0	0	45	0	0	45								
<i>Summary Senegal</i>	801	756	0	45	380	0	421								

The information about the TAH roads in Senegal was received from UEMOA.



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The Dakar - N'djamena Highway starts in the west in Dakar and goes through Senegal eastwards to Mali. Currently, there exists no entirely paved link between the capitals of Senegal and Mali, Dakar and Bamako. Two alignments are proposed: the southern way from Dakar – Tambacounda – Saraya – Kenieba – Kita – Bamako, and the northern way from Dakar – Tambacounda – Kidira – Kayes – Sandaré – Diéma – Kolokani – Bamako, see chapter 5.3.

In Senegal, the Trans African Highways towards Mali (Dakar-Kidira and Dakar-Kéniéba respectively) are paved, except the last 45 km between Saraya and the border to Mali. The missing link however is part of the designed new road between Saraya and Kita in Mali.

In order to remedy frequent congestions between Rufisque and Mbour, close to Dakar, rehabilitation and extension of the road on a length of 42 km is planned. The section between Kaolack and Tambacounda (273 km) is reported to be in a poor condition, and partial rehabilitation is programmed for 2003.

The road from Tambacounda to Saraya is in good condition except for the last 61 km between Kedougou and Saraya, which is to be rehabilitated.

The distance from Dakar to Kidira is 642 km, and between Dakar and Kéniéba 800 km.

UEMOA has programmed the following for the sections mentioned above:

Section	km	Object	Amount [Mio US\$]	Financing institutions	Status	Realisation
Diam Niadio-Mbour	42	Rehabilitation and extension of paved road	13	FKDEA/ BAD	Studies required	2002-2004
Kaolack-Kaffrine-Tambacounda	248	Rehabilitation of paved road	24,8	BOAD/ FED	Studies required	2002-2003
Kédougou-Saraya	60	Rehabilitation of paved road	3,6	FED/BID	Studies required	2002-2004
Saraya-border Mali	45	Reconstruction and paving	5,7	BID	Studies finished	2002-2005

By 2005 the road links from Senegal to the Mali border will be entirely paved and in accordance with current planning and standards.

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**5.2.2 Mali**

Map 5.2.2 Trans African Highways in Mali

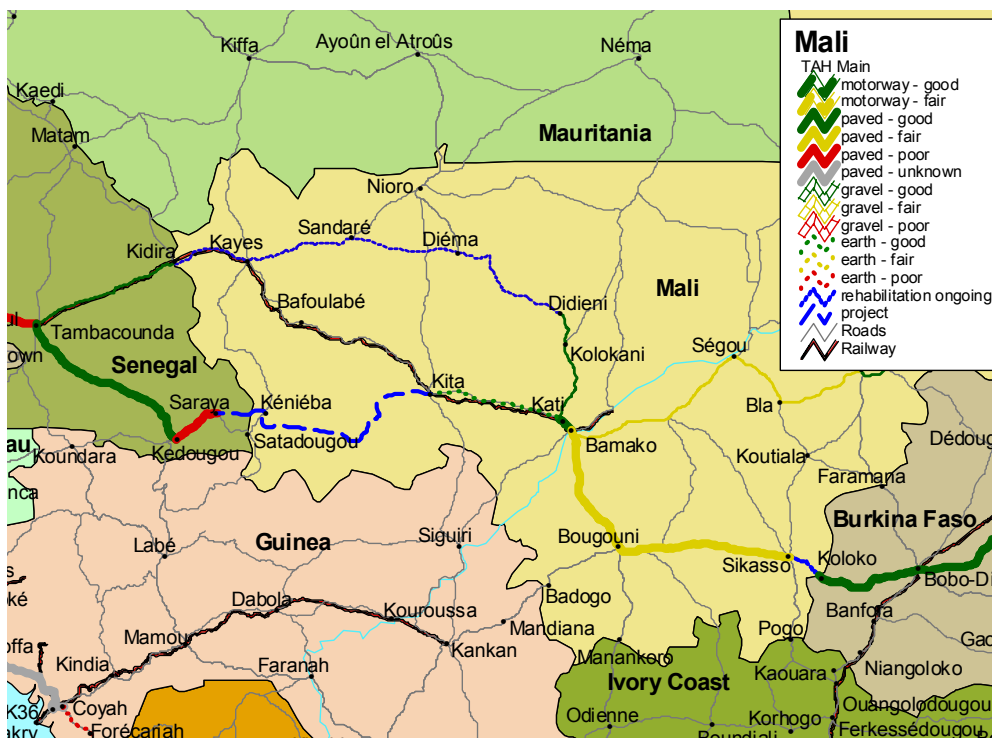


Table 5.2.2 Dakar – N’djamena Highway in Mali

Mali Section	length km	Type			Condition			construct ed year	main- tain- ed year	Road parameters (existing or in ongoing improvement)				Traffic flow	
		paved km	gravel km	track km	good km	fair km	poor km			paved width m	shoulder gravel m	shoulder paved m	total width m	total ADT	heavy vehicles %
Falémé-Kéniéba-Kita	300	0	0	300	0	0	300			7		2*1,5	10	14	43
Kita-Bamako	180	20	0	160	180	0	0	2001		7		2*1,5	10	51	45
Bamako-Bougouni	163	163	0	0	0	163	0			6		2*1,5	9	131	58
Bougouni-Sikasso	211	211	0	0	0	211	0			6		2*1,5	9	210	52
Sikasso-Koloko	50	0	0	50	0	0	50			7		2*1,5	10	50	36
<i>Summary Mali</i>	904	394	0	510	180	374	350								

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The Dakar - N'djamena corridor crosses Mali from Senegal in the west to Burkina Faso in the east. Between Senegal and Bamako there are two roads planned.

The western section of the TAH from the Senegalese border (river Falémé) to Kéniéba and Kita is not constructed yet. A detailed project has been elaborated and potential funding agencies identified. The next process stages are the updating of the economical study as well as an environmental impact assessment, as the road will cross vast forest areas and four rivers. The cost for the entire road from Saraya to Kita is estimated to 50 billion FCFA (76 MUSD). The connecting link between Kita and Bamako is a recently rehabilitated earth track, which will be paved as soon as decision about construction of the Saraya-Kita link is taken and funds are made available. The entire link from Senegal to Bamako will not be realised before 2005.

However, an entirely paved connection between Dakar and Bamako will be provided north of the TAH corridor by passing Kidira, Kayes, Sandaré, Diéma, Didjeni, Kolokani and Kati to Bamako. Until recently, the entire section consisted of an earth track. Currently, the road is in construction on the sections Kayes-Sandaré, Sandaré-Diéma and Didjeni-Bamako. The section between Kidira and Kayes will be strengthened and paved during 2003, and tendering has been initiated for the construction works. The alignment of Sandaré-Diéma road does not pass Nioro, as proposed by UEMOA, but goes straight between Sandaré and Diéma. The section between Diéma and Didjeni is an earth track (*terre moderne*) constructed in 1998. The paving was postponed due to a lack of funds, but consultants are updating the economic study, and after provision of funds the road will be entirely paved. The road from Kidira to Bamako is expected to be entirely paved as of 2005.

The Dakar - N'djamena link continues southeast from Bamako to Bougouni-Sikasso-Koloko on the border to Burkina Faso. The existing road is paved on a width of 6 m and is in general in a fair or bad condition. Structural strengthening and a new pavement would be necessary. However, funding has not made available yet. The missing link between Sikasso and Koloko is currently being constructed. The paved road will be completed in March 2003.

In 2001 the cost for routine maintenance of 8'500 km paved roads amounted to 5,5 billion FCFA, corresponding to a cost of 650'000 FCFA (about 1'000 USD) per km.

All roads presently being constructed or rehabilitated are designed according to ECOWAS' standards, which means a paved width of 7 m, shoulders of 1,5 m and a maximum axle load of 13 tons.

The road data for a network of 14'000 km is collected and managed in a database. The database includes information about geometric characteristics as well as about the road condition. Data concerning the degradation of the road surface could be included as well. However, the required measurement equipment is not available yet,

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but a request for funding has been prepared. As geographical information system tool the program IDR is used. Maps and database are not linked.

The road database system is used for preparation of preliminary studies as well as for planning of routine maintenance. As a planning tool HDM3 is used.

Information about the road condition is updated once a year. A large amount of staff has been trained with the available tools, also on regional levels.



Pictures 5.1 and 5.2: Road from Bamako to Kolokani, ca 10 and 40 km north of Bamako, respectively.



Picture 5.3: Road from Bamako to Kita, ca 10 km west of Bamako.



Picture 5.4: Road from Bamako to Bougouni, ca 10 km south of Bamako.



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**5.2.3 Burkina Faso**

Map 5.2.3 Trans African Highways in Burkina Faso

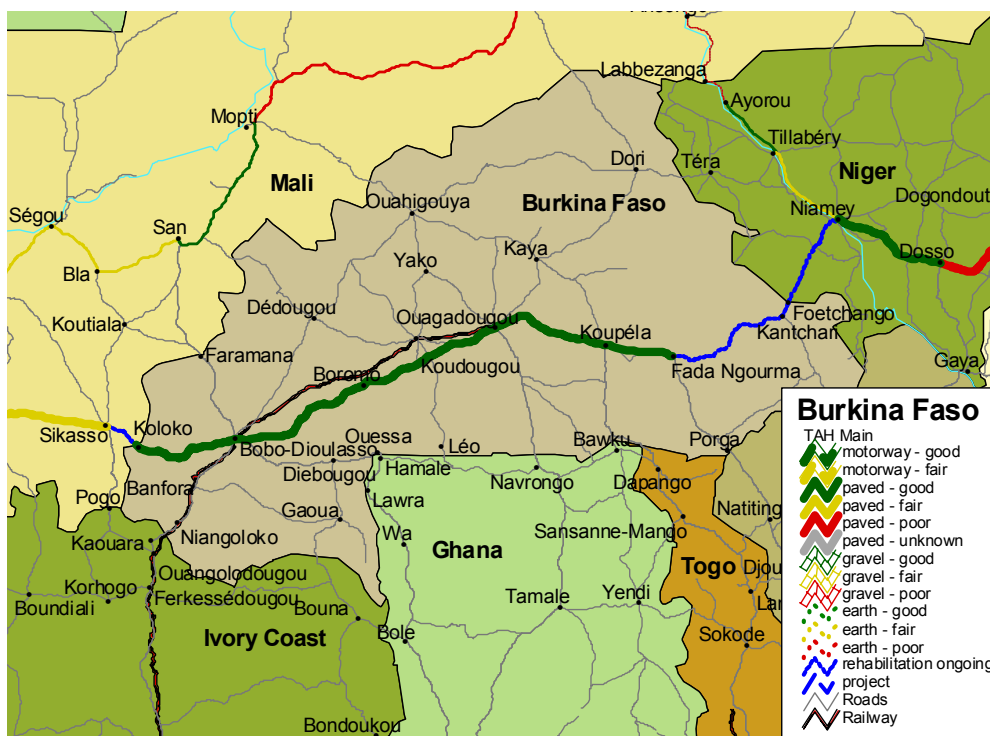


Table 5.2.3 Dakar – N’djamena Highway in Burkina Faso

Section	Type				Condition					Road parameters (existing or in ongoing improvement)				Traffic flow	
	length	paved	gravel	track	good	fair	poor	construct ed	main- tained	paved width	shoulder gravel	shoulder paved	total width	total	heavy vehicles
	km	km	km	km	km	km	km	year	year	m	m	m	m	ADT	%
Koloko-Bobo Dioulasso	118	118			118			68-69	97/98	7		2*1	9	100	40
Bobo Dioulasso-Boromo	182	182			182			76-82	00/02	7		2*1	9	700	40
Boromo-Ouagadougou	174	174			174			76-82	99/00	7		2*1	9	1000	40
Ouagadougou-Koupéla	137	137			137			70-72	00/02	7		2*1	9	1050	40
Koupéla-Fada Ngourma	82	82			82			80-82	00/02	7		2*1	9	550	40
Fada Ngourma-Kantchari	150	150			60		90	83-84	00/02	7		2*1	9	350	40
Kantchari-Foetchango	19	19					19	84-86		7		2*1	9	250	40
<i>Summary Burkina Faso</i>	862	862	0	0	753	0	109								

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The main east-west road within Burkina Faso, linking Mali with Niger, is an integral part of the Dakar-N'djamena Highway. Connecting the two biggest cities in Burkina Faso, Ouagadougou and Bobo Dioulasso, this link is of greatest importance in a national context, and highest priority to the link between Mali and Niger through Burkina Faso is also given in UEMOA's strategy.

The total length of the road between the border stations with Mali (Koloko) and the border with Niger amounts to 862 km. The road was constructed in the years 1968 – 1986, and is entirely paved. In 1997, periodic maintenance and rehabilitation of the deteriorated road was gradually initiated. Currently, about 90% of the road is rehabilitated and in good condition. East of Fada Ngourma towards the border with Niger, the rehabilitation works are currently being finalized on a section of 110 km. After completion of these works, the entire Trans African Highway in Burkina Faso will be in good physical condition.



Picture 5.5 and 5.6: Road from Ouagadougou to Koupéla

The Pictures 5.5 and 5.6 show the road from Ouagadougou towards the east, approximately 30 km from Ouagadougou. The road is completely equipped with signs, etc, and the infrequent curves are well marked.

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In the vicinity of Ouagadougou, the shoulders are partially eroded, see Picture 5.7. The surface of the pavement, which was laid some 10 years ago, is very even, without any potholes.



Picture 5.7: TAH in the outskirts of Ouagadougou

The real travel speed for passenger cars and for trucks is shown in the table below. For the passenger cars the estimation is given from the road administration. The estimation for the trucks comes from the truck drivers association.

	Distance [km]	Car		Truck	
		[h]	[km/h]	[h]	[km/h]
Border Mali-Bobo Dioulasso	118	2	60	4	30
Bobo Dioulasso-Ouagadougou	356	4	90	5	70
Ouagadougou-border Niger	380	5	75	8	50

According to the table above, the average travel times for cars are rather high and not significantly below the design speed, indicating a good physical condition of the road and no congestion. The low speeds for trucks are due not to the condition of the road but to non-physical factors discussed further below.

The periodic maintenance and the rehabilitation works along the Trans African



Highway have been executed at an average cost of 43 million FCFA per km, corresponding to about 65'000 USD per km. Routine maintenance has amounted to 230,000 FCFA / km (350 USD) per year, based on the average of the years 1997-2001.

The road design standards in Burkina Faso are derived from the French standards. Roads with two lanes have a paved width of 7 m, shoulders of 2 x 1 m and therewith a total width of 9 m. The axle load limit is 11,5 tons / axle. However, taking into consideration the frequently overloaded trucks, roads are designed for a load of 13 tons / axle. The main roads are usually designed for a speed of 100 km/h.

All road information is collected in a database managed by the road administration. The database includes general information (mileage, junctions, agglomerations), geometric information (horizontal and longitudinal profile, fill / cut slopes, paved / total width, ditches, bridges and sewers), structural information (depth of pavement, base course, subbase, ground material, CBR). The database also comprises results of periodical inspections and measurements of deformations, evenness, cracks, reparations, erosions, potholes, shoulder damages, etc. One inspection team has the task to inspect the roads and upgrade the database. It is envisaged to install two more inspection teams. The database also includes the deflexion parameters, a global appraisal of the condition of the road and the daily annual traffic flows. The database is part of an information system allowing the planning of the maintenance programme. For the planning the HDM model is used. The database is not yet linked to geographical data.

All the construction works (new roads, rehabilitation, periodic maintenance) are performed by private contractors. The construction works are supervised by the road administration. The design for new roads and for rehabilitation of existing roads is by 90% carried out by private consulting firms, 10% remains with the road administration. Soil investigations and material tests can in Burkina Faso only be performed by one state-owned laboratory.

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**5.2.4 Niger**

Map 5.2.4 Trans African Highways in Niger

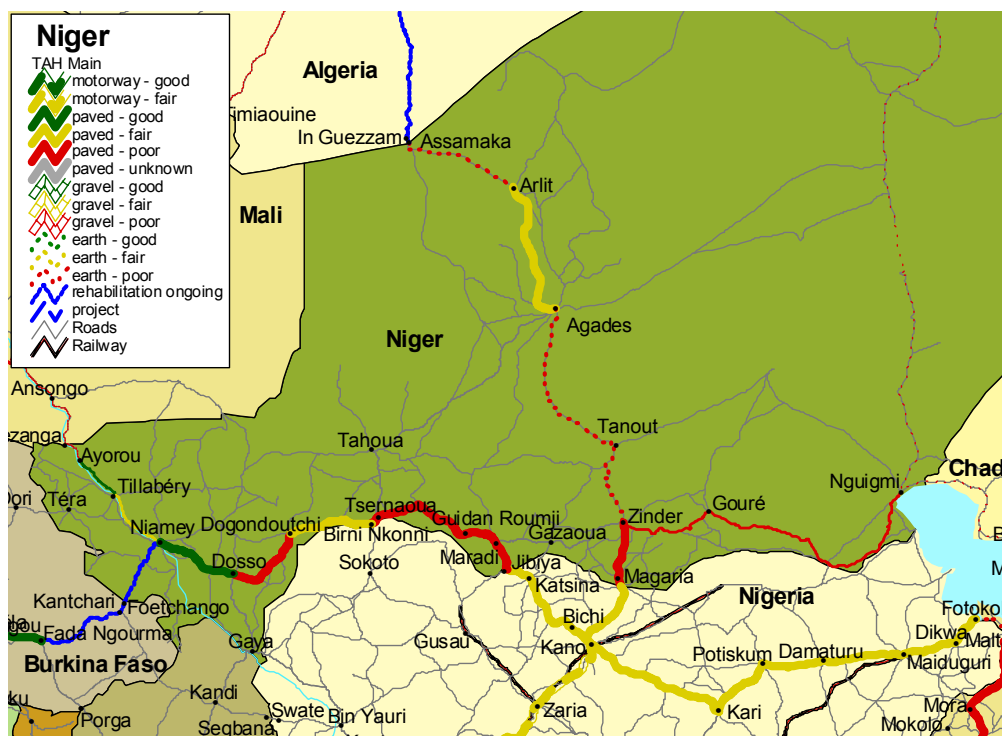


Table 5.2.4 Dakar – N’djamena Highway in Niger

Section	length km	Type			Condition			construct- ed year	main- tained year	Road parameters (existing or in ongoing improvement)				Traffic flow	
		paved km	gravel km	track km	good km	fair km	poor km			paved width m	shoulder gravel m	shoulder paved m	total width m	total ADT	heavy vehicles %
Foetchango-Niamey	120	120	0	0	0	0	120			7		2x1,5	9	391	
Niamey-Dosso	136	136	0	0	136	0	0		2002	7		2x1,5	9	1232	
Dosso-Dogondoutchi	136	136	0	0	0	0	136			7		2x1,5	9	1348	
Dogondoutchi-Birmin N’Konni	145	145	0	0	0	103	42	1971		7		2x1,5	9	663	
Birmin N’Konni-Tsernaoua	15	15	0	0	0	0	15	1971							
Tsernaoua-Guidan Roudmji	190	190	0	0	0	0	190	1971						728	
Guidan Roudmji-Maradi	45	45	0	0	0	0	45	1970						675	
Maradi-Jibiya	50	50	0	0	0	0	50								
<i>Summary Niger</i>	837	837	0	0	136	103	598								

The Trans Sahelian Highway crosses Niger along its southern border, from Burkina Faso via Niamey, Dogondoutchi, Birnin-Konni and Maradi to Jibiya on the border to

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Nigeria. However, UEMOA has outlined an alternative alignment, continuing along the southern border of Niger further eastwards to Zinder and Nguigmi and crossing the border to Chad north of Lake Chad.

The total length of the road between the border stations with Burkina Faso and Nigeria amounts to 837 km. The road is entirely paved, but is to a great extent in a poor condition. The rehabilitation of the link between the border to Burkina Faso and Niamey will start in September 2002. The periodic maintenance of the road between Niamey and Dosso is currently under way with completion foreseen for 2003. According to the investment programme of UEMOA, most of the other parts of the road will be rehabilitated during 2002-2004. The funding for a new bridge crossing the river Niger in Niamey has been finalised. The bridge will supplement the existing one and is foreseen for 2005.

UEMOA has programmed the following for the sections mentioned above:

Section	km	Object	Amount [\$]	Financing institutions	Status	Realisation
Border Burkina F-Niamey	120	Rehabilitation of paved road	12187	FED	Current	2002-2003
Niamey-Dosso	136	Rehabilitation of paved road	13325	FED	Current	2001-2003
Dosso-Dogondoutchi	136	Periodical maintenance	3359		Studies required	2002-2004
Dogondoutchi- Birni N’Konni	145			FED	Studies required	
Birni N’Konni-Tsernaoua	15	Periodical maintenance	260		Studies required	2002-2004
Tsernaoua-Guidan Roundji	190				Studies required	
Guidan Roundji-Maradi	45	Rehabilitation of paved road		BOAD	Studies required	2002-2004
Maradi-border Nigeria	50					

Except the sections Dogondoutchi-Birni N’Donni and Tsernaoua-Guidan Roundji, the Dakar – N’djamena Highway in Niger will be in good condition after fulfilment of UEMOA’s investment program for the next 5 years.

The continuation of the UEMOA community road CU2, which mostly coincides with the Dakar-N’djamena Highway, passes north of Lake Chad, without passing Nigeria. From Maradi, the road meets the Trans Saharan Highway in Zinder and continues eastwards to Gouré-Diffa-Nguigmi on the border to Chad. The link Maradi-Nguigmi has a total length of 832 km and is in very poor condition. This section is sometimes also attributed as feeder to the Trans Saharan Highway. The continuation in Chad does not exist yet.

Niger has indicated that one of the shortest road links from Niamey to N’djamena goes via Maradi-Zinder-Diffa in Niger and then over the border to Nigeria in Damasak joining the original alignment of the corridor in Dikwa, 50 km west of the border between Nigeria and Cameroon. However, the condition of the road between Zinder and Diffa is reported to be poor.

### 5.2.5 Nigeria

Map 5.2.5 Trans African Highways in Nigeria

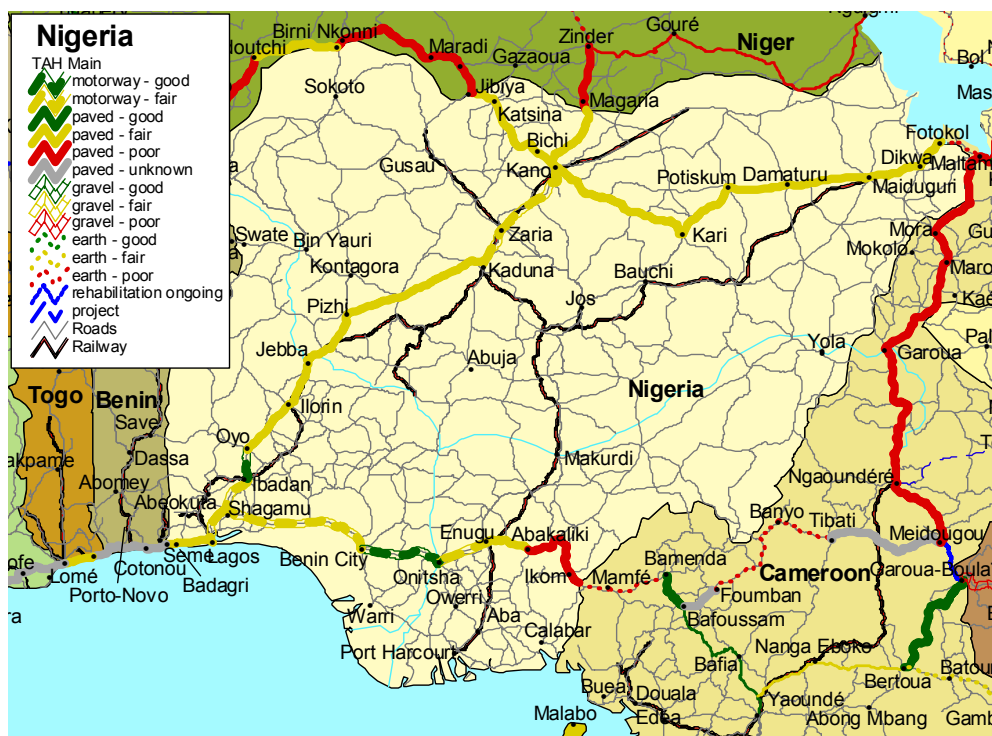


Table 5.2.5 Dakar – N’djamena Highway in Nigeria

Nigeria		Type			Condition			Road parameters (existing or in ongoing improvement)						Traffic flow	
Section	length	paved	gravel	track	good	fair	poor	construct ed	main- tained	paved width	shoulder gravel	shoulder paved	total width	total	heavy vehicles
	km	km	km	km	km	km	km	year	year	m	m	m	m	ADT	%
Jibiya-Katsine-Kano SB	128	128				128				7,3		2,75	12,8	4544	15
Kano SB-Bichi-Kano	90	90				90				7,3		2,75	12,8	2072	15
Kano-Kwana-Jigawa SB	115	115				115				7,3		2,75	12,8	13268	15
Jigawa SB-Bauchi SB	82	82				82				7,3		2,75	12,8	5432	15
Bauchi SB-Kari-Jobe SB	146	146				146				7,3		2,75	12,8	2903	15
Jobe SB-Damaturu-Borno SB	170	170				170				7,3		2,75	12,8	3377	15
Borno SB-Maiduguri-Fotokol	241	241				241				7,3		2,75	12,8	2444	15
<i>Summary Nigeria</i>	972	972	0	0	0	972	0								

According to ECA the Dakar-N’djamena highway traverses Nigeria along its northern border to Niger from Jibiya (border) via Katsina-Kano-Maiduguri to Fotokol on the border to Cameroon. The length of the road on Nigeria’s territory is

972 km. The road is entirely paved, and the condition of the road is generally considered as fair.

ECOWAS standards are applied when roads are reconstructed or rehabilitated.

### **5.2.6 Cameroon - Chad**

The section from the border (Fotokol) to Maltam (85 km) is an earth road, which is not passable during the rain season. The rain season lasts from May to September. As the road is not used by vehicles from Cameroon but mostly from Nigeria or Chad, no initiative has been taken in paving the section and allowing an all year round functioning.

The section from Maltam to Kousséri is paved and in poor condition. The crossing of the river Chari is made on a single lane bridge just south of N'djamena.

The Dakar – N'djamena Highway ends in N'djamena, adjacent to the border with Cameroon.

As far as the link from Nguigmi in Niger north of Lake Chad to Bol-Massakori (582 km) is concerned, the road does not exist yet. However, at the end of 2002 a feasibility study will be started regarding the construction of a paved road. The construction is estimated to 200 billion FCFA (about 300 MUSD). The funding has not been searched yet. The section from Bol-Massakori is included in Chad's first priority road network.

Map 5.2.6 Trans African Highways in Cameroon and Chad



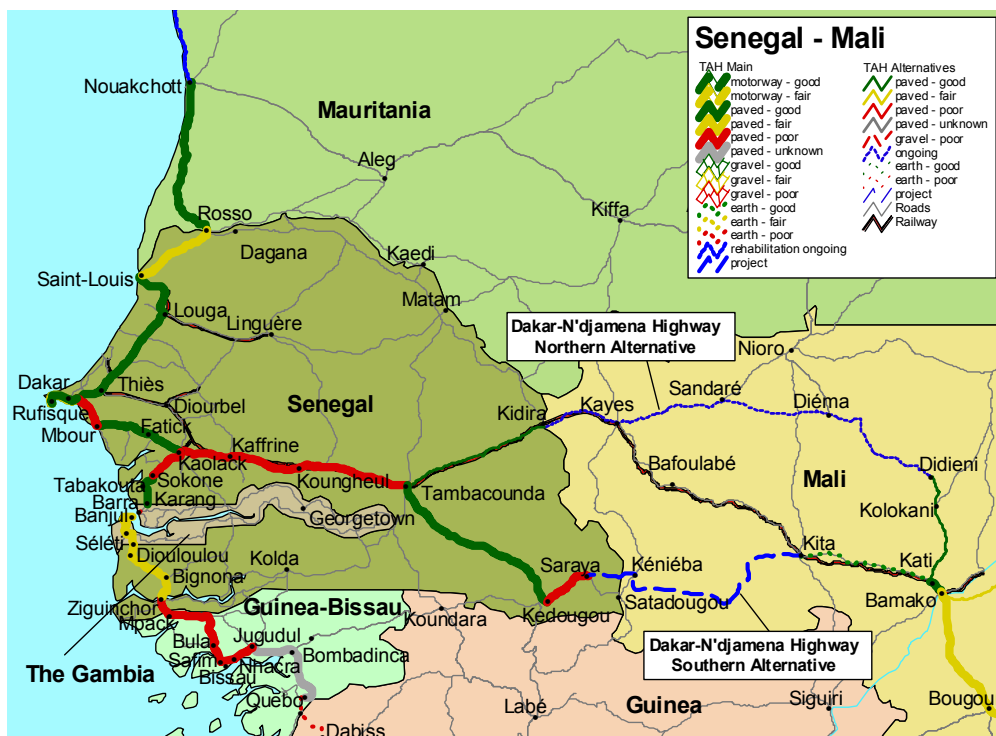
Table 5.2.6 Dakar – N’djamena Highway in Cameroon and Chad

Section	Type				Condition			Road parameters (existing or in ongoing improvement)						Traffic flow	
	length	paved	gravel	track	good	fair	poor	construct ed	main-tained	paved width	shoulder gravel	shoulder paved	total width	total	heavy vehicles
	km	km	km	km	km	km	km	year	year	m	m	m	m	ADT	%
<i>Cameroon</i>															
Fotokol-Maltam	85			85			85								
Maltam-Kousséri	28	28					28								
<i>Summary Cameroon</i>	<i>113</i>	<i>28</i>	<i>0</i>	<i>85</i>	<i>0</i>	<i>0</i>	<i>113</i>								
<i>Chad</i>															
Kousséri-N’djamena	7	7			7										
<i>Summary Chad</i>	<i>7</i>	<i>7</i>	<i>0</i>	<i>0</i>	<i>7</i>	<i>0</i>	<i>0</i>								

**5.3 ALTERNATIVE ALIGNMENT**

At the time being there is no entirely paved road from Senegal to Bamako in Mali. A northern and a southern alternative is currently proposed, see map 5.3. In a TAH context, the southern alternative is seen as the original alignment. However, the northern alternative is currently in construction and will be entirely paved until 2005.

Map 5.3 Dakar-N’djamena Highway, Dakar-Bamako Alternatives



The section from Dakar to Tambacounda is common for both alternatives. According to the northern alternative (CU2a according to UEMOA’s terminology), the Trans Sahelian continues towards Kidira, which is the border crossing to Mali. In Mali, the road passes the towns of Kayes, Sandaré, Diéma, Didjeni, Kolokani and finally Bamako. The southern alternative (CU2b according to UEMOA’s terminology) heads from Tambacounda south to Kedougou-Saraya, and continuation will be provided by a completely new road between Saraya and Kita in Mali, crossing the border on the river Falémé between Saraya and Kéniéba. From Kita, the existing road along the railway will be paved all the way to Bamako.

The distance from Dakar to Bamako amounts to 1’365 km along the northern alternative and to 1’281 km along the southern alternative.

According to the road administrations of Senegal and Mali, the southern alternative is considered as Trans African Highway, even though the time frame for the

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construction of the remaining missing link between Saraya and Kita is not defined yet. However, as completion of the Dakar-N'djamena Highway along the northern alternative is currently underway and will be completed until 2005 the link from Saraya and Kita is not considered as a missing link in context of the TAH network.

**5.4 ROAD TRAFFIC AND SAFETY****5.4.1 Volume and Composition of Road Traffic Flows**

The road traffic for the countries visited is shown in the table below.

Section	Total ADT	Passenger cars ADT	Heavy trucks ADT	Heavy trucks %
<i>Mali:</i>				
Kita-Bamako	51	28	23	45
Kidira-Kayes	97	44	53	55
Kayes-Sandaré	41	19	22	54
Sandaré-Diéma	not existing			
Diéma-Didjeni	573	241	332	58
Didjeni-Kolokani-Kati	150	100	50	33
Kati-Bamako	2241	2231	10	0
Bamako-Bougouni	131	55	76	58
Bougouni-Sikasso	210	100	110	52
Sikasso- border	50	32	18	36
<i>Burkina Faso:</i>				
Border-Bobo Dioulasso	100	60	40	40
Bobo Dioulasso-Boromo	700	420	280	40
Boromo-Ouagadougou	1000	600	400	40
Ouagadougou-Koupéla	1050	630	420	40
Koupéla-Fada Ngourma	550	330	220	40
Fada Ngourma-Piéga	350	210	140	40
Piéga-Niger border	250	150	100	40

**5.4.2 Road Security and Safety**

The road safety and security situation is poor or very poor in most of Africa. The fatality rate per registered vehicle in Africa is 8-50 times higher than in the industrialised world although the road safety situation differs substantially from country to country. While the Central African Republic had a fatality rate of 339 persons per 10 000 vehicle in 1995, the fatality figure for Namibia was 9 in 1996.

There are a number of reasons for the poor road safety record of Africa. A rapid increase in the number of vehicles combined with poor road standard, lack of



training, education and information in the road safety field. It has also proven difficult to establish the kind of multi-sectoral, inter ministerial institutional structures needed for successful road safety activities. For a more detailed discussion of the road safety situation in Africa see the presentation under Highway 3 Tripoli-Windhoek.

The problems along the Dakar-N'djamena Highway in the road safety field reflects most of the more general problems mentioned above.

## **5.5 MANAGEMENT OF THE CORRIDOR**

### **5.5.1 Responsibility for and Management of the Highway**

On the regional or continental level, the Trans Sahelian Highway has been defined by the ECA documents issued with respect to the Trans African Highways. It is the alignment shown in map 5.1. It is fully defined with the exception of the section in Senegal from Tambacounda to the frontier with Mali which shows two alternative alignments with two corresponding alternative alignments on the Mali side up to just west of Bamako. However, on the ground the northern alignment is now being completed to paved conditions in its entirety with completion expected for around 2004/2005 and it can thus be seen as part of the Trans Sahelian Highway. This does not exclude the continued works on the southern alternative.

On the sub regional level there are two Regional Economic Communities (REC) which have a direct interest and bearing on the Trans Sahelian Highway. The Union Economique et Monetaire Ouest Africaine (UEMOA), comprising Benin, Burkina Faso, Cote d'Ivoire, Guinea Bissau, Mali, Senegal, Togo, and with headquarters in Ouagadougou as well as the Economic Community of West African States (ECOWAS) with a membership, in addition to the aforementioned countries, also Cape Verde, Gambia, Ghana, Guinea, Liberia, Niger, Nigeria, Sierra Leone, headquartered in Abuja, have both taken an active role in the planning and programming of the works and improvements in the corridor. Further east, none of the RECs of the Central African Sub-region appears to engaged in road planning and programming for the Trans Sahelian Highway in the same way as UEMOA and ECOWAS have done.

UEMOA is deeply involved in planning and coordinating both with respect to the road networks and traffic as well as in transport and trade facilitation. In September of 2001 UEMOA completed a report in the field "Infrastructure and Road Transport in the Member Countries of UEMOA". This very comprehensive report deals with road programs in the countries concerned, trade and transport facilitation, road information systems and traffic safety within a ten year horizon. The road programs concern those roads which have a community (REC) interest and defines a network

of 27 main roads of community wide interest. The report was discussed during a round table in March of 2002 and a five year investment program was subsequently adopted by the members, as the framework for their national plans and programs.

ECOWAS has also carried out a study on the development and maintenance of the road network in the member countries, dated April 2002. For the Trans Sahelian Highway it involves only the programming of missing links, in Mali and Senegal.

These two studies are not quite comparable in that they have somewhat different priorities and coverage but they are basically consistent.

Final responsibility for the roads, including the Trans Sahelian Highway, rests with the countries concerned. This is true particularly for the execution of all works and their financing. With respect to planning there is a mutual influence and complementarity between the work done by the REC's and that carried out by countries. This was attested to by the work done by UEMOA for the road plan which was extensively discussed and modified through inputs from the countries before issued in final version. Thus the recommendations arrived at by the REC's can be seen as providing the framework for the national plans.

As the countries through which the corridor passes are all poor, the lack of resources is the foremost problem affecting the road networks, including the Trans Sahelian Highway. International financial assistance therefore plays a crucial role in all of the countries, except Nigeria, in some cases reaching 90% of the total road budget and accounting for all expenditures except for administration and routine maintenance. Thus, the influence of the IFI's and donors is naturally rather important. In the policy area this has led to conditionalities requiring that the countries give absolute priority to routine maintenance when allocating their own resources. Despite this severe financial constraint, the road administrations generally perform on a sufficiently high technical level.

### **5.5.2 Road Sector Operations**

In all the countries visited, the overall responsibility for the so called national road network, i.e. the main roads, is with the National Road Administration which reports to the Ministry of Transport. It is charged with planning and programming as well as all maintenance, rehabilitation and new construction works. In addition it is also charged with operating various activities such as toll collection.

As the extent of the networks varies between the countries, so do the staffing and the competencies. Generally, the Road Administrations are considered relatively well equipped and competent for the tasks confronting the road networks for which they are responsible. In the area of maintenance programming, based on a computerized road data bank and the routine use of sophisticated planning tools, such as HDM-4,

some administrations, such as the one in Burkina Faso, are quite advanced.

The execution of all works, except routine maintenance, is done on a contract basis by private companies. This also applies to all design work.

### **5.5.3 Strategy and Priorities**

The sub regional strategies as identified by the REC's are clear and consistent. The strategy for developing the road networks has been defined according to three levels of priorities. The first priority is assigned to the main roads that connect the capitals of the member states. The second deals with alternative connections between the capitals and the third finally with those roads leading to non member neighbouring countries. Within each priority five components are then defined. For the paved roads they deal with periodic maintenance and rehabilitation, pavement of earth roads, bridge and drainage works and earth road periodic maintenance. Routine maintenance is viewed as a basic priority and has not been included as such in the strategy. Its role and importance are recognized and it is underlined by the fact that international financial institutions and other donors generally require, as a condition for their assistance, that routine maintenance be carried out with the countries' own means.

Thus, within UEMOA the Trans Sahelian Highway clearly fits into the first priority as it is the main connecting road between the capitals. Also without this definition of priorities these sections would be among the most important ones as they constitute the backbone of the networks and are the roads with generally the most traffic. With respect to the section through Nigeria, it has not been assigned any priority in the ECOWAS program.

Apart from the strategies and priorities concerning the roads, the aspect of non physical barriers to trade and traffic has a most significant and detrimental effect in the region. The multitude of controls, both formal and informal, that exist on the main roads is seen as a main impediment to the free and efficient flow of passengers and goods. To improve this situation has therefore been given high priority in various REC programs. The situation as well as the measures proposed to improve it are described in section 5.6 below.

## **5.6 FUNDING**

### **5.6.1 Corridor Programming**

Both UEMOA and ECOWAS have programmed expenditures for the Trans Sahelian Highway for the next few years. As explained above, the two programs are conceptually not identical and the UEMOA program appears to be more reflected in

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the countries' own road sector programs. It foresees for a five year period total expenditures covering periodic maintenance, rehabilitation and strengthening as well as paving of the non paved links a total expenditure of USD 225 million, or about USD 45 million per year. To this should be added the expenditures in Nigeria, Cameroon and Chad as well as those for routine maintenance. Thus, for the UEMOA members concerned this implies an average annual expenditure level of about 2.5 MUS\$D. This is well within the overall planning framework.

**5.6.2 Sources of Financing**

As mentioned above, the financing of the whole road sector relies to an extremely high degree upon international grants and credits. This has been the case for many years and it is not likely that the situation will radically change in the foreseeable future. Thus the further improvement and maintenance of the Trans Sahelian Highway is dependent on the continued availability of grants and credits. The works presently under way and planned in Mali to connect to Senegal are financed under EU grant arrangements. The rehabilitation and periodic maintenance programs are well within the priority given to preserving the existing road networks and the likelihood of their funding can be considered assured.

With respect to the western sections through Niger, Cameroon and Chad, their financing remains uncertain. Road tolls have been introduced and are being gradually extended in several countries (Mali, Burkina Faso, Niger). However, the relative importance of these proceeds remains limited.

**5.7 TRADE AND TRANSPORT FACILITATION****5.7.1 Scope of the Problem**

The problem of non physical barriers to trade and transport has been much noted and commented upon as a general problem and impediment to development in Africa. Thus West Africa is not unique in this respect but it is widely recognized that such problems are particularly severe in that region. It affects both freight and passenger transport, particularly between the countries but also within them. It has reached such proportions that it is no longer just a general nuisance and inconvenience to trade and transport but has severe negative effects on the development and integration processes in the region. The operations on the Trans Sahelian Highway are therefore also much affected.

### **5.7.2 Agreements and Protocols**

There is a large number of international agreements and protocols in the area of trade and transport facilitation and which would have a direct bearing on the conditions in West Africa, as they aim at simplifying and harmonizing trade and transport between the signatory parties. They also provide a useful framework for other possible sub regional and bilateral agreements dealing with the same questions. However, very few African countries adhere to these conventions. The TIR convention for example, which enables a truck or container with a TIR document to travel from origin to destination without having to be subjected to customs inspection at each border crossing, has been ratified only by two African countries (Morocco and Tunisia). The reasons for the general non adherence to such international agreements are varied but are often found in the lack of capacity to administrate them.

There are however on the sub regional level several agreements and protocols entered into between the countries which have the objective of facilitating the movement of freight and passengers. The two most important such conventions which have been entered into by the ECOWAS member states are the conventions pertaining to Inter State Transports (La Convention de Transport Inter-Etats, TIE) and Inter State Road Freight Transit (La Convention Relative au Transit Routier Inter-Etats de Marchandise, TRIE). These conventions define the conditions of road transport between member states and provide the transit, without interruption, of freight as well as the non payment of customs and other fees, covered by the single TRIE document. Both conventions were signed in 1982 and have entered into effect. In addition, there are other agreements entered into on a sub regional basis with the aim of harmonizing transport conditions.

In addition, and in reality overshadowing the sub regional agreements are the numerous bilateral agreements international road transport which have been entered into between the countries in the sub region. In fact, it has been estimated that of the rules which govern road transport in the UEMOA area, only 30% are sub regional, the remaining 70% being either bilateral or national. It has been indicated that there are, between the UEMOA members, more than 100 agreements in the transport area. This obviously does not contribute to a unified and coordinated transport market but leads to many rules covering the same areas with ensuing uncertainty and a multiplication of forms and procedures.

### 5.7.3 Non-Physical Barriers

A problem for road transport in the region, in some respects more serious than the lack of coordinated rules, is the relatively widespread non application of the existing rules and the proliferation of various controls and check-points, not only at the border crossings but also within the countries. In addition, not all the controls are official but there are also many unofficial controls which levy important amounts from the truckers, bus operators and passengers. This is a problem which has been extensively studied and where the results all indicate huge economic losses for the countries. It has for example been estimated that only the non application of the TRIE convention between eight member states of ECOWAS gives rise to annual losses (1997), through various charges levied under way as well as loss of time at such checkpoints, of more than two billion CFA, or about 3 MUSD at today's exchange rate.

The proliferation of controls and checkpoints underway is most disruptive for transport. Between Lagos and Abidjan, a distance of less than 1000 km, it has been reported that there were, in 2000, 69 different control points, i.e. one every 15 km. On the road through Burkina Faso from the border with Cote d'Ivoire to the border with Niger, which is about 900 km within one country, there are 37 controls. Each of these controls collected one to two thousand CFA so the total adds up to around 50,000 CFA (about 75 USD) per loaded domestic truck travelling that road with about twice that amount charged from foreign trucks. The control points are not fixed but vary from time to time. They are set up and manned by various entities such as police (national as well as municipal), gendarmerie, customs, veterinary services, etc. Neither are they all official and the main purpose is reported not to be a control of adherence to laws and regulations, but simply to collect money from those using the roads. Also, the procedures on the borders are reported to be very cumbersome, usually taking at least one full day. There are other problems at the borders. As the border posts are separated, all the procedures and controls, and hence the time needed, are duplicated. In addition, there is a widespread system of obligatory customs escorts in which the trucks are forced to wait until a sufficient number of them are formed into a group which is then escorted by customs officers. As these escorts are not organized on a daily basis, they further add to the time needed for transport. There are also fees to be paid by the vehicles thus escorted, even if the escorts never take place.

The problems are thus extensive, deep rooted and difficult to come to grips with. They have been noted for a long time, and the studies and proposals how to improve the situation are numerous, ranging from additional studies to decreasing the number of controls and adherence to and application of international conventions in these

areas. The concrete measures underway, on a pilot basis, include the construction of border posts situated in one common area, to shorten the time for crossing the border, and the introduction of an observatory function to continuously report on the delays and other conditions on the borders and elsewhere. Basically, the problems and their solutions are of a political nature and thus require agreements and interventions from the highest government levels.

One proposal on how to mobilize such a political intervention is to convince the financing institutions to introduce a conditionality dealing with the reduction of the non physical barriers. Most of the countries finance all the rehabilitation activities and new construction from loans and grants. In order for this to be effective there needs to be a coordination and understanding between the financing institutions. This should be possible through a donors' conference which is an established procedure for the coordination of lending activities. There are already a number of conditions tied to road sector financing, such as environmental protection measures, AIDS prevention, adequate current maintenance funding and others. The issue of non physical barriers is of such importance to the functioning of the transport system and the viability of the investments that it seems to be fully justified for the financing institutions to introduce such a conditionality, for all operations in the road sector. A successful example of such an approach can be found in Central Africa where the European Union, which is a dominant financing institution for roads in the sub region, has imposed strict requirements on maximum axle loads as a condition for financing. If such an approach to the problem of non physical barriers will lead to a real decrease in the gross inefficiencies now prevailing, only time and experience will tell. However, the likelihood of the governments being willing and capable to respond, leading to positive effects, seems probable and at any rate well worth trying.

## **5.8 MISSING LINKS**

The western section of the TAH from Saraya in Senegal crossing the river Falémé to Kéniéba and Kita is missing. A detailed project has been elaborated and potential funding agencies identified. The next process stages are the updating of the economical study as well as an environmental impact assessment, as the road will cross vast forest areas and four rivers. The connecting link between Kita and Bamako is a recently rehabilitated earth track, which will be paved as soon as decision about construction of the Saraya-Kita link is taken and funds are made available. The entire link from Senegal to Bamako will not be realised before 2005.

However, an entirely paved connection between Dakar and Bamako will be provided by construction of the road north of the TAH link, via Kidira-Kayes-Sandaré-Diema-Didjeni, which will be completed before 2005.

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A missing link can be found in Cameroon, between Fotokol on the to Nigeria, and Maltam, length 85 km. The road is not paved and in a poor condition. This section is not prioritised by the Cameroon road authority, as the road is only used by vehicles traversing Cameroon from Nigeria to Chad or vice versa.

Table 5.7

Dakar-N'djamena Highway		Type				Upgrading to recommended minimum standard	
Section	Country	length	paved	gravel	track	description	cost
		km	km	km	km		M US\$
Saraya-Falémé	Senegal	45			45	new road	10
Falémé-Kéniéba-Kita	Mali	300			300	new road	85
Kita-Bamako	Mali	180			180	paving	30
Fotokol-Maltam	Cameroon	85			85	new road	10
<b>Summary</b>		<b>610</b>			<b>610</b>		<b>135</b>

## 5.9 CONCLUSIONS

The main road policy priority in West Africa has been, and remains, to connect the capitals with paved all weather roads. The Trans Sahelian Highway has contributed in an important way to this objective. However, it is but one part of the picture and with other roads having the same importance in the efforts to better integrate the countries of the sub region. Some other roads, e.g. those to the main ports, may even be of more importance. The REC's of the sub region, UEMOA and ECOWAS, have recognized this by defining and developing a category of important sub regional roads, the community roads. Therefore it is not unreasonable to say that the main impact of the Trans Sahelian Highway has been to provide good road links between neighboring countries rather than providing a Trans African link which has developed almost as a byproduct or an afterthought.

In this perspective it is not surprising to note that the main problems encountered in expanding the Trans Sahelian Highway have been the same as for the network in general, i.e. mainly one of finding financing. In the search for financing it is evident that funding a Trans African Highway link has not been appreciably easier than funding any other link. The financing institutions have required uniform justifications for all road projects. This appears fully justified also in the light of the road classification mentioned above.

The main stakeholders have thus been the countries through their Ministries of



Transport and Road Administrations, and the financing institutions. The one real issue in this context is that of the distribution of work and responsibilities between the REC's, i.e. UEMOA and ECOWAS. Both organizations have done valuable work in planning, programming and coordinating the road sector in the sub region. It is also undeniable that some of the work has been overlapping and thus could have been more efficient with clearer demarcation lines between the two REC's. This is a general and inherent issue, well noted and debated, and not one particular for the road sector. Therefore the solution also has to be of a more general character and the mission thus abstains from making any recommendations in this area.

The mission does recommend however that some such coordinating role as the REC's have played, should be further developed. There is a real need to attack some important issues collectively on a sub regional basis. Most important among these is the problem of non physical barriers which, as has been described above, is a real handicap for overall development of the countries. As a proposed measure, the report recommends that the financing institutions a conditionality aiming at decreasing the non physical barriers. The REC's are also well placed to continue raising this issue. In addition, there is also a need to promote professional development and cooperation which is considered best done on a sub regional basis where the conditions often are quite similar and where there are common problems to be discussed and solved. The REC's already have their transport departments and these could be developed further into a forum for road policy and development discussions.

## 6 HIGHWAY 6 - N'DJAMENA - DJIBOUTI

### 6.1 DESCRIPTION OF THE CHARACTERISTICS OF THE CORRIDOR

This corridor transverses desert or semi-desert areas in the west and mountains in the east, with Sudan in the centre, see map 6.2. The corridor functions as an artery for goods and passengers between the landlocked parts of Sudan, Ethiopia and Chad to the capitals of the three countries as well as to the ports of Nigeria in the west and main ports in the east like the Ports of Sudan and Djibouti.

### 6.2 PHYSICAL CONDITION

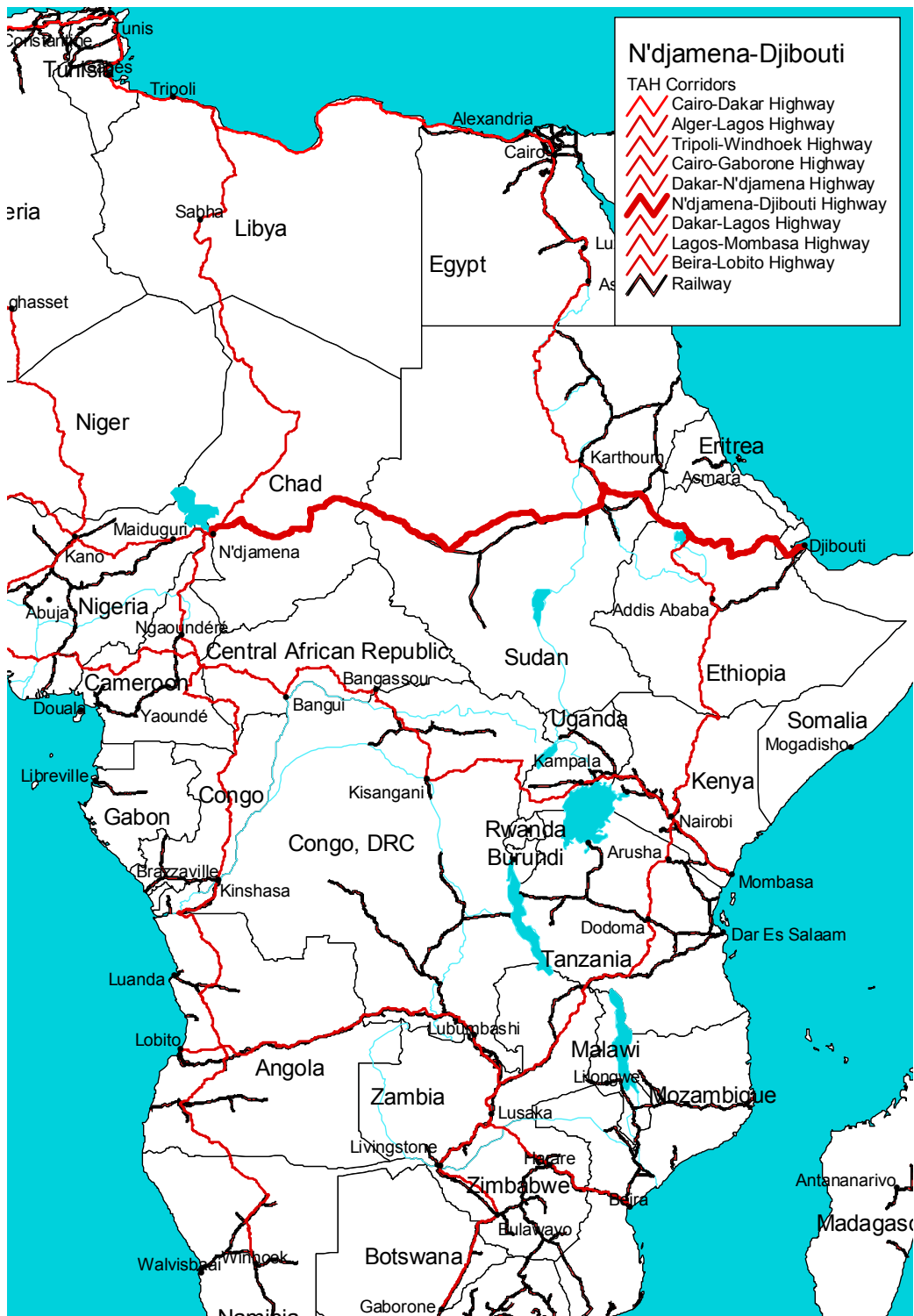
The N'djamena – Djibouti Corridor, as indicated by ECA, starts in N'djamena in Chad, running eastwards through Chad and Sudan, turning to southeast to Ethiopia and ending in Djibouti. The road link has been investigated by country-visits in three of the four countries. The remaining country, i. e. Djibouti, is described with information collected from reports and interviews in Ethiopia.

All information from the inventory phase is summarised in sheets presented in Volume 4. Extracts from these sheets are shown in table 6.2 and illustrated in maps, presented country wise.

Table 6.1 N'djamena - Djibouti Corridor. Link number 6

Section	length	Type			Condition		
		paved	gravel	track	good	Fair	poor
	km	km	km	km	km	Km	km
Chad	1052	81	0	971	46	431	575
Sudan	1892	1201	80	611	541	682	669
Ethiopia	1056	306	750	0	795	28	233
Djibouti	219	119	100	0	0	119	100
<b>Total N'djamena - Djibouti</b>	<b>4219</b>	<b>1707</b>	<b>930</b>	<b>1582</b>	<b>1382</b>	<b>1260</b>	<b>1577</b>

Map 6.2 N'djamena - Djibouti Corridor. Link number 6



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The following sub-chapters describe the status of the highway in each country. The definitions of the various parameters are given in the section “Field Inventory” in the beginning of this volume.

**6.2.1 Chad**

The Highway in Chad can be divided into the distinct sections shown in the table below.

Section	Length [km]	Pavement	Geotechnical conditions	Rehabilitation Cost [mio FCFA]
N'djamena-Massaguet	81	yes, good condition	difficult	
Massaguet-Ngoura-Bokoro	291	no, will be paved by 2006	difficult	72'000
Bokoro-Mangalmé-Oum Hadjer	441	no, not planned	ok	
Oum Hadjer-Abéché	145	no, planned but no funding yet	difficult	36'000
Abéché-Adre	166	no, not planned	ok	

The investment program for these sections is based on the provision of pavements in the areas with difficult geotechnical conditions. Otherwise, maintenance cost necessary for an all year round service will not be affordable.

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Map 6.2.1 Trans African Highways in Chad

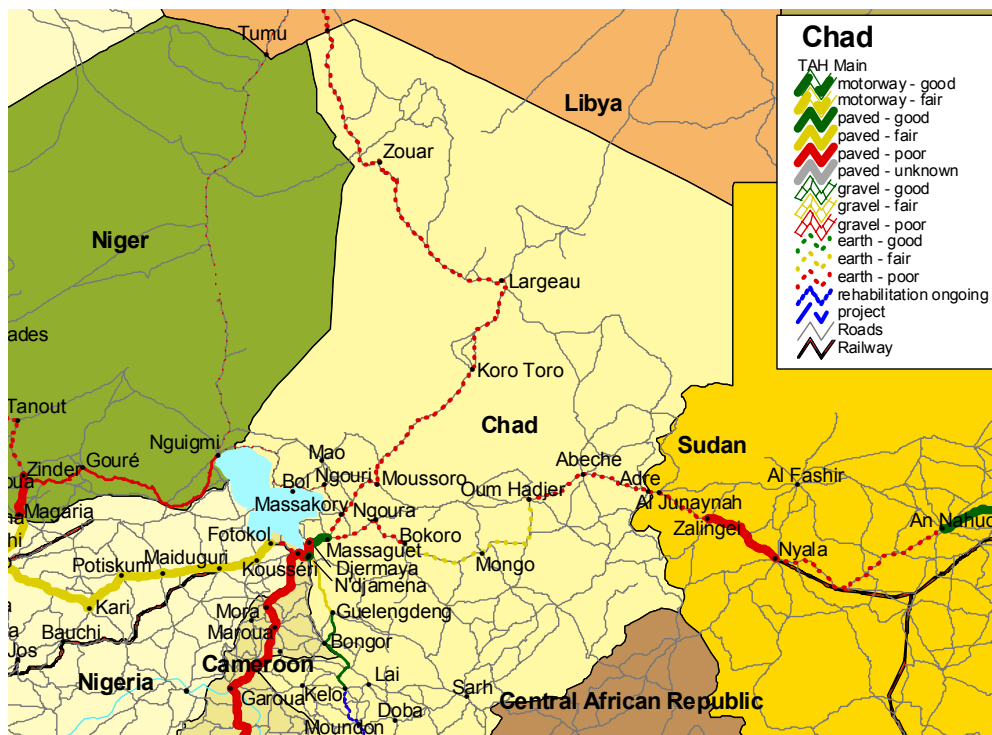


Table 6.2.1 N'djamena – Djibouti Highway in Chad

Section	Type				Condition					Road parameters (existing or in ongoing improvement)				Traffic flow	
	length	paved	gravel	track	good	fair	poor	construct ed	main-tained	paved width	shoulder gravel	shoulder paved	total width	total	heavy vehicles
	km	km	km	km	km	km	km	year	year	m	m	m	m	ADT	%
N'djamena-Djermaya	35	35	0	0	35	0	0			7		2*1	9		
Djermaya-Massaguet	46	46	0	0	46	0	0		2000	7		2*1	9	400	
Massaguet-Ngoura	125	0	0	125	0	0	125			6		2*1,5	9	150	
Ngoura-Bokoro	104	0	0	104	0	0	104			6		2*1,5	9		
Bokoro-Oum Hadjer	431	0	0	431	0	431	0								
Oum Hadjer-Abéché	145	0	0	145	0	0	145							50	
Abéché-Adre	166	0	0	166	0	0	166							35	
<i>Summary Chad</i>	4219	1707	930	1582	1417	1260	1542								

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**6.2.2 Sudan**

Map 6.2.2 Trans African Highways in Sudan



Table 6.2.2 N’djamena – Djibouti Highway in Sudan

Section	Type				Condition					Road parameters (existing or in ongoing improvement)				Traffic flow	
	length	paved	gravel	track	good	fair	poor	construct ed	main- tained	paved width	shoulder gravel	shoulder paved	total width	total	heavy vehicles
	km	km	km	km	km	km	km	year	year	m	m	m	m	ADT	%
Adre-El Geneina	25	0	0	25	0	0	25								
El Geneina-Zalingei	150	0	0	150	0	0	150							50	70
Zalingei-Nyala	213	213	0	0	0	155	58	1980		7		2*1,5	10	782	30
Nyala-En Nouhud	436	0	0	436	0	0	436			7		2*1,5	10	268	58
En Nahud-El Obeid	190	190	0	0	190	0	0	2004		7		2*1,5	10		
El Obeid-Kosti	281	281	0	0	281	0	0	1987		7		2*1,5	10	1842	69
Kosti-Sennar-Wad Medani	220	220	0	0	0	220	0	1983		7		2*1,5	10	2803	20
Wad Medani-Gedaref	227	227	0	0	0	227	0								
Gadaref-Doka	70	70	0	0	70	0	0							563	
Doka-Gallabat (Metema)	80	0	80	0	0	80	0							212	
<i>Summary Sudan</i>	<i>1892</i>	<i>1201</i>	<i>80</i>	<i>611</i>	<i>541</i>	<i>682</i>	<i>669</i>								

The TAH-link through Sudan, starting in Adre at the Chad border, deviates after 25 kms from the original alignment of the Highway, and follows a development corridor, which is given higher priority. Thus, the link is directed southeast towards Zalingei, where a paved road of 213 km already exists, although not in the best of conditions. The following link, from Nyala to En Nahoud is at present an earth track, However, a project for its improvement has been formulated and the new, improved road has already been designed. Tender documents have also been prepared and the procurement process could start as soon as financing has been secured. From En Nahoud the link follows the original Trans African Highway, passing El Obeid, Kosti and Sennar. From Sennar to the Ethiopian border, the link follows the Trans African Highway Cairo-Gaborone along a section of 377 km. For a description of this section please see the Cairo-Gaborone Corridor (Highway 4).

The remaining sections from Nyala can be described as follows: the total length of 1515 km contains sections with unpaved surfacing of 611 km (40 %) and 904 km paved surfacing. The paved sections are divided in sections with good condition, 471 km (52 %), fair condition 375 km (42 %) and poor condition 58 km (6 %).

All sections except for the first 25 km from the Chad border are planned for some kind of improvement, rehabilitation or construction, although funds are not available for all inputs. Sections with paved surfaces have cross-sections with a total width of 10m. The paved sections are divided into carriageway 7 m and paved shoulders 2 times 1,5 m.

The road structures are designed for axle load limits of 10 tons for single axle and 16 tons for narrow dual axles.

6.2.3 Ethiopia

Map 6.2.3 Trans African Highways in Ethiopia and Djibouti

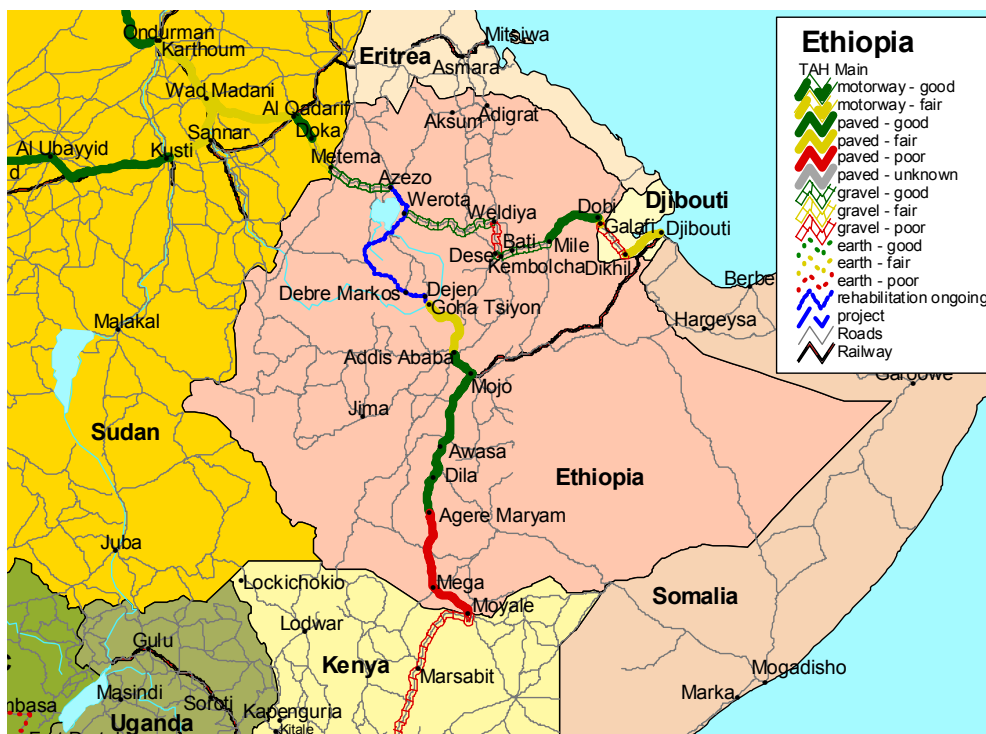


Table 6.2.3 N’djamena – Djibouti Highway in Ethiopia and Djibouti

<i>Ethiopia</i>	Type				Condition			Road parameters (existing or in ongoing improvement)						Traffic flow	
Section	length	paved	gravel	track	good	fair	poor	construct ed	main- tained	paved width	shoulder gravel	shoulder paved	total width	total	heavy vehicles
	km	km	km	km	km	km	km	year	year	m	m	m	m	ADT	%
Gallabat (Metema)-Azèzo	185	0	185	0	185	0	0	2002		7		2*1	9	107	
Azèzo-Werota	113	113	0	0	0	0	113			7		2*1,5	10	271	
Werota-Weldiya	300	0	300	0	300	0	0	1980	1997	7		2*1,5	10	220	65
Weldiya-Dese	120	0	120	0	0	0	120	1965	1997	7		2*1,5	10	420	60
Dese-Kembolcha	25	0	25	0	25	0	0	1965	1997	7		2*1,5	10	420	60
Kembolcha-Bati	42	0	42	0	42	0	0	1965	1996	7		2*1,5	10	400	70
Bati-Mille	88	10	78	0	88	0	0	1965	1997	7		2*1,5	10	400	70
Mille-Dobi	155	155	0	0	155	0	0	1970	1999	7		2*1,5	10	700	80
Dobi-Galafi	28	28	0	0	0	28	0			7		2*1,5	10	700	80
<i>Summary Ethiopia</i>	<i>1056</i>	<i>306</i>	<i>750</i>	<i>0</i>	<i>795</i>	<i>28</i>	<i>233</i>								

As mentioned in the description for the Cairo – Gaborone Corridor, Ethiopia Road Authority is struggling with a road network of class A roads, which has exceeded the life expectancy or has been damaged by a traffic volume which the road links were not designed for.

The road sections included in the Trans African Highway N’djamena – Djibouti



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follows road links belonging both to the highest road standard, the Trunk Road Network and to the Link Road Network. The first 298 km from the Sudan border are identically to the road as described in the Cairo – Gaborone Highway. The main part of the remaining sections in Ethiopia is constructed as gravel roads, viz 565 km (75 %) of 758 km. Only 193 km (25 %) are paved sections. The gravel sections are maintained to good standard on 80 % of its length. Similar to the gravel roads, the paved sections are kept in good condition on 85 % of the length. Since 1996 most sections have been treated with periodic maintenance.

All road sections have been constructed with a cross-section of 7 m carriageway and 2 times 1,5 m shoulders.

Regarding the relatively high traffic volume on the current road link, it should be questioned whether a gravel surfacing is the most adequate one. On the gravel sections the traffic for 2000 is approximately 400 vehicles per day, with about 60 to 70 % of heavy vehicles. The paved part of the road link carries a traffic of 700 vehicles per day with 80 % of heavy vehicles.

The road structures are designed for axle load limits of 10 tons for single axle and 16 tons for narrow dual axles.

**6.2.4 Djibouti**

<i>Djibouti</i>	Type				Condition			Road parameters (existing or in ongoing improvement)				Traffic flow			
	length	paved	gravel	track	good	fair	poor	construct- ed	main- tained	paved width	shoulder gravel	shoulder paved	total width	total	heavy vehicles
Section	km	km	km	km	km	km	km	year	year	m	m	m	m	ADT	%
Galafi-Dikhil	100	0	100	0	0	0	100	0	0	0		0	0	702	80
Dikhil-Djibouti	119	119	0	0	0	119	0	0		0		0	0	1007	80
<i>Summary Djibouti</i>	<i>219</i>	<i>119</i>	<i>100</i>	<i>0</i>	<i>0</i>	<i>119</i>	<i>100</i>								

The remaining road link from the Ethiopian border to Djibouti measures 219 km, of which 119 km are paved. The rest is of gravel standard. The paved section is in fair condition. The gravel section however is in poor condition. The gravel section is planned to be restored with bituminous surfacing. Further reconstruction work is planned for to bring the paved sections to good standard.

The traffic increases from 700 vehicles per day at the border to 1000 vehicles towards Djibouti. The amount of heavy vehicles is recorded to 80 %.

Information about Djibouti has been collected from a Pre-Feasibility Study for the road link Arta-Galafa-Dobi (2000).

### **6.3 ROAD TRAFFIC AND SAFETY**

#### **6.3.1 Volume and Composition of Road Traffic Flows.**

##### *Sudan*

The traffic flow, counted in 2001 is rather low, from 300 to 800 vehicles per day, but reaches much higher volume towards Khartoum, where a traffic of 2000 to 3000 vehicles/day is recorded. The percentage for heavy vehicles varies between 20 and 60 %.

There are major problems with overloading of vehicles. Legal axle weights are 10/16/22 ton. In the field of overload control, only the total vehicle weight is measured.

##### *Ethiopia*

The level of road traffic is modest in Ethiopia with the highest number of vehicles in the Addis Ababa area, where the annual average daily traffic is around 6 000. The traffic flow is much lower further away from Addis with 500-800 vehicle a day in the south and only an average of about 300 in the north.

#### **6.3.2 Other Modes of Transport**

Sections of the corridor are supplemented by railway services. A case in point is the Addis Ababa area which has access to the Djibouti port through alternative road connections (among them the Corridor) but also the railway. However, the railway is old and has limited capacity and is at present handling only 0.16 million tons annually out of a total export/import volume of 2.8 million tons. There is also a railway in Sudan which to some extent supplements the transport capacity of the Highway in sections of the Corridor. However, the railway system is undercapitalised and the railway tracts are in a poor state of maintenance, which has left the road the most import mode of land transport, by far.

In Sudan there is also limited transport of passengers and goods on the Nile, providing a link to Egypt.

#### **6.3.3 Road Security and Safety**

##### *6.3.3.1 Road Safety*

The road safety and security situation is poor or very poor in most of Africa. The fatality rate per registered vehicle in Africa is 8-50 times higher than in the industrialised world although the road safety situation differs substantially from

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country to country. While the Central African Republic had a fatality rate of 339 persons per 10 000 vehicle in 1995, the fatality figure for Namibia was 9 in 1996.

There are a number of reasons for the poor road safety record of Africa. A rapid increase in the number of vehicles combined with poor road standard, lack of training, education and information in the road safety field. It has also proven difficult to establish the kind of multi-sectoral, inter ministerial institutional structures needed for successful road safety activities. For a more detailed discussion of the road safety situation in Africa see the presentation under Highway 3 Tripoli-Windhoek.

The problems along the N'djamena-Djibouti Highway in the field of road safety reflects most of the more general problems mentioned above. While there is little or no road safety information available related directly to this particular Trans African Highway, there is information available for some of countries intersected by the Highway. The fatality rate is 195 fatalities per 10 000 vehicles in Ethiopia. The accident information available for Sudan does not provide fatality rate per 10 000 vehicles but rather total number of people killed and injured. The development during the last decade is summarised below.

<b>Year</b>	<b>Dead</b>	<b>Seriously Injured</b>	<b>Injured</b>
1992	414	1689	2755
2001	952	3231	5589

The number of people killed and injured has more than doubled but with the highest rate of increase for the number of people killed.

### *6.3.3.2 Road Traffic Security*

There are different types of security problems encountered by the road traffic in Africa.

- Major security problems (large scale robbery, armed attacks etc.) often encountered in periods of conflict between and within countries.
- The lack of or poor availability of telecommunication services, fuel, repair facilities, accommodation, food, drinking water, etc. along the roads constitutes another group of risks

The first type of security concerns are at present experienced only in DR Congo but has also been common in the Central African Republic over the years. The second type of problems is more prevalent and must be considered to be a constraint on road traffic along the least well developed sections of the Highway. The first type of security problems could on the whole not be considered to be a major deterrent to

normal road transport anywhere along the extent of this highway. This does not mean that there are no problems but they are more in the nature of “normal” criminality.

## **6.4 MANAGEMENT OF THE CORRIDOR**

### **6.4.1 Responsibility for and Management of the Highway**

The management and coordination of this corridor at a multinational level is that provided for by the RECs of the sub regions, i.e. ECOWAS and COMESA. The RECs have taken an active role in the planning and programming of the road networks of the member countries. Each of the RECs, as well as the individual member countries, have their own set of high priority roads. These priorities have however, not be established in isolation but rather after consultations and discussions with all parties involved at both national and sub-regional levels. There is thus a high degree of agreement as to the network of main international road links of importance in each of the sub-regions. It is apparent that the work on determining the core network of road connections has involved the whole of the main networks and has not in any way been directed exclusively towards the Trans African Highways.

Although the work done by RECs provides the framework for the development and investments in the road sector, it is the responsibility of each country to manage the implementation, including funding, contracting, supervision and maintenance. The very high degree of dependence on outside funding means that the donors have had an important, if indirect, influence on the condition and future development of the N'djamena-Djibouti Highway.

### **6.4.2 Road Sector Operations**

As mentioned above the actual road operations are handled by the road administrations of the individual countries. The systems for road management varies somewhat from country to country with Chad retaining the more traditional set up with a Department of Roads forming an integral part of a ministry (Ministry of Works) and with funding provided under the consolidated central government budget. Sudan and Ethiopia have semi-autonomous road authorities and with the development budgets funded under the consolidated budget supplemented with external assistance inputs. The maintenance funding varies between Ethiopia and Sudan. In Ethiopia the financing of the routine maintenance is handled by Road Fund based on road user charges, while the revenue from Road Tolls cover the same requirements in Sudan.

The trends in the operational field (road design, construction and supervision) are a bit more consistent in the sense that in most countries there is a clear move to employ the services provided by the private sector, through consultants and contractors for

the design, construction, rehabilitation and maintenance activities. A case in point is Sudan where in 1996 the road administration of Sudan was split into the now existing National Highway Authority and a Construction Company to function on commercial lines and provide contracting services in the road construction and maintenance field.

There is still some force account activities in corridor countries but the trend is towards a steady increase in the private sector involvement in this field.

### **6.4.3 Strategy and Priorities**

The strategies employed and priorities established for the TAH network of highways amounts to a combination of strategies and priorities established at both national and REC levels. In the case of the N'djamena-Djibouti Highway this means the positions taken by COMESA, and ECOWAS the national priorities tend to coincide or to be closely related to those formulated by the RECs and that is also the case for this Highway.

## **6.5 FUNDING**

### **6.5.1 Corridor Programming**

ECOWAS and COMESA have included the Highway in their long term plans for key roads in the development of the sub-regional road network.

### **6.5.2 Sources of Financing**

In the countries of the N'djamena-Djibouti Highway the funding of road sector activities is arranged along the following main lines:

- External assistance sources for road construction, rehabilitation (and to some degree also for period maintenance purposes).
- Central government financing of counterpart funds and the construction, rehabilitation and period maintenance work not covered under the different external assistance programmes.
- Road Fund for road maintenance in general and a routine maintenance in particular.

Although these three main sources of funding are all employed in the countries concerned their actual importance and availability varies greatly from country to country. The road sector activities in all three countries are depending on external assistance to a smaller or greater degree. The Road Fund in Ethiopia plays an important role in the maintenance field. It is at present providing all the routine

maintenance requirements and expects in the near future also to be able to provide funds for periodic maintenance.

The general level of funding is not very satisfactory, with a more general situation of inadequate funding for period maintenance and rehabilitation.

## **6.6 TRADE AND TRANSPORT FACILITATION**

### **6.6.1 Road Sector**

The main problem in the road sector is poor maintenance standard, a fact aggravated by high axle-loads resulting from the common over-loading of trucks. This inability of the countries to properly control the total weight and axle-load of heavy vehicles have serious consequences for the whole road transport industry.

### **6.6.2 Non-Physical Barriers**

The progress in this field is very slow. Simplifications of the custom procedures have been introduced, however the rate of implementation tends to be slow. Still, improvements within the COMESA countries can be seen.

There are also major unresolved problems in this field. One has to do with the handling of customs bonds that at present functions as a fragmented system. (Each country through which transit goods passes, requires each their own bond). Work is now in progress to establish a Regional Customs Bond Guarantee that would be accepted by all corridor countries.

One simple measure, which would considerably reduce the waiting time at borders, would be to extend the opening hours of the border post. This measure has been temporarily introduced in some of the COMESA countries with very good results.

## **6.7 MISSING LINKS**

A missing link should fulfil the criteria of either to be none-existing as road with all-weather standard or with standard far below the minimum standard for the current traffic flow. Neglected road maintenance does not qualify for being a missing link. Thus poor sections with acceptable, yet too narrow road width are not listed as missing links. Gravel roads are included in the list of missing links, as they are meant to be upgraded sooner or later to fulfil the requirements of an international road.

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In this sense missing links are observed in following countries:

Chad	1043 km	Earth tracks
Sudan	25 km	Earth track
	150 km	Earth track
	436 km	Earth track with ready design, but not planned for construction
Ethiopia	565 km	Gravel road, insufficient for traffic volume
Djibouti	100 km	Gravel road, insufficient for traffic volume
<b>Total</b>	<b>2319 km</b>	

Details about the missing links are given below.

Table 6.7 Missing links

N'djamena-Djibouti Highway	Country	length km	Type			Upgrading to recommended minimum standard	
			paved km	gravel km	track km	description	cost M US\$
Massaguet-Ngoura	Chad	125			125	new road	40
Ngoura-Bokoro	Chad	166			166	new road	50
Bokoro-Oum Hadjer	Chad	441			441	new road	130
Oum Hadjer-Abéché	Chad	145			145	new road	45
Abéché-Adre	Chad	166			166	new road	50
Adre-El Geneina	Sudan	25			25	new road	10
El Geneina-Zalingei	Sudan	150			150	new road	60
Nyala-En Nouhud	Sudan	436			436	new road	175
Werota-Weldiya	Ethiopia	300		300		improvement	60
Weldiya-Dese	Ethiopia	120		120		improvement	25
Dese-Kembolcha	Ethiopia	25		25		improvement	5
Kembolcha-Bati	Ethiopia	42		42		improvement	10
Bati-Mille	Ethiopia	78		78		improvement	15
Galafi-Dikhil	Djibouti	100		100		improvement	20
<b>Summary</b>		<b>2319</b>		<b>665</b>	<b>1654</b>		<b>695</b>

## **6.8 CONCLUSIONS**

The total length of the TAHs of this corridor amounts to around 4 200 km. Half of this distance consists of missing links, mainly in the central sections of the corridor. To a considerable degree these sections of missing links are located in sections of the corridor, which are sparsely populated and has no other economic activity than subsistence farming. Consequently these sections have also very limited levels of road traffic (depending more on low demand for transport services than the lack of proper roads). In this context it should be kept in mind that most of the countries forming part of this corridor are very poor and/or have development priorities that gives only limited attention to the TAHs of this corridor.

The general level of traffic is low (an ADT of a few hundred vehicles) particular in Chad and western Sudan. There is also a predominance of heavy vehicles in the vehicle fleet using the highways. This corridor has also the specific characteristic that most of the traffic is divided into a western and an eastern part with relatively little through traffic originating in the west and with a destination in the east (or the other way around).



## **7 HIGHWAY 7 - DAKAR - LAGOS**

### **7.1 DESCRIPTION OF THE CHARACTERISTICS OF THE CORRIDOR**

The Dakar-Lagos Trans African Highway, also called the Trans Coastal West African Highway, traverses all the eleven coastal countries between Senegal and Nigeria. The definition of its northern extension varies, sometimes it is defined as starting in Nouakchott, but more often in Dakar which has also been retained for this study. Consequently, the connecting Trans African Highway, coming from Cairo has been defined as going all the way to Dakar. Dakar is also the connecting point to the Trans Sahelian Highway and in Lagos it connects to two other Trans African Highways, the Trans Saharan and the Lagos-Mombasa. See map 7.1.

The main importance of the Highway is that it provides the most direct, and in some cases the only, road connection between the capitals of the countries along its alignment. It also provides the starting points for the roads leading from the ports to the landlocked countries in the hinterland. It has a total length of 4010 km of which about 3260 km are paved, in various conditions with respect to maintenance. The remainder, 750 km, constitutes the missing links. There are 9 missing links distributed among 6 of the countries. Their present condition is usually earth roads or tracks.

As the mission has not officially visited any of the countries concerned, with the exception of Nigeria, what follows is based primarily on information from UEMOA and ECOWAS documents.

## **7.2 PHYSICAL CONDITION**

The length and the main characteristics of the highway are shown in table 7.1 and on map 7.1. All detailed information from the inventory phase is summarised in sheets presented in Volume 4. Extracts from these sheets are shown in tables and illustrated in maps presented country wise. Facts about the condition of the paved roads were not available, as the countries were not visited.

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Map 7.1 Dakar - Lagos Corridor. Link number 7



Table 7.1 Dakar - Lagos Corridor. Link number 7

Section	Type				Condition		
	length km	paved km	gravel km	track km	good km	fair km	poor km
Senegal	391	391	0	0	247	0	144
Gambia	97	72	0	25	0	72	25
Guinea Bissau	387	306	0	81	0	0	164
Guinea	475	266	0	209	0	0	209
Sierra Leone	481	329	0	152	0	0	197
Liberia	540	320	69	151	0	0	282
Ivory Coast	779	719	0	60	105	554	120
Ghana	583	583	0	0	0	0	155
Togo	65	65	0	0	0	65	0
Benin	122	122	0	0	0	0	0
Nigeria	90	90	0	0	0	90	0
<b>Total Dakar - Lagos</b>	<b>4010</b>	<b>3263</b>	<b>69</b>	<b>678</b>	<b>352</b>	<b>781</b>	<b>1296</b>

7.2.1 Senegal and Gambia

Map 7.2.1 Trans African Highways in Senegal and Gambia



Table 7.2.1 Dakar - Lagos Highway in Senegal and Gambia

Section	Type				Condition			Road parameters (existing or in ongoing improvement)					Traffic flow		
	length	paved	gravel	track	good	fair	poor	construct ed	main- tained	paved width	shoulder gravel	shoulder paved	total width	total	heavy vehicles
	km	km	km	km	km	km	km	year	year	m	m	m	m	ADT	%
Dakar-Diam Niadio	41	41	0	0	41	0	0								
Diam Niadio-Mbour	42	42	0	0	0	0	42								
Mbour-Kaolack	106	106	0	0	106	0	0								
Kaolack-Sokone	50	50	0	0	0	0	50								
Sokone-Karang	35	35	0	0	35	0	0								
Karang-Barra (Gambia)	25	0	0	25	0	0	25								
Banjul-Séléti (Gambia)	72	72	0	0	0	72	0								
<i>Summary Gambia</i>	97	72	0	25	0	72	25								
Séléti-Diouloulou-Bignona	65	65	0	0	65	0	0								
Bignona-Ziguinchor	27	27	0	0	0	0	27								
Ziguinchor-Mpack	25	25	0	0	0	0	25								
<i>Summary Senegal</i>	391	391	0	0	247	0	144								

Information about Senegal and Gambia has been received from UEMOA and ECOWAS.

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From Dakar to Kaolack, the corridor is identical with the Dakar – N'djamena corridor. The road between Dakar and Kaolack (190 km) is paved and in good condition. In order to remedy frequent congestions between Diam Niadio and Mbour, close to Dakar, rehabilitation and extension of the road on a length of 42 km is planned. In Kaolack, the corridor heads towards Gambia to the south.

The corridor then enters Gambia in Karang and continues on a length of 25 km to Barra on the river Gambia. Between Karang and Barra, the road is in poor condition, and on some sections the pavement is missing. The river crossing to Banjul, Gambia's capital, is made by ferry. The road continues for 72 km to Séléti, where it enters Senegal again. The road traverses the Casamance region, with Ziguinchor as main city, on a length of 117 km along the coast. South of Bignona, on a length of 52 km, the road is in poor condition. The border town to Guinea Bissau is Mpack.

**7.2.2 Guinea Bissau**

Map 7.2.2 Trans African Highways in Guinea-Bissau and Guinea



Table 7.2.2 Dakar - Lagos Highway in Guinea Bissau

<i>Guinea Bissau</i>		Type			Condition					Road parameters (existing or in ongoing improvement)				Traffic flow	
Section	length	paved	gravel	track	good	fair	poor	construct ed	main- tained	paved width	shoulder gravel	shoulder paved	total width	total	heavy vehicles
	km	km	km	km	km	km	km	year	year	m	m	m	m	ADT	%
Mpack-Bula-Safim	110	110	0	0	0	0	110								
Safim-Bissau	10	10	0	0	0	0	0								
Safim-Nhacra-Jugudul	54	54	0	0	0	0	54								
Jugudul-Bambadinca	57	57	0	0	0	0	0								
Bambadinca-Quebo	75	75	0	0	0	0	0								
Quebo-Border	81	0	0	81	0	0	0								
<i>Summary Guinea-Bissau</i>	387	306	0	81	0	0	164								

Information about Guinea Bissau has been received from UEMOA and ECOWAS.

The length of the section in Guinea Bissau amounts to 387 km. 306 km thereof are paved.

As of 2002, two rivers had to be crossed by ferries between Bissau and Mpack. On the section Jugudul-Nhacra-Safim-Bula-Mpack periodic maintenance is programmed for 2002-2004, including the construction of bridges.

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The section from Quebo to the border to Guinea (81 km) is not paved yet. In order to interconnect Guinea Bissau and Guinea, the two countries have agreed upon the construction of a new road between Quebo and Boké, total length 206 km, including a big bridge crossing the river Kogon in Guinea. The start to realise the project is planned for 2003.

**7.2.3 Guinea**

Table 7.2.3 Dakar - Lagos Highway Guinea

Section	Type				Condition					Road parameters (existing or in ongoing improvement)				Traffic flow	
	length	paved	gravel	track	good	fair	poor	construct ed	main-tained	paved width	shoulder gravel	shoulder paved	total width	total	heavy vehicles
	km	km	km	km	km	km	km	year	year	m	m	m	m	ADT	%
<i>Guinea</i>															
Border-Dabiss-Boké	125	0	0	125	0	0	125								
Boké-Boffa-PK36	212	212	0	0	0	0	0								
PK36-Conakry	36	36	0	0	0	0	0								
PK36-Coyah	18	18	0	0	0	0	0								
Coyah-Forécariah	50	0	0	50	0	0	50								
Forécariah-Pamelap	34	0	0	34	0	0	34								
<i>Summary Guinea</i>	<i>475</i>	<i>266</i>	<i>0</i>	<i>209</i>	<i>0</i>	<i>0</i>	<i>209</i>								

Information about Guinea has been received from UEMOA and ECOWAS.

The length of the section in Guinea amounts to 475 km. Only 266 km thereof are paved.

The section from the border to Guinea – Guinea Bissau to Boké (125 km) is still missing, but will soon be constructed as mentioned above.

**7.2.4 Sierra Leone**

Map 7.2.3 Trans African Highways in Sierra Leone and Liberia



Table 7.2.4 Dakar - Lagos Highway in Sierra Leone

Sierra Leone Section	Type				Condition			Road parameters (existing or in ongoing improvement)					Traffic flow		
	length	paved	gravel	track	good	fair	poor	construct ed	main- tained	paved width	shoulder gravel	shoulder paved	total width	total	heavy vehicles
	km	km	km	km	km	km	km	year	year	m	m	m	m	ADT	%
Pamelap-Port Loko	70	0	0	70	0	0	70								
Port Loko-Masiaka	45	45	0	0	0	0	45								
Masiaka-Freetown	74	74	0	0	0	0	0								
Masiaka-Taiama	107	107	0	0	0	0	0								
Taiama-Bo	57	57	0	0	0	0	0								
Bo-Bandajuma	46	46	0	0	0	0	0								
Bandajuma-Mru Bridge	82	0	0	82	0	0	82								
<i>Summary Sierra Leone</i>	<i>481</i>	<i>329</i>	<i>0</i>	<i>152</i>	<i>0</i>	<i>0</i>	<i>197</i>								

Information about the Sierra Leone has been received from UEMOA and ECOWAS.

The length of the section in Sierra Leone amounts to approximately 480 km. Only 330 km thereof is paved. The condition of these pavements is not known.

The road between Pamelap (border to Guinea) and Port Loko is not paved (70 km). The paving is planned.



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A bridge over the river Mano on the border to Liberia was constructed in 1976 (MRU bridge). The paving of the road from Bandajuma to this bridge, length 82 km, is planned, with execution in 2005. The project includes construction of 3 bridges over the rivers Moa, Sewa and Waanje. A rehabilitation of the road from Bo to Bandajuma (46 km) was planned during 1998-1999, but it is not known if it has been executed.

**7.2.5 Liberia**

The length of the section in Liberia amounts to 540 km. 320 km thereof is paved. Two sections between Monrovia and Ganta, –Gbarnga - Ganta (69 km) and Kakata - Totota (62 km) are in need of rehabilitation. From Ganta to the border to the Ivory Coast (Ganta – Tappita -), the road is not paved on a length of 151 km. The paving of this section is programmed, and the start of the project is planned for the end of 2002.

Table 7.2.5 Dakar - Lagos Highway in Liberia

Section	Type				Condition			construct ed year	main- tained year	Road parameters (existing or in ongoing improvement)				Traffic flow	
	length	paved	gravel	track	good	fair	poor			paved width	shoulder gravel	shoulder paved	total width	total	heavy vehicles
	km	km	km	km	km	km	km			m	m	m	m	ADT	%
Mru Bridge-Klay	69	0	69	0	0	0	0								
Klay-Monrovia	50	50	0	0	0	0	0								
Monrovia-Kakata	59	59	0	0	0	0	0								
Kakata-Totota	62	62	0	0	0	0	62								
Totota-Gbarnga	80	80	0	0	0	0	0								
Gbarnga-Ganta	69	69	0	0	0	0	69								
Ganta-Tappita-Tobli-Blay	151	0	0	151	0	0	151								
<i>Summary Liberia</i>	<i>540</i>	<i>320</i>	<i>69</i>	<i>151</i>	<i>0</i>	<i>0</i>	<i>282</i>								

Information about Liberia has been received from UEMOA and ECOWAS.

**7.2.6 Ivory Coast**

Map 7.2.4 Trans African Highways in the Ivory Coast



Table 7.2.6 Dakar - Lagos Highway in the Ivory Coast

Ivory Coast	Type				Condition			Road parameters (existing or in ongoing improvement)						Traffic flow	
	length	paved	gravel	track	good	fair	poor	construct ed	main- tained	paved width	shoulder gravel	shoulder paved	total width	total	heavy vehicles
Section	km	km	km	km	km	km	km	year	year	m	m	m	m	ADT	%
Blay-Toulepleu-Blolékin	60	0	0	60	0	0	60								
Blolékin-Guiglo-Duekoué	109	109	0	0	0	109	0								
Duekoué-Daloa	103	103	0	0	0	103	0								
Daloa-Yamoussoukro	141	141	0	0	0	141	0								
Yamoussoukro-Toumodi	46	46	0	0	0	46	0								
Toumodi-Fin autoroute	50	50	0	0	0	50	0								
Fin autoroute-Abidjan	105	105	0	0	105	0	0								
Abidjan-Grand Bassam	44	44	0	0	0	44	0								
Grand Bassam-Aboisso	61	61	0	0	0	61	0								
Aboisso-Elubo	60	60	0	0	0	0	60								
<i>Summary Côte d'Ivoire</i>	779	719	0	60	105	554	120								

Information about the Ivory Coast has been received from UEMOA.

The total length of the section in the Ivory Coast amounts to 780 km.

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The section from the border to Liberia, Blay – Toulepleu – Blolékin, is not paved on a length of 60 km (ECOWAS, April 2002). Approximately 150 km from Yamoussoukro towards Abidjan is a dual carriageway in good condition. The remaining part is a single carriageway in fair or mostly poor condition. The condition of the road from Abidjan to Elubo on the border to Ghana (179 km) is fair-poor. The section from Aboisso to Elubo needs rehabilitation.

West of Abidjan, the corridor was originally determined to go along the coast, and the coastal road was constructed on the territory of the Ivory Coast. However, there is no continuation after the border to Liberia.

**7.2.7 Ghana – Togo - Benin**

Map 7.2.5 Trans African Highways in Ghana, Togo and Benin

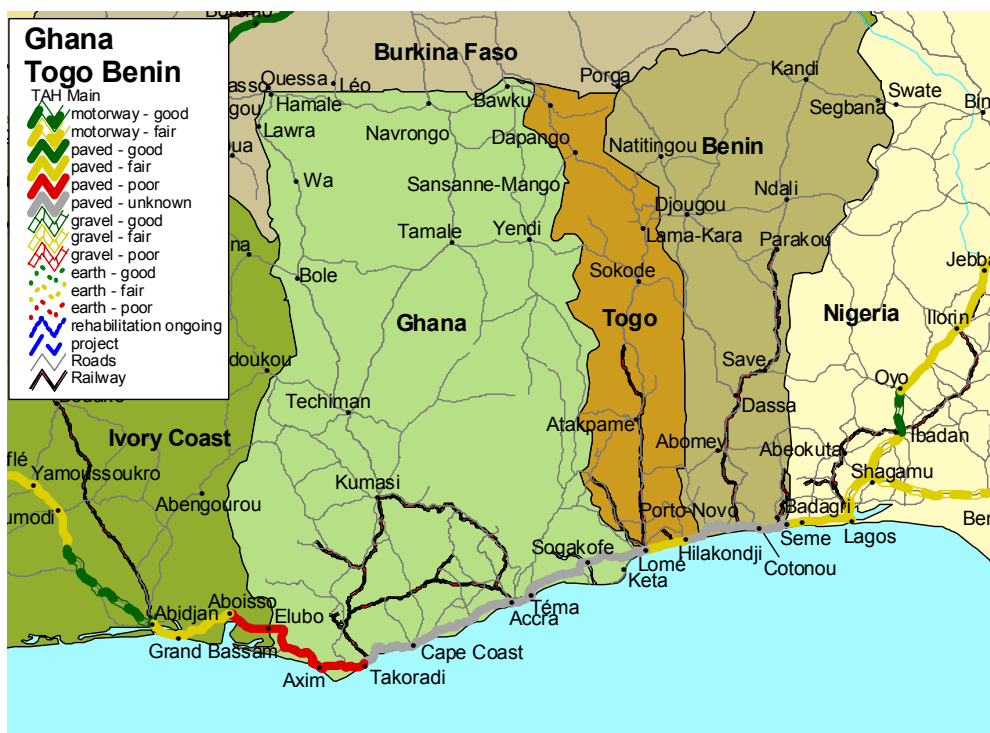


Table 7.2.7 Dakar - Lagos Highway in Ghana

Ghana	Type				Condition					Road parameters (existing or in ongoing improvement)				Traffic flow	
	length	paved	gravel	track	good	fair	poor	construct ed	main- tained	paved width	shoulder gravel	shoulder paved	total width	total	heavy vehicles
Section	km	km	km	km	km	km	km	year	year	m	m	m	m	ADT	%
Elubo-Axim	92	92	0	0	0	0	92								
Axim-Sekondi Takoradi	63	63	0	0	0	0	63								
Sekondi Takoradi-Accra	237	237	0	0	0	0	0								
Accra-Dawa	71	71	0	0	0	0	0								
Dawa-Sogakofe	50	50	0	0	0	0	0								
Sogakofe-Denu	70	70	0	0	0	0	0								
<b>Summary Ghana</b>	<b>583</b>	<b>583</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>155</b>								

Information about Ghana have been received from ECOWAS.

The length of the Dakar - Lagos Highway in Ghana amounts to 583 km, some 70 km thereof as dual carriageway in the vicinity of Accra. The section in Togo has a length of 65 km and in Benin 122 km.

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Ghana, Togo and Benin have agreed upon the construction of a new road along the coast parallel to the existing road, facilitating the traffic in this densely populated area. The road starts in Akatsi and passes Dzodze (border Ghana – Togo) and Noepe, bypasses Lomé on its north, continues to Aného and Hilakondji (border Togo – Benin) and ends in Cotonou. The length of the road amounts to 30 km in Ghana, 80 km in Togo and 90 km in Benin. Start of the execution of the works is planned for 2002-2003. The new road will particularly improve the reliability of the link between Togo and Benin, as the existing coastal road is deteriorated and often disrupted, due to heavy maritime erosion.

Furthermore, rehabilitation of 2 sections in Ghana (Téma-Aflao, 166 km, Sekondi Takoradi-Axim-Elubo, 155 km) is needed.

Table 7.2.8 Dakar - Lagos Highway in Togo and Benin

Togo and Benin	Type				Condition			construct- ed	main- tained	Road parameters (existing or in ongoing improvement)				Traffic flow	
	length	paved	gravel	track	good	fair	poor			paved width	shoulder gravel	shoulder paved	total width	total	heavy vehicles
Section	km	km	km	km	km	km	km	year	year	m	m	m	m	ADT	%
Denu-Lomé	10	10	0	0	0	10	0								
Lomé-Hilakondji	55	55	0	0	0	55	0								
<i>Summary Togo</i>	65	65	0	0	0	65	0								
Hilakondji-Cotonou	92	92	0	0	0	0	0								
Cotonou-Seme	30	30	0	0	0	0	0								
<i>Summary Benin</i>	122	122	0	0	0	0	0								

Information about these 2 countries have been received from UEMOA and ECOWAS.

7.2.8 Nigeria

Map 7.2.6 Trans African Highways in Nigeria



Table 7.2.9 Dakar - Lagos Highway in Nigeria

Nigeria	Type				Condition					Road parameters (existing or in ongoing improvement)				Traffic flow	
	length	paved	gravel	track	good	fair	poor	constructe d	main-tained	paved width	shoulde r gravel	shoulder paved	total width	total	heavy vehicles
Section	km	km	km	km	km	km	km	year	year	m	m	m	m	ADT	%
Seme-Badagry-Lagos	90	90	0	0	0	90	0	1980		14,6		2* 2,75+2*1	22,1	17860	15
Summary Nigeria	90	90	0	0	0	90	0								

The Nigerian branch from Seme on the border to Benin to Lagos is a dual carriageway and has a length of 90 km. Its structural condition is recorded as fair.

### **7.3 ROAD TRAFFIC AND SAFETY**

#### **7.3.1 Road Traffic**

As none of these countries except Nigeria have been visited, no information about the road traffic and safety is available. In Nigeria, the traffic towards Benin amounts to 15'000-20'000 vehicles per day (ADT), 15% thereof are heavy vehicles.

#### **7.3.2 Road Security and Safety**

The road safety and security situation is poor or very poor in most of Africa. The fatality rate per registered vehicle in Africa is 8-50 times higher than in the industrialised world although the road safety situation differs substantially from country to country. While the Central African Republic had a fatality rate of 339 persons per 10 000 vehicle in 1995, the same figure for Namibia was 9 (1996).

There are a number of reasons for the poor road safety record in Africa. A rapid increase in the number of vehicles combined with poor road standard, lack of training, education and information in the field of road safety. It has also proven difficult to establish the kind of multi-sectoral, inter ministerial institutional structures needed for successful road safety activities. For a more detailed discussion of the road safety situation in Africa see the presentation under Highway 3 Tripoli-Windhoek.

The problems along the Lagos-Dakar Highway in the road safety field reflects most of the more general problems mentioned above.

### **7.4 MANAGEMENT OF THE CORRIDOR**

#### **7.4.1 Responsibility for and Management of the Corridor**

The management and coordination of this corridor that takes place on a multinational level is provided for by the REC's of the sub region, i.e. UEMOA and ECOWAS. There is not, and has never been, a bureau especially set up for this corridor. The definition of the corridor rests on the ECA documents and there seems not to have been any discussion about the alignment or proposals for alternatives, although the present alignment through Yamoussoukro in Cote d'Ivoire is an alteration since originally the alignment was shown along the coast up to the Liberian border.

Both the REC's have taken an active role in the planning and programming of the road networks of the member countries as described in more detail in the chapter dealing with the Trans Sahelian Highway. This involvement has dealt with the whole

of the main networks and has not in any way been directed exclusively towards the Trans African Highways.

Although the work done by UEMOA and ECOWAS, which has been discussed and agreed upon by the member countries, provides the framework for the development and investments in the road sector, it is the responsibility of each country to manage the implementation, including funding, contracting, supervision and maintenance. As in the case of the Trans Sahelian, it can also be argued that because of the very high degree of dependence on outside funding, the IFI's and other donors in reality have an important, if indirect, influence on the condition and future development of the Lagos-Dakar Highway.

#### **7.4.2 Road Sector Operations**

Apart from the information from the REC's, the only direct country information is that from Nigeria. From an institutional point of view, the administration of public roads of Nigeria is organized at local, state and federal levels. The national network (which includes all TAH links in Nigeria) is the responsibility of the Federal Highway Department (FHD) under the Ministry of Works. The FHD plans, implements and maintains the Federal roads with the exception of routine maintenance which is delegated to the state level.

The FHD is organized with headquarters in Abuja and field offices in all states. These field offices form an integral part of the representation of the Federal Ministry of Works at state level. The state level FHD's are headed by Chief Engineers.

In operational terms the current trend is for the private sector to take over an increasing share of operational activities like construction, rehabilitation, supervision, maintenance and design. This has resulted in a situation where the FHD has rather too many than too few qualified staff in technical and managerial positions.

#### **7.4.3 Strategy and Priorities**

The sub regional strategies as identified by the REC's are clear and consistent. The strategy for developing the road networks has been defined according to three levels of priorities. The first priority is assigned to the main roads that connect the capitals of the member states. The second deals with alternative connections between the capitals and the third finally with those roads leading to non member neighbouring countries. Within each priority five components are then defined. For the paved roads they deal with periodic maintenance, and rehabilitation, pavement of earth roads, bridge and drainage works and earth road periodic maintenance. Routine maintenance is viewed as a basic priority and has not been included as such in the



strategy. Its role and importance are recognized by the fact that international financial institutions and other donors generally require, as a condition for their assistance, that routine maintenance be carried out with the countries own means.

Thus, within UEMOA the Lagos-Dakar Highway clearly fits into the first priority as it is one of the main road connections between the capitals. Also within this definition of priorities these sections would be among the most important ones as they constitute one of the backbones of the networks and are, together with the Trans Sahelian Highway, among the roads with the highest traffic volumes.

The case of Nigeria has been looked at separately and therefore merits special mentioning. The roads to be built, rehabilitated and maintained are determined by the Federal Ministry of Works. However, the overall planning framework within which these decisions are taken is provided by the Federal Ministry of Transport. There is at present the National Transport Policy of 1983 which covers all modes of transport but which needs to be updated. There are plans for such updating, but the work has not yet commenced.

In the road sector the policy documents stress the need to close the resource gap that existed in the early 90's and give priority to maintenance and road preservation efforts. The TAH network within Nigeria is described in the policy as the international road network of the country but is not specifically mentioned as a type of road to be given special importance in the overall national network.

The Federal Ministry of Transport is also in the process of completing a major 20 year perspective Master Plan for Integrated Transportation Infrastructure. The road sector plays an important part in this master plan, which is expected to be incorporated into the revised National Transport Policy. The master plan identifies the infrastructure measures (including investments in new and improved roads) needed to improve the situation in the road and road transport sector. Although the TAH links are not given any preferential treatment in the plan, most of them will benefit from the proposed improvement plans because of their importance to the domestic road transport requirements of Nigeria.

## **7.5 FUNDING**

### **7.5.1 Corridor Programming**

Both UEMOA and ECOWAS have programmed expenditures for the Lagos-Dakar Highway. The two programs are conceptually somewhat different. The ECOWAS' program covers all the countries, in contrast to UEMOA's program which covers only 5 of the 11 countries, and it has here been taken as the basis for describing the expenditure programming. It foresees a total expenditure of 243 MUS\$ for the

missing links of the Trans Coastal. In addition, 39 MUSD have been estimated to be needed for rehabilitation.

### **7.5.2 Sources of Financing**

In the countries of the Lagos-Dakar Highway, with the exception of Nigeria, the financing of the whole road sector relies to a very high degree upon international grants and credits.

For Nigeria, the federal road network is funded under the federal budget as any other activity of the Federal Ministry of Works. This means that the financial resources needed for both development and recurrent budgets are provided by the central government as part of the consolidated federal budget.

Budget procedures, release of funds, etc, follow normal government procedures. There are no special or earmarked funds made available to the road sector. The funding actually made available is only about 70% of the approved budget.

The development funding for federal roads has been maintained on the relatively high and steady level of about 70 billion Naira (600 MUSD) annually during the last few years. There is little or no international ( bilateral or multilateral) funding available at present to the road sector.

The situation for maintenance funding has been extremely difficult for the last three years. Only 295 million Naira (2,5 MUSD) were provided in 2001 and for the current fiscal year this was reduced to 284 million Naira (2,4 MUSD). This is a fraction of actual requirements and all maintenance activities have for all intents and purposes stopped. The reason for this peculiar and damaging situation is found in the fact that the new civilian government of Nigeria, that took over from the military in the late 90's, wanted to establish a Road Maintenance Agency as soon as possible, with its own financing (partly to replace the defunct Petroleum Trust Fund). The preparatory work has been slow and in order to speed up matters a task force has been established to initiate activities. An annual budget (including some road user charges, basically road tolls) of about 10 billion Naira (85 MUSD) has been mentioned for that Agency. That amount is more in line with actual requirements.

## **7.6 TRADE AND TRANSPORT FACILITATION**

The situation with respect to non physical barriers to trade and traffic is basically the same in the whole of West Africa. For the Lagos-Dakar Trans African Highway the same description and comments as those given above for the Trans Sahelian Highway apply. The problem is a serious one with very negative consequences for the economies of the sub region. It is a known problem which has been extensively studied but for which effective counter measures have been hard to implement.

**Volume 2 – Description of Corridors****7.7 MISSING LINKS**

The identified missing links have a total length of 765 km. There are 9 such sections distributed between 6 of the countries. Their present condition is usually that of existing earth roads or tracks or originally paved roads which are completely deteriorated. The new coastal road from Akatsi to Cotonou, does supplement the existing road and is therefore not considered as a missing link. The table below summarizes the missing links.

Table 7.7 Missing links

Section	Country	length km	Type			Upgrading to recommended minimum standard	
			paved km	gravel km	track km	description	cost M US\$
Karang-Barra	Gambia	25			25	new road	5
Quebo-Border	Guinea Bissau	81			81	new road	9
Border-Boké	Guinea	125			125	new road	25
PK36-Pamelap	Guinea	84			84	new road	25
Pamelap-Porto Loko	Sierra Leone	70			70	new road	30
Bandajuma-MRU Bridge	Sierra Leone	82			82	new road	50
MRU Bridge-Klay	Liberia	69		69		new road	40
Ganta-Blay	Liberia	151			151	new road	83
Blay-Blolékin	Ivory Coast	60			60	new road	13
<b>Summary</b>		<b>747</b>	<b>0</b>	<b>69</b>	<b>678</b>		<b>280</b>

ECOWASThe total cost for the construction of the missing links along the Dakar-Lagos Highway is estimated at 280 MUSD.

**7.8 CONCLUSIONS**

As the mission has not visited the countries concerned, no particular comments are offered at this stage.



## **8 HIGHWAY 8 - LAGOS - MOMBASA**

### **8.1 DESCRIPTION OF THE CHARACTERISTICS OF THE CORRIDOR**

The Lagos-Mombasa Trans African Highway provides a road connection between the ports of Nigeria and Cameroon in West Africa and the East African port of Mombasa, see map 8.1. The landlocked countries of Central Africa receive thus access to the coast. The flow of traffic along this highway and the condition of different sections of the road reflects the limited trade between West and East Africa. The Highway consists for all intents and purposes of two separately functioning sections:

- One connecting the landlocked countries around the Great Lakes with the East African Coast;
- The other providing access from the Atlantic Coast to north-western DR Congo and the Central African Republic.

The highway has a total length of about 6260 km of which about 54 % is paved, in various conditions, with the remainder as either gravel or earth.

The main importance of the Highway is that it provides the most direct connection to Mombasa for Uganda and the most convenient road connection to that port for Rwanda, Burundi and eastern DR Congo.

The Mission has visited some of the countries concerned (Nigeria, Central African Republic, DR Congo and Kenya). For these countries up to date information on the conditions, missing links and future plans have been collected. For the countries not visited, information from ECOWAS, COMESA, EAC, CEMAC, ECCAS and the Northern Corridor has been used in the analytic work.

### **8.2 PHYSICAL CONDITION**

The Lagos – Mombasa Corridor starts in Nigeria and passes Cameroon, Republic of Central Africa, Democratic Republic of Congo, Uganda and ends in Mombasa, in Kenya.

**Volume 2 – Description of Corridors**

Map 8.1 Lagos - Mombasa Corridor. Link number 8



**Volume 2 – Description of Corridors**

All information from the inventory phase is summarised in sheets presented in Volume 4. Extracts from these sheets are shown in table 8.2 and illustrated in maps presented country wise.

Table 8.1 Lagos - Mombasa Corridor. Link number 8

Section	Type				Condition		
	length	paved	gravel	track	good	fair	poor
	km	km	km	km	km	km	km
Nigeria	737	737	0	0	139	412	186
Cameroon	1044	513	0	531	80	0	303
CAR	1319	554	215	550	263	291	413
DR Congo	1561	0	0	1561	0	0	1561
Uganda	696	696	0	0	98	141	457
Kenya	902	902	0	0	171	403	328
<b>Total Lagos - Mombasa</b>	<b>6259</b>	<b>3402</b>	<b>215</b>	<b>2642</b>	<b>751</b>	<b>1247</b>	<b>3248</b>

The following sub-chapters describe the status of the highway in each country. The definitions of the various parameters are given in the section “Field Inventory” in the beginning of this volume.

8.2.1 Nigeria

Map 8.2.1 Trans African Highways in Nigeria



Table 8.2.1 Lagos - Mombasa Highway in Nigeria

Nigeria	Type				Condition					Road parameters (existing or in ongoing improvement)				Traffic flow	
	length	paved	gravel	track	good	fair	poor	construct ed	main- tained	paved width	shoulder gravel	shoulder paved	total width	total	heavy vehicles
Section	km	km	km	km	km	km	km	year	year	m	m	m	m	ADT	%
Lagos-Shagamu	60	60	0	0	0	60	0			2*7,3		2*3,75	22,2	16194	33
Shagamu-Ogun SB	78	78	0	0	0	78	0			2*7,3		2*3,75	22,2	20875	15
Ondo SB-Ogun SB	86	86	0	0	0	0	86			2*7,3		2*3,75	22,2	7053	15
Ondo SB-Benin	80	80	0	0	0	80	0			2*7,3		2*3,75	22,2	4156	15
Benin-Edo SB	54	54	0	0	54	0	0	1990	2002	2*7,3		2*3,75	22,2	17463	15
Edo SB-Asabra-Onitsha	85	85	0	0	85	0	0	1990	2002	2*7,3		2*3,75	22,2	2668	15
Onitsha-Ananbra SB	52	52	0	0	0	52	0			2*7,3		2*3,75	22,2	15276	15
Ananbra SB-Enugu	55	55	0	0	0	55	0			7,3		2*2,75	12,8	26719	15
Enugu-Enugu SB	40	40	0	0	0	40	0			7,3		2*2,75	12,8	4793	15
Enugu SB-Abakaliki	47	47	0	0	0	47	0			7,3		2*2,75	12,8	6755	15
Abakaliki-Enugu SB	40	40	0	0	0	0	40			7,3		2*2,75	12,8	3605	15
Enugu SB-Ekok	60	60	0	0	0	0	60							7099	7
<b>Summary Nigeria</b>	<b>737</b>	<b>737</b>	<b>0</b>	<b>0</b>	<b>139</b>	<b>412</b>	<b>186</b>								



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The TAH-link within Nigeria starts in Lagos, following the Algiers-Lagos Corridor for approximately 60 km. From Lagos to Enugu, a section of 550 km, the highway consists of a dual carriageway with 2 times 7,3 m carriageway and shoulders of 2,75+1,0 m along each carriageway. The remaining link to the Cameroon border consists of a single 7,3 m wide carriageway with 2,75 shoulders.

In Nigeria the funds for routine maintenance are very inadequate and periodic maintenance very often has to be postponed due to lack of funds. The consequence of this policy can be observed in the condition of the road network. Without routine maintenance the condition of a road deteriorates sooner or later to a level, which makes an inevitable input very costly. A contributing factor to the deterioration of a pavement is of course the large amount of traffic, which generally could be noticed in Nigeria.

The entire section from the junction with the Algiers-Lagos highway to the Cameroon border, 677 km, represents all three levels of pavement conditions. 139 km (21 %) are in good condition, 352 km (52 %) are in fair condition and 186 km (27 %) are in poor condition. Most of the sections are planned for periodic maintenance in 2003, if funds are available.

8.2.2 Cameroon

Map 8.2.2 Trans African Highways in Cameroon



Table 8.2.2 Lagos - Mombasa Highway in Cameroon

Cameroon	Type				Condition			Road parameters (existing or in ongoing improvement)						Traffic flow	
	length	paved	gravel	track	good	fair	poor	construct ed	main- tained	paved width	shoulder gravel	shoulder paved	total width	total	heavy vehicles
	km	km	km	km	km	km	km	year	year	m	m	m	m	ADT	%
Ekok-Mamfé	82	0	0	82	0	0	82						3-7		
Mamfé-Bamenda	123	0	0	123	0	0	123						3,5-7		
Bamenda-Bafoussam	80	80	0	0	80	0	0	1992		7		2*1,5	10		
Bafoussam-Foumban	72	72	0	0	0	0	0			7		2*1	9		
Foumban-Tibati	326	0	0	326	0	0	0						3-6		
Tibati-Meidougou	263	263	0	0	0	0	0			7		2*1	9		
Meidougou-Garoua Boulai	98	98	0	0	0	0	98								
<b>Summary Cameroon</b>	<b>1044</b>	<b>513</b>	<b>0</b>	<b>531</b>	<b>80</b>	<b>0</b>	<b>303</b>								

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The Lagos-Mombasa Highway traverses Cameroon from Ekok in the west to the east in Garoua Boulai via Mamfé, Bamenda, Bafoussam, Banyo, Tibati and Meidougou.

According to ECCAS/CEMAC, an alternative route going from Bafoussam down south to the capital Yaoundé and connecting to the Tripoli-Windhoek Corridor in Bertoua, south of Garoua Boulai is considered more advantageous. It links the Lagos-Mombasa Highway with Yaoundé, Cameroon's capital, and approaches Douala, the most important port in the subregion. Moreover, this road is already entirely paved, whereas the section Fouban-Tibati (326 km) along the original TAH network is not paved yet. However, for the purpose of this mission, the originally described road sections are investigated and presented in the following tables.

CEMAC's first priority road network includes the link Douala-Yaoundé-Bertoua-Garoua Boulai, but not the link Bafoussam-Banyo-Tibati.

**8.2.3 Central African Republic (CAR)**

Map 8.2.3 Trans African Highways in CAR

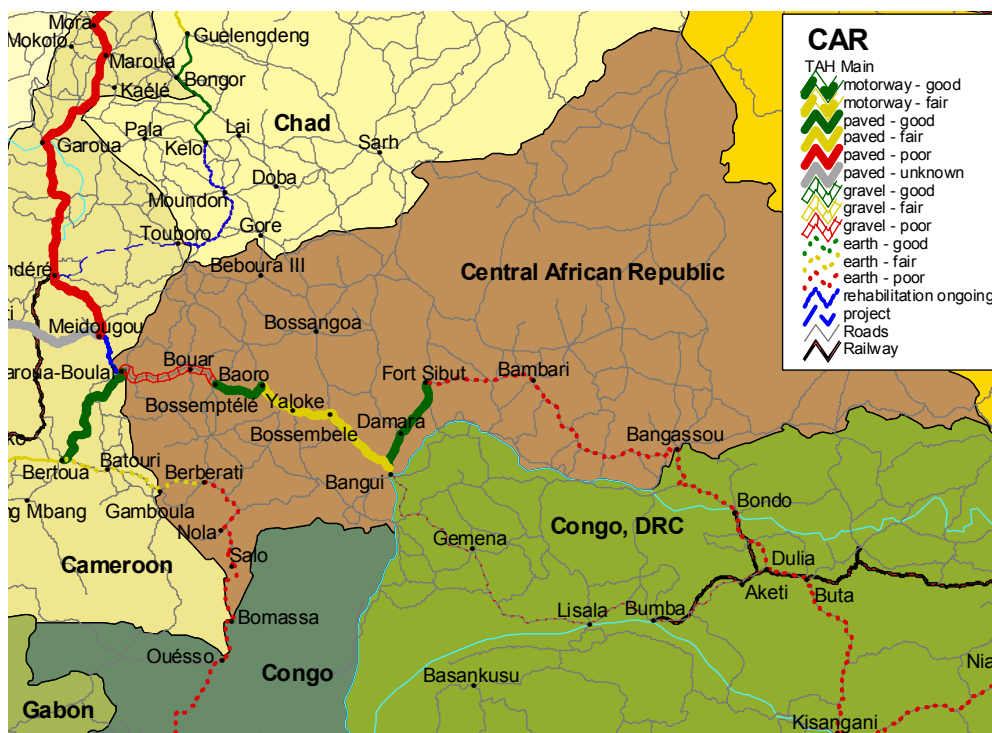


Table 8.2.3 Lagos - Mombasa Highway in CAR

Section	Type				Condition			construct ed	maintained	Road parameters (existing or in ongoing improvement)				Traffic flow	
	length	paved	gravel	track	good	fair	poor			paved width	shoulder gravel	shoulder paved	total width	total	heavy vehicles
	km	km	km	km	km	km	km	year	year	m	m	m	m	ADT	%
Garoua Boulai-Bouar	155	0	155	0	0	0	155							63	
Bouar-Baoro	60	0	60	0	0	0	60							100	
Baoro-Bossemptélé	89	89	0	0	89	0	0		2002	6		2*1	8	120	
Bossemptélé-Yaloké	68	68	0	0	0	68	0		1999					130	
Yaloké-Bossembélé	66	66	0	0	0	66	0		1992	6		2*1	8	150	
Bossembélé-PK12	145	145	0	0	0	145	0		1999	6		2*1	8	300	
PK12-Bangui	12	12	0	0	0	12	0	1989		11,5		2*2	15,5		
PK12-Damara	62	62	0	0	62	0	0	1969	1999	6		2*1	8	400	
Damara-Sibut	112	112	0	0	112	0	0	1974	1999	6		2*1	8	140	
Sibut-Bambari	198	0	0	198	0	0	198							70	
Bambari-Bangassou	352	0	0	352	0	0	352							30	
<i>Summary CAR</i>	<i>1319</i>	<i>554</i>	<i>215</i>	<i>550</i>	<i>263</i>	<i>291</i>	<i>765</i>								

The CAR has adopted CEMAC’s first priority road network to also be of first

national priority.

The link from Garoua Boulāï on the border with Cameroon to Bouar-Baoro-Bossemptélé-Yaloké-Bossembélé to Bangui and further east to Bangassou is considered as first priority road according to CEMAC. It is the major route from the port of Douala in Cameroon to the CAR, and it constitutes a main link even in a national context, as it traverses the country from west to east.

The section from Garoua Boulāï to Baoro (215 km) is not paved yet and in poor condition. The rehabilitation of the first section Garoua Boulāï-Bouar will soon be executed, as the studies are accomplished and tendering for the construction works are being made. As far as the section Bouar-Baoro is concerned, financing has been obtained for the feasibility study, and rehabilitation and paving will presumably be done within 5 years.

The section Baoro-Bossemptélé (89 km) is entirely paved and in good condition. The section Bossemptélé-Yaloké-Bossembélé-Bangui (291 km) is entirely paved and recently rehabilitated (1999).

The continuation from Bangui to Sibut (186 km) is paved and in good condition. The section Sibut-Bambari (198 km) is a gravel road, and funding for periodic maintenance of this section has just been obtained.

The road from Bambari further to Bangassou is an earth track in poor condition. No works are currently planned.

The CAR has also 2 feeders, one on the north (N'djamena – Sarh – Sido – Kaga Bandora – Sibut), and in the south (Baoro – Carnot – Berberati), connecting with the Tripoli – Windhoek Highway. The feeders are not paved.

**8.2.4 Democratic Republic of Congo**

Map 8.2.4 Trans African Highways in DR Congo

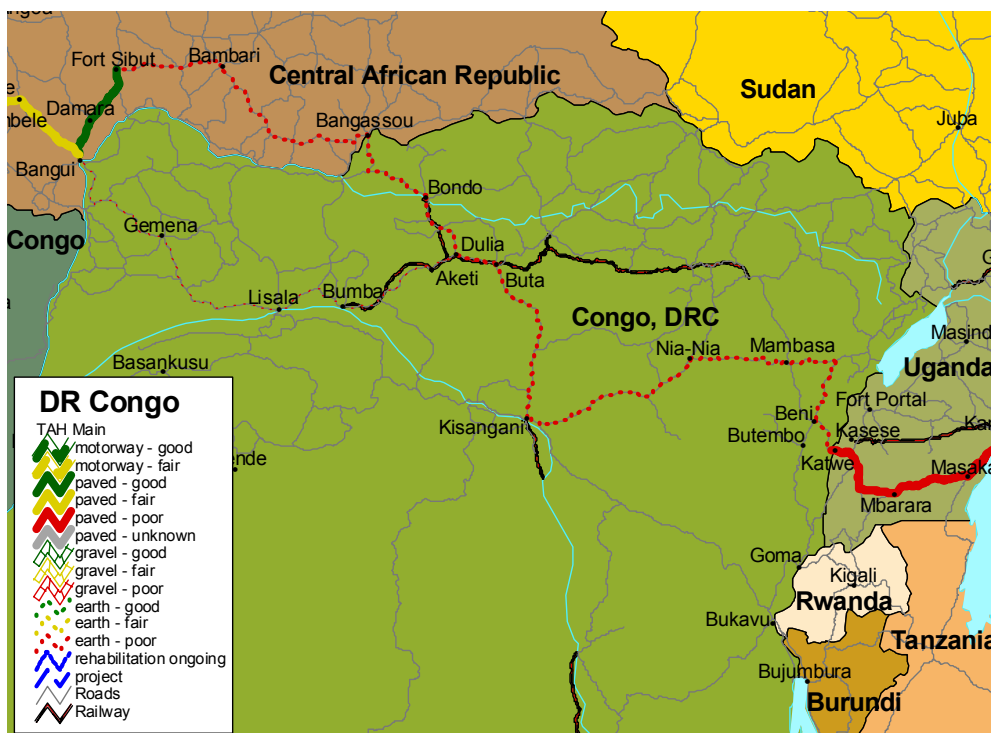


Table 8.2.4 Lagos - Mombasa Highway in DR Congo

Section	Type			Condition			Road parameters (existing or in ongoing improvement)				Traffic flow				
	length	paved	gravel	track	good	fair	poor	construct ed	main- tained	paved width	shoulder gravel	shoulder paved	total width	total	heavy vehicles
	km	km	km	km	km	km	km	year	year	m	m	m	m	ADT	%
Bangassou-Bondo	200	0	0	200	0	0	200								
Bondo-Dulia	130	0	0	130	0	0	130								
Dulia-Buta	74	0	0	74	0	0	74								
Buta-Kisangani	321	0	0	321	0	0	321								
Kinsangani-Nia Nia	342	0	0	342	0	0	342								
Nia Nia-Komanda	289	0	0	289	0	0	289								
Komanda-Beni	125	0	0	125	0	0	125								
Beni-Kasindi	80	0	0	80	0	0	80								
<i>Summary DR Congo</i>	<i>1561</i>	<i>0</i>	<i>0</i>	<i>1561</i>	<i>0</i>	<i>0</i>	<i>1561</i>								

The section of the Lagos-Mombasa Highway in DR Congo is currently under control of the MRC rebels. The road administration does not know the physical condition of the section.

The section starts in Ndu, at the river Mbomou, opposite of the town of Bangassou (CAR). The river is crossed by ferry. An earth track goes from Ndu to Monga-Bondo-Dulia, reaching a more travelled road heading to Buta and Kisangani. The earth track from Ndu to Dulia has a length of 330 km and is interrupted by two rivers that have to be traversed by ferry. The distance from Dulia to Kisangani is 395 km.

Due to the political situation in DR Congo and to the virtual inexistence of a practicable road link between Bangassou and Dulia, there is no long distance traffic between the CAR and Kisangani.

From Kisangani the road continues eastwards to Beni (756 km) and further on 80 km to Katwe, which is the border station with Uganda.

The entire section of the Lagos-Mombasa Highway is an earth road, except a few kilometres in Kisangani. The physical condition of the road in 1990, when the administration in Kinshasa still had control over the area, was poor, and it is not likely that the situation has improved.

The road administration in Kinshasa has indicated that the earth track from Ndu to Dulia has no function as it transverses a sparsely settled area and they have proposed an alternative alignment for the Lagos-Mombasa Highway. It would start opposite Bangui in Zongo and lead to Gemena-Lisala-Bumba and join the original alignment in Dulia. The alternative has the advantage that it goes through an area with intense agricultural activity, that the road is in a better condition than the earth track and that only one ferry service would remain.

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**8.2.5 Uganda**

Map 8.2.5 Trans African Highways in Uganda



Table 8.2.5 Lagos - Mombasa Highway in Uganda

Uganda	Type			Condition			Road parameters (existing or in ongoing improvement)				Traffic flow				
	length	paved	gravel	track	good	fair	poor	construct ed	main- tained	paved width	shoulder gravel	shoulder paved	total width	total	heavy vehicles
	km	km	km	km	km	km	km	year	year	m	m	m	m	ADT	%
Kasindi-Mbarara	168	168	0	0	0	0	168								
Mbarara-Kampala	282	282	0	0	0	141	141								
Kampala-Mbalala	24	24	0	0	24	0	0								
Mbalala-Jinja	74	74	0	0	74	0	0								
Jinja-Bugiri	78	78	0	0	0	0	78								
Bugiri-Malaba	70	70	0	0	0	0	70								
<i>Summary Uganda</i>	696	696	0	0	98	141	457								



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The TAH-link through Uganda has been recorded from information received from Northern Corridor Transit Transport Coordination Authority in Mombasa.

The entire road link from the border crossing to DRC at Kasindi to the border crossing to Kenya at Malaba, consists of 696 km paved road. The pavement is recorded as 98 km in good condition, 141 km in fair condition and 457 km in poor condition. The information about the pavement condition is from the year 1998.

No information was available for the quality of shoulders and traffic volume.

8.2.6 Kenya

Map 8.2.6 Trans African Highways in Kenya

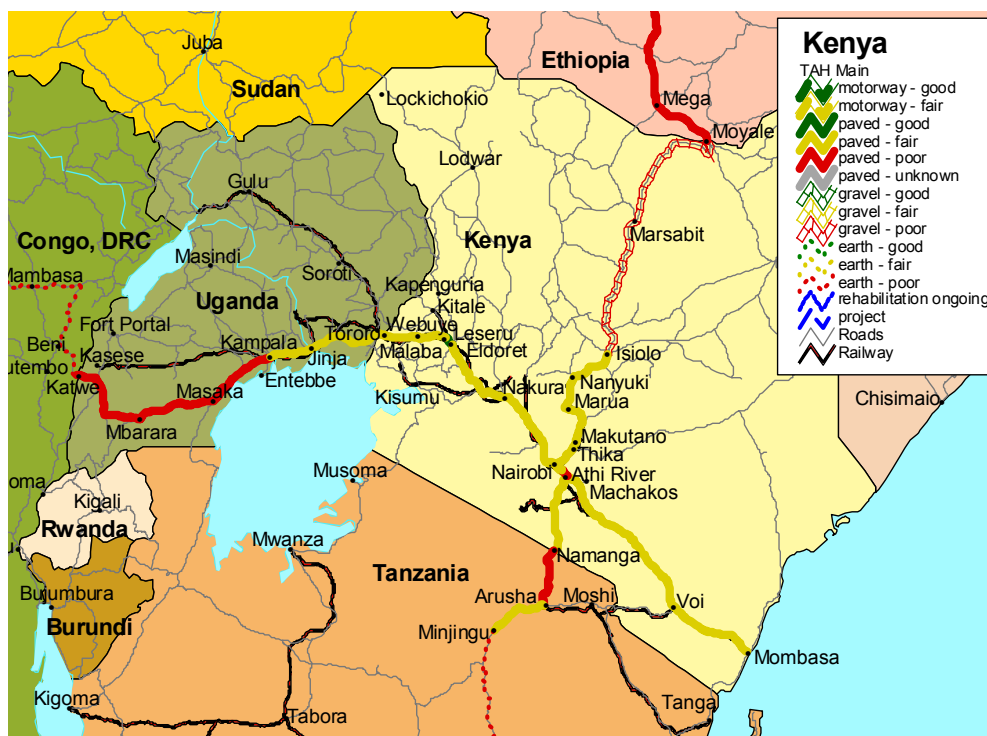


Table 8.2.6 Lagos - Mombasa Highway in Kenya

Section	Type				Condition			Road parameters (existing or in ongoing improvement)						Traffic flow	
	length	paved	gravel	track	good	fair	poor	construct ed	main-tained	paved width	shoulder gravel	shoulder paved	total width	total	heavy vehicles
	km	km	km	km	km	km	km	year	year	m	m	m	m	ADT	%
Malaba-Webuye	33	33	0	0	0	33	0			6,5		2*1,5	9,5	740	43
Webuye-Lesseru	62	62	0	0	0	62	0			6,5		2*1,5	9,5	899	35
Lesseru-Eldoret	15	15	0	0	15	0	0			6,5		2*1,5	9,5	2738	50
Eldoret-Nakuru	154	154	0	0	32	40	82			6,5		2*1,5	9,5	2166	34
Nakuru-Kamandura	124	124	0	0	40	34	50		1999	6,5		2*1,5	9,5	4309	36
Kamandura-Nairobi	32	32	0	0	0	32	0			6,5		2*1,5	32	4309	36
Nairobi-JKIA Turn off	14	14	0	0	0	14	0			2*6,5		4*1,5	19	6997	3
JKIA Turn off-Athi River	11	11	0	0	0	0	11			6,5		2*1,5	9,5	7276	16
Athi River-Machakos Turn off	22	22	0	0	0	22	0			6,5	2*1,5		9,5	2684	55
Machakos Turn off-Voi	283	283	0	0	12	126	145		1999	6,5	2*1,5		9,5	1899	70
Voi-Mombasa	152	152	0	0	72	40	40		2001	6,5		2*1,5	9,5	1911	57
<i>Summary Kenya</i>	<i>902</i>	<i>902</i>	<i>0</i>	<i>0</i>	<i>171</i>	<i>403</i>	<i>328</i>								

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The Kenyan part of the TAH-link Lagos-Mombasa passes developed areas and supports 900 to 4000 vehicles per day. The amount of heavy vehicles is very high with a lowest figure of 34 %, and reaching up to 70 %.

The entire section of 902 km is paved, but shows much varying pavement conditions. 25 km of this link follows the Cairo-Gaborone link. Only 171 km (19 %) of the entire section are in good condition, whereas 403 km (45 %) are in fair condition and 328 km (36 %) are in poor condition. Many parts of the link are subject to proposed feasibility studies. On two sections, rehabilitation work is going on.

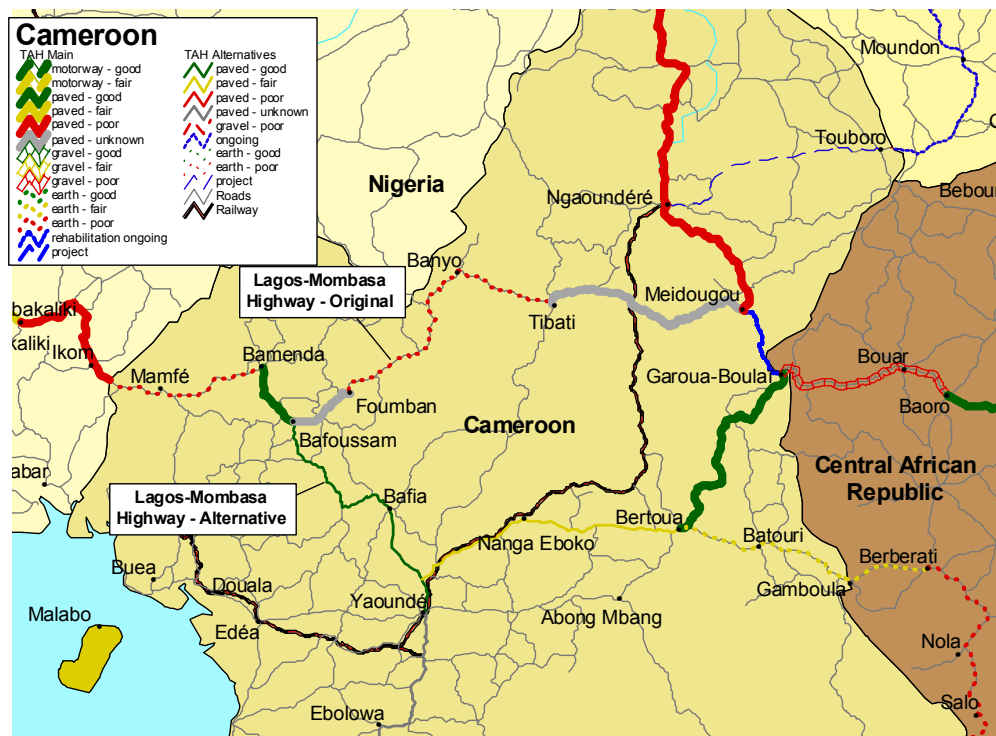
Considering the high amount of heavy vehicles, the width of the carriageway of 6,5 m does represent a rather low standard.

**8.3 ALTERNATIVE ALIGNMENTS**

**8.3.1 Cameroon**

It is a fact that Cameroon has designed its first priority road network according to CEMAC’s and ECCAS’s international first priority road networks. The road from Bafoussam via Yaoundé-Bertoua to Garoua Boulaï is or will soon be entirely paved and in good condition, whereas sections along the original TAH alignment from Bafoussam via Foumban-Banyo-Tibati-Meidougou to Garoua Boulaï still remain unpaved, with no plans for upgrading. It is therefore proposed to redefine the Lagos-Mombasa Corridor in Cameroon as the road link from Ekok (border to Nigeria)-Mamfé-Bamenda-Bafoussam-Yaoundé-Bertoua-Garoua Boulaï (border to CAR). The length of the new alignment from the Nigerian border to the CAR border in Cameroon increases thereby from 1044 km to 1217 km.

Map 8.3.1: Lagos-Mombasa Highway: original alignment and alternative through Cameroon.

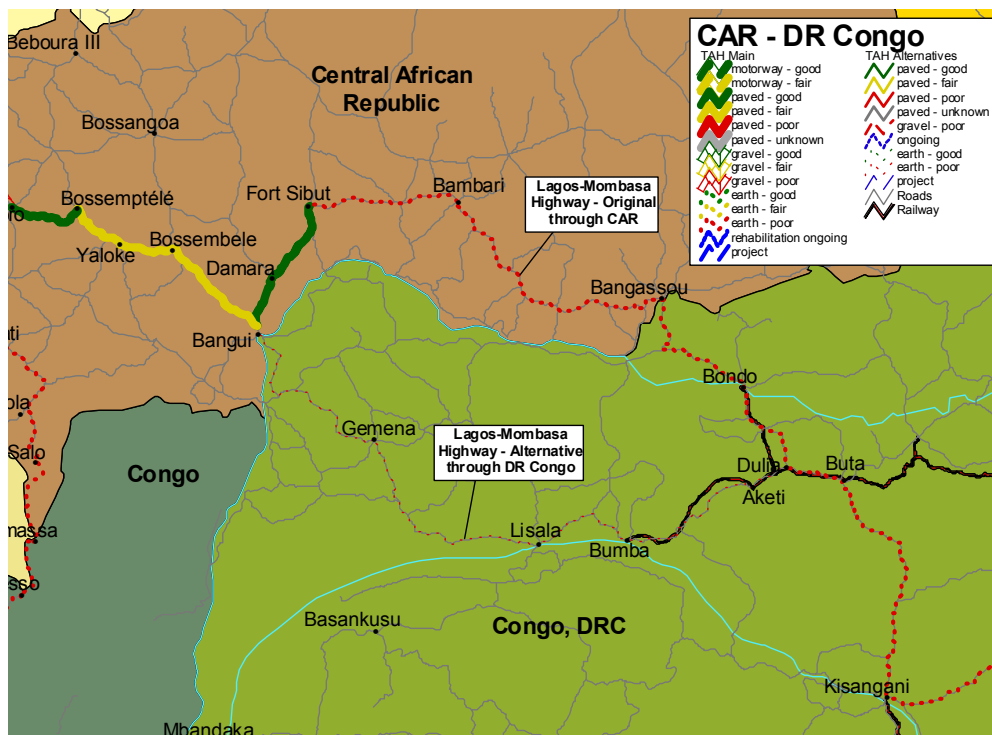


**8.3.2 CAR - DR Congo**

As mentioned in the respective section, the authorities of DR Congo suggested an alternative alignment from Bangui via Zongo, Gemena, Lisala, Bumba to Dulia. The suggested alignment goes parallel to the current alignment, but on the territory of the DR Congo. The length of the alternative is similar to the existing alignment.

The motivation for the suggestion is that the new alignment would traverse an area with great potential in agriculture and therewith guarantee an easy transport and distribution of the goods to the markets. Furthermore, less rivers have to be crossed by ferry than the original alignment.

Map 8.3.2: Lagos-Mombasa Highway: original alignment (CAR) and alternative through DR Congo.



It has to be highlighted that the original alignment forms the backbone of the national road system in the CAR. The corridor is essential for provision of the east of CAR with goods from the port of Douala and from Bangui. On a regional level, the new suggested alignment via DR Congo has a certain importance, as well, but not to such an extent that would justify to alter the definition of the alignment of the Lagos-Mombasa Highway.

## **8.4 ROAD TRAFFIC AND SAFETY**

### **8.4.1 Volume and Composition of Road Traffic Flows**

#### *Nigeria*

The traffic on this link reaches a high to very high volume. From Lagos to Enugu traffic figures between 3 000 and 27 000 vehicles per day are recorded. The remaining section to the Cameroon border shows a traffic volume between 3 600 and 7 000 vehicles per day.

#### *CAR*

The traffic in vicinity of Bangui amounts to 300-400 vehicles per day and is fading out towards the border to Cameroon and wards Bangassou to ca 30-60 vehicles per day.

#### *Cameroon, DRC, Uganda*

Information about traffic figures were not available.

#### *Kenya*

The traffic volume along the road link from Uganda border to Mombasa is recorded to a volume of 740 vehicles per day on the first link, increases to 4300 towards and from Nairobi and drops to 1900 vehicles per day on the last link to Mombasa. The amount of heavy vehicles is extremely high, varying from 35 % to 70 %. The highest figures are recorded between Nairobi and Mombasa.

### **8.4.2 Other Modes of Transport**

The Easter section of the Lagos-Mombasa Corridor is provided with both railway and pipeline services. These supplementary modes of transport lessens to some degree the load on the roads by some types of heavy transports with considerable damaging effect on the road network (fuel, export crops, minerals).

#### *8.4.2.1 Pipeline*

The pipeline extends from Mombasa to Eldoret and Kisumo (at the Victory Lake) and has a throughput of 4-5 million tons a year. Local distribution from Eldoret and Kisumo is basically by road.

#### *8.4.2.2 Kenya-Uganda Railway*

Over the last few years about 2 million tons/year have been transported by rail. There has been considerable problems increasing the transport volumes, partly because of a poor state of repair of the rails and inadequate availability of motive power and

rolling stock. The railway is also in an urgent need for organisational and managerial reform. These problems are reflected in the fact that a Railway Act of 1992 remains on paper only. However, the Corridor has encouraged operational improvements, like the introduction of block trains that have considerably improved the utilisation of the railway for Ugandan goods, albeit from a very low level. As a consequence the railway carries a relatively modest portion of the total transport volumes of the Corridor (some 16% of the total Kenyan export and import and 33% of the Ugandan).

### **8.4.3 Road Security and Safety**

#### *8.4.3.1 Road Safety*

The road safety and security situation is poor or very poor in most of Africa. The fatality rate per registered vehicle in Africa is 8-50 times higher than in the industrialised world although the road safety situation differs substantially from country to country. While the Central African Republic had a fatality rate of 339 persons per 10 000 vehicle in 1995, the fatality figure for Namibia was 9 in 1996.

There are a number of reasons for the poor road safety record of Africa. A rapid increase in the number of vehicles combined with poor road standard, lack of training, education and information in the road safety field. It has also proven difficult to establish the kind of multi-sectoral, inter ministerial institutional structures needed for successful road safety activities. For a more detailed discussion of the road safety situation in Africa see the presentation under Highway 3 Tripoli-Windhoek.

The problems along the Lagos-Mombasa Highway in the road safety field reflects most of the more general problems mentioned above. While there is little or no road safety information available related directly to this particular Trans African Highway, there is information available for some of countries intersected by the Highway. The fatality rate is high in Uganda, 122 or even very high, e. g. 339 in the Central African Republic. Most countries e.g. Kenya, Cameroon, Nigeria have rates in the 50 to 70 interval.

#### 8.4.3.2 *Road Traffic Security*

There are different types of security problems encountered by the road traffic in Africa.

- Major security problems (large-scale robbery, armed attacks etc.) often encountered in periods of conflict between and within countries.
- The lack of or poor availability of telecommunication services, fuel, repair facilities, accommodation, food, drinking water, etc. along the roads constitutes another group of risks

The first type of security concerns are at present experienced only in DR Congo but has also been common in the Central African Republic over the years. The second type of problems is more prevalent and must be considered to be a constraint on road traffic along the least well developed sections of the Highway. The first type of security problems could on the whole not be considered to be a major deterrent to normal road transport anywhere along the extent of this highway. This does not mean that there are no problems but they are more in the nature of “normal” criminality. Possible exceptions to this are the area on the border between Kenya and Ethiopia and where cattle rustling and traditional fights between tribes at time spill over in road robbery.

### **8.5 MANAGEMENT OF THE CORRIDOR**

#### **8.5.1 Responsibility for and Management of the Highway**

The management and coordination of this corridor at a multinational level is that provided for by the REC's of the sub region, i.e. ECOWAS, COMESA, EAC and the Northern Corridor. The Lagos-Mombasa Highway also had its own multi-lateral Highway Authority established at Bangui in the early 1980s. This Authority was given substantial powers, but functioned only for a limited period and was disbanded at the end of the 1980s.

The REC's have taken an active role in the planning and programming of the road networks of the member countries. Each of the RECs, as well as the individual member countries, have their own set of high priority roads. These priorities have however, not be established in isolation but rather after consultations and discussions with all parties involved at both national and sub-regional levels. There is thus a high degree of agreement as to the network of main international road links of importance in each of the sub-regions. It is apparent that the work on determining the core network of road connections has involved the whole of the main networks and has not in any way been directed exclusively towards the Trans African Highways.



Although the work done by RECs provides the framework for the development and investments in the road sector, it is the responsibility of each country to manage the implementation, including funding, contracting, supervision and maintenance. The very high degree of dependence on outside funding, with the exception of the Highway sections in Nigeria and to some extent in Kenya, the donors have had an important, if indirect, influence on the condition and future development of the Lagos-Mombasa Highway.

### **8.5.2 Road Sector Operations**

As mentioned above the actual road operations are handled by the road administrations of the individual countries. The systems for road management varies somewhat from country to country with some countries, like Nigeria, retaining the more traditional set up, with a Department of Roads forming an integral part of a ministry (Ministry of Works) and with funding provided under the consolidated central government budget. Other countries have started the process of creating semi-independent organizations for the management of roads and the funding of at least parts of the road activities. This reform process is strongly supported by the RECs but not fully implemented in most countries. A case in point is Kenya which has an independent Road Fund, while the road management operations remain within the Ministry of Roads.

The trends in the operational field (road design, construction and supervision) are a bit more consistent in the sense that in most countries there is a clear move to employ the services provided by the private sector, through consultants and contractors for the design, construction, rehabilitation and maintenance activities. There is still some force account activities going on but the trend is towards a steady increase in the private sector involvement in this field.

### **8.5.3 Strategy and Priorities**

The strategies employed and priorities established for the TAH network of highways comprise a combination of strategies and priorities established at both national and REC levels. The western part of the Lagos-Mombasa Highway (Nigeria, Cameroon, CAR and DR Congo) is covered by ECOWAS, CEMAC and ECCAS. The eastern part (DR Congo, Uganda, Kenya) is covered by COMESA EAC and the Northern Corridor. The national priorities tend to coincide or to be closely related to those formulated by the RECs and that is also the case for this Highway.

## **8.6 FUNDING**

### **8.6.1 Corridor Programming**

ECOWAS, CEMAC and ECCAS cover the western sections of the Lagos-Mombasa Highway in its sub-regional network of high priority roads. COMESA, EAC and Northern Corridor has in a similar fashion included the eastern sections of the Highway in their long term plans for key roads in the development of the sub-regional road network.

### **8.6.2 Sources of Financing**

In the countries of the Lagos-Mombasa Highway the funding of road sector activities is arranged along the following main lines:

- a) External assistance sources for road construction, rehabilitation (and to some degree also for period maintenance purposes).
- b) Central government financing of counterpart funds and the construction, rehabilitation and period maintenance work not covered under the different external assistance programmes.
- c) Road Fund for road maintenance in general and a routine maintenance in particular.

Although these three main sources of funding are all employed in the countries concerned their actual importance and availability varies greatly from country to country. The road sector activities in Nigeria and Kenya are highly depending on locally generated funds, with the Nigerian roads fully funded under the federal consolidated budget, while the Road Fund plays an important role for the upkeep of the Kenyan road network (the level of external assistance to improvement and rehabilitation projects is far below requirements). For countries like Uganda, DR Congo and the Central African Republic external funding sources play a central role in the road sector.

A common condition in all countries is the fact that the funds made available to the road sector is inadequate to meet maintenance and rehabilitation requirements. Very limited funds are at present made available for the maintenance of the federal road network of Nigeria, 259 million Naira (USD 2,2 million) compared to the 70 billion Naira set aside for development purposes annually during the last few years. This means that no periodic maintenance is possible shortening the life span of roads and increasing the demand on road rehabilitation measures. In Kenya some USD 110 million are collected each year. It is estimated that this amount is adequate to cover the annual road maintenance requirements. However, with a USD 1 billion rehabilitation backlog some of the Road Fund resources are set aside for the most

pressing rehabilitation needs (avoiding asphalt roads to deteriorate beyond repair). The result has been a shift in the funding deficit to the area of periodic maintenance, particular the periodic maintenance of gravel roads.

## **8.7 TRADE AND TRANSPORT FACILITATION**

### **8.7.1 Road Sector**

The main problem in the road sector is poor maintenance standard, a fact aggravated by high axle-loads resulting from the common over-loading of trucks. This inability of the countries to properly control the total weight and axle-load of heavy vehicles has serious consequences for the whole road transport industry.

### **8.7.2 Non-Physical Barriers**

There are progress in this field but slow progress. There are simplifications introduced in the field of custom procedures and handling partly thanks to the introduction of computerised systems. However, the developments seem to be of the “two step forward, one step backward” kind. Although the number of standard documents have been reduced (the Road Customs Transit Document now in use replaces 13 old ones) new are introduced. The reason given for this is that as traders and transporters try to avoid paying custom duties by utilising loopholes in existing regulations or outright fraud the customs authorities tend to counter such attempts with the help of new documents and/or control procedures, complicating the clearing process.

There are also major unresolved problems in this field. One has to do with the handling of customs bonds that at present functions as a fragmented system. Each country through which transit goods passes, requires its own bond. Work is now in progress to establish a Regional Customs Bond Guarantee that would be accepted by all corridor countries.

One simple measure, which would considerably reduce the waiting time at borders, would be to increase the number of hours the border post is open. Such extended opening hours have been temporarily introduced in e.g. Zambia in conjunction with the import of emergency food and with very good results.

## **8.8 MISSING LINKS**

A missing link should fulfil the criteria of either to be none-existing as road with all-weather standard or with standard far below the minimum standard for the current traffic flow. Neglected road maintenance does not qualify for being a missing link. Thus poor sections with acceptable, yet too narrow road width are not listed as

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missing links. Gravel roads are included in the list of missing links, as they are meant to be upgraded sooner or later to fulfil the requirements of an international road.

In this sense missing links are observed in many countries. The following missing links are listed below:

Cameroon	531 km	Earth tracks
Central African Republic	854 km	Gravel sections or earth tracks
Democratic Republic of Congo	1561 km	Earth tracks or improved roads impassable in bad weather (entire link except for some kilometres around Kisangani)

Total missing links                      2946 km

Details about the missing links are given below.

Table 8.8 Missing links

Section	Country	length km	Type			Upgrading to recommended minimum standard	
			paved km	gravel km	track km	description	cost M US\$
Ekok-Mamfè	Cameroon	82			82	new road	35
Mamfè-Bamenda	Cameroon	123			123	new road	50
Foumban-Tibati	Cameroon	326			326	new road	130
Garoua Boulai-Bouar	CAR	155		155		improvement	30
Bouar-Baoro	CAR	60		60		improvement	12
Baoro-Bossemptélé	CAR	89		89		improvement	18
Sibut-Bambari	CAR	198		198		improvement	40
Bambari-Bangassou	CAR	352			352	new road	140
Bangassou-Bondo	DR Congo	200			200	new road	80
Bondo-Dulia	DR Congo	130			130	new road	50
Dulia-Buta	DR Congo	74			74	new road	30
Buta-Kisangani	DR Congo	321			321	new road	130
Kinsangani-Nia Nia	DR Congo	342			342	new road	135
Nia Nia-Mambasa-Komanda	DR Congo	289			289	new road	115
Komanda-Beni	DR Congo	125			125	new road	50
Beni-Katwe	DR Congo	80			80	new road	30
<b>Summary</b>		<b>2946</b>		<b>502</b>	<b>2444</b>		<b>1075</b>

## **8.9 CONCLUSIONS**

This corridor is in a way a continuation of the Dakar-Lagos TAH and extending it to the African East Coast. The total length of the corridor is about 6 300 km with nearly 3 000 km of missing links in the central section of the corridor (basically in Central African Republic and the DR Congo). The problems in the centre of the corridor are very much the result of civil wars and political turmoil, feeding through into poor economic development and social conditions. Such a situation hardly helps in generating the funding needed for an adequate maintenance, rehabilitation and development of the road network, including the TAHs in the countries concerned.

The travel and transport patterns along the corridor reflects closely local and sub-regional requirements. The countries to the east of DR Congo are basically relying on the ports of East Africa for their overseas export and import requirements, while the countries to the west are using the ports on the West Coast. There is very little, if any, road transport between e.g. Lagos and Nairobi/Mombasa. The corridor thus functions as two separate traffic systems with little or no interaction between the two.

While there are problems with the up-keep and rehabilitation of many of the sections of the TAHs of the corridor, the problems are known and acted upon at both national and RECs level. This is particularly true for the TAH sections with the highest traffic loads.



## **9 HIGHWAY 9 - BEIRA – LOBITO**

### **9.1 DESCRIPTION OF THE CHARACTERISTICS OF THE CORRIDOR**

The Beira – Lobito Highway as originally defined, see map 9.1, coincide in most parts with the Southern African Regional Development Corridors, as proposed by SADC in April 2001. The Trans African Highway connects Beira with Harare, following SADC's trunk road number 30 and continues to Lusaka, where many of the development corridors meet. From Lusaka the TAH-link connects Lubumbashi in Democratic Republic of Congo. The link between Lubumbashi and Lobito in Angola follows another of the SADC corridors, which still has a poor infrastructure.

This corridor exists more as a concept than as a reality, at least as far as the western sections through Angola and DR Congo are concerned. There is little information available about the condition of the Highway through these two countries and the war conditions have made the systematic collection of road traffic data impossible. What little information available seems to indicate that major efforts would be required to bring back the infrastructure (both roads and railway infrastructure) as well as road and railway transport facilities, to a level that would provide more normal transport services in the corridor.

The situation is considerably better in the Eastern section of the Corridor (Mozambique, Zimbabwe and Zambia). Major efforts have over the last few decades gone into rehabilitating and expanding the port, road, rail and pipeline facilities linking the Port of Beira with the hinterland of Mozambique and the landlocked countries to the west of Mozambique.

### **9.2 PHYSICAL CONDITION**

The Beira - Lobito Corridor starts in Beira in Mozambique and passes Zimbabwe, Zambia, Democratic Republic of Congo and ends in Lobito in Angola. The road link has been investigated by country-visits in three of the five countries. The remaining countries, Zimbabwe and Angola, are described with information collected from SADC in Maputo.

All information from the inventory phase is summarised in sheets presented in Volume 4. Extracts from these sheets are shown in table 9.1 and illustrated in maps, presented country wise.

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Map 9.1 Beira - Lobito Corridor. Link number 9





**Volume 2 – Description of Corridors**

Table 9.1 Beira – Lobito Corridor. Link number 9

Section	Type				Condition		
	length	paved	gravel	track	good	fair	poor
	km	km	km	km	km	km	km
Mozambique	282	282	0	0	257	0	25
Zimbabwe	655	655	0	0	614	0	41
Zambia	606	606	0	0	316	183	107
DR Congo	823	210	0	613	90	120	613
Angola	1157	419	404	334	0	342	815
<b>Total Beira - Lobito</b>	<b>3523</b>	<b>2172</b>	<b>404</b>	<b>947</b>	<b>1277</b>	<b>645</b>	<b>1601</b>

The following sub-chapters describe the status of the highway in each country. The definitions of the various parameters are given in the section “Field Inventory” in the beginning of this volume.

9.2.1 Mozambique

Map 9.2.1 Trans African Highways in Mozambique and Zimbabwe

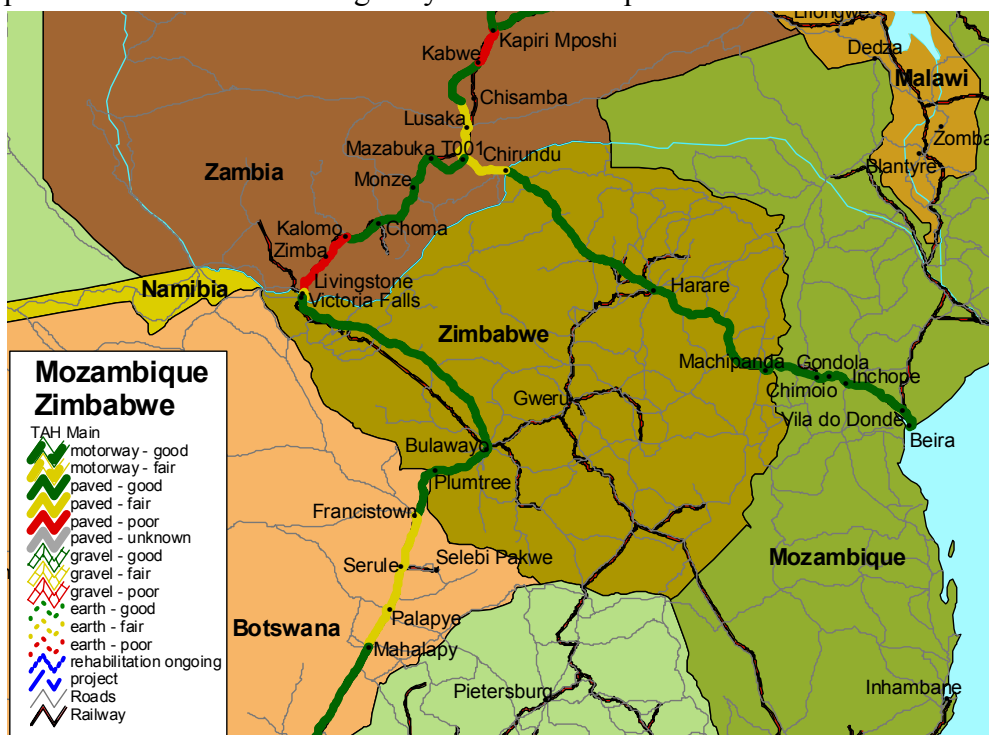


Table 9.2.1 Beira - Lobito Highway in Mozambique

<i>Mozambique</i>		Type			Condition					Road parameters (existing or in ongoing improvement)				Traffic flow	
Section	length	paved	gravel	track	good	fair	poor	construct ed	main- tained	paved width	shoulder gravel	shoulder paved	total width	total	heavy vehicles
	km	km	km	km	km	km	km	year	year	m	m	m	m	ADT	%
Beira-Nhandue	4	4	0	0	4	0	0			11		2*3,2	17,4	1946	33
Nhandue-Fr. Dondo	16	16	0	0	16	0	0			7		2*1,5	10	1833	34
Fr. Dondo-Dondo	15	15	0	0	15	0	0			7		2*1,5	10	1527	40
Dondo- Fr. Nhamatan	25	25	0	0	0	0	25			7		2*1,5	10	1196	47
Dondo-Tica	11	11	0	0	11	0	0			7		2*1,5	10	1625	45
Tica-Nhamatanda	28	28	0	0	28	0	0			7		2*1,5	10	2054	44
Nhamatanda-Inchope	31	31	0	0	31	0	0			7		2*1,5	10	1025	44
Inchope-Maforga	30	30	0	0	30	0	0			7		2*1,5	10	692	44
Maforge-Chimoio	34	34	0	0	34	0	0			7		2*1,5	10	1116	43
Chomoio-Chipata	20	20	0	0	20	0	0			7		2*1,5	10	854	42
Chipata-Bandula	15	15	0	0	15	0	0			7		2*1,5	10	677	29
Bandula-???	27	27	0	0	27	0	0			7		2*1,5	10	719	15
???-Vila de Manica	6	6	0	0	6	0	0			7		2*1,5	10	655	16
Vila de Manica-Machipanda	20	20	0	0	20	0	0			7		2*1,5	10		
<i>Summary Mozambique</i>	282	282	0	0	257	0	25								

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The TAH-link within Mozambique is part of the Beira Corridor, which has been rehabilitated for over 10 years. The Road Authorities succeeded to considerably improve the standard of the pavement, although the road structure is quite old. The road length in Mozambique is 282 km, of which only 25 km are in poor condition.

The cross-section has a carriageway of 7,0 m and paved shoulders of 1,5 m. Along the entire road link, many bridges are recorded, some of them in locations sensitive to flooding, particularly in the Limpopo plain. There are 52 bridges with a total length of 2100 m, the longest one with a length of 190 m.

**9.2.2 Zimbabwe**

Table 9.2.2 Beira - Lobito Highway in Zimbabwe

Section	Type				Condition			Road parameters (existing or in ongoing improvement)				Traffic flow			
	length	paved	gravel	track	good	fair	poor	construct ed	main- tained	paved width	shoulder gravel	shoulder paved	total width	total	heavy vehicles
	km	km	km	km	km	km	km	year	year	m	m	m	m	ADT	%
Machipanda-Mutare	31	31	0	0	31	0	0			6				0	0
Mutare-Nyazura	60	60	0	0	60	0	0			10				5751	23
Nyazura-Macheke	80	80	0	0	80	0	0			10				1812	33
Macheke-Harare	108	108	0	0	94	0	14			12,5				5929	19
Harare-Chirundu	376	376	0	0	349	0	27			12,5				4200	29
<i>Summary Zimbabwe</i>	<i>655</i>	<i>655</i>	<i>0</i>	<i>0</i>	<i>614</i>	<i>0</i>	<i>41</i>								

The link connects Mozambique with Zambia and passes Zimbabwe's capital Harare. The Zimbabwe section of the Beira-Lobito Highway has a length of 655 km and the section is paved. 614 km are in good condition and 41 km (6 %) in poor condition, according to a condition survey of 1998.

The travelled width of the road varies between 6 meters near the Mozambican border and 12,5 meters on the western 484 km towards the Zambian border. No information is available about the division into carriageway and shoulders. The above description of the Beira-Lobito Highway through Zimbabwe is based on SADC information.

**Volume 2 – Description of Corridors****9.2.3 Zambia**

Map 9.2.2 Trans African Highways in Zambia

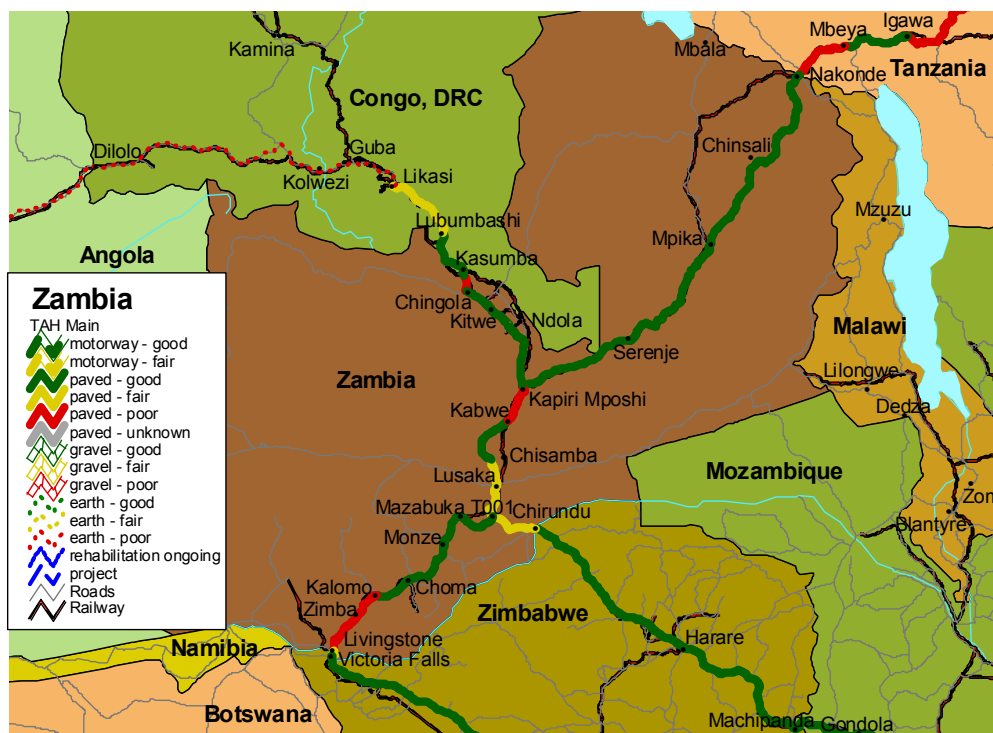


Table 9.2.3 Beira - Lobito Highway in Zambia

Zambia Section	Type				Condition			Road parameters (existing or in ongoing improvement)						Traffic flow	
	length	paved	gravel	track	good	fair	poor	construct ed	main- tained	paved width	shoulder gravel	shoulder paved	total width	total	heavy vehicles
	km	km	km	km	km	km	km	year	year	m	m	m	m	ADT	%
Chirundu-T001	80	80	0	0	0	80	0	1985	1999	8	2*1		10	591	32
T001-Lusaka	56	56	0	0	0	56	0	1976	1995	9	2*1		11	5362	13
Lusaka-Chisamba	47	47	0	0	0	47	0		1995	6	2*1		8	3138	46
Chisamba-Kabwe	92	92	0	0	92	0	0		1995	6	2*1		8	1893	31
Kabwe-Kapiri (T2)	68	68	0	0	0	0	68		1975	6	2*1		8	1513	25
Kapiri (T2)-Ndola	114	114	0	0	114	0	0	1970	1995	6,7	2*1,5		9,7	1506	35
Ndola-Kitwe	57	57	0	0	57	0	0	1970	1995	8	2*1,5		11	2381	30
Kitwe-Chingola	53	53	0	0	53	0	0	1970	1995	8	2*1,5		11	4103	20
Chingola-Kasumbalesa	39	39	0	0	0	0	39	1970	1986	12	2*1		14	970	21
<i>Summary Zambia</i>	<i>606</i>	<i>606</i>	<i>0</i>	<i>0</i>	<i>316</i>	<i>183</i>	<i>107</i>								

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As mentioned in the description of the Cairo – Gaborone link, the road network in Zambia is generally fairly old, originally from the 1960's. However, major efforts have been made to rehabilitate and improve the main road network. Consequently, sections with poor standard are rare.

The Beira-Lobito Highway section in Zambia has a total length of 606 km and is paved. A part of this section (263 km) coincides with the Cairo–Gaborone Highway. The remaining link of 343 km includes sections with poor condition (39 km, 11 %) and fair condition (80 km, 23 %). The remaining sections are in good condition.

The width of the carriageway varies between 6,7 to 8 meters. The shoulders are unpaved and the width varies from 1 m to 1,5 m. In the western part of the country, towards the Democratic Republic of Congo there is a section of 57 km length with dual carriageway.

**9.2.4 Democratic Republic of Congo**

Map 9.2.3 Trans African Highways in DR Congo

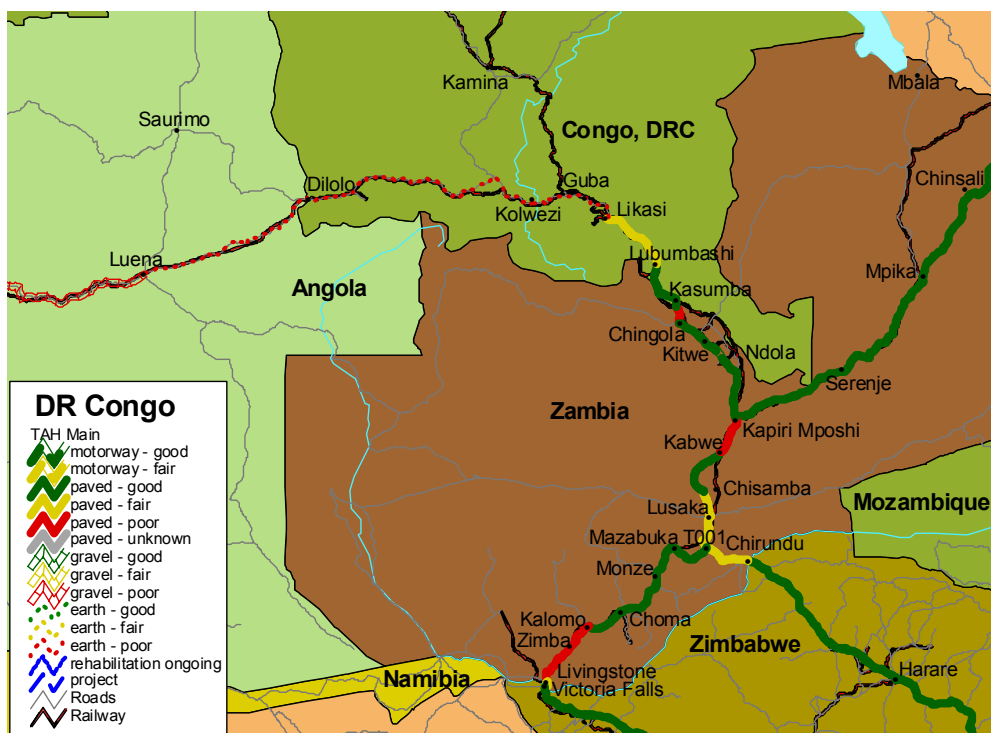


Table 9.2.3 Beira - Lobito Highway in DR Congo

DR Congo	Type				Condition			Road parameters (existing or in ongoing improvement)						Traffic flow	
	length	paved	gravel	track	good	fair	poor	construct ed	main- tained	paved width	shoulder gravel	shoulder paved	total width	total	heavy vehicles
	km	km	km	km	km	km	km	year	year	m	m	m	m	ADT	%
Kasumbalesa-Lubumbashi	90	90	0	0	90	0	0			7		2*1,5	10		
Lubumbashi-Likasi	120	120	0	0	0	120	0			7		2*1,5	10		
Likasi-Nguba	120	0	0	120	0	0	120			3		2*1,5	6		
Nguba-Kolwezi	65	0	0	65	0	0	65								
Kolwezi-Dilolo	428	0	0	428	0	0	428	1992							
<i>Summary DR Congo</i>	823	210	0	613	90	120	613								

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Entering DCR all vehicles have to adapt to right-hand traffic rules.

From the Zambian border the road consists of a paved section, passing Kasumbalesa, Lubumbashi and Likasi, a link of 250 km, of which 90 km serves as a toll road. From Likasi to Nbuba the road has originally been paved, but has deteriorated to an earth track. From Nguba via Kolwezi to the Angolan border at Dilolo, the road is an earth track and almost impassable in some sections, especially during the rainy season.

Between Kasumbalesa and Nguba, rehabilitation and reconstruction work is planned for the near future.

No information about the traffic volume is available.

**9.2.5 Angola**

Map 9.2.4 Trans African Highways in Angola



Table 9.2.4 Beira - Lobito Highway in Angola

<i>Angola</i>		Type			Condition			Road parameters (existing or in ongoing improvement)						Traffic flow	
Section	length	paved	gravel	track	good	fair	poor	construct ed	main- tained	paved width	shoulder gravel	shoulder paved	total width	total	heavy vehicles
	km	km	km	km	km	km	km	year	year	m	m	m	m	ADT	%
Dilolo-Luena	334	0	0	334	0	0	334								
Luena Kuito	404	0	404	0	0	0	404							137	
Kuito-Cachiungo	77	77	0	0	0	0	77							340	
Cachiungo-Alto Hama	102	102	0	0	0	102	0							312	
Alto Hama-Lobito	240	240	0	0	0	240	0							462	
<i>Summary Angola</i>	<i>1157</i>	<i>419</i>	<i>404</i>	<i>334</i>	<i>0</i>	<i>342</i>	<i>815</i>								



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From the border crossing to DRC at Dilolo, the road link consists of 334 km earth track and 404 km gravel road. The remaining 419 km (of a total length of 1157 km) have paved surfacing, of which 77 km (18 %) are in poor condition and 342 km (82 %) are in fair condition. The information about the pavement condition is from 1998.

The paved sections have a carriageway width of 6 m. No information was available for the quality and width of shoulders.

**Volume 2 – Description of Corridors****9.3 ROAD TRAFFIC AND SAFETY****9.3.1 Volume and Composition of Road Traffic Flows.**

The following information about traffic figures are extracted from the tables (all figures are rounded):

Country	Year	Total traffic (ADT)	Heavy vehicles and buses (%)
Mozambique	2001	2000 (Beira) 700 (Border)	30 to 45 15
Zimbabwe	1998	6000 (Harare) 4200 (Zambia border)	20 to 30 30
Zambia	2001	600 (Zimbabwe border) 3000 to 5400 (Lusaka) 2400 (Kitwe) 1000 (DRC border)	50 % 45 to 15 % 30 % 20 %
DRC		N. A.	N. A.
Angola	1970	140 to 470	N. A.

**9.3.2 Other Modes of Transport**

This Corridor connects two relatively modern ports with road, rail and pipeline facilities of a very varying capacity and level of up-keep. As mentioned above, the civil wars in Angola and DR Congo have badly effected most of what facilities there were prior to the war. As a result it is only the Port of Lobito that retains a semblance of normal transport sector activities in the western sections of this Corridor.

The situation in the East is much better although not perfect. The Port of Beira has limitation as to the kind of vessel it can accommodate, due to its location (continuous dredging is required to keep the entrance channel open) and the performance of both the port and railway operations is not competitive when compared to the systems of e.g. South Africa. However, the eastern part of the Corridor has a considerable potential taking into account the combined capacity of the road, rail and pipeline (the pipeline extending from Beira to Harare) systems.

### **9.3.2 Road Security and Safety**

#### *9.3.2.1 Road Safety*

The road safety and security situation is poor or very poor in most of Africa. The fatality rate per registered vehicle in Africa is 8-50 times higher than in the industrialised world although the road safety situation differs substantially from country to country. While the Central African Republic had a fatality rate of 339 persons per 10 000 vehicle in 1995, the fatality figure for Namibia was 9 in 1996.

There are a number of reasons for the poor road safety record of Africa. A rapid increase in the number of vehicles combined with poor road standard, lack of training, education and information in the road safety field. It has also proven difficult to establish the kind of multi-sectoral, inter ministerial institutional structures needed for successful road safety activities. For a more detailed discussion of the road safety situation in Africa see the presentation under Highway 3 Tripoli-Windhoek

The problems along the Beira-Lobito Highway in the road safety field reflects most of the more general problems mentioned above. While there is little or no road safety information available related directly to this particular Trans African Highway, there is information available for some of countries intersected by the Highway. Figures are available for Zambia and Zimbabwe that have 39 and 17 fatalities per 10 000 vehicles respectively.

#### *9.3.2.2 Road Traffic Security*

There are different types of security problems encountered by the road traffic in Africa.

- Major security problems (large scale robbery, armed attacks etc.) often encountered in periods of conflict between and within countries.
- The lack of or poor availability of telecommunication services, fuel, repair facilities, accommodation, food, drinking water, etc. along the roads constitutes another group of risks

The first type of security concerns is at present experienced basically in DR Congo. The second type of problems is more prevalent and must be considered to be a constraint on road traffic along some of the less well-developed sections of the Highway.

## **9.4 MANAGEMENT OF THE CORRIDOR**

### **9.4.1 Responsibility for and Management of the Highway**

The management and coordination of this corridor at a multinational level is that provided for by the REC's of the sub regions, i.e. COMESA and SADC. The REC's have taken an active role in the planning and programming of the road networks of the member countries. Each of the RECs, as well as the individual member countries, have their own set of high priority roads. These priorities have however not been established in isolation but rather after consultations and discussions with all parties involved at both national and sub-regional levels. There is thus a high degree of agreement as to the network of main international road links of importance in each of the sub-regions. It is apparent that the work on determining the core network of road connections has involved the whole of the main networks and has not in any way been directed exclusively towards the Trans African Highways.

Although the work done by RECs provides the framework for the development and investments in the road sector, it is the responsibility of each country to manage the implementation, including funding, contracting, supervision and maintenance. The very high degree of dependence on outside funding means that the donors have had an important, if indirect, influence on the condition and future development of the Beira- Lobito Highway.

### **9.4.2 Road Sector Operations**

As mentioned above the actual road operations are handled by the road administrations of the individual countries. The systems for road management varies from country to country and the main institutional models being used in Africa at present is actually represented in this Corridor.

- a) DR Congo retains the more traditional set up with a Department of Roads forming an integral part of a ministry (Ministry of Works) and with funding provided under the consolidated central government budget;
- b) Other countries have started the process of creating semi-independent organizations for the management of roads and the funding of at least parts of the road activities. This reform process is strongly supported by the RECs but not fully implemented in most countries. A case in point is Zambia that initiated the reform process already in 1994 when a National Roads Board was established to administrate and manage a Road Fund. The Board and the Fund are now well established but the operational and management of the national road network (including the TAH links) remains a responsibility of the Roads Department within the Ministry of Communications and Transport;

- c) Mozambique is one of the few countries, which have reformed both the operational and funding aspects of road management and administration. This new system has been in operation since the late 1990s.

The trends in the operational field (road design, construction and supervision) are a bit more consistent in the sense that in most countries there is a clear move to employ the services provided by the private sector, through consultants and contractors for the design, construction, rehabilitation and maintenance activities. There is still some force account activities going on, but the trend is towards a steady increase in the private sectors involvement in this field. Mozambique and Zambia have for all intent and purposes abandoned the traditional type of force account activities.

### **9.4.3 Strategy and Priorities**

The strategies employed and priorities established for the TAH network of highways comprises a combination of strategies and priorities established at both national and REC levels. In the case of the Beira - Lobito Highway, this means the positions taken by COMESA, SADC and ECCAS. The national priorities tend to coincide or to be closely related to those formulated by the RECs, and that is also the case for this Highway.

There are major improvements and rehabilitation requirements along the extent of the highway as well as a maintenance backlog. These requirements are most pronounced in Angola and DR Congo, but that is also the countries where more concrete plans and projects are available for early implementation.

## **9.5 FUNDING**

### **9.5.1 Corridor Programming**

The Beira - Lobito Corridor is included in the sub-regional network of high priority roads established by COMESA, SADC and ECCAS. The Trans African Highway forms an integral part in their long term plans for key roads in the development of the sub-regional road network.

### **9.5.2 Sources of Financing**

In the countries of the Beira- Lobito Highway the funding of road sector activities is arranged along the following main lines:

- a) External assistance sources for road construction, rehabilitation (and to some degree also for period maintenance purposes);
- b) Central government financing of counterpart funds and the construction,

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rehabilitation and period maintenance work not covered under the different external assistance programmes;

- c) Road Fund for road maintenance in general and a routine maintenance in particular.

Although these three main sources of funding are all employed in the countries concerned their actual importance and availability varies somewhat from country to country. While Central Government funding is important for the maintenance of roads in DR Congo important parts of the maintenance funding in Mozambique and Zambia are provided under Road Fund financing (through road user charges). Major road sector projects like periodic maintenance, rehabilitation and road improvements are normally provided under different external funding schemes for this Corridor.

A common condition in all countries is the fact that the funds made available to the road sector is inadequate to meet maintenance and rehabilitation requirements. Mozambique is a case in point where the road users charges collected by the Road Fund is inadequate to meet even routine maintenance requirements. A decision has therefore been taken to substantially increase the fuel levies in order to be able to secure full funding of the routine maintenance costs of a limited network (which includes the TAH link in the country). Over time it is expected that the road Fund will be able to generate enough revenue to cover the full cost of both routine and period maintenance of an extended road network. External assistance is expected to provide for rehabilitation and improvement requirements for a foreseeable future. The situation is very much the same in the other countries of the corridor.

## **9.6 TRADE AND TRANSPORT FACILITATION**

### **9.6.1 Road Sector**

The main problem in the road sector is poor maintenance standard, a fact aggravated by high axle-loads resulting from the common over-loading of trucks. This inability of the countries to properly control the total weight and axle-load of heavy vehicles have serious consequences for the whole road transport industry.

### **9.6.2 Non-Physical Barriers**

There are progress in this field but slow progress. There are simplifications introduced in the field of custom procedures and handling partly thanks to the introduction of computerised systems. However, the developments seem to be of the “two step forward, one step backward” kind. Although the number of standard documents have been reduced (the Road Customs Transit Document now in use replaces 13 old ones) new are introduced. The reason given for this is that as traders

and transporters try to avoid paying custom duties by utilising loopholes in existing regulations or outright fraud the customs authorities tend to counter such attempts with the help of new documents and/or control procedures, complicating the clearing process.

There are also major unresolved problems in this field. One has to do with the handling of customs bonds that at present functions as a fragmented system. (Each country through which transit goods passes, requires each their own bond). Work is now in progress to establish a Regional Customs Bond Guarantee that would be accepted by all corridor countries.

One simple measure, which would considerably reduce the waiting time at borders, would be to increase the number of hours the border post is open. Such extended opening hours have been temporarily introduced in e.g. Zambia in conjunction with the import of emergency food and with very good results.

### **9.7 MISSING LINKS**

A missing link should fulfil the criteria of either to be none-existing as road with all-weather standard or with standard far below the minimum standard for the current traffic flow. Neglected road maintenance does not qualify for being a missing link. Thus poor sections with acceptable, yet too narrow road width are not listed as missing links. Gravel roads are included in the list of missing links, as they are ment to be upgraded sooner or later to fulfil the requirements of an international road.

In these sense missing links are observed in DRC and Angola only:

- In DRC missing links are found from Nbuba to the Angolan border with a length of 613 km.
- In Angola missing links are the sections from the DRC border to Kuito, an earth track and a gravel section in poor condition with a total length of 738 km.

The total length of missing links is **1351 km**, corresponding to **38 %** of the Trans African Highway Beira – Lobito.

Details about the missing links are given below.

Table 9.7 Missing links

Beira-Lobito Highway		Type				Upgrading to recommended minimum standard	
Section	Country	length	paved	gravel	track	description	cost
		km	km	km	km		M US\$
Likasi-Nguba	DR Congo	120			120	new road	50
Nguba-Kolwezi	DR Congo	65			65	new road	25
Kolwezi-Dilolo	DR Congo	428			428	new road	170
Dilolo-Luena	Angola	334			334	new road	135
Luena Kuito	Angola	404		404		improvement	80
<b>Summary</b>		<b>1351</b>		<b>404</b>	<b>947</b>		<b>460</b>

## 9.8 CONCLUSIONS

The Beira-Lobito Corridor contains some 3 600 km of Trans African Highways, with a very varying level of construction and maintenance standards. This is to a considerable degree the result of the long period of civil war in Angola and the more recent fighting in DR Congo. This has resulted in a situation where the TAHs in the western part of the corridor is in a poor state of repair and with limited traffic, while the eastern section (from Beira to Lusaka) consist of paved highway sections, which on the whole are in a good state of repair and carries fairly substantial volumes of traffic (on the average well above 1 000 vehicle/day).

It follows from what has been stated above that the problem with missing links is a problem limited to the western section of the system. There are a total of 1 350 km of missing links in Angola and DR Congo which amounts to a staggering 68% of their portion of the Beira-Lobito TAHs.

It is of some importance from a management and development point of view that the Beira – Lobito corridor forms part of the SATCC scheme of Regional Development Corridors. This means that questions related to the timing, location and priorities of required rehabilitation work, maintenance funding etc. are areas of activities where the concerned governments are provided with advice and support from a REC like SATCC. This kind of support and advise could be of particular importance for countries like Angola and DR Congo.