

**MiNTS – MISR NATIONAL TRANSPORT STUDY**

**THE COMPREHENSIVE STUDY  
ON THE MASTER PLAN  
FOR NATIONWIDE TRANSPORT SYSTEM  
IN  
THE ARAB REPUBLIC OF EGYPT**

**FINAL REPORT**

**TECHNICAL REPORT 1  
ROAD SECTOR**

March 2012

**JAPAN INTERNATIONAL COOPERATION AGENCY**

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**ORIENTAL CONSULTANTS CO., LTD.  
ALMEC CORPORATION  
KATAHIRA & ENGINEERS INTERNATIONAL**

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**TRANSPORT PLANNING AUTHORITY  
MINISTRY OF TRANSPORT  
THE ARAB REPUBLIC OF EGYPT**

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## CHAPTER 1: INTRODUCTION

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### 1.1. BACKGROUND

The Japan International Cooperation Agency (JICA) and the Transport Planning Authority of the Ministry of Transport are cooperating in the conduct of the *Comprehensive Study on The Master Plan for Nationwide Transport System in the Arab Republic of Egypt (MiNTS – Misr National Transport Study)*, based upon agreements finalized during July, 2009<sup>1</sup>. Oriental Consultants Company Limited, headquartered in Tokyo, Japan, is the designated lead consultant for the study. Associated firms are Almec Corporation, Japan and Katahira & Engineers International, Japan. Technical efforts in Egypt were initiated during December, 2009.

### 1.2. THE MiNTS FRAMEWORK

#### 1.2.1. Study Scope and Objectives

MiNTS is comprehensive in nature, that is, approaches have been designed to mitigate transport problems and contribute to the sustainable development of the nation. Investigative efforts extend over the entirety of the Republic (Figure 1.2.1), with a particular focus being major corridors of movement for both persons and cargo. All major modes of transport are addressed including road, rail, maritime, inland waterway, civil aviation and pipeline. However, the practical master planning focus falls upon those modes falling under the jurisdiction of the Ministry of Transport; that is, the road, rail, maritime and inland waterway sectors.

Five key milestones form the foundation upon which planning efforts are based:

- Establish a nationwide, multi-modal database whose validity rests on a series of focused transport survey and data collection exercises;
- Formulate overall strategies and policies for development of the nationwide transport fabric;
- Develop an integrated, multi-modal transport master plan with years 2017, 2022 and 2027 being short, medium and ultimate planning horizons, respectively;
- Identification, within the master plan framework, of high-priority projects; and,
- Implementation of an effective and productive technology transfer program with Egyptian counterparts.

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<sup>1</sup> *Scope of Work - Comprehensive Study on The Master Plan for Nationwide Transport System in the Arab Republic of Egypt*, as mutually agreed upon between the Japan International Cooperation Agency and the Ministry of Transport, Government of Egypt, July 16, 2009.



Source: JICA Study Team

Figure 1.2.1 MiNTS Study Area

The transport strategy embedded within MiNTS must concurrently contribute to an efficient economic structure, strengthen linkages within Egypt as well as with neighboring countries, and provide a base for market-oriented transport activity. Economic expansion and social transformations within Egypt are well underway; continuing improvements in productivity and well-being are expected. As economic growth continues, changes in transport activities and behavior will follow suit. **Thus, the foci of transport planning must gradually shift from alleviation of present deficiencies to realization of a transport system founded upon sustainable evolution and integrated, mutually supportive transport solutions.** This strategy is particularly valid given the almost 20-year planning horizon adopted by MiNTS.

### 1.2.2. A Consultative Planning Process

The final structure of MiNTS, and the successful reception thereof, can only be achieved as a direct result of cooperative efforts and close liaison between the Study Team and local experts. Considerable efforts have been expended in gathering information, reviewing previous studies and holding numerous discussions to enhance knowledge of, and sensitivity to, local transport conditions, norms and practices.

The Study Team, housed in the offices of the Transport Planning Authority, Ministry of Transport, is being strongly assisted by its designated counterpart Special Working Group, Coordination Committee and Steering Committee. Thus, continuous and productive technical liaison is being maintained with a number of organizations including the Ministry of Transport and various entities thereof (Office of the Minister, Transport Planning Authority, Egypt National Railways, General Authority for Roads, Bridges and Land Transport, General Authority for River Transport, Maritime Transport Sector); the Ministry of Housing,

Utilities and Urban Communities; Ministry of Civil Aviation; Ministry of Agriculture and Land Reclamation; Ministry of Trade and Industry; Ministry of Industrial Development; Ministry of Interior; Ministry of Local Development; Ministry of Finance; State Ministry of Foreign Affairs, Sector of International Cooperation; Ministry of the Environment; CAPMAS (Central Agency for Public Mobilization and Statistics); as well as various Governorates and entities thereof. Close coordination has also been effected with Universities and various departments within those learned institutions.

Likewise, effective consultations are programmed with various international agencies, funding institutions, donors, and consultant groups in order to obtain an overview of previous, current, and likely future activities and/or involvement in Egypt.

### 1.2.3. Sustainability and Human Resources Development

The components of the Master Plan diversify beyond the traditional "hardware" concepts associated with infrastructure provision. Additional key elements of the process consist of "software" aspects, that is, available technology, international standards, and modal integration needs (cargo/passenger terminals, logistics chains, transfer points) as well as "humanware" needs. In the latter case, this represents the cultivation of human resources via the designation of training and education programs as well as other requirements for developing expertise. In other words, "sustainability", or the notion that the planning process must allow Egyptian stakeholders to participate in visualizing and shaping their own future. **This is of substantial importance in terms of ownership building if MiNTS is to be adopted and used by the people and their elected officials both during, and following, the conduct of MiNTS.**

## 1.3. REPORTING STRUCTURE

The *Final Report* consists of three elements: *The Master Plan* report, *Technical Reports* and *Appendix Reports*.

- *The Master Plan* report is seen as the main document whose intent is to present, in a synoptic sense, main findings of the MiNTS investigations;
- *Technical Reports* represent a series of sector-specific reports which document the technical underpinning of *The Master Plan* document (Table 1.3.1), and,
- *Appendix Reports* represent task-specific or activity-specific documents and other data summaries, some of which have been developed in response to client group requests.



Table 1.3.1 Technical Reporting Structure

Report Number	Subject
1	Road Sector
2	Rail Sector
3	Inland Waterway Transport Sector
4	Maritime Sector
5	Civil Aviation and Pipeline Sectors
6	Demand Simulation and Scenario Testing
7	Organizational and Functional Aspects of the Transport Sector
8	Private Sector Participation
9	Environmental Considerations
10	The MiNTS Vision, Policies and Strategies
11	Transport Survey Findings
12	Project Prioritization
13	Counterpart Training Program

Source: JICA Study Team

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## CHAPTER 2: OVERVIEW OF ROAD SECTOR

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### 2.1. OVERVIEW

The Sector Report on Road Sector presents a comprehensive analysis of the road sector and related matters as part of the MiNTS Projects. It presents the overall findings and major results of various technical discussions, information and data gathered from the field, as well as meetings with various government agencies and counterpart organizations.

The road sector is important to the overall transport system of Egypt as the country moves towards greater economic integration of its major economic growth centers. It is noted that the current state of the national road infrastructure needs to be improved particularly the expressways, the primary and secondary networks of which are critical to sustaining the gains of major economic development projects taking place in the whole of

Egypt. Further, road transport services must be made efficient and affordable to productive sectors such as agriculture, services and industry to enhance the investment climate in major growth centers along the Nile River and in the Nile Delta Area as well as in other desert areas of the country.

A number of major road projects have been implemented, which included bridges and tunnels construction. These major road improvement, rehabilitation and construction projects were made possible with the assistance of international donor countries. However, improving the road infrastructure alone is not sufficient in making the sector relatively more efficient. There are other issues that are equally important to enable the road sector to become more responsive to the needs of the economic sectors and to sustain the economic gains made in the past years. Further, the road sector must be integrated more effectively with other transport sectors, such as shipping, rail and air transport, to further enhance the economic gains of transport investments as a whole.

Other equally important issues that need to be addressed to enable the road infrastructure system to be more operationally efficient include the following: making the road institutional system more adapted and responsive to the needs of the economic sectors; better and more effective road operation and management; and more effective road safety in the country.

Sector Report No. 1 provides an analysis of the existing situation of the road sector, the current state of its infrastructure network in relation to the economic development needs of major growth centers and developing areas, and its institutional system and current road management practices. Based on the analysis of the sector, the report also provides short- to medium-term and long-term strategies to enable the road sector to function more efficiently.

## 2.2. OBJECTIVES

Sector Report No. 1 on Road has the following objectives:

- The formulation of long-term development strategies for the road transport sector up to year 2027;
- The formulation of a national road transport development master plan up to year 2027; and
- The strengthening of planning capabilities of road transport agencies and the under-taking of necessary technology transfer.

## CHAPTER 3: PRESENT CONDITION

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### 3.1. INSTITUTIONAL FRAMEWORK

#### 3.1.1. Organizational Responsibilities

The main authority in the Egyptian road sector is GARBLT (General Authority for Roads, Bridges and Land Transport) which is a part of MOT (Ministry of Transport). Its tasks are, inter alia, to:

- Provide through planning, design and construction, an interurban road network that is safe, efficient and well-managed;
- Implement road safety in all aspects from design to construction and maintenance,
- Maintain the existing network, routine, preventive, rehabilitation, and emergency;
- Partner with private and semi governmental entities in the construction, operation, and maintenance of selected capital roadway projects after conducting the necessary due diligence and feasibility studies;
- Inspect, with the assistance of the Ministry of Interior, truck axle loads in order to ensure compliance with the allowed limits.

Other players of authorities active in the Egyptian road sector are:

- Ministry of Interior (Traffic Police): Undertaking road side random checks, issuing of vehicle registration certificates, issuing of driving licenses, regulating driving times and rest periods (within the overall labor law, and conducting road worthiness tests.
- Ministry of Transport: Licensing of transport operators and developing the transportation master plan.
- Ministry of Housing, Utilities and Urban Development (MOHUUD): Road Planning and construction within / connecting urbanized area and the new urban communities. After constructing the roadways, the right of management and maintenance works change over to GARBLT or to one of 29 Governorates.
- 29 Governorates: planning, construction, management and maintenance of city and town roadways within Governorates under the supervision of the Ministry of Local Development.

GARBLT includes many different departments, many of which operate in areas connected to road sector, such as planning and design of new highways and bridges, registration of road inventory, volume and

accidents data, re-designing establishment and changing of road technicalities etc. GARBLT is also responsible for setting up sign postings and undertaking the paintwork of road markings, including its own factory producing road signs. GARBLT recently has been approved to administrate for land transport services, such as inter-city passenger bus service and licensing the inter-city logistic service managements (Figure 3.1.1). The main interlocutors on road sector in GARBLT are:

- The Central Department for Chairmanship Affairs; the department has responsibility for overall planning and for media, press and public relations within GARBLT,
- The Department for Expressways and Weighing Stations; this department is responsible for weighing stations and technical issues amongst others,
- The Department for Road Maintenance; the mandates of this department for road maintenance include standard maintenance and rebuilding, plans for road markings with signposts and painted road markings. Activities classify emergency, routine, improvements and rehabilitation works,
- The Department for Road Construction; this departments works mainly with plans for establishing new road systems and has a subdivision undertaking road safety related issues in this connection. Activities include building new roads and expanding existing roads to dual lanes,
- The Road Engineering and Safety Department; this department is responsible for implementing and sustaining roadway safety measures, including signs, markings, lightning and U-turns,
- The Central Department for Road Research; this department works mainly with research in connection with road construction, design as well as drafting technical proposals, traffic counting and road signs.

GARBLT has 12 districts which cover the whole area of Egypt. These districts are in charge of GARBLT activities in the governorates they cover. In addition, GARBLT districts provide technical support regarding road construction and maintenance to the departments of roads and bridges in each governorate. The districts offices have a large force (4-5,000), and each office is responsible for on average 1,500 km of highways. Table 3.1.1 shows the governorates covered by each district.

**Table 3.1.1 GARBLT Districts and covered governorates**

District No.	District Name	Covered Governorates
1	Central	Cairo – Giza – Qalubia- 6th of October – Helwan
2	Canal and Sinai	Port Said – Ismailia – North Sinai
3	East Delta	Dakahlia – Sharqia – Damiatta
4	Middle Delta	Kafr El Sheikh – Gharbia – Minufia
5	West Delta	Alexandria – Behira – Matrouh
6	Beni Suif	Beni Suif – Fayum
7	Asyout	El Menya – Asyout
8	Qena	Luxor – Qena – Sohag
9	Red Sea	Red Sea
10	Aswan	Aswan
11	South Sinai	Suez – South Sinai
12	New Valley	New Valley

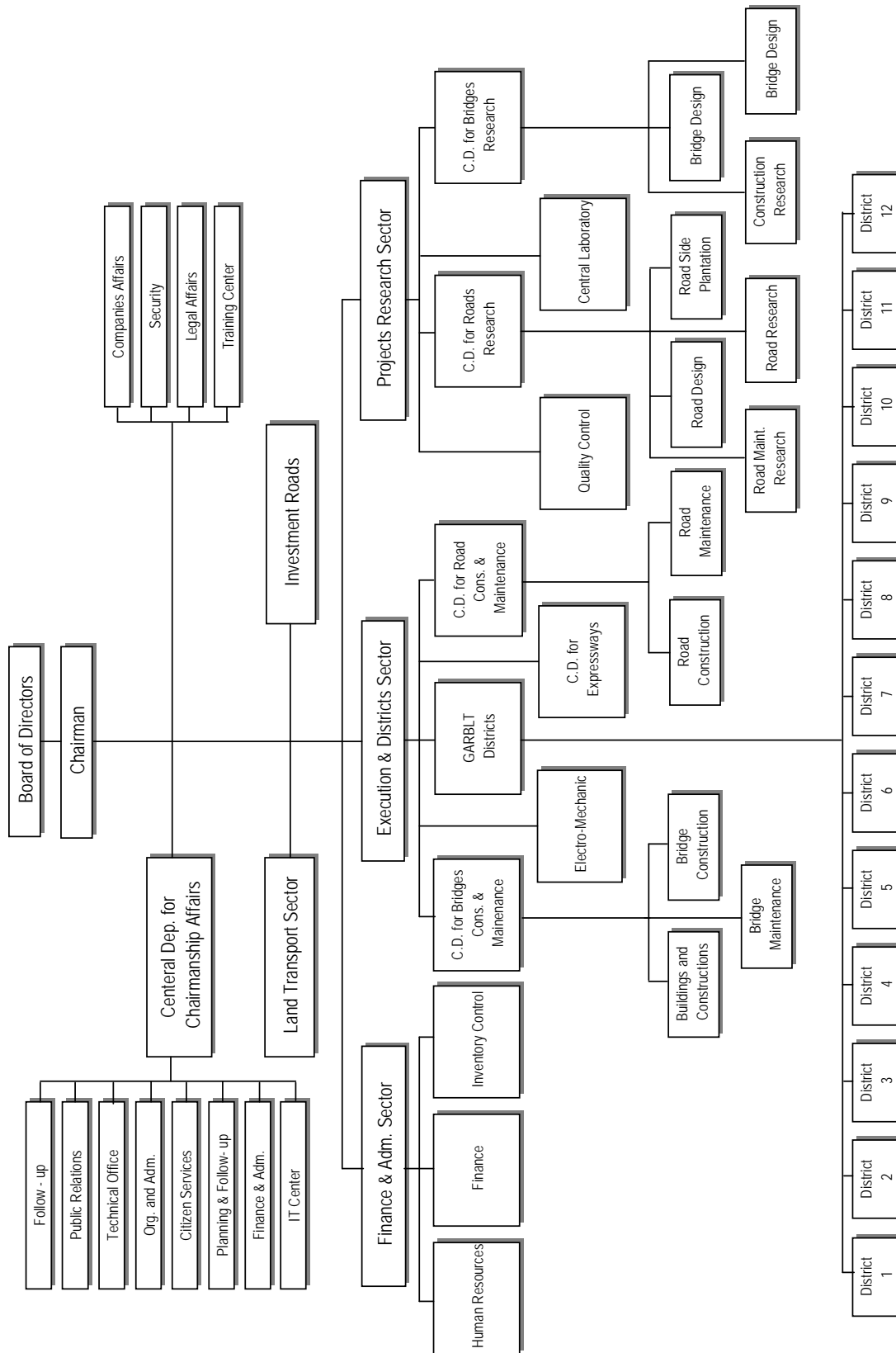


Figure 3.1.1 Organizational Structure of GARBLT Source: GARBLT

### 3.1.2. Laws and Regulations related to Road Sector

#### (1) Laws and Decrees related to Road Sector and Land Transport Service

Laws in Egypt are issued by Presidential decrees after the approval of the parliament while executive Regulations or Ministerial decrees are issued by relevant Ministers to set the implementation rules for the Laws. The following list represents the main legislations covering road sector and land transport service in Egypt:

- Public Roads Law No. 84 / 1968 and as amended
- Building of Roads Law No. 229 / 1996 and as amended
- GARBLT Law No. 334 / 2004
- Goods Transport on Public Roads No. 64 / 1970
- Operating Public Transport Concession Law No. 55 / 1975
- Trucks Importation Decree No. 266 / 1970 issued by Minister of Transport
- Traffic Law No. 66 / 1973 and as amended
- Traffic Executive Regulations No. 2777 / 2000 issued by Minister of Interior
- Vehicle Compulsory Insurance Law No. 72 / 2007
- Environment Law No. 4 / 1994 and its Executive Regulations No. 338 / 1985

#### (2) Vehicle Operation License System

The traffic department of Ministry of Interior is the organization in charge of checking the road worthiness of vehicles before granting operation license. The check is made at the premises of the traffic police at each district and/or markaz. Such premises, in general, have limited space and are very crowded with vehicles and people. The traffic engineer has little time to check thoroughly all aspects of the vehicle and it is easy to notice the result in the status of old vehicles still running on the street some of them are more than 30 years old, exceeding all the designed life span. Broken down vehicles that can be noticed on the sides of the national roads is another indicator of low safety standards of vehicle inspection procedures. Egypt has no accreditation system to qualify inspectors for road worthiness of vehicles. For instance, in Japan getting an engineering degree from any university is not enough qualification for being road worthiness inspector. The applicator has to pass very rigorous national tests to qualify for the lowest level of inspectors and then has to work for specified period before staying for the test of the next level. The road worthiness check is done into well equipped workshops and only new vehicles are exempted from such checks because all car makers must employ inspectors of the highest level to certify each and every vehicle before getting the vehicle out of the factory. The rationale behind such strict rules is to enhance road safety not only for drivers and passengers but also for third party as well. The Study Team urges the concerned parties in Egypt to start serious planning for adopting strict rules and procedures for the improvement of road worthiness of vehicles. The Egyptian Government may seek international cooperation for the technical support of inspector's accreditation and for providing model facilities for vehicle inspection. ENIT can be the institute for inspector's education, training and accreditation and the Traffic Police can be the manager of the model inspection facilities. Similar inspection facilities could be established by private sector and the overall supervision of Traffic Police.

### (3) Logistic Operation License Systems

The regulations regarding the operating license for road haulage companies are summarized in various laws and decrees. The related authorities are currently preparing a new "Unified Transport Law" which will regulate the licensing of professional drivers. The existing operating license for haulage companies is issued by the MOT. The license for regional public transport companies are issued by eight provincial governors. In the remaining governorates the issuing is unregulated. The good repute, the financial standing and the technical competence criteria are part of the national legislation:

Good repute: For the drivers and other staff members it is mandatory to have a clear crime record.

The financial standing criterion and the technical competence criterion are part of the national legislation. The haulage company's financial and technical standing are verified during the evaluation phase.

### (4) Road Worthiness

According to the Traffic Law, a regular technical inspection and road worthiness regime applies to Heavy Vehicles and Buses. The aim is to ensure that vehicles using the roads are of high technical quality and safe to drive. The test considers exhaust emissions, equipment and ignition. Only if the vehicle meets the minimum requirement it is authorized to be driven on the roads, Otherwise the problem must be rectified within seven days. The intervals of road worthiness test depend on the type of vehicle: Heavy Vehicle and buses are tested yearly, Private cars and taxis are tested every third year. There are 12 certified test centers in Egypt to conduct the tests. Roadside random tests are executed by teams comprising traffic police and technical experts. These checks examine whether the trucks, buses or cars using the roads fulfill the technical and environmental standards. The tests include the following:

- A visual inspection of the vehicles maintenance
- A check of the vehicles certification and road worthiness documentation
- An inspection of the braking systems, exhaust systems, suspension, lighting, signaling, emissions and taco-graph.

The verification of taco-graphs was slated for 2008, but the actual implementation has yet to be adopted.

### (5) Driving License and Driver Test

The regulations regarding the driving license are regulated as the followings:

- Driver must be mentally and physically fit to drive and driver examination is mandatory
- Drivers have to pass a theoretical and practical test
- Driver have to be above the minimum age of 18 years
- The following categories for a driving licenses exist;
  - Private license for non-professional drivers. It permits the driving of private cars, taxis used in



tourist transport, agricultural tractors for personal use, and light transport vehicles with loading capacity not exceeding two tons.

- Third-Class driving license for professional divers; it permits the driving of taxis and buses with capacities not exceeding 17 passengers, as well as vehicles indicated above
  - Second-Class driving license; It permits the driving of taxis, buses with capacities not exceeding 26 passengers, trucks, and heavy duty equipment, as well as vehicles indicated above. The license shall only be issued after three years after obtaining a Third-Class driving license.
  - First-Class driving license; It permits the driving of all vehicles. This license shall be only issued after three years after obtained a Second-Class deriving License.
  - Agricultural Tractor Driving License; It permits the driving of a single tractor, or a tractor with an agricultural trailer.
  - A temporary learning driving license; It shall be granted to those learning how to drive
- The valid period of a driving license is not limited.
  - Haulage companies that use foreign drivers need to provide a certification of employment

The Traffic Department of the Ministry of Interior is the organization in charge of granting driving license for all kind of vehicles. The driving license for private cars is valid for 10 years and that of trucks and busses is valid for one year. In general, getting driving license in Egypt is an easy matter. The driving test is done in the traffic department at each district and each kism and it takes few minutes. Although there are some so called driving schools, they have no training space and usually they train the license seeker in the ordinary street. Although the owner of the driving school should have license, his instructors who teach driving has no accreditation. The cars used for training are not specially equipped. Most of Egyptian drivers know very little about traffic law. The Ministry of Tourism is currently constructing the first driving school with international standard. This school will train tourist bus drivers in the first phase and then will also provide training for truck drivers. It is to be noticed that Cairo Transport Authority and Alexandria Transport Authority who operate public busses in Greater Cairo and Alexandria has their own facility for the training of their own drivers. According to some research in causes of traffic accidents it was found that drivers' behavior is the top cause of accidents. This can be attributed to lack of proper training and education in driving and traffic rules.

## **3.2. ROAD NETWORK SYSTEM**

### **3.2.1. Road Network**

The road network in Egypt is approximately 100,000 km long; near 23,500 km of which is managed and maintained centrally (Table 3.2.1). This network comprises expressways, toll roads, primary inter-city road and other major roads. Responsibility for these major roads, illustrated in Figure 3.2.1, is mainly with the General Authority for Roads, Bridges and Land Transport. The rest of Egypt's paved roadway, including city and town roads approximately 59,500 km, is administrated by any of the country's 29 governorates, under the supervision of the Ministry of Local Development. Coordination between GARBLT and the

Governorates administration takes place where any of GARBLT 12 districts interfaces with any of the 29 governorates.

The major road network, illustrated in Figure 3.2.2, expands and spreads in Nile Delta area, Coastal area of Red Sea and Sinai Peninsula and along Nile River, which mostly connects with Cairo, the capital of Egypt. The desert area apart from Nile River and coastal area have not been habitation. Therefore the road extension has not been developed historically.

**Table 3.2.1 Road Network Extent by Governorate in 2008**

Governorate	Unpaved Road (km) (A)	Paved Road (km)					Total (km) (A)+(B)	Paved %	Road Length (km) per 1000 capita
		Paved Road Total (B)=(C)+(D)	Local Management (C)	GARBLT Management					
				W< 12m (E)	W>= 12 m (F)	Total (D)=(E)+(F)			
Cairo	4,961	20,452	19,862	470	120	590	25,413	80.5%	3.0
Alexandria	1,059	4,249	3,646	403	200	603	5,308	80.0%	1.3
Port Said	153	730	445	195	90	285	883	82.7%	1.5
Suez	209	1,640	938	250	452	702	1,849	88.7%	3.6
Damietta	0	1,033	595	343	95	438	1,033	100.0%	0.9
Dakahlia	274	2,378	1,720	213	445	658	2,652	89.7%	0.5
Sharkia	4,419	3,096	2,392	178	526	704	7,515	41.2%	1.4
Qalyubia	213	1,456	1,134	129	193	322	1,669	87.2%	0.4
Kafr El Sheikh	542	2,147	1,427	0	720	720	2,689	79.8%	1.0
Gharbia	117	1,586	1,111	298	177	475	1,703	93.1%	0.4
Minufia	239	1,600	1,175	156	269	425	1,839	87.0%	0.6
Behera	214	4,382	2,962	983	437	1,420	4,596	95.3%	1.0
Ismailiya	617	1,996	1,041	217	738	955	2,613	76.4%	2.7
Giza	142	1,862	914	348	600	948	2,004	92.9%	0.4
Beni Suef	187	1,618	1,058	153	407	560	1,805	89.6%	0.8
Fayoum	175	1,685	1,260	83	342	425	1,860	90.6%	0.7
Minya	63	2,445	1,805	28	612	640	2,508	97.5%	0.6
Asyut	235	2,837	1,687	450	700	1,150	3,072	92.4%	0.9
Sohag	653	3,498	3,098	65	335	400	4,151	84.3%	1.1
Qena	146	3,258	2,083	169	1,006	1,175	3,404	95.7%	1.1
Aswan	174	2,491	1,011	275	1,205	1,480	2,665	93.5%	2.2
Luxor	157	1,037	1,037	0	0	0	1,194	86.9%	2.6
Red Sea	147	3,616	936	268	2,412	2,680	3,763	96.1%	13.0
New Valley	335	2,305	720	0	1,585	1,585	2,640	87.3%	14.1
Matrouh	1,190	2,063	913	352	798	1,150	3,253	63.4%	10.1
North Sinai	0	3,817	2,147	616	1,054	1,670	3,817	100.0%	11.1
South Sinai	282	3,649	2,364	300	985	1,285	3,931	92.8%	26.2
Total	16,903	82,926	59,481	6,942	16,503	23,445	99,829	83.1%	1.4

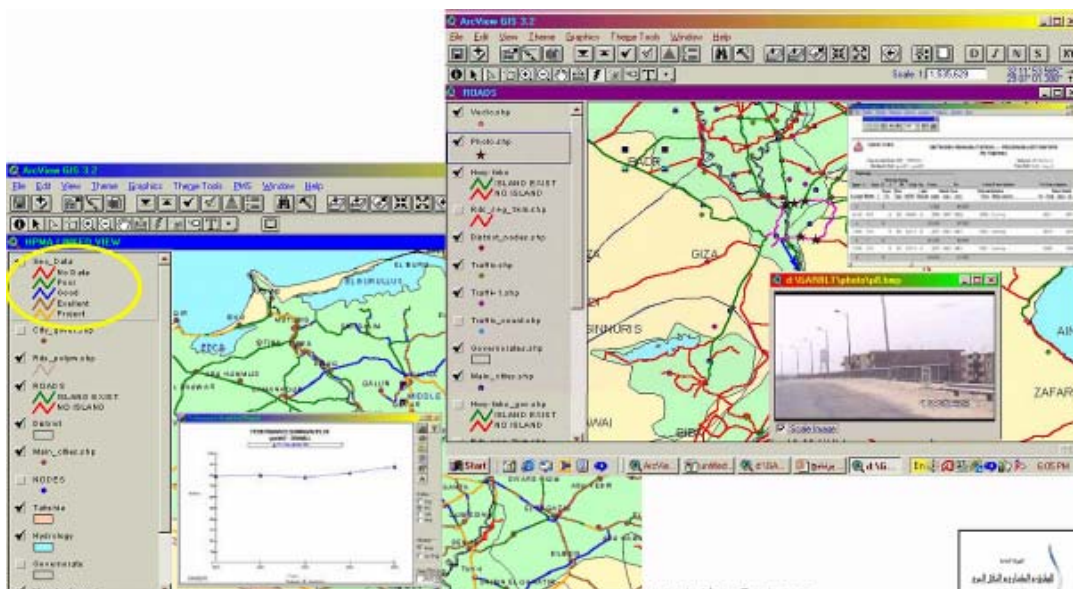
Source: CAPMAS 2008

The intercity road under GARBLT jurisdiction is categorized into Expressway, Primary road and secondary roads, which length is 395km (2%) for expressway, 15,002 km (63%) for primary road and 8,189 km for Secondary road respectively (Table 3.2.2). The pavement conditions on major roads are not well organized, but the national wide investigation has been carried out in 2009.

Table 3.2.2 Road Classification and Extension in Egypt as of 2009

Facility	GARBLT Responsibility (km)	Governorate Administration
Expressway	395	
Primary Road	15,002	
Secondary Road	8,189	59,481(Paved)+16,903(Unpaved)
Total	23,586	59,481+16,903

Source: JICA Study Team based on GARBLT and CAPMAS data



Source: GARBLT

Figure 3.2.1 Pavement Management System in GARBLT (On-Going)



Source: JICA Study Team based on GARBLT and EC (EUR-MEDA Transportation Project) map

Figure 3.2.2 Major Road Network in Egypt

### 3.2.2. Comparison of Road Network Coverage among MENA Countries

The most extensive paved road networks within MENA countries were, for recent years, those of Saudi Arabia (221,372 kilometers), Iran (172,927 kilometers) and Algeria (108,302 kilometers). The total supply of identified MENA motorway-class facilities aggregated to some 8,400 kilometers, with largest extent in KSA (3,900 kilometers), Iran (1,400 kilometers) and Syria (1,100 kilometers).

A comparison was made of unit network coverage; that is, number of road kilometers related population as well as to land area falling within national boundaries. Libya, Oman, KSA and Qatar achieve highest road network concentrations on a unit population basis. Bahrain, Palestine, Israel, Lebanon and Qatar achieve highest network concentrations on a land area basis. Egypt is shown as being in the lower range of MENA road network concentration; however, this is likely influenced by unique Egyptian terrain and geographic constraints (Figure 3.2.3).

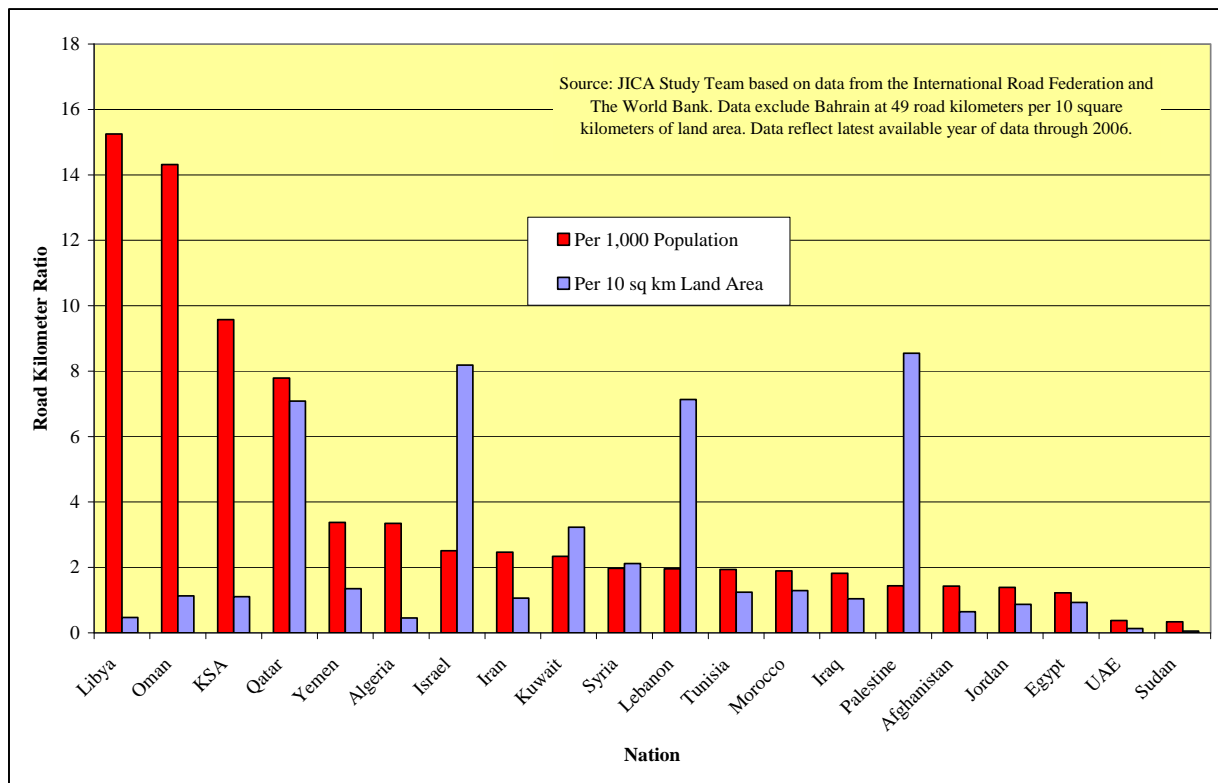


Figure 3.2.3 MENA Road Network Coverage

### 3.2.3. Toll Road System

Usage of roads is generally free of direct user charges. However, Egypt Toll Road system has started in 1984. This was the first applied on the Cairo Alexandria Desert Road in a strategy aimed to improve its condition and to use the revenue collected for that purpose. The GARBLT has extended its toll road system in the following years to include more roads. This system includes approximately 915 km at present. The list of toll road in Egypt is noted in Table 3.2.3. The toll structure varies from 2 L.E. to 25 L.E. depending on facility and vehicle classification. The total revenue from the toll roads reached 229 million L.E. in the financial year 2008/2009 (Table 3.2.4). These charges do not cover operating and maintenance costs and

appear to have been set for social reasons years ago. In general toll roads cannot be built unless drivers have a reasonable free option. Where drivers do not perceive their time as having high value, high toll fees would likely drive away customers. Since drivers do not pay the real costs of vehicle travel today, toll rates have been set below costs. This situation may change in the future as continuing subsidies for petrol and low vehicle licensing and inspection fees are not sustainable.

**Table 3.2.3 List of Toll Road in Egypt as of 2007**

	Length (km)	Toll Rate (L. E.)			
		Passenger Car	Mini Bus Small Truck	Large Bus Large Truck	Trailer
Cairo Alexandria Desert Road	228	4	6	10	20
Cairo Ismailiya Port Said Road	224	4	6	10	20
Cairo Sokhna Road	135	5	10	15	25
Cairo Fayoum Road	105	2	5	10	15
Cairo Belbis Road	52	2	3	6	9
Wadi Natrun Alamein Road	135	2	5	10	15
Kafr Zayat Defrah Road	27	3	5	10	15
Suez Canal Bridge	9	2	3	5	10

Source: Toll rates are obtained from GARBLT as of July 2007

**Table 3.2.4 Annual Revenue from Toll Road**

Fiscal Year	Annual Revenue from Toll Roads
2004 / 2005	89.9 million L. E.
2005 / 2006	101.8 million L. E.
2006 / 2007	173.6 million L. E.
2007 / 2008	202.5 million L. E.
2008 / 2009	229.2 million L. E.

Source: GARBLT

There are already efforts underway to improve the situation. GARBLT has carried out a feasibility study which addresses the creation of an urban toll expressway system inside the Cairo Ring Road. Implementation is seen as occurring in stages, with the eventual privatization to a toll road company. A BOT or PPP approach to design, construction and operation is suggested as an interim stage, with the government owing the land and managing the franchise. Given the level of congestion within the Ring Road funding via bonds or other debit instruments with interest covered by tolls would generate funds for a rolling program of construction. A similar approach might be considered for funding of segments of the proposed Cairo Outer Ring Road. In addition, GARBLT is preparing tender documents for several new BOT road projects:

- Alexandria – Fayoum Road, Length 199 km, Cost 700 million L.E.
- Cairo Alexandria Matrouh Road, Length 520 km, Cost 900 million L.E.
- Cairo Ismailia Port Said Road, Length 180 km, Cost 500 million L.E.
- Sohag Hurghada Road, Length 250 km, Cost 500 million L.E.
- Luxor Hurghada Road, Length 250 km, Cost 450 million L.E.

- Fayoum Assuit Road, Length 260 km, 500 million L.E.
- Dayrout Faraafra Road, Length 263 km, Cost 500 million L.E.
- Ain Sokhna Marsa Allam Road, Length 630 km, Cost 1200 million L.E.
- Cairo Aswan Road, Length 800 km, Cost 1500 million L.E.

### 3.2.4. Weighing Station and Overweight Vehicles

Overweight and thus unsafe trucks contributing to exorbitant fast road deterioration are not allowed in Egypt. In most countries restrictions are rigidly enforced. Truck weight standards are based upon 2 axles limit of 20 tones, 3 -4 axles limit ranging from 27 – 46 tones and 5 or more axles articulated ranging up to 60 tones. Maximum back axle load is 13 tones in Egypt. While GARBLT is able to collect fines at permanent weigh stations when police are in attendance they are not able to impound the vehicle until the load is reduced and vehicles are made road worthy. If these procedures were enforced, the positive impacts on road maintenance costs and safety are obvious. The revenue from this source was 425 million L. E. in financial year 2006/2007.

Although GARBLT has weighing facilities at fixed locations along main roads (Figure 3.2.4), GARBLT can not enforce the trucks to check their axle load without the attendance of traffic police which is not always available. The consequence is having many trucks running on the roads with excessive axle load which results in fast deterioration of the pavement.



Source: GARBLT

**Figure 3.2.4 Weigh System along Cairo Alexandria Desert Road (Cairo Gate)**

The unwarranted axel load has the following negative effects:

- It accelerates the deterioration of the pavement and thus shortens its life span and results in increasing the road maintenance cost. The repair cost of road damages due to the excessive axel cost exceeds the collected fine.
- After completing the construction and/or repair of GARBLT roads, the contractor is responsible about the road maintenance for three years after which the road is handed over to GARBLT. This means that the contractor bears added cost for the repair of road damages due to the excessive axel load for the said period. This situation leads to ambiguity of responsibility and is a debating issue between GARBLT and the contractors.
- The excessive axel load means an increase in the total weight of the truck. This means that the stoppage distance when applying the break will increase which in turn could be the cause of serious accidents.

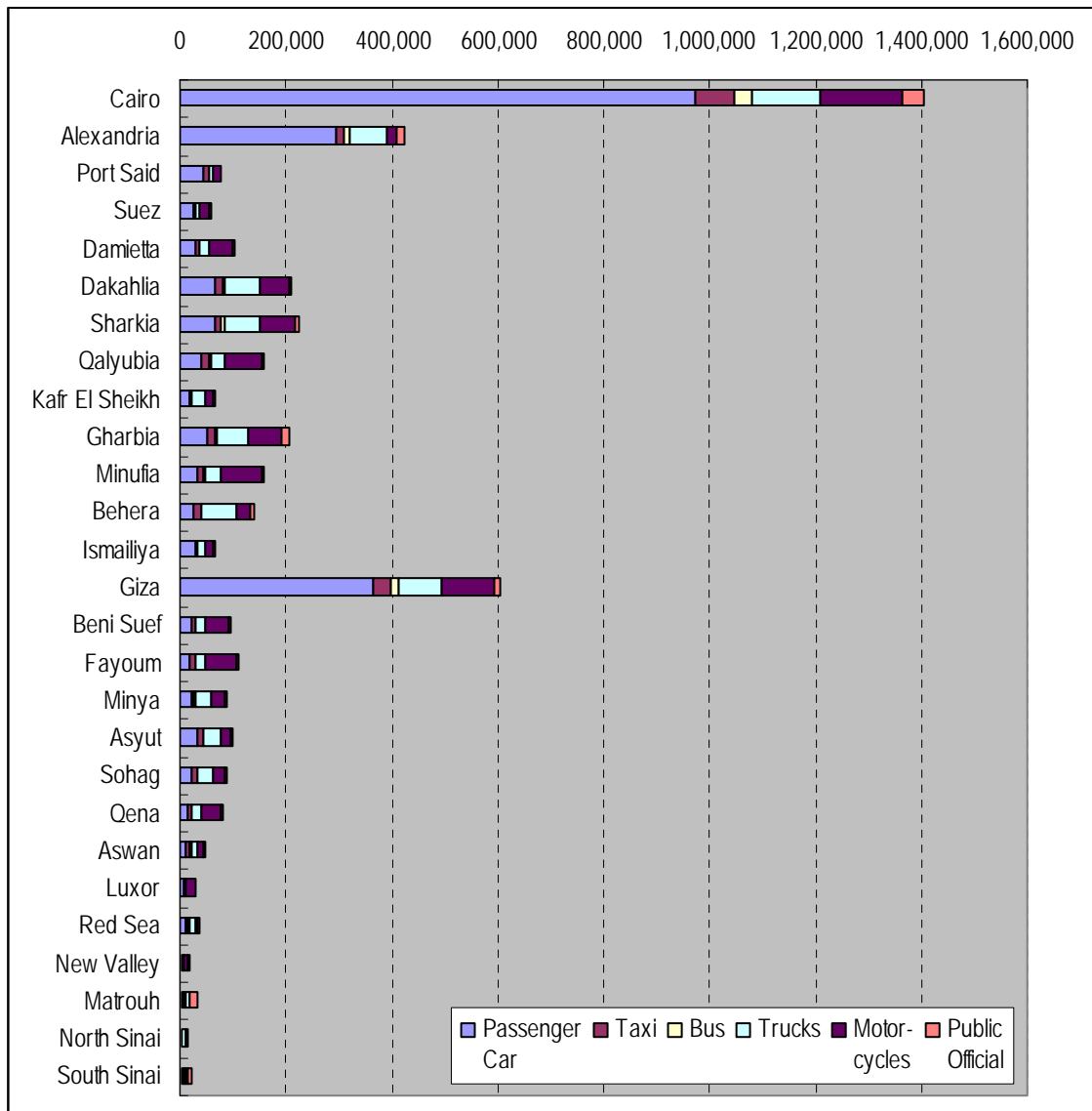
### 3.3. REGISTERED VEHICLES

A discussion of vehicle registrations was previously presented. This section presents additional detail for the Governorate and vehicle type level of detail.

#### 3.3.1. Number of registered vehicles by Vehicle type and by Governorate

Table 3.3.1 and Figure 3.3.1 show the registered vehicle number by Governorate in 2008. The number of registered vehicles in total reaches 4.7 millions, of which 2,233 thousand passenger cars, 316 thousand taxis, 93 thousand buses and 862 thousand trucks. The composition shares by vehicle category are 48% for passenger car, 7% for taxi, 19% for trucks and 21% for motorcycles. The share of all vehicles registered in Cairo Governorate occupies 30% of the total, and that of passenger car is about 44%, while that of trucks is 15%. The ownership rate of passenger car per 1000 population is 31 vehicles in the whole Egypt, but that in Cairo is 115, about three times higher than the country average. The share of three urbanized governorates, Cairo, Giza and Alexandria occupies 73% in passenger car, 38% in taxi, 65% in bus and 32% in trucks.





Source: CAPMAS

Figure 3.3.1 Registered Number of Year 2008 Vehicles by Governorate

Table 3.3.1 Registered Number of Year 2008 Vehicles by Governorate

Governorate	Passenger Car	Taxi	Bus	Trucks	Motor-cycles	Public Official	Total	Share %	Pax. Car per 1000 Capita
Cairo	974,907	71,370	34,400	128,760	154,520	39,490	1,403,447	30.1%	115
Alexandria	293,275	18,062	9,000	70,434	19,681	13,042	423,494	9.1%	71
Port Said	44,556	9,480	601	7,244	14,038	1,646	77,565	1.7%	78
Suez	26,920	3,375	981	7,178	15,903	6,450	60,807	1.3%	53
Damietta	30,293	4,825	545	20,228	43,128	2,755	101,774	2.2%	28
Dakahlia	65,979	15,133	2,340	68,840	53,786	4,493	210,571	4.5%	13
Sharkia	64,682	14,470	5,337	67,238	67,133	5,236	224,096	4.8%	12
Qalyubia	39,074	16,999	3,128	26,911	67,702	2,990	156,804	3.4%	9
Kafr El Sheikh	16,974	6,282	417	23,800	13,871	5,149	66,493	1.4%	6
Gharbia	52,432	13,469	3,372	60,013	61,264	14,330	204,880	4.4%	13
Minufia	31,649	13,379	1,910	28,851	79,505	4,032	159,326	3.4%	10
Behera	24,438	15,491	1,617	64,670	28,038	6,320	140,574	3.0%	5
Ismailiya	28,206	5,002	715	14,835	13,776	2,182	64,716	1.4%	30
Giza	364,425	32,015	16,850	80,302	100,235	12,036	605,863	13.0%	64
Beni Suef	20,661	7,411	590	20,813	42,575	2,456	94,506	2.0%	9
Fayoum	17,631	10,625	709	18,504	61,223	3,637	112,329	2.4%	7
Minya	21,852	5,250	740	29,397	27,836	4,587	89,662	1.9%	5
Asyut	33,657	10,873	586	31,994	19,724	4,257	101,091	2.2%	10
Sohag	22,505	11,396	384	26,920	23,762	2,774	87,741	1.9%	6
Oena	14,308	8,938	487	16,372	38,600	2,324	81,029	1.7%	5
Aswan	11,246	8,825	905	11,831	11,533	2,759	47,099	1.0%	9
Luxor	5,551	2,683	1,716	2,584	16,729	1,072	30,335	0.6%	12
Red Sea	12,381	2,271	3,270	10,030	4,987	2,443	35,382	0.8%	43
New Valley	2,313	808	96	2,543	9,913	1,857	17,530	0.4%	12
Matrouh	4,636	4,477	115	9,169	1,783	13,085	33,265	0.7%	14
North Sinai	3,063	1,989	68	7,475	1,754	1,182	15,531	0.3%	9
South Sinai	4,653	1,395	1,746	4,909	2,782	6,511	21,996	0.5%	31
Total	2,232,267	316,293	92,625	861,845	995,781	169,095	4,667,906	100.0%	31
Share %	47.8%	6.8%	2.0%	18.5%	21.3%	3.6%	100.0%		

Source: CAPMAS

### 3.3.2. Trend of Registered vehicle number

Table 3.3.2 explains and Figure 3.3.2 shows the trend of registered vehicles from 2002 to 2008. The average annual growth rate of the whole vehicle is 5.8% per year. The number of vehicle is rising faster than population growth which is estimated with 3 % per year. Thus congestion in most urban area is significant.

Table 3.3.2 Trend of Registered Vehicle by Vehicle Type from 2002 to 2008

Vehicle Type	2002	2003	2004	2005	2006	2007	2008
Passenger Car	1,511,645	1,566,397	1,642,496	1,759,416	1,911,626	2,078,453	2,232,267
Taxi	329,245	312,315	315,293	320,471	328,273	309,784	316,293
Buses	Public	13,778	13,766	14,300	15,043	16,097	16,153
	Private	21,524	22,426	24,918	24,993	26,594	24,527
	Tourism	8,133	8,431	9,133	10,128	11,125	12,343
	Travels	11,264	13,056	15,300	16,976	19,503	22,314
	Schools	4,096	4,439	4,802	5,214	5,844	6,319
Trucks	Lorries	593,522	623,681	646,391	668,185	705,521	724,792
	Trucks	51,785	54,470	58,016	59,537	60,995	56,947
	Tractors	22,166	22,904	23,164	23,229	23,643	22,872
Motorcycles	539,570	553,110	564,171	578,978	645,893	793,107	995,781
Public & Official	Political	8,086	4,334	4,505	3,687	3,878	4,034
	Commercial / Temporary	13,661	13,088	12,970	12,954	13,150	12,229
	Customs	47,231	34,404	28,602	31,116	47,846	25,126
	Public Sector	65,517	63,697	44,333	43,593	43,681	33,491
	Government	55,538	55,319	54,681	55,013	55,218	58,548
	Governorate	31,571	33,945	34,092	34,355	34,924	38,827
Total	3,328,332	3,399,782	3,497,167	3,662,888	3,953,811	4,239,866	4,667,906

Source: CAPMAS

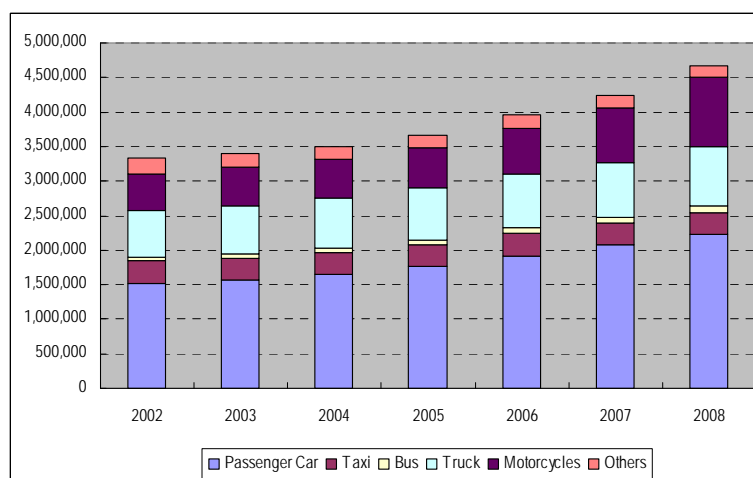


Figure 3.3.2 Trend of Registered Vehicle by Vehicle Category from 2002 to 2008

### 3.4. TRAFFIC VOLUME

GALBLT, with administration responsibility of the intercity road system, has been collecting traffic volume data at 15 permanent stations and 43 temporary stations. Permanent stations use double loop detectors, while temporary sites use pneumatic tube detectors. This traffic volume management system was developed in 1997, but only for analyzing traffic volume, not travel speed analysis. Table 3.4.1 summarizes average daily year 2008 GARBLT traffic volume information at each site.

The average traffic growth rate derived from the 58 stations is 5.5 % per year from 1999 to 2008. This 5.5 % figure is very similar to growth in vehicle registrations (5.8 %) over the same period.

Table 3.4.1 Average Annual Daily Traffic (A.A.D.T.) from 1999 to 2008

Sta	Location	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
1	EL Korimat - Zafrana	28,794	30,290	35,028	39,147	41,451	43,583	45,405	49,237	54,795	62,224
2	Gharbia - Beheira	26,527	26,449	30,328	31,600	32,486	32,105	32,475	34,320	39,138	45,121
3	Giza - Beni Suef	10,331	10,350	12,193	13,043	13,500	12,847	12,197	12,312	12,493	12,764
4	Cairo - Suez	10,050	10,963	12,171	13,484	14,410	15,344	15,723	15,941	17,118	18,703
5	Sharkia - Ismailia	8,249	8,367	9,195	9,763	10,209	10,001	10,406	11,376	12,164	13,094
6	Menoufia - Gharbia	23,657	25,157	34,717	39,959	38,286	39,570	42,414	46,507	50,126	50,786
7	Oaliubia - Sharkia	9,589	10,110	14,205	15,453	14,938	14,471	14,548	14,292	14,684	15,230
8	Defra-KafirEliziat									10,166	17,901
9	Gharbia - Dakahlia	17,433	17,528	18,849	18,754	18,974	19,936	20,383	20,854	21,407	20,623
10	Cairo - Oaliubia	51,843	55,164	80,359	88,688	92,010	93,649	97,305	104,835	106,792	107,445
11	Mit Ghamr - Aga	16,659	17,404	21,909	23,607	25,260	25,370	26,263	27,849	28,672	30,608
12	Sadat City - Wadili Nairun	16,180	17,886	23,736	24,588	25,237	25,483	26,725	27,552	28,553	31,425
13	Giza - Faiyum	8,421	7,416	9,188	10,830	10,575	11,958	12,737	13,832	15,488	16,107
14	Minya - Asyut	3,831	4,066	4,555	4,855	4,880	5,613	6,584	7,183	7,232	7,404
15	Beheira - Alexandria	35,856	37,318	33,332	31,388	34,160	35,831	36,018	39,182	40,979	41,118
100	Sohag - Qena	5,471	5,027	5,718	6,707	7,073	7,464	8,151	8,363	8,491	8,931
101	Qena - Aswan	3,508	3,353	3,531	3,551	3,798	4,099	4,577	4,675	4,841	5,146
102	Sharkia - Dakahlia	8,610	8,782	8,657	8,155	9,438	9,752	9,011	8,795	9,986	11,931
103	Suez - Ismailia	5,848	7,913	10,620	11,028	10,110	10,937	11,061	12,300	12,974	14,443
104	Belbeis - Abu Hamad	5,440	5,599	6,825	8,251	8,224	7,940	7,544	8,946	8,730	10,804
105	Belbeis - Zagazig	17,017	13,234	N.A.	N.A.	N.A.	20,113	24,069	25,430	27,463	27,504
106	Zagazig - Abu Hamad	11,091	10,473	12,471	11,741	12,574	13,442	13,582	16,191	17,071	19,441
107	Port Said - Damietta	4,395	7,854	7,027	9,674	9,504	9,488	8,952	8,906	8,885	9,767
108	Sharkia - Dakahlia	10,690	11,068	10,633	10,933	10,441	10,271	10,205	10,691	10,473	10,921
109	Oalubia - Sharkia	8,408	7,947	8,492	7,971	7,996	9,636	9,758	12,791	14,467	17,079
110	Oaliubia - Dakahlia	18,518	19,408	22,425	20,722	23,516	23,470	27,943	27,705	26,912	27,415
111	Benha - Quesna	36,711	41,566	40,293	46,555	47,246	45,568	50,507	51,437	52,258	60,594
112	Shebin El Kom - Quesna	12,436	13,447	13,352	14,910	16,279	16,119	16,542	17,959	19,663	21,848
113	Tania - Zefta	9,116	9,016	9,724	10,474	10,999	10,970	10,761	11,371	11,574	13,045
114	Menoufia - Gharbia	8,978	7,938	7,283	8,861	8,465	7,641	8,965	9,162	9,515	10,151

Sta	Location	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
115	Kanater Khairia - Bagur	12,485	11,284	12,882	13,915	15,006	15,701	16,935	17,573	19,652	20,219
116	Aga - Simbilawein	4,812	6,490	6,634	7,370	8,336	8,189	7,336	7,784	7,166	7,472
117	Aga - Mansoura	13,217	19,041	22,259	20,806	21,783	22,753	24,827	26,632	28,894	30,347
118	Talkha - Sherbin	16,197	19,042	22,490	20,963	22,787	20,946	23,417	23,246	24,416	24,673
119	Biyala - Bilqas	4,746	4,805	4,760	4,916	N.A.	N.A.	6,326	6,721	6,886	7,576
120	Kafir El Sheikh - Mahala	4,205	4,895	6,833	5,428	5,538	5,433	4,896	4,413	4,571	4,589
121	Tanta - Mahala	22,703	22,633	24,117	25,978	26,000	24,520	27,660	28,973	32,122	35,814
122	Gharbia - Kafir El Sheikh	6,459	6,938	7,874	7,459	7,915	7,787	7,283	7,360	7,532	8,067
123	Behaira - Kafir El Sheikh	8,893	8,329	10,130	9,911	10,424	10,171	10,333	10,952	11,439	11,704
124	Giza - Beheira	18,549	17,036	18,519	19,542	22,265	24,727	26,921	31,039	30,687	35,366
125	Behaira - Alexandria	22,276	25,194	24,976	26,113	26,038	26,716	25,449	25,503	28,724	30,965
126	Giza - Badrashin	18,994	21,813	20,330	18,852	21,328	20,896	19,289	20,438	18,932	19,069
127	Maadi - Helwan	11,931	11,940	11,107	10,375	11,052	10,588	11,191	10,999	10,589	11,986
128	Fayum - Beni Suef	4,039	3,757	4,230	4,072	4,186	4,319	4,827	5,391	5,077	5,286
129	EL Korimat - Zafarana	598	647	800	766	894	930	903	927	989	1,200
130	Beni Suef - Minya	7,160	8,914	8,542	7,756	7,942	7,678	6,874	7,065	6,985	6,717
131	Assuit - New Valley	5,866	7,254	7,809	7,186	7,408	7,801	7,320	7,445	7,469	9,079
132	Assuit - Sohag	4,254	7,792	7,744	8,528	8,691	8,964	7,717	7,497	6,902	6,386
133	Alexandria - Matruh	16,037	14,145	16,431	15,333	16,919	16,316	16,438	18,092	18,035	21,984
134	Suez - Ras Zafarana	9,662	10,297	11,744	11,753	12,011	12,076	11,847	13,266	13,515	15,911
135	Oena - Red Sea	2,815	2,329	2,706	2,660	3,123	3,100	3,245	3,195	3,378	3,777
136	Kanater Khairia - Kom Hamada	7,780	7,999	9,806	8,739	7,562	7,455	6,939	7,107	7,076	7,640
137	Ismailia - Northern Sinai	5,039	3,908	4,859	4,866	5,275	5,627	4,744	5,067	5,176	6,118
138	Tunnel - Qantara	861	1,110	1,144	1,097	1,005	1,051	929	975	1,021	1,144
139	Tunnel - Nakhl	1,419	1,649	1,520	1,809	1,794	1,760	1,717	1,989	1,817	2,080
140	Tunnel - Uyun Mousa	3,702	3,558	3,403	3,283	3,792	3,637	3,642	3,954	4,058	4,867
141	Saff - Beni Suef	4,237	3,448	5,902	4,509	4,536	4,554	5,248	5,871	5,639	6,633
142	Dakhila - Damietta	16,080	16,525	18,402	19,202	18,198	18,839	18,089	18,449	18,251	19,323
143	Ismailia - Port Said	11,140	12,232	11,861	11,449	12,079	12,480	13,701	15,188	16,034	19,971

Source: GARBLT

### 3.5. DESIGN STANDARDS AND ROAD GEOMETRIC DESIGN

#### 3.5.1. Present Road Classification and Design Criteria in Egypt

GARBLT is the only one of several agencies designing and building intercity roads. The intercity road under GARBLT jurisdiction is categorized into Expressway, Primary road and secondary roads, but that definition is not clear and not considered the road characteristics and functions. While the GARBLT has his own design criteria based on AASHTO, these are not applied universally throughout the country. For cross sections on existing freeway and expressway systems, there is no serious gap with international standard. The wide median of about 20 m in width may be even safer especially in the desert area. The GARBLT design criteria for the alignment are fairly up to date year by year, but some are hardly to detect in the written descriptions such as those for a consistent alignment and the coordination of horizontal and vertical alignment.

On the other hands, MHUUC on their part of the planning and construction of the roads can apply their own standards. Although being crucial, it is not guaranteed that road bridges, interchanges and cross ramps are designed to high standards. The MHUUC have recently issued a new road design standard titled "Egyptian Code for the Work of Urban and Rural Roads" in 2008. It is mandatory for the Governorates to follow these standards; however, application outside of Cairo has not been audited. It is assumed that MHUUC follow the standards for roads built in urbanized city and new urban communities. These MHUUC standards do not have clear definition for expressways and toll roads.

This code defines the road classification system based on ASSHTO and HCM. The following is the definition of road characteristics in urban and rural roads depending on its functional classification.

##### (1) Area Definition, Urban and Rural areas

Each of the urban and rural areas has different basic characteristics according to land uses, intensity of road networks, traffic pattern, and the method of linking these elements. Thus, there is a functional classification system for urban areas and another one for rural areas. Urban areas are those areas within the responsibility of governorates and localities. It comprises 5000 or more population. Urban areas are internally subdivided into populous areas (50 thousand or more population) and small urban areas (from 5000 to 50 thousand). For design purposes, population count must be predicted in urban areas according to the target year.

##### (2) Functional classification

Functional classification of roads differs in urban areas and rural areas. Road hierarchy contains main arterial roads (main movement), secondary arterial roads (distributional), collector roads, local roads. However, roads in urban areas are featured by relative multiplicity of arterial roads hierarchy. This hierarchy gives additional functional subdivision to arterial roads. While rural areas roads are featured by relative multiplicity of collector roads hierarchy.

##### (3) Functional systems of rural and urban roads

Rural roads are roads connecting urban areas. They include main arterial roads, secondary arterial roads, main collector roads, secondary collector roads, and local roads. The four functional hierarchies for urban

roads also are main arterial roads, secondary arterial roads, collector roads, and local roads. The difference between the nature and density of rural areas and urban areas leads to the difference in the characteristics of roads in rural areas and urban areas.

**Table 3.5.1 Definition of Functional Classification for Rural and Urban Roads**

Area	Class	Definition
Rural Area	Main Arterial roads	<p>Main arterial roads in rural areas are a network of routes having the following characteristics:</p> <ul style="list-style-type: none"> <li>• Regional traffic movement of high lengths and density.</li> <li>• Traffic movement between urban areas of more than 50000 population and urban areas of more than 25000 populations.</li> </ul> <p>In high populated areas, main arterial roads include high traffic density routes. Main arterial roads comprise rural freeways in general.</p>
Rural Area	Secondary Arterial roads	<p>Secondary arterial roads in rural areas connect main arterial roads to form network of routes having the following characteristics:</p> <ul style="list-style-type: none"> <li>• Connecting cities with other large cities and sources of traffic generation (big tourist resorts) able to attract long distance trips.</li> <li>• Secondary arterial roads achieve traffic services integration with the rest of road hierarchies in the network.</li> <li>• Distances between secondary arterial roads should cope with population density so that development areas can be on appropriate distance from arterial roads.</li> <li>• Regional traffic on Secondary arterial roads in the previous items is for long distance and high intensity trips than served by rural collector or local roads.</li> </ul> <p>Routes of secondary arterial roads must be designed to provide relatively high speeds and should also prevent traffic conflict.</p>
Rural Area	Collector roads	<p>Rural collector roads serve traffic movement in regions. Regardless to traffic volumes on rural collector roads, it consists of long trips roadways shorter than that of arterial roads. Consequently, speeds on collector roads are less than arterial roads. To identify rural collector roads more clearly, it is divided according to the following criteria:</p> <ul style="list-style-type: none"> <li>• Main collector roads</li> <li>• It serve the regional movement which is not served by arterial roads, big cities not served by high class road, important traffic generators like malls, schools, freight areas, entertainment areas, important mining areas, and agriculture areas.</li> <li>• It links important traffic sources in suburbs or roadways of higher classification.</li> <li>• Secondary Collector roads</li> <li>• The distance between them copes with the density of population to carry traffic from local roads and making development areas on appropriate distance from collectors.</li> <li>• Serving small communities</li> <li>• Connecting important traffic sources with its annexes</li> </ul>
Rural Area	Local roads	<p>Compared to arterial and collector roads, the main function of local rural roads is reaching the areas neighboring collector roads network. It serves traffic of short lengths. Local roads comprise all rural roads which are not classified as arterial or collector roads.</p>

Area	Class	Definition
Urban Area	Main Arterial roads	<p>In every urban environment, there are main urban roads. It is very effective because of the nature and structure of the traffic serving it. In small urban areas (less than 50000 population), main arterial roads are very limited in number and length and its main importance lies in serving the passing traffic. As for the intensified urban areas, the importance of main arterial areas is serving the rural traffic (inside cities) and serving the circular traffic inside urban areas. The main arterial roads serve the major activity centers in big urban areas, roadways of high traffic volumes, and intensified long distance trips. It carries the vast majority of trips in urban areas even if these main arterial roads form a relatively small rate of the overall urban roads network. Generally, the functional system should be integrated internally and between linking points with rural roads. Main arterial roads have all trips whether entering urban areas or coming out of it as well as most of traffic movement without entering down town. In addition, it serves traffic between city centre and border communities, and city centre and the suburbs or the suburbs centre.</p> <p>Main arterial roads are often serving the important traffic in urban areas and regional routes of buses. Because of the nature of traffic served by main arterial roads, most of traffic axes having full or partial access control, it is functionally classified as main arterial roads. Although, this functional system is not confined to roads or axes that have full or partial access control. The distance between the main arterial roads depends on the density distribution in urban areas. Although there are no distance rules between main arterial roads, these guidelines can be followed:</p> <ul style="list-style-type: none"> <li>• In dense urban areas, distances between main arterial roads can reach 1.6 km.</li> <li>• In less dense urban areas, distances between main arterial roads averaging from 5 to 15 km.</li> </ul>
Urban Area	Secondary Arterial roads	<p>The secondary arterial roads are linking the main arterial roads. It carries shorter long distance trips and slower speeds. Secondary arterial roads distribute traffic on smaller geographical areas than those served by first class roads. It includes arterial axes that are not included in main arterial roads. Distances between secondary arterial roads varies from 0.1 – 0.2 in urban areas centers to 5 – 3 in suburbs.</p>
Urban Area	Collector roads	<p>Collector roads achieve the features of communication by land use and speedy traffic inside residence avenues, malls, and industrial centers. It differs from arterial road as it can penetrate residence avenues to distribute traffic from arterial roads to it maximum end. Thus, collector roads collect traffic from local roads in populated areas heading it to arterial roads. In urban areas centers and areas similar in growth and traffic density, collector roads comprise roads of the same level. It can include collector roads from local bus routes.</p>
Urban Area	Local roads	<p>Local roads include all road levels that are not included in any higher levels. The main function of local roads is to make the vehicles reach its origin and destination. Local roads are connected to higher level roads. Local roads are characterized by lower speeds and non achievement of speed traffic.</p>

Source: JICA Study Team



Figure 3.5.1 illustrates the hierarchical functional classification of rural and urban roads by the MOHUU Code.

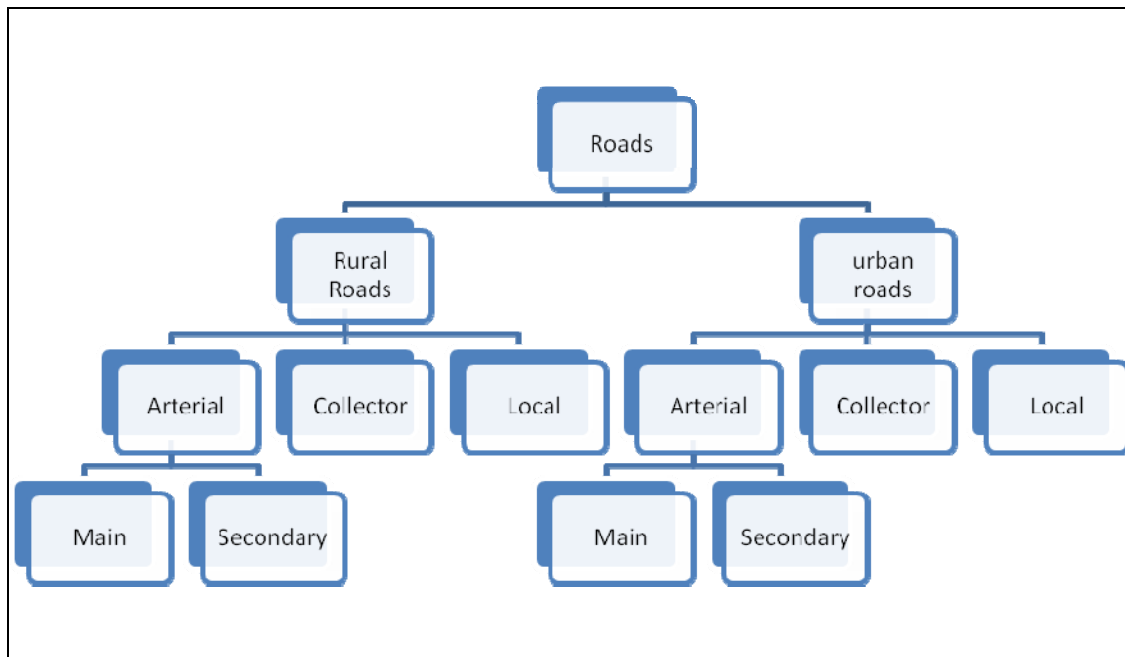


Figure 3.5.1 Hierarchy of Road Functional classification by MOHUU Code

#### (4) Design speed

The designer must choose the suitable design speed based on road level and function, in addition to traffic volume, area topography, and economic considerations. Table 3.5.2 illustrate the guideline of design speeds of rural and urban roads on the MOHUU Code.

#### (5) Lane width

Lane width has a direct impact on road capacity and the safety and comfort of users. Narrow lanes force the driver to move close to the other vehicles which affects negatively the smoothness traffic flow. Safety increases with increase of lane width to 3.60 meters. This width provides sufficient side clearance for trucks moving on the roads. Sometimes the location forces the designer to make the lane width less than 3.6 meters, but it must not be less than 3 meters. In special cases like populated areas roads of low traffic, lane width can be 2.75 meters. While using additional lanes for speed change, the width of these lanes have to be equal to the width of main lanes i.e. not less than 3 meters. The number of lane is determined by capacity and design traffic volume as illustrated in the part concerned with traffic studies. In industrial zones where the number of trucks is high, lane width can increase to 4 meters.

#### (6) Median

The median is the separating section between the two directions of divided road. The main aims of the median is to separate the two traffic directions and provide a width that gives the high speed vehicle driver the chance to regain control over his vehicle in emergency and gives width for making different speed lanes or u-turn lanes as well as future road expansions. The median reduces the effect of lights coming from opposite direction cars. The width of the median should cope with the other dimensions of the road. Its level

can be high (mostly in urban roads) or low (mostly in rural roads) than the level of the middle of the road. The median must be clearly seen day and night. The width of the median is associated to road classification as follows:

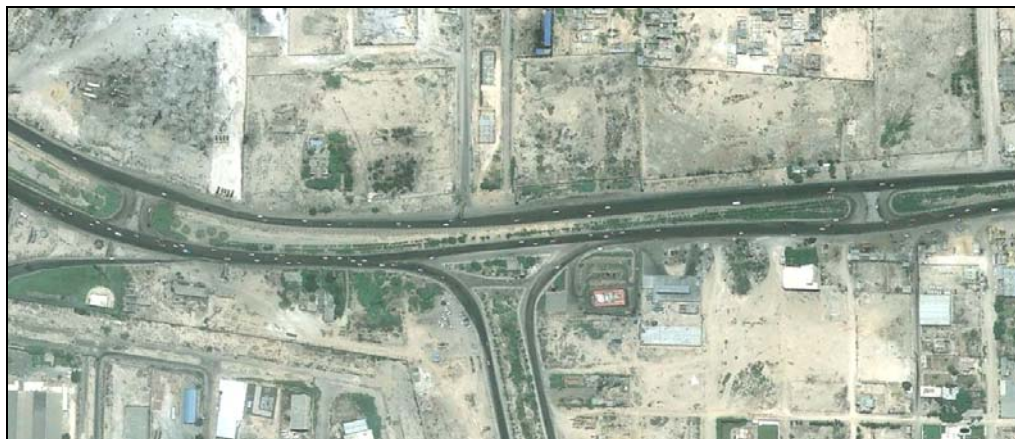
**Table 3.5.2 Guideline of design speed and Minimum Lane Width by the MOHUU Standard**

Area	Road Class	Speed (km/h)		Minimum Lane Width (m)	Minimum Median Width (m)
		Minimum	Desired		
Urban	Local	30	40	2.70	-
	Collector	40	60	3.30	0.6
	Secondary Arterial	60	80	3.60	3.6
	Main Arterial	80	100	3.60	3.6 - 15
Rural	Local	30	50	3.00	-
	Collector secondary	50	60	3.30	2.0
	Collector main	60	80	3.30	
	Secondary Arterial	80	100	3.60	2.0
	Main Arterial	100	120	3.60	4.0

Source: JICA Study Team

### 3.5.2. Intersection Geometry

There exist no official standards or written descriptions regarding the design of road intersections and interchanges. Different types of non-signalized solutions have been applied along the existing road network. Most intersections are of an unusual design compared to solutions for typical T-junctions or crossings in most other countries. Instead, numerous U-turns are found. This approach is used in very few European countries or the USA. In Egypt U-turns (Figure 3.5.2) in highways and rural roads have been built for enforcing the right of way when entering the main road from the secondary road or for normal left turning. Often speed management measures such as humps are installed before intersection even as part of freeway or express configurations. U-Turns along existing motorways had been installed because of an uncontrolled settlement policy along these main arteries in the past. They are on the way to be replaced by well designed interchanges in combination with parallel service roads for the accesses, e.g. along the Cairo Alexandria Desert Motorway. The same policy is necessary for other higher-order (express) roads.



**Figure 3.5.2 U-turn system on Cairo Alexandria Desert Road (Source: Google Map)**

### 3.6. BUDGET AND INVESTMENT

While the World Bank estimates that an annual road maintenance budget of LE 1.3 billion is needed for the next five years - then subsequently LE 800 million per year - the government, until now, has been providing the GARBLT with an annual maintenance budget of LE 200 million. Although the GARBLT is only responsible for highways and bridges that connect governorates - the individual governorates are responsible for those wholly within their boundaries. But recently government amended regulations increasing tolls and weighbridge fees have given the authority a boost. The extra revenue will be added to the LE 250 million currently generated from road advertising, permits, licenses, and vehicle fuel surcharges.

GARBLT gets most of its budget from the national budget allocated to the Ministry of transport, its self generated income includes; tolls collected from toll roads, revenue from advertisement concessions along the sides of its roads and the fines collected from trucks with axle loads over the permitted by the law.

Moreover GARBLT has received an increase in funding within the last few years for better maintenance, as well as to initiate projects aimed at creating new roads and bridges. The GARBLT's budget has increased significantly, from LE 360 million before 2006 to LE 3.6 billion in FY 2009-10. This clearly allows the authority to spend more on transport infrastructure. The GARBLT has received a soft loan of LE 300 million from the MHUUC; LE 150 million of this will be used on the first phase of the LE 900 million projects to upgrade the Cairo-Alexandria Desert Road to freeway standard. The project includes replacing the existing intersections and U-turns with flyovers, to enhance safety, and improving service roads, lighting, road marking, and maintenance. The remaining LE 150 million will be used to expand the Alexandria to Port Said portion of the International Coastal Highway.

### 3.7. TRANSPORTATION INDUSTRY

#### 3.7.1. Passenger Transport Service

##### (1) Regular Bus Service

Regular intercity bus passenger transport is undertaken by 17 private sector companies and 3 companies under Holding Company for Maritime and Land Transport (HCMLT) as listed in Table 3.7.1. Several companies are contracted by the Ministry of Transport. In total these company operate about more than 5,000 buses and mini buses. International passenger transport is done by large size buses. Main destinations for international passenger transport are bound for East direction, such as Jordan and Saudi Arabia, and for West (Libya). Both directions are equally important as they carry laborers and other professionals to the job markets such as the Gulf States.

**Table 3.7.1 Intercity Regular Bus Service Company**

	Bus Company name	No of Bus	No of Route	Remarks
1	East Delta Company for Transport and Tourism	N. A.	N. A.	HCMLT
2	Upper Egypt Company for Transport and Tourism	N. A.	N. A.	HCMLT
3	West and Middle Delta Bus Company	N. A.	N. A.	HCMLT
4	Arabian Union for Land Transport Company, "Super Jet"	N. A.	N. A.	Multi Nation
5	El Gona for Transportation Company	192	N. A.	MOT
6	United Brother for Transportation Company	46	N. A.	MOT
7	The 6 <sup>th</sup> October for Transportation Company	42	N. A.	MOT
8	Egyptian United Transportation Company	71	N. A.	MOT
9	Go Bus Land Transport	134	34	MOT
10	High Jet Public Transport	44	7	MOT
11	United Trans	112	27	MOT
12	Herz Passenger Transport	10	5	MOT
13	MCV Passenger Transport	143	45	MOT
14	Mashtool Elsouq Society	5	1	MOT
15	El-Banna Public Transport	20	5	MOT
16	MISA Travel	6	5	MOT
17	Golden Horse Transport	12	3	MOT
18	El-Sedeeq Public Transport	16	7	MOT
19	Tulip Public Transport	24	10	MOT
20	Haram Land Transport	92	26	MOT

Source: JICA Study Team based on GALBLT and HCMLT information

## (2) Shared Taxi Service

Shared taxi operations contribute considerably to the intercity passenger transport. Benefiting from the small size and being operated by individual drivers/owners, the shared taxis are heavily used in intercity passenger transport service. They are private individuals who own and operate (either by themselves or by employing drivers) of seven seats cars or 14 seats minibuses. The vehicles get the operating license from the traffic police and get their operating line from the governorates.

They are operated on licensed route and serving between many cities. The fares on the licensed routes are decided by the local authorities of the Governorates. But the shared taxi services are not well organized and not controlled by Governorates, because of the lack of cooperation and very limited monitoring by the local authorities.

Officially, the shared taxi operates between designated terminals in each city but due to the congestion and waiting time at the terminals, some of these taxis got their passengers from around the railway stations. The modal share of the shared taxi is around 50% of the total passenger movement in Egypt. The operation of shared taxi on this scale has the following negative effects:

- Increase the congestion at the terminals due to limited space.
- Increase traffic congestion on the road because the numbers of taxis to carry the same number of passengers occupy more space than the equivalent buss.
- Increase traffic accidents due to bad behavior of taxi drivers.
- Negative environmental effects due to the increase in emissions.
- Unfair competition with buss service because the shared taxi does not start the trip with less than full capacity, while scheduled buss operation does not wait for the passengers.

### 3.7.2. Freight Transport Service

Large number of truck operators provides road freight service in Egypt. They are mainly privately owned, with the exception of five specialized truck operators belonging to the Ministry of Investment. The remainder largely belongs to the Freight Transport Co-operatives located in the most of the governorates. In total there are more than 3,700 companies, each employing more than 50 staff. Roughly 35% of companies belong to public sector, the remainder (65%) to the private sector. There are no firms or companies exclusively in international road freight transport. Namely "Own Account" trucks, belong either to the public or private sectors, are carrying their own products. Table 3.7.2 presents road truck operators, who supply road freight service in Egypt. The average fleet age of the main five companies is about 15 years.

Table 3.7.2 Freight Transport Company in Egypt

Operator Name	Affiliation	Fleet size	Annual Freight Carried (Million Tons)
Nile company for direct transport	State Companies (under the law #159 in 1981)	291	5.0
Nile company for inland transport		229	
Nile company for transport works		229	
Nile company for heavy transport		138	
Nile company for freight transport		232	
24 Freight transport cooperatives (one in each governorate)	Private Sector	18241	24.4
Companies that work under the investment law	Private Sector	117300	392.0
Individual operators	Private Sector		
Own account fleet companies			
Total		136,600	421.4

Source: The Study On Multimodal Transport And Logistics System of The Eastern Mediterranean Region And Master Plan In The Arab Republic of Egypt, JICA

### 3.7.3. Bus and Taxi Terminals

Buss and taxi terminals are important facilities within the passengers transportation system from origin to destination. In Egypt there are 383 buss and taxi terminals. They are divided into three categories; 232 terminals for shared taxi, 64 terminals for busses and 87 terminals for both shared taxi and busses. Some of these terminals belong to the buss companies and most of them belong to the local governorates. These terminals have the following problems.

- Most of the terminals are constructed at the outskirts of the cities because of land availability, but this means that the passenger has to use other transport mode to reach his destination or to reach the station of other modes such as railway. This means added cost, more time and less comfort for the passengers.
- Most of the terminals are badly planned regarding the movement of passengers and vehicles.
- Most of the terminals need rehabilitation regarding the pavement, shades, waiting areas, water closets, kiosks etc.
- Most of the terminals suffer from bad management and bad security measures.

### 3.8. ROAD SAFETY

#### 3.8.1. Road Accident in Egypt

Traffic safety situation on the roads of Egypt has seriously worsened due to traffic accidents. According to the Ministry of Interior which is responsible for the national accident data, number of fatalities due to road accidents is 6,000 to 8,000 per year. On the other hand, data from the Ministry of Health, Critical Care and Emergency Department which were consolidated from different ambulance facilities in governorate indicate 3,700 to 4,500 as shown in Table 3.8.1. As shown in Figure 3.8.1, the MOH also reported that injuries resulting from road traffic worsened, from being 5<sup>th</sup> leading cause of injuries in 2005, to 4<sup>th</sup> in 2008, and 3<sup>rd</sup> in 2009, based on hospital surveillance system. In addition, WHO reports show that every year, about 12,000 Egyptians lose their lives as a result of road traffic accidents and thousands more sustain non-fatal injury with some resulting to long-term disability.

It is however difficult to obtain exact figures of fatalities and injuries due to road accidents in Egypt. Not only in the number of fatalities, but the number of accidents and injuries also have large discrepancies in statistics and reports (see Table 3.8.2). However, it is likely that actual numbers are considerably higher than the officially reported figures.

**Table 3.8.1 Traffic Accident Data 2006-2008**

Year	No. of Accidents	No. of Injuries	No. of Deaths
2006	67,828	101,085	3,737
2007	79,068	124,854	4,205
2008	78,543	122,531	4,471

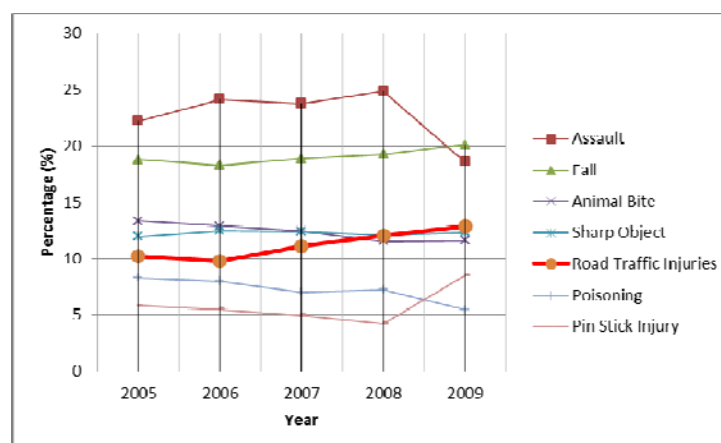
Source: Accident Rate Study 2008 (WHO)

**Table 3.8.2 Comparison of the Traffic Accident Data**

Source	No. of Accidents	No. of Injuries	No. of Deaths
MOI	25,088	35,718	6,799
MOH, Ambulance	78,543	122,531	4,471
WHO	-	150,000	12,295

Source: EU Twinning Project

**Figure 3.8.1 Percentage Distribution of Injuries According to Accident Type, 2005-2009**

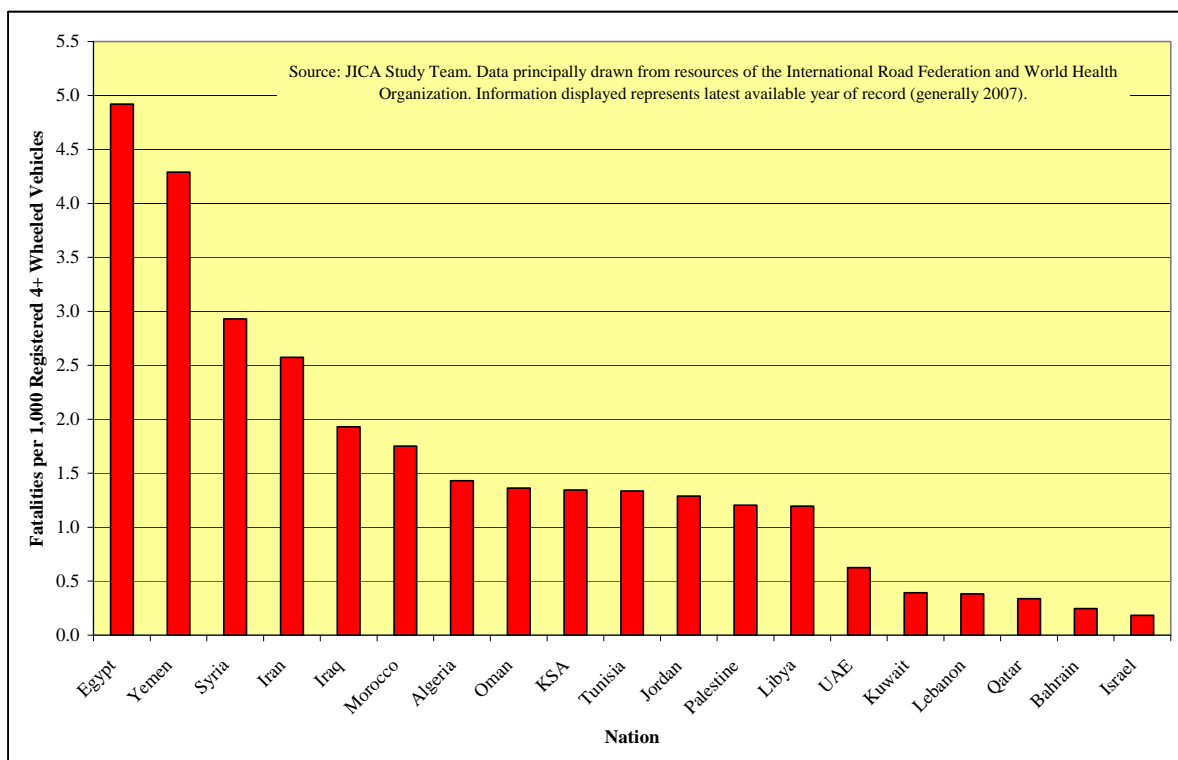


Source: Injury Surveillance Report 2009 (MoH)

Comprehensive and reliable accident data are often lacking. Societal pressures also play a role. For example, accidents which resulted only to "damage to property" may not be reported anymore; more often than not, involved parties enter into damage settlement on the spot. The participation of the police may also

not be desired in some instances. Thus, generally, only published data involving fatality accidents and, to a lesser extent, injury accidents, can be considered reasonably reliable indicators of road safety. Further, to remove bias, accident data should be correlated with exposure; that is, the degree to which vehicles is being used. Vehicle exposure data are available for only few MENA nations thus again hindering the development of a consistent and comparative road safety data base. For purposes of the current exercise, an alternative approach has been adopted which relates accident data (fatalities) to number of registered vehicles as well as national population.

Findings for most recent (2007) total number of road accident fatality linked with vehicle supply suggest that Egypt and Yemen have the highest numbers and thus, most unsafe road environment, with fatality rate in excess of four persons per year per 1,000 registered vehicles. This was followed by Syria and Iran with incidence rates of over two annual road fatalities per 1,000 registered vehicles (Figure 3.8.2). More limited data suggest that deaths on non-motorized (including pedestrians) road users as a percentage of all road fatalities are very high in the region. Egypt, Iran and Libya have the highest rates with 40% to 50% of all road fatalities being attributed to non-motorized users, while Morocco, Tunisia, Bahrain, and Israel have rates recorded 30% to 40% , and Jordan, Qatar and UAE with less than 30% incidence.



**Figure 3.8.2 MENA Road Accident Fatalities and Vehicle Ownership Relationship**

It is of further interest to examine MENA trends over time; that is, fatality incidence by year. In Europe, North America and Japan, for example, historic accident rates have been decreasing over time due to increasing driver discipline, enforcement, road design, and vehicle construction standards. A consistent comparison between MENA nations is difficult due to data availability and can only be done by using national population. As mentioned in the previous discussion, this is less reliable than vehicle registrations . Nevertheless, some interesting insight may be obtained.



In recent years, highest 2007 incidence in terms of fatalities per 100,000 population is found in Libya, Iran and Oman, all being in excess of 300 fatalities per million persons. The Egyptian experience is near the mid-point of MENA norms at 200 annual fatalities per million populations. Some encouraging trends are noted. For example, the fatality incidence has recently been decreasing for Qatar and Israel. However, for other nations, incidence has been increasing over time (e.g. Iran and Syria). For most, incidence has been consistent (Figure 3.8.3). Overall, this is not encouraging from a regional safety perspective. Regional statistics confirm that the MENA region is among the regions experiencing the highest global road fatality incidence, with African nations topping the list.

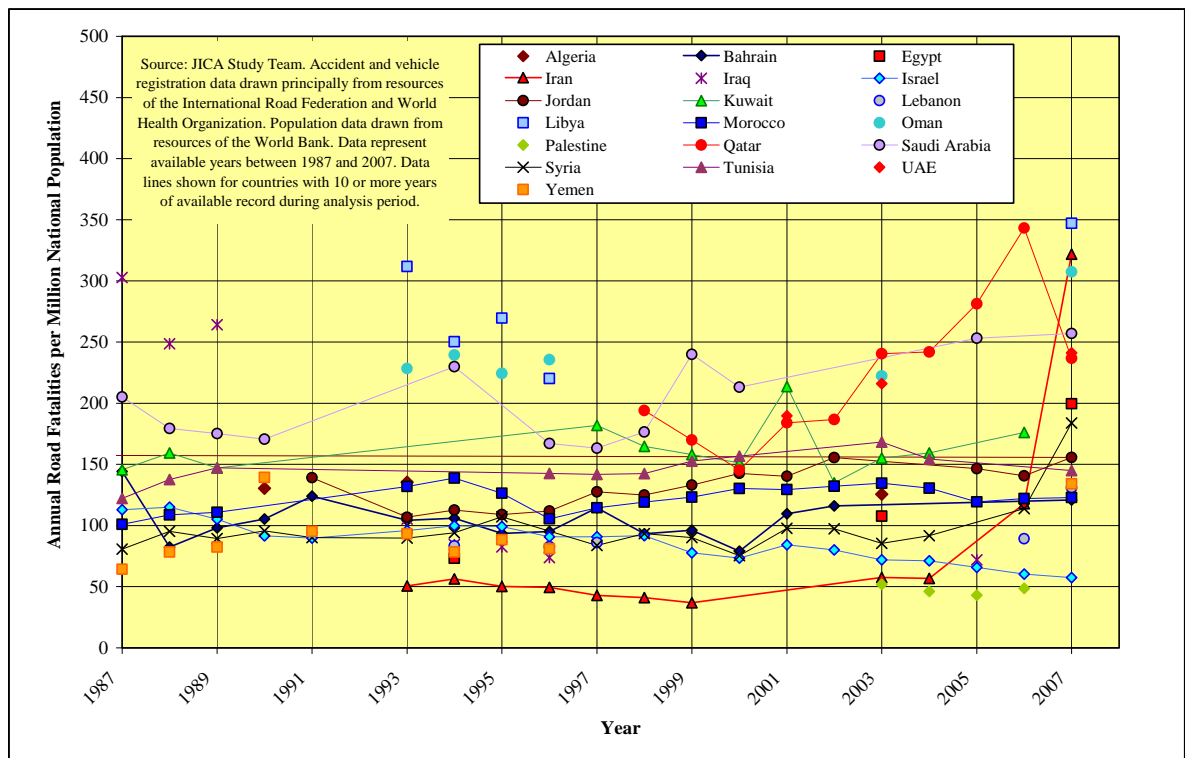


Figure 3.8.3 MENA Trend in Road Accident Fatalities and National Population

### 3.8.2. Examination of Road Traffic Accident Data

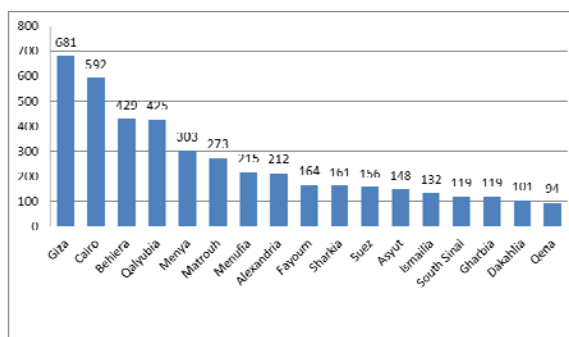
Even though there is a large discrepancy among the sources of data, trend or feature of the accident can be observed from WHO's "Accident Rate Study 2008", which is an analytic study conducted by the Ministry of Health in accordance with notifications and statistics from Critical Care and Emergency Department. The numbers included in the study do not represent the actual figures of accidents and injuries in Egypt, but it represents the number of accidents transported by the ambulance affiliated to the Ministry of Health nationwide.

#### (1) Variation of Accident numbers in Governorates

Figure 3.8.4 shows the number of car accident in Governorate in descending order, with Giza, Cairo, Beheira and Qalyubia among the highest during 2008. There was a total of 681 accidents in Giza Governorate (Giza and 6 October) which was on Cairo/Alexandria desert road, Giza/Asyut agriculture road, Giza/Asyut western road, 26<sup>th</sup> of July corridor and Keraimat new road.

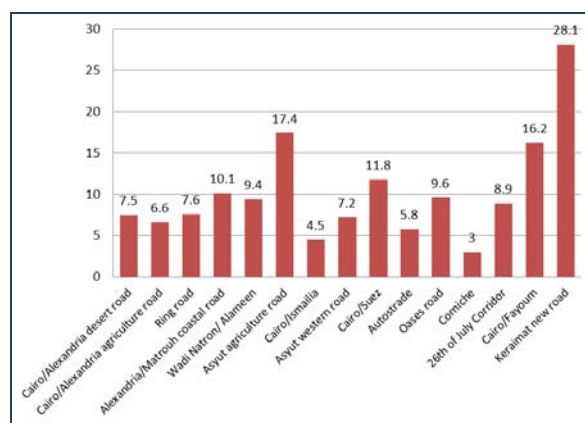
Cairo follows Giza with a total of 592 car accidents focused on the Ring Road, Cairo/Ismaillia road, Cairo/Suez road, Autostrade, and Corniche. Beheira is third with a total of 429 car accidents focused on Cairo/Alexandria desert road, Cairo/Alexandria agriculture road, Wadi Natron/Alameen road. And Qalyubia occupies the fourth place with a total of 425 car accidents focused on Cairo/Alexandria agriculture road and Ring Road.

Table 3.8.3 shows that total of 36% of road accidents focused on 15 roads out of the rest of Egypt's highways and intercity roads. Cairo/Alexandria desert and agriculture roads have the highest rate of accidents followed by Cairo Ring Road and Alexandria/ Motrouh Coastal Road. Figure 3.8.5 shows death percentages on the top 15 roads with highest number of accidents. The highest rates of deaths are on Keraimat new road and Giza/Asyut agriculture road with 28% and 17% death percentages respectively.



Source: Accident Rate Study 2008 (WHO)

Figure 3.8.4 Comparison of Car Accident in Governorate



Source: Accident Rate Study 2008 (WHO)

Figure 3.8.5 Death Percentage of the 15 Highest Accident Roads

Table 3.8.3 Number of Accidents and Casualties on the Top 15 Roads with Highest Number of Accidents in 2008

	Road	Number	Percentage	Injuries	Deaths	Death rate
1	Cairo/Alexandria desert road	303	16.9	1446	118	7.5
2	Cairo/Alexandria agriculture road	241	13.4	1236	87	6.6
3	Ring road	216	12.0	827	68	6.7
4	Alexandria/Matrouh coastal road	208	11.6	954	107	10.1
5	Wadi Natron/ Alameen	161	9.0	725	75	9.4
6	Asyut agriculture road	92	5.1	485	102	17.4
7	Cairo/Ismaillia	91	5.1	386	18	4.5
8	Asyut western road	88	4.9	399	31	7.2
9	Cairo/Suez	78	4.3	201	27	11.8
10	Autostrade	74	4.1	277	17	5.8
11	Oases road	59	3.3	274	29	9.6
12	Corniche	58	3.2	191	6	3.0
13	26 <sup>th</sup> of July Corridor	56	3.1	58	58	8.9
14	Cairo/Fayoum	52	2.9	56	56	16.2
15	Keraimat new road	18	1.0	52	52	28.1
	<b>Total</b>	<b>1795</b>	<b>100.0</b>	<b>7899</b>	<b>773</b>	<b>8.9</b>

Source: Accident Rate Study 2008 (WHO)

## (2) Type of Road Accidents and Type of Vehicles Involved

Among the types of road accidents, vehicle crash (collision) and overturning comprised more than 90% of the total types of accidents in 2008 (Table 3.8.4). Overturning of vehicles usually takes place because of high speed leading to vehicle imbalance (blown tires, sudden braking with bending, etc.). On the vehicle type, Microbus had the highest number of accidents and casualties due to overturning, followed by private vehicles, both comprising more than 30% (Table 3.8.5). Figure 3.8.6 indicates percentage of the overturn and crash accident by vehicle type. Overturning accident of Microbus shares 34% of the total Microbus accidents probably because of speeding and reckless driving or vehicle defect. Figure 3.8.7 shows the type of accidents on the 15 roads with highest accident incidences. On the top 5 roads with highest accident rates such as Cairo Alexandria desert and agriculture roads, both overturning and crash accidents occur frequently, while on the congested Cairo Ring Road, crash accident would be predominant as compared with other roads.

**Table 3.8.4 Type of Road Accident in 2008**

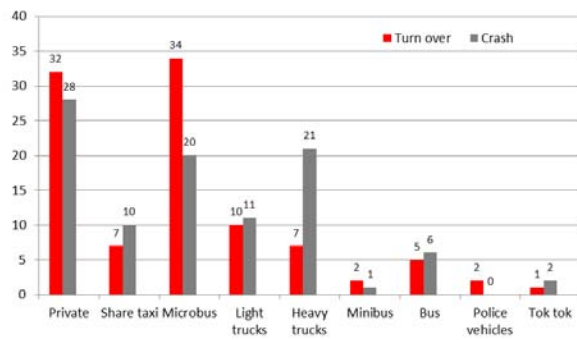
	Accident	Number	Percentage	Injuries	Deaths	Death rate
1	Vehicles Crash	2307	47.1	13014	1224	8.6
2	Overturning vehicles	2121	43.3	13012	819	5.9
3	Crash barriers	253	5.2	1265	74	5.5
4	Hitting pedestrians	121	2.5	294	66	18.3
5	Fall in a canal	68	1.4	449	167	27.1
6	Vehicles on fire	10	0.2	18	5	21.7
7	Fall from a vehicle	9	0.2	35	0	0.0
8	Hitting an animal	3	0.1	14	3	17.6
9	Train collision	3	0.1	50	43	46.2
	<b>Total</b>	4895	100	28151	2401	7.9

Source: Accident Rate Study 2008 (WHO)

**Table 3.8.5 Type of Vehicles Involved in the Traffic Accident in 2008**

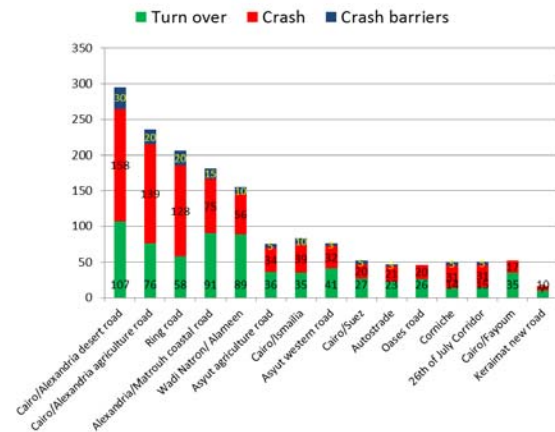
	Vehicle type	Number	Percentage	Injuries	Deaths	Death rate	Average casualties/ accident
1	Private	676	31.9	2244	240	9.7	4
2	Share taxi	152	7.2	642	45	6.6	5
3	Microbus	712	33.6	5472	275	408	8
4	Light trucks	212	10.0	1654	75	4.3	8
5	Heavy trucks	147	6.9	977	85	8.0	7
6	Minibus	39	1.8	400	9	2.2	10
7	Bus	98	4.6	1256	84	6.3	14
8	Police vehicles	35	1.7	210	2	0.9	6
9	Motorcycle	33	1.6	83	2	2.4	3
10	Tok tok	10	0.5	38	1	2.6	4
11	Army trucks	4	0.2	19	1	5.0	10
12	Ambulance	2	0.1	4	0	0.0	2
13	Firefighting	2	0.1	8	0	0.0	4
	<b>Total</b>	2122	100.0	13008	819	5.9	7

Source: Accident Rate Study 2008 (WHO)



Source: Accident Rate Study 2008 (WHO)

Figure 3.8.6 Number of Overturning and Crash Accidents by Type of Vehicle

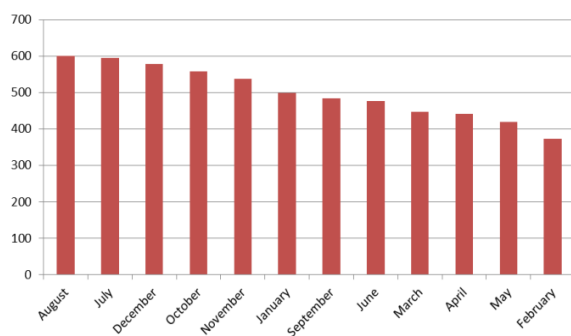


Source: Accident Rate Study 2008 (WHO)

Figure 3.8.7 Number of Overturning/Crash / Crash-Barrier Accidents on the Top15 Accident Prone Roads

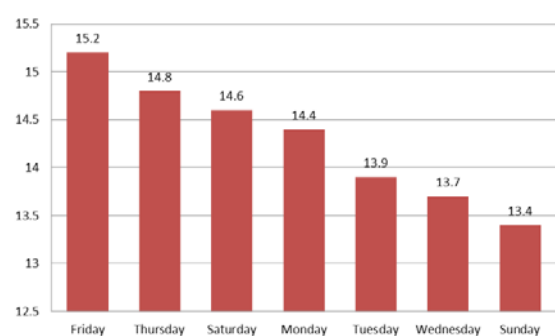
(3) Monthly, Weekly and Hourly Fluctuation of Road Traffic Accident

Monthly fluctuation of the traffic accidents is shown in Figure 3.8.8. The road accident rate increases during summer and decreases in February. But any predominant seasonal trend is not observed. During weekdays, it increases a little on Thursday and Friday maybe due to the increasing number of travelers during weekends, and the decrease in traffic congestion resulting in increase in speed. But this relatively decreases on Sundays (see Figure 3.8.9). Accidents rate during the daily 24 hours increase especially at first hours of the day due to fog. It increases again from 3 to 9 pm due to traffic congestion. While it decreases relatively in the late night hours (Figure 3.8.10).



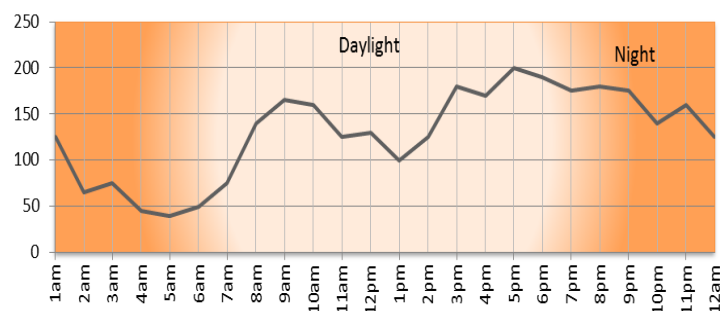
Source: Accident Rate Study 2008 (WHO)

Figure 3.8.8 Monthly Fluctuation of Road Traffic Accident



Source: Accident Rate Study 2008 (WHO)

Figure 3.8.9 Daily Fluctuation of Road Traffic Accident



Source: Accident Rate Study 2008 (WHO)

Figure 3.8.10 Hourly Fluctuation of Road Traffic Accident

Table 3.8.6 Number of Accident by Number of Casualties

Casualties	Number of accidents	Percentage
3 – 1	1548	31.6
6 – 4	1743	35.6
9 – 7	751	15.3
12 – 10	354	7.2
15 – 13	190	3.9
18 – 16	86	1.8
21 – 19	38	0.8
33 – 22	47	1.0
35	1	0.02
36	1	0.02
37	1	0.02
38	1	0.02
40	1	0.02
41	1	0.02
45	1	0.02
60	1	0.02
No injuries+ /-Deaths	130	2.7
Total	28151	4895
Average / Accident	6	

Source: Accident Rate Study 2008 (WHO)

#### (4) Number of Road Accident Victims

Number of victims (injuries + deaths) ranges from 1 to 60 per accident averaging 6 injuries while 8 accidents resulted in 35-60 injuries. Mass casualty accident (i.e. more than 4 casualties) shares nearly 70% of the total, which is quite a high rate. In comparison, average number of victims per accidents in Japan or France would be 1.2 to 1.3 according to the World Road Statistics 2010 (see Table 3.8.6).

#### (5) Traffic Accidents on the GARBLT Roads

The traffic accident data above mentioned are derived from the ambulances affiliated to the Ministry of Health nationwide. In addition, there is information regarding the traffic accidents on the GARBLT roads in the EU Twinning Project. The following information are also important inputs in the preparation of a nationwide traffic safety plan during the conduct of the MiNTS project.

- High concentration of accidents on a limited percentage of roads (50% are killed on 10% of

locations)

- More accident occur on desert roads compared to agricultural roads
- The seriousness of accidents is higher on agricultural roads (50% of fatalities but 25% of GARBLT network)
- The main reasons for accidents resulting in personal damages are:
  - Bad road user behavior including speeding
  - Cars in a poor state of repair
  - Poor or defective road conditions
- Trucks overrepresented in accidents on GARBLT roads
- Many taxi are involved in accidents
- Pedestrian casualties seem to be underreported in official statistics; it is likely that the number of unreported pedestrian casualties is considerably high.

In addition, it is apparent that safety helmets and seat belts are rarely used and are most likely also not used by people involved in accidents which in turn lead to more serious consequences. Photos shown in Figure 3.8.11 demonstrate some scenes of predominant road traffic accidents and their risks in Egypt. Most of the inter-urban trunk highways in Egypt are built with smooth and straight alignment based on the flat and desert terrain. These straight alignments sometimes cause drowsy driving and over speeding. How to avoid monotony and sleepiness on the Egyptian roads will be another question.

Road signs and pavement markings which will be important facilities to ensure safe driving are well designed based on international standards. However, insufficient maintenance has resulted in deteriorating visibilities particularly on the pavement marking. The insufficient road maintenance is also reflected on the repair of road safety facilities and cleanup of roads. Guard blocks and curbs damaged by accidents are left unattended and many pieces of burst types also can be seen on the hard shoulders as shown in photos in Figure 3.8.11.



Overtaken Lorry and Mini Bus due to speeding



Reckless crossing and waiting for bus on the shoulder, and road side development along expressways





Flat Tire Lorry stopped on the outside shoulder in opposite carriageway

**Figure 3.8.11 Scene of the Accidents and their Risks**

#### (6) Serious Traffic Accidents Reported by the Press

Published reports by the press will be one of the recourse of information in Egypt because of the limited reliable traffic accident data and information. Some mass casualties' accident in 2010 and 2011 are introduced below:

- (a) On 11 September 2011, a minibus crashed into a truck-trailer killing 15 passengers and injuring two others in the Red Sea Governorate along the new Sohag Road.
- (b) On 11 September 2011, six people were killed and eight others were injured in Beni Suef after a microbus crashed into a pickup truck on the Eastern Desert Road.
- (c) On 24 August 2011, eleven people died on the Cairo-Aswan Agricultural Road in a three car pileup near the Upper Egyptian city of Malawi due to speeding.
- (d) On 11 January 2011, 20 people were killed and four others were injured when truck carrying sand hit a car and a minibus on a road in Al-Sharqiya, north of the capital. In the same province, 10 people were killed and another 24 hurt when a van hit a truck carrying bottled gas.
- (e) On 27 December 2010, eight American tourists were killed and 21 injured when their bus collided with a truck near the southern city of Aswan (Figure 3.8.12)



**Figure 3.8.12 Serious Traffic Accident where 8 American Tourists were Killed, 2010**

- (f) On 15 October 2010, 11 people were killed and 18 people wounded on the Giza Ring Road. A private car lost control and hit a group of 29 by-standers after the truck hit the private car.
- (g) On 28 March 2010, a bus collided with a van on one of Egypt's southern highways killing at least 16 people, officials said.

### 3.8.3. Institutional Framework for Road Traffic Safety

Laws in Egypt are issued by Presidential decrees after the approval of the parliament while executive Regulations or Ministerial decrees are issued by relevant Ministries to set the implementation rules for the Laws. The following list represents the main legislations covering road safety in Egypt:

- Public Roads Law No.84/1968 and as amended
- Building of Road Law No.229/1996 and as amended
- GARBLT Law No.334/2004
- Goods Transport on public Road Law No.64/1970
- Operating Public Transport Concession Law No.55/1975
- Trucks Importation Decree No.266/1970, issued by Minister of Transport
- Traffic Law No.66/1973, and amended (2008)
- Traffic Executive Regulations No.2777/2000, issued by Minister of Interior
- Vehicle Compulsory Insurance Law No.72/2007
- Environment Law No.4/1994 and its Executive Regulations No.338/1995

Traffic Legislations such as Traffic Law and Traffic Executive Regulation are the fundamentals for traffic safety development. The following section shortly presents an assessment of these regulations.

The Traffic Law No.66/1973 (and its amendments) defines the different roles of the Ministry of Interior and Ministry of Local Development (Governorates). The Traffic Law of Egypt determines legal and social grounds of traffic regulations with the purpose of protecting citizens' life, health and property, creating safety and comfort conditions for participants of traffic and environmental protection. It regulates public relations in the sphere of traffic and its safety. The Law sets basic rules and duties of drivers, pedestrians, passengers, cyclists and issues related to increasing awareness of traffic rules to all road users. The Executive Regulations sets the detailed information for the implementation.

The Traffic Executive Rules, decree No.2777/2000 was issued by the Minister of Interior covering implementation of the Traffic Law. Traffic rules and road ethics include general rules such as road safety measures, road behavior, vehicle maintenance, use of seatbelts for front seat passengers, helmets for motorcycle rider, method of using mobile phones while driving, the seating of children below seven years old at the back, giving way to emergency vehicle, level crossing, etc.

Other traffic rules and road ethics include driving rules such as driving at the right side of the road, staying within the lane, turning, signaling, following distance, oncoming traffic, overtaking, speed limits, intersections and priority rules, stopping, parking, vehicle weight, transport of dangerous goods, bicycle traffic, pedestrian activities, driver behavior towards pedestrians, etc.

The Traffic Executive Regulations also cover vehicles and driver licensing and requirements for technical condition and safety equipment for fast and slow vehicle. The requirements for operating motorized vehicles



including how driver licenses are obtained and what is needed to operate driving school including curriculum, practical training, instructors, etc.

All brand new motorized vehicles are required, according to Vehicle Compulsory Insurance Law No.72/2007 and its Executive Regulation No.338/1995, to obtain an insurance policy against civil responsibility arising from the vehicle accidents. The insurance covers fatalities, injuries and property damages to others, except vehicle damages. It is also required that the insurance policy for each vehicle is presented to the traffic department when licensing or upon renewal, and is filed in the traffic department with the other licensing documents.

The Traffic Law and Traffic Executive Rules are to a large extent in accordance with international legislations. However, the following areas of road traffic safety shall be reviewed:

The main stakeholders for road traffic safety in Egypt are the Ministry of Transport (MOT), its affiliate – the General Authority for Roads, Bridges and Land Transport (GARBLT), the Traffic Police – Ministry of Interior (MOI), and National Road Safety Board which includes members representing competent authorities. Other stakeholders include Ministry of Education (MOE), Ministry of Communication among others. Main responsibilities of the key stakeholders are as follows:

- National Road Safety Board is responsible for developing and overseeing the implementation of national road safety strategies and plans,
- GARBELT is responsible for ensuring road safety measures in the design, construction, maintenance of roads, and
- Traffic Police - MOI is responsible for legislation and law enforcement including vehicle inspection and driver licensing.

#### **(1) National Road Safety Board**

The National Road Safety Board is the central body responsible for setting and overseeing the implementation of national strategies and plans for road traffic safety in Egypt. Established in 2005, the board was created with the aim of increasing the professionalism, consistency and effectiveness of the future work of the Government in areas related to road traffic safety in Egypt.

The National Road Safety Board is headed by the Traffic Police – MOI and includes approximately 14-member board representing the most important actors (MOT-GARBLT, MOH, MOE, MOC, Insurance companies, university) concerned with road safety field.

To support the work of the Board, a new secretariat was established with an engineer and a computer expert seconded by the Traffic Police. There are presently no technical sub-committees or other technical staff connected to the Board, so the manning and the organization is relatively weak compared to similar organizations in the other countries. Furthermore, the Board does not have budgetary instruments.

The Board has no plenary power and does not issue acts or regulations. In addition, it has not as of yet set quantifiable targets for road safety and has not established concrete measures for coordination between the various stakeholders. However, it is important to note that the Road Safety Board prepared a National Road

Safety Program in 2007 that forms the basis for future actions in the field of road safety over the upcoming 5 years (refer to Chapter 4.3.1 Natural Road Safety Program).

## (2) GARBLT-MOT

According to Public Road Law and decree by the Minister of Transport, freeways, express highways and main roads are determined, built, modified and managed by the General Authority for Road, Bridges, and Land Transport (GARBLT). The public treasury of the State bears all costs regarding these roads. GARBLT is also responsible for ensuring road safety, including preparation of strategic and prioritized plans on road traffic safety activities.

GARBLT includes many different departments, many of which operate in areas connected to road traffic safety such as planning and design of new highways and bridges, registration of data indicating black spots, redesigning, establishing and changing of road technicalities of the identified black spots, etc. GARBLT is also responsible for setting up signage and for undertaking paintwork of road markings. GARBLT also has its own factory producing road signs.

Major departments related to the road traffic safety in GARBLT are:

- The Central Department for Chairmanship Affairs. The department has responsibility for overall planning and for media, press and public relations within GARBLT.
- The Departments for Expressways and Weighing Stations. This Department is responsible for weighing stations and technical issues among others.
- The Central Department for Road Construction and Maintenance which is composed of:
  - The Department for Road Maintenance. This department is responsible for road maintenance, which includes standard maintenance and rebuilding, plans for road marking with signposts and painted road marking. Activities include Emergency, Routine, Improvement and Rehabilitation Works.
  - The Department for Road Construction. This department works mainly on plans for establishing new road systems and has a division undertaking road safety-related issues including building new roads and dualling existing roads.
  - The Road Engineering and Safety Department. This department is responsible for implementing and sustaining safety measures including Signs, Marking, Lighting and U-turns.
- The Central Department for Road Research. This department works mainly on research in connection with road construction, design as well as drafting technical proposal, traffic counting and road signs.

Various departments and units in GARBLT are involved in the activities related to the road traffic safety. However, still there is no entity or unit which has overall responsibility for the preparation of a strategy and plan on road safety as well as ensures the implementation of road safety activities. The road safety department should be positioned clearly in the organization as the focal point for the provision of road safety input not only during the design and construction of new roads but also during the operation and maintenance of existing roads.

### (3) Traffic Police – MOI

The Traffic police in Egypt is a part of the National Egyptian Police Force and is mainly financed by the Egyptian State. The Traffic Police is organized in a structure where central headquarters is situated in Cairo and the senior management runs the road safety work of the police in the whole country.

The Central Traffic Police senior management holds a central function in the overall traffic safety work in Egypt. They are responsible for providing the government with recommendations related to road safety legislation and, at same time, is the governing body for traffic police enforcement. The Traffic Police responsibilities include, but are not limited to, the following:

- Patrolling and supervision
- Producing police reports in connection with violation of traffic rules and regulations
- Producing police reports in connection with traffic accidents
- Undertaking driving tests
- Car inspections
- Operating the Accident Database

Besides the police force activities, the Central Traffic Police has, independently and in cooperation with the local police, implemented awareness raising activities on an ad hoc basis. Such activities included police visits to schools where safe conduct in traffic was presented to school children.

A radio campaign is also being implemented through which a senior policemen has short spots 3 times a day informing the listeners about traffic rules, safe conduct as well as providing sound advice and warning to road users.

In cooperation with a number of chosen private firms, the Traffic Police has had a large quantity of flyers printed, giving sound advice about control and maintenance of tires, use of mobile phones in traffic, etc. These flyers are distributed by the police to the road users, when required.

### 3.8.4. Existing Problems and Issues on Road Traffic Safety

Based on the available traffic accident data and information, current situation of the traffic accidents and issues for the traffic safeties are summarized below:

#### (1) Accident Situation and Cause of Accidents:

Due to the speeding and reckless driving, many traffic accidents have occurred on the major inter-urban highways (Motorways and expressways) such as Cairo/Alexandria Desert and agriculture roads. Involvement of many minibuses and minibuses in the traffic accident makes the accidents worse. It is reported that 70% to 80% of traffic accident causes are due to human errors while defect of the road facilities including improper geometric design is just less than 10%.

Number of fatalities caused by traffic accident is accounted from 6000 to 8000 every year. Statistically it can be said that one person per 10,000, one vehicle per 1000 vehicles is involved in traffic accidents, and 18

people per day are killed and four people every hour are injured by traffic accidents. According to one news report, accident by busted tire would be accumulated to 21 % of the total because of common usage of the second hand tire as well as long journey with high speed.

## **(2) Inter-Sectoral Issues**

The Government of Egypt has undertaken several countermeasures as well as enlisted the support, assistance and cooperation of international donors, such as WHO and European Unions, to alleviate one of the most pressing social problems in the country. In spite of the numerous efforts, there is still a long way to go to develop safe driving behaviors among traffic participants in the country. In order to make traffic safety measures effective, it is indispensable to coordinate or cooperate among the stakeholders involved in the implementation of the countermeasure; particularly the role of the National Road Traffic Safety Board will be significant. Besides institutional issues, comprehensive traffic safety planning, e.g. Five-Year Traffic Safety Plan, is another significant issue so as not only to ensure the effective coordination among the stakeholders, but also to ensure sustainability of the safety policies/measures. In this context, the National Safety Board has, in 2007, launched new Road Safety Programme (2007-2012). However the Programme does not have a clear realistic quantifiable target and neither lays down specific mechanisms for monitoring implementation nor requests from stakeholders the preparation of action plans for their activities.

While Legislation on traffic regulation is very close to international standard, there is still room for improvement especially in the area related to professional transport.

## **(3) Infrastructure/Traffic Management Issues**

Although the main cause of a traffic accident is human error, particularly reckless driving and ignoring of traffic rules and regulations, insufficient road facilities and traffic congestions are also major causes of traffic accidents. While human errors will be addressed by the education and enforcement sectors, it is equally important that appropriate geometric design and safety facilities, as well as sufficient information system, be provided to minimize, if not totally avoid, the human errors.

At present, GARBLT is conducting black spot improvement in line with EU Twinning Project to an urgent countermeasure to avoid future traffic accidents. However, there are some factors which hinder smooth project implementation such as lack of accident data and budgetary constraints. Road cleaning and maintenance will be also important work to keep the good road surface conditions from obstacles such as a piece of busted tire, stones and sand among others which may cause traffic accident on the high speed highways.

Road geometrics of the major highways in Nile Delta region where many traffic accidents are reported will be preferable conditions; however, this unfortunately encourages speeding and reckless driving. However, most of the major highways do not control the access; there are many intersecting points as well as U-turn slots, even though their high speed traffic flows in practice. Mix traffic is also raising the risk of accidents.

## **(4) Transport Operation and Management Issues**

Three areas are being addressed in this area: (1) licensing system, (2) vehicle inspection and (iii) transport operation. With regards to the licensing system, there are no proper training schools and curriculums at present which have adequacy to acquire safety knowledge and safety driving skills.

Lack of proper vehicle maintenance is one of the causes of serious traffic accidents including trucks and minibuses. Stricter vehicle inspections system will be required. Among the types of vehicle, minibus shows the biggest number of accidents, even higher than private vehicles according to the WHO accident rate study. It will be a significant and unacceptable message that passenger vehicles operated by professional drivers has the highest accident risk of transportation.

#### (5) Enforcement Issues

Regardless of the frequent enforcement activities for speeding on high risk roads, the activities are still not adequate to meet the increasing traffic demand and traffic law violators. Lack of enforcement facilities and equipment is also limiting the effectiveness of the enforcement efforts. Given such limitations, strategic enforcement planning based on traffic accident data and violation data will be required.

Traffic accident data is one of the basic data information not only for traffic enforcement but also for engineering improvements and traffic safety education program. Therefore, development of the reliable database will be urgently required.

#### (6) Education and Propaganda Issues

Traffic safety education is a big concern since the highest cause of traffic accident is due to human error. Recklessness of safety behavior and driving are highly dependent on level of education and social morality. Thus, traffic safety education system will be provided for various groups, from young children to adult in different community groups. In addition, the systems must be sustainable and are complementing with each other. However, in Egypt at present, faced with lack of overall traffic safety education system including organization and human resources, it is necessary to develop comprehensive traffic safety education system encouraging NGOs, and transport related associations and agencies in cooperation with Ministry of Education and Ministry of Interior. National Road Traffic Safety Board will be the central agency to coordinate among the concerned organizations and agencies.

#### (7) Medical Emergency Issues

Development of the medical emergency system is one among the important factors of a post-accident measure to save peoples' lives. Currently, medical emergency vehicles are deployed at the toll gates, road maintenance office and other strategic places along the major highways. Their effective efforts can be observed from their record of activities summarized into the "Accident Rate Report" prepared by WHO. However, further improvement will be required to meet large number of traffic accident and also to handle mass casualty accidents. In line with medical emergency system, insurance system shall be improved for all traffic accident victims to receive appropriate emergency treatment and the insurance shall also cover sequela as well as to support child orphaned from a traffic accident. According to the secondary resources, as of 2010, there are 1035 emergency centers and 2713 emergency cars allotted along the national highways across the country.

### 3.9. ROAD CONSTRUCTION MANAGEMENT

The major part of the investment budget for road construction is ultimately paid to contractors to construct new projects or to maintain old ones. This means that improving contractors' performance can have direct

benefits to the transportation system as a whole. Contractors interested in participation of the projects of any organization of MOT should register in the list of eligible contractors of that organization. In most cases a short list is prepared by the organization and the listed contractors are called to submit their technical and financial proposals based on the TOR and specifications prepared by the organization. Since the list of the eligible contractors includes only qualified contractors, comparison of financial proposal is the main factor for the contractor selection. The Study Team has surveyed some of the construction sites of roads and bridges and has the following observations:

- Construction sites are not organized for optimum performance.
- The level of safety arrangement for the contractors' employee and for vehicles and pedestrians around the construction sites is far below international standards.
- Construction activities are going at leisurely manner with no signs of urgency even in critical bottlenecks. This indicates low productivity of equipment and personnel and longer period of project implementation. In other words, lower efficiency of investment and lower return for the contractor.
- The quality of roads and bridges construction is low-grade. This means faster deterioration and shorter life span of the project. This translates in more cost.

The main reasons for the above mentioned observations could be summarized as:

- Weak project management.
- Low technical level of contractor's personnel due to insufficient training programs.
- Lower efficiency of project supervision.
- Contractual problems such as non enforcement of delay penalties and non enforcement of safety measures.

## CHAPTER 4: CURRENT POLICY, PLANS AND PROJECTS

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### 4.1. ROAD SECTOR DEVELOPMENT STRATEGY

The proposed National Transportation Strategy related to Road Sector is pointed out as follows:

- Develop a comprehensive transportation plan inclusive of balanced various transportation mode and prioritized infrastructure development
- Emphasize safety, the integration of environmental considerations and inter-modality
- Develop a regulatory framework through institutional building and organizational restructuring
- Assess financing strategies with a focus on the participation of the private sector
- Strengthen and develop better asset management and an efficient operation and maintenance procedures

Addressing on the Road Sector, the first development priority for road network improvements from the hardware element viewpoints is aiming to increase safety, efficiency and well-managed of road transport, especially for the passenger transport. The Road sector Agency needs in short-term temporally,

- Increase where necessary the capacity of the road to reduce congestion,
- Expand the highway network to include high-order, access controlled facilities, in appropriate corridors and where suitable on environmental and social grounds,
- Reduce uncontrolled at-grade crossings on main roads and eliminate them on high-order highways,
- Reduce and/or abolish artificially induced bottle-necks on main rods and highways, in particular the U-turns which need to be replaced by proper ingress / egress facilities (interchanges) or high-order signalized intersections,
- Strive for more safety by improving safety devices, control and education.
- Utilize available resources, both existing and external in the most efficient manner
- Implement road safety measures on all projects, those already constructed as well as those in the planning stage
- Introduce capacity building of staffs through training, workshops, the use of improvised contracting methods
- Reduce the technological gap in the roadway industry, the use of innovated materials, new design method and applying asset management approach.

The second developing priority is to make the good balancing point of modal share between road and other transport modes, to provide efficient transport alternatives where possible to reduce road utilization.

Furthermore, it is necessary to develop the new road network so as to support the corridor development for comprehensive development.

This contributes to:

- Support the rapid pace of economic development by providing good access to new development areas, industrial, agriculture, residential and tourism
- Accommodate the growth in population and social demands
- Prioritize infrastructure projects in view of the above demands

## 4.2. CURRENT ROAD NETWORK DEVELOPMENT PLAN

Before preparing road project lists, the existing main development plans and projects are reviewed. The major projects are reviewed and explained here, but the summary of individual road projects are attached in the appendix. Based on the review and analysis of existing projects and studies, the candidate road project list (the long list of the project) is prepared.

### 4.2.1. EURO MEDA Network Plan

A sustainable and efficient inter-modal transport system is vital for the success of the Euro-Mediterranean Free Trade Area, as well as for an increased integration of the economies of the Mediterranean Partner Countries. To support the objective of achieving sustainable and integrated multimodal transport network at the regional level, and to promote cooperation with the countries of southern Mediterranean, the EU approved within the framework of the MEDA Program, the Euro-Mediterranean Regional Transport Project. The overall objectives of this project are to:

- Contribute to overall economic and social development of the MEDA countries through increased and more sustainable transport flows, increased trade competitiveness and more balanced exchanged.
- Improve the quality, safety and efficiency of both the goods and passenger systems in the region, and improving the functioning of the transport sector as a whole.
- Support the development of integrated multimodal transport networks and infrastructure, leading to improved transport flows, better connections and reductions in bottlenecks.

There are three road corridors linking with neighboring countries, these are illustrated in the Figure 4.2.1 and Table 4.2.1. Core elements are:

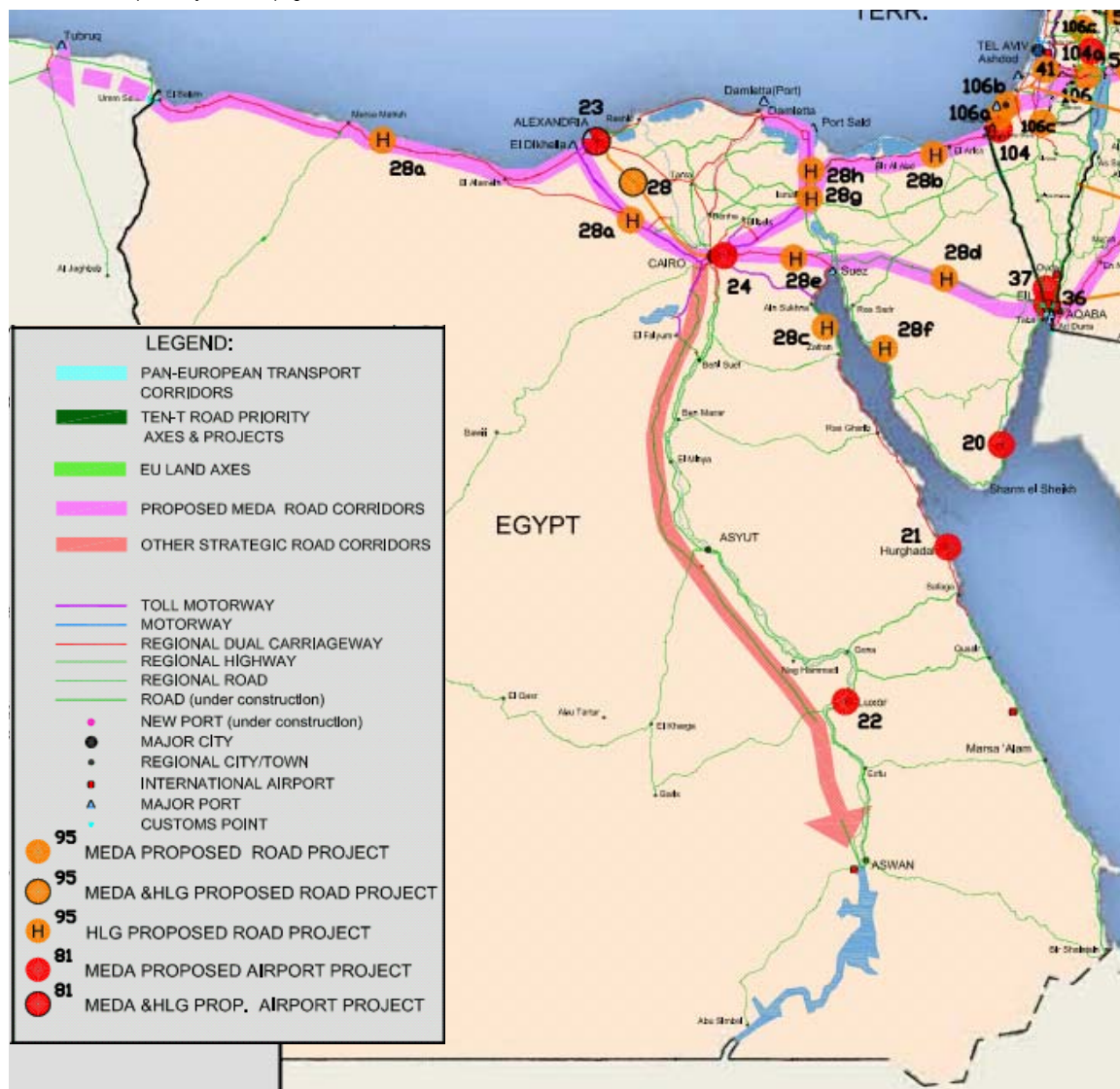
- East African Corridor (Cairo – Sudan, continuing southwards).
- North Coast Road (Cairo Libya, continuing westwards to Tunisia, Algeria and Morocco)
- Cairo – Aqaba – Amman Road



Table 4.2.1 List of Road Corridors in Egypt

Database Code	Map Ref.	Network Name
EG-1-Rd	28	Alexandria – Cairo proposed new expressway
EG-2-Rd	28a	Cairo / Alexandria / Matruh road to motorway standard
EG-3-Rd	28b	Upgrading Bir Al Abd / Rafah road to dual carriageway
EG-4-Rd	28c	Upgrading Zafran / ElAin Sokhna road to dual carriageway
EG-5-Rd	28d	Upgrading Ahmed Hamdi Tunnel / Nakhi / Taba to dual carriageway
EG-6-Rd	28e	Cairo Suez road connection
EG-7-Rd	28f	Shram el Sheikh / Ras Sadr / Tawr road links
EG-8-Rd	28g	Upgrading Ismailia / Port Said (East and West of Suez Canal)
EG-9-Rd	28h	Road tunnel under Suez (South of Port Said)

Source: EUR-MEDA Transport Project Homepage



Source: EURO-MEDA Transport Project Homepage

Figure 4.2.1 EURO MEDA Road Network

#### 4.2.2. Superhighway Nile Western Bank

This project advances the case for a proposed superhighway west of the Nile from the Mediterranean Sea coastline to Lake Nasser by Dr. Farouk El-Baz. The proposal would provide numerous opportunities for the development of new communities, agriculture, industry, trade and tourism around a 2,000 km strip of the Western Desert. It is not possible to foresee establishment of a modern network of transportation systems within the confines of the Nile Valley and its Delta, because that would reduce agricultural land. The fertile soil within the inhabited strip of Egypt was deposited by the Nile River over millions of years, and it is irreplaceable. In the meantime, the growth of population negates the potential of continuing to live on and utilize only five per cent of the land area of Egypt. Thus, it is imperative to open new vistas for expansion outside of the inhabited strip. This proposal provides an innovative solution to the numerous problems that face Egypt today. Based on the above, the proposed project includes the establishment of the following:

- A superhighway to be built using the highest international standards, 1,200 km in length, from west of Alexandria to the southern border of Egypt, (Figure 4.2.2)
- Twelve east-west branches, with the total length of approximately 800 km, to connect the highway to high-density population centers along the way,
- A railroad for fast transport parallel to the superhighway,
- A water pipeline from the Toshka Canal to supply freshwater, and
- An electricity line to supply energy during the early phases of development.

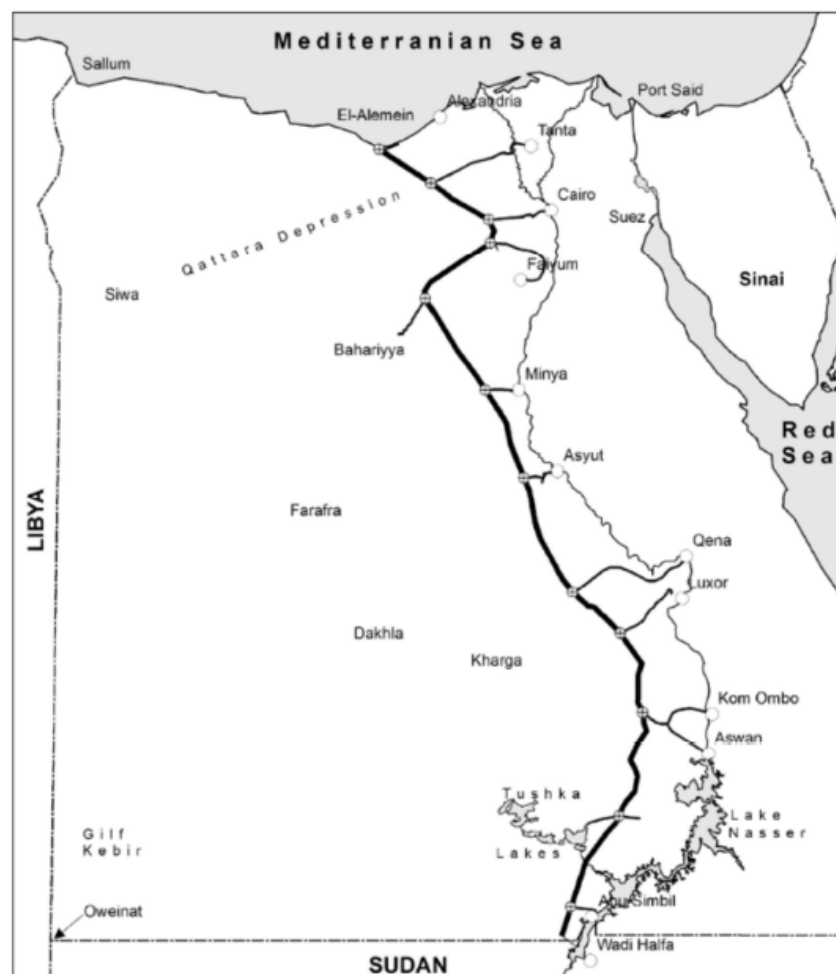


Figure 4.2.2 Desert Development Corridor by Superhighway Western Nile

### 4.2.3. Egypt Vision 2052

A National Spatial Development Plan it needed to provide the big picture frame work for achieving the national objectives of more balanced urban distribution with due regard to environmental considerations. The importance of a spatial strategy at the national level stems from the fact that the current population is concentrated in the narrow Nile Delta and its Valley, representing only 6.5 % of the total area of Egypt. Exploring new opportunities for expansion in other desert areas is essential to alleviate pressure on valuable agricultural land and to accommodate the expected population growth in a harmonious manner.

The Egypt Vision 2050 and revised 2052 aim to be a road map (Figure 4.2.3) that will guide development in Egypt to 2050 and 2052, reflecting the Government goals and vision. It will highlight areas suitable for urban development as well as a network of expansion corridors and hubs that will interlink main areas of economic activity and major population agglomerations, and identify size, type and location of required transportation routes. In addition the Egypt Vision 2050 and 2052 will promote the achievement of the social equity and a fair distribution of basic and social services among all Egyptian regions.

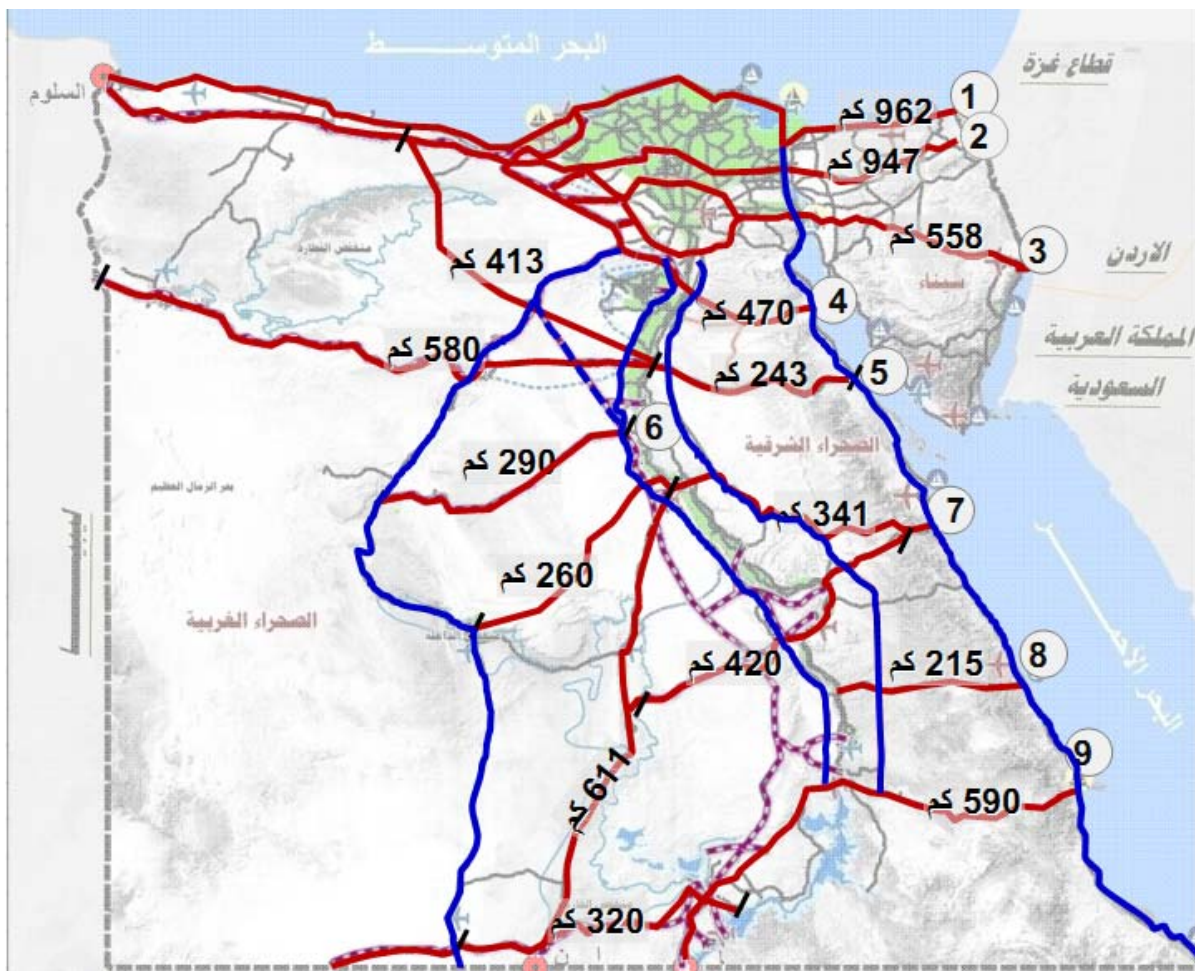


Figure 4.2.3 Development Axis by Egypt Vision 2052

#### 4.2.4. Multimodal Transport and Logistics System of the Eastern Mediterranean Region and Master Plan

The study presents the present and future conditions of the freight logistics for export and import. It presents the overall plan for the further logistics development of all the multimodal modal and logistics system: including forwarding activities, custom clearance and procedure activities. For the newly suggested projects, more than twenty projects are proposed in addition to the projects that have been already planned by the Government of Egypt, which are shown in Figure 4.2.4 and Figure 4.2.5.

Under this process, the projects and programs/studies, which were not related to logistics such as passenger transport projects, minor road development projects, etc., were excluded. Concerned to Road Sector, 1 new road project, 1 dry port project and 3 logistic center projects are additionally proposed to the on-going and committed projects. The Table 4.2.2 shows the newly planned and the proposed projects by the Multimodal Transport and Logistics System of the Eastern Mediterranean Region and Master Plan.

**Table 4.2.2 The Proposed Projects in related Road Sector by Multimodal Transport and Logistics System of the Eastern Mediterranean Region and Master Plan**

Sector	Project Name	Status	Implementing Agency	Project Cost (million LE)	Expected Fund Source
Road	Regional Ring Road Development Project (South Arc)	Planned	GARBLT	1,500	GOE
Dry Port	Dry Port Development Project (17 location)	Planned/ New	Inland and Dry Ports Authority	720	PPP
Logistics Center	Logistics Center Development Project (6th of October)	New	Inland and Dry Ports Authority	80	PPP
	Logistics Center Development Project (10th of Ramadan)	New	Inland and Dry Ports Authority	80	PPP
	Logistics Center Development Project (Port Said East)	New	Inland and Dry Ports Authority	80	PPP



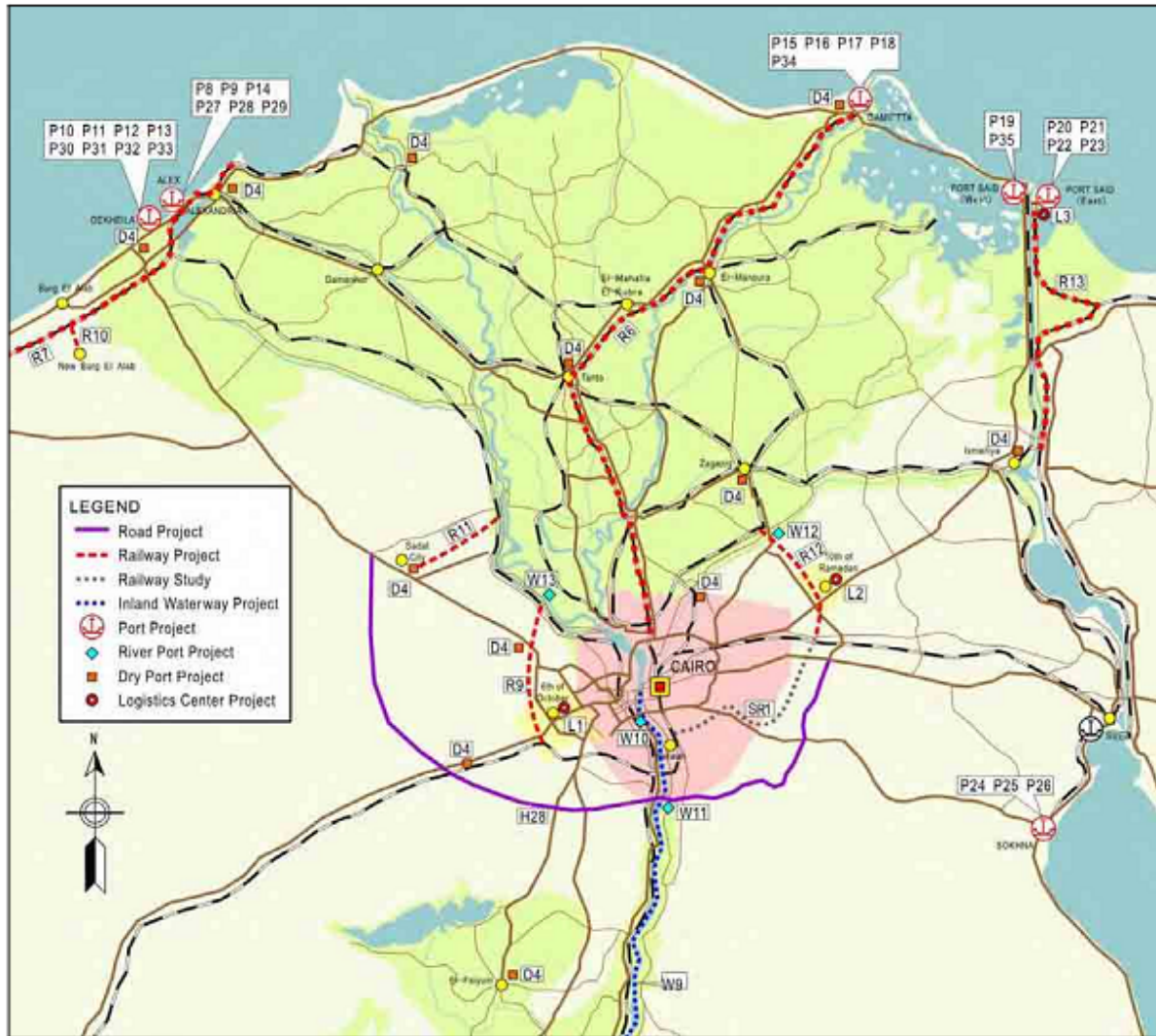


Figure 4.2.4 Project Map of Multimodal Transport and Logistics System of the Eastern Mediterranean Region and Master Plan (Nile Delta Area)



Figure 4.2.5 Project Map of Multimodal Transport and Logistics System of the Eastern Mediterranean Region and Master Plan (Upper Egypt)

#### 4.2.5. Current Five Year Development Plan

The present year of 2011/12 is the last year of the sixth five year development plan, in which the followings are listed as important policies in the road and bridge sector:

- Achieving horizontal and vertical development of transport network and connecting the new urban areas with the main network, promoting connection through Nile River, expanding the establishment of the roads that connect Upper Egypt with Red Sea coastal areas and raising its efficiency.
- Establishing dual carriageways instead of the existing single carriageways to cope with the

increase in vehicles and traffic.

- Diverting the vital roads connecting governorates to freeways and proposing some of them to be implemented by the private and investment sectors.
- Establishing regional and ring roads to avoid bottlenecks in Delta.
- Expanding the establishment of bridges and bridges across Nile River in Upper Egypt and Delta.
- Developing transport network in Greater Cairo by rejuvenating and organizing the corridors nourishing Cairo.
- Setting the regulations needed to support and secure traffic on transport network to reduce accidents rate.
- Improving some of the Metro lines, like (Helwa – Marg) and (Munib – Shubra) to be in line with the volume of forecast traffic.
- Completing the improvement and modernization of land ports and providing it with security equipments (Saloum – Awga – Rafah – Taba – Ras Hadarba – Soheen – Arqeen)

Roads and bridges plan aims at establishing new roads to serve South Valley and regional and ring roads to avoid bottlenecks in Delta, doubling the existing single roads to cope with the increase in vehicles and traffic, developing and diverting the vital roads connecting governorates to freeways, and facilitating transport to all activities on existing corridors to reduce accidents and alleviate traffic congestion. In addition, completing the establishment of bridges across highways and railways, starting the establishment of new bridges across Nile, and replacement and renewal of feeble bridges established across waterways.

**Table 4.2.3 Road and Bridge Project for the year 2011/2012**

Category/ Region	Projects/ Road Route	Governorates
Completing the establishment of dual carriageways	Mahala / Kafr El-Sheikh / Desouq / Damanhour / Housh Essa / Janaklees / Alexandria	Gharbia / Alexandria / Kafr El-Sheikh / Beheira
	Qanater El-Khairia / Khatatba / El-Tawfikia	Behiera / Miunfia / Qalyubia
	Zagazig / Synbelawen	Sharkia / Dakahlia
	Entrance of Mansoura / entrance of Talkha eastern bridge 10 km	Dakahlia
	Mansoura / Tanah / Dakarnas / Mataria	Dakahlia
	Qantara / Salhya / Faqoos / Abu Kbeer / Hahya / Zagazig	Ismailia / Sharkia
	Qena / Safaga 160 km – Upper Egypt	Qena / Red Sea
	Third lane of agriculture road from Kafr El-Dawar to Kafr El-Zayat of 70 km, about 35 km of which had been carried out.	Behira
	Cairo / Imbaba / Nakla / Khatatba ring road	Giza / Behira
	From Sheben El-Kom till Minuf and dual carriageway from Minuf to Tamalay 35 km	Minufia
Establishing and developing ring roads and changing them into freeways:	Cairo / Ismailia / Port Said, and changing it to freeway from 10 <sup>th</sup> of Ramadan to Port Said	Qalyubia / Ismailia / Port Said
	Cairo / Suez, and changing it to freeway from Robeiky to Suez	Cairo
	Belbeis / Banha / Bagour / Khatatba (phase two the regional ring road)	Sahrkia / Qalyubia / Minufia
	Badr El-Robeiky / 10 <sup>th</sup> of Ramadan / Belbeis (phase one the regional ring road)	Cairo / Sharkia
	Ring road around cairo and adding a 12 km long fourth lane from Katamia section	Cairo
	Kafr El-Zayat / Housh Essa / Alexandria (Freeway)	Beheira / Alexandria
	Qanater / Bagour / Tanta / Shebeen El-Kom / Mahalt Matbool (Freeway)	Minufia / Gharbia
	International coastal road	Number of governorates
	Cairo / Alexandria desert road, changing it into a freeway	Cairo / Beheira / Alexandria
	Cairo / Ismailia / Port Said, and changing it to freeway from 10 <sup>th</sup> of Ramadan to Port Said	Qalyubia / Ismailia / Port Said
	Cairo / Suez, and changing it to freeway from Robeiky to Suez	Cairo
	Belbeis / Banha / Bagour / Khatatba (phase two the regional ring road)	Sahrkia / Qalyubia / Minufia
	Badr El-Robeiky / 10 <sup>th</sup> of Ramadan / Belbeis (phase one the regional ring road)	Cairo / Sharkia

Projects to be finished		
Upper Egypt Governorates	<b>Roads establishment</b>	
	Regional ring road in Luxor (17 km)	Luxor
	Ring road in Luxor city (12 km) (Green Belt)	Luxor
	Outer ring road of El-Qosser city (20 km)	Aswan
	Baris road / Darb El Arbeen (180 km)	New Valley
	Starting the project of Toshka / Arqeen road	New Valley
	<b>Dual Carriageway</b>	
	Maghagha / Adwa (26 km)	Menya
	Beni Soueif / Menya agriculture western road (125 km)	Beni Soueif / Menya
	Asyut / Sohag road (El-Kawamel Entrance) west Nile bank(120 km)	Asyut / Sohag
	<b>Linkages establishment</b>	
	Pavment of Shalateen / Soheen road of 210 km long	Red Sea
	Connecting Nile bridges with main roads east and west Nile of 65.5 km (Malawy / Beni Mazar / Wasty)	Beni Soueif / Menya
	Damo till Beni Soueif ring road (Beni Soueif linkage 28 km)	Beni Soueif / Fayoum
	Qanater Naga Hamady of 3.5 km	Qena
Mahrosa / Taref – Desert hinterland (40 km)	Luxor	
Suez Canal and Sinai Governorates	Treatment of heavy rains effects in Aswan and read sea and establishment of ring road around Areesh in North Sinai Governorates.	
	Ismailia / Qasaseen / Abasa dual carriageway (55 km) in Ismailia and Sharkia governorates.	
	Dual carriageway of tunnel road (from km 109 Suez intersection to the tunnel) of 25 km long in Suez governorate.	
Delta Governorates	Sanbelwaeen / Kafe Sakr of 19 km long	Sharkia
	Km 85 (Cairo / Ismailia ) the distance between Qasaseen and Salyhia 45 km	Ismailia / Sharkia
	Tanta / Zefta(21 km)	Gharbia
	Zagazig / Meet Ghamr (25 km)	Sharkia / Dakahlia
	Mounier / Belbeis / Abassa agriculture road (45 km)	Cairo / Sharkia
Tanta / Kafe El-Sheikh from Tanta to Damietta	Kafr El-Sheikh	

Source: Socio-Economic Development Plan 2011/2012

As for bridges, seven bridges are planned crossing the Nile (Foah – Kafr El-Sheikh, Beni Mazar – Menya, Tema – Sohag, Talkha – Dakahlia, Gerga – Sohag, Abou Teg & Sahel Sileem – Asyut, and Kalabsha Kom Imbo – Aswan).

To implement the abovementioned projects, a sum of 2,579 million L.E. is allotted only for the road and bridge sector. The amount accounts for 28% of the total investment in transportation sector

### 4.3. TRAFFIC SAFETY DEVELOPMENT PLANS AND PROJECTS

#### 4.3.1. National Road Safety Program

The National Road Safety Board has, in November 2007, lunched the National Road Safety Program with the purpose of improving the road safety level in Egypt. This program describes the different road safety activities to be implemented in Egypt and assigns responsibilities to specific stakeholders. Table 4.3.1 below describes the elements for stage 1 (the first 5 years) of the program. Each of the sub-programs is divided into several tasks.



Table 4.3.1 List of the Projects Proposed in the National Road Safety Program

Main Elements	Sub-elements	Sub-Program	Responsibility
Road	Geometrical Design	Improve horizontal curves on 1 <sup>st</sup> Class single roads	GARBLT
		Improve horizontal and longitudinal alignment on 1 <sup>st</sup> Class single roads	GARBLT
		Securing roadsides by removing obstacles effecting sight distance	GARBLT + Governorates
	Structural design, 1 <sup>st</sup> Class single roads	Pavement maintenance for areas in severe distresses	GARBLT
		Severe dangerous side slops	GARBLT
	Traffic control, 1 <sup>st</sup> Class single roads	Provide more signs, maintenance, cleaning	GARBLT
		Improve road marking	GARBLT
		Increase safety precautions during construction and maintenance work	GARBLT
		Provide more police checkpoint and patrols on daily basis	Mol + National Council
	Safety audit for 1 <sup>st</sup> Class single and dual roads	Increase speed controlling techniques by using different types of radars	Mol+ National Council
		Establish new system for design stage	GARBLT
		Establish new system for construction stage	GARBLT
Vehicle	Vehicle condition	Establish new system for maintenance stage	GARBLT
		Establish new system for maintenance stage	GARBLT
		Establish new system for maintenance stage	GARBLT
	Technical inspection required for issuing license	Provide training for maintenance employee working in public companies for passenger and freight transport	Holding company for passenger and freight transport
		Develop technical inspection in companies' garages	Holding company for passenger and freight transport
		Enhance mechanical inspection, provide inspectors to check vehicles on the roads	GARBLT, MOI, MoEn
Driver	Driving schools	Develop existing technical inspection	Mol
		Enhance private sector to establish new centers for vehicles inspection	Moll
Awareness	Educational program	Standardization and development of driving training program	Mol
		Increase number of driving schools	Mol
	Media	Develop the existing test	Mol
		Review the qualification required by the tourism companies and other companies for drivers	Companies, Mol and National Road Safety Board
Rescue	Rescue centers	Establish a new system for monitoring drivers and vehicles	Companies, Mol and National Road Safety Board
		Review and develop the road safety materials provided by schools	MoE
Land use	Media	Provide lectures on road safety in all universities	MoE
		More programs and adds on TV and radio	TV and Radio Union + Mol
	Website	More article in press	Press Council and Mol
		Establish a new website for the National Road Safety Board to be the main source of information on road safety and accident	National Road Safety Board
Rescue	Accident reporting	Develop the existing centers	MoH
		Encourage the private sector to build new centers	MoH
Land use	Land use	Increase number of rescue phone and maintaining the existing cone	MoH and GARBLT
		Develop the pedestrian crossing facilities on high population areas	GARBLT

Source: National Road Safety Program (2007)

### 4.3.2. EU Twinning Project on Road Safety in Egypt

The twinning project serves the objectives of the EU-Egypt Association Agreement (AA) which was enforced on 1 June 2004 and EU-Egypt Neighborhood Policy (ENP) Action Plan adopted by both parties in March 2007. The Twinning project is in line with the activities suggested in the ENP Action Plan that include promoting cooperation in the transport field, with a special focus on the following areas:

- Implementation of a national transport strategy, including transport infrastructure development and transport sector reform
- Implementation of the sector reform program aiming at separating regulatory, management and operation tasks
- Promotion of the involvement of the private sector in transport projects and services
- Application of selected measures and reforms in the road transport sectors including:
  - Introduction of a transparent regulatory process for the issuance of freight and passenger transport licenses and for granting access to the profession
  - Implementation of relevant international conventions, notably on dangerous goods transport
  - Development of an integrated action plan on road safety including the technical control/road worthiness testing of vehicles, and
  - Development of inter-modality and multi-modal service, address issues of interoperability.

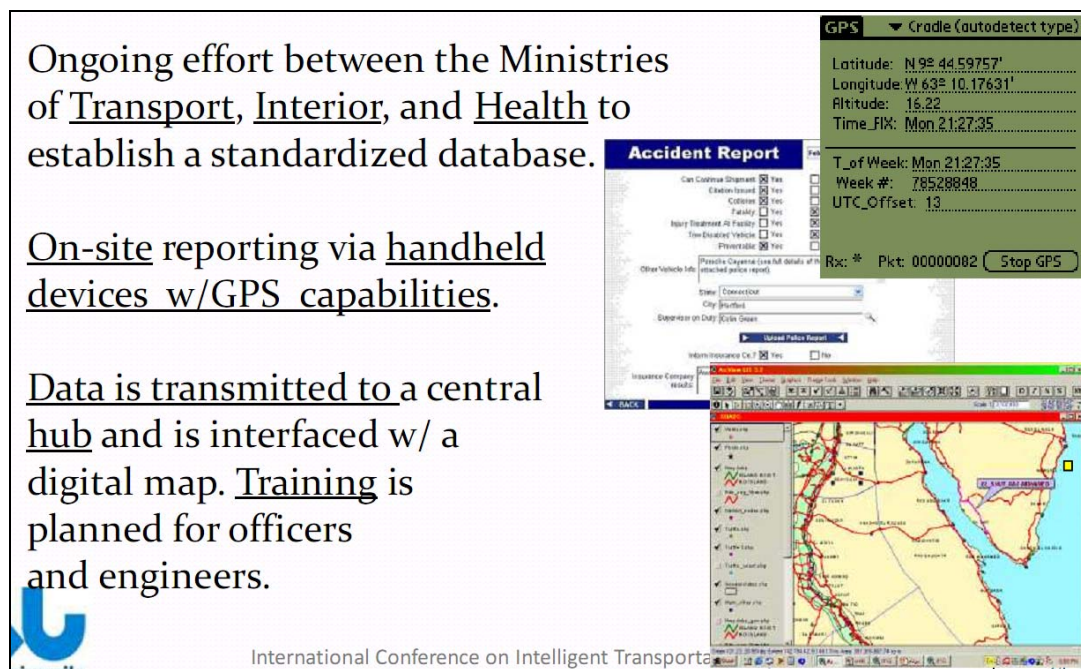
Due to the exorbitant high fatality and road accident situation, road safety is the highest on the transport reform agenda. Consequently, EU Twinning Project on Road Safety has been designed to support the Egyptian Institutions involved in road safety, in reforming framework and building their institutional capacity to enhance road safety. The EU Twinning Project on Road Safety has been stated in 2009 with the three years project periods. The major activities are noted in Table 4.3.2. One outgrowth of this effort has been an initial attempt to define/standardize a road accident database (Figure 4.3.1).

**Table 4.3.2 Activities and Outcomes Plan by EU Twinning Project on Road Safety**

Component A	Coordination of National Road Safety Activities and Legislative Reforms
Outcomes	A framework for the National Road Safety Boards secretariat prepared and establishment of technical committees ready for approval and adaptation
Component B	Institutional Development and capacity Building of GARBLT
Outcomes	Legislation for GARBLT operation reviewed and clauses addressing GARBLT's mission with respect to road safety are proposed and Ministerial Decrees issued.
	Organization of GARBLT is reviewed and suggestion for expanding the role of the road safety department in the organization so it would also be responsible for ensuring road safety during the design and construction, maintenance and operation of existing roads are proposed and approved by GARBLT
	The capacity of GARBLT's employees to plan and implement activities related to road safety is raised.
	An Integrated Road Safety Action Plan for GARBLT is prepared and politically adapted to the overall governmental strategy for safety and steps for implementation are laid down
Component C	Upgrading Road Safety management System
Outcomes	A system for road safety auditing has been established and implemented on a pilot basis as well as training of trainers carries out
	Road and traffic management standards have been carefully reviewed and suggestion for improvements put forward and adopted by GARBLT

	Improved national road accident database with analysis tools developed in coordination with MOI through the National Road Safety Board and access from all main stakeholders in road safety.
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Source: JICA Study Team based on GARBLT Information



Source: GARBLT

Figure 4.3.1 Road Accident Management Database System (ongoing)

#### 4.3.3. Road Safety Action Plan for GARBLT

The Road Safety Action Plan for GARBLT was developed as a part of the EU Twinning Project mentioned above. Outline of the action plan is as follows:

##### (1) Priority Areas:

- Road infrastructure
- Vehicles (fleet of GARBLT)
- Methodological framework

##### (2) Targets:

The overall objective is to reduce fatalities, injuries and accident severity on GARBLT roads.

Target till 2015: -25% fatalities

Sub-target: -10% injuries

##### (3) Measures

Details and practical measures are prepared for the action plan for the three areas respectively, see Table 4.3.3, below.

Definition of implementation period:

Start package 2010-2011

Mid-term 2012-2015

Long-term 2016-2020

Table 4.3.3 List of the Projects proposed in the GARBLT Traffic Safety Action Plan

## a. Road Infrastructure

	Start package	Mid-term	Long-term	Measures
				General Road Safety (maintenance) issues
1	√			Road Safety Inspection (RSI) (for 2000km of the GARBLT roads)
2	√			Road Safety Audits (RSA)
3	√			Black Spot Management
4		√		Enhancement of the Daily/regular maintenance
				Road Function (e.g. mixed functions, lack of access control,....)
5	√			Access Control on high level GARBLT roads
6		√		Review of the road hierarchy
7		√		Review of Maximum speed Limit on urban roads (apply 50km/h)
8		√		Review of Maximum Speed Limit on inter-urban roads (apply 70km/h)
9		√		Construction of Village Bypasses
				Cross Section
10		√		Provide Separated Carriageway for slow moving traffic
11	√			Redesign of small median barriers
12	√			Speed Reduction measures at entrance of villages and towns
13		√		Provision of wide hard shoulders
				Alignment (and sight distances)
14			√	Road alignment improvement project (avoid sharp curves after long straight sec.)
15			√	Sight Distance improvement
				Intersection including u-turns and roundabouts
16	√			Improvement of U-Turn Lanes
17		√		Improvement of Existing Roundabouts
18		√		Improvement of Slip Roads (merging lane) on the Motorway
19		√		Accident prone T-Junctions Improvement
20		√		Y-Junctions Improvement
21	√			Roadside Development Control on high level GARBLT roads
				Needs of Vulnerable Road Users (VRU-e.g. pedestrian) and speed management
22		√		Improvement of crossing facilities for pedestrians and other VRU
23		√		Improvement of Separated Carriageway for VRU
24		√		Bus Stop Facility Improvement
25			√	Safety Measures for Pedestrians
				Road side Furniture and Passive Safety Installations
26		√		Development of Safety Corridor (9 meters)
27		√		Improvement of Concrete Barriers
28	√			Installation of milled Rumble Strips
29	√			Remove singular concrete barrier
30	√			Improvement of the Safety Facility on Bridges
31	√			Improvement of the Safety Facility on Channel Roads
				Construction Sites (safety for road workers)
32	√			Warning Clothes for road workers
33	√			Temporally Traffic Control Equipment for road work sites
34	√			Work Zone Safety Management
35		√		Improvement of the visibility of vehicles for the road works
36		√		Provision of separate lanes for the construction works
37		√		Development of the Safety Standards on Construction Sites
				Railway Level Crossing
38	√			Assessment of the level crossing including accident records at the crossing
39		√	√	Grade Separation or State of the Art Traffic Control Equipment

## b. Vehicles (fleet of GARBLT)

	Start package	Mid-term	Long-term	Measures
1		√		Improvement of Driver Testing
2		√		Introduction of Advanced Driver Training and Monitoring
3	√			Behavioral Improvement Measures
4		√		Improvement of Vehicle Inspection System
5		√		Introduction of Incident Management System within GARBLT

c. Methodological Framework

	Start package	Mid-term	Long-term	Measures
1		√		Integration of GARBLT engineers into the planning and audit process
2		√	√	Cost Benefit Estimation
3		√		Enlargement of Automatic Traffic Census Points
4	√	√		Training of GARBLT staffs

Source: GARBLT

#### 4.3.4. RS10 Project

Egypt is one of 10 countries included in the Road Safety in 10 countries (RS10) project funded by Bloomberg Philanthropies. The project is implemented by national partners with technical support provided by a consortium of road safety partners. The partners in Egypt are WHO (as lead), the Global Road Safety Partnership (GRSP), the International Injury Research Centre of John Hopkins University and the Association for Safe International Road Travel (ASIRT). Objectives of the project are as follows:

- Develop model programs which address speed management and seat-belt use that can be replicated in other sites in Egypt;
- Improve the quality of road traffic injury data through the implementation of a road traffic accident database as well as through injury surveillance in hospitals, community based surveys and improved death certification;
- Raise public awareness through an appropriate social marketing campaign;
- Strengthen the road safety capacity of multi-sectoral professionals through appropriate training programs;
- Stimulate the involvement of nongovernmental road safety organizations; and
- Monitor and evaluate the impact of the interventions.

Activities during the first phase (2010-2011) of the projects are;

- Reviewing and revising road safety legislation;
- Enhancing enforcement of road safety regulations;
- Advocating and raising public awareness about the high burden of traffic injuries and the potential for improving road safety;
- Training key personnel on road safety planning, risk factor assessment and enforcement of road safety legislation;
- Strengthening nongovernmental organizations to conduct advocacy and awareness raising;

- Providing equipment to assist in addressing risk factors;
- Improving road traffic injury and fatality data systems; and
- Conducting studies to monitor and evaluate impact of interventions.

Interventional activities for the two risk factors of Speed and Seat-Belt were implemented in two pilot sites: Greater Cairo Ring Road and Alexandria.

#### 4.3.5. National Decade of Action for Road Safety 2011-2020

In 2009, the United Nations Secretary General, in his report to the UN General Assembly, encouraged Member States to support efforts to establish a decade for road safety. The aim was to provide a time-frame for action to encourage political and resource commitments, both globally and nationally. In 2011, Egyptian national partners concerned with road safety, both governmental and non-governmental, and in collaboration with WHO, agreed to a national decade of action and plan to be accounted by the Government on 11 May 2011. The plan for the Decade was based on a revision of the 2007 strategy with regard to the national ministerial and NGO plans, together with the recommendations of the European Union Twinning project for road safety in Egypt.

The overall objective of the Decade of Action for Road Safety in Egypt is the reduction of road fatalities, injuries and disabilities by 2020. This can be achieved through:

- Development and implementation of sustainable road safety strategies and program;
- Reduction of road fatalities by 2020;
- Strengthening the management infrastructure and capacity for technical implementation of road safety activities at the national level;
- Improvement on the quality of national data collections;
- Monitoring progress and performance for a number of pre-defined indicators at the national level;
- Encouraging increased funding for road safety, and better use of available resources, including working to ensure the inclusion of a road safety compliments within road infrastructure projects.

The national decade of action is consisted of five pillars and each pillar includes several sub-components as summarized below:

##### Pillar 1: Road safety management

- 1.1 Strengthen National Road Safety Council and national sub-committee
- 1.2 Implementation a unified standardized crash database to be collected by all sectors
- 1.3 Strengthen national death registration system
- 1.4 National participation in the International Road Traffic Accident Data (IRTAD) database
- 1.5 Support NGO declaration on road safety

##### Pillar 2: Safer road and mobility

- 2.1 Implement road safety impact and road safety audit inspection
- 2.2 Remedy deficiencies in elements of engineering design
- 2.3 Capacity building of road safety engineers
- 2.4 Strengthen and implement legislation related to general roads

Pillar 3: Safer vehicles

- 3.1 Application of motor vehicle safety regulations in line with the United Nations World Forum for the Harmonization of Vehicle Regulations
- 3.2 Addressing issues related to vehicle condition

Pillar 4: Safer road users

- 4.1 Strengthening the awareness of road users towards road safety using the RS10 implementation of social marketing and awareness campaigns in selected sites as a country model to be extended nationally.
- 4.2 Undertaking technical checks for vehicle licenses
- 4.3 Establishing national standards for driving schools
- 4.4 Upgrading and enforcement of driving test
- 4.5 Developing and strengthening of educational Programme
- 4.6 Involving mass media
- 4.7 Making appropriate use of the internet
- 4.8 Addressing the rights of vulnerable road users
- 4.9 Strengthening legislation relating to commercial road transport
- 4.10 Strengthening laws, standards and evidence-based rules for the use of seat belt, helmets and child safety equipment

Pillar 5: Post crash response

- 5.1 Strengthening pre-hospital care
- 5.2 Development and improvement of hospital emergency departments for care of the injured and assessment of the quality of care through the implementation of good practices related to care and quality assurance.
- 5.3 Strengthening national disability activities, including coordination with the United Nations Joint Project for Realization of the Rights of Persons with Disabilities in Egypt.

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## CHAPTER 5: MAIN PLANNING AND MANAGERIAL ISSUES

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### (1) Road Hierarchy

The road network in Egypt comprises expressways, toll roads, primary inter-city road and other major roads. Although the access control policy and the designed speed are different between the above road types, the functional difference is not so clear at present. This allows the existence of level crossing intersections and the mixed traffic of high / low speed vehicles on expressways. Furthermore, it is often observed in city area that public transport passengers are boarding and alighting on the expressways and crossing the roads with high speed driving vehicles.

A road hierarchy creates a functional classification of the roads to allow the specific inter-city roads to concentrate on either facilitating high capacity or property access. An important factor in the development of road hierarchy is road classification standards. Unfortunately, the classification of roads in Egypt relates to administration matters, while there is none by function. And while there is a GARBLT road design standard, it is incomplete. Road classification by function involves applying standards on key design elements such as design speeds, speed limits, access control, treatment of intersections, and others. It also ensures that facilities are optimally designed as a network through standardization and rationalization of specifications, thereby creating a harmonious and consistent operation of vehicles. The nationwide road network therefore needs to be examined and redefined based on functional classification standards. Along with these design standards, it is also important to incorporate regionally agreed standards

### (2) Road Congestion in Urban Area

Some of the inter-city road network have many congested sections in cities and towns along the roads, which reduce travel speeds and increase traffic accidents. As cities and towns grow along arterial roads, a new bypass becomes an urban road soon after it is opened to the public. Therefore, construction of bypasses tends to be only a short-term countermeasure for congestion near cities. The lack of road funds for urban roads and the absence of road network plans in local municipalities may contribute to this effect. Access control along inter-city road is one of the solutions but it tends to divide local communities.

### (3) Mix of Road Traffic (Freight and Passenger) on the inter-city road network

The mix traffic of freight and passenger traffic / high speed and low speed traffic is another problem. Naturally, trucks need to use major roads because one of the basic roles of inter-city roads is to serve as inter-governorate and long-distance routes for freight transportation. However, it is observed that passenger cars cannot travel at the desired speeds even if the volume of the traffic is low due to the presence of slow trucks.



#### **(4) Overloading**

This is the aforementioned problem in the transport sector in Egypt. Vehicle overloading is a major cause of premature pavement deterioration and an impediment to the sustainable development of the highway network. Overloading reduces the economic benefits of road projects and increases maintenance costs. The main adverse effects of overloading are:

- Excessive axle loads and high tire pressures lead to premature and rapid deterioration of existing and new roads in the form of cracking, rutting and potholes;
- Premature damage accelerates and increases the road maintenance budget;
- Public transport, such as overloaded buses may not be a source of damage to roads, but, together with overloaded commercial vehicles, they are the major safety road hazard and are involved in most accidents;
- Transport time is lost by trucks being off road for repairs due to overloading. Revenue is lost to the owner from down time and repair costs are borne by them;
- Marginalization of profitability of the trucking industry due to the overloading fines.

#### **(5) Road Safety Problem**

It is estimated that approximately 6,000 to 8,000 people fatalities every year as a result of road accidents. The number of fatalities with not reported officially might be even higher because of an unsatisfactory system of reporting and follow-up. Whilst statistics show that poor driving habits and bad behavior on the road general are the main causes of death on Egypt's road, more particular causes of death and injury on the roads of Egypt are disregard of road warning signs and signals, changing lanes without due care, dangerous overtaking, poor maintenance of vehicles, driving too close to the vehicle in front, fatigue, distractions whilst driving and speeding.

#### **(6) Improvement of Long-distance Bus and Truck Transportation Services**

The quality of long-distance passenger and goods services has been substandard. Vehicles and on-board amenities require substantial improvements. In addition, roadside facilities are not adequate even though some toll roads have the roadside stations. While there are many commercial facilities, such as restaurants, coffee shops, fueling stations, and hotels, these are scattered along the roads in an unorganized manner, thereby failing to provide comfort and convenience to both passengers and drivers. The development of roadside stations as an integral part of road facilities needs to be considered to enhance safety and comfort of road users, and at the same time promote local economic development.

#### **(7) Impact of MENA Cross-Border Transportation**

With the growth of the globalizing economy, MENA cross-border traffic has been growing and is expected to increase further in the future. As Egypt shares land borders with MENA countries, the impacts of cross-border traffic have to be carefully studied and considered in road transportation development.

**(8) Road management and maintenance**

Based on the recent investment on road sector and the five year plan projects, the arterial road network is expected to expand rapidly, some efforts are considered in the management and maintenance concerns, but the road sector still suffers from the road management and maintenance aspects as follows.

- An aging road network with decreasing service quality, because of insufficient funding and poorly managed maintenance, especially on roads managed by Governorates and local governments
- Capacity bottlenecks on the most heavily trafficked corridors in the absence of expressways in Egypt, affecting the ability of the road network to accommodate ever-increasing levels of traffic;
- Outdated and inconsistent road standards;
- High number of road accidents
- Complex and compartmentalized institutional structure
- Dominant role of the public sector in road construction and maintenance
- Decreasing revenues from user fees contributing to about 25 percent of GARBLT expenditures

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## CHAPTER 6: ROAD NETWORK DEVELOPMENT PLAN

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### 6.1. ROAD CLASSIFICATION SYSTEM

#### 6.1.1. Laws and Regulations related to Road Classification

##### (1) Laws and Decrees related to Road Sector and Land Transport Service

Laws in Egypt are issued by Presidential decrees after the approval of the parliament while executive Regulations or Ministerial decrees are issued by relevant Ministers to set the implementation rules for the Laws. The following list represents the main legislations covering road sector and land transport service in Egypt:

- Public Roads Law No. 84 / 1968 and as amended
- Building of Roads Law No. 229 / 1996 and as amended
- GARBLT Law No. 334 / 2004
- Goods Transport on Public Roads No. 64 / 1970
- Operating Public Transport Concession Law No. 55 / 1975
- Trucks Importation Decree No. 266 / 1970 issued by Minister of Transport
- Traffic Law No. 66 / 1973 and as amended
- Traffic Executive Regulations No. 2777 / 2000 issued by Minister of Interior
- Vehicle Compulsory Insurance Law No. 72 / 2007
- Environment Law No. 4 / 1994 and its Executive Regulations No. 338 / 1985

##### (2) Egyptian Public Road Law

The fundamental definition of the road classification is described in the Public Road Law in Egypt. The public roads in Egypt are divided into Freeways, Highways, Main Roads and Regional Roads in the law. Freeways, highways and main roads shall be established and modified, and their types shall be determined by virtue of a decree of the Minister of Transport. The decree describes the ownership and control body of the road, but has not clear mention of road function. The GARBLT shall supervise these roads while the Local Government Units shall supervise the regional roads.

#### 6.1.2. Present Road Classification and Design Criteria in Egypt

GARBLT is the only one of several agencies designing and building intercity roads. The intercity road under GARBLT jurisdiction is categorized into Expressway, Primary road and secondary roads, but that definition is not clear and not considered the road characteristics and functions. While the GARBLT has his own design criteria based on AASHTO, these are not applied universally throughout the country. For cross

sections on existing freeway and expressway systems, there is no serious gap with the international standard, the wide median of about 20 m in width may be even safer especially in the desert area. The GARBLT design criteria for the alignment are fairly up to date year by year, but some are hardly to detect in the written descriptions such as those for a consistent alignment and the coordination of horizontal and vertical alignment.

On the other hands, MHUUC on their part of the planning and construction of the roads can apply their own standards. Although being crucial, it is not guaranteed that road bridges, interchanges and cross ramps are designed to high standards. The MHUUC have recently issued a new road design standard titled “Egyptian Code for the Work of Urban and Rural Roads” in 2008. It is mandatory for the Governorates to follow these standards; however, application outside of Cairo has not been audited. It is assumed that MHUUC follow the standards for roads built in urbanized city and new urban communities. These MHUUC standards do not have clear definition for expressways and toll roads.

This code defines the road classification system based on ASSHTO and HCM.

Figure 6.1.1 and Table 6.1.1 illustrate the hierarchical functional classification of rural and urban roads by the MOHUU Code.

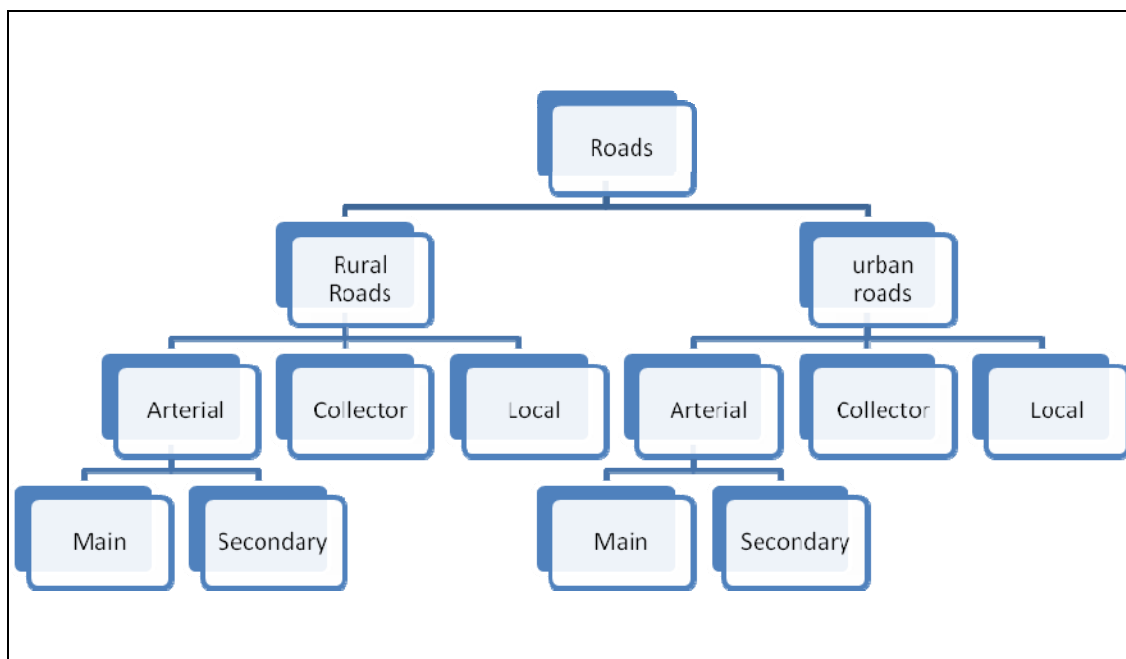


Figure 6.1.1 Hierarchy of Road Functional classification by MOHUU Code

Table 6.1.1 Guideline of design speed and Minimum Lane Width by the MOHUU Standard

Area	Road Class	Speed (km/h)		Minimum Lane Width (m)	Minimum Median Width (m)
		Minimum	Desired		
Urban	Local	30	40	2.70	-
	Collector	40	60	3.30	0.6
	Secondary Arterial	60	80	3.60	3.6
	Main Arterial	80	100	3.60	3.6 - 15

Area	Road Class	Speed (km/h)		Minimum Lane Width (m)	Minimum Median Width (m)
		Minimum	Desired		
Rural	Local	30	50	3.00	-
	Collector secondary	50	60	3.30	2.0
	Collector main	60	80	3.30	
	Secondary Arterial	80	100	3.60	2.0
	Main Arterial	100	120	3.60	4.0

Source: JICA Study Team

### 6.1.3. Road Classification and Design Criteria for MiNTS

Intercity road design classes may be renamed more clearly, and design classes can be defined by factors of classification and the area of service introduced as the area specification factor. Relationship between the road classification by the Public Road Law or MOHUU standards and MiNTS, and modified road design criteria with renaming are proposed in Table 6.1.2 and Figure 6.1.2.

Table 6.1.2 Proposed Road Classification for MiNTS

		Expressway	Arterial Main	Arterial Secondary	Collector
		(EX)	(A1)	(A2)	(CO)
Public Road Law	Freeway				
	Highway				
	Main road				
	Regional Road				
Design Speed (km)	Rural	100 - 120	100 - 120	80 - 100	60 - 80
	Urban	80 - 100	80 - 100	60 - 80	40 - 60
No of Lane		4 and more	4 and more	2 and more	2 and more
Lane Width	Desert / Rural	3.5	3.5	3.5	3.25
	Urban	3.5	3.5	3.5	3.25
Median	Desert	5.0	4.0	-	--
	Rural	5.0	4.0	2.0	2.0
	Urban	5.0	4.0	2.0	2.0
Outer Shoulder	Desert / Rural	2.5 - 3.5	1.5 - 3.5	1.50 - 2.50	1.50 - 2.50
	Urban	2.5 - 3.5	0.5 - 2.5	0.5 - 1.50	0.5 - 1.50
Inner Shoulder	Desert / Rural	0.5	0.5	0.5	0.5
	Urban	0.5	0.5	0.25	0.25

Source: JICA Study Team

Road Type	Typical Road Cross Section
Expressway (8 lanes)	
Expressway (6 lanes)	
Arterial Main A1 (6 lanes)	
Arterial Main A1 (4 lanes)	
Arterial Secondary A2 (4 lanes)	
Arterial Secondary A2 Rural (2 lanes)	
Arterial Secondary A2 Desert (2 lanes)	
Collector CO (2 lanes)	

Figure 6.1.2 Typical Road Cross Section by Road Category by Number of Driving Lane for MiNTS

## 6.2. CONSTRUCTION COST BY ROAD CLASS AND WORK TYPE

### 6.2.1. Composition of the initial capital cost estimate

The composition of the initial capital cost of the project cost is shown in Figure 6.2.1. This cost consists of the construction cost, procurement cost, General Consultant (GC) service cost, land acquisition and compensation cost, physical contingencies, cost for diversion of public utility and price escalation.

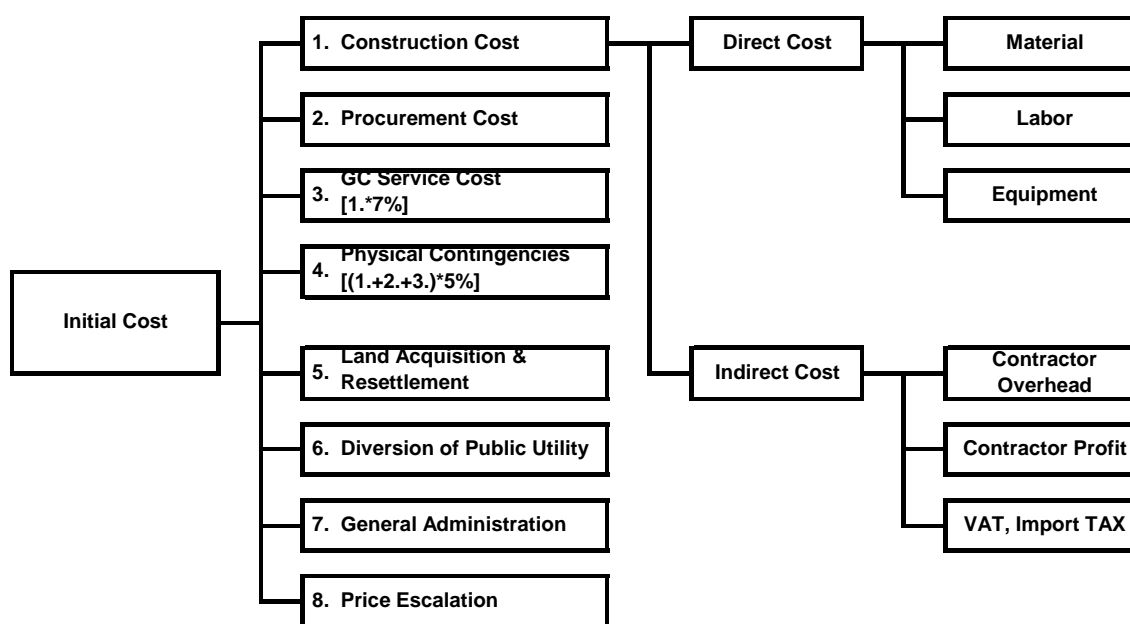


Figure 6.2.1 Composition of the Project Cost

Note) GC: General Consultant, VAT: Value-Added Tax)

Source: JICA Study Team

#### a. Construction cost

The construction cost is divided into “direct cost” and “indirect cost”. The direct cost was estimated on the basis of the pay items of permanent and temporary works and quantities derived from the preliminary plan and design. The indirect cost is composed of contractor’s overhead, contractor’s profit and Taxes. The sources and breakdown of the unit costs used for these estimates are obtained from the recent GARBLT road projects as of October 2010.

#### b. Procurement cost

The procurement cost relates to the purchase of road facilities. It has been assumed that the some of road facilities for the road development projects will be imported from a supplier country. Therefore its cost is assumed to include: shipping cost; import duty; value added, or sales, tax; VAT” and the cost of inland transport.

#### c. GC Service Cost

The GC Service Cost consists of the cost of Basic design & Tender preparation (only applicable for Normal Loan), general consultancy (GC), or construction supervision service.

**d. Physical Contingency**

The physical contingency allows for the possibility of additional work which is not expected. The physical contingency rate is assumed at 5% of the consolidated construction, procurement and Consultancy service cost.

**e. Land Acquisition and Resettlement**

The Land Acquisition and Resettlement cost was estimated on the basis of the preliminary plan and design. The cost of land acquisition was calculated in accordance with current market values for land and the cost of resettlement at the rates approved by the relevant local government authorities. The actual unit costs for land acquisition by land use type are achieved based on the recent GARBLT road projects.

**f. Diversion of Public Utilities**

Diversion of public utilities, such as water and sewerage mains, electricity transmission lines, etc if required, is often necessary before excavation work can commence in preparation for construction of the upgrading projects. The authorities of road development project will be responsible for executing the diversion of public utilities before the start of construction.

**g. General Administration cost**

The General Administration Cost is related to the cost of obtaining necessary government approvals and permits and is calculated at 3% of the construction cost.

**h. Foreign and Local Portion**

All costs are composed of foreign and local currency portions. The foreign currency portion is generally made up of cost, insurance and freight (CIF) for imported goods and materials. The local currency portion consists of, import tax; value added tax, domestic handling and transportation costs, local processing costs, overhead and local sales and market costs, profit of local firms, etc. In the case of imported equipment and materials, all costs except domestic handling and transportation, local processing, overhead, etc. are deemed as foreign portion. The cost components of foreign and local currency portions were assumed to be based on prices of Egyptian products and materials of past projects. For Egyptian products and materials that will be produced using imported machines, the cost of machine was included in the foreign currency portion.

**6.2.2. Unit Cost by Road Work Items**

Table 6.2.1 provides the consolidated estimate of initial capital costs for the road development projects in our study. This presents unit costs of major work items were obtained from GARBLT recent road projects and similar project studies, and shows the costs as of September 2011, considering all of the items described in the foregoing sub-sections, labor, material and equipment costs plus overhead and profit rates.

**Table 6.2.1 Unit Cost by Road Work Items as of 2011**

Work Items	Unit	Price in 2011 (LE)	Foreign and Local Portion (%)	
			Foreign	Local
Land Acquisition			0%	100%
Desert	m2	25		
Agriculture	m2	100		
Urban	m2	500		



Work Items	Unit	Price in 2011 (LE)	Foreign and Local Portion (%)	
			Foreign	Local
Earth Work			36%	64%
Clearing / Grubbing	m2	20		
Embankment Common(100cm)	m3	50		
Excavation Common	m3	25		
Excavation Rock	m3	70		
Pavement			28%	72%
Wearing Course (AC) (10cm)	m3	1,000		
Tuck Coat	m2	5		
Prime Coat	m2	10		
Base Course (15cm)	m3	200		
Sub Base Course (30cm)	m3	150		
Surface Treatment	m2	10		
AC Base Pavement	m3	1,500		
Facilities			27%	73%
Median Concrete Block	m	300		
Side Concrete Block	m	450		
Delineator	unit	30		
Traffic Sign	unit	3,000		
Road Marking	ls/m	15		
Bridge Construction				
PC Concrete Bridge	m2	7,000	29%	71%
Metal Bridge	m2	15,000	32%	68%
Tunnel Construction				
Shield Tunnel Construction (Arterial Road with 4 lanes)	m	812,000	37%	63%

Source: JICA Study Team

### 6.2.3. Unit Cost of Typical Road Cross Section by Road Class and Number of Lane

Applying unit costs by work type on each road cross section, the unit cost per length by location and earth work type are projected as shown in the Table 6.2.2, Table 6.2.3 and Table 6.2.4.

**Table 6.2.2 Unit Cost including Land Acquisition, Foreign and Local Portion (UNIT: million LE per km)**

Work Type	Location	Earth Work	Express -way	Express -way	Arterial Main	Arterial Main	Arterial Second	Arterial Second	Collector
			8 Lanes	6 Lanes	6 lanes	4 lanes	4 lanes	2 lanes	2 lanes
New Construction	Desert	Embank -ment	13.666	11.593	10.948	8.876	6.921	4.847	3.982
New Construction	Desert	Rock Excavation	14.646	12.433	11.648	9.436	7.381	5.167	4.282
New Construction	Agriculture	Embank -ment	18.091	15.493	13.873	11.276	8.946	6.347	5.407
New Construction	Urban	All	41.690	36.293	29.473	24.075	19.745	16.346	13.006
Widening	Desert	Embank -ment	8.199	6.956	6.569	5.325	4.152	2.908	2.389
Widening	Desert	Rock Excavation	8.787	7.460	6.989	5.661	4.428	3.100	2.569
Widening	Agriculture	Embank -ment	10.854	9.296	8.324	6.765	5.367	3.808	3.244
Up-grade	All	All	9.741	8.193	8.223	6.676	5.096	3.547	2.757

Source: JICA Study Team

Table 6.2.3 Unit Cost only Foreign Cost Portion (UNIT: million LE per km)

Work Type	Location	Earth Work	Express -way	Express -way	Arterial Main	Arterial Main	Arterial Second	Arterial Second	Collector
			8 Lanes	6 Lanes	6 lanes	4 lanes	4 lanes	2 lanes	2 lanes
New Construction	Desert	Embankment	3.674	3.104	2.975	2.405	1.869	1.298	1.063
New Construction	Desert	Rock Excavation	4.027	3.406	3.227	2.606	2.035	1.414	1.171
New Construction	Agriculture	Embankment	3.674	3.104	2.975	2.405	1.869	1.298	1.063
New Construction	Urban	All	3.674	3.104	2.975	2.405	1.869	1.298	1.063
Widening	Desert	Embankment	3.674	3.104	2.975	2.405	1.869	1.298	1.063
Widening	Desert	Rock Excavation	4.027	3.406	3.227	2.606	2.035	1.414	1.171
Widening	Agriculture	Embankment	2.204	1.862	1.785	1.443	1.122	0.779	0.638
Up-grade	All	All	2.204	1.862	1.785	1.443	1.122	0.779	0.638

Source: JICA Study Team

Table 6.2.4 Land Acquisition Unit Cost Unit (UNIT: million LE per km)

Work Type	Location	Earth Work	Express -way	Express -way	Arterial Main	Arterial Main	Arterial Second	Arterial Second	Collector
			8 Lanes	6 Lanes	6 lanes	4 lanes	4 lanes	2 lanes	2 lanes
New Construction	Desert	Embankment	1.475	1.300	0.975	0.800	0.675	0.500	0.475
New Construction	Desert	Rock Excavation	1.475	1.300	0.975	0.800	0.675	0.500	0.475
New Construction	Agriculture	Embankment	5.900	5.200	3.900	3.200	2.700	2.000	1.900
New Construction	Urban	All	29.500	26.000	19.500	16.000	13.500	10.000	9.500
Widening	Desert	Embankment	0.738	0.650	0.488	0.400	0.338	0.250	0.238
Widening	Desert	Rock Excavation	0.738	0.650	0.488	0.400	0.338	0.250	0.238
Widening	Agriculture	Embankment	2.950	2.600	1.950	1.600	1.350	1.000	0.950
Up-grade	All	All	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Source: JICA Study Team

### 6.3. ROAD NETWORK DEVELOPMENT PROJECTS (HARDWARE PROJECTS)

#### 6.3.1. Future Network Plan

The MiNTS road network development plan is formulated to support the overall national physical development framework. The strategic corridors were identified in past chapter and a long list of candidate projects up to 2027 (Do-Maximum) is drawn up. A multi-criteria analysis will be then used to rank projects in this long list in evaluation chapter. A short and mid term program up to 2017 and 2022 will be then formulated as the staged master plan by selecting highly rated projects, as constrained by the available funding. The 65 road network development projects with 85 billion L. E. is proposed in Do-Maximum Projects List.

To support the formulated physical framework development plan of Egypt, transport corridors need to be strengthened by appropriate selection and implementation of road projects. A long list of candidate projects was compiled from various government plans and discussion with relevant agencies. The long list includes committed / on-going projects and plans in various stages of planning, as well as, new proposals.

Figure 6.3.1 and Table 6.3.2 explain the candidate road network projects for Master Plan evaluation (Do-Maximum).

### 6.3.2. Road Maintenance Cost

Road Maintenance did not receive needed attention for decades in Egypt. The GARBLT annual maintenance budget for the 23,000 km of intercity roads used to be only EGP 450 million, of which EGP 200 million was from the government budget and EGP 250 million from tolls and advertising revenue. This figure represented only 0.05% of GDP, as compared to maintenance budgets ranging from 0.23% to 0.45% in countries like Ecuador and Ukraine. Egypt's has now planned to increase its road maintenance budget nearly threefold to EGP 1200 million (0.15 % of GDP) by increasing tolls, advertising revenue, and fines for excess truck weight and general fund. Moreover Egypt has local roads with about 75,000km under Governorate jurisdiction. The governorate road maintenance is less poor than the intercity roads under GARBLT, because of the lack of fund and low technical facilities, manpower and skill.

The based on the analysis of existing road maintenance status above, the road maintenance annual cost per km is assumed as the Table 6.3.1. This covers the cost for the following.

- Cleaning of pavement
- Cleaning of ditches and culverts
- Repairs of pavement, such as patching and resurfacing
- Repairs of road facilities, signal, marking, lightning, joints of bridges and so on
- Repairs of road facilities damaged by traffic accidents
- Pavement overlay and repairs of road thermoplastic markings and curb stones
- Handling of accidents

**Table 6.3.1 Annual road maintenance cost and projected annual road maintenance cost**

		2011	2017	2022	2027
Road Length (km)	GARBLT	23,000	23,250	24,250	26,950
	Governorate	75,000	75,000	75,000	75,000
	Total	98,000	98,250	99,250	101,950
Maintenance UNIT COST (1000 LE / km / year)	GARBLT	20	41	61	82
	Governorate	10	20	31	41
Maintenance Cost (million LE per year)	GARBLT	460	951	1,488	2,205
	Governorate	750	1,534	2,301	3,068
	Total	1,210	2,485	3,789	5,273
Foreign and Local Portion (million LE per year)	Foreign	303	621	947	1,318
	Local	908	1,864	2,842	3,955

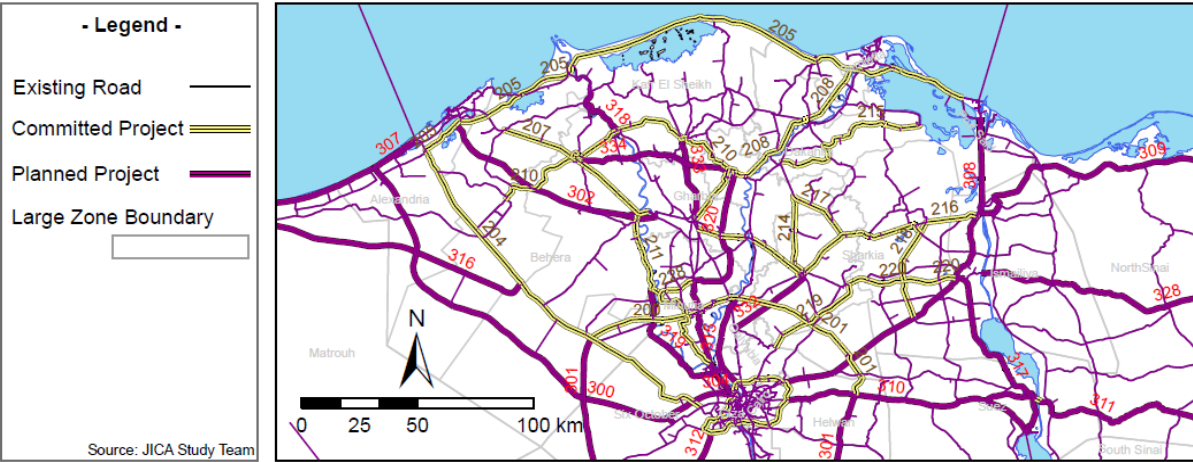
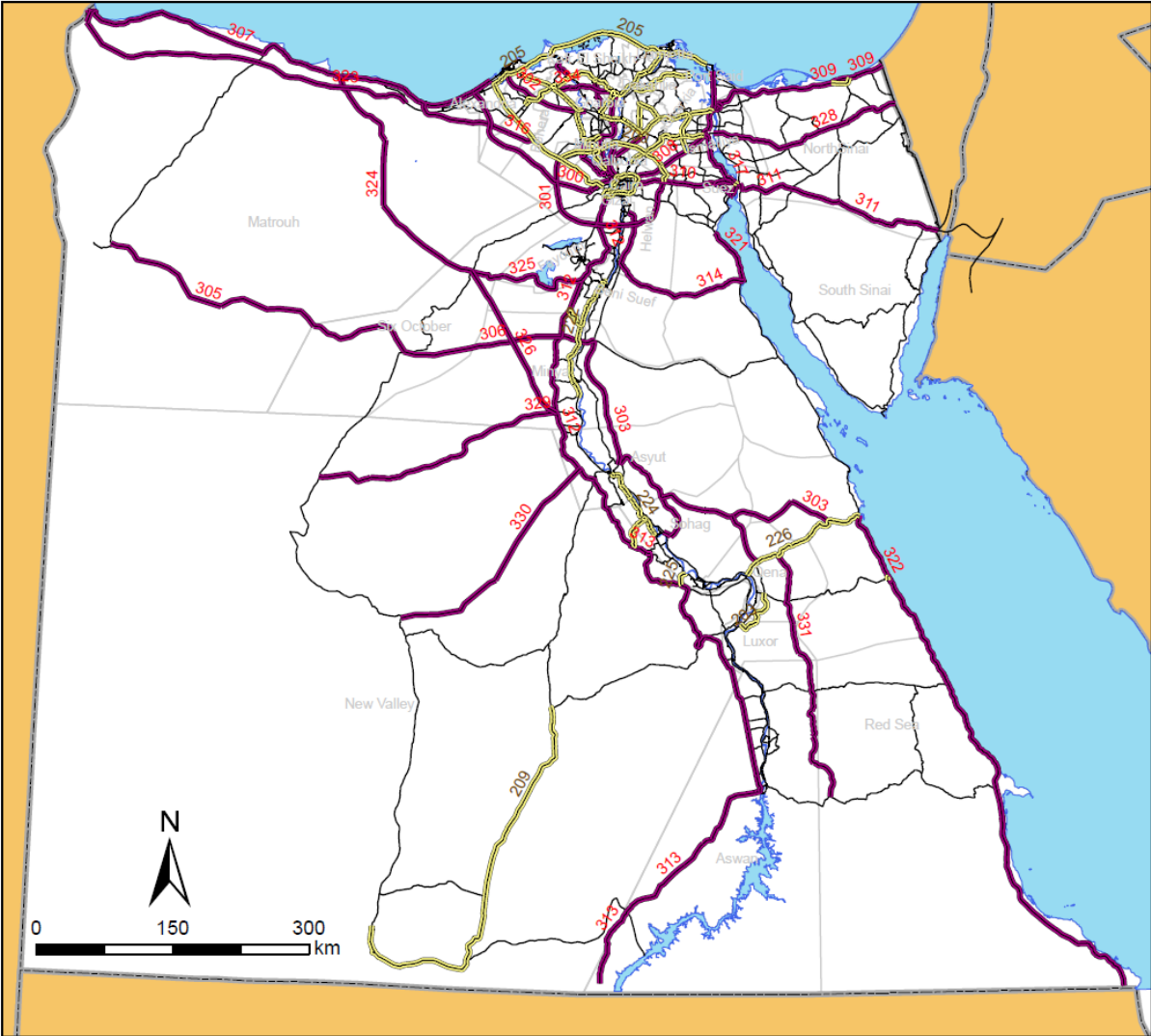
Source: JICA Study Team

Table 6.3.2 Candidate Road Network Projects

Project No	Project Category	Project Category	Road Type	No. of Lanes	Design Speed (km/h)	Length (km)	Project Cost (million LE)	Project Situation	Opening Year
RD-200	Belbeis-Banha-El Bagour-El Khataiba Regional Ring Road (Expressway)	Construction	Ex	6	100	95.1	3500.0	on-going	2012 / 2013
RD-201	Badr-El Robeiky-El Asher-Belbeis Regional Ring Road (Expressway)	Construction	Ex	6	100	43.0	1395.0	on-going	2012 / 2013
RD-300	3rd Cairo Alex Expressway	Construction	Ex	6	120	180.0	2086.2	MINTS planned	2027
RD-301	3rd Stage Regional Ring Road (Expressway)	Construction	Ex	6	100	208.8	2420.8	Egypt Gov. planned	2022
RD-202	El Atish ring road	Construction	A2	4	80	22.8	415.0	on-going	2011 / 2012
RD-203	Luxor ring road	Construction	A2	4	80	72.9	100.0	on-going	2011 / 2012
RD-302	Cairo Alex Agriculture Bypass Kafr El Zayat-Alexandria	Construction	A1	6	80	101.4	1406.8	Egypt Gov. planned	2022
RD-303	Upper Egypt East Desert Red Sea Road	Construction	A2	4	80	543.0	4007.5	committed	2022
RD-304	Rod El Farag Road	Construction	A1	6	80	39.5	1164.2	Egypt Gov. planned	2022
RD-305	Bahriya Siwa Road	Construction	A2	2	80	383.6	1859.5	MINTS planned	2027
RD-306	Bahriya Minya Road	Construction	A2	2	80	213.7	1035.7	MINTS planned	2027
RD-323	Wadi Alnatroum Saloum Road	Construction	A2	4	80	416.0	2879.1	MINTS planned	2027
RD-324	Eldaba Albetrol Road	Construction	A2	4	80	288.0	1993.3	MINTS planned	2027
RD-325	Albetrol Beni Mazar Road	Construction	A2	4	80	137.5	951.5	MINTS planned	2027
RD-326	Albetrol Malwa Road	Construction	A2	4	80	185.0	1280.0	MINTS planned	2027
RD-327	Sueze Canal Tunnel Ismailia	Construction	A2	4	80	14.2	930.1	MINTS planned	2027
RD-329	Farafra Malwa Road	Construction	A2	4	80	290.0	2140.3	MINTS planned	2027
RD-330	Eldakha Assuyit Road	Construction	A2	4	80	271.4	2003.1	MINTS planned	2027
RD-331	Oena Aswan Nile East Bank Road	Construction	A2	4	80	308.3	2275.3	MINTS planned	2027
RD-332	Zaqaziq-Toukh	Construction	A2	4	80	37.5	335.9	MINTS planned	2027
RD-317	Ismailia Suez Road (Expressway)	Widening	Ex	6	100	86.1	800.8	MINTS planned	2022
RD-210	El-Mahalla Kafr El-Shaikh Desouq Damamhour Hosh Eisa Ganakles Road	Widening	A2	4	80	129.1	1730.0	on-going	2011 / 2012
RD-211	Al Oanater Al Khayreya El Khataiba Tawfegeya Road	Widening	A2	4	80	91.4	740.0	on-going	2012 / 2013
RD-212	Tanta - Zefla Road	Widening	A2	4	80	20.6	255.0	on-going	2011 / 2012
RD-213	Zaqaziq - Mit Ghamr Road	Widening	A2	4	80	26.1	116.0	on-going	2011 / 2012
RD-214	Zaqaziq Sinbellaween Road	Widening	A2	4	80	38.0	440.0	on-going	2012 / 2013
RD-215	Mansoura Tanah Dekernes Mataria Road	Widening	A2	4	80	78.0	720.0	on-going	2011 / 2012
RD-216	Qantara Salheya Faqous Abu Kbeir Hehya Zaqaziq Road	Widening	A2	4	80	89.3	520.0	on-going	2011 / 2012
RD-217	Sembellaween Kafr Sakr Road	Widening	A2	4	80	30.8	51.0	on-going	2010 / 2011
RD-218	quantum 85 of Cairo Ismailia road- Kasasein Salhia Road	Widening	A2	4	80	40.9	168.0	on-going	2011 / 2012
RD-219	Moneir Belbeis Abbasa Agricultural Road	Widening	A2	4	80	43.9	250.0	on-going	2012 / 2013
RD-220	Ismailia Oassasein Abbasa Road	Widening	A2	4	80	48.9	265.0	on-going	2011 / 2012
RD-221	Beni Suef Ring Road	Widening	A2	4	80	5.3	188.0	on-going	2011 / 2012
RD-222	Beni-suef Menia Arabian Agricultural Road	Widening	A2	4	80	142.9	960.0	on-going	2012 / 2013
RD-223	Maghagha Edwa Road	Widening	A2	4	80	24.1	140.0	on-going	2011 / 2012

Project No	Project Category	Project Category	Road Type	No. of Lanes	Design Speed (km/h)	Length (km)	Project Cost (million LE)	Project Situation	Opening Year
RD-224	Asyut Sohag Westside Road	Widening	A2	4	80	91.4	400.0	on-going	2011 / 2012
RD-225	El-Belina and Tahta Road	Widening	A2	4	80	52.9	200.0	on-going	2012 / 2013
RD-226	Oena Safaga Road	Widening	A2	4	80	161.0	600.0	on-going	2012 / 2013
RD-227	Suez Cross Tunnel (Dualing)	Widening	A2	4	80	7.9	443.3	MINTS planned	2027
RD-228	Shebein El-Koum Menof Tomlay Road	Widening	A2	4	80	15.9	200.0	on-going	2012 / 2013
RD-229	Al Ouseir city ring road	Widening	A2	4	80	7.4	80.0	on-going	2012 / 2013
RD-318	Desouq Fowa Metobas Road	Widening	A2	4	80	26.3	200.0	committed	2027
RD-319	Imbaba Oalyub Tawfekia Road	Widening	A2	4	80	71.2	500.0	committed	2017
RD-320	El-Qanater El-Bagour Shebin El-Koum Tanta Mahalla Matboul Road	Widening	A2	4	80	105.9	550.0	committed	2017
RD-321	El Ain El Sokhna-Zafarana Road	Widening	A2	4	80	65.7	272.7	committed	2022
RD-322	Safaga Baranis Halayeb Road	Widening	A2	4	80	632.2	2624.8	Egypt Gov. planned	2022
RD-328	Alawga Ismailia Road	Widening	A2	4	80	210.7	1073.9	MINTS planned	2027
RD-333	Tanta-Kafr El Sheikh	Widening	A2	4	80	35.4	190.1	MINTS planned	2017
RD-334	Al Mahalla-Kafr El Sheikh-Damanhour	Widening	A2	4	80	67.4	361.8	MINTS planned	2017
RD-204	Cairo Alexandria Desert Expressway (Upgrade)	Upgrade	Ex	6	100	173.4	5100.0	on-going	2012 / 2013
RD-205	Coastal Road Expressway	Upgrade	Ex	6	100	262.3	2000.0	on-going	2011 / 2012
RD-206	Greater Cairo Ring Road (Expressway)	Upgrade	Ex	6	100	88.9	2500.0	on-going	2012 / 2013
RD-307	Alexandria-Saloum Road (Expressway)	Upgrade	Ex	4	100	491.8	3282.9	Egypt Gov. planned	2022
RD-308	Cairo Ismailia Port Said Road (Expressway)	Upgrade	Ex	6	100	165.6	2500.0	Egypt Gov. planned	2017
RD-309	Qantara-Rafah Road (Expressway)	Upgrade	Ex	6	100	209.6	1717.4	MINTS planned	2022
RD-310	Cairo -Suez Expressway	Upgrade	Ex	6	100	112.0	2000.0	committed	2017
RD-311	Suez Ras einakab Road (Expressway)	Upgrade	Ex	4	100	272.8	1821.1	MINTS planned	2027
RD-312	Cairo -Asyut Desert Western Road (Expressway)	Upgrade	Ex	6	100	361.5	2961.4	committed	2017
RD-313	Asyut Aswan Abu simble Desert Western Road (Expressway)	Upgrade	Ex	6	100	752.5	6165.0	Egypt Gov. planned	2027
RD-314	Zafarana Eikoraymat Road (Expressway)	Upgrade	Ex	6	100	221.0	1810.8	Egypt Gov. planned	2027
RD-315	Shubra elkhema-Banha Agriculture Road (Expressway)	Upgrade	Ex	6	100	43.8	2000.0	Egypt Gov. planned	2022
RD-207	Kafr El- Dawar Kafr El-Zayat Road	Upgrade	A2	4	80	75.1	444.0	on-going	2012 / 2013
RD-208	Tanta Damietta Road	Upgrade	A2	4	80	105.7	434.0	on-going	2012 / 2013
RD-209	Baris - Darb ElArbaeen Road	Upgrade	A2	4	80	431.4	80.0	on-going	2010 / 2011
RD-316	Alamein Road	Upgrade	A2	4	80	134.2	684.0	Egypt Gov. planned	2017

Source: JICA Study Team



Source: JICA Study Team

Figure 6.3.1 Road Network Development Project ( Long List of Road Development Project)

## 6.4. ROAD MANAGEMENT AND MAINTENANCE PROJECT (SOFTWARE AND HUMANWARE PROJECTS)

### 6.4.1. Present situation and issues on the management and maintenance of Road Sector

Based on the recent investment on road sector and the five year plan projects, the arterial road network is expected to expand rapidly, some efforts are considered in the management and maintenance concerns, but the road sector still suffers from the road management and maintenance aspects as follows.

- An aging road network with decreasing service quality, because of insufficient funding and poorly managed maintenance, especially on roads managed by Governorates and local governments
- Capacity bottlenecks on the most heavily trafficked corridors in the absence of expressways in Egypt, affecting the ability of the road network to accommodate ever-increasing levels of traffic;
- Outdated and inconsistent road standards;
- High number of road accidents
- Complex and compartmentalized institutional structure
- Dominant role of the public sector in road construction and maintenance
- Decreasing revenues from user fees contributing to about 25 percent of GARBLT expenditures

### 6.4.2. Project Ideas of the improvement of road management and maintenance system in EGYPT

The road agency is required to improve road management policies and practices that lead to sustained and cost-effective improvements in the overall network condition and service standards for the local and arterial road network in Egypt. The study team proposed that the key concept of the road management and maintenance is expressed with "Efficient", "Safety" and "Well – managed".

The proposed activities required for the future road network with efficient, safety and well-managed are;

- Improving Road Management systems, tools and standards
- Streamlining institutional structures, operating procedures and staffing for efficient service delivery
- Strengthening road financing: better expenditure prioritization and management; moving towards a reliable and stable source of funding for road network preservation.

#### (1) Road Network Management Program

The primary focus of Road Network Management is to foster development of main road networks that are fundamental to national economies. Main roads are defined as roads under the responsibilities of the central and provincial governments. They link the main administrative and economic centers together, provide the backbone of a country's road network.

The Road Network Management includes the challenge which has been to promote policy reforms aimed at sustaining road networks and preserving road assets. Improved road network management contributes to this objective by ensuring that the best performance and value-for-money are obtained from the road network and the resources invested in it and eventually the best service is offered to the road users.

Road network management consists in five functions:

- Planning: to develop a strategic view of road network development and maintenance, targeted performance and resources required;
- Programming: to decide, under budget constraints, on multi-year road works and expenditure programs;
- Preparation: to prepare implementation of the first year trench of the program defined at the

- programming stage;
- Operation : to implement the first year trench of the program defined at the programming stage;
- Monitoring and Evaluation : to monitor the results and the impact of the program and compare to the strategic objectives defined during planning.

## (2) Road Agencies Reformation Program

Road maintenance reforms are built on three pillars: improved road maintenance financing, improved road maintenance management capacity and improved execution capacity. This focuses on the second pillar. Indeed, while the policy to develop second generation road funds was successful in sustaining road maintenance financing and improving efficiency in the management of road maintenance resources, the capacity to use these resources often remained weak. Restructuring of Road Departments did not have the expected impact because too many constraints remained preventing the full use of existing technical capacity. The previous lessons learned from the creation of Road Funds have been used to promote the creation of Road Agencies as autonomous entities responsible for the management of road networks in complement to the Road Funds which are responsible for provision and financial management of road maintenance resources.

Formulation of Road Management Agency should be undertaken to review the legal and institutional framework for road agencies and road funds in Egypt. The purpose of the task is:

- to assess the legal and institutional framework under which road agencies and road funds operate with a view to identifying some of the common features which may indicate good practice for others to subsequently follow. The task is also to unearth specific approaches taken in some countries which may not as yet have been universally adopted, but which may merit further consideration.
- to assess the performance of road administrations and the impact of the changes in the institutional framework for road maintenance resulting from the creation of road agencies and road funds; and
- to provide guidelines to improve performance of road institutions and efficiency of the institutional framework for road maintenance.

## (3) Road Funds Improvement Program

Roads have to compete for funds against other more visible and popular sectors like health, education and law enforcement and this usually places them at a considerable disadvantage in the annual budget debate. Many countries around the world responded to the growing shortage of finance by attempting to earmark selected road related taxes and charges and depositing them into a special off-budget account, or road fund, to support spending on roads. The performance of such funds had, however, been mixed, and generally quite poor. Some of the common problems cited were: poor financial management; absence of independent audits; extensive use of funds for unauthorized expenditures; diversion of funds; and weak oversight. As a result, most of these earlier road funds, sometimes known as "first generation" road funds, have actually been closed down.

The road sector reforms are intended to address these weaknesses as well as to enhance road management efficiency and emerging from this process is the so called "second generation" road fund. The second generation road fund has become a significant feature of sector reform programs and strategies for improving road maintenance. The key characteristics of these funds, as generally understood, are set out below:



- Sound legal basis - separate road fund administration, clear rules and regulations
- Strong oversight - broad based private/public board
- Agency which is a purchaser not a provider of road maintenance services
- Revenues incremental to the budget and coming from charges related to road use and channeled directly to the Road Fund bank account
- Sound financial management systems, lean efficient administrative structure
- Regular technical and financial audits

#### (4) Capacity Building Program

Reforms in the road sector, such as the establishment of road funds and road agencies, have created a need for professional staff with technical, financial and managerial skills to effectively pilot and help develop the new institutions. Building and sustaining the requisite capacity for road sector management is achieved by a combination of factors. Solid educational background and basic training in key professional disciplines - engineering, economics, accounting, etc. - are essential building blocks. The institutional work environment and the incentive structure also play a critical role in defining how productively skills are employed and how appropriately skills and experience are rewarded. This section focuses on professional training aspects of capacity building proposed. The proposed training courses are

- Road Economic Decision Module : Economic evaluation of investment on low volume roads;
- Tariff and Traffic Module : Interactive learning tool for managers of road maintenance resources which simulates financing options and their impact on road networks;
- Transportation Engineering Module : Benchmarking tool for road network based on vehicle travel speed;
- Evaluation Module : Economic evaluation of investment and road maintenance strategies on main road networks.

## 6.5. TRAFFIC SAFETY DEVELOPMENT PLANS AND PROJECTS

### 6.5.1. Philosophy for the Road Safety Development Plan

Road safety philosophies are a usual means of planning a general sense and reasoning for safety among all stakeholders and the common road user. The best known examples for such philosophies from the European Union are "Vision Zero" (Sweden) and "Sustainable Safety" (Netherlands). According to the Integrated Road Safety Action Plan for GARBLT 2010-2015 (GARBLT Safety Action Plan), a joint philosophy has emerged from these two approaches, called the "Safe System Approach". The National Transport Study (MiNTS) shall adopt the philosophy in order to ensure the consistency among the authorized plans.

### 6.5.2. Objectives and Targets

The overall objective of the MiNTS Traffic Safety Development Plan is the reduction of road fatalities, injuries and disabilities by 2027, which will cover three 5-Year Plans from 7<sup>th</sup> to 9<sup>th</sup> Plan. The Study defines the three 5-Year Plans as a Short-, Medium- and Long Term Plan respectively. GARBLT Safety Action Plan proposes to reduce 25% fatalities and 10% injuries till 2015, of which basic of the reduction calculation are average accident figures from 2005 until 2010 from MOI. The problem of current underreporting of road accidents in Egypt will affect the subsequent evaluation of target achievement. If the accident data recording improves, there will be more accidents reported in the first place. However, large discrepancies can be observed in the number of accident and injuries. Number of fatalities in MOI data is higher than the data in MOH Ambulance. Therefore, MiNTS will apply just only number of fatalities as a target indicator, which will be proposed as follows:

<i>Short term (2012-2017)</i>	- 25 % fatalities (less than 6,000 fatalities)
<i>Medium term (2017-2022)</i>	- 38 % fatalities (less than 5,000 fatalities)
<i>Long Term (2022-2027)</i>	- 50 % fatalities (less than 4,000 fatalities)

In addition to the numerical targets, qualitative target will be proposed particularly for the institutional development. It will be:

*To strengthen the capability and functions of the organization involved in road traffic safety and to develop new organizations and rules/regulations necessary to ensure sustainability of traffic safety measures.*

### 6.5.3. Basic Strategies and Focus Areas

Traffic accidents occur due to various causes and their complexities. However, the causes can be divided into the three elements of Person, Vehicle and Road Traffic Environment. From the perspective of traffic safety measures, they should cover 4Es to include Engineering, Enforcement, Education and medical Emergencies for the effective implementation of the safety measures. Accordingly, MiNTS shall prepare the following three basic strategies:

**Strategy 1:** Covering the three elements as well as 4Es components, traffic safety measures shall be prepared in the following 6 areas:

- (1) Development of Safe Road Traffic Environment (infrastructural improvement)
- (2) Enhancement of Safe Driving
- (3) Ensuring Safety in Vehicles
- (4) Effective and Efficient Traffic Control and Enforcement
- (5) Enhancement of Traffic Safety Education and Propaganda
- (6) Development of Post-Accident Countermeasures

**Strategy 2:** In order to implement the effective countermeasures comprehensively and sustainably, it is indispensable to improve all necessary institutions including human and financial resource developments, from planning to implementation sectors.

**Strategy 3:** There has been remarkable technology development in the automobile industry which has expanded in the developed countries such as Intelligent Transportation System (ITS), safety vehicles and advanced equipment for enforcement, supporting system to minimize human errors, etc. Although acquisition, operation and maintenance of such systems require substantial investment, aside from the required additional highly skilled manpower, the advance system will play a significant role to minimize human errors which accounts for 70-80% of the total accidents causes.

Based on the current traffic accidents situation, traffic safety measures shall be focused on the following areas, particularly for the short- or Medium-term measures.

- (1) Black spots improvement on Interurban motorways and expressways such as Cairo Alexandria desert and agriculture roads, Ring Road and Alexandria/Matrouh coastal road, etc., where many serious traffic accidents are reported.
- (2) Speeding and reckless overtaking which are main causes of serious traffic accidents.
- (3) Commercial vehicles including Microbus, bus and trucks, which are operated by professional drivers and they have a high risk of mass casualty accident.
- (4) Advocacy and awareness focusing on 80-90% of total accident causes.

- (5) Mass casualty, large number of serious traffic accidents involving many casualties were reported in Egypt, therefore improvement of the post-accident countermeasures will be required to save peoples' lives.
- (6) Road traffic accident database, which will be fundamental information for the development of effective traffic safety programs/projects.

#### 6.5.4. Traffic Safety Development Plan

MiNTS traffic safety development plan is prepared based on the strategies and target areas formulated in the previous section. The proposed list of the project shown in Table 6.5.1 includes all existing efforts of EU Twinning project and UN National Decade Traffic Safety Projects, as well as GARBLT Traffic Safety Plan prepared as a part of EU Twinning Project. The proposed projects will cover three elements of the traffic accident causes (Person, Vehicle and Traffic Environment) and divided into six administration areas (road infrastructure, Transport Management, Enforcement, Education, Medical Emergency and Institutions). Implementation schedule of the proposed projects is divided into three stages of Short-, Medium- and Long Term, which will be corresponding to the 5-Year Plan of Egyptian Government. With regards to the prioritization of the projects, countermeasures for the high risk roads such as GARBLT desert and agriculture roads will be prioritize over the others. In addition, the projects which do not contribute directly to reduce the traffic accidents but which are indispensable for the traffic safety policy development, such as traffic accident database and improvement of Traffic Laws as well as strengthening of the National Road Safety Board, shall be implemented as soon as possible.

Many serious accidents were caused by the professional drivers, minibuses, shared taxis and trucks. They should have more responsibilities on the safety driving for their customers as a professional driver. In order to stop their reckless driving, more strict regulations should be prepared not only for the drivers but also for transport operators.

Traffic enforcement is an effective measure which will be expected to get immediate impacts. But more strategic and frequent enforcement activities will be required including using police motorbikes and police patrol cars in addition to the current spot activities. Higher traffic fines and strict punishment for the frequent violators are also effective measures to remind the drivers to abide by the traffic laws and regulations. Vehicle registration database and License Database are required to monitor or record their violation records.

Traffic safety education, although most of the accident causes is human error, will be significant issue but it will be difficult to get immediate impact of the activities. A long period of time will be required and moreover, only continuous efforts will result to sustainable practice through the decade. For example, Japanese government started to provide traffic safety education focusing on mother and children in 1970s, which were not drivers and frequent road uses but are future drivers as well as road uses. The activities become a useful and effective measure in order to have a correct and safe behavioral habit and contribute to reduce the traffic fatalities into the half within 10 years. Another issue on the traffic safety education is to formulate necessary laws and regulation so as to make sure their sustainable activities.

The traffic safety projects proposed in the list is not showing specific project such as dual-carriageway expressway construction project from point A to point B. They are rather target areas or themes for the countermeasures, thus it will be necessary to examine further to confirm detailed contents of the projects. For example, in case of Black Spot Improvement Projects, we do not know at present where the black spots are, and how many black spots exist for improvement. In order to prepare detailed projects contents, we have to start form collecting detailed accident data and information on the target highways and analyze, so that we can make a design for the project. Moreover, the black spots may increase year by year because of

the expansion of road network or expansion of the motorization, and also changes of the roadside activities. Moreover, there are many choices of countermeasures from tentative ones to permanent ones. For the black road sections with busy road side activities for example, installation of facilities which can reduce the vehicle speed would be a tentative measure, while development of village bypass would be a radical solution. Traffic safety projects shall be carefully examined based on the severity of the safety situation as well as availability of fund. Subsequently, traffic safety organizations and its reliable human resources become a crucial issue.

Sometimes it is difficult to secure sufficient budget for traffic safety projects and activities, as compared with large investment on the economic infrastructure such as expressways and railway development projects. Traffic safety project is not contributing economic development in the country; rather, it will contribute to the improvement of social issues so that the priority of the project is not always high. Economic development which will be able to bring increment of their income will be priority over traffic safety. While traffic safety needs a sustainable fund for the continuous activities to change peoples' habit and transfer this safety habit from generation to generation. Therefore, beside state budget, special fund sourcing should be developed for the traffic safety project, such as Traffic Safety Fund.

Traffic safety investment is an investment for the social safety and quality of life, and it is not an economic investment such as transport infrastructure development. And it might be difficult to get sufficient budget given the limited resources of the government. Therefore, to raise peoples' social norms and cooperation to social responsibilities for the traffic safety and also to provide a special attention to the vulnerable road users will be helpful to build a consensus on the budget as well as effective implementation of the safety measures.

As already mentioned, traffic safety will be a long term issue, continuous efforts will be required, and many stakeholders will be involved to cover the comprehensive traffic safety including 4Es (Engineering, Enforcement, Education and Medical Emergency). In order to implement smooth and effective traffic safety activities with effective cooperation and coordination among the stakeholders, appropriate institution and plans will be required such as Traffic Safety Committee (from National level to local level) and continuous Five Year Traffic Safety Plan.

**Table 6.5.1 MiNTS Proposed Road Traffic Safety Project**

Proposed Traffic Safety Program/Project		Short Term	Mid-Term	Long Term	Remarks		
A. Road Infrastructure		Traffic Safety Inspection and Audit System					
	1	1.1	Inter-urban Motorways and Expressway	√	√		
		1.2	Other high traffic accident risk roads		√	√	
		1.3	Development of Traffic Safety Audit System	√			
		Black Spot Improvement Projects					
	2	2.1	Inter-urban Motorways and Expressways	√	√	√	
		2.2	Other high traffic accident risk roads		√	√	
	3	Urban/Village Bypass Construction Projects				√	
	4	Vulnerable Road User Accident Prevention Project				√	
	5	Road Sign and Pavement Marking Improvement Project				√	√
	6	Traffic Safety Corridor Improvement Project				√	√
	7	Road Work Traffic Safety Improvement			√		
	8	Railway Crossing Improvement Projects				√	√

Proposed Traffic Safety Program/Project			Short Term	Mid- Term	Long Term	Remarks
B. Transport Management	1	Commercial Vehicle Safe Driving Management System				
		1.1 Motor Vehicle Safety Regulation	√	√		
		1.2 Safety Inspection System	√	√		
	2	Improvement of Driver Training and Testing				
		2.1 Establishment of National Standards of driving school	√	√		
		2.2 Improvement of Driving Test	√	√		
	3	Improvement of License Renewal System		√	√	
	4	Driver License Database Development		√	√	
5	Vehicle Registration Renewal System		√	√		
C. Traffic Enforcement	1	Upgrading Enforcement Capacity on the Major Highways				
		1.1 Patrol and Enforcement Equipment	√	√		
		1.2 Installation of Enforcement Camera		√	√	
	2	Upgrading Enforcement Capacity in Major Urban Areas		√	√	
	3	Traffic Accident Database Development	√	√		
4	Upgrading Enforcement Capacity in other areas		√	√		
D. Education	1	Traffic Safety Education for Student		√	√	
	2	Safety Practice for Pre-school Children		√	√	
	3	Traffic Safety Campaign and Propaganda				
		3.1 Seat-belts	√			
		3.2 Helmets	√			
3.3 Child Safety Equipment	√					
E. Medical. Emerge	1	Strengthening Pre-hospital Care	√	√		
	2	Improvement of Hospital Emergency Department	√	√		
	3	Development of Mass Casualty Emergency System		√	√	
F. Institution	1	Safety planning Capacity Development				
		1.1 Five-Year Traffic Safety Plan	√			
		1.2 Traffic Data and Information Database (Census)		√	√	
	2	Enhancement of National Road Traffic Safety Board	√			
3	Financial Resource Development for Traffic Safety		√	√		

Source: JICA Study Team

### 6.5.5. Investment and Evaluation

Investment cost of the road traffic safety sector will be difficult to estimate because of the lack of information such as number of black spots and their causes of the accidents. There are many kinds of countermeasures for the black spots based on the function of road and cause of accidents. For example, some of the at-grade U-turn slots on the expressway cause the serious accident. In order to improve the safety on the slots, one of the minor countermeasures is to improve the geometric design of the acceleration or deceleration lane for the U-turn traffic, while radical countermeasures may require constructing a grade separation ramp way of which cost will be much higher than the one for the geometric improvement. What kind of countermeasure should be employed will be examined carefully based on the traffic demand as well as road functions. In spite of the difficulty on the estimating cost, as a general rule, about 10% of investment in the infrastructures should be dedicated to road safety. Range of the road investment in MiNTS will be 106 to 86 billion LE according to the three scenarios. If so, the budget for the traffic safety will be assumed to be around 10 billion LE.

Table 6.5.2 shows budget allocation for the proposed MiNTS road traffic safety projects. Some 70% of the total budget will be allocated into road infrastructure improvement programme including black spots improvement and construction of bypass, etc. Strengthening of the traffic enforcement is a significant issue to curb reckless driving or behaviors, which can be justified to allocate such amount of budget. Traffic safety education is also an important component; however, in terms of budget, it can be handled effectively with small amount of budget. Relatively high amount of budget will be allocated to the medical emergency sector to improve hospital emergency facilities and to develop mass-casualty emergency system.

Economic loss by the road traffic accidents estimated approximately 12 billion LE for the year 2008 as shown in Table 6.5.3. The losses can be assumed to cost the economy annually between 1 and 2% of the GDP value. According to the Table 6.5.3, average cost per fatal accident is estimated around 2 million LE. If number of fatal accidents would be reduced by half, gradually from 8000 in 2011 to 4000 in 2027, accumulating savings in fatal accident cost for 15 years (from 2012 to 2027) will reach up to 60 billion LE. Just comparing investment cost and savings cost, it will be easily judged for the economic viability, as long as the reduction target would be achieved.

In order to achieve the target on the reduction of number of traffic accidents fatality, traffic safety programme must be implemented comprehensively and strategically as well as continuously. Although the investment is warranted by socio-economic factors, if the implementation would not be done comprehensively, the investment would not reap any benefit. Therefore, institutional improvement including capacity development in the responsible organizations will be a critical issue.

**Table 6.5.2 Investment Allocation for the Proposed Traffic Safety Program from 2012 to 2027**

Proposed Traffic Safety Program	Investment Allocation (million LE)	Remarks
A. Road Infrastructure Improvement	7,000	70% of the total
B. Transport Management Improvement	300	
C. Traffic Enforcement Improvement	1,000	10% of the total
D. Traffic Safety Education Improvement	500	
E. Medical Emergency Improvement	1,000	10% of the total
F. Institutional Improvement	200	
Total	10,000	

Source: MiNTS

**Table 6.5.3 Total Cost of Road Traffic Accidents according to Severity Level in Egypt 2008**

Accident Severity Level	Estimated Number of Accidents (accident)	Average Cost per accident (LE)	Total Cost (Million LE)	Percentage of all accidents Total Cost (%)
Fatal	5,372	1,994,001.8	10,711.8	85.8
Serious	12,758	120,735.3	1,540.3	12.3
Slight	2,801	84,200.2	235.8	1.9
Property Damage only	7	55,472.7	0.4	0.0
All Road Traffic Accidents	20,938	-	12,488.4	100

Source: "Cost of Road Traffic Accidents in Egypt" Mohamed A. Ismail and Samar M. M.Abdelmageed, 2010

# APPENDIX

## PROJECT SHEET LIST OF ROAD SECTOR

## Transportation Project Sheet

Internal Code   
 (to be given by the Study Team)

Prepares by: M. ONO  
 Date: 20/ Oct/ 2010

Original Code   
 (if any given by the Organization in charge)  
 Project Title : Rehabilitation and Development of Cairo – Alex  
 Dessert Freeway (Part of Cairo-Alexandria-Matrouh Highway Project)

Transport Mode  
 Road  IWT  
 Rail  Pipeline  
 Port  Others

### Project Description in Charge

The Cairo/Alex Desert Motorway with 231 km Is the one of the main roadway arteries in Egypt, connecting the two largest and most populated cities in Egypt: Cairo and Alexandria. The road passes through a new industrial city: Sadat City and connects to the North Coastal Road, which is the main access to summer resorts. The project is aiming to transform the current road into a 231-km-long freeway.



Organization in charge: MOT

Planned Implementation Period:

Information Source:

Cost:

Route/Location Map



Progress of the Project

- 1 Under Construction
- 2 Bidding/Constructing
- 3 Financed/Budget Allotted
- 4 D/D Completed
- 5 F/S Completed
- 6 Project Idea Stage

Egypt





## Transportation Project Sheet

Internal Code        
 (to be given by the Study Team)

Prepares by: M. ONO  
 Date: 20/ Oct/ 2010

Original Code        
 (if any given by the Organization in charge)  
 Project Title: Cairo-Alexandria-Matrouh Highway Project

Transport Mode  
 Road  IWT  
 Rail  Pipeline  
 Port  Others

### Project Description in Charge

Cairo-Alexandria-Matrouh Free Highway is one of the most vital arteries of the highway network in Egypt, linking the largest and most important port in Egypt with the Capital and serving the internal trade movement between them. As well as serving the urban development in the West Delta, its desert expansion and tourist activities in the North Coast. The project scope of works include to build & upgrade existing roads and transfer to free roads, earthworks - paving - construction - lighting and power - agriculture and irrigation – varied works.

Phase 1: Aiming to transform the current road into a 231-km-long freeway, Development of a free Highway (From kilo 26 to kilo 51) and raise its efficiency.  
 Contract Value: EGP 237 million,  
 Contract Value (inc. additional and recent works): EGP 495 million.  
 Phase 2: Development and expansion of a free Highway (from kilo 51 to kilo 76)  
 Contract Value: EGP 210 million.  
 Contract Value (inc. additional and recent works): EGP 409 million.

Organization in charge: MOT  
 Planned Implementation Period:  
 Information Source:  
 Cost:

Progress of the Project

- 1 Under Construction
- 2 Bidding/Constructing
- 3 Financed/Budget Allotted
- 4 D/D Completed
- 5 F/S Completed
- 6 Project Idea Stage

### Route/Location Map



### Egypt



### Transportation Project Sheet

Internal Code         
 (to be given by the Study Team)

Prepares by: M. ONO  
 Date: 20/ Oct/ 2010

Original Code        
 (if any given by the Organization in charge)  
 Project Title : Mediterranean Coastal Highway

Transport Mode  
 Road  IWT  
 Rail  Pipeline  
 Port  Others

**Project Description in Charge**  
 The Coastal Free road with 285 km has importance of connecting East to West, connecting all of Egypt's, Mediterranean ports, Port Said – Damietta –Alexandria, International gateway in North Africa. Population around the coastal road exceeds 8 Million citizens forming the demand for the revenue generators: Toll fees, Advertising concessions, Commercial & services centers, Added value service for freight.

Organization in charge: MOT  
 Planned Implementation Period:  
 Information Source:  
 Cost:

**Progress of the Project**

- 1 Under Construction
- 2 Bidding/Constructing
- 3 Financed/Budget Allotted
- 4 D/D Completed
- 5 F/S Completed
- 6 Project Idea Stage

Route/Location Map



### Transportation Project Sheet

Internal Code        
 (to be given by the Study Team)

Prepares by: M. ONO  
 Date: 20/ Oct/ 2010

Original Code        
 (if any given by the Organization in charge)  
 Project Title : Cairo Ring Toll Road Project

Transport Mode  
 Road  IWT  
 Rail  Pipeline  
 Port  Others

**Project Description in Charge**

This project makes to convert free road to toll road for the Cairo Ring Road. The functions of the Cairo Ring Road are ;

- Connecting the Greater Cairo Governorates
- Connecting most of the new developed cities. Solid demand potential of 24 Million citizens.
- Serving the increasing transportation traffic passing from the South of Egypt and Red Sea to the North of Egypt & Alexandria.
- Improving the transportation & traffic levels in & out of Greater Cairo.
- Reducing trip time.
- Creating new accesses of commercial development

The summary of the project is as follows;

- Distance 95 Km
- Traffic 80,000 vehicles / day
- Est. Increase 3% Annually

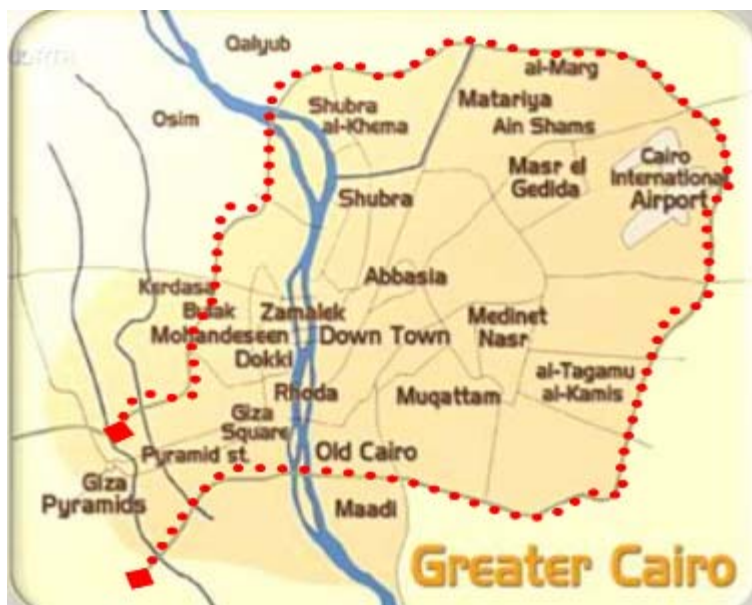
Organization in charge: MOT

Planned Implementation Period:

Information Source:

Cost:

Route/Location Map



Progress of the Project

- 1 Under Construction
- 2 Bidding/Constructing
- 3 Financed/Budget Allotted
- 4 D/D Completed
- 5 F/S Completed
- 6 Project Idea Stage

Egypt



### Transportation Project Sheet

Internal Code <input style="width: 100px;" type="text"/> (to be given by the Study Team)	Prepares by: M. ONO Date: 20/ Oct/ 2010
Original Code <input style="width: 100px;" type="text"/> (if any given by the Organization in charge) Project Title: <u>Shubra - Banha Highway Project</u>	Transport Mode <input checked="" type="checkbox"/> Road <input type="checkbox"/> IWT <input type="checkbox"/> Rail <input type="checkbox"/> Pipeline <input type="checkbox"/> Port <input type="checkbox"/> Others

**Project Description in Charge**

The Shubra / Banha Highway Project is one of the key PPP Pilot projects whereby the GARBLT with the technical assistance of the PPP Central Unit will invite the private sector participation through a competitive bidding process to enter into PPPs for the construction, operation and maintenance of a new freeway linking Shubra city to Banha city. The Project consists of a dual three lane motorway parallel – and East located - to the existing road between the Cairo Northern ring road and Banha city, the motorway is around 38 km long. It would start on the Northern Ring Road and will connect both roads to Alexandria and to Al Mansura.

The project will be tendered under the Roads law No. 229 of 1996 which is an amendment of Law No. 84 of 1968, that allows granting concessions to local and foreign investors for purpose of building, managing, maintaining highways and free ways in return for collecting user charges.

Organization in charge: MOT	Progress of the Project <input type="checkbox"/> 1 Under Construction <input type="checkbox"/> 2 Bidding/Constructing <input type="checkbox"/> 3 Financed/Budget Allotted <input type="checkbox"/> 4 D/D Completed <input type="checkbox"/> 5 F/S Completed <input checked="" type="checkbox"/> 6 Project Idea Stage
Planned Implementation Period:	
Information Source: GARBLT, MOT	
Cost:	

Route/Location Map



Egypt





## Transportation Project Sheet

Internal Code        
 (to be given by the Study Team)

Prepares by: M. ONO  
 Date: 20/ Oct/ 2010

Original Code        
 (if any given by the Organization in charge)  
 Project Title : Kafr El Zayat – Alexandria Delta Motorway

Transport Mode  
 Road  IWT  
 Rail  Pipeline  
 Port  Others

### Project Description in Charge

The project is part of the Delta roads network whereby population is exceeding 49 Millions citizens forming a substantial solid demand in a congested area.

- The proposed new road is serving the transportation traffic from / to Alexandria and to reduce the traffic saturation in the Delta.
- The free road will start from Kafr Al Zayat heading west to Abu Al Matameer to Alexandria.
- The revenue generators are from the toll fees –advertising concessions – service areas which shall be created on the road.
- Distance 110 Km
- Traffic (est.) 32,000 vehicles/ day
- Est. Increase 1.2% Annually

Organization in charge: MOT

Planned Implementation Period:

Information Source:

Cost:

Route/Location Map



Progress of the Project

- 1 Under Construction
- 2 Bidding/Constructing
- 3 Financed/Budget Allotted
- 4 D/D Completed
- 5 F/S Completed
- 6 Project Idea Stage

Egypt



## Transportation Project Sheet

Internal Code <input style="width: 40px; height: 15px; margin-right: 5px;" type="text"/> <input style="width: 40px; height: 15px; margin-right: 5px;" type="text"/> <input style="width: 40px; height: 15px; margin-right: 5px;" type="text"/> <input style="width: 40px; height: 15px; margin-right: 5px;" type="text"/> <input style="width: 40px; height: 15px; margin-right: 5px;" type="text"/> <input style="width: 40px; height: 15px; margin-right: 5px;" type="text"/> (to be given by the Study Team)	Prepares by: M. ONO Date: 20/ Oct/ 2010
Original Code <input style="width: 40px; height: 15px; margin-right: 5px;" type="text"/> <input style="width: 40px; height: 15px; margin-right: 5px;" type="text"/> <input style="width: 40px; height: 15px; margin-right: 5px;" type="text"/> <input style="width: 40px; height: 15px; margin-right: 5px;" type="text"/> <input style="width: 40px; height: 15px; margin-right: 5px;" type="text"/> <input style="width: 40px; height: 15px; margin-right: 5px;" type="text"/> (if any given by the Organization in charge) Project Title : <u>Euro-Mediterranean Regional Transport Project</u>	Transport Mode <div style="display: flex; flex-wrap: wrap; gap: 10px;"> <div style="display: flex; align-items: center;"><input checked="" type="checkbox"/> Road</div> <div style="display: flex; align-items: center;"><input type="checkbox"/> IWT</div> <div style="display: flex; align-items: center;"><input type="checkbox"/> Rail</div> <div style="display: flex; align-items: center;"><input type="checkbox"/> Pipeline</div> <div style="display: flex; align-items: center;"><input type="checkbox"/> Port</div> <div style="display: flex; align-items: center;"><input type="checkbox"/> Others</div> </div>

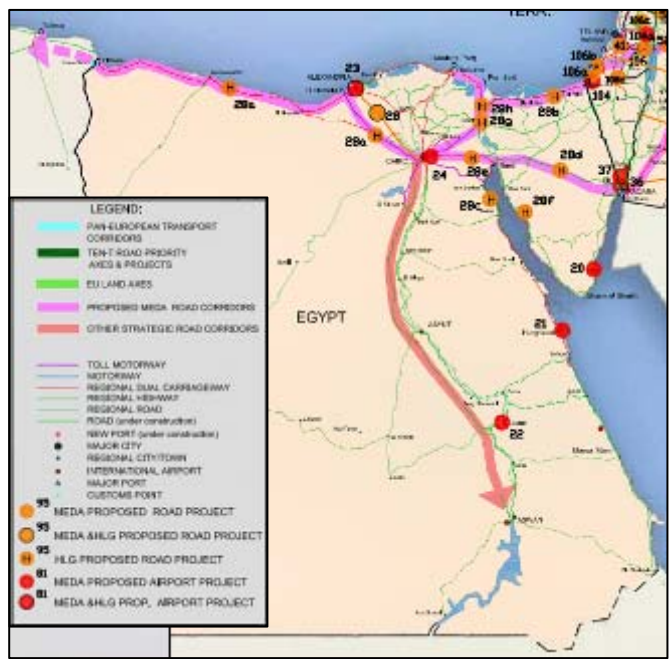
### Project Description in Charge

To support the achieving sustainable and integrated multimodal transport network at the Euro - Mediterranean trade area, and to promote cooperation with the countries of the southern Mediterranean, the EU approved the Euro-Mediterranean Regional Transport Project.

There are three Egyptian road corridors linking with neighboring countries: (a) East African Corridor (Egypt – Sudan, continuing southwards); (b) North Coast Road (Egypt - Libya, continuing westwards to Tunisia, Algeria and Morocco); and, (c) Cairo – Aqaba – Amman Road, composed from below.

- Alexandria – Cairo proposed new expressway North of the existing Desert Road
- Cairo / Alexandria / Matruh road to motorway standard
- Upgrading Bir Al Abd / Rafah road to dual carriageway
- Upgrading Zafran / ElAin Sokhna road to dual carriageway
- Upgrading Ahmed Hamdi Tunnel / Nakhi / Taba to dual carriageway
- Cairo Suez road connection
- Sham el Sheikh / Ras Sadr / Taw road links
- Upgrading Ismailia / Port Said (East and West of Suez Canal)
- Road tunnel under Suez (South of Port Said)

Organization in charge: MOT	Progress of the Project
Planned Implementation Period:	<input type="checkbox"/> 1 Under Construction
Information Source:	<input type="checkbox"/> 2 Bidding/Constructing
Cost:	<input type="checkbox"/> 3 Financed/Budget Allotted
Route/Location Map	<input type="checkbox"/> 4 D/D Completed
	<input type="checkbox"/> 5 F/S Completed
	<input checked="" type="checkbox"/> 6 Project Idea Stage



### Egypt



### Transportation Project Sheet

Internal Code        
 (to be given by the Study Team)

Prepares by: M. ONO  
 Date: 20/ Oct/ 2010

Original Code        
 (if any given by the Organization in charge)  
 Project Title : Land Transport Corridors in Egypt Vision 2050

Transport Mode  
 Road  IWT  
 Rail  Pipeline  
 Port  Others

**Project Description in Charge**

In Egypt Vision 2050, the spatial dimension for the overall development strategy for Egypt 2050 has been studied. The Vision document proposes international and regional, national, as well as local corridors. New development areas are proposed, which are supported by road networks and other transportation to link poles of development and underpin development. These national and international corridors extend beyond the borders of the Republic. The following strategies are embedded in the concept:

- Revival of the historic paths through Western desert;
- Linking the provinces of Upper Egypt and the Red Sea with a network of cross roads;
- Transport facilities across the Gulf of Suez and the Gulf of Aqaba to revive the land movement between the eastern and western parts; and,
- Provide a secure and advanced to facilitate the movement of passengers and goods and the development of new urban communities.

Organization in charge: MOT

Planned Implementation Period:

Information Source:

Cost:

Route/Location Map



Progress of the Project

- 1 Under Construction
- 2 Bidding/Constructing
- 3 Financed/Budget Allotted
- 4 D/D Completed
- 5 F/S Completed
- 6 Project Idea Stage

Egypt



### Transportation Project Sheet


Internal Code <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> (to be given by the Study Team)	Prepares by: M. ONO Date: 20/ Oct/ 2010
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Original Code <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> (if any given by the Organization in charge) Project Title : <u>Regional Ring Road Project</u>	Transport Mode <input checked="" type="checkbox"/> Road <input type="checkbox"/> IWT <input type="checkbox"/> Rail <input type="checkbox"/> Pipeline <input type="checkbox"/> Port <input type="checkbox"/> Others
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**Project Description in Charge**  
 The Regional Ring Road, as presented is located at about 100 km radius encompassing the area outside the Greater Cairo Region. Based on a review of previous studies, the GOPP has given priority to the southern part of the Regional Ring Road. This will integrate suburban economic agglomerations into a wider metropolitan region, and provide functional linkages between the Greater Cairo Region and the other regional economies. Yet, the concept of the Regional Ring Road needs to be further scrutinized from the points of view of economic feasibility and transportation planning.


Organization in charge: MOT	<b>Progress of the Project</b> <input checked="" type="checkbox"/> 1 Under Construction <input checked="" type="checkbox"/> 2 Bidding/Constructing <input checked="" type="checkbox"/> 3 Financed/Budget Allotted <input type="checkbox"/> 4 D/D Completed <input type="checkbox"/> 5 F/S Completed <input type="checkbox"/> 6 Project Idea Stage
Planned Implementation Period:	
Information Source:	
Cost:	

Route/Location Map



القوس الشمالي بطول 164 كم التابع لوزارة النقل ( الهيئة العامة للطرق والكباري والنقل البري )  
 القوس الجنوبي بطول 236 كم تابع للقوات المسلحة ووزارة الإسكان والمجمعات العمرانية الجديدة

**Egypt**



1. Al-Daqqahiyah  
 2. Al-Baharyyah  
 3. Al-Ghaziyah  
 4. Al-Haramiyah  
 5. Al-Dokkiyah  
 6. Al-Mokattam  
 7. Al-Nasr  
 8. Al-Dokki  
 9. Al-Dokki  
 10. El-Dokki  
 11. El-Dokki  
 12. Al-Khamsin



### Transportation Project Sheet

Internal Code        
 (to be given by the Study Team)

Prepares by: M. ONO  
 Date: 20/ Oct/ 2010

Original Code        
 (if any given by the Organization in charge)  
 Project Title: Rod El Farag - 6th. of October Highway

Transport Mode  
 Road  IWT  
 Rail  Pipeline  
 Port  Others

**Project Description in Charge**

The Rod El Farag Access Project is one of the key PPP pilot projects whereby the MHUUD with the MOT and by the technical assistance of the PPP Central Unit will invite the private sector participation through a competitive bidding process to enter into PPPs for the construction, operation and maintenance of Rod el Farag Access. The project route connects main routes at the River Nile bank to the ring road around greater Cairo then, to Cairo – Alexandria highway. The project will connect main routes with about 35km, as Abu Bakr Al Sedeek corridor and Seket al waily corridor in eastern Cairo to the Greater Cairo ring road starting at El khalafawy square and Ismailia lake in addition to crossing the River Nile at Al Warrak island till the ring road; achieving speed limit of 120 km/hour. The highway will be of 4.2 km length, and width 45 m consisting of 4 lanes each side.

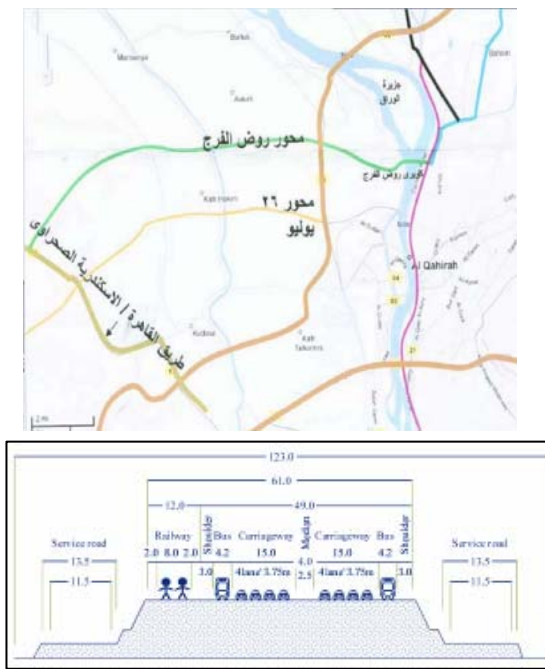
The Invitation for Prequalification for the project was issued on April 13th, 2010 and deadline for submission of the PPP road tender was postponed to August 1st , 2010. Five consortia have entered the bidding process according to World Highways. The five pre-qualified consortiums are asked to submit their bids by August 2011. The preferred bidder will be chosen in late 2011.

Organization in charge: MHUUD, MOT  
 Planned Implementation Period:  
 Information Source: MHUUD  
 Cost:

Progress of the Project

- 1 Under Construction
- 2 Bidding/Constructing
- 3 Financed/Budget Allotted
- 4 D/D Completed
- 5 F/S Completed
- 6 Project Idea Stage

Route/Location Map



Egypt



### Transportation Project Sheet

Internal Code        
 (to be given by the Study Team)

Prepares by: M. ONO  
 Date: 20/ Oct/ 2010

Original Code        
 (if any given by the Organization in charge)  
 Project Title : Upper Egypt – Red Sea Project

Transport Mode  
 Road  IWT  
 Rail  Pipeline  
 Port  Others

**Project Description in Charge**  
 It is an integrated project based on establishing a first class 412 km highway; connecting the Sohag, Qena and Assiut governorates in Upper Egypt with the Safaga harbor by the Red Sea. The project's total cost is about 764 Million US\$.  
 The road is planned to be a free highway, connecting Upper Egypt governorates with the Red Sea harbour at Safaga. The road will be a regional corridor connecting the Sohag, Qena and Assiut governorates with each other. The road is consisting of three main parts, which are: The western part, which starts from Assuit valley towards the governorate's southern borders. The middle, which starts from the Sohag governorate's northern border to the Qena governorate; in addition to a 65 km section in the Assiut governorate. The eastern part, which is located in the Red Sea governorate and connects the governorate to the north-eastern part of Qena.

Organization in charge: MOT

Planned Implementation Period:

Information Source: MOT

Cost: 764 Million US\$

Route/Location Map



**Progress of the Project**

- 1 Under Construction
- 2 Bidding/Constructing
- 3 Financed/Budget Allotted
- 4 D/D Completed
- 5 F/S Completed
- 6 Project Idea Stage

