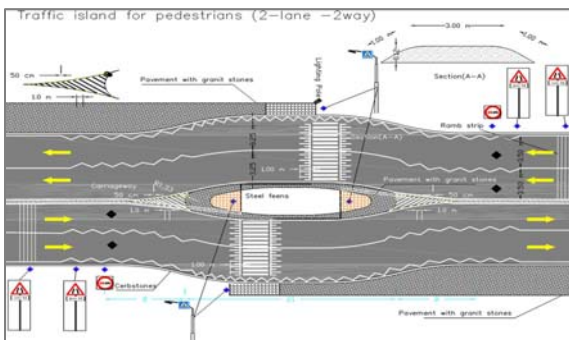
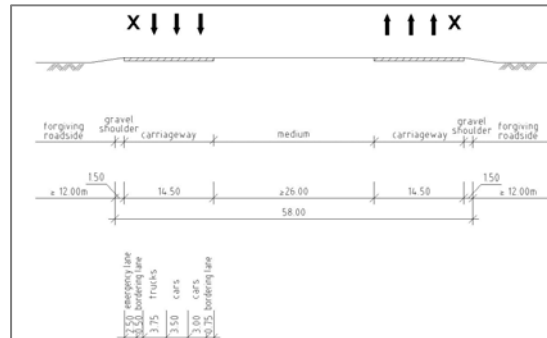
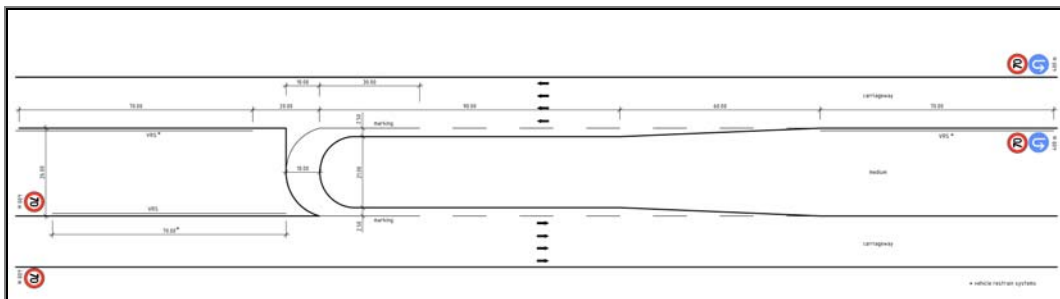




# The EU-Twinning Expertise for Enhancing Road Safety in Egypt Decade of Action on the way to Vision Zero in Egypt



Twinning Project Number EG08/AA/TP13  
Germany / Austria / Egypt 2008 – 2011



Pictures:

Reconstruction of a U-Turn;

Road Safety Inspection - Training of Engineers;

Cross section of a Desert Motorway

Traffic island for pedestrians

Accident Investigation Training of Police officers

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## 0 Preface

We are gratified to present the results of the European twinning project “Enhancing Road Safety in Egypt” in this report. Within a period of two and a half years more than 30 German and Austrian experts and lawyers have reached together with their Egyptian colleagues outstanding results.

The Egyptian National Road Safety Board and its five Subcommittees with the representatives of the most important Egyptian institutions in Road Safety have started to work systematically at the most urgent problems in the field of Road Safety. In training courses over many weeks Egyptian road experts and Egyptian traffic policemen got acquainted with the European Know how on the field of Road Safety. Many Egyptian experts had the chance within this project to participate in one of several study tours to Germany or to Austria to get an impression about Road Safety work in Europe. Proposals for amendments to Egyptian laws and by-laws, for example for the Public Roads Law and for the Traffic law were made and proposals for new regulations, instruments and standards, e.g. for traffic calming, for safety in working zones and for Road Safety Audits and Inspections were developed. Initiatives of NGOs and private persons were brought together for a joint work for Road Safety. In workshops open for the public and in exhibitions for road equipment the ideas of Road Safety were brought to the mind of many people in Egypt.

We hope that the very successful Road Safety work will be continued to get sustainability in the interest of the likeable Egyptian people.

On behalf of the Twinning Team:

Konrad Bauer, Günter Breyer, Hans-Joachim Vollpracht,

Thomas Fessl, Jürgen Gerlach, Horst Hanke, Martin Mönninghoff



# 1 Introduction

On the national level, road safety has been identified as a serious issue and a growing problem. Road accidents have great implications, not only on road users but also on the economy at large. In Egypt road death is the second most common cause of death. In addition to loss of lives, injuries and permanent disabilities, road accidents result in other damages including reduced productivity, losses of public and private belongings and vehicles as well as the huge amounts spent on insurance and social spending.

Traffic accidents also result in considerable economic losses, turning road death and injuries into a development problem as well as a social and human tragedy. Traffic accidents are very costly for the society. According to the World Bank the costs of road crashes in middle-income countries such as Egypt normally account for 1.5% of the GDP. In an article published in the Middle East Times it has been indicated that the costs might actually reach 3% of the GDP.



Examples of severe accidents on Egyptian Roads

A National Executive Programme for Road Safety has been implemented in 2008 with clear objectives for enhancing road safety in Egypt. The objective of the EU-Twinning Project for enhancing Road Safety in Egypt during a period of 28 months from October 2008 until March 2011 was to help realising the ambitious goals on the levels of Road Safety Policy, Management and Standards - (see Document 1). Member State Partners were the Administration of the German Federal Ministry of Transport, Building and Urban Affairs (BMVBS) and the Austrian Federal Ministry of Transport, Innovation and Technology (BMVIT).

34 experts from Austria and Germany developed the recommendations on the system approach of road safety, in detail on the fields of accident data management and investigations, vehicle safety, traffic legislation and public awareness, training of commercial drivers, and the infrastructure safety management especially for the final beneficiary, the General Authority for Roads, Bridges and Land Transport – Ministry of Transport in Egypt (GARBLT). The specific objectives of the Twinning Project were the

- Coordination of National Road Safety Activities and Legislative Reforms,
- Institutional Development and Capacity Building of GARBLT,
- Upgrading the Egyptian Road Safety Management System.

This expertise has the main aim to support GARBLT and the Sub-Committees in their further work on road safety in Egypt and to show the detailed work as outputs of the Twinning Project. It summarises the lessons learned in the project and all the recommendations for improving the road infrastructure on the way to Vision Zero in Egypt.

## 1. National Executive Programme for Road Safety

The documents in the Annexes can be found on the DVD in this booklet. They include a lot of information, presentations and several recommendations. They should lead to a positive system approach to road safety in Egypt.





## 2 External Events during the Project

### The Moscow Declaration

The most important external event with an influence on the road safety efforts in Egypt was definitely the First global ministerial conference on road safety 19-20 November 2009 in Moscow.

Ministers from more than 70 countries responsible for road safety as well as leaders from international, regional, governmental and non-governmental organisations from more than 140 countries participated in the conference and three Egyptian Ministries were represented by high ranking deputies (see Document 2).

The conference with the logo “Time for action” was set to reveal the most effective policies and practices in road safety improvement. Ministers responsible for related issues accepted a coordinated plan of actions to stop a global growth of road fatalities.

### The UN Resolution

The UN-Resolution of the General Assembly on Improving Global Road Safety followed in March 2010, welcoming the Moscow Declaration. The Assembly underlined the necessity of a multi-sectoral collaboration of efforts that includes academia, the private sector, professional associations, non-governmental organisations and civil society, which is also one of the main objectives and strategies of this Twinning Project (see Document 3).

### The Programme Decade of action

In order of the UN-Assembly the UN Road Safety Collaboration Meetings under the leadership of WHO developed the Programme for the Decade of Actions for road safety taking nations into the responsibility of improving their accident figures by their national Road Safety Policy (Pillar 1), their Roads (Pillar 2), their Vehicles (Pillar 3), their Road Users (Pillar 4) and their Post-Crash Care (Pillar 5). The Twinning project was online with these pillars by the exception of Pillar 5, which is in very good hands of the Ministry of Health (see Document 4).

2. Moscow Declaration

3. UN Resolution A/64/L.44

4. UN-Decade of action Programme

### 3 The three Levels of the Twinning Project

According to the international best practice, Road Safety has the three levels of Road Safety Policy, Road Safety Management and Road Safety Performance.

It needs a hierarchy of responsibilities and actions:



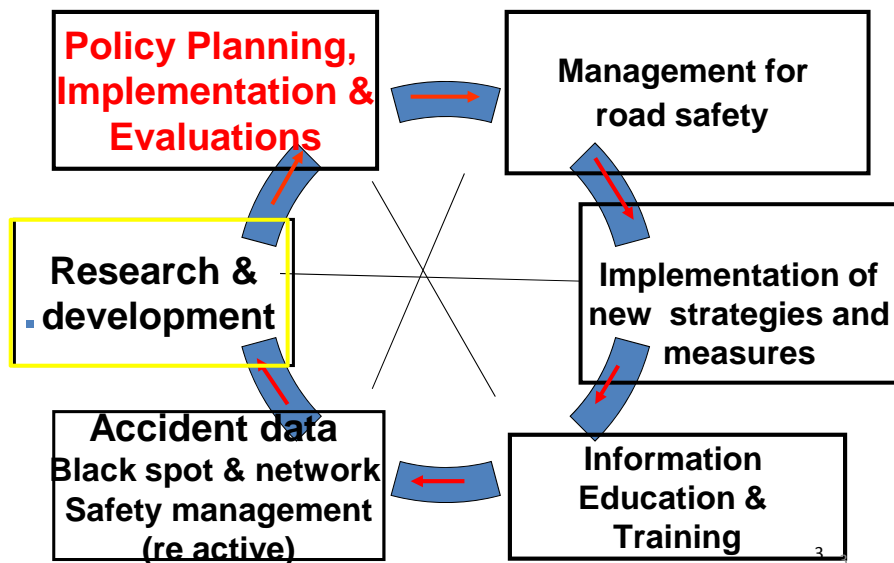
These levels were implemented by the Twinning project in Egypt (see Document 5).

- 5. Egyptian National Road Safety Board: The foundation of the working committees

### 3.1 Level A: Road Safety Policy

Level A was the strengthening of the National Road Safety Board by the implementation of sub-committees bringing them to the routine work in their different road safety policy circles:

#### The Twinning Programmes will help to let the Road Safety Policy Circle of Egypt turn around



The presence of the National Road Safety Board (NRSB) can be interpreted as a vital sign of road safety awareness at authority level in Egypt. The NRSB was established in 2003, according to Ministerial Decree no 13426/2003 (“Establishing the National Road Safety Board”). This was a result of a study tendered by the Transport Planning Authority (TPA) on “safety and security of (public) transport” which was carried out by the DRTPC of the University of Cairo. One of the 60 recommendations of the study was to set up a National Road Safety Board.

According to the Decree, resolutions of the Board are to be presented to the Prime Minister for approval (after approval of the Minister of Interior), and subtasks are disseminated subsequently to relevant ministries by the Prime Minister.

In the early stage of the project an assessment report about the Board had been elaborated according to the activity A 1 and recommendations covering responsibilities and activities of NRSB in line with EU best practice had been delivered as results of activity A 2 (see Documents 6 and 7).

Finally the following structure of the Board and its subcommittees and as well the Three-year Rolling Action Programme for competent organisations involved in road safety has been prepared according to EU best practices (see Document 8).

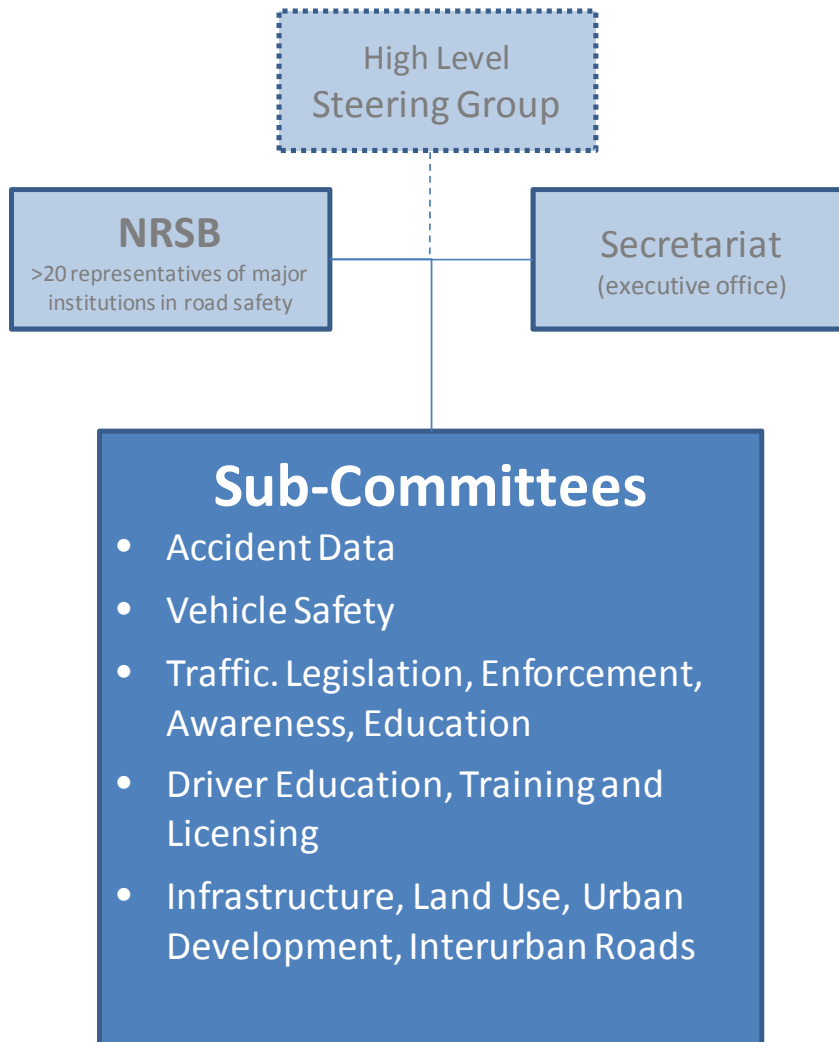
The further work was concentrated on the implementation of the routine work of the sub-committees. As a first basis for the work of the sub-committees workshops on the actual Road Safety situation were organised. The presentations can be found in Document 9.

6. Assessment Report for the National Road Safety Board

7. Road safety strategy for the National Road Safety Board of Egypt

8. Assisting in preparation of a 3 year rolling action Programme for organisations involved in road safety according to EU best practice

9. The actual situation of Road Safety in Egypt in comparison with the EU and worldwide approach



Chapter 4 describes the tasks of the different Sub-Committees in relation to the outputs of the Twinning Project and its recommendations.

10. Traffic Safety Legislation Report

The existing traffic legislations and planned legislative reforms have been reviewed and an assessment report had been prepared which came to the result that the Egyptian traffic regulations are well comparable to the regulations in developed countries by few exceptions regarding (see Document 10)

- no regulations for the transport of dangerous goods.
- low penalties and poor control mechanisms on bad technical conditions and overloading of trucks.
- no usage of seatbelts also on rear seats and child restraint systems.
- no general training courses in driving schools as a condition for getting driving licenses.
- poor regulations for the safety of vulnerable road users.
- poor road safety education at schools on all levels.
- no qualification for professional drivers.

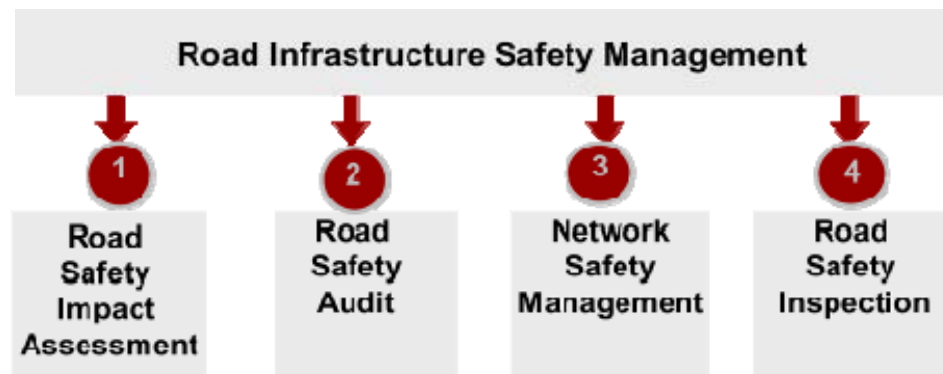
In general, the most crucial problems are the lack of enforcement of the existing regulations in the Transport Law and the Ministerial Decree. The implementation of tachographs with speed limitation will help to improve the safety of commercial transport.

For giving practical advices to several members of the Board two visits to the two EU Member States, Germany and Austria have been performed in June 2009 and September 2010 (see Document 11).

11.  
Programmes of  
study tours

### 3.2 Level B: Road Safety Management

Level B of the Road safety pyramid is the level of Road Safety Management. The Twinning project was focussing on GARBLT's position in respect of its legal and organisational strength for enhancing the safety of the public roads (National Roads) from the planning phase of new and rehabilitated roads until their operation and maintenance under traffic.



Instruments of a Road Infrastructure Safety Management

The existing legislations and planned legislative reforms have been reviewed. An assessment report had been prepared and was approved by GARBLT (see Document 12). It results in the assessment that safe roads are an issue of The Public Roads Law 84 -1968 and the Presidential Decree 334/2004. Especially the latter covers all components of the Twinning Contract related to the strengthening of GARBLT's capacity in the field of road safety. The boards of GARBLT and the MoT have the legal authorisation to decide on more detailed safety improvements for roads and bridges. The problem of the Public Roads Law is the lack of detailed regulations concerning road classification, road access, road use and the responsibilities of the different Authorities. In the report there are given recommendations for upgrading the Road Law, especially for the regulation of Safety Audits and for the enforcement of the role of GARBLT (see Document 13).

12.  
Assessment report  
on GARBLT's  
position

The practice of giving approvals for accesses to private properties and for other land uses but for agriculture aside on highways as well as the lack of access control and enforcement is a serious road safety problem in Egypt, which causes crucial consequences especially for vulnerable road users.

13.  
Proposal for a  
RSA Law

GARBLT has already implemented a special Road Safety Department for the improvement of road equipment such as signing and marking. There are first steps into the direction of Road Safety Inspections and an infrastructure safety ranking on the basis of accident numbers on different road sections. Its role, structure and operations have been analysed (see Document 13).

But a consistent Road Infrastructure Safety Management with proactive approaches such as routine Road Safety Inspections along existing roads, Road Safety Audits and Road Safety Impact Assessments in the planning process, had not been implemented.

In respect of improving the position and structure of the Road Safety department of GARBLT a review of similar structures in EU-Member States and of German and Austrian road safety department operations have been presented to demonstrate the important role of such a department for Egypt (see Document 14 and 15).

14.  
The Mission and legislation of GARBLT and the organisation of the present road safety department in GARBLT

The detailed recommendations for the improvements of the Infrastructure Safety Management of GARBLT, see below, will be presented in Chapter 4.6.

GARBLT is not the only institution which is building public roads. Important motorways are built by other ministries such as the Ministry of Defence and the Ministry of Housing. Roads will be handed over to GARBLT when the work is finished. GARBLT has no influence on the safety of design and construction.

15.  
German and Austrian road safety department operations.

Therefore, the implementation of Road Safety Audits and Inspections in GARBLT's Road Safety Department has to be developed and include all roads and bridges of other Ministries and of the Government roads too.

The road engineers of GARBLT and its districts had been trained in a five week training course on the performance of Road Safety Audits and Inspections during the duration of the extended project.

The content of this course is the focus of Chapter 5.

16.  
Programmes of study tours for GARBLT engineers

For providing the engineers with a view on good experience three visits to the two EU-Member States, Germany and Austria have been performed to both in June 2009, then to Austria in October 2009, and to Germany again in July 2010 (see Programmes in Document 16).



Study Tours with Egyptian Experts in Germany and Austria

Safe roads are not only a product of good planning and building. It is also very important to maintain the roads in a good way to hold a high level of safety when the

road is under traffic. The proper organisation of road maintenance and the safe performance of road works were realised as a crucial problem of the district offices. Road safety work has to be established especially on the local level to react immediately on safety issues especially if they are related to infrastructure or maintenance deficiencies. Training of staff and the equipment have to be adapted to their new challenges. Both topics got a special focus within the Twinning Project (see the recommendations in Chapter 4.6 and on the training course in Chapter 5). Additionally there is a great problem to ensure the safety when working on the roads.



Damaged Safety Barriers: Lack of Maintenance and Unprotected work zone on an expressway

An extra study visit for high ranking managers to Germany under the leadership of the Chairman, Mr Attaf Pollok, has been performed for demonstrating safe road works and professional road maintenance training and operations (see Programme in Document 17).

17.  
Programme of the  
high ranking study  
tour of GARBLT to  
Germany

### 3.3 Level C: Road Safety Performance

Level C of the Road Safety Pyramid is the level of accident investigations, performance of road safety work and training of staff.

#### 3.3.1 The Accident Data

A review on the existing accident data base came to the result that in Egypt three different accident data sources are available:

18. Assessment report on the Egyptian accident data and on report forms

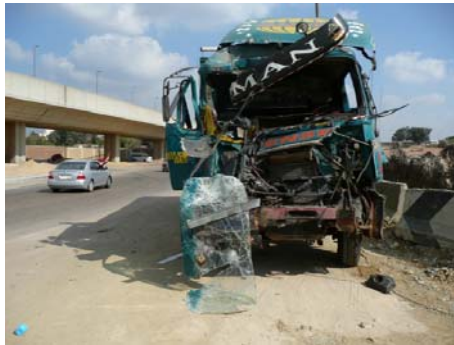
- Ministry of Health (data from emergency services and hospitals)
- Ministry of Interior (police recorded accident data)
- General Authority for Roads, Bridges and Land Transport – GARBLT – an affiliate of the Egyptian Ministry of Transport

(see Assessment report in Document 18).

Data on Road Accidents in Egypt - 2008			
	accidents	injuries	fatalities
Mol	25,088	29,000	6,799
MoH, Ambulance	78,543	122,531	4,471
<b>WHO</b>	<b>110,000*</b>	<b>150,000</b>	<b>12,295</b>

\* estimation on basis of the victims/accident rate from Mol and MoH

Data Base of Accidents is Egypt 2008



Examples of Severe Accidents

A unified accident data base as part of a modern GPS related Accident Data Management is developed and will be presented in Chapter 4.1. together with an accident investigation guideline for Egypt also containing proposals for accident costs for Egypt.

Police officers have been trained in accident investigations starting from the reporting work at the accident spots until the investigation for the reasons of hazardous accident spots and road sections. This training was performed together with road engineers to strengthen their cooperation in future.

19. Programme of the police study tour

A special study tour to Germany for some high ranking Police officers had been offered to take part in an Accident Investigation Congress in the German Police Academy in Münster (see Document 19).



### 3.3.2 The road infrastructure safety

According to the Twinning Contract Annex 1 two reports had to be delivered about activities

- C.1.1 conducting an assessment of the requirements for road safety auditing in Egypt and
- C.1.2 providing an analysis of international road safety auditing systems and best practices.

Some study tours, Road Safety Inspections (RSI) and Road Safety Audits (RSA) were performed by the STE and the Component leader (RTA) during January and February 2009. An inspection report about the national road NR 02 between Giza and Asyut is attached in Annex 11 and an audit report about the project documents for the Cairo - Ismailia - Port Said Desert Road in Annex 12 as examples of their work. Some serious deficits along the existing roads and in the design documents have been found, which crucial dangers for all kind of road users are.

To avoid duplications both reports were summarised in Document 20.

Reports on Road Safety Audits (RSA) and Inspections (RSI) in Egypt will be discussed in Chapter 4.6.



Road Safety Inspections and Audits with trainers and trainees

One of the most important tasks on this level was the development of safer standards for Egyptian roads. The key problems had been reported and based on the results of RSA and RSI a gap analysis was prepared and discussed with Egyptian experts (see Document 21).

Improved standards on road design and traffic management have been developed; they have been discussed with the Sub-Committee SC 5 and will be presented in Chapter 4.6 on Safer Land Use and Road Infrastructure, Urban Development and Urban Roads.

20.  
Requirements for  
Road Safety Au-  
dits and Inspec-  
tions in Egypt.

21.  
Gap Analysis of  
Egyptian road  
standards

## 4 Recommendations for the Sub-Committees of the National Road Safety Board

### 4.1 The general understanding of the Sub-Committees

The future road safety action plans for Egypt have to be structured and developed by the five Sub-Committees of the National Road Safety Board. Their general tasks are:

- Analyses of the existing situation.
- Definition of the deficits.
- Search for international best practice.
- Development of countermeasures and strategy papers for the Board.
- Drafting of policy papers by the Secretariat.
- Implementation by the Government.
- Following up by the Committees.
- Evaluation of the results by the Committees.

Their regular meetings will follow a well-defined agenda and the minutes will be spread to the board members for their information.

The Board will make the final decision and corrections if necessary before the political papers will go to the Ministries (see again Document 8).

### 4.2 The Sub-Committee SC-1 on Accident Data Collection and Analysis

SC-1 will have the following Objectives for the years 2010-2013:

1. **GPS/GIS based accident information system:** Pilot study along certain corridors, procurement of adequate recording devices, training of police and ambulance personnel, quality control of collected data
2. **Install unified process for accident statistics and investigation:** Creation of national accident database, creation of adequate tools for accident analysis, common process for accident investigation
3. **Matching of data from different sources:** In order to arrive at realistic figures on fatalities and injuries, arrange for a regular comparison / matching process between police and hospital data, break down results at regional level in order to identify and treat local data quality problems
4. **Availability of data for research:** Make disaggregated (anonymous) accident data available to all member organisations of the NRSB as well as other experts acting in the safety field

The Terms of Reference for the pilot project are presented in Document 22

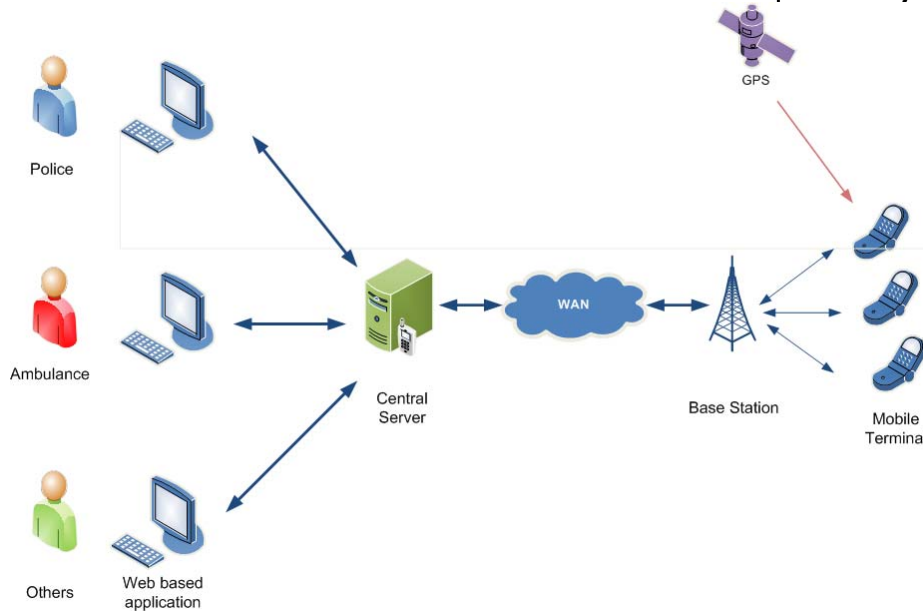
8.  
Assisting in preparation of a 3-year rolling action Programme for organisations involved in road safety according to EU best practice

22.  
Terms of Reference for the Pilot of the new Egyptian Accident Data Management



#### 4.2.1 The GPS/GIS based accident information system

The implementation of a modern electronic accident data system with a central data server within the Secretariat of the NRSB is the most important objective:



The National Accident Management system is intended to be built as a new system for both investigating and analysing road accident data and it is intended as a shared 'space' for all parties responding to different kinds of road accidents, such as medical rescue services, police forces, fire brigades, hospital personnel and the road administration.

This procurement started in the last quarter of 2010 and is directed to the hardware and software of GPS based Mobile Terminals, called PDA'S in the following, to be used at the accident spots for stationing, documentation, reporting and information by police officers and ambulance. The procurement will also include a GIS-based system as a backbone.

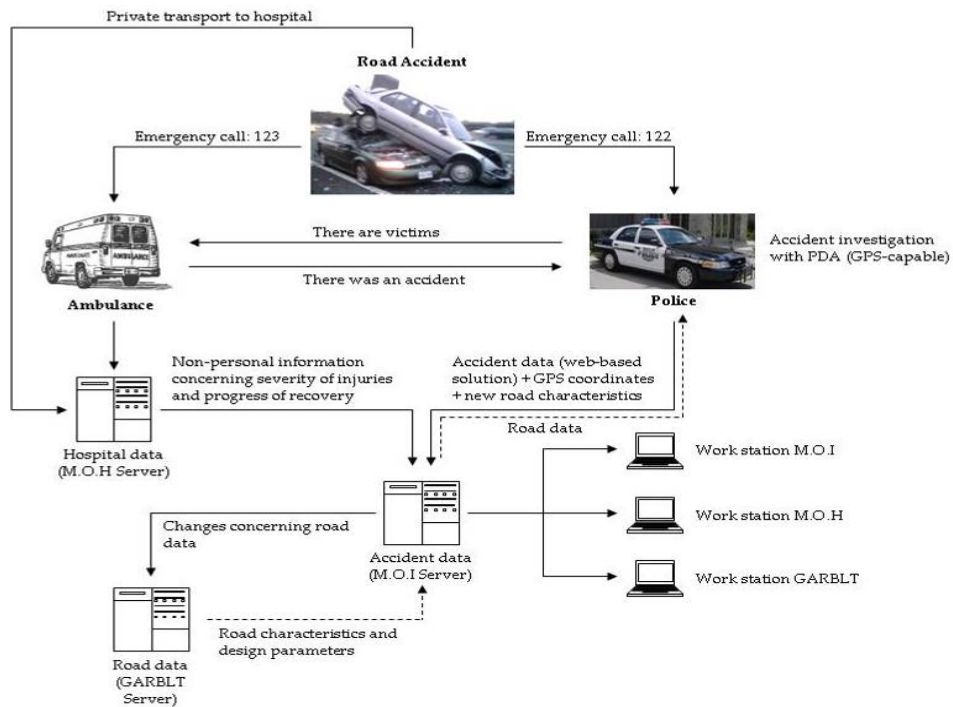
GIS technology is now used to manage and handle various activities all over the world. Realising the role of GIS in accident management and field activities; the required system is to handle appropriate data transformation from field to control room, display the data using an efficient way, and analysing them.

GIS features become increasingly valuable when multiple accidents begin to occur or when mutual aid units (unfamiliar with the local area) are utilised. That is why the system should also handle field gathered data that will be used later in accidents analysis.

The system will have a main control room with main servers connected to a secure wireless network provided by one of the GSM operators with national coverage.

The following figure gives the total overview of the intended information system. Document 22 is the document for the procurement process. It has a model character for many other countries.

22.  
Terms of Reference for the Pilot of the new Egyptian Accident Data Management



This new system will have many advantages:

- It will install the unified process for accident statistics and investigation
- match the data from different sources
- and provide the different researchers on road safety with the necessary accident data.

The handheld devices for the accident registration will contain the accident report sheets in form of multiple choice tables, easily to be filled in at the accident spots and organised in a way which will restrain personal data from being given to other authorities than the court, insurances and hospitals.

Four Traffic Accident Report (TAR)-sheets have been developed to be filled in at the accident spot (see Document 23).

23.  
New Traffic Accident Report Sheets

TAR-A: The general data to be filled in by whom is first at the accident spot, police or ambulance, for the use of different authorities with special pictograms for 52 different accident types.

TAR-B: The specific data: to be filled in by police only for the use of different authorities

TAR-C: The personal data to be filled in by police for the use by special authorities only.

TAR-D: The injury data to be filled in by the ambulance for the use of the hospitals and police only.

#### 4.2.2 Install unified process for accident statistics and investigation

The development of an Accident Investigation Guideline for Egypt was an ambitious challenge especially in respect of the accident costs. These will be the fundament for the several Road Safety Action Plans of the different stakeholders such as GARBLT. Different approaches have been studied for the calculation starting from the very rough estimation of the World Bank of 1.5 % of the GDP to a very detailed one.

Additionally the guideline will be the tool for the investigations at hazardous road locations and sections (see document 24).

24.  
Egyptian Accident  
Investigation  
Guideline

#### 4.3 The Sub-Committee SC-2 on Vehicle Safety

SC-2 will have the following **Objectives** for the years 2010-2013:

1. Regular road worthiness tests
2. Tachographs, speed limiters
3. Emergency call (eCall) in trucks and busses
4. Seat belts, child seats
5. Crash standards, ESC all new cars be in line with modern crash standards
6. Hazardous goods: labelling of vehicles carrying dangerous goods
7. Cargo security: provide best practice guidelines for cargo securing

##### 4.3.1 Regular Road Worthiness Tests (RW-Tests)

The regular road worthiness tests are regulated in the Egyptian Traffic law but they are not yet installed. The twinning experts delivered a report on the European regulations (see Document 25) and representatives of the German Association TÜV Rheinland came for a visit to Cairo to offer their assistance for the implementation.

25.  
Road Worthiness  
tests for Transport  
of goods  
and passengers

Regular road worthiness tests especially for commercial vehicles would be more efficient than the ban of trailers, which is a done deal from 2012 on. That was found out by an investigation of experts from the semitrailer producer, Kögel, when they followed an invitation of the Twinning project to Egypt.

For that reason a proposal for the realisation of Road Worthiness Test Centres for Commercial Transport of goods under the roof of commercial institutions was developed and sent to MoI for further deliberations (compare Document 26).

26.  
Proposal for the  
realisation of RW-  
Tests under pri-  
vate initiatives



Examples of overloaded trucks

To combine such RW-Test Centres with training centres for commercial bus and truck drivers e.g. on the new Egyptian Training Centre of Excellence (ETCE) south of Cairo would be the most appropriate solution.

#### **4.3.2 Tachographs and Speed limiters**

Tachographs will have a great enforcement effect on commercial drivers. This was deepened in several discussions with the Secretariat of the NRSB, Colonel Dr. Ayman, with Austrian and German experts from the public service and a producer of such devices (Continental). Colonel Ayman El Dabaa agreed with the recommendations of the STE's.

The recording equipment should be as simple and as reliable as possible. Nevertheless a vision should be kept as guideline for the project allowing further development and supplementation by handhelds and GPS.

The starting concept should be the print-out produced by the vehicle unit of the control device. This allows fewer precautions on data security and so remarkably cheaper devices.

To make use of the control device in the beginning only 2 categories of smartcards will be needed:

- driver card,
- workshop card.

For the future a combination of driving license and driver card is envisaged. The introduction of control cards and company cards may happen later on as well.

An urgent task will be the solution of interoperability between the vehicle unit of the recording device and the smart cards, as well as between the different products of various manufacturers.

Mr Bosch from Continental expressed that the envisaged retrofitting by the Egyptian recording equipment will take about 3 years.

There had been intensive discussions about the implementation of speed limiters in all commercial vehicles which is strongly recommended. They have to be seen completely separated from the 'black box' (see the European regulations in Document 27).

#### **4.3.3 Emergency call in trucks and buses**

The implementation of the Navigation system in Egypt offers a new emergency call system by an automatic emergency call in case of an accident. It will allow to reaching precisely the location of the accident and also a fast access either by the ambulance cars or in future by helicopters.

Make sure to provide relevant dispatcher infrastructure for emergency requests via eCall, as eCall-equipped cars will arrive on Egyptian roads by 2015 at the latest.

27.  
European regulations for speed limiters



#### **4.3.4 Equipment and use of seat belts and child restraint systems**

##### **Legal situation in Egypt**

According to Art 143 of the traffic law, a vehicle's seats should be equipped with seat belts (conditions for acquiring a vehicle license).

The use of seat belts is obligatory for driver and passenger in all vehicles (Art 4 ER). However, this only applies to the front seat. According to Art 74 ER, a fine of no less than 100 and no more than 300 pounds applies for an infringement of this rule. The driver is also fined when he allows a front seat passenger to sit without fastening the seat belt.

There are no rules on child restraint systems.

##### **Legal situation in the European Union**

Directive 2007/46/EC provides the framework for type-approval in the EU. All vehicles newly introduced to the market have to be equipped with seat belts according to the technical specifications regulated either in EU directives/regulations (for seat belts and child restraint systems see directives 76/115/EEC, 77/541/EEC) or the corresponding ECE/UN-regulations (ECE 14/06, 16/04). This applies to passenger cars, buses and trucks.

The implementation of these systems is strongly recommended for Egypt. Crash tests and real accidents show that the risk of being killed or heavily injured on rear seats is as high as on front seats, especially for children (see document 28).

28.  
Recommendations  
on seat belts and  
child restraint sys-  
tems

#### **4.3.5 Crash standards, ESC all new cars be in line with modern crash standards**

It has to be ensured that all new cars be in line with modern crash standards and the EuroNCAP procedure and are equipped with ESC (electronic stability control).

#### **4.3.6 Hazardous goods: labelling of vehicles carrying dangerous goods**

The labelling of vehicles carrying dangerous goods according to the European ADR classification has to be ensured and as well the training of emergency personnel on treatment of these goods in case of accidents

#### **4.3.7 Cargo security: provide best practice guidelines for cargo securing**

Best practice guidelines for cargo securing have to be implemented taking international best practice guidelines as a model (see also Chapter 4.5 on drivers' certification).

#### 4.4 The Sub-committee SC-3 on Traffic Legislation, Enforcement, Awareness, Education

SC-3 will have the following Objectives for the years 2010-2013:

1. Further traffic regulations
2. Priority ranking of enforcement
3. Awareness campaigns in key areas of enforcement
4. Traffic education at schools and child care
5. Police enforcement equipment
6. Overloading and other awareness issues of Commercial Transport

29.  
Minutes of the 2<sup>nd</sup>  
SC-3 meeting

The first meeting of the Sub-committee took place under the leadership of General Salah, MoI Traffic Department, on the 28<sup>th</sup> September 2010 with some important members (compare Document 29).



Meeting of Sub-committee 3



#### 4.4.1 Further traffic regulations

##### Proposals for General Traffic regulations

From the analyses of the existing traffic law (see document 10) the Twinning experts have developed recommendations for reforming the general traffic regulations (activity A 12) regarding the

- Equipment and use of seat belts and child restraint systems and on
- Pedestrians' rights and duties

The Egyptian law contains the basic rules as laid out by the Vienna convention on road traffic of 8<sup>th</sup> November 1968. However, there are some rules that should be improved. The most important measures that should be taken are to increase drivers' awareness to pedestrians and the right of the pedestrians in general and to enforce the rules.

Concerning cyclists, the rules that are necessary depend on the available infrastructure: An obligation to use a cycle path is only needed if there are cycle paths, which is rarely the case at the present. Thus, the recommendations in this part do not deal with cyclists. The infrastructure in Egypt has to separate the vulnerable road users from the fast traffic in future. As soon as this has been achieved, changes in the law will be necessary (see more in Document 30).

In addition to these proposals the merit point system has been discussed and promoted in the 3<sup>rd</sup> meeting of SC-3 on the 29<sup>th</sup> of November 2010. A special proposal has been developed for Egypt (see Document 31).

#### 4.4.2 Priority ranking of enforcement

To set up priority rankings – based on the key problem areas – where and what to enforce is most important for future police activities and has to be concentrated on the areas:

- **Respect of traffic regulations**
- **Keeping speed limits**
- **Seatbelt and helmet use**
- **Drugs and Alcohol (Drugs more than alcohol)**

The respect to traffic lights and pedestrian crossings seems to be the most serious objective to be enforced. The lack of such enforcement in the past has led to dangerous U-turns which are creating extra traffic and congestions. Pedestrian crossings have to be implemented into the signalisation wherever possible.

Similar to the importance of enforcing helmet use of motorcyclists, the enforcement of wearing seatbelts has to be strengthened.



Examples of driving in the wrong direction and of unprotected and overloaded two-wheelers

10.  
Traffic Safety Legislation Report

30.  
Recommendations for reforming the general traffic regulations

31.  
Minutes of the 3<sup>rd</sup> SC-3 meeting

#### 4.4.3 Awareness campaigns in key areas of enforcement

Media campaigns (TV, radio, print, etc) on specific road safety issues should be launched in connection with stepwise police enforcement activities on the same issue. As an example, a seatbelt campaign should be accompanied by intensified police seatbelt enforcement.

32.  
German Road  
Safety Council:  
Strengthening the  
National Road  
Safety Board of  
Egypt

The first meeting of SC-3 had been launched on the occasion of the visit of the German Road Safety Council (DVR), represented by Ms. Lacroix. She gave an overview of the work of the Council and its objectives and presented some specific video clips (compare Document 32).

Her special recommendation was a document similar to the European Road Safety Charter ([www.erscharter.eu](http://www.erscharter.eu)):

An Egypt Road Safety Charter to be signed by companies, schools, associations, organisations, individuals.

33.  
EU Documents for  
Public Awareness  
campaigns

(This idea is close to the proposal of the Egyptian Society for Road Safety: The Cairo Declaration – a document which is derived from the Moscow Declaration).

Some EU documents for the development and performance of public awareness campaigns should be taken into consideration (compare Document 33).

#### 4.4.4 Traffic education at schools and child care

To make sure that road safety is part of education at all school grades is a most important objective of this sub-committee. Common best practice is to integrate road safety seamlessly into other school subjects such as mathematics, physics, or history. This education has to continue until the age when pupils acquire moped or car driving licences. In the second meeting of SC-3 on the 9th October the representative of the Ministry of Education gave an impressive overview of the traffic education Programme of MoE. The Ambulance data of Dr. Mohamed Seif about traffic accident victims in Annex 34 demonstrates a slide 20 the high percentage of children and young victims heavily injured in traffic as vulnerable road users.

34.  
The Ambulance Ac-  
cident Data

#### 4.4.5 Training, Salary, Supervision and Equipment for Police Enforcement

The Egyptian traffic police would have the chance to be much more respected and more successful if the staff would get better training, salary and supervision. Effective Police Enforcement needs acquisition and use of modern equipment for the police such as mobile and fixed (automatic) speed cameras. The exhibition at the end of the project will be open for such equipment.

#### 4.4.6 Proposals of specific regulations for Commercial transport

The Twinning experts have developed special legal recommendations for the commercial transport (compare the Documents 10 and 35).

Legal regulations on driving and resting times are most crucial for the commercial transport in Egypt, where sleepiness is a crucial reason for many severe accidents.

The Twinning experts strongly recommend a reduced daily driving time of 8 hours due to the more difficult climatic conditions in Egypt, interrupted at the latest after 4 hours by a break at least 30 minutes long. Thus they elaborated two Addenda to the traffic law about driving times (Document 36) and responsibilities of vehicle owners for the technical conditions (Document 37).

Further recommendations are:

- Driver identification: The driver has to identify himself properly and not share his identity with others. To facilitate the motivation of the drivers a smart card will be recommended which is also valid as driving license
- Consecutive activities record: As drivers may drive more than one vehicle a day, the concept must allow for storing a consecutive personal activities record on a personal storage medium;
- Interoperability: As transport companies may choose systems from different suppliers, or drivers may drive vehicles of different companies, the personal identification method as well as the personal storage media should be compatible with all approved/ homologated recording devices;
- Interfaces for road enforcement authorities: If the way data being presented to enforcement authorities is not only supported by the print-out, it should be standardised in terms of access rights, interfaces, protocols and data set! Otherwise enforcers would be confronted with dozens of different in-vehicle recording systems whereby most of them will not be compatible with their enforcement tools;
- Resistance of hardware and software against intended manipulation: Any mandated systems aiming at influencing driver's behaviour are subject to massive manipulation attempts. A comprehensive device will be resistant against tampering up to a defined standard and tested against this standard by independent authorities;
- Motion sensor: A typical tachograph system including motion sensor as shown in the Egyptian standard 5815/2007 figure 1 and required by normative reference to ISO 16844, part 3 could be too much sophisticated and rather costly to enforce. It should be noted, that a motion sensor concept including processing unit and security components may not fit into some trucks and buses currently operated in Egypt.
- ISO 16844: e.g. secured CAN: It should be checked whether this requirement is needed.

35.  
Recommendations for legislative reforms related to commercial trans-

36.  
Addendum to the Traffic Law for social legislation relating to commercial road

37.  
Addendum to the Traffic Law for Responsibility of the vehicle owners for the technical condition

#### 4.5 Sub-Committee SC-4 on Driver Education, Training and Licensing

SC-4 will have the following Objectives for the years 2010-2013:

1. Driver education in commercial transport, public transport and micro buses
2. New driver education system of best practice
3. Implementation of a demerit point system: in the long term with tighter sanctions for young drivers

##### 4.5.1 Driver education in commercial transport, public transport and micro buses

Driver education in commercial transport, public transport and micro buses consider the establishment of an authorised training academy for professional drivers, and organise periodic retraining for drivers. This not only implies training and quality assurance procedures for professional drivers but also for driver examiners and driving instructors.



Examples for Overloading and wrong Cargo securing

38. Awareness raising plan for drivers and commercial transport companies

An awareness raising plan for drivers and commercial transport companies was a special task of the Twinning-Contract Activity13. Chapter 4 of the document developed is related to the education of commercial drivers, compare Document 38 on Awareness raising plan for drivers and commercial transport companies.

Special leaflets have been drafted for

- Check your ride,
- Check your light,
- Check your breaks,
- Check your load

39. Leaflets for commercial drivers

(compare Document 39).

It needs much more than written papers for improving commercial driving. The Twinning Project could initiate a special training programme for commercial drivers in a German-Egyptian PPP-Project which will start in 2011. It will have close relations between Mercedes-Benz Egypt, the German Arabic Chamber of Industry and Trade, the Egyptian Training Centre of Excellence (ETCE) and TÜV Rheinland.

#### **4.5.2 New driver education system of best practice**

International best practice examples on driver education should be taken as models for further development, such as initial driver training, accompanied driving, and safety halls

#### **4.5.3 Implementation of a demerit point system**

In the medium term a demerit point system should be implemented, with tighter sanctions for young drivers. It will be much more effective than monetary fees for violations against traffic rules.

#### **4.6 Sub-Committee SC-5 on Road Infrastructure, Land use, Urban Development and Urban Roads**

SC-5 will have the following Objectives for the years 2010-2013:

1. Create a stringent Road Hierarchy with an improved Road Design for safety
2. Improve Road Maintenance and Road Works
3. Implement hazardous spot management and Network safety ranking
4. Implement Road Safety Audits, Inspections and Road Safety Impact Assessment
5. Create facilities for pedestrians and other vulnerable road users and implement traffic calming and safety management
6. Improve intersections and railway crossings
7. Enforce access control against linear settlements
8. Perform the Road Safety Action Plan for Public Roads
9. Provide the legal and organisational structures

The work on these topics was the most crucial part of the Twinning Project for achieving sustainable results for the Egyptian society.

A general problem is that the design standards in Egypt are not developed under the respect of the Egyptian mentality and behaviour. A system with analyses of the traffic situation, an own research and own guidelines is missing. The design standards are based on the American AASTHO guidelines, which require with its very wide dimensions for cross sections and for the alignment a strong enforcement and a strong respect of traffic rules. These requirements cannot be found in Egypt. The European standards for instance recommend more narrow lanes, wider sidewalks, an alignment with short straights and a smooth curvy design with a good orientation and perception for the driver to avoid high speed and to ensure the needs of vulnerable road users. In general the Egyptian infrastructure is over dimensioned with more and wider lanes and therefore higher costs than necessary. The starting point for new road projects should be an assessment about the existing situation including especially a detailed count of traffic volumes. They give a basis for a capacity proof which is necessary for an assessment of alternatives. For that an Egyptian Capacity Manual should be developed together with new Egyptian Design guidelines. A very important task for further work is therefore to improve the standards and to design in a safe way.

#### 4.6.1 Create a stringent Road Hierarchy

The Egyptian system of public roads is not consistent, but a mixture of motorway – like trunk roads, expresses roads with fast and slow traffic such as the Cairo-Alex Agriculture road and highways with linear settlements but high speeds.

This has been realised in different study tours during the time of the projects (compare document 40).

The Widening of the National Road No. 2 parallel to the Western Desert Road between Beni Suêf and Assut is an example of the ineffective development of the Egyptian road network.

The Road Safety Inspection Report on National Road No. 2 between Cairo and Assut (Document 40) came to the following proposal:

40.  
Road Safety In-  
spection and  
Countermeasures  
for the National  
Road No. 02



“For the whole section from Cairo to Assut suitable investments have to be made for shifting especially the heavy traffic from the Agriculture Road No. 2 to the Western Desert Road by:

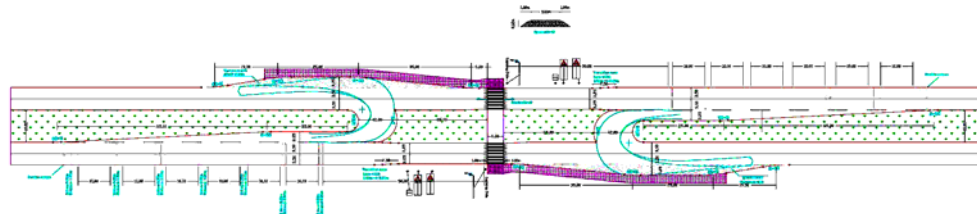
1. Upgrading the Desert Road to a motorway with the following steps:
  - change of all intersection into split level interchanges
  - closing of access to private property or secondary roads (partly additional secondary network must be installed)
  - Service and rest should have deceleration and acceleration lanes
  - Speed limits may be increased to 120 km/h for passenger cars

2. As a result of a traffic study and detailed road safety inspections more connectors between the urbanised areas along the Nile and the Western desert road should be constructed.
3. The connectors themselves should get a direct road course out of built up areas with very few intersections only
4. More speed management and traffic calming measures should be installed in the built up areas along the Agriculture road to reduce its attractiveness for the far going traffic and to improve the safety for the citizens by traffic calming, sidewalks and pedestrian crossings.”

But the opposite was done by the GARBLT district office in El Minia: The National Road No.2 is getting a second carriageway between the towns and villages, some of them will be partly bypassed others will get more traffic without any precautions for the local people and the vulnerable road users.



Examples for missing sidewalks and a dangerous U-Turn



Suggestion for the reconstruction of a U-Turn

This is only one example among several others which shows the need of a stringent road hierarchy.

On the upper level of the road hierarchy Egypt needs a reliable and **self explaining Road Hierarchy** and a consistent **Motorway Network** in which the separate motorway sections are connected by interchanges on separate levels.

**Express Roads** will connect larger cities and other important goals such as harbours, airports and industrial centres with this Motorway Network.

Both categories will not pass villages and towns.

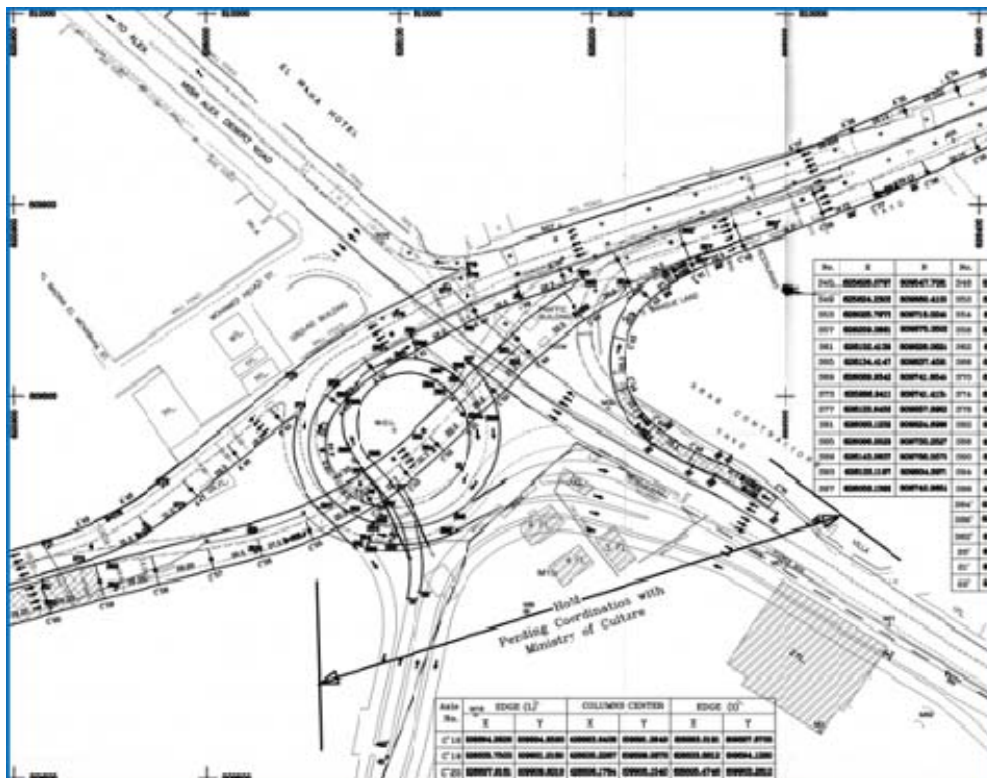
**Other Rural Roads** and the roads of Governorates could pass settlements but with lower speeds enforced by traffic calming and by controlled speed limits.



From the gap analyses of Egyptian Design Standards in Document 21 very detailed **Recommendations for Egyptian Standards** for Road and Bridge Design have been developed in Document 41 treating all road features from the PIARC (World Road Association) survey on international best practice.

41. Recommendations for Egyptian design standards

1. Functions and access control
2. Cross sections
3. Alignment
4. Intersections
5. Services, rest areas, markets
6. Needs of vulnerable road users
7. Signing, marking and lighting
8. Road side features and passive safety



Critical design for the Interchange Cairo Ring Road/ Alexandria Desert road

#### 4.6.2 Improve Road Maintenance and Road Works

13.  
The Mission and legislation of GARBLT and the organization of the present road safety department in GARBLT

Road Maintenance and Road Works have been detected as a serious traffic safety problem in Egypt as reported in Document 13, the Mission and legislation of GARBLT, chapter 6.3.

The analysis of the work of the districts and the maintenance units shows the following problems of GARBLT referring to traffic safety aspects:

- The Districts and the MU's are not really integrated in the road safety work and they are not trained in these aspects
- The districts are not full involved in the planning and reconstruction of the roads. So it is not possible to input their local know-how and experiences
- The districts have not enough sovereignty in their budget and for small contracts. Private contractors are not involved in maintenance works. So it is not possible to react quickly in cases of danger
- The MU's have not enough time and capacity for continuous and periodical inspections of the roads, there are no check lists and no guidelines for these daily inspections
- The equipment of the MU's is not adequate for the tasks they have to fulfil: Both quantity and quality of the machines are not sufficient. So continuous maintaining the steel and the concrete barriers is not possible, also the cleaning of road signs and markings. This leads to a bad and dangerous condition of the barriers, the signs and the markings.
- Slow driving equipment can not be applicated in the whole network effectively because of lack of trailers
- There is no organisation and regulation for accident service (repair and cleaning after accidents)
- There are no guidelines and techniques for the safety of the work zones (both short work zones and construction zones), which means a lack of safety for the traffic and the own personal

42.  
Concept for a pilot project for enhancing the safety of maintenance and road works.

For improving these serious problems it is necessary to improve the Road Maintenance of GARBLT. To develop and test the measures and methods in detail it was suggested to select a Test Maintenance Unit first and implement the new system within short time there. Document 42 shows this suggestion with the following steps:

1. Work out the concept and measures of the Pilot Project in Detail Select a Pilot District and MU for the Test
2. Discuss and harmonise the Concept with all responsible persons and the participants
3. Analyse the Situation in the Pilot Area (Roads, Equipment, Staff, Traffic Safety)
4. Work out a detailed concept for the Pilot Area
5. To-Do-List to prepare and start the Pilot Project
6. Procure new and additional equipment for the Pilot MU
7. Procure Contracts for special Maintenance Tasks with private companies
8. Training of the Staff of the District and the MU in new techniques and new safety work

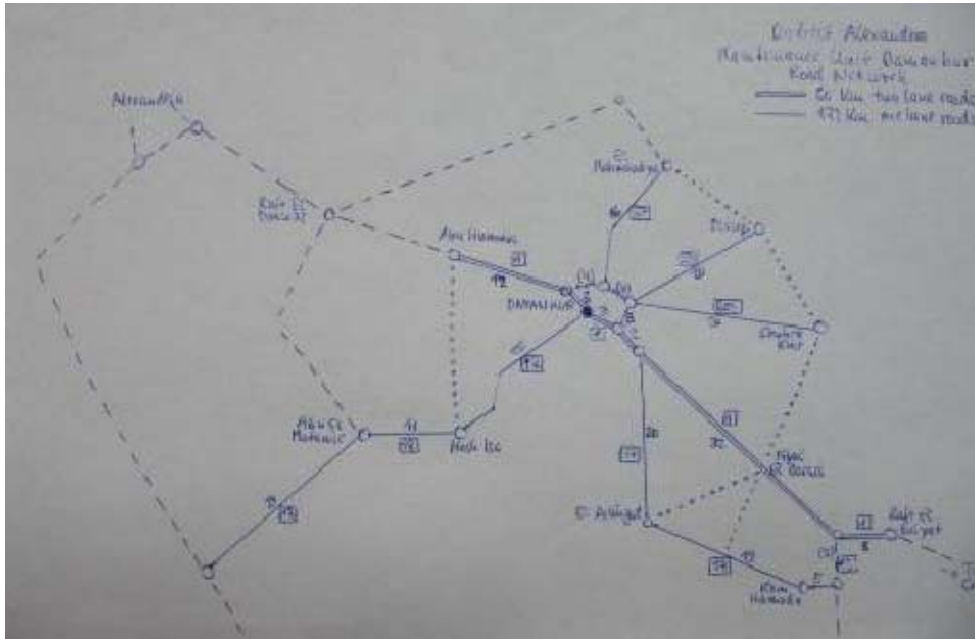


9. Support and Review of the Pilot Work by the GARBLT Central Office and the Twinning Project
10. Optimise the measures of the Pilot Project
11. Transfer the measures and experiences of the Pilot Project to the other Districts.

As a result of the study tours to different district offices the Maintenance Unit of Damanhur, belonging to the district of Alexandria, was selected to be the Pilot Unit. The network of Damanhur is representative for Egypt because it contains all types of roads.

The report (Document 43) shows not only a lack of maintenance but also a lack of safe road standards in the existing network.

43. Road Inspection of the Network of the Maintenance Unit Damanhur



The Road Network of Damanhur

The traffic volume in the network is very different. The highest volume is on the Road No. 1 with approximately 45.000 vehicles per day. The other roads have partly also high volumes with many trucks, for example Road No. 18 and partly 17. Some roads have less traffic. On these roads is partly much agricultural and passenger traffic in the road. There are not much data about traffic volumes in the network.

There are many village and town inside of the network, and some of them are very long (so-called linear settlements). So this makes an important part of the network to consider specially. Inside of the towns and villages there are often many vulnerable users on the road or crossing it. The road is often used for shops and markets, the sites along the road and the houses are mostly not protected. At the beginning of the villages and at the crossing inside there are mostly humps on the roads to reduce the speed of the traffic. But these humps are not always well announced.



Pedestrians are endangered in villages and towns

Result of the inspection of the Damahur network was that not only a new maintenance is necessary but there have to be taken some immediate measures to upgrade safety in the net. This is necessary as basis for the Pilot Project. The biggest problems exist on Road No. 1 (Agriculture Road Cairo – Alex) where we have a lot of severe accidents and black spots.

Chapter 5 of the report summarises the following recommendations:

### **Short-Term-Measures in the Network**

The following steps ought to be done immediately in the network to enhance traffic safety and to have the prepositions for the Pilot Test:

- Speed limits with enforcement on the critical points (U-Turns, Crossings, Intersections) of the road no. 1 with enforcement
- Building, Marking and Signing safer pedestrian crossings at the most important point (with speed limit) on road no. 1
- Close all unofficial and not necessary U-Turns on road no. 1
- Speed limits with strong enforcement at all U-Turns, Warning signs in front
- Rebuild the most dangerous U-Turns, perhaps provisionally, as soon as possible
- Renew all damaged concrete barriers
- Set up concrete barriers at precipices, on the bridges and in front of concrete or stone obstacles
- Speed limits in all sections where obstacles (Lamp posts, trees) are beside the road without protection
- Clear up whether the lamps can be deconstructed outside the villages
- Renew road markings at the most important places like forbidden overtaking, intersections and crossings and track separation with strong enforcement
- Secure all existing working zones according to the proposed new technical regulations
- Speed limits and warning signs before all railway crossings beside the road
- Enforced speed limits, marking and warning signs at all dangerous intersections, provisional rebuilding

### Measures done with the Pilot Project

- Regularly observation of the roads (at least weekly every road), checking the road and the equipment
- Renew all concrete barriers broken down or damaged immediately
- Regularly renew road marking which is not more sufficient
- Renew all traffic signs missing or damaged immediately
- Regularly cleaning of the roads and signs
- Constructing and Working on the road only with strong safety measures, optimised work zone safety
- Systematic accident service
- Regularly road safety inspections by the District to check whether the safety measures work well
- Regularly, systematic and detailed analysis of all accidents; derive additional safety measures from this as necessary
- Close contact to the Traffic Police in analysis of the Accidents, Safety Measures by GARBLT and Enforcement of Police

For these measures it is necessary to train the staff in the MU and in the Districts. Also there is a need for better machinery equipment (described in the report November 2009) and contracts with companies for renew the barriers.

### Medium-Term-Measures

As short-term-measures above there are only described those which are needed immediately for traffic safety and for the Pilot Project, also provisional measures.

Regarding the enormous figure of the great need of measures to enhance traffic safety it is not possible to do all things at the same time, and some measures need more time. So we set priorities with the short-term-measures. In the second priority we see the following medium-term-measures:

- Build up safe road crossings for pedestrians and agricultural traffic by pedestrian bridges in the towns and by culverts outside
- Upgrade all necessary U-Turns in the described way
- Renew all old single-standing concrete barriers by continuous systems
- Put up safety barriers before all obstacles
- Renew the road marking in the whole network, in the future it should be regularly renewed
- Upgrade all railway crossings in the described way
- Final rebuilding of the dangerous intersections

The next steps have been reported in the Working and Responsibility Plan, see Document 44.

In a meeting on the 15th July 2010 the following decisions have been made:

44.  
Working and Responsibility Plan  
for Maintenance  
Units

### **Machinery Equipment of the MU Damanhur**

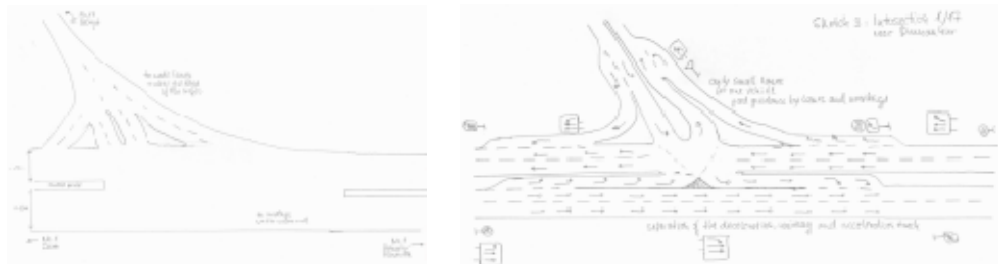
- Procurement of a new small truck with double cabin (German like “Kolonnenfahrzeug”)
- Procurement of Movement from another District/Department of two additional Pick-Ups for observers
- Procurement of a Mini-Loader with additional equipment for craning and earth movement
- Procurement of a small tractor with Mini-Sweeper as a trailer
- Procurement of tool kits and materials for work on traffic signs on the road, small water tank for building of concrete fundamentals as portable equipment on the pick-ups and trucks

### **Safety Equipment of the MU Damanhur**

- Procurement of eye-catching warning signs at the rear end of all vehicles working on the road
- Procurement of portable pre-warning signs for work zones on the road and for lane closure
- Procurement of a trailer with warning signs for lane closure
- Delivery of helmets and warning jackets for the whole staff of the MU Damanhur
- Procurement of moving rumbles (mobile warning humps) for work zones on the road

There should be different trainings for the Staff of MU Damanhur:

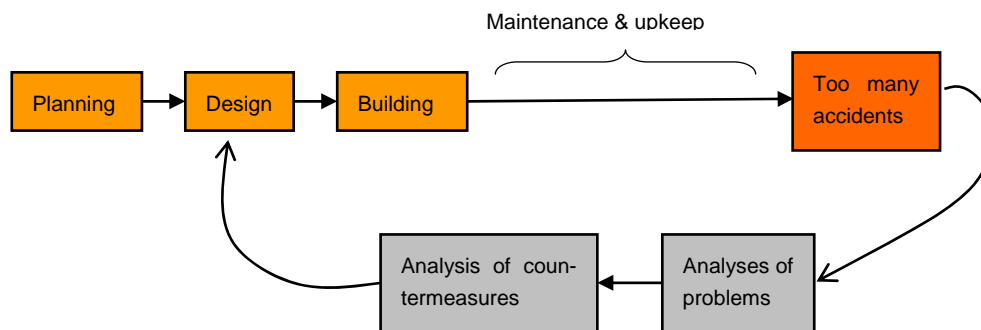
- Driver Training
- Training in Work Zone Safety
- Training for the observers
- Work Zone Safety was found out as a general problem on GARBLT roads which should be solved immediately in whole Egypt. So these trainings were organised for all districts and for the contractors of GARBLT working on the roads.



Situation and Suggestion of an intersection near Damanhur

#### 4.6.3 Implement hazardous Spot Management and Network safety ranking

The traditional road engineering approach to safety has very often been to “wait and see”, i.e. safety countermeasures are not considered until the accident situation becomes unacceptable. This may occur at one or a few locations or for longer road segments. Then the accident situation is analysed, countermeasures designed and implemented and after this little happens until the accident situation becomes unacceptable once again. The traditional approach with black spot identification, analysis and remedy is a reactive approach, largely event-driven.



As soon as more detailed accident data are available for Egypt (see Chapter 4.6.1) a consequent accident investigation has to be started by all road administrations of Egypt and GARBLT especially. For those duties a special accident investigation guideline has been developed (see Document 24) and trained.

24.  
Egyptian Accident  
Investigation  
Guideline

#### 4.6.4 Implement a Road Safety Management with Road Safety Audits, Inspections and Road Safety Impact Assessment

The implementation of Road Safety Inspections on existing roads and Road Safety Audits on planned roads – new or rehabilitated – as part of a whole Road Safety Management System was a central challenge of the Twinning Project.

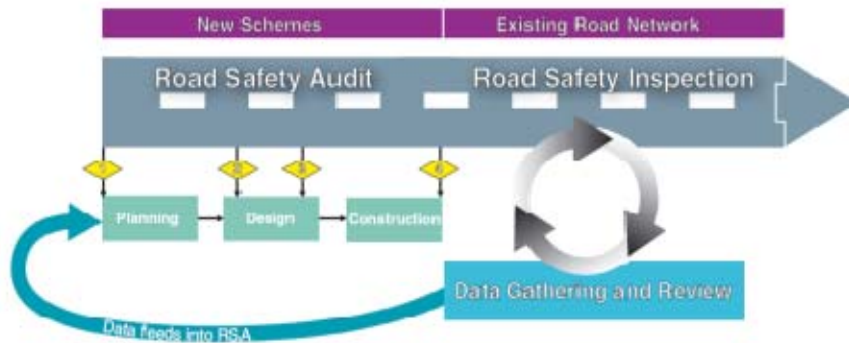
Road safety requirements both for planning, construction, maintenance, as well as operation, and equipment are contained in the applicable technical standards and specifications. Nevertheless, road construction measures are constantly being planned and implemented which do not fully exploit the design possibilities for road safety, in accordance with the latest technological developments. This can also be the result of balancing the various interests that are involved. Ideally, a road satisfies the demand for road transports (i.e. has sufficient capacity and high level of service), provides good safety and causes minimum adverse effect to the environment. In practice, a road is often a compromise that partially satisfies the criteria. Very often transport demand is given highest priority, followed by environmental, private or political interests and finally safety aspects.

Because of the appearance of accident spots and dangerous road sections along new roads in many countries the road safety audit was created first in England and developed by the **World Road Association (PIARC)** and its member countries.

The method of **Road Safety Audits (RSA)** as one part of the Road Safety Management was presented to the world on the XXI World Road Congress in Kuala Lumpur 1999 and of **Road Safety Inspection** on the XXII World Road Congress in Paris 2007

- **Road Safety Audits (RSA)** are at the project design stage, before any construction has started, with the task to screen the designs on paper for any safety issues. This is a formal process best conducted by an independent auditor.
- **Road safety inspections (RSI)** are done by driving and walking along the whole road, looking at each road segment and checking whether a series of items are consistent with road safety concerns. These inspections are usually repeated regularly.

So RSA is the systematic work on design plans and RSI is the systematic study along existing roads concentrated on the elimination of design deficiencies which could lead to accidents and human errors.



Since autumn 2008 there is a new **EU-Directive for Road Infrastructure Safety Management** with five basic management standards for safe roads which could be a basis for the further development in Egypt. These are defined in Article 2 of the directive:

1. "Road Safety Impact Assessment" means a strategic comparative analysis of the impact of a new road or a substantial modification to the existing network on the safety performance of the road network;
2. "Road Safety Audit" means an independent detailed systematic and technical safety check relating to the design characteristics of a road infrastructure project and covering all stages from planning to early operation;
3. "Ranking of high accident concentration sections" means a method to identify, analyse and rank sections of the road network which have been in operation for more than three years and upon which a large number of fatal accidents in proportion to the traffic flow have occurred and "Network Safety Ranking" means a method for identifying, analysing and classifying parts of the existing road network according to their potential for safety development and accident cost savings;
4. "Safety Inspection" means an ordinary periodical verification of the characteristics and defects that require maintenance work for reasons of safety.

20.  
Requirements for  
Road Safety Audit-  
ing and Inspections  
in Egypt

For further details see again Document 20.



Road Safety Auditors and Inspectors will need guidelines for their work as well as for their contracts with road administrations, companies and the donors financing road infrastructures.

There are no common guidelines compulsory for Europe, different countries have different guidelines.

From those and others from his member states all over the world PIARC has developed such guidelines and a catalogue of design faults and infrastructure deficiencies as well for selecting suitable countermeasures and treatments. These guidelines have been transformed to the Egyptian situation (see Documents 45 and 46).

In this context the regularly road observation of the Maintenance Units is part of an overall Road Safety Management System (see Document 46a). In the Road Inspections therefore also questions are integrated concerning the quality of maintenance.

### The Use of Checklists

To ensure that safety aspects have not been overlooked during the procedure, checklists should be used to assist the auditors/inspectors in considering the relevant issues. Different checklists have been developed for different stages of a project's development. The checklist present different questions regarding the safety of all users but they are not exhaustive. They identify issues and problems that can arise at the relevant stage of an audit. The checklists are an aid for the application of the knowledge and experience and to make sure that all factors are considered. They also can be used as forms for the documentation of deficiencies.

### Who should carry out an Inspection and Audits?

Depending on the complexity of the work, an Inspection/Audit may be done by a single inspector or by a group of inspectors who are not involved in the maintenance of the inspected road section to be independent and to see the section with fresh eyes. These guidelines suggests on major roads a multi-member team is engaged to ensure there are more than one pair of eyes doing the audits and inspection, there is exchange of ideas from discussions between the members of the team and all necessary skills and backgrounds are covered by the team.

It is preferable for an inspector/auditor to have specific training in audits and/or inspections. Such trainings have been given to the engineers of GARBLT during the project, see Chapter 5.

### Road Safety Management System

For maximum effectiveness it is very important that RSA/RSI is carried out by an independent staff, which is not involved in the maintenance of the existing roads respectively the development of the design for the road. Auditors/Inspectors can be from private firms or road administration or a **Road Safety Audit Centre in the head quarter of the Road Administration**. That was proposed for GARBLT by the Twinning Team (see Chapter 4.7.9). **The Road Safety Audit Centre should be the central group of GARBLT's Road Safety Department.**

45.  
Egyptian Road  
Safety Inspection  
Guideline

46.  
Egyptian Road  
Safety Audit  
Guideline

46a.  
Road Safety De-  
partment Concept

<b>Road Safety Department</b>			
Responsibility:	Road Safety Audit Center	Safety Engineers / Regional Road Safety Commissions	Districts / Maintenance Units
New roads / Existing roads:	Road planning and construction of new roads & extension of existing roads	Roads under traffic	Roads under traffic
To do:	Road Safety Audit during the whole process of planning until opening	Regularly Road Safety Inspections Accident investigation & Black spot management Inspection of markings, signing (e.g. yearly)	Pavement management system – status of pavement (e.g. yearly) Regularly road observation – road equipment, signs, obstacles,... (e.g. weekly)

Proposal for a Road Safety Management System in GARBLT

During the time of the project several Road Safety Inspections and Audits on Egyptian projects have been performed in teams of the local future trainers from GARBLT and the Twinning experts.

47.  
Collection of RSI Reports

Document 47 is containing a collection of such Road Safety Inspection and 48 of Road Safety Audit reports.

**4.6.5 Create facilities for pedestrians and other Vulnerable Road Users and implement traffic calming and Safety Management for urban areas**

48.  
Collection of RSA Reports

There are several hazardous locations along the Egyptian Highways, where they are crossing small villages and towns. The lack of separating the agriculture vehicles and vulnerable road users from the fast and far going truck and vehicle traffic is the second most serious gap in respect of road safety in the agriculture and urban areas. In addition accidents occur either at U-Turns, small intersections or where foot passes are crossing the carriageways.



Unsecured Pedestrian Crossings

Those situations should be eliminated along all Motorways and express roads by two level interchanges and overpasses for pedestrian and agriculture traffic. Along Highways this will not be achievable. Low cost measures have to be implemented

to arrange safer conditions for passenger cars and the vulnerable road users as well. When entering built-up areas, speed has to be reduced to the speed limit for build up areas.

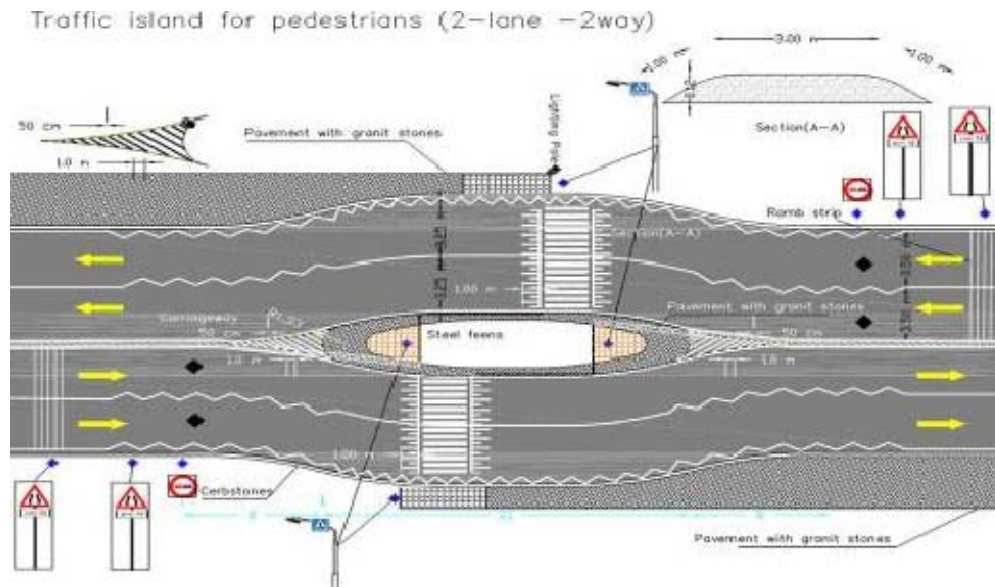
Following international experiences marking and vertical signing alone will not fulfil the expectations on enhancing road safety at such locations. This is well known in Egypt, where local authorities are constructing humps from asphalt at the entrances of the villages. But those solutions are unsafe themselves causing rear end collisions when the first cars stop suddenly and unexpected.

It needs traffic calming solutions by small road constructions to make road users aware of the special event they have to care for by reduction of speed such as the entrance of a village and the local people along the road, a small intersection, a bus stop and a pedestrian crossing.

The Traffic Calming guideline in Document 49 contains such solutions for, U-Turns, Roundabouts, and single pedestrian crossings which have been adapted from international experience to the Egyptian situation, where humps and rumble stripes are already accepted by the drivers and local people.

They have to be adapted the local situation. But they should be used as unique models around the country and can be implemented in connection with all mayor Maintenance projects but as a special project of the Road Safety Action Plan of GARBLT (see 4.6.8) as well.

49.  
Traffic Calming  
Guideline for  
Egypt



Suggestion for a Staggered pedestrian refuge islands in four lane roads

#### 4.6.6 Improve intersections and railway crossings

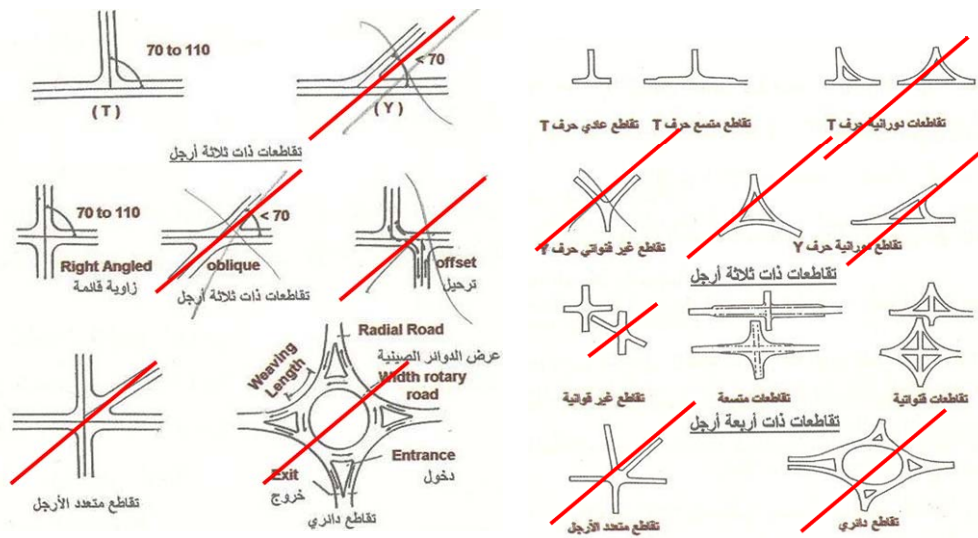
The existing design of intersections is one of the most crucial problems in Egypt. Intersections do mostly not fit to traffic volumes, so that either the capacity is not high enough or the over dimensioning leads to high speed and severe accidents. In some cases existing interchanges are complicated to understand and can mislead the driver. In many cases acceleration and deceleration lanes are missing.



Example of a design plan with missing acceleration lane and unclear organisation of the merging traffic

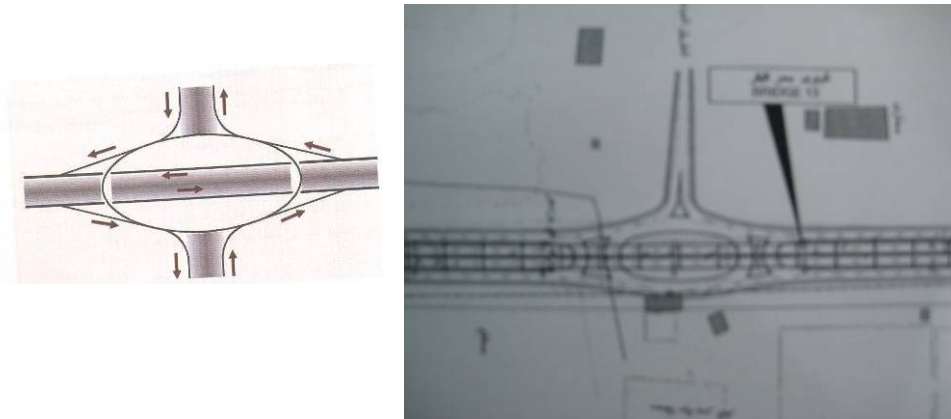
In most intersections U-Turn solutions can be found. This type of intersections has an unusual design comparable to solutions for normal T-junctions or crossings in most other countries. In Egypt U-turns in highways and rural roads have been built for enforcing the right of way when entering the main road from the secondary road or for normal left turning. U-turning takes time, creates traffic congestions and results in accidents. 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 is necessary at express roads for high speeds and traffic volumes.

Also very dangerous Y-intersections can be found in the design regulations of GARBLT and recently realised at bypasses e.g. of Biba, National Road Nr. 2. It is strongly recommended to exclude this type from the regulations.



Unsafe types of intersections in the Egyptian standards (based on Aashto)

The Egyptian standards and practice for roundabouts have to be improved because the over-dimensioned roundabout solutions with too large diameters, too low angles and insufficient deflection faces the problem of high speed and low respect on the right of way for the circling traffic.



Unsafe Roundabout design in the Egyptian standard (based on Aashto) and in a design plan

Recommendations for intersections can be found in Document 41.

Railway crossings are serious road safety problems in most countries and in Egypt as well. As an example the Twinning Team has inspected and audited the Cairo-Alexandria Agriculture Road (No.1) between Shobra and Banha with numerous secondary roads crossing the Railway and the National road as well (compare the document 50).

- 41. Recommendations for Egyptian design standards
- 50. Audit/ Inspection report on Railway crossings along National Road 1



The most critical deficits in respect of road safety are:

- The wide cross section and the straight alignment gives the impression of a motorway with high speeds, but the lack of access control leads to most dangerous conditions with mixed traffic of far and fast going heavy traffic with local agriculture traffic and jaywalking pedestrian
- The intersections and junctions with small secondary agriculture roads are the most critical characteristics of No. 1. Their negative influence on road safety is even worse because of their crossings with the railway tracks.
- The railway crossings themselves are extremely dangerous and of an unsafe design and operation by handhold metal chains.
- They lead to traffic congestions on the No. 1
- The railway is not integrated in the Pedestrian overpasses, which don't invite the usage because their steps are too steep and not to manage with animals and small carts.
- In general the usage of the pedestrian bridges is not enforced by fences.
- The unregulated bus stops create additional problems for pedestrian safety

Especially the combined junctions with railway crossings are the main safety problems. Their removal needs combined actions of GARBLT and the Railway Authority.



It is obvious, that the most important deficits cannot be solved by low cost measures. A feasibility study should be immediately ordered with the following three goals:

1. To find solutions for the repair of access control either by service roads parallel to No. 1 or from behind the built up belt.
2. To create pedestrian bridges that overpass the highway and the railway
3. To avoid the one level railway crossings and the intersections and junctions as well

The upgrading of the No. 1 to a freeway/motorway in the whole length from Cairo to Alexandria is still a potential which to achieve should be the main objective. But it can only be achieved by the cooperation of both Authorities. A single way of GARBLT on the plus one level is not possible.

#### 4.6.7 Enforce access control against linear settlements

As the example of the Cairo-Alexandria Agriculture road demonstrates the lack of access control in Egypt which leads to unacceptable road safety problems from the development of so called linear settlements with mixed functions and mixed speeds. This is a worldwide problem of emerging countries. Please compare the attached article of the PIARC publication Routes and Roads (R&R), Document 51. Usually those developments are starting from small sales of agriculture products such as along the Costal Road from Alexandria to Port Said.

51.  
Routes & Roads  
article on Linear  
settlements



Examples of merchandising and of parking lots directly on the motorway

A strategy against such developments should include the offer of legal and safe alternatives e.g. at parking places with safe deceleration and acceleration lanes. But never the less the situation will develop to a disaster for traffic economy and the health of the population as well if access control fails (see more in Chapter 4.6.9).

#### 4.6.8 Implement the Road Safety Action Plan for Public Roads

The Road Safety Action Plan for GARBLT contents all further activities for enhancing the Safety of Egyptian National Roads.

The Document 52 has been developed from the experience of the Twinning Project in Egypt and all necessary investigations are mentioned there so far.

52.  
Integrated Road  
Safety Action Plan  
for GARBLT

##### Philosophy for the Road Safety Action Plan

Road Safety philosophies are a usual means of planting 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).

In recent years, a joint philosophy has emerged from these two approaches, called the “Safe System Approach”. The basic cornerstones are:

- Shared responsibility in road safety: from provider to user
- Socio-economic analysis: investment in measures with highest safety potential (cost/benefit ratio)
- Human errors can be minimised by respecting human abilities and limitations (human factors) in road design and operation
- Human error will always occur – just in any industrial process. Measures are taken in order to alleviate the consequences
- Better management of crash energy, so that no individual road user is exposed to crash forces likely to result in death or serious injury.

- Good communication and management structures of all stakeholders
- Road safety targets to be in line with other goals of society, such as those in the health and environment sectors

The „Safe System Approach“ should be set on top of all road safety activities in Egypt. All in all, successful road safety work is a complex management process which must be planned, implemented and evaluated according to market-oriented principles.

The priority areas are:

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

And the Targets are:

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

Target till 2015: - 25 % fatalities

Sub-target: - 10 % injuries

Performance indicators are used in addition to numerical targets, for example:

- How many kilometres of GARBLT roads are treated with demonstration projects?
- How many audits and inspections have been carried out on GARBLT roads per number of construction projects?
- How many kilometres of public roads are located outside villages and towns, how many inside villages (thoroughfares)?
- How many kilometres of GARBLT roads and bridges have no forgiving road sides (obstacle free zones and passive safety installations)?
- How many U-turns are along express- and freeways? How many U-turns have protected deceleration and acceleration lanes?
- How many service and rest stations are connected without de- and acceleration lanes?
- How many railway crossings are along the public roads or close to them with secondary roads?
- What is the average number of road trading/sales booths per kilometre along GARBLT roads?

**The Socio-economic costs of road accidents** play an important role for the decision of investments for safer roads in Egypt, because

- Budgetary limits requires to consider, where to spend the money most efficiently
- Decision makers would like to know which measure brings the highest output (“return of investment” in a socio-economical manner).

The documents contain an approach for such a calculation which results in accident costs for Egypt in a size of 12 Billion EGP without the accidents with damages only and 32 billion EGP for all accidents.



#### 4.6.9 Provide the legal and organisational structures

Following the Programme of the Decade for Actions "Road authorities will be made legally responsible for improving road safety on their networks through cost effective measures and for reporting annually on safety situation, trends and remedial work undertaken":

##### The Amendment of the public Road Law for mandatory RSA

As it was seen from the performance of several Road Safety Audits and some accident investigations the implementation of Road Safety Audits by legal regulations is crucial for the road infrastructure investments in Egypt to avoid quick losses of human resources by dangerous road investments!

For that reason, two documents have been prepared for the discussions with Parliamentarians (see Documents 53 and 54).

These recommendations are in close connection with Chapter 4.6.3 - the Implementation of the Road Safety Auditing System/ Mechanism.

The draft contains for the RSA procedure the following way:

1. Installing an independent unit (Audit Centre- AC) at GARBLT for the supervising the RSA/RSI procedures wherever they are used.
2. Installing a controlling body in the MoT (CBMoT).
3. The AC has a frame contract with the auditors. When the client asks the AC for a RSA, the AC decides which auditor has to act in that special case.

It is the AC who gets the construction documents from the client and who gives them to auditor. The AC receives the written audit report and gives it to the client. The CBMoT gets one copy of the audit report.

The client has to decide if he follows the requirements of the auditor. If he doesn't accept and doesn't follow the auditors suggestions he has to give a detailed written justification to every single argument. This "Justification" is to be given to the AC, the CBMoT and to the auditor.

4. The auditing system depends on well trained and well informed experts. These experts have to be experienced in road construction and road safety matters and have to be on the state of the art. So it is essential that a person can only become auditor when he passes examinations to proof that he has the expert knowledge. Because the stand of art is developing fast from international experience the auditor and inspectors have to brush up his knowledge in regularly courses.
5. There has to be a fixed levy of the contract sum (per thousand sum of the total value of investment) to be paid to the AC and a scale of fees made by the AC too for paying the auditors. The alternative solution is that the fee of the auditor is the result of a tender and a bid of the auditor and the fee is a part of the construction costs paid by the client.

The articles 22 to 24 for public roads are on request.

53.  
Proposal for a Law  
on Public Roads

54.  
Proposal for legal  
regulations to im-  
plement Manda-  
tory Road Safety  
Audits/Inspections

**Access control**

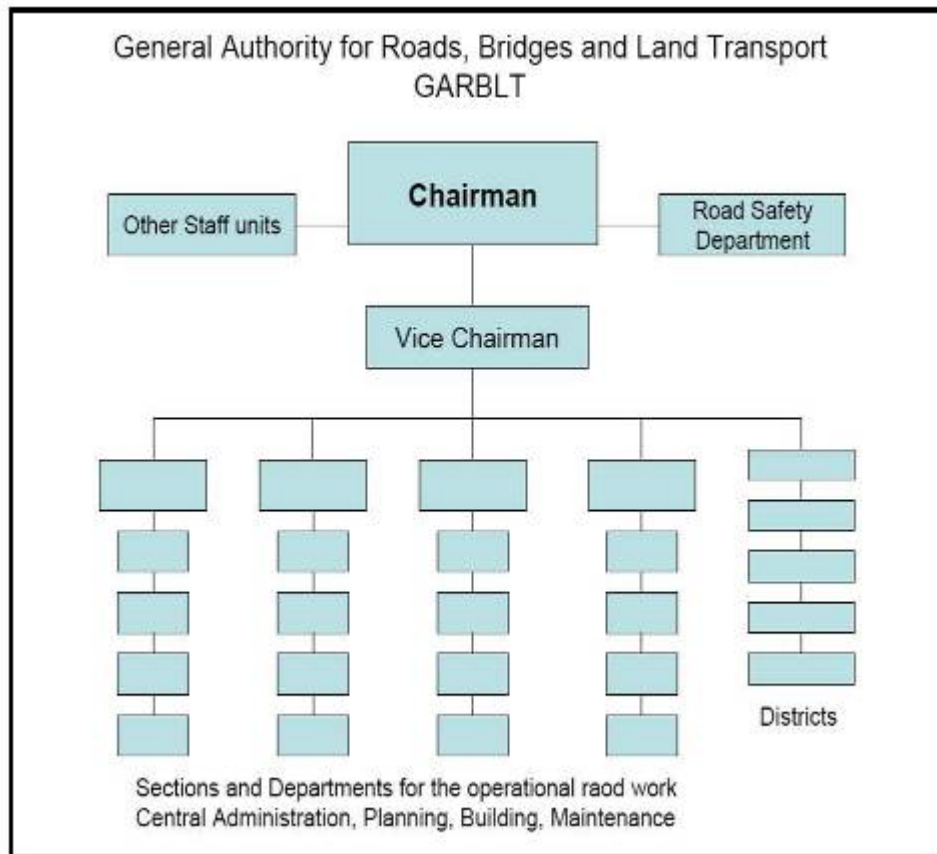
Access control is closely related to chapter 4.6.7. The public roads law has the regulations for access control but they are not yet used properly by the district offices of GARBLT because they don't have the possibilities of enforcing themselves without police assistance. This has to be achieved by an amendment on the Public roads act.

**The Organisational Structure for enhancing Road Safety within GARBLT**

Recommendations for the restructuring of the road safety department within GARBLT have been developed. According to EU best practices there should be established an overall Road Safety Management System which integrates and coordinates all institutional and technical measures to strengthen road safety.

55. Suggestions for a Road Safety Strategy and Management System with a strong Road Safety Department in GARBLT

Heart of this strategic system should be the Road Safety Department with a renewed structure, a new role and strong enlarged tasks. In Document 55 the new concept for the role and the tasks of the RSD is described in detail and recommendations for the organisational structure are made. Road Safety is a task which should be considered in all steps and all aspects of Road Engineering: from the first idea of road and network planning over the road design and the road equipment design, the road building up to the road maintenance. In all these steps of work safety aspects should be integrated in the work and the results of the work to ensure safe roads.



Recommendation for the Structure of GARBLT with an independent and powerful role of the Road Safety Department

For the existing roads it is necessary to examine them concerning safety aspects. Accidents should be investigated systematically to find out the reasons and to elaborate safety measures for these situations.

This Road Safety Management System is working effectively in Germany and Austria where all tasks and responsibilities of traffic safety are concentrated in one department.

From these experiences the main tasks of the Road Safety Department in GARBLT should be:

- Safety Impact Assessment and Network Safety Management with systematic accident data collection and accident investigation
- Performing Road Safety Inspections and
- Road Safety Audits (sometimes integrated in the planning units)
- Take part in the central and regional road safety commissions
- International Partner for all aspects of Road Safety
- Further research and development of the road safety know how in contact to other country administrations and to their research institutes
- Internal and external training

This leads to the following conclusions for the role and structure of Road Safety in Egypt:

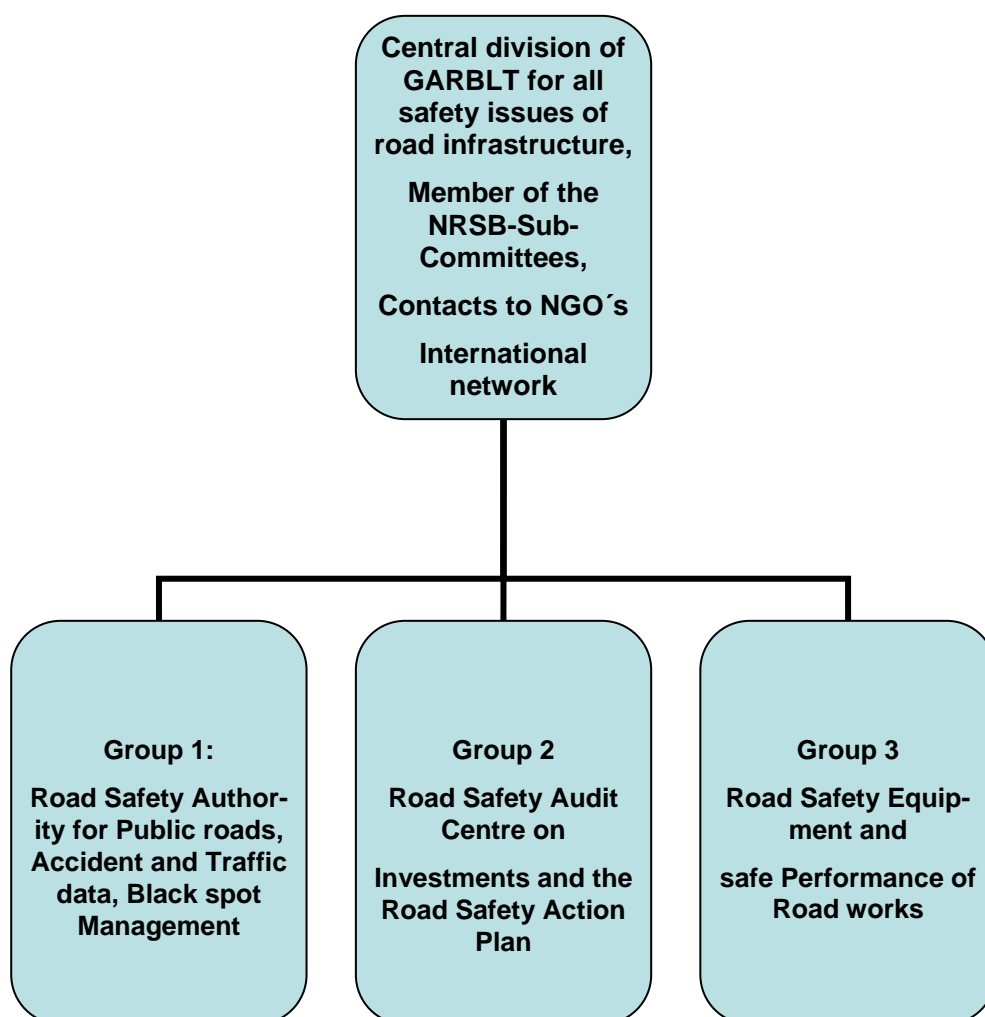
- The task of the Traffic Authority should be concentrated in the Road Administration, that means inside of GARBLT; for an effective road safety work it should be integrated in the RSD
- All tasks of Road Safety should be concentrated in the RSD and separated from the operational daily work
- The work of the RSD should be closely connected with the districts, where the daily operational work should be performed.
- Because GARBLT's responsibility for whole Egypt (one administration for the whole country) there are additional statewide tasks to do in GARBLT such as the Road Safety Action Plan, Public relations, Research and Technical Development and Trainings
- To ensure the intercession and strong role of traffic safety inside of GARBLT, the independence of the daily operational work and the necessity to work closer together with all departments the RSD should not be integrated in another department or session. It should be installed as a staff unit

These tasks are described in detail in the document 55.

We suggest a staff unit for the RSD inside of GARBLT with all these tasks and responsibilities concentrated in this unit and independent of the operational daily road work. Such a Department/Division should have the position of an advising staff of the Directory Board of GARBLT. This ensures the independence from the operational work and tasks of the singular sections of GARBLT.

Following the scientific recommendations about the efficiency of organisational structures a section should have at least three and maximum 8 Units. Two options for the RSD, one with five and the other with three subgroups are recommended. For the start the alternative with three subgroups seems to be easier to implement.

55. Suggestions for a Road Safety Strategy and Management System with a strong Road Safety Department in GARBLT



Recommendation for the structure of the Road Safety Department with three subgroups

It is the aim to install the new structure as soon as possible because this is the heart of the road safety work in GARBLT.

Apart of those internal safety departments there is a centralised Federal Highway Research Institute ("Bundesanstalt für Straßenwesen" BAST) in Germany which is specialised in the research and development of issues related to

- The safety of road material and road equipment and their certification for roads and bridges
- The road geometry and design for different types of roads
- Procedures of operation, maintenance and construction
- Traffic performance and regulations
- Road users behaviour and training
- Principle accident investigations and the evaluation of implemented strategies, legal traffic regulations and other measures
- National Road Safety Programme with proposals for road safety policy planning
- A special department is related to the safety of vehicles and cars

Most European Countries have such Research Institutes on road safety which are integrated in FEHRL, the Federation of European Highway Research Laboratories and FEHRL, Federation of European Road Research Institutes Road Safety Institutes. Other countries such as Malaysia did follow these examples. Road Safety Research Institutes share their experiences, knowledge and activities. Such an institute is strongly recommended for Egypt in future.

#### 4.6.10 Road equipment

In order to improve the road safety, the design of roads requires in certain sections and at particular locations the installation of vehicles restraint systems. Those systems shall hold up vehicles from dangerous zones or areas. The question to use is depending from different criteria. The main question is what shall be protected. Generally Safety barriers are intended to minimise the consequences of accidents. They are used in order

- to **protect bystanders** or areas requiring protection next to the road or oncoming traffic in the case of two-lane roads
- to **protect vehicle passengers** from serious consequences as a result of leaving the carriageway, e.g. in the event of crash or from colliding with dangerous obstacles next to the carriageway.

They are designed and specified to contained and redirecting errant vehicles. A further effect is providing guidance for road users. Therefore, in view of the road safety vehicle restraint system are indispensably necessary today in the traffic for road safety.

First general annotations follow to the actual situation of Vehicle Restraint Systems in Egypt. A general problem of passive traffic safety in Egypt is the bad condition of the road equipment.

This was recognised within the training seminars and Road Safety Inspections (RSI) with the Egyptian road construction engineers of GARBLT. This was recognised within the training seminars and Road Safety Inspections (RSI) with the Egyptian road construction engineers of GARBLT and confirmed in several further road inspections at different places on the Egyptian road system by the Twinning experts in many cases.

In particular observed was this for the objects for passive safety devices (Vehicle Restraint Systems) and for road markings. Here considerable deficits exist in comparison to the European ratios. In opinion of the Twining experts suitable measures should be carried out here as quickly as possible. A lot of dangerous obstacles exist.

Therefore, the most important is, it has to be developed a plan for vehicle safety barriers and road markings. In the medium term, it is necessary to make an analysis, what kind of traffic signs and orientation panels must be changed or added.

#### 4.6.10.1 Vehicle restraint systems

First general annotations follow to the actual situation of Vehicle Restraint Systems in Egypt. In Egypt there is a principle question in case of Vehicle Restraint Systems like in Europe. The existent systems are divided in two groups, in steel and concrete barriers. In the most cases concrete barriers in very different manner was used. If steel systems were seated, the protective planks themselves are absent in many cases. Besides, rests of the deformed or destroyed Steel parts often rise in the sphere of the traffic. Especially at night these objects form dangerous obstacles, because in most cases also any road markings are absent to the guiding the road users.



A positive example is the highway No. 03 from Cairo to Suez which is equipped in the edge of carriageway mainly with steel systems. The installed systems there are comparable with a protection system of the containment level H2 according to the European Standard 1317 (see below). These systems can detain vehicles with a total weight of 13 to. Indeed, these are destroyed at many places by accidents and must be urgently repaired. All vehicle restraint systems can fulfil her function only, if they are not damaged and completely connected.

The separation of the same highway on the approx. 50 m wide middle stripe is a concrete protection wall from single elements. This serves in this case excluding the prevention of turns by drivers. It is not necessary to use a vehicle restraint system for traffic safety.

List of most recognised defects in order of importance and effectiveness:

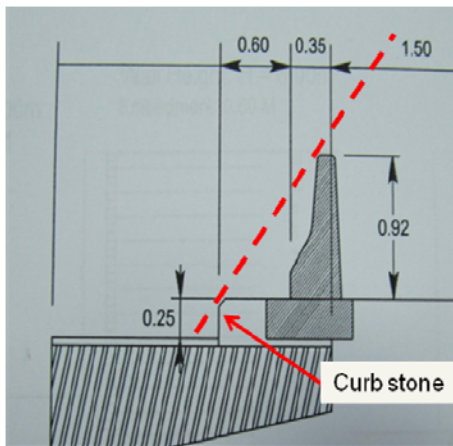
- Systems or elements are not connected
- neither single elements nor local concrete walls are reinforced with steel elements in longitudinal direction
- Systems were partly or completely destroyed
- Systems are from a short length or single elements stand alone, without any safety function and, in contradiction, they are obstacles
- destroyed systems or system parts rise in the sphere of the traffic
- fallen down elements or longer local concrete barriers
- Obstacles (lamp or sign posts, etc.) in front of restraint systems (Steel or concrete)

- in many cases restraint system are not necessary
- a lot of damaged single lamp-posts rises in the sphere of the traffic, because they were unprotected and damaged by accidents
- further points



The new Developments of concrete barriers in Egypt, to be seen in the construction area for the new desert road Cairo - Alexandria, has only one advantage compared with the up to now used ones: They are put together. But the indispensably necessary connections as well as the steel armouring in longitudinal direction are absent. This concrete barrier is fixed with relatively short steel dowel in the subsoil. This construction allows expecting no bigger opposition in case of

an accident in connection with a heavy weight trucks.



An unfavourable example for a vehicle restraint system will be found during a Road safety audit in a part of a new planned bridge of the Cairo – Alexandria Desert Road. How the picture shows, the vehicle barrier does not function in case of an accident. As shown, if a vehicle touches to the high kerbs it would not held back, on account of the already achieved tilting moment. Rather it will be hit on account of the high tilting moment on the vehicle restraint system and, if it concerns a truck, falling down from the bridge. The curb stone in this position

prevent the impact of restraint system.

To find general solutions for the application of vehicle restraint systems in Egypt is very difficultly.

In many cases it would be advantageous to use steel vehicle restraint system instead of concrete restraint systems for constructive reasons. Another reason is the not available classification of the existing streets according to the traffic load or the traffic composition. A further problem shows the heterogeneous use of the streets.

Indeed, proposals can be made for certain streets. In particular for new streets or street segments the following conditions could be considered:

- A good solution is a error-forgiving roadside with embankment on the same level with flat slop, better level hollows instead of ditches in the edges, without Vehicle Barriers
- no obstacles in Sphere of traffic, wide middle stripes, there is enough space in Egypt
- The best and safest solutions are a well designed and constructed roads and passive safety installations, in dependence of traffic and traffic compound

Also with existing streets improvements can be carried out. For example, evident obstacles, like parts of destroyed or destroyed concrete restraint system, can be removed from out the Sphere of traffic. Not functioning ones or already destroyed street lamps has to be removed, which are arranged in front of restraint systems.

#### **4.6.10.2 Road markings**

Road markings are traffic signs within the sense of the Egyptian 'Executive Regulations of Traffic Law' (Article 129) and therefore indispensable in traffic. Worldwide they are considered to be one of the most important safety measures. Studies performed in England (Road Marking Industry Group, 1976 and 1981) and in the USA (Miller, 1993) have already proven the great effectiveness for safety and a high cost/benefit factor. Three primary characteristics for increasing the traffic safety should be mentioned here:

- They accompany the vehicle driver continuously, so that it is not necessary to keep them in mind, such as with traffic signs.
- Due to the good contrast to the road surface, they are easy to recognise under all weather conditions (except when covered by sand).
- In the dark they are located in the immediate area illuminated by the headlamps.

However, if road markings are to be effective in the sense of traffic safety, they must fulfil the following most important demands:

- Night time visibility (dry/wet)
- Daytime visibility
- skid resistance
- durability

About road markings in Egypt and in case of those demands there exist many problems. In most cases thermoplastic material is used for road markings. This material gets quickly dirty in a few days by using with bituminous pavement surfaces. One of the reasons is the surface especially concerning thermoplastic road marking material. This effect becomes particularly in case of new road surfaces in connection with new road markings. Even in later times they get darker on account of touch by dirty tires and almost disappear. Further problems exist generally on the road markings in Egypt. During the day the road surfaces go heated up very strong by sun. Thereby the surface from the road markings becomes soft, so the glass beads go into the material substance. The effect is, the road markings lose the night time visibility, the most important requirement. The same effects exist in the most South-European and North-African countries.

According European experiences paints and two or more component road marking systems, so called cold plastics, do not have those problems. Moreover, cold plastic road markings system has a longer durability than such as comparable thermoplastic materials. But all road marking systems has one common disadvantage. Indeed, they get dirty with dust and sand. In contrast to thermoplastic road markings it is possible to clean cold plastic road markings easier.

The best way to find out a solution for Egypt is, examine different road marking systems with a test field on roads. The following proposal is given, to find out better (maybe the best) road marking systems for the especially climatic conditions on Egyptian roads.



Material	Application system	Thickness [mm]
Thermoplastic	Extruder/Screed	2,0/3,0
	Spray	0,6
2-component paint	Spray	0,6
2-component (Cold Plastic)	Agglomerate	2,0 - 5,0
	Extruder/Screed	2,0/3,0
	Spray	0,6

Realisation of a test field to the investigation of different selection systems according to the European Standard EN 1824 'Road Marking Materials - Road Trials', but in an adapted form. Three different materials with different systems should be examined.

The application shall be done in the direction of the traffic in longitudinal pattern (according EN 1824).

Parameter	Initial measurements Measurements shall be taken after a minimum of 3 days after application and before a maximum of 14 days	Retained measurements Before 6 months	Retained measurements After one or more full climatic cycle
Night time visibility [R <sub>L</sub> ]	+	+	+
Daytime visibility [Q <sub>d</sub> ]	+	+	+
Colour coordinates x,y	+	+	+
Skid resistance [SRT]	+	+	+
Removability		+	+

To find out realistic results and the best solution for Egypt streets and climatic conditions it would be useful, to carry out the measurement in steady temporal distances and steady conditions.

#### 4.6.10.3 Traffic signs

In Case of traffic signs in general, can be recognised, it will used a material with highest quality by GARBLT (in the most cases micro prismatic Type 3 -Tapes). Indeed, this is not or not yet to see in the real traffic situation. The traffic signs as well as the signs of the road instruction are, if generally available, in bad quality. Also is, except some exceptions, recognise hardly continuity in the kind of installation. Especially on the Cairo ring road, is yet a big gap between a good seeing sign and other signs (e.g. advertising boards). Advertising boards overlay the traffic signs. The result is, the vehicle drivers are not able to recognise the important traffic signs. A continuous system of the signing concerning sign size, contents and arrangement is not recognisable.



No special analysis of the available being, the impact or right use of traffic sign has still taken place. Nevertheless, the first short analyses show that here a big improvement potential is given.

In the figure is shown a positive example for traffic signs. There is a good example for announcing the distance between two points. This sign was developed from the GARBLT staff. The picture shows three generations of posts for this kind of traffic signs. On the left is shown the first step; the last development is shown on the right side. This construction has given an advantage of weight and also for passive safety. Because the post is made of recycling concrete glass fibre material and has in case of an accident impact with a car not so big resistance.

## 5 The Training Courses or the Twinning Project

Three different types of training courses have been performed during the Twinning Project:

1. The Training of road engineers from GARBLT in Road Safety Audits and Inspections,
2. The Training of road engineers from GARBLT in Road Maintenance and safe Road Works
3. The Training of Police officers from Mol and engineers from GARBLT in Accident investigations

### 5.1 The Training in Road Safety Audits and Inspections

The training of 30 engineers of the GARBLT staff was one of the key elements of the Twinning project and covered the following aspects:

- The new organisational structure and functions of the Road Safety Department (tasks, responsibilities and competences),
- Road Safety Inspections and Auditing on interurban and urban roads,
- Road safety deficiencies and countermeasures,
- New design standards.



Lectures and self-study in groups

The training courses were provided by Professor Dr. Juergen Gerlach, University of Wuppertal, Germany as activity leader in cooperation with road safety experts and road safety auditors. The structure of the courses followed the training of trainers approach in order to ensure continuous transfer of know how throughout the organisation.

The courses were divided in different elements:

- Seminars (lectures) on Road Design, Road Side Features, Signing, Marking and Safety Aspects,
- Field studies and design document studies including documentation and proposals,
- Own field and document studies as homework including documentation and proposals in small groups and in their own districts,
- Presentations of results to the entire group,
- Discussions and review with the experts,

56.  
Lectures of the first training Course on Road Safety Inspections

- An additional seminar about the Road Standards and guidelines in Egypt in comparison to US and European standards

This methodology combines theoretical aspects and presentations with practical case studies. The acquired knowledge was developed further through self-study in small groups. The results of the self-study were presented by groups to the plenary and discussed with the experts during the courses.

57.  
Lectures of the second training course on Road Safety Audits

The courses were conducted in five weeks divided as follows:

- One course about Road Safety Inspections for two weeks in May 2009 inclusive lectures, fieldwork along existing roads and preparation of reports,
- One course about Road Safety Audits for two weeks in January 2010 inclusive reports of the trainees about their case studies on design plans, lectures, the preparation of design examples as well as preparation of reports,
- One final course for one week in November 2010 on additional aspects like maintenance tasks with relation to safety or like the design of rest areas and roundabouts inclusive reports of the trainees about their case studies on conducting audits.

58.  
Lectures of the third training course on additional aspects for safe design

An abstract of the presentations of lectures can be seen in the documents 56 (first course May 2009), 57 (second course January 2010) and 58 (third course November 2010). The documents 47 and 48 include an abstract of the RSI and RSA Reports which were part of the self-study and homework.

47.  
Collection of RSI Reports

48.  
Collection of RSA Reports

In addition the Egyptian Road Standards and the design guideline for road (Egyptian Code 104) was analysed and discussed together with the trainers and trainees, with members of the University of Cairo and with engineering consultants in a workshop in March 2010 (see document 59). Several lacks and many recommendations for unsafe design solutions were identified. The need for improving the guideline was agreed and recommendations for changes in the Egyptian Code were worked out (see again Document 41).

59.  
Workshop on Egyptian Road Standards

41.  
Recommendations for Egyptian design standards



Some Trainers and Trainees on Road Safety Audits and Inspections

The training courses were very sufficient – the trainees were engaged and developed their experience in Road Design. The instruments of Audits and Inspections were trained in detail and the participants are now able to use these instruments and to train the whole staff of GARBLT. Their position and the position of the Road Safety Department should be strengthened – it is important that every Road Project in all phases and all design documents will be followed up, supported and checked by that unit. The certification and qualification to Road Safety Auditors and Inspectors which was offered in the courses is the basis to ensure the further development of safe existing roads and safe road projects.

## 5.2 The Training in Road Maintenance and Road Works

In the field of road maintenance and road works there were led through the following trainings:

1. Training in Work Zone Safety: 3 courses for GARBLT Engineers and Technicians and 2 courses for Contractors working on GARBLT roads. As basis for this trainings there was worked out a Guideline for Work Zone Safety on GARBLT Roads.
2. Training for regularly road observation for observers of the Pilot MU Dammanhur: Training on the job on basis of check lists and protocol forms
3. Training for systematic Road Maintenance Planning and Organisation: Training on the job for MU Engineers in Alexandria (Pilot Area).

60.  
Courses in Work  
Zone Safety

## 5.3 The Training in Accident Investigations

In three Modules Police Officers from all over Egypt got instructions on different levels about the topics:

- The actual road safety situation in Egypt
- The accident data base
- Accident response
- Traces at the accident spot (surface, cars, persons )
- Causes of accidents
- Investigation on the accident spot
- Technical equipment
- Accident photography

61.  
All lectures of the  
training course  
Module I



62.  
All the lectures of  
Module II

After the training of 100 police officers in the first Module in a second Module 16 police officers trained together with engineers:

- Investigation on the accident spot
- The three phases of a collision
- Accident lists and diagrams
- Accident reconstruction
- Black Spot management

In a third Module the same engineers and police officers are training together to work on an actual accident scene.



## 6 Conclusions

Road safety is a complex bundle of reasons and tasks in which many stakeholders are involved. After decades of try and error strategies, legal regulations, organisational structures for education and enforcement as well as technical solutions have been developed in Europe and other continents to tackle the bloodshed on their roads successfully. Emerging countries such as Egypt must not repeat those long periods of suffering but can take the best practise from the international network of experience, research and development.

The intention of the EU-Twinning Project was to offer such experiences by legal, organisational and technical proposals focussed on the situation of the country. To strengthen the leadership of the National Road Safety Board (NRSB) is in close relation to the Moscow Declaration Nr2. "Reinforce governmental leadership and guidance in road safety, including by designating or strengthening lead agencies and related coordination mechanisms at national or sub-national level." High ranking Egyptian representatives took part in that Minister's Conference and did sign the full declaration.

The interdisciplinary cooperation between governmental and none governmental organisations has been initiated and institutionalised in five subcommittees of the NRSB. It is now up to their leaders and members to come to a consistent work with routine meetings for the evaluation and development of decision papers to let the Egyptian Road Safety Policy Circle turn around to safer and safer levels on the fields of safer vehicles, safer road users and last but not least safer roads.

A strong position and capacity of GARBLT as a centre for the safety management of public roads is a crucial objective for enhancing road safety in Egypt. Based on numerous Road Safety Inspections (RSI) of existing roads and Audits (RSA) on the drawings for new roads, guidelines for RSI and RSA and design standards for safer roads and bridges have been recommended. Their country wide implementation is up to the board of GARBLT for their public roads and the Sub-Committee 5 of the NRSB for all roads in Egypt. The amendments for their implementation by legal regulations have been drafted and provided for the Minister of Transport.

30 Engineers from the centre in Cairo and the districts have got a special training in safe road design and operation for their future fight for human rights on the countries trunk roads. The training was widened to safer road works and maintenance, which had been detected as a serious road safety issue in Egypt.

The safety of vulnerable road users has to be a special objective in future. Following the Moscow Declaration Number 4, "particular efforts have to be made to develop and implement policies and infrastructure solutions to protect all road users in particular those who are most vulnerable such as pedestrians, cyclists, motorcyclists and users of unsafe public transport, as well as children, the elderly and people living with disabilities". A special guideline has been developed for Egypt to construct traffic calming measures along the agriculture roads and in the cities and villages. Those measures must have an important priority in the Road Safety Action Plan of GARBLT.

Each countries Road Safety Policy circle starts with the evaluation of the earlier implemented measures. About 150 police officers and engineers have been trained in accident reporting and accident investigations along a special guideline which has been developed for Egypt. In future they will use the Geographical Information System (GIS) for the exact localisation of the accidents and for defining a unique accident identification number. A special fund of the EU allows the piloting of the hard and software in 2011. This new management will prepare Egypt to

become a member of the International Road Traffic Accident Data system (IR-TAD). The connections have been provided by the Twinning Project.

Like in other countries accident costs will become an important tool for political decisions on the whole complex field of road safety. In close cooperation with the Ministry of Health and the World Health Organisation the elements of those costs have been calculated reaching a total amount of economical losses of about 32 billion Egyptian pounds per year:

**It is really time for a decade of actions now!**





## **7 Guidelines**

Accident Sheets (Annex 23)

Amendment for Public Roads Law (RSA: Road Categories; Road Access; Bus stops) (Annex 53)

Egyptian RSA Guideline (Annex 46)

Egyptian RSI Guideline (Annex 45)

Guideline Work Zone Safety (Annex 60a)

Proposal RSA Law (Annex 13)

Realisation of Road Worthiness Test Centres for Commercial Transport (Annex 26)

Recommendations for Egyptian Design Standards (Annex 41)

Requirements for Road Safety Audits and Inspections in Egypt (Annex 20)

Traffic Calming guideline for Egyptian Highways (Annex 49)

## 8 Involved Institutions

<b>AustriaTech</b>	Gesellschaft des Bundes für technologiepoltische Maßnahmen GmbH, Wien Austrian Federal Agency for Technological Measures Ltd., Vienna <a href="http://www.AustriaTech.org">www.AustriaTech.org</a>
<b>AEI</b>	Austrian Agency for European Integration and Economic Development <a href="http://www.AEI.at">www.AEI.at</a>
<b>BASt</b>	Bundesanstalt für Straßenwesen, Bergisch Gladbach bei Köln German Federal Highway Research Institute, Bergisch Gladbach near Cologne <a href="http://www.BASt.de">www.BASt.de</a>  Beschaffungsamt des Bundesministeriums des Innern, Bonn German Agency of Procurement <a href="http://www.BeschaffungsamtBMI.de">www.BeschaffungsamtBMI.de</a>
<b>BAG</b>	Bundesamt für Güterverkehr, Köln Federal Agency for Long-distance Goods Traffic, Cologne <a href="http://www.BAG.de">www.BAG.de</a>
<b>BMVBS</b>	Bundesministerium für Verkehr, Bau und Stadtentwicklung, Berlin/Bonn German Federal Ministry for Transport, Building and Urban Development, Berlin/Bonn <a href="http://www.BMVBS.de">www.BMVBS.de</a>
<b>BMVIT</b>	Bundesministerium für Verkehr, Innovationen und Technologie, Wien Austrian Federal Ministry of Transport, Innovation and Technology, Vienna <a href="http://www.BMVIT.at">www.BMVIT.at</a>
<b>DEGES</b>	Deutsche Einheit Fernstraßenplanungs- und -bau GmbH, Berlin German Unity Motorway Planning and Construction Ltd <a href="http://www.DEGES.de">www.DEGES.de</a>
<b>DHPol</b>	Deutsche Polizei Hochschule, Muenster German University for the Police, Muenster <a href="http://www.DHPol.de">www.DHPol.de</a>
<b>DVR</b>	Deutscher Verkehrssicherheitsrat, Bonn German Road Safety Council <a href="http://www.DVR.de">www.DVR.de</a>
<b>ESR</b>	Egyptian Society for Road Safety
<b>ETF</b>	Egyptian Tourist Federation
<b>ETSC</b>	European Transport Safety Council, Brussels
<b>FGSV</b>	Forschungsgesellschaft für das Straßen- und Verkehrswesen, Köln, Berlin German Road and Transportation Research Association, Cologne, Berlin <a href="http://www.FGSV.de">www.FGSV.de</a>

<b>GARBLT</b>	General Authority for Roads, Bridges and Land Transport, Cairo www.GARBLT.et
<b>GTZ</b>	Gesellschaft für Technische Zusammenarbeit, Eschborn, Germany German Development Cooperation, Eschborn, Berlin
<b>GUC</b>	German University Cairo
<b>HLSV</b>	Hessisches Landesamt für Straßen- und Verkehrswesen, Wiesbaden Road Administration of the German State of Hestia, Wiesbaden
<b>IMNRW</b>	Innenministerium NRW, Düsseldorf Ministry of Interior of the German State Northrhine-Westfalia
<b>IRTAD</b>	International Road and Transport Accident Database, OECD, Paris
<b>KfV</b>	Kuratorium für Verkehrssicherheit. Wien Austrian Road Safety Board, Vienna www.KfV.at
<b>LAFP</b>	Landesamt für Ausbildung, Fortbildung und Personalangelegenheiten der Polizei NRW, Neuss Police Training Agency of the Police of the German State Northrhine-Westfalia
<b>LfS</b>	Saarland Landesbetrieb für Straßenbau Saarland, Neunkirchen Road Administration of the German State Saarland, Neunkirchen www.lfs.saarland.de
<b>MSWV</b>	Bbg Ministerium für Stadtentwicklung, Wohnen und Verkehr Brandenburg, Potsdam Ministry for Urban Development, Housing, and Transport of the German State of Brandenburg, Potsdam
<b>MoH</b>	Ministry of Health, Cairo Ägyptisches Gesundheitsministerium
<b>MoHo</b>	Ministry of Housing. Cairo
<b>Moi</b>	Ministry of Interior, Cairo
<b>MoT</b>	Ministry of Transport, Cairo
<b>NLS</b>	Niedersächsische Landesbehörde für Straßenbau
<b>PAO</b>	Programme Administration Office, within the Egyptian Ministry of International Cooperation, Cairo
<b>PIARC</b>	World Road Association, Paris
<b>PD Duisburg</b>	Polizeipräsidium Duisburg, Wasserschutzpolizei, Duisburg Director of the police of Duisburg - Waterpolice
<b>RP Freiburg</b>	Regierungspräsidium Freiburg, Freiburg State District Administration of Freiburg
<b>StraßenNRW</b>	Landesbetrieb Straßenbau Nordrhein-Westfalen
<b>Uni Erlangen</b>	Friedrich-Alexander-Universität Erlangen-Nürnberg State University Erlangen-Nueremberg, Germany

**Uni Wuppertal** Bergische Universität Wuppertal  
University of Wuppertal, Department of Transport Planning and  
Transport Systems  
[www.uni-wuppertal.de](http://www.uni-wuppertal.de)

**WHO** World Health Organisation, Regional Office for the Eastern  
Mediterranean, Cairo



## 9 The short Bio's of the Twinning Experts

### German Project Leader (PL)



**Konrad Bauer** (1943) is the German leader of this German – Austrian – Egyptian project. As a lawyer specialised on road and traffic law, EU standardisation in road materials, human resources, financial management, research management, he was civil servant in the German Federal Ministry of Transport (15 years) and in the German Federal Highway Research Institute BASt (19 years). He was former German delegate to OECD and EU technical committees, and held many speeches on international congresses. He was member of several Assessment Institutions for Governmental Staff Officers. Since 2008 retired he still publishes books on road and traffic law and works as international road law expert.

### Junior Project Leader (Junior PL)



Dipl. Ing. Dr. **Günter Breyer** (1945) had until recently the position as a Deputy Road Director and head of the Technology and Road Safety Division at the Austrian Ministry of Transport. He received an education as a Civil Engineer at the Technical University of Vienna where he also spent 10 years as a scientific assistant. After 5 year in a research institute of the construction industry he returned to public service as a Road Engineer, specialised on road technology and road safety. Günter Breyer is member of several national and international technical organisations. He retired in summer 2010 and now acts as senior consultant for international projects

### Resident Twinning Adviser (RTA)



Dipl. Eng. **Hans-Joachim Vollpracht**, Residential Twinning Advisor for Enhancing Road Safety in Egypt, managed similar Projects in Romania and Vietnam before. After the German reunification 1991, he was head of the Ministry Department for Roads and Traffic, Brandenburg, and initiated the first Road Safety Programme in Eastern Germany. Before he managed roads, bridges and urban development in Berlin where he made his master in Civil Engineering at the Technical University and got the certificate for management in supreme positions. He is chairing PIARC Technical Committees on safer Roads, key speaker at international congresses and an active UN Road Safety Collaboration member.

### Residential Twinning Assistant



**Omneya Farouk** (1983) works as the Resident Twinning Advisor Assistant for the project. Upon completion of her Law studies, she worked in many developmental projects in the fields of education, culture and research in Alexandria, Cairo and Lisbon. She obtained a Master degree in Euro-Mediterranean relations from Barcelone, and is now responsible for coordination of the Twinning Project activities in Cairo.

### Activity Leaders



Dipl.-Ing. **Thomas Fessl** (1969), project coordinator within the Austrian Road Safety Board (KfV), joined the KfV in 2003. He graduated from the Vienna University of Technology in the field of Regional Sciences in 1996 and has 14 years professional expertise in road safety, transport-economics, traffic engineering and telematics.



Univ.-Prof. Dr.-Ing. **Juergen Gerlach** (1963) is heading the Institute for Road Traffic Planning and Engineering at the University of Wuppertal, Germany, since 1999. As a civil engineer he has experience in Road Design, in network planning, environmental assessments and in road safety for 23 years. He works on standards and guidelines, is certified Training Supervisor for Road Safety Auditors, Chief Editor of the German Magazine for Road Safety and Member in Committees of PIARC and of EU-COST Actions. He was honored for outstanding activities in the field of road design and for the best traineeship at the University of Wuppertal.



Dr.-Ing. **Horst Hanke** is working at the Ministry of Transport of German State Saarland heading the Road Administration. As civil engineer he has experience in Road Design, Traffic Management, Road Maintenance and Traffic Safety for 29 years, most in the German Road Administration. He works in several national and international committees in the field of Road Design and Maintenance, especially CEN, COST and PIARC. He leads the German Federal Committee of Road Maintenance. He has published several reports and presentations in the field of Road Design and Management. He was honored for outstanding activities with the German Road Safety Award.



**Martin Moennighoff** (1960) is police officer in North Rhine-Westphalia and is heading the branch of traffic Management at the German Police University ([www.dhpol.de](http://www.dhpol.de)). For ten years he is responsible for the Master study course and the further training for all senior police officers in Germany. He is an international expert in the field of Road Safety and Police Management. He was engaged in the Road safety project (ADB and GRSP) in China 2005-2007.

### Short Term Expert



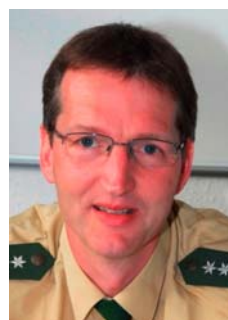
Colonel. **Mourid Albert** (1970) works as the head of the Research & Development Division in the Egyptian General Traffic Department. He obtains two Master degrees in Public Security and Crisis Management. Upon completing his studies he worked as a traffic police officer, and contributed to the traffic planning and geographic information systems work within the traffic department. He is now responsible for developing and managing several advanced projects on traffic management, traffic accidents investigation, ITS, and crisis management.



Dipl.-Ing. **Ralf Baumann** (1963) works as head of Road Design Department of the Engineering Consultant Schuessler-Plan in Berlin, Germany. He is a certified Road Safety Auditor. As a civil engineer he is experienced in design of different traffic facilities, e.g. motorways, rural roads and inner urban roads for 22 years. He makes road safety audits for different kind of roads and takes part in international road design projects as a consultant in case of road safety, e.g. in Romania. He works as a member of the German Road Safety Association to raise the level of road safety.



Dipl.-Eng. **Gerhard Bößling** (1950) works as department head for the German Unity motorway planning and construction company (DEGES). He is a certified Road Safety Auditor. At completion his education in civil engineering he has been working for the State Office for Road construction in Lower Saxony, Germany as civil engineer for traffic affairs for the examination of motorway and highway design. Working for the DEGES he is now responsible for placing orders for planning, bid invitation and construction of motorways and highways. He makes road safety audits for different kind of roads.



Kriminalhauptkommissar **Andreas Brockerhoff** (1962) is Police teacher for road accident affairs at the Institut for Education and Further Education of the police of North-Rhine Westphalia. He trains policemen in acquisition of accident data, securing of evidence and road accident investigation for more than 10 years. He has the qualification in schooling members for road accident management commissions and he is member of the national road management commission from North-Rhine Westphalia.



Eng. **Tarek El-Attar** (1949) worked as the Chairman of the Egyptian Public Authority for Roads, Bridges and Land Transport. He is a certified mechanical engineer, with several higher studies in economics and management. He undertook several managerial positions in the oil&gas sector before transferring into the roads & bridges sector. Prior to his retirement in 2010, he was responsible for the top management and supervision of all projects related to the roads, bridges and land transport sector in Egypt.



Dipl.-Ing. **Robert Fürst** (1942) today works as independent consultant in the area of vehicle and transport safety. Before retiring 2003 he was the director of the Federal Office for Vehicle Inspection in Austria. He represented Austria on behalf of the Ministry for Transport, Innovation and Technology in several European working groups, developing and adapting European legislation linked to vehicle inspection, vehicle surveillance, the European recording equipment and the rules of driving-time and rest.

Additionally he took part as expert on numerous TAIEX missions and European projects (TWINNING, BISTRO, implementation of remote sensing on roadside inspection procedures, ....).



Dr.-Ing. Arnold Hemmert-Halswick is head of section Steel Structures, Corrosion Protection in the department Bridges and Structural Technology of the Federal Highway Research Institute BAST since 2001. His main task is to work on research projects for the German ministry of Transport and to write additional technical contract conditions with testing procedures and delivery conditions based on European standards. The tasks of the section are also the bridge equipment like the anchoring of vehicle restraint systems on bridges, layers, bearings and expansion joints.

Academic Director Dr. phil. Ass. jur. **Franz-Rudolf Herber** is a lawyer and philologist. At Friedrich-Alexander-University Erlangen-Nuremberg he teaches inter alia road law, public service law, liability of public authorities and cross-curriculum interrelations between law and language. He disposes of great experience in international negotiations which he acquired during his long-standing occupation in the German Ministry of Transport. In 2010 he contributed ca. 550 pages to the German standard work to road law (Kodal, Straßenrecht, München, 2010).





Dipl.-Ing. **Hans Walter Horz** (1948) is Managing Director of the German Road and Transportation Research Association (FGSV), since 1997. As a civil engineer he has experience in Road Construction, Road Maintenance including Asset Management Systems. He works on standards and guidelines, is chief editor of the German magazines "Straße und Autobahn" and "Straßenverkehrstechnik" and participates in activities of the World Road Association (AIPCR/PIARC). There he is member of the AIPCR Council and its Committee on Terminology and secretary of the German National Committee of AIPCR



Dr. **Armin Kaltenecker** (1965) is head of division legislation & regulations at the Kuratorium für Verkehrssicherheit (Austrian Road Safety Board), since 2010. As a lawyer he has experience in legislative processes concerning mobility and transport and has excellent knowledge of road safety, legal affairs concerning traffic and mobility for 13 years. He works on standards and guidelines, drafting of regulations and laws, as a project leader and collaborator of projects at national and international level and is governmental driver license examiner and Member of professional bodies Austrian Safety Fund and Austrian Traffic Safety Council. He was involved in the preparation of the Austria National Road Safety Action Plan published in 2001 and is writing professional articles.



Colonel **Ulrich Knappe** (1959) is police governor at the police department of Hameln-Pyrmont /Holzminden, Lower Saxony – Germany, since July 2010. After police staff college he works as a police officer (major/leutnant colonel and colonel) in various functions of police working. He has experience in police traffic management, in police operations (world exhibition "EXPO 2000"; soccer world championship; demonstrations and events) and as a lecturer for police traffic management at the German police university in Münster. He gives seminars for higher ranks of German and European police officers, takes place in different working groups of German domestic affairs in police traffic management, was responsible for the German report of drugs in traffic and author at professional police journals.



**Rudolf Keppler** (1943), Senior Road Equipment Consultant, RKM-Consult, since 2008. He has worked for 36 years in the German Federal Highway Research Institute in different Departments (Accident research, planning and coordination for Research Projects, Traffic Engineering). Too last he was Deputy Leader of the Division 'Road Equipment'. During the active time he was Member of EU TC 226 WG2 'Horizontal Signs' and head of the Task Group 'Wear Simulator' within this Group. He is still working in all topical national Road Markings Working Groups.



Dipl.-Geogr. **Jacqueline Lacroix** (1961) is responsible for international relations and co-operation at the German Road Safety Council since 1991. She has studied Geography in Cologne and has a broad experience in setting up road safety organisation structures and networks, first in the Eastern part of Germany and then at European level. She is member of the expert network of the European Transport Safety Council, of the IRTAD/OECD Group (International Road Accident Database), author of articles and speaker at international conferences and is advisor of road safety projects in developing countries.



Dipl.-Ing. **Klaus Machata** (1965), has been with the Austrian Road Safety Board (KfV) since 1993. He has a background in electrical and transport engineering and is responsible for KfV's international relations and strategic road safety work in cooperation with authorities and companies. He is member of several research & consulting projects and working groups at EU level as well as in associated countries.



Eng. **Sayid Metwalli** (1965) works as manager of road safety Department for the Egyptian Public Authority for Roads, Bridges and Land Transport. He studied civil engineering in Egypt and obtained his Bachelor and higher Diploma in roads engineering, and had a Diploma in roads maintenance and management from Germany. Upon completing his studies he worked as a maintenance engineer for bridges and roads. He is now responsible for managing the activities of his department including road safety audit & inspection, road safety impact assessment, managing road projects related to traffic control devices, and supervising the signing and marking works over the Egyptian roads network.



Dipl.-Ing. **Cornelia Nussbaumer** (1979) was heading the department for Road User Behaviour at the Austrian Road Safety Board, Austria, between 2008 and 2010. As a road safety researcher she has experience in Road and Railway Safety Programme, rural roads, tunnel safety, enforcement and general road safety work for 10 years. She worked on several EU-projects on various road safety topics and as short term expert in 3 Twinning projects.



Dipl.-Ing. **Lutz Pfeiffer** (1962) got his diploma as civil engineer in Dresden in the year 1988. He is certified auditor (University Weimar) since 2003 and in addition certified at the Wuppertal University in 2010. He is working as designer and project manager of substantial road infrastructure projects in Germany. In addition he is working as designer and road safety expert as well as lecturer for road safety design and audit in different projects in Europe, Asia and Africa. He is the first chairman of a non-profit road safety audit association in Germany (GRSA).



DI Dr. tech. **Reinhard Pfliegl** (1944) is actually Managing Director of AustriaTech – Agency for Intelligent Transport Systems (ITS) of the Austrian Ministry for Transport, Innovation and Technology. Before he served for 20 years for Alcatel in the area of telecommunication, development and application of mobile communication in transport and logistics. In 2000 he joined via donau, the Austrian Waterway Operator, to develop the Danube River Information Service, the first of its kind worldwide.



**Susanne Reichwein** (1965) is working freelance for the OECD (Research Centre of the International Transport Forum), [www.internationaltransportforum.org](http://www.internationaltransportforum.org). She is responsible for the maintenance and administration of the International Road Traffic and Accident Database (IRTAD) and its web site, data collation and quality control, contact with national member institutes in 30 countries, product development, coordination of the IRTAD Working Group. For further information see [www.irtad.net](http://www.irtad.net).



Mag. **Birgit Salamon** (1982) is legal expert and project collaborator at the Department for Legislation & Regulations at the Kuratorium für Verkehrssicherheit (Austrian Road Safety Board) since 2007. She has 3 years of experience in traffic law and works as a legal expert in national and international projects and task groups concerning traffic safety. She is a member of the organizing team of the Austrian Traffic Law Day (Verkehrsrechtstag) since 2008.



**Christian Stefan** (1974) studies Regional Science & Town Planning at the Technical University of Vienna. From 2000 to 2002 he was Project collaborator at the Institute for Transport Planning and Traffic Engineering. Since 2002 he is Project Manager of national and international projects within the Austrian Road Safety Board (KfV)  
His main fields of expertise are: Cost-Benefit Analysis, Multivariate statistical techniques, Accident Prediction Models, Pedestrian safety, Heavy Goods Vehicles



Dipl.-Eng. **Bernd Strnad** (1970) is Team leader of the Traffic Engineering unit within the Austrian Road Safety Board. He has experience in Road Design and Traffic Planning, in his work for the Austrian Road Safety Board he is mostly working on Road Safety Audit and Road Safety Inspection. He works on standards and guidelines and is lecturer in the Austrian training course for Road Safety Auditors and Road Safety Inspectors.



Chief Superintendent **Wolf Wewers** (1958) is heading the Training Unit for foreign assignments in the State Bureau for Education, Training and Personnel of the police in Northrhine-Westfalia. For several years he has been responsible for the training of 17,000 police officers in all fields of road safety (prevention, procession of accidents, traffic control) and furthermore was a lecturer for traffic science at the German Police University. Beside several years in all fields of major crime investigation he has practical experience as head of a big motorway police department and is engaged in the “Lifesaver-Project” of the European Traffic Police Network (TISPOL) with training courses and as an author for an Enforcement Manual for Senior Command Staff of the police in Europe.



Dipl.-Ing. **Martin Winkelbauer** (1966) is holding a position as senior researcher in the Department “Research & Knowledge Management” of KfV, the Austrian Road Safety Board. Since 1993 he lead and executed research and implementation activities of various content. His focus is on driver education and vehicle technology. Particular fields of experience are vehicle safety, child restraints, driver testing and efficiency assessment. He is leading the Austrian Standards working group on cargo securing. He is involved in several activities to improve motorcycle and moped safety worldwide, e.g. co-chairing the respective ETSC working party and as a member of the JTRC-OECD motorcycle safety group.

#### **Further Short Term Expert**

Chairman el Bolok

General Sharif

Khozouei, Nooshin

Kattusch, Martin

Näke, Ulrich

Prummer, Karl

Vorrath, Ernst

Weber, Bernd