REPUBLIC OF TURKEY

Road Improvement and Traffic Safety Project

Traffic Safety Project

NATIONAL TRAFFIC SAFETY PROGRAM

FOR TURKEY

MINISTRY OF INTERIOR
MINISTRY OF NATIONAL EDUCATION
MINISTRY OF PUBLIC WORKS AND SETTLEMENT
MINISTRY OF HEALTH
GAZİ UNIVERSITY

MAIN REPORT
December 2001

SWE ROAD

This National Traffic Safety Program for Turkey is presented in:

- Main Report and Appendices
- Executive Summary

Foreword

In Turkey more than nine thousand persons are killed in road accidents every year and probably some two hundred thousand are injured. In other words, around 25 people are killed and more than 500 are injured every day on Turkish roads. Some of the injured are handicapped for life. Many of the victims are young, which means that major parts of their lives are totally or partially destroyed.

In addition to pain and suffering, grief and sorrow, accidents cause huge economic losses to the Turkish society and its citizens. It has been estimated that the socio-economic costs of road crashes amount to TL 2 000 000 billion per year (1999 price level).

It is not reasonable to accept that the road transport system creates such human disaster every year. In order to substantially reduce the problem, this National Traffic Safety Program has been developed within the Traffic Safety Project (financed partly by World Bank loans and partly by Turkish funds).

The aim is to tackle the accident and casualty problem by firstly analyzing the *Problem*, formulating a safety *Vision*, developing a *Strategy* and an action *Plan*, and then by implementing proposed actions. The time-period for the Program is 2002-2011.

The overall long-term **safety vision** is that:

- *Nobody should be killed or seriously injured (as a result of a road accident) on Turkish roads.*

The medium-term **safety objectives** are that:

- *The numbers of persons killed and seriously injured (as a result of a road accident) should be continuously reduced.*
- *Special attention should be paid to the safety of vulnerable road users and children.*

The **safety targets** compared with 1999 are that:

- *by 2006*
  - *the number of killed should be reduced by 20 percent,*
  - *the number of killed vulnerable road users should be reduced by 20 percent,*
  - *the number of killed children (0-14 years) should be reduced by 25 percent,*
- *by 2011*
  - *the number of killed should be reduced by 40 percent.*
  - *the number of killed vulnerable road users should be reduced by 40 percent.*
  - *the number of killed children (0-14 years) should be reduced by 50 percent.*

Implementing the proposed interventions and attaining these targets will altogether save more than 4 200 lives over the next 5 years.

To attain the targets, a broad spectrum of "institutional" as well as "technical" interventions have been proposed. The Program focuses on a number of institutional areas: improved transport policy, attitudes towards safety, organization, cooperation and coordination, safety staff, funding, data banks, and safety research and development, as well as a number of

technical areas: safer roads and vehicles, safer road users, better education, better legislation and enforcement, and improved emergency services. The Program also includes some specially prioritized areas, reduced speeding and aggressive driving, and increased use of safety equipment.

The proposed interventions will require additional funds, improved social responsibility and tougher regulations and enforcement. The success of the Program will of course depend on its implementation. Increased efforts are needed from all parts of society: public agencies, private enterprises and organizations as well as all individuals.

It must be stressed that traffic safety is a most important responsibility for all involved in road transport. Everyone has a stake, the Parliament and the government, many ministries and government authorities (KGM, Police and Jandarma, MoNE and MoH etc.), provincial governments, local authorities, car makers and importers, fuel/tire and insurance companies, transport providers, universities, schools, emergency services and health care organizations, media, planning and design organizations, and non-governmental organizations (NGOs), all have a role in creating the conditions for safer road traffic. Last but not least, the individual road user – drivers, riders and walkers – has an important role.

The intention is that this national Program should be complemented by provincial and local safety programs, which are consistent with this Program, but reflecting provincial and local problems and imperatives.

The progress of the Program should be continuously monitored and evaluated. In 2006 the Program should be reviewed and revised.

The Program has been prepared by SweRoad[x)] in collaboration with the "Task Force" of the Traffic Safety Project. A draft version of this Program has been sent for consultation to the main actors. Their comments have been considered and included in this final version.

TRAFFIC SAFETY STARTS WITH YOU

Ankara 2001-12-31

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Abbreviations

AADT	Annual Average Daily Traffic
AASHTO	American Association of State Highway and Transportation Officials
ABS	Anti-blocking Brake System
ACC	Adaptive Cruise Control
BAC	Blood Alcohol Concentration
BASt	German Federal Highway Research Institute
BS	Bachelor of Science
ca	Approximately
CBA	Cost-Benefit Analysis
CE	Civil Engineering
CEN	European Committee for Standardization
DK	Denmark
EAPP	Emergency Aid Pilot Project
EC	European Community
EEC	European Economic Community
EU	European Union
Euro NCAP	European New Car Assessment Program
EGM	General Directorate of Security (Police)
GCJ	General Commandership of Jandarma (Jandarma)
GIS	Geographic Information System
GNP	Gross National Product
GRSP	Global Road Safety Partnership
HEC	Higher Education Council
HTSC	Highway Traffic Safety Council
IRTAD	International Road Traffic and Accident Database
IT	Information Technologies
ITS	Intelligent Transport Systems
KGM	General Directorate of Highways
LoS	Level of Service
mc	Motorcycles
MoPWS	Ministry of Public Works and Settlement
MoL	Ministry of Labor

MoH	Ministry of Health
MoI	Ministry of Interior
MoIC	Ministry of Industry and Commerce
MoNE	Ministry of National Education
MoT	Ministry of Transport
NGO	Non-governmental organization
NL	The Netherlands
NP	National Project
NRTSS	National Road Traffic Safety System
NTF	Swedish National Society for Road Safety
OECD	Organization for Economic Co-operation and Development
PhD	Doctor of Philosophy
PIARC	Permanent International Associations of Road Congresses
PP	Pilot Project
PRI	La Prévention Routière Internationale
R&D	Research and Development
RfSF	Danish Road Safety Council
SE	Sweden
SHSC	Supreme Highway Traffic Safety Council
SIS	State Institute of Statistics
SPO	State Planning Organization
SweRoad	Swedish National Road Consulting AB
ToR	Terms of Reference
TL	Turkish Lira
TSP	Traffic Safety Project
TSS	Traffic Safety Secreteriat
TŞOF	Turkish Drivers and Automobiles Association
TÜBİTAK	Turkish Scientific and Technical Research Organisation
UKOME	Transportation Coordination Centre
USD	United States Dollars
VAT	Value Added Tax
VMS	Variable Message Signs
VOC	Vehicle Operating Costs
WB	World Bank

1 Introduction

1.1 Background

The Government of Turkey is carrying out a "Road Improvement and Traffic Safety Project", financed by World Bank loans and domestic funds. The Traffic Safety Project (TSP), which is part of the mentioned project, has a budget of close to USD 91 million[*], and consists of three parts: a Pilot Project (PP), a National Project (NP) and a Strategy for a National Road Traffic Safety System (NRTSS).

The Swedish company "Swedish National Road Consulting AB" (SweRoad) is providing consultancy services for the Traffic Safety Project. A special Task Force is the counterpart of the Client, and has the function of a discussion group and an approval and decision body for SweRoad.

According to the Terms of Reference (ToR), the Consultant will "produce a proposed long-term Traffic Safety Plan (2001-2010) by the end of September 2000[**]. The plan shall cover the institutional framework for traffic safety, a mid-term (5 years) program of priority activities and list of performance indicators required for monitoring implementation of the Traffic Safety Plan and related programs. The overall target of the Traffic Safety Plan shall be to "reduce the amount of fatalities and injuries in traffic accidents by at least 40 percent within a 10 year period from the commencement of implementation of the Plan".

This final report for the NRTSS has been called the **National Traffic Safety Program for Turkey.**

1. 2 Objectives of the program

The overall objective of the program is to substantially reduce the accident and casualty problem in Turkey during the next decade and in the future.

This is to be achieved by firstly analyzing the *Problem,* formulating a safety *Vision,* developing a *Strategy* and an action *Plan,* and then by implementing proposed actions.

1. 3 Basic principles and structure of the program

The basic principles for the development and the structure of the program are given in Appendix A. In brief, the National Traffic Safety Program is developed in four steps:

1. Analysis of the present accident and casualty problem ("**Problem**")
2. Formulation of a safety vision ("**Vision**")
3. Development of a strategy ("**Strategy**")
4. Development of an action plan ("**Plan**")

[*] later reduced to about USD 80 million
[**] later postponed until December 2001.

In "**Problem**", the road accident and casualty problem is analyzed, mainly by studying accident statistics and major factors effecting the safety situation. The Problem forms an important and necessary basis for the Strategy and the Plan.

In "**Vision**", the ultimate and ideal, long-term image for traffic safety is formulated. The Vision forms an important basis for the Strategy and the Plan. The Vision is also necessary in order to increase politicians', media's and the general public's interest in traffic safety.

In "**Strategy**", the overall objectives and the long-term targets are developed. It is also proposed what strategic actions should be taken in order to achieve the targets in an efficient way. The Strategy has to be carefully prepared and agreed upon, and forms an important and necessary basis for the Plan.

In "**Plan**", mid- and short-term targets are developed. It is also proposed what actions should be taken in order to attain the targets in an efficient way. The Plan has to be carefully prepared and agreed upon.

1. 4 Authorization, responsibility and accountability

It is suggested that the Program, after having been approved by the Task Force, should be authorized by the Supreme Highway Traffic Safety Council (SHSC) or some of the involved ministries. This authorization should imply that the Program is finally approved and should be implemented, and that necessary state financing is secured.

It is further suggested that the Program be published by the Highway Traffic Safety Council (HTSC) or the Task Force, in principle, by order from the SHSC.

The ultimate responsibility and accountability for the Program and its implementation rests with the SHSC or the authorizing ministries. However, it is suggested that the HTSC should act as a preparatory and assisting group for the SHSC (or the authorizing ministries) in this matter, and act on its behalf. This implies that the HTSC should take responsibility for "minor" matters. For "extensive and far-reaching" matters, the SHSC (or the authorizing ministries) has the ultimate responsibility.

1. 5 Monitoring and evaluation

It is suggested that the implementation of the Program be monitored by a special group from the proposed Traffic Safety Secretariat (see "Strategy" and "Plan"). Awaiting this, the present Task Force should act as the monitoring group. The group should report its findings to the HTSC at least twice a year. The HTSC then decides about "minor" actions needed. If the necessary actions are "extensive and far-reaching", the question has to be transferred to the SHSC (or the authorizing ministries). In order to be effective, it is suggested that the Task Force, during the time-period the Task Force is acting as the monitoring group, is supported by at least one full-time experienced safety specialist.

The HTSC reports to the SHSC (or the authorizing ministries), at least once a year on this matter. The SHSC can then take further action.

1. 6 Time-periods and revisions

The time-period for the Program is suggested to be 2002-01-01--2011-12-31. The intention is that the Program (at least the Strategy and the Plan) should be reviewed and revised in the year 2006 to cover the period 2007-01-01--2011-12-31.

It is suggested that the review and the revisions should be carried out by the monitoring group, and be authorized by the SHSC (or the authorizing agencies), in the same way as for this Program.

2 Problem

Basic principles:

In this Problem section, the road accident and casualty problem is analyzed, mainly by studying accident statistics and major factors affecting the safety situation. In principle, the analysis should have a wide approach and cover all major safety problems. The Problem forms an important and necessary basis for the Strategy and the Plan.

As many of the problems have been analyzed and discussed in previous SweRoad reports (see References), this section will mainly contain brief summaries of the problems. In some cases the problem statements are based on a limited number of observations.

2.1 Statistics and forecasts

2.1.1 Development and present situation

Main problems:

- The number of reported road traffic accidents has increased from approximately 115 000 in 1990 to 466 000 in 1999 (corresponding to an average annual increase of 17 percent). In 2000 the number was 501 000.
- The number of reported injuries has increased from 88 000 in 1990 to 126 000 in 1999 (corresponding to 4 percent annually). In 2000 the number was 135 000.
- The number of reported fatalities was 6300 in 1990 and 6100 in 1999 (corresponding to a 0.4 percent decrease per year). In 2000 the number was 5600.
- According to official statistics, the following factors contribute to severe accident and casualty problems: speeding, low seat belt usage, junctions, and pedestrians.

Accidents, casualties and influencing factors
The *historic development* of reported road traffic accidents and casualties, as well as some influencing parameters, are illustrated in Appendix B and Appendix C. The diagrams and tables in this section give a brief summary of the development. The annual numbers of reported accidents, injuries and fatalities are shown in Figure 1, 2 and 3 respectively.

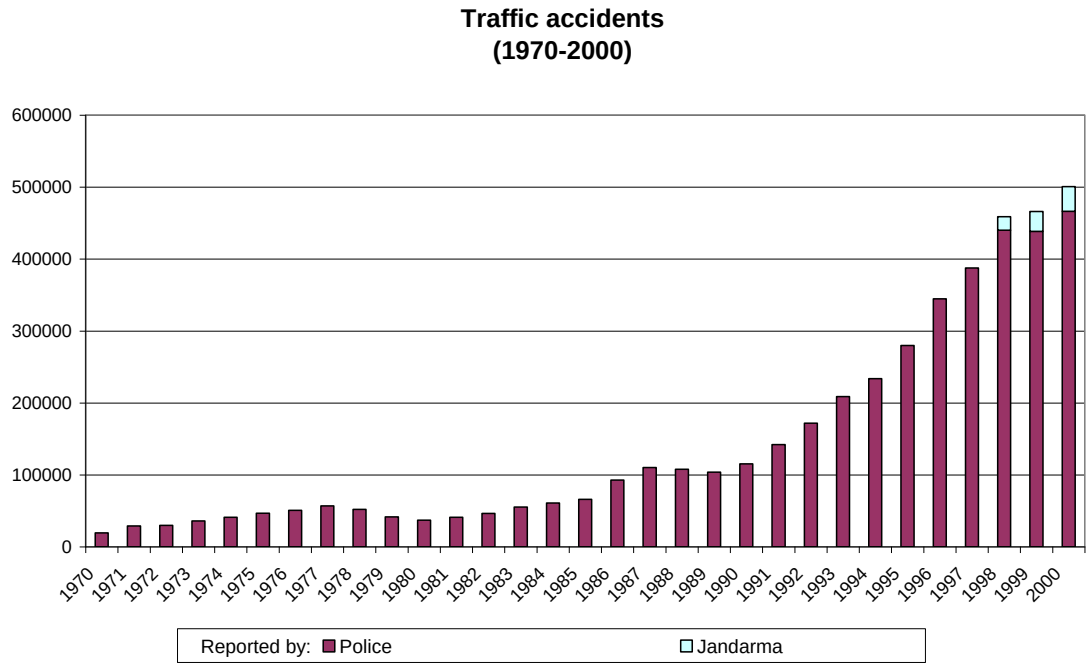

Figure 1: Number of reported accidents (Police and Jandarma).

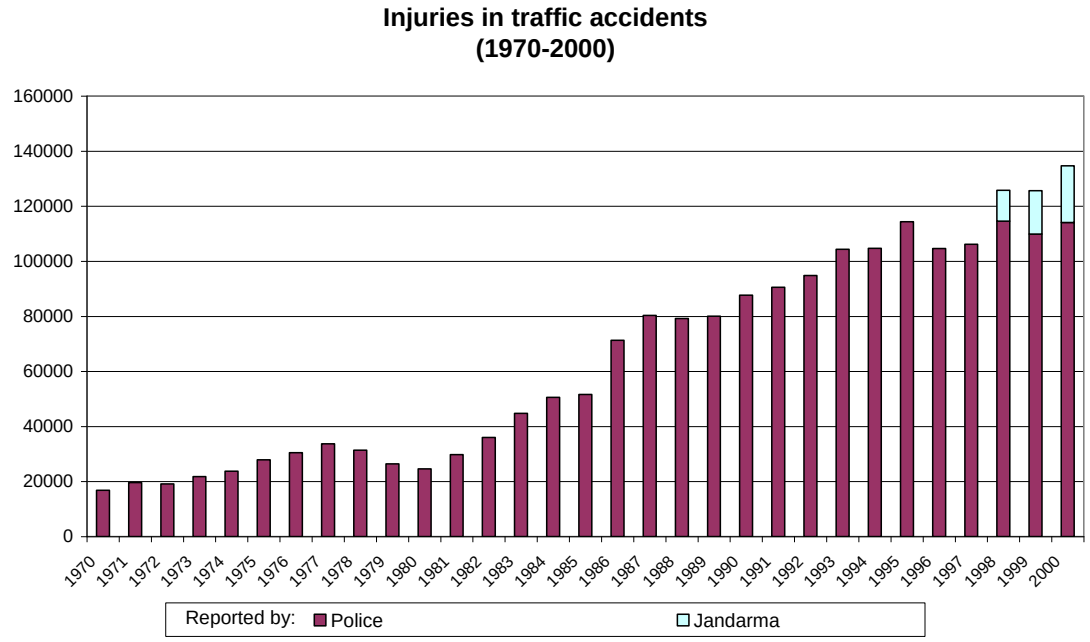

Figure 2: Number of reported injuries (Police and Jandarma).

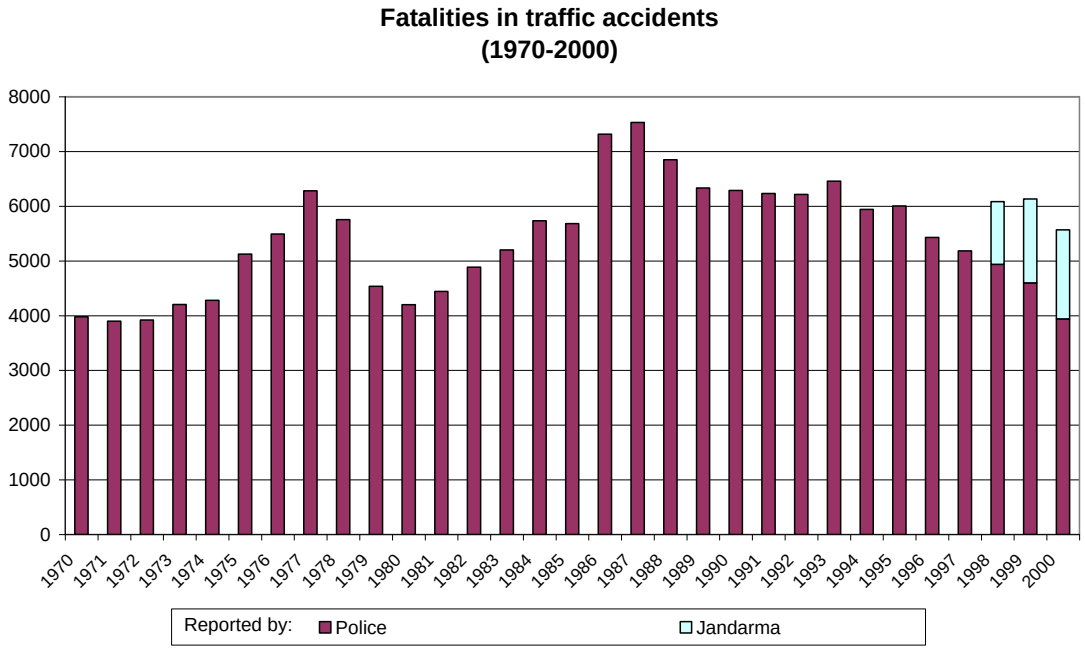

Figure 3: Number of reported fatalities (Police and Jandarma).

The development is summarized in Table 1.

Table 1: Number of reported accidents, injuries and fatalities (Police and Jandarma).

Reported:*)	1970**)	1990**)	Ratio 1990/1970	Increase (%/year)	1999***)	2000 ***)	Ratio 1999/1990	Increase (%/year)
Accidents	19207	115295	6.0	9.4	465915	500653	4.04	16.8
Injuries	16838	87693	5.2	8.9	125586	134618	1.43	4
Fatalities	3978	6286	1.58	2.3	6130	5566	0.975	0
Injury accidents	–	50681		–	67732	71771	1.34	–
Fatal accidents	–	5090	–	–	4537	4210	0.89	–
Injuries per injury accident	–	1.73	–	–	1.85	1.88	–	–
Fatalities per fatal accident	–	1.23	–	–	1.35	1.32	–	–

*) "hit and run" cases not included. **) EGM only. ***) EGM plus Jandarma.

The development can be described as follows:

- The number of reported road traffic fatalities (by EGM and Jandarma) has increased from 3 978 in 1970 to 6 130 in 1999. The trend has fluctuated. The average annual change the last nine years has been zero. In 2000, the number was 5 566. In addition, the number of "hit and run" cases was 433 in 1999.
- The number of reported injuries has increased from 16 838 in 1970 to 125 586 in 1999. The annual increase the last nine years has been 4 percent. In 2000 the number was 134 618. In addition, the number of "hit and run" cases in 1999 was 10 664.

- The number of reported accidents has increased from 19 207 in 1970 to 465 915 in 1999. The annual increase the last nine years has been almost 17 percent. In 2000, the number was 500 653. In addition, the number of "hit and run" cases was 14 021 in 1999.
- It must be observed that accidents and casualties in Jandarma regions are included only in the 1997 (partly), 1998, 1999 and 2000 figures. This means that accident and casualty numbers from previous years are underestimated.

It seems as if the number of fatalities for year 2000 is quite different from the numbers for previous years. The year 2000 has therefore been considered as somewhat exceptional, and year 1999 has been selected as the "base year" for comparisons with targets.

The development for some major influencing parameters are illustrated in Table B2 in Appendix B. From this table it can be seen that:

- The number of inhabitants has increased from 35 million in 1970 to 64 million in 1999.
- The GNP per capita has increased from USD 519 in 1970 to USD 2 996 in 1999. In 2000, the corresponding value was USD 3100. For 2001, the value will be substantially lower.
- Passenger car ownership has increased from 4 passenger cars per 1 000 inhabitants in 1970 to 74 in 1999.
- The number of passenger cars has increased from 0.14 million in 1970 to 4.7 million in 1999.
- Motor vehicle ownership*) has increased from 14 motor vehicles per 1 000 inhabitants in 1970 to 137 in 1999.
- The number of motor vehicles*) has increased from 0.49 million in 1970 to 8.8 million in 1999.

Based on the reported numbers of inhabitants and registered motor vehicles*), the development has been as follows:

- The number of reported fatalities per 100 000 inhabitants has decreased slowly from 11 in 1990 to 9.5 in 1999.
- The number of reported injuries per 100 000 inhabitants has increased slowly from 156 in 1990 to 195 in 1999.
- The number of reported accidents per 100 000 inhabitants has increased rapidly from 205 in 1990 to 724 in 1999.
- The number of reported fatalities per 100 000 motor vehicles*) has decreased from 154 in 1990 to 69 in 1999.
- The number of reported injuries per 100 000 motor vehicles*) has decreased from 2 143 in 1990 to 1 421 in 1999.
- The number of reported accidents per 100 000 motor vehicles*) has increased rapidly from 2 818 in 1990 to 5 272 in 1999.

*) incl. mc and tractors. EGM statistics.

The *present situation* concerning accident and casualty reporting and statistics can be characterized as follows:

- EGM and Jandarma report accidents, injury accidents, injuries, fatal accidents and fatalities (dead at the accident scene)[*)]. From 1999, special data for so-called "hit and run" cases are also reported by EGM.
- There is no official information available concerning how many injured persons die during transport to medical care.
- MoH publishes hospital statistics concerning annual number of deaths in hospital from "motor vehicle accidents" and from "other transport accidents".

Altogether this means that it is very difficult to get a true picture of the total accident and casualty situation. Actual and estimated numbers for the years 1997 to 1999 are presented in Table B3 in Appendix B.

As can be seen from this table, the *estimated* number of fatalities, which are reported by EGM, Jandarma and MoH, is more than 8 488 in 1997 and 8 775 in 1998. In 1999, the corresponding value is 8 666. If "hit and run" cases are added, the value is 9 099 in 1999. To these values should be added the number of injured who die during transport to hospital. This means that the total number of fatalities (with the 30-days definition of a road fatality) amounts to somewhere between 8 900 (in 1997) and 9 550 (in 1999, including "hit and run").

The number of reported injuries has been between 106 146 and 125 793. If the "hit and run" cases are added, the total for 1999 amounts to 136 250. The number of reported accidents has varied between 387 533 and 465 915. If the "hit and run" cases are added, the total for 1999 amounts to 479 936.

Major accident types and problems
According to EGM statistical reports, the following factors contribute to severe accident and casualty problems (see Appendix B):

- speeding,
- low seat belt use,
- junctions,
- pedestrians.

2.1.2 Forecasts of motorization, accidents and casualties

Main problems:

If the traffic safety work is carried out as usual, that is, if no additional or special safety actions are taken, the number of casualties and accidents are forecasted to be:

- fatalities: 9 125 in 2006 and 9 200 in 2011,
- injuries (reported): 167 000 in 2006 and 193 000 in 2011,
- accidents (reported): 824 000 in 2006 and 1 185 000 in 2011.

*) According to some information, EGM/Jandarma statistics can include some (very few) persons who die within 24 hours.

The *developments for the last nine year and forecasts* for several parameters up to and including 2011 are illustrated in Appendix B and Appendix C. The following tables give a summary of the forecasts. Table 2 shows predictions of some of the major influencing parameters.

Table 2: Predicted number of inhabitants, GNP/capita, passenger car ownership, number of passenger cars, motor vehicle ownership and number of motor vehicles.

Year	Population (million)	GNP/inhabitant (USD/cap)	Passenger car ownership (passenger cars/1000 inh)	Passenger cars (million)	Motor vehicle*) ownership (motor vehicles/1000 inh)	Motor vehicles*) (million)
1990	56.1	2 665	33	1.86	73	4.09
1999	64.4	2 996	74	4.74	137	8.84
2006	70.7	3 002	95.5	6.75	171	12.11
2011	75.2	4 140	109.2	8.21	193	14.54

*) incl. mc. and tractors. EGM statistics.

In Table B7 in Appendix B predictions are shown of future reported accidents, injuries and fatalities (by EGM and Jandarma). A summary of the "best estimates" is shown in Table 3, together with estimated costs of the accidents/casualties.

Table 3: Actual and predicted numbers of reported accidents, injuries and fatalities as well as estimated accident and casualty costs (1999 price level).

Year	Fatalities (number/year)	Injuries (number/year)	Accidents (number/year)	Costs**) (TL billion/year)
1990	6 286*)	90 520	115 295	1 360 000
1999	6 130*)	125 586	465 915	1 780 000
2006 best estimate	**5 850**	**155 000**	**800 000**	**2 060 000**
2011 best estimate	**6 050**	**180 000**	**1 150 000**	**2 420 000**

*) "hit and run" cases not included. **) 1999 price level. Reported casualties only.

From the table it can be seen that if safety interventions are being carried out "as usual" (i.e., if no additional or special safety actions are taken):

- the number of reported accidents will increase by 250 percent from 1999 to 2011,
- the number of reported injuries will increase by 40 percent,
- the number of reported fatalities will decrease by 1 percent,
- the costs of reported accidents and casualties will increase by 36 percent.

To these estimates of reported accidents and casualties (by EGM and Jandarma) the number of "hit and run" cases and the number of fatalities during transport to hospital and in hospital should be added. The total estimated numbers are given in Table 4.

Table 4: Predictions of total fatalities and reported injuries and accidents for 2006 and 2011.

Year	Fatalities (number/year)	Injuries (number/year)	Accidents (number/year)	Costs**) (TL billion/year)
2006 best estimate, Table 3	5 850	155 000	800 000	2 060 000
"hit and run"	351	12 400	24 000	130 000
Deaths during transport and in hospital	2 925	–	–	330 000
TOTAL 2006	**9 126**	**167 400**	**824 000**	**2 520 000**
2011 best estimate, Table 3	6 050	180 000	1 150 000	2 420 000
"hit and run"	303	12 600	34 500	130 000
Deaths during transport and in hospital	2 844	–	–	320 000
TOTAL 2011	**9 197**	**192 600**	**1 184 500**	**2 870 000**

*) "hit and run" cases included. **) 1999 price level.

Altogether, it is estimated that there will be approximately:

in 2006:
- 9 125 fatalities
- 167 000 injuries (reported)
- 824 000 accidents (reported)

at the cost of TL 2 500 000 billion (1999 price level).

in 2011:
- 9 200 fatalities
- 193 000 injuries (reported)
- 1 185 000 accidents (reported).

at the cost of TL 2 900 000 billion (1999 price level).

The numbers are based on the assumption that the "historic development" in a way repeats itself in the next 10-year period. If, however, there will be substantial changes in attitudes towards safety and increases in safety interventions, the numbers can be reduced substantially.

It must be observed that the above numbers are based on available statistics and forecasts, and that they are "best estimates" with a considerable degree of uncertainty.

2.2 "Institutional/administrative" areas

2.2.1 Transport policy

Main problems:

- There is no established national transport policy.
- There are no established transport policy objectives.
- There is an unbalance between different transport modes and different transport policy objectives.

There is no established national transport policy and there are no transport policy objectives (e.g., concerning accessibility and speed, transport costs, environmental impact and safety). Nor are there any medium- or long-term transportation master plans. Instead, yearly plans have been followed. Because of the lack of policy, longer-term plans and insufficient annual plans, there is an unbalanced situation between the different modes of transport. The situation has been slowly deteriorating during the last decades. At present, 96 percent of all passenger transport and 89 percent of freight transport are carried on roads*). Also concerning transport policy objectives, there seems to be an unbalanced situation; good accessibility and high speeds are given higher priority than good safety and low environmental impact.

The only comprehensive attempt to have such a master plan was made in the early 1980's. At that time, a 10-year Transportation Master Plan (1983 - 1993) was produced and put into application. Unfortunately, it was not fully implemented. Although the State Planning Organization has prepared 5-year development plans for each sector, it seems as if they have not been so active in practice concerning transportation issues.

2.2.2 Attitudes towards traffic safety

Main problems:

- There is low awareness of, and interest in, traffic safety.
- Some people consider that accidents and casualties are results of fate and destiny.
- Politicians and other high-level decision-makers do not give sufficient support to safety.

Although there are few studies available about the awareness of traffic safety, it is quite obvious that it is limited. This includes politicians and other decision-makers, public agencies, private enterprises and organizations, media and the general public.

Ministers, Members of Parliament and other high-level politicians have not so far shown any great interest in safety. There appears as if very little concerning safety has been discussed in the political parties' programs.

The situation could also be improved in organizations which are responsible for traffic safety. It seems, for example, as if EGM, KGM and MoNE could give higher priority to safety issues than they do at present.

*) Source: The 8th 5-year plan prepared by the State Planning Organisation. Pipelines are included in freight transport.

The media does not give high priority to safety. Accidents with very many casualties may find place on the last pages of daily newspapers or as very short bulletins towards the end of TV news. The worst is that it seems as an average of about 25 traffic deaths per day has been accepted as normal and regarded as the price for mobility.

The general public's interest in traffic safety is fluctuating. After serious traffic accidents, the public and media start to ask for changes in the traffic law. Since law enforcement is not sufficient, law changes alone do not normally yield any substantial positive results.

It also seems as if some people consider that accidents and casualties are results of fate and destiny, and that there is not much to do about it.

One major deficiency is the lack of understanding of the magnitude of the problem. There is a great risk that the problem will grow, unless awareness is increased and attitudes substantially changed.

2.2.3 General approach to safety activities

Main problems:

- There is no systematic approach to traffic safety work, including vision, targets, strategies and plans.
- There is a general lack of methods, knowledge and experience.

There is no generally established and used systematic approach for traffic safety work. Although different involved organizations have gained experience during several years, no systematic approach has been developed. Therefore, there are no stated safety vision, objectives, targets, strategies and plans.

There is a general lack of systematic methods and models to be applied as well as knowledge and experience, partly because very few evaluations have been carried out. This implies that implementation tools and procedures are missing. A more target/result-oriented way of working has only recently been started at one of the involved agencies.

Traffic safety is a multi-sectoral and multi-disciplinary area. Therefore, several organizations and many different kinds of specialists have to take part. Unfortunately, there is no single body with overall responsibility (see section "Organization, cooperation and coordination").

2.2.4 Organization, cooperation and coordination

Main problems:

- There is no single organization with overall responsibility. Duties are not clearly defined.
- There are many ministries, government agencies and other organizations involved.
- There seems to be a pronounced lack of cooperation and coordination.
- There are several deficiencies concerning the present national safety organization.
- Provincial and local safety organizations do not appear to work effectively.
- There is little cooperation between public agencies and private sector.

There are many public organizations involved in the traffic safety work; the Parliament, the government, ministries, government agencies, provincial and local authorities. In addition, there are several private organizations involved (see Appendix E). The great number of involved organizations creates problems for coordination and cooperation. In summary, the national, public safety organizations are as follows (according to the Traffic Law):

1. The Supreme Highway Traffic Safety Council (SHSC):
   - Prime Minister, chairman
   - *evaluates and decides on proposals from the HTSC*
   - *determines coordination necessary*
   - meets twice a year
   - the secretariat is EGM.
2. The Highway Traffic Safety Council (HTSC):
   - EGM Traffic Services Director, chairman
   - *decides upon feasibility of measures recommended by EGM, etc.*
   - *gives recommendations for ensuring coordination*
   - *gives recommendations for reduction of accidents*
   - *determines difficulties in application*
   - *determines deficiencies arising from legal provisions*
   - meets once a month
   - the secretariat is EGM.
3. Other national and provincial organizations, responsible for their parts of traffic safety, for example, KGM, EGM, MoNE and MoH.
4. Provincial and sub-provincial traffic commissions and municipal traffic units.

Some identified deficiencies with the present organization are:

Councils:
- there appears to be too many members of both Councils,
- all members may not be fully committed and/or competent,
- all members of the HTSC may not have sufficiently high positions within their own organizations,
- the real influence of the HTSC appears to be limited,
- the SHSC does not meet sufficiently often,
- the HTSC does not seem to be sufficiently effective,
- the secretariat functions for the two Councils are not sufficient in number and competence,
- the duties for the two Councils do not seem to be clearly defined.

Other:
- cooperation between involved public agencies is limited,
- cooperation between public agencies, private enterprise and NGOs (incl. voluntary safety organizations) is very limited. There are, for instance, very few, if any, established working groups and committees that involve private enterprise (e.g., car makers/importers and insurance companies) in the safety work.
- commitment and competence seem to be lacking in some cases,
- provincial and local organizations do not appear to be effectively integrated in the national safety work. Nor do they seem to work effectively with safety matters within their own areas,

- the safety bodies are not sufficiently "powerful", that is, they do not have: sufficient resources (competence, staff, funds, equipment, etc.), sufficiently high level "position" to be respected, and sufficient support from the Parliament and the government,
- the internal organization within involved agencies does not always appear to be well functioning.

2.2.5 Traffic safety staff

Main problems:

- There is a severe lack of competent and experienced traffic safety staff.
- There is limited university education and very few other courses on safety.
- There are few positions available for people interested in working with safety.

There is a lack of competent and experienced staff for traffic safety work. There are well educated and experienced highway engineers at KGM and police officers at EGM etc., but these persons have not been specially educated and trained in safety related areas. It is possible that this problem is not fully experienced and known, because there are quite a few persons working with safety matters, but many of them are not sufficiently trained and competent.

There is very limited special university education on safety and there are very few other safety courses available. For example, safety education has only been given to a very limited number of civil engineering students in universities. Although some courses and graduate programs are available, a systematic and comprehensive approach has not been applied.

There appears to be very few attractive positions available, both in public and private sector, for people interested in working with safety.

2.2.6 Funding of safety activities

Main problems:

- The present funding for traffic safety is very limited and split into many organizations.

The present public funding for traffic safety interventions is as follows:

- national, provincial and municipal yearly budgets for involved public organizations (e.g., EGM, KGM and MoNE), and provincial and municipal bodies (some support is given to municipalities by the state),
- the Traffic Services Development Fund,
- other contributions.

It is very difficult to estimate the amount of money spent for safety in the budgets of each of the public organizations and in the total public budgets. A brief study of KGM shows that KGM's total budget has been decreased substantially in terms of percentage of total state budget but increased in terms of TL (from TL 1 800 billion in 1990 to 330 000 billion in 1999, nominal value). The share used for specific safety issues, the safety component, has varied between 3 and 1 percent of the total. In 1999, KGM spent around TL 4 100 billion on safety issues.

The Traffic Services Development Fund, based on charges for license plates and printed forms for vehicle registration, has been used for safety purposes to a limited extent. Previously, there was also a Road Fund based on revenues from fuel taxes. This fund, however, contributed only marginally to KGM's budget. All similar funds, however, are abolished from the fiscal year 2001.

Contributions from private enterprise and NGOs are limited (and mainly used for some safety information and campaigns).

2.2.7 Data banks and accident statistics

Main problems:

- There is no comprehensive and modern common data bank for traffic safety.
- There is no statistics that include all necessary information on accidents/casualties, roads, traffic, vehicles and drivers.
- The international 30-days definition of a road fatality is not implemented.
- Accident reports and records are unreliable, sometimes with low quality data.
- There is lack of cooperation between involved bodies. There are only limited data available from hospitals and insurance companies.
- Very limited accident analysis is carried out.
- There are no data for vehicle-kilometers for urban areas, and no data for person-kilometers traveled.

Today, there is a data bank under the responsibility of EGM. In addition to crime records and registration of vehicles and driving licenses, traffic accident data are kept here. This data bank is not a "common traffic safety data bank" including all information concerning safety and road transport. The database mainly gives service to EGM.

There is no access to this data bank from the external environment (e.g., KGM, the State Institute of Statistics, universities and private organizations). Also, there is no data flow from the external environment, so, only information from accident reports is stored in the EGM data bank.

The computer system of the data bank is fairly old and breakdowns in the computer functions and operations are numerous.

Within KGM, there is no specific computerized data bank including all road and traffic data. When accident data are needed, they are obtained from the EGM data bank, by using magnetic tapes.

Each year, an annual statistical yearbook is prepared and published by EGM mainly for accidents that occurred in EGM regions, but nowadays it also includes accidents reported by Jandarma. Although many accidents occur in Jandarma regions, these accidents are not analyzed in the same way as those reported by EGM. Sometimes, it appears as if EGM reported accidents are presented as total national figures, for instance, in some international comparisons (e.g., IRTAD).

All national statistics, including accident statistics, are prepared by the State Institute of Statistics, and presented in an annual book of Turkish statistics. This Institute uses accident data obtained from the EGM data bank.

There are no comprehensive statistics covering all accidents/casualties for the whole country. EGM and Jandarma report accidents and casualties at the accident site and MoH reports deaths in hospitals. These data are not compiled and analysed in one document. Nor is there any document that links accident and casualty information to information on roads and traffic, etc. There appears to be rather limited cooperation between involved organizations concerning accident and casualty statistics.

EGM and Jandarma accident records are not, and will probably never be, complete because of a certain degree of underreporting. This is a world-wide problem. There are several reasons for people not to report an accident: not knowing the legal obligation to report, forgetfulness, the injury appears after some days, fear of prosecution, not having valid driving license or insurance etc. The most serious accidents, however, are normally reported to a great extent.

This underreporting may not be a serious problem provided that the missing portion is known. In order to get a better picture of the magnitude of the total accident problem, the reported accident numbers could be adjusted by using a set of correction factors. One remaining problem, however, is that the proportion will not be the same for all types of accidents and for all regions and times of day, etc.

Concerning fatalities, only the number of people killed at the accident site is stored in the EGM data bank (not deaths during transport or in hospitals). That is, the international 30-days definition of a road fatality has not been implemented. This makes it impossible to tell the total number of road fatalities in Turkey and to make correct comparisons with other countries.

There does not seem to exist any common and established methods for accident analysis. Therefore, very limited accident analysis is carried out as a base for safety interventions, for instance (see Ref. 117, 161).

There seems to be some discrepancies regarding accident and casualty trends between different sources. During the last few years, according to EGM records, the number of fatalities is decreasing, but, contrary to this, statistics from Jandarma indicate that fatalities are increasing. These two figures should reasonably have similar trends, unless the borders between EGM and Jandarma have been changed substantially.

So-called “hit and run” accidents are reported by EGM general security police or Jandarma, not by EGM traffic police. Therefore, these accidents are not included in the database as “normal accidents/casualties”. In 1999, “hit and run” cases were reported for the first time in the statistical yearbook published by EGM.

In the accident report form, the degree of injury severity is not recorded (e.g., as slight or serious). Such a distinction is useful for economic analysis and black spot identification. Although location is one of the most important issues for accident analysis, vital errors are sometimes made while filling in the accident form.

There are data available for vehicle-kilometers traveled on state and provincial roads (produced by KGM), but there are no data for vehicle-kilometers traveled in urban areas. Nor are there any data on person-kilometers traveled, for example, for car occupants, pedestrian and cyclists. This is needed for relevant comparisons between different years, countries and road user groups.

In-depth investigations of severe accidents are not carried out. In several countries, such investigations have given important contributions to the safety work. However, EGM and KGM have recently decided to start tests in the Ankara region.

2.2.8 Safety research and development (R&D)

Main problems:

- Present applied traffic safety R&D appears to be under-funded, limited and fragmented.
- There is no main body responsible. Cooperation and coordination seem to be very limited.
- There appears to be almost no international cooperation.

Total R&D expenditures in Turkey are low in comparison with Western-European countries. Present traffic safety R&D seems to be under-funded, very limited and fragmented.

There is no single body responsible for safety R&D. The collaboration between different R&D organizations, universities and executing agencies appears to be very limited.

Safety R&D is not an integral part of a national traffic safety program supported by the two safety Councils, for example. There is no comprehensive safety R&D program.

There seems to be no scientific library responsible for safety literature.

International safety R&D results and experiences may not always be valid in Turkey. It does not seem as if such results are checked, validated and adjusted to Turkish conditions.

Turkey appears to take part only in very few international safety R&D-projects (e.g, within the EU). Nor does Turkey take part regularly in many international meetings on safety issues (e.g., within PIARC, OECD and CEN).

2.2.9 Other “institutional/administrative” areas

Main problems:

- There are no reductions in taxes or other charges, for example VAT, for traffic safety related equipment.
- Insurance premiums may not properly reflect drivers’ and vehicles’ accident records.

There are no special systems to favor traffic safety by reduced taxes, etc. This can depend on the general lack of awareness of safety. When the importance of the problem is understood, it is possible that such actions can be taken. Then, for example, it could be effective to reduce VAT on safety related equipment, such as, tires and safety helmets.

One way to increase the motivation of drivers to drive safely is to make insurance premiums directly relational to the accident records of the drivers and their vehicles. Then safe driving would result in low premiums and unsafe driving in high premiums.

2.3 "Technical" areas

2.3.1 Modal split

Main problem:

- The present modal split is not suitable. The percentage of road transport is very high, both for passenger and freight transport.

There is an unbalanced situation between different modes of transport. For passenger transport, road transport has had an almost constant share of 96 percent in the last ten years, while rail has had 3 - 4 percent and remaining modes around 0 - 1 percent.

The situation is similar concerning freight transport. Road transport has gained 15 percentage points over the last ten years and has now reached 89 percent, whereas rail and sea transport have lost more than 4 points during the same period and make up for less than 5 percent*).

The situation is similar in intracity transportation. Istanbul, having a population of more than 10 million, is an example. There, road transport makes up for around 90 percent of the total. It should be mentioned, however, that in some major cities there are attempts to increase the share of public rail transport.

2.3.2 Road infrastructure – rural roads

Main problems:

- Road design is not always safe.
- Road equipment is not always used in a suitable and sufficient manner.
- Land-use planning does not seem to be well coordinated and controlled.
- There appears to be a lack of systematic safety considerations in road investment planning. The methods and values used in economic appraisals need up-dating.
- Comprehensive guidelines for road design and equipment are missing. Existing guidelines are not always followed in practice.
- Safety audits of planned and existing roads are not used, but preparations have started.
- The maintenance of roads and equipment is sometimes poor.
- There is no special unit at KGM responsible for guidelines for road design and equipment.

*) Pipelines are included in freight transport.

Observed problems and deficiencies[**)]
Turkish rural roads present many different characteristics, from modern and well equipped and maintained motorways to old and poorly maintained minor roads. The main observed deficiencies from the safety point of view are (see Ref. 33-70):

- Junctions are sometimes unsafe, areas and lanes are often too wide, and angles between intersecting roads too small.
- Roadside areas are often unsafe, with steep and high side slopes, stone or concrete lined ditches, rock cuttings and hazardous objects (e.g., poles and trees) close to the roadway. Guardrails are often missing. In many medians there are dangerous columns and no guardrails. Deformable and energy absorbing supports are not used.
- City-passings are often deficient from the safety point of view. They permit too high speeds and there are only limited facilities for vulnerable road users (e.g., sidewalks and pedestrian crossings).
- In many locations, there are wide uncontrolled areas at the roadsides, for example, at petrol stations and other roadside establishments.
- There are seldom road guardrails before bridges. This implies that errant vehicles could crash directly into the end of the bridge parapet.
- There are normally adequate road markings (edge, median and lane) and signing on motorways. On some state and provincial roads, markings can be non-existent or in poor condition.
- Speed limits are sometimes not realistic (e.g., too low at road works).
- Pavement maintenance is sometimes poor. In some cases there are height differences between carriageway and shoulder. At several locations road surface friction is low, especially in wet conditions.
- Road equipment is quite frequently poorly maintained (markings, signs and guardrails).

Land-use planning
Land-use planning in rural and semi-rural areas does not seem to be well coordinated and controlled from the safety point of view. This deficiency, which especially concerns roadside development and access roads, can create problems for road planning, road design and traffic safety.

Road planning. Economic appraisal
There appears to be a lack of systematic safety considerations in road planning. For instance, there is no systematic "deficiency analysis focused on safety" of existing roads in the investment planning process. Nor does it seem as if the safety demands of all road users are taken into account.

There seems to be a doubtful balance between major road projects and minor road improvements. The design of new roads appears to be aimed at rather high geometric standards, resulting in high investment costs, instead of at efficient solutions implying the best use of limited resources. This could be detrimental to the total effects on safety.

**) Based on some inventories (see References) and observations, mainly on the Pilot Project roads and in the Ankara region. The observed problems and deficiencies may not be valid for all conditions and all rural roads.

The method for Cost-Benefit Analysis, CBA (used for feasibility studies) for *major road investments* appears to be adequate. However, there are some deficiencies concerning safety: estimated accident and casualty reductions are doubtful, and estimated accident and casualty reductions are not given proper monetary values. To improve this, more and better data are required (see Ref. 120).

The method and values for CBA for *black spot analysis* also seem to have some deficiencies, partly, due to lack of data:

- accident and casualty forecasts are doubtful,
- reduction factors seem to overestimate benefits,
- accident and casualty reductions are not given proper monetary values,
- maintenance costs of safety interventions are not included.

It should be mentioned, however, that KGM has already started to eliminate some of these deficiencies.

Guidelines and practices for road design and road equipment
There does not seem to exist any comprehensive, modern guidelines for road design and road equipment adapted for Turkish conditions (e.g., topography, economy and road user behavior). There are two design tables, one for 2-lane rural highways (from 1983) and one for motorways. To these tables some amendments have been made. There are also some guidelines concerning junction types and notes on guardrails. Since all design items are not covered by these documents, there also seems as if some non-documented principles are used, many of them based on foreign guidelines (e.g., the American AASHTO guidelines and the German Richtlinien von A bis Z).

It should be mentioned that KGM has started to prepare new guidelines for road geometric design, mainly based on the AASHTO standards. This work is planned to be completed in 2002. Even after this, however, it appears that guidelines for some types of road equipment will be missing, for example, for road lighting.

Besides the main deficiency that there are no comprehensive guidelines for road design and equipment, it seems that existing guidelines are not always followed in practical design. Some identified deficiencies concerning the present guidelines are (see Ref. 34-39):

- low minimum requirements for sight distances,
- small minimum radii for horizontal and vertical curves,
- no established rules for the design of roadside areas,
- many types of junctions and no established rules for the selection of junction types,
- little use, and sometimes misuse, of roundabouts,
- no suitable rules for city-passings, especially concerning safety,
- no established rules for access control,
- no national standards for the use of road equipment (e.g., guardrails and yielding columns),
- some unsuitable rules for road markings and signing (e.g., at climbing lanes).

At present, road construction works are checked by construction engineers only. It is preferable if in the future, the work also could be checked by design engineers.

At present, road equipment (e.g., guardrails, markings and signs) is designed in a phase separated from road design. It is preferable if in the future, the design and use of road equipment could be integrated into the road design.

Facilities for vulnerable road users
Facilities for vulnerable road users, such as pedestrians and bicyclists, are often lacking or inadequate. Sidewalks are often missing or deficient. Marked pedestrian and cyclist crossings are rare. The lack of proper facilities is especially troublesome for city-passings.

Speed reducing devices
Speed reducing devices (e.g., humps and rumble strips) are used in some locations, but do not seem to result in much lower speeds. The design and application may not always be suitable.

Black spot identification and elimination
The present method for identification of black spots is not correct concerning the statistical analysis and not always used in identifying the black spots. Low-cost alternatives are not always considered (see Ref. 40-52).

Safety audits
There are very few safety audits carried out for planned and existing roads. However, KGM has recently started a program for safety audits of new road projects (see Ref. 71-74).

Maintenance and operation
Except for motorways, the maintenance and operation of rural roads is sometimes poor. This concerns mainly:

- pavements,
- road markings, signs and signals and guardrails,
- work zone signing.

It seems as if existing draft standards and guidelines regarding road maintenance are not always used in practice, for example, concerning road markings and the repair of guardrails.

Organization
There is no special unit at KGM responsible for guidelines for road design and equipment. There are, however, plans to re-create a high-level committee for the approval of draft guidelines. It appears as if cooperation within KGM concerning safety could be improved.

2.3.3 Road infrastructure - urban roads and streets

Main problems:

- Road/street design is not always safe.
- Road equipment is not always used in a suitable and sufficient manner.
- Land-use and urban planning does not seem to be well coordinated and controlled.
- Functional classification of roads/streets does not seem to be sufficiently well elaborated. There appears to be a lack of systematic safety considerations in urban road planning. Economic appraisals are probably not used.
- Present guidelines for design of roads/streets and equipment may need revision and are not always used in practice.

- Black spot identification and elimination is not carried out. There are no methods available.
- Safety audits of existing or planned roads/streets are not carried out. There are no methods available.
- Traffic calming is hardly used at all. Facilities for vulnerable road users are often lacking or of inferior quality.
- Parking facilities are lacking, which often results in blocked sidewalks.
- The maintenance of roads/streets and equipment is sometimes poor.
- There seems to be no established organization for cooperation between local authorities and only limited cooperation between local authorities and KGM concerning roads, traffic and safety.

Observed problems and deficiencies*)

Turkish urban roads and streets present many different characteristics, from modern and well equipped and maintained main arterials to old and poorly maintained minor local streets. The main observed deficiencies from the safety point of view are:

- Junctions are sometimes unsafe, areas and lanes are often too wide, and angles between intersecting roads too small.
- Roadside areas are often unsafe, with stone or concrete lined ditches and hazardous objects (e.g., poles and trees) close to the roadway. Guardrails are often missing. In many medians there are dangerous columns and no guardrails. Deformable and energy absorbing supports are not used.
- City-passings are often deficient from the safety point of view. They permit too high speeds and there are only limited facilities for vulnerable road users (e.g., sidewalks, cycle lanes and crossings).
- Facilities for vulnerable road users are limited and often not properly designed and maintained. This comprises sidewalks, special paths/lanes for cyclists, crossings and bus stops. Pedestrian bridges and underpasses, as well as normal sidewalks, are in many cases almost impossible to use for old people, perambulators and wheel-chairs because of steep stairs, rough surfaces and deep holes.
- In many locations, there are often wide uncontrolled areas at the roadsides, for example, at petrol stations, shops and restaurants.
- Road markings (edge, median and lane) and signing are often missing or deficient.
- In some locations, street lighting is inferior.
- Pavement maintenance is sometimes poor (potholes, drainage culverts at lower levels, etc.). At many locations road surface friction is low, especially in wet conditions.
- Sidewalk maintenance is often very poor. Sidewalks are often blocked by parked cars.
- Winter maintenance appears to be rather poor.
- Road equipment is frequently poorly maintained (markings, signs and guardrails etc.).
- Halt/stop lines in front of traffic signals are almost always missing.

Land-use and urban planning

Land-use and urban/town planning does not seem to be well coordinated and controlled from the safety point of view. This deficiency, which especially concerns roadside

*) It should be noted that most parts of the Traffic Safety Project concern rural roads. The observed problems and deficiencies for urban roads and streets are based on a limited number of observations and may therefore not be valid for all conditions and all urban roads/streets.

development and access roads to major roads, can create problems for road/street planning, road/street design and traffic safety.

Road/street classification and planning. Economic appraisal
There seems to be a need for an improved system for functional classification of urban roads/streets into different "traffic networks", for instance:

- "motor vehicle network",
- "mixed traffic network",
- "walking pace streets".

There seems to be a lack of systematic safety considerations in urban road planning. The safety demands of all road users should be taken into account.

Although in some cases municipalities borrow money and use the government's guarantees for receiving credits, it appears as if investments do not always follow long-term plans, based on sensible economic appraisals.

Guidelines and practices for road/street design and road equipment
There are guidelines for the design of road/streets and road equipment. These guidelines are published by the Turkish Standards Organization and have been prepared with the help of working committees, with members from different organizations, including KGM. The guidelines are not mandatory and are not always followed by the municipalities. For road signs and markings, KGM's guidelines are being used. The implementation, however, does not always seem to be quite satisfactory.

It appears as if there are some safety deficiencies on the local street networks. Particularly the situation for vulnerable road users is inadequate.

Black spot identification and elimination
There appears to be no systematic method for identification and elimination of urban black spots, routes and areas. Police records are not always analyzed and improvements seldom initiated from accident statistics or other systematic studies. There may be exceptions in some major cities and for city-passings managed by KGM.

Safety audits
There seems that no safety audits are carried out for existing or planned urban roads/streets.

Facilities for vulnerable road users
Facilities for vulnerable road users, such as pedestrians and bicyclists, are often lacking or inadequate. Sidewalks are often missing or deficient and frequently blocked by parked cars. Marked pedestrian and cyclist crossings are rare.

Traffic calming. Speed reducing devices
Traffic calming of business or residential areas and streets appears to be used only to a small extent. Speed reducing devices (e.g., humps and rumble strips) are used in some locations, but do not seem to result in much lower speeds. The design and application may not always be suitable.

Maintenance and operation
The maintenance and operation of urban roads/streets are sometimes rather poor. This concerns mainly:

- pavements,
- sidewalks,
- road markings, signals, guardrails and lighting,
- traffic management (e.g., one-way street schemes),
- work zone signing.

There does not seem to exist any comprehensive modern guidelines for the maintenance of urban roads and streets.

Organization
There are unofficial associations between local authorities. These associations, however, do not usually work with technical matters, such as street design and traffic safety.

Municipalities have contacts with KGM, especially when discussing the management of certain road sections, and also through the provincial and sub-provincial commissions. Some municipal safety issues are discussed in these commissions, for example, speed limits on urban streets.

There is only a very limited number of competent and experienced traffic engineers in the municipalities. This creates problems for municipal safety activities.

2.3.4 Vehicles

Main problem:

- The periodic vehicle inspection is under-staffed and under-equipped, and the inspection is rudimentary.

Legislation and responsibility for vehicle safety and vehicle environmental matters are split up on at least four ministries. Another general problem is that there are large differences between the registers for vehicles at the State Institute of Statistics and the vehicle register at EGM (see Ref. 107-111, 154).

It seems as if Turkey is not fully involved in European and international work to improve and standardize vehicle design and equipment as well as uniform performance tests (e.g., the European New Car Assessment Program, Euro NCAP).

While vehicles in major cities often seem to be of good quality and in good condition, vehicles in rural parts of Turkey do not appear to be of the same quality and condition. This means that there is a mix of new, high quality cars and old, deficient ones. This is detrimental to safety. Like in many other countries there appears to be many new, four-wheel-drive multi-purpose vehicles, which consume more fuel and are less favorable from the safety point of view than normal passenger cars.

Overloading of heavy vehicles seems to be a serious problem. Even if this mainly is a problem for road construction, it also has some safety implications (e.g., longer braking

distances, slow speeds up-hill creating dangerous overtakings, and overheated brakes downhill). Agricultural tractors often appear in road traffic, especially early in the morning and late in the evening, sometimes without proper lighting and retro-reflective devices.

The unit at the Ministry of Industry and Commerce (MoIC) dealing with type approval of vehicles seems to be under-staffed. The organization for periodic vehicle inspection at KGM is seriously under-staffed and under-equipped. In practice, periodic vehicle inspections are limited to identification and very rudimentary visual inspections. The administrative procedures in connection with the inspections are not up-to-date. Exhaust emission checks are carried out separately and not included in the ordinary periodic vehicle inspections.

2.3.5 Commercial traffic

Main problems:

- Road freight transport is not sufficiently safe.
- Passenger transport by bus is not sufficiently safe.

Heavy freight transport on roads is unsafe. This is serious since 89 percent of all freight transport in Turkey is carried on roads and more than 40 percent of all vehicles on main corridors can be heavy goods vehicles.

One problem is that there are rather few major haulage companies and instead very many individual owners of small trucks. These owners compete for contracts and there is always the temptation to work too many hours and load more than allowed. This creates safety problems, especially as enforcement is not sufficient.

There are many buses on Turkish roads. Similar to the case for freight transport, there is a large number of individual bus owners competing for contracts, sometimes tempted to ignore regulations concerning working hours etc. It should be mentioned, however, that there are some major bus companies with good and safe operating conditions.

Concerning enforcement for heavy goods vehicles, experience from Europe shows that normal stationary police controls tend to be ineffective because the drivers communicate with each other (via mobile telephones etc.) and can therefore quickly take a different route to avoid the road check. To reduce this problem, the controls have to be carried out on many parallel roads at the same time.

2.3.6 Road user behavior

Main problems:

- In general, road user behavior is poor.
- Speed violations are very frequent.
- The use of seat belts by drivers is low.
- Red light, stop sign and one-way regulations are frequently violated.
- Lane markings and normal rules for choosing lane before turning are very often ignored. At signalized junctions, drivers frequently drive too close to the junction area.
- Drivers very often ignore pedestrians, even at marked pedestrian crossings.
- Parking habits are deficient.
- Many drivers show an aggressive driving style.

- "Public" drivers often ignore basic traffic rules.
- The use of safety helmets for motorcycle and moped riders is very low.
- The use of seat belts for passengers and restraint systems for children is very low.
- Pedestrians cross roads everywhere, even on wide major arterials.
- Pedestrians do not use retro-reflective devices at night.
- Pedestrians often have to walk on the carriageway/street.
- The use of safety helmets for bicyclists is almost non-existent.
- There is a lack of reliable data on speeds, seat belt use and other safety related indicators, especially for urban roads.

Observed problems and deficiencies*)

The following observations are based on a limited number of observations and sites. They may therefore not give a full and comprehensive picture. The comparisons are made with road user behavior in Western-European countries with good safety records.

Drivers:

- Drivers (especially of passenger cars and buses) very often exceed the speed limits.
- The use of seat belts is low.
- Drivers very often ignore red light, stop sign and one-way regulations. This creates dangerous situations and accidents.
- Drivers sometimes overtake at dangerous locations (crests and curves), also on opposing climbing lanes. Drivers frequently overtake on the right hand side on divided multi-lane roads.
- Drivers seldom stick to marked driving lanes and frequently change lanes. Nor do they bother to take the left lane when intending to turn left and vice versa.
- At signalized junctions, drivers almost always drive too close to the junction area during the red phase in order to gain some space and time. Therefore, they cannot see the traffic light and have to rely on the sound of horns from other drivers to know when the light has turned to green.
- At both road sections and junctions, car drivers often drive too close to each other.
- Drivers very often ignore pedestrians and almost never stop at pedestrian crossings. Drivers seem to pay very little consideration to pedestrians.
- Drivers often park and double park at junctions. They also drive and park on sidewalks and sometimes stop and park on motorways.
- Many drivers drive in an aggressive style and appear to have very little tolerance to delays.
- "Public" drivers (even police officers and school-bus drivers) sometimes ignore basic traffic rules (e.g., red light and one-way regulations).
- Some statistics show amazingly high frequencies of high blood alcohol concentration of drivers.
- There is very low use of safety helmets for motorcycle and moped riders.
- It happens that moped riders drive with a child on their lap.
- Agricultural tractors are sometimes driven on public roads in darkness without proper lighting. Many tractors have no or deficient retro-reflective devices.
- Identifying signs of some vehicles are missing (such as school service buses). Some signs are not according to standards.

*) Based on some measurements and observations, mainly on the Pilot Project roads and in the Ankara region. The observed problems and deficiencies may not be valid for all conditions and the whole country.

Passengers:

- The use of seat belts for adult passengers is low.
- The use of child restraint systems is very low. There are very few rearward facing seats for small children and booster cushions for older children.
- Children are frequently permitted to stand in the car or sit in the front seat, or on the lap of an adult, without any protection.
- People sometimes travel standing or sitting on platforms of trucks or pick-ups.
- There are often too many persons in the vehicles jeopardizing stability as well as braking and steering characteristics.

Vulnerable road users:

- Pedestrians frequently cross roads everywhere, even on wide major arterials.
- Pedestrians and cyclists sometimes walk/cycle along and across motorways.
- Pedestrians do not use retro-reflective devices in darkness.
- Pedestrians often have to walk on the carriageway, sometimes because there are no sidewalks and sometimes because the sidewalks are very uneven or blocked by parked cars.
- At present the number of bicyclists is limited. An increase will require improved infrastructure.
- Cyclist very seldom use safety helmets.

Measurements

Speeds:

There is no specific and uniform system to measure speeds for the whole country. Some speed measurements have been carried out around Ankara within the Pilot Project (PP) area of the Traffic Safety Project. The results show that on some undivided roads up to 50 percent of the vehicles exceed the speed limit and on some divided roads up to 80 percent exceed the permitted speed. Speed measurements made by KGM at a number of fixed stations around the country show that on many road sections more than 50 percent of all passenger cars exceed the speed limit. On the average, about 30 percent of all trucks and 70 percent of all busses exceed their speed limits. These figures are not valid for all roads in the whole country, but they indicate the magnitude of the problem.

Seat belt use:

There is no specific and uniform system to measure seat belt use for the whole country. According to some measurements in connection with the seat belt campaign on the PP roads in late 2000, the seat belt use of drivers of passenger cars on rural roads varies between 35 percent and 80 percent, or between 45 percent and 65 percent, if the extreme values are excluded. The use in urban areas is most probably much lower. Some limited observations in Ankara indicate that the use could be only about 20 percent.

Other indicators:

There are no studies reported for other safety related indicators. It is possible that there are some studies made by EGM or Jandarma for specific areas in connection with enforcement.

2.3.7 Safety education in schools

Main problems:

- Curricula are not sufficiently adapted to different age-levels.
- There is lack of trained teachers.
- There is lack of relevant and updated educational materials. The existing materials do not encourage or support practical training.
- Contents are to a large extent focused on rules instead of risks.
- Parents' participation is very limited.
- There is no safety education in universities for prospective teachers.

There are obligatory traffic safety courses in the sixth and eighth classes (grades) of the primary schools. There are also some sections related to safety in social sciences courses for other grades (see Ref. 125-133, 165).

One basic problem is that the traffic course curricula are not sufficiently adapted to different student- or age-levels and that the topics do not follow a systematic order. The content is limited to teaching traffic rules and not sufficiently to risk understanding. In addition, overall attention is concentrated on theoretical training. Adequate practical training is missing.

The teachers giving traffic courses do not always seem to be sufficiently trained, neither qualitatively nor quantitatively. Adequate training materials (overhead sheets, videos and films etc.) are lacking.

Pre-school children normally live together with their parents. Their attitudes to safety is not clear. It seems as if the engagement is too limited, perhaps because of insufficient overall understanding of the problem. Practical training together with parents seems to be very limited (e.g., teaching safe routes to school).

There is no university education or other courses on safety for prospective teachers.

It should be mentioned that MoNE reviews all courses, including the traffic ones, every five years.

2.3.8 Driver training and licensing

Main problems:

- Curricula and teaching and training methods are not up-to-date. Practical training and tests are inadequate. The theoretical test is too long and the practical one too short.
- There is a lack of competent examiners, especially for the practical driving test. Their training is inadequate.
- Drivers' licenses are not in accordance with the Vienna Convention and the EU Directives.

Driver education, training and examination
The curricula and methods for driving education, training and examination are not up-to-date (see Ref. 104).

The practical driving training and the driving test are normally carried out on a predetermined, restricted area with specially equipped vehicles. The road is often horizontal and straight and seems to have few similarities with real traffic environments. The examiners are normally seated in the rear seat.

The theoretical test is rather long (2 hours), while the driving test seems to be very short (about 15 minutes for category B). International practice indicates that neither the theoretical test nor the practical one should be less than 45 minutes. During the theoretical training, 28 hours out of totally 83 hours are spent on first aid and engine and motor vehicle techniques (for category B). This seems to be too much.

The present 90 hours training for driving instructors appears to be insufficient.

The examiners carry out the examinations outside their normal lines of duties. Before being appointed an examiner, the person has to attend a special course with a total duration of 30 hours (5 days *6 hours per day), which seems to be insufficient. The present number of experienced examiners, especially for the practical driving test, appears to be too low in comparison with the demand.

Driver licenses
The driving licenses are not classified in accordance with the Vienna Convention and the EU Directives (see section "Registration of vehicles and driving licenses").

2.3.9 Registration of vehicles and driving licenses

Main problems:

- There is lacking conformity with the Vienna Convention and the EU Directives.
- The licenses do not contain information about date of expiry.
- The administration of the registration system is heavy, not efficient, and not consumer friendly.

The current driving license system does not follow the Vienna Convention and the EU Directives concerning which vehicle categories the holder is authorized to drive. The driving license does not contain any information about date of expiry and restrictions. This could be understood as if the licences are valid for life, which is not suitable. The license does not have sufficient protection against forgery. The license can, in principle, be revoked by the Ministry of Interior (MoI), but this regulation is seldom used (see Ref. 105-106).

The more than 300 district traffic registration offices are not linked to the central database. Data are normally transported to the 81 provincial offices by mail. There is, however, work going on to develop a more modern on-line system that will connect all registration offices to the central database.

Service concerning registration of vehicles and driving licenses can only be given if the person who wants service visits one of the registration offices. Consequently, the service is obtainable only at office hours. Changes in information in the database have to be initiated by the owner of the vehicle or the license holder.

The registration plate includes information about the registration province. This creates increased administrative handling when an owner moves, or the car is sold, to another province. Then the waiting time for the client can be fairly long at the registration office.

The manual information handling around the registration of vehicles and licenses is substantial. The information is not entered into the computer before the application is forwarded to the issuing officer. There are large volumes of documents to handle for applicants and registration officers. All documents are filed in archives at the registration office.

The present computer system is old and mostly used to record and retrieve data in the central database. The system does not seem to support the officers when handling the applications. Breakdowns in the computer system are numerous and cause problems.
Only about 70 percent of all registered vehicles are recorded in the present computer system.

2.3.10 Safety information and campaigns

Main problems:

- There is no long-term plan for major safety information and campaign activities.
- There is no single body with overall responsibility. Duties are not clearly defined.
- There is lack of coordination and cooperation.
- The quality of some performed safety campaigns has been inferior.
- Very few evaluations have been carried out.

There is no elaborated, established and comprehensive long-term plan for traffic safety information and campaigns.

There is no single body responsible for major safety information activities. The duties are not clearly defined. Many government organizations (KGM, EGM and MoNE, etc.) have prepared their own information activities. Only a few of these have been designed and implemented professionally. They have seldom been followed up and evaluated, so their impacts are not known. Because of this, no recommendations for future activities have been obtained.

There are also some NGOs (like TŞOF) working with safety information activities. These activities do not always appear to have been well designed and coordinated.

The media's interest seems to be rather limited.

In the mid 1990's, a fairly comprehensive safety campaign was implemented by KGM. Roadside billboard posters were the main elements, and several TV films were prepared and broadcasted. It is not known if this campaign has been evaluated.

The quality of some safety campaigns has been inferior. Some safety information is transmitted in a few TV channels late at night or early in the morning when very few viewers are watching.

It should be mentioned that some safety campaigns have been designed and implemented within the Pilot Project of the TSP (see Ref. 95-103, 153).

2.3.11 Traffic legislation

Main problems:

- There is lacking compatibility between Turkish traffic legislation, the Vienna Convention and the EU Directives.
- There are ambiguities between the traffic law and the traffic regulations, and between the traffic legislation and the penal code.
- There are deficiencies concerning rules for revocation of licenses, drunken driving and use of safety equipment. In addition, some relations between offences, fines and penalties are unsuitable.
- There is no "transportation law" regulating road transport.

The contents of the Turkish traffic legislation, generally speaking, seems to be reasonably sufficient (see Ref. 90-91, 148, 171).

The compatibility of the traffic legislation with the Vienna Convention and the EU Directives must be studied more in depth. For two important subjects, there are obvious differences; the classes for driving licenses and, in a few cases, road signs and signals.

In a number of cases the same rule, at least in substance, occur both in the traffic law and in the traffic regulations. There also appears to be "grey" zones between the traffic legislation and the penal code.

According to the present legislation a *driver's license* can be *revoked* only by the court. This can be rather time consuming. Revocation is not only a penal action but also a preventive action in the interest of safety by removing unfit drivers from the roads. It is, therefore, important that action is taken quickly. A system should be developed where the police can immediately impound the driver's license when there is reason to believe that the court may revoke the license.

The periods for revocation given in the legislation seem somewhat arbitrary. The seriousness of a drunken driving offence, for example, could vary much and can hint at an alcohol dependency. If this is the case, the license should be revoked until the driver can prove that he is not abusing alcohol.

The legislation on *drunken driving* should be studied and revised at least in two aspects: Firstly, there is a problem with the rule for commercial drivers. As the text is written it could be construed as meaning that they may not drive at any time after having taken alcoholic beverages irrespective of if they are under the influence or not. Moreover, since alcohol is produced in the digestive system in the body, it is not reasonable to have an "absolute zero limit". A "practical zero limit" could be, for example, 0.05 mg/ml. Secondly, the fine for drunken driving is constant, irrespective of the degree of impairment of the driver. This is not good since the seriousness of the offence is a function of the degree of intoxication.

Concerning *safety equipment*, the legislation makes it compulsory to use seat belts in cars and safety helmets on motor cycles. A minority of the road users seems to follow these rules. Taking into consideration the importance of using this equipment, no effort should be spared in order to improve the situation. It can be assumed that education and information, in connection with improvement of the legal texts and strengthened enforcement, will substantially contribute to this.

An overall study of the *fines and other penalties* gives the impression that circumstances other than safety have been leading the decision-making. Each offence should be analyzed from a safety point of view. The offences should be arranged in groups with regard to their significance. The penalties should then be decided with this main principle as leading. Furthermore, there are a number of offences for which the penalty rather should be in the form of an interval, within which the individual case should be estimated.

The legislation to regulate road transport does not seem to be sufficient, for example, concerning operating permits for heavy vehicles.

2.3.12 Surveillance and enforcement

Main problems:

- It is difficult to evaluate the effectiveness of surveillance and enforcement.
- Working methods can be improved.
- Some types of efficient surveillance equipment are missing.
- Training has been lacking but is now better.
- The responsibility for surveillance is shared between Police and Jandarma.
- There is limited cooperation and joint training between Police and Jandarma.
- Working conditions for traffic police officers are not always satisfactory.
- Police officers do not always enforce the traffic law when they observe traffic offences.
- Traffic police drivers are not always "good examples" in traffic.
- The basic principle "equality before the law" is not always applied.

A large proportion of all crashes is preceded by one or more traffic offences. It could be said that traffic offences are a major contributing factor to accidents and casualties. Therefore, it is most important that surveillance and enforcement is given high priority, both in terms of amount of resources and how the resources are used (see Ref. 80-89, 160, 163).

Although the traffic police has a long experience in surveillance and enforcement, they have not until recently used a "target-oriented way of working". Because of this, it is difficult to evaluate the efficiency of activities and resource allocations. The present situation, however, seems to be fairly good and improving.

The traffic police is increasing the quantity and the quality of surveillance equipment. The present situation is fairly good, even if laser guns for speed checks are missing, for example. No surveillance is carried out by automatic cameras.

Up to 1999, the traffic police was not specially educated or trained, with the exception of some short seminars. Since then, the police have started special courses for traffic police officers. New training material and methods have been developed. For Police Academy students, new course material and reference books have been prepared.

The responsibility for traffic surveillance and enforcement is shared between Police and Jandarma. This could create problems with lacking uniformity and efficiency.

There does not appear to be much cooperation and joint training between Police and Jandarma concerning traffic policing. For Jandarma, it is recommended that traffic surveillance should be carried out by experienced officers (permanent staff), and not by soldiers during their obligatory military service.

One problem area, according to some police officers, is that their working conditions are not always satisfactory. Among other things, this concerns working methods, support by senior officers and Head Office, salaries, and the risk of being forced to move to other duties and locations.

It seems as if provincial decision-makers within the police give rather low priority to safety.

Police officers do not always enforce the law even if they observe obvious violations, for example, driving against red light. This is detrimental to traffic law obedience.

Some police drivers do not always act as "good examples" to other drivers. This destroys the image of the police in the eyes of the public. It is also most doubtful if a policeman really believes in the importance of his work, if he himself is disobeying basic traffic rules.

The basic principle "equality before the law" is not always applied in enforcement. This is detrimental to law obedience and safety.

2.3.13 Emergency rescue, medical care and rehabilitation

Main problems:

- The present emergency alarm system is unsuitable.
- In small towns and villages, there can be a lack of competence and suitable equipment.
- There is little coordination and cooperation between involved emergency service organizations. The function "On Scene Commander" is not sufficiently developed.
- There is lack of knowledge of first aid.

The present state of emergency services in Turkey is normally at an acceptable level within each branch (rescue/fire brigades, ambulances, EGM/Jandarma, TŞOF, emergency medical care and rehabilitation and civil defense), at least in major cities. In smaller towns and municipalities, however, the emergency services may have insufficient education/training and equipment (e.g., little or no rescue equipment) (see Ref. 134-143).

The emergency alarm system is not well organized. There are many different numbers to call in case of emergency. This could cause unnecessary delay in providing adequate assistance.

Another major problem with emergency services appears to be the lack of coordination and cooperation between different branches, at national, provincial and local levels. This can cause serious delays and other deficiencies in the rescue, attention and treatment of accident victims.

There appears to be a lack of knowledge of first aid among emergency services personnel, road users and the population in general.

There does not seem to be any established "lowest acceptable levels of emergency services" for different circumstances, for example, the longest acceptable time to wait for an ambulance after alarm. There also appears to be a general lack of knowledge of other basic data, for instance, normal times from alarm to adequate medical treatment. Such information is necessary to be able to design a suitable system for emergency services.

2.3.14 Special regional problems

Major problems:

- In certain regions there are many agricultural tractors on public roads during certain time-periods.
- In some regions there are many tourists on the roads during vacation periods.

Agricultural tractors are frequent on public roads in some regions, especially during certain seasons. They can create safety problems, for example, by not using proper lighting or retro-reflective devices at night.

In western and southern Anatolia there are many tourists (including foreign), especially during the warm seasons. This can create special accident problems.

3 Vision

Basic principles:

In this Vision section, the ultimate and ideal, long-term image for traffic safety is formulated. The Vision forms an important basis for the Strategy and the Plan. The Vision is also necessary in order to try to increase politicians', media's and the general public's interest in traffic safety.

3.1 Background

In Turkey more than nine thousand persons are killed in road accidents every year and probably some two hundred thousand are injured. In other words, around 25 people are killed and more than 500 are injured every day on Turkish roads. Some of the injured are handicapped for life. Many of the victims are young, which means that the major parts of their lives are totally or partially destroyed.

In addition to pain and suffering, grief and sorrow, road accidents cause huge economic losses to the Turkish society and its citizens. It has been estimated that the socio-economic costs of road crashes amount to TL 2 000 000 billion per year (1999 price level).

It is not reasonable to accept that the road transport system creates such human disaster every year. If another technical "system", for example, air transport, suddenly should start to show similar numbers, politicians and individuals should be very worried and firm action should be taken immediately. It seems, somehow, as if the heavy toll on the roads is accepted as an unavoidable price for mobility.

Can the Turkish people really accept that so many persons are killed and injured on the roads every year? The answer must be NO! Firm action has to be taken immediately aimed at eliminating the principle causes of this disaster.

Safety is a most important responsibility of anyone involved in road transport. Everyone has a stake, the Parliament and the government, many ministries and government authorities (KGM, Police and Jandarma, MoNE and MoH etc.), provincial governments, local authorities, car makers and importers, fuel/tire and insurance companies, transport providers, universities and schools, emergency services and health care organizations, media, planning and design organizations, and NGOs, all have a role in creating the conditions for safer road traffic. Last but not least, the individual road user – drivers, riders and walkers – has an important role.

In reality, a balance has to be struck between improving traffic safety and furthering many other legitimate community objectives. Outside the transport system, there are needs concerning education, social welfare and hospital care, etc. Within the transport system there are needs for improved railway, port and airway facilities, as well as improved roads. Nowadays, the need for improved internet and e-mail communications is also strong. Within the road transport system there are needs for improved mobility (accessibility and speed, etc.), reduced transport costs and lowered environmental impact, in addition to improved safety.

It is often considered that better roads and increased traffic will yield economic and employment benefits, and that improved mobility can result in better quality of life, especially for young and older people. On the other hand, increased traffic will result in more environmental pollution and accidents. So even within the road sector, there are many considerations to be made in order to strike the most beneficial balance between all legitimate objectives within available resources. This is naturally a very difficult problem with many facets. The priority given to traffic safety should reflect the value that the community places on the preservation of human life and the prevention of serious injury.

3.2 Safety visions in other countries

In several countries, safety visions have been formulated. The idea is that a safety vision sets out the strategic direction towards a safe road transport system and that this direction should be followed in the safety work. In Appendix F, a summary is given of the safety visions in Denmark, the Netherlands and Sweden. They are called:

- "Every accident is one too many" (DK)
- "Sustainable safety" (NL)
- "Vision Zero" (SE)

3.3 Proposed safety vision

The following **safety vision** is proposed:

- *Nobody should be killed or seriously injured (as a result of a road accident) on Turkish roads.*

In the long-term perspective, the structure and the function of the road transport system has to be brought into line with all demands this vision entails. The vision allows property damage only accidents and slight injury accidents to occur.

In the medium-term perspective, the following **safety objectives** are proposed as complements to the vision:

- *The numbers of persons killed and seriously injured (as a result of a road accident) should be continuously reduced.*
- *Special attention should be paid to the safety of vulnerable road users and children.*

For a long period of time in the future, intermediate safety targets should be set and resources should be provided in order to attain these targets and objectives, and to approach the vision. All kinds of interventions should be used. The benefit-cost ratio or the effectiveness-cost ratio of each intervention should be guiding when setting priorities.

4 Strategy

Basic principles:

In this Strategy section, overall objectives and long-term targets are developed. It is also proposed what strategic actions should be taken in order to achieve the objectives and targets in an efficient way. The Strategy forms an important and necessary basis for the Plan.

Before the strategy for each item is formulated, a short background is given. This background is based on both foreign and Turkish experiences.

4.1 General

4.1.1 Systematic approach to traffic safety

The traffic accident and casualty problem can be characterized as follows:

- it is urgent and complicated,
- there are many types of interventions possible, with different effects and costs,
- many of the interventions also affect other variables (e.g., accessibility, speed and environmental impact),
- many public and private organizations as well as private individuals are involved.

In order to reduce the problem efficiently, coordinated and balanced actions from many parts of society are required. To obtain this, it is necessary to use an elaborated and *systematic approach*. The following steps describe such an approach:

1. Study the present situation and analyze the Problem
2. Formulate a safety Vision
3. Planning
   - develop a Strategy
   - develop an action Plan
4. Implement
5. Follow up and evaluate

Step 1 includes a general study of the present situation concerning the awareness of traffic safety, the cultural, educational and economic situation, and the opportunities and resources available. In addition, this step comprises a detailed study of the problem, mainly by analyzing accident statistics and major factors affecting safety.

Step 2 is the formulation of a safety Vision, that is, the ultimate and ideal, long-term image for safety.

Step 3 comprises the development of a Strategy, including overall objectives and long-term targets, as well as what strategic actions should be taken in order to achieve the objectives. This step also includes the design of a Plan, including short- and medium-term targets, as well as a detailed plan of action for what safety interventions should be carried out to attain the targets in an efficient way.

Step 4 is the implementation of the proposed interventions. During implementation, monitoring should be carried out to follow the progress and to observe any problems arising.

Step 5 includes the follow-up and evaluation of the effects and costs of the interventions, in order to check if estimated effects were obtained and if the targets were attained, as well as to gain general knowledge of the effects of different countermeasures.

After Step 5, a new or revised round of steps could start.

To be able to follow this outlined, systematic approach, several "tools"*) are needed (methods, models, knowledge etc.), for example:

- safety indicators,
- methods for problem analysis and diagnosis,
- appraisal methods,
- estimated effects of safety interventions,
- monetary values of accident and casualty reductions,
- methods for planning, monitoring, follow-up and evaluation,
- accident statistics and data banks.

One special tool for planning and evaluation, is the *"target/result-oriented way of working"*. This method is described in Appendix G. In principle, it implies that targets are set for a chain of different types of variables, for instance, what volume of a certain action should be carried out (e.g., what percentage of police working time should be devoted to speed surveillance), what performance should be obtained (e.g., how much speeds should be reduced) and, finally, how much accidents and casualties should be reduced (e.g., by speed enforcement).

During implementation of the interventions, progress should be monitored. After implementation, follow-up and evaluation should be carried out. Results should be disseminated to involved agencies and other interested parties.

Strategy:

- Develop and implement a systematic approach to tackle the road accident and casualty problem, including "tools".
- Develop and implement principles and methods for target/result-oriented way of working.
- Monitor implementation. Follow up and evaluate. Disseminate results to involved agencies and other interested parties.

4.1.2 Objectives and targets

Objectives
The Strategy is based on the fundamental principle of establishing a sound, safe and sustainable road transport system capable of coping with the changing and growing demands on transport.

*) All of these tools have been discussed and many of them have been improved in the Traffic Safety Project. However, all the tools need continual improvement. Some of them have to be based on results of safety research and development (R&D), and others need to be based on results of follow-up and evaluation.

The Vision for traffic safety is formulated in section 3. The overall objective of the Strategy is to substantially reduce road fatalities and severe injuries up to and including the last year for this Traffic Safety Program, that is, 2011. This could, for example, be obtained by establishing and achieving the following safety objectives:

- The numbers of persons killed and seriously injured (as a result of a road accident) should be continuously reduced.
- Special attention should be paid to the safety of vulnerable road users and children.

Safety indicators
In the last decades, it has been agreed that operational targets are more effective than general safety objectives. Safety targets could be set in terms of different *safety indicators*, for example:

1. the total number of killed and/or seriously injured persons,
2. the risk expressed in number of killed and/or seriously injured persons per inhabitant,
3. the risk expressed in number of killed and/or seriously injured persons per registered motor vehicle,
4. the risk expressed in number of killed and/or seriously injured persons per vehicle-kilometers traveled,
5. the total number of reported accidents,
6. the risk expressed in number of reported accidents per registered motor vehicle.

The first type of indicator gives a general measure of the magnitude of the casualty problem by stating the absolute number of severe casualties per year. This type does not take into account any increase in population and/or motor vehicle fleet.

The second illustrates the “health risk”, as it states the number of severe casualties per inhabitant. This safety indicator can, for instance, be compared with indicators used in medical care concerning fatalities caused by different illnesses. If the population change is limited, this indicator will be almost similar to the first type.

The third shows the number of casualties per registered motor vehicle. This indicator does not reflect the “health risk” and is therefore not quite suitable to describe the casualty situation.

The fourth indicator takes into account the number of vehicle-kilometers traveled and is therefore more relevant than the third one. This indicator is suitable if there are reliable data available on vehicle-kilometers.

The fifth gives a general measure of the magnitude of the accident problem by stating the absolute number of reported accidents per year. This measure, however, depends significantly on the number of motor vehicles.

The sixth takes into account the change in number of motor vehicles and is therefore more suitable to describe the general accident situation than the fifth indicator.

In summary, the most suitable indicators to describe the safety situation in terms of accidents and casualties are:

- the number of severe casualties, and/or the number of severe casualties related to the number of inhabitants,
- the number of accidents related to the number of registered motor vehicles,
- the number of severe casualties (or accidents) per vehicle-kilometer, if available.

In addition to the mentioned safety indicators expressed in terms of accidents and casualties, indirect safety indicators, so-called *safety performance indicators*, can be used in connection with a target/result-oriented way of working. These indicators should be causally related to accidents and casualties; the stronger the relationship, the better the indicator.

Some examples of such safety performance indicators are:

- speed (mean/average, percentage over limit etc.),
- use of seat belts and child restraints,
- use of safety helmets,
- percentage of drunk-driving,
- percentage of red light violations,
- use of retro-reflective devices during darkness (especially pedestrians and cyclists).

Proposed safety targets
The mentioned safety indicators require reliable data about accidents, casualties and risk exposure. This is a problem at present, as accident/casualty statistics are not fully developed, and there are only limited data available concerning vehicle-kilometers traveled etc. In order to be able to fully use different safety targets and indicators, it is necessary first to develop a suitable system for traffic safety statistics. Awaiting this, the following overall safety targets are proposed (compared with the numbers in 1999):

1. The total number of *killed* should be reduced by at least 20 percent in year 2006 and 40 percent in 2011.
2. The number of killed *vulnerable road users* should be reduced by at least 20 percent in 2006 and 40 percent in 2011.
3. The number of killed *children (0-14 years)* should be reduced by at least 25 percent in 2006 and 50 percent in 2011.

When a better statistical system has been developed, more elaborated safety targets can be implemented.

These overall national safety targets should preferably be broken down into targets suitable for different sectors, agencies and regions etc.

Strategy:

- Develop and implement a system for traffic safety statistics about accidents, casualties and measures of risk exposure, including links to data on roads, traffic, vehicles, drivers and enforcement etc.
- Apply the proposed safety targets. Develop and implement more elaborate targets when reliable data are available.
- Develop and apply suitable safety performance indicators to use in connection with a target/result-oriented way of working.

4.1.3 General strategy and top priorities

The general and overall strategy is to address all major safety isues and to focus on the most effective actions. This includes "Institutional/administrative" questions as well as "Technical" questions.

The "Institutional/administrative" questions concern:

- improved transport policy,
- improved attitudes towards safety,
- improved organization, cooperation and coordination,
- improved safety staff,
- improved funding of safety activities,
- improved data banks and accident statistics,
- improved safety research and development (R&D),
- other "institutional/administrative" actions.

The "Technical" questions concern:

- improved modal split,
- safer infrastructure (rural and urban roads),
- safer vehicles,
- safer road users (children and youths, driver training and licensing, alcohol, drugs and drowsiness, vulnerable road users, safety information and campaigns),
- better traffic legislation,
- better surveillance and enforcement ,
- reduced speeding and aggressive driving,
- increased use of safety equipment,
- improved emergency rescue, medical care and rehabilitation,
- improved registration of vehicles and driving licenses,
- safer commercial traffic,
- new technology,
- reduced regional problems.

All these areas have been examined and appraised, and interventions have been proposed accordingly. In order to be able to adhere to the Strategy and to implement the Plan, seven actions are of special importance and have to ***be started immediately*** and given ***top priority.*** These actions constitute a basic "infrastructure" for many of the proposed safety interventions (see Appendix H).

1. The full commitment of Parliament, government and the administration is of utmost importance for the success of the Program. Therefore, starting immediately, special information has to be given to high-level decision-makers, and campaigns have to be launched to influence the attitudes of the general public. It is suggested that in early 2002, at least two major campaigns should be launched, one on speeding and one on seat belts. To the extent possible, these campaigns should be designed also to increase the general awareness of traffic safety. The campaigns have to be carefully prepared, implemented and evaluated. To the most possible extent, private enterprise, NGOs and media should be involved.

2. In order to support and strengthen the existing national traffic safety organization, it is urgent to establish an effective Traffic Safety Secretariat. This Secretariat should serve the two safety Councils as well as the Parliament and the government. It should have competent staff with experience from many fields of safety. The Secretariat should be established and start its work in late 2002. From the beginning, the Secretariat will have to recruit and probably borrow personnel from involved organizations and universities etc. After some years, traffic safety graduates from the university could be employed. As a second step, a study should be carried out to find out if it could be suitable to establish a special Traffic Safety Directorate.

3. In order to be successful with all safety interventions, it is extremely important to have access to competent safety staff. Therefore, preparations must start immediately to strengthen university education on traffic safety. In addition, special safety courses should be developed for present staff working with safety issues. The university education should include all major involved disciplines, including civil (traffic) engineering and behavioral sciences. The first comprehensive courses should start during the autumn semester of 2002. From the start, and preferably also later, it should be possible to invite foreign visiting professors for the courses.

4. To be able to monitor the safety situation over time, and to evaluate the effects of safety interventions, it is absolutely necessary to have a reliable traffic safety database. The work to develop and implement such a database should be carried out with the highest pace possible. The databank should be functioning from January 2004, preferably including accident records for the last 5 years.

5. Improved methods and knowledge is of great importance for the safety work. Therefore, it is urgent to establish a Center for applied traffic safety research and development (R&D), as well as to develop and start a safety R&D program. The Center should be established and able to start its work in late 2002.

6. Safety information and awareness campaigns are of great importance. It is not possible with the present organizational structure to carry out such tasks with sufficient quality and effectiveness. Therefore, it is proposed that the organization for information and campaigns should be strengthened. The first step of this should be finalized in late 2002.

7. Improved traffic safety education in schools will positively affect the safety situation, especially in the long-term perspective. It is therefore urgent that curricula are suitably adapted, teachers sufficiently trained, and that good educational materials are developed.

Strategy:

- Increase the awareness of, and interest in, traffic safety of high-level decision-makers in the Parliament, the government and the administration.
- Establish a Traffic Safety Secretariat to support the existing safety Councils. Investigate if it is suitable to establish a special Traffic Safety Directorate.
- Strengthen university education on traffic safety and arrange special courses for safety staff.
- Develop a nationwide comprehensive and reliable traffic safety database.
- Establish a national Center for applied traffic safety research and development (R&D).
- Strengthen the organization for traffic safety information and campaigns.
- Improve traffic safety education in schools.

4.2 "Institutional/administrative" actions

4.2.1 Improved transport policy

To be able to develop an efficient transport system, it is necessary to establish a national transport policy, which, among other things, states what general principles should govern the development of the transport system and what objectives should be attained (e.g., good accessibility and speed, low transport costs, low environmental impact and good safety). Important strategic questions, which should be addressed in the policy, are the balance (competition and/or coordination) between different transport modes, and what relative value should be given to traffic safety improvements compared with other types of improvements.

The principles and objectives could be implemented in long- and/or medium-term transportation master plans. The policy and the plans have to be reviewed and up-dated at certain intervals.

Strategy:

- Develop and implement a comprehensive national transport policy.

4.2.2 Improved attitudes towards safety

The awareness of, interest in, and attitudes towards, traffic safety is of utmost importance for the success of the safety work. Great awareness and favorable attitudes will facilitate funding for safety interventions, increase involved agencies' motivation and efforts, improve road users' willingness to accept increased restrictions and costs, and increase road users' interest in safe behavior. It is vital that high-level politicians give their active support - advocacy - for the safety efforts.

It is also important to try to avoid misunderstandings that accidents and casualties are results of fate and destiny, and to stress that there are cost-effective countermeasures.

Strategy:

- Promote awareness of, and interest in, the accident problem and traffic safety.
- Inform about cost-effective countermeasures.

4.2.3 Improved organization, cooperation and coordination

The organizational structure for traffic safety in a country is of great importance for the success of the safety work. A recent review has shown that:

- Lead responsibility for traffic safety needs to be defined (and should include coordinating role) and accepted by key organization.
- A good bi-lateral working relationship between law enforcement agencies and road authorities should be the second priority.
- Multi-sectoral coordination should be based on successful local precedents. If none exists, traffic safety coordinating body should be limited to key ministries.

- Working groups and technical committees should be used both to promote the participation of business and civil society in developing traffic safety policy.
- Council and committee members will have a large role in the success of a program. Members need to be committed and pro-active.
- A traffic safety central office will be required, regardless of the organizational model chosen, with adequate financial and technical resources to be effective.

The normal public, organizational structures for safety in a country are: *either* a Lead Ministry (and/or a Lead Authority) with overall responsibility for traffic safety and its coordination, *or* a National Traffic Safety Council with responsibility mainly for coordination and some overall safety activities. In addition, there are usually several other, public organizations involved, responsible for their respective parts (in Turkey, e.g., EGM, KGM, MoNE and MoH), as well as provincial and local committees.

It is of great importance that the traffic safety organization has: sufficient resources (in terms of competence, staff, funds, equipment, etc.), sufficiently high level "position" to be respected, statutory powers to carry out its duties, sufficient authority, responsibility and accountability, as well as strong support from Parliament and government.

In order to be successful it is also necessary that all relevant organizations and levels are involved, including private enterprises and NGOs, and provincial and local levels. The latter is necessary because a significant part of the safety work has to be carried out close to the road users.

Based on these principles, the following options could be possible for Turkey:

1. Appoint a Lead Ministry and establish a safety unit with overall responsibility for traffic safety, for example:
   - a special unit within the Ministry,
   - an existing, subordinate authority (e.g., EGM and KGM),
   - a new, authority, a "Traffic Safety Directorate".
2. Strengthen the existing Supreme Highway Traffic Safety Council (SHSC) and the Highway Traffic Safety Council (HTSC), by defining duties, authority, responsibility and accountability for the two Councils, and by establishing a strong and effective Secretariat supporting the two Councils. This Secretariat will have many qualified duties and must have a competent staff with experience from many fields of safety.
3. Establish an independent "Traffic Safety Directorate".

For all these options, the other involved, public organizations should continue their safety work.

Because of what is stated in the existing Traffic Law, it may be difficult at present to create a Lead Ministry, even if this is considered to be an effective type of organization in many countries. It could perhaps also be difficult to create an independent Traffic Safety Directorate in the near future. Therefore, for the time being, it is proposed that the present solution with the two Councils should be preserved and strengthened by establishing a Traffic Safety Secretariat supporting the Councils.

In a longer time perspective, it is suggested that a study should be conducted to assess if it is suitable to establish a fully independent Traffic Safety Directorate, superior to involved ministries and subordinate to the Prime Minister's office, or a special Directorate under one

of the involved ministries. If this turns out to be a suitable option, the proposed Traffic Safety Secretariat could constitute one important base for this new Directorate.

In Appendix H, some duties of the two Councils and the Secretariat are proposed. In principle, it is suggested that:

- The SHSC should be responsible and accountable for, and take decisions concerning, all major and overall traffic safety issues in Turkey.
- The HTSC should assist the SHSC by preparing, discussing and approving background material, proposals and other kinds of basic material for decisions on major and overall safety issues (i.e., to act as a "preparatory group" for the SHSC). It should also be responsible for, and take decisions about, overall safety issues, which are not of the magnitude that they require decisions by the SHSC.
- The Secretariat should assist the two Councils by preparing background material, proposals, analyses and other kinds of basic material for discussions and decisions, give advise on safety matters to the Parliament and the government, and be responsible for the execution of the Councils' decisions for which there are no other responsible public organization.

It may also be necessary to review, and if necessary revise, the duties of the other involved, national public organizations. Furthermore, it may be necessary to review the provincial and local safety organizations with the view to make them more effective.

Strategy:

- Review the function, duties and composition of the two Traffic Safety Councils.
- Establish a Traffic Safety Secretariat to support the Councils, the Parliament and the government.
- Supply the national public safety organization with sufficient authority.
- Review the function and duties of other involved, national public organizations.
- Review the function, duties and composition of provincial and local safety organizations.
- Establish partnership and cooperation with private enterprise, NGOs and media.

4.2.4 Improved safety staff

The commitment, competence, experience and willingness to cooperate of the staff working with traffic safety is of great importance for the success of the work.

To improve the present situation it is, among other things, necessary to improve university education on safety and to develop courses for further education and training on safety topics. In addition, attractive positions should be created for people interested in working with safety.

Strategy:

- Develop competence of traffic safety staff by improved university education and special safety courses.
- Increase the number of specialist staff working with safety. Create positions for people interested in safety work.
- Promote the prestige of working with safety.
- Send national experts to important international safety events. Participate in international cooperation concerning safety issues.

4.2.5 Improved funding of safety activities

Funding of traffic safety activities is generally supplied by:

- national, provincial and municipal budgets (e.g., roads, police, health care and school education),
- private individuals (e.g., safety equipment, such as, seat belts, airbags, ABS and tires, driver training/licenses and vehicle inspection),
- private enterprises (e.g., car makers/importers and insurance companies),
- NGOs (e.g., voluntary safety organizations).

It could be noted that the costs paid by private individuals are often substantial and may sometimes exceed public spendings.

There are some general options for increasing safety funding:

- allocating more funds from the national, provincial and municipal budgets,
- reallocating funds from ameliorative activities to more preventive interventions,
- "commercializing" safety and get road users and others to pay more,
- requesting development assistance from donors and loans from international development banks.

One way to try to increase public funding is to produce better background and decision material that clearly shows decision-makers what safety benefits would be gained by increased funding.

Reallocation of funds can, for example, be done by stating that a certain portion of the road maintenance budget should be earmarked for road safety interventions.

"Commercializing" safety can be done in different ways:

- imposing special safety levies on (third party) insurance premiums,
- returning "funds to the source" (e.g., speed fines to police safety work),
- developing road funds, that is, to create exclusive budgets for road improvement, perhaps including safety interventions (by road user charges, e.g., fuel tax, vehicle registration and licensing fees),
- developing safety funds, that is, to create exclusive budgets for safety interventions (by road user charges, e.g., driver testing and vehicle registration),
- paying more for government safety services, for example, by increasing safety standards at full cost recovery (e.g., improved vehicle inspection),
- sponsoring by private enterprises and NGO's, at least of certain safety activities.

In addition, it should be mentioned that more effective and efficient use of existing funds could also contribute to "increased funding" for safety interventions.

Strategy:

- Use available funds in a more efficient way for traffic safety interventions.
- Increase state, provincial and municipal funding for safety.
- Study if "commercializing" safety is a suitable funding option.
- Increase safety funding by private enterprises and NGOs.

4.2.6 Improved data banks and accident statistics

Accident and casualty databases are indispensable tools to allow for objective assessment of the traffic accident problem, identification of priority areas for action and for evaluation of the effectiveness of countermeasures. Such databases are also needed to help define target levels and to facilitate a systems approach in defining suitable strategies. The databases should include all road accidents and casualties, and permit links between accidents and casualties on the one hand and roads, traffic, vehicles, license holders, enforcement and weather conditions etc. on the other.

Elaborated accident statistics and analysis are necessary tools for a successful safety work.

It is important to use suitable definitions of fatalities and injuries. For fatalities the international 30-days definition should be used. For injuries it may be suitable to adopt the term "hospitalised" instead of "seriously injured".

Strategy:

- Develop and implement a reliable nationwide data bank for traffic safety. Improve cooperation between EGM, Jandarma and MoH concerning accident reporting.
- Develop and implement an improved national statistical yearbook on accidents, roads and traffic.
- Implement the 30-days definition of a road fatality. Study if the term "hospitalised" could be used instead of "seriously injured".
- Improve the quality of accident reports and records.
- Develop and implement improved methods for accident analysis.
- Improve information about risk exposure, mainly vehicle-kilometers and person-kilometers traveled.

4.2.7 Improved safety research and development (R&D)

Applied Research and Development (R&D) is an important way to improve knowledge necessary to create better traffic safety. This can be achieved by:

- acquiring knowledge from abroad by studying international safety literature etc.,
- carrying out domestic safety R&D, partly to verify foreign results,
- taking part in international safety R&D cooperation.

Evaluation data of safety interventions must be collected and analyzed in order to develop more effective safety programs in the future.

A well-focused research effort is required to support future safety programs concerning accident contributing factors, consequences of road crashes, effects of existing countermeasures, and likely effects of potential countermeasures.

Strategy:

- Establish a national Center for applied traffic safety R&D.
- Increase funding for safety R&D.
- Improve cooperation and coordination between safety R&D-organizations, universities and executing agencies.
- Develop and implement a program for safety R&D.
- Take part in international cooperation on safety R&D.

4.2.8 Other "institutional/administrative" actions

There are many other "institutional" actions that can affect traffic safety. For example, the price the consumer has to pay for safety related equipment, such as tires and safety helmets, and the incentives given by car insurance premiums are both of relevance.

Strategy:

- Investigate if it is suitable to implement a system with low or no VAT on safety related equipment.
- Investigate if it is suitable to change present principles for setting car insurance premiums in relation to drivers' and vehicles' accident records.

4.3 "Technical" actions

4.3.1 Improved modal split

Different modes of transport show different levels of safety. Public transport, for example, especially rail transport, generally demonstrates much better safety than road transport. Therefore, one way to reduce the accident and casualty problem is to reduce road traffic by transferring road transport to safer modes. Another way to reduce road transport is to substitute passenger transport by tele-communication, for instance, e-mail.

Strategy:

- Promote transport systems that reduce road transport, especially freight transport.
- Promote public transport and other means to reduce car traffic.

4.3.2 Safer road infrastructure – in general

It has been shown that simply building more and more roads may not always be the best answer to traffic growth. The emphasis in many Western-European countries is now getting more directed towards making the best use of the existing road network and giving priority to sites with the worst safety, congestion and/or environmental problems. In many countries, it is recognized that:

- good road and traffic engineering can reduce the risk and severity of accidents,

- the focus should be more directed towards targeted programs of safety improvements, and demand and traffic management,
- for local roads and streets, the focus should be on coordinated local planning, traffic calming, and improvements for pedestrians and cyclists.

The safety of roads and streets depends on many characteristics concerning:

- design,
- construction,
- equipment,
- traffic regulations and control
- maintenance and operation.

Road *design* should set reasonable demands on drivers, contribute to correct expectations and be "forgiving", if the vehicle leaves the roadway. Road *construction* should contribute to safe driving by providing sufficient surface friction. Road *equipment* should give sufficient visibility, facilitate comprehension, and reduce consequences of accidents. This includes, markings, signs and signals, road lighting and guardrails. During the last decade, traffic calming measures have frequently been used to reduce speeds in local streets. *Traffic regulations and control* should facilitate driving, for instance, concerning speed and overtaking. Road *maintenance* should keep the road in good condition over its lifetime, while *operation* should ensure that the road is possible to use safely at all times. In the future, new technology, so-called Intelligent Transport Systems (ITS) will contribute to safer infrastructure.

Evaluations in many countries have shown that it is generally much more cost-effective from a safety point of view, to spend money on low cost improvements, for example, black spots, than on major road schemes. For the same amount of money, low cost improvements have resulted in 5 to 10 times the reduction in accidents and casualties. It should also be observed that for minor improvements, it is normally more efficient to use low cost options instead of high cost ones. Furthermore, it should be mentioned that, in some countries, the emphasis on improving local black spots is starting to give way to route and area treatments.

4.3.3 Safer infrastructure – rural roads

Some of the most urgently needed safety actions for rural roads are to:

- reduce head-on and across-median crashes,
- keep vehicles on the roadway and minimize the consequences of leaving the road,
- improve the design and function of junctions.

Strategy:

- ❑ Develop and implement improved methods for land-use planning.
- ❑ Develop and implement improved methods for road planning and economic appraisal.
- ❑ Develop and implement comprehensive guidelines for road design and equipment.
- ❑ Develop and implement improved methods for black spot identification and elimination.
- ❑ Develop and implement safety audits for planned and existing roads.
- ❑ Develop and implement improved guidelines for some safety related maintenance activities.
- ❑ Establish a special unit for guidelines at KGM Head Office.

- Improve cooperation between KGM and local authorities concerning safety issues related matters.
- Improve cooperation within KGM concerning safety issues. Increase the use of working groups.
- Improve the competence of KGM staff working with safety.

4.3.4 Safer infrastructure – urban roads and streets

Some of the most urgently needed safety actions for urban roads and streets are:

- coordinated local land-use and transportation plans,
- improvements for pedestrians and cyclists,
- traffic calming measures.

Strategy:

- Develop and implement improved methods for land-use and urban planning.
- Develop and implement improved methods for functional road/street classification, roads/streets planning and economic appraisal.
- Review and revise present guidelines for road/street design and equipment.
- Develop and implement methods for black spot identification and elimination.
- Develop and implement methods for safety audits of planned and existing roads/streets.
- Develop and implement methods and guidelines for traffic calming and facilities for vulnerable road users.
- Develop and implement guidelines for some safety related maintenance activities.
- Improve cooperation between local authorities and KGM concerning safety related matters.
- Create an association for cooperation between provinces and local authorities concerning roads, traffic and safety.
- Increase the number and competence of traffic safety personnel in major cities.

4.3.5 Safer vehicles

Modern vehicles are much better than older ones with regard to safety. They are usually easier to control in normal driving, more predictable in emergency situations, and give better protection in a crash. Improvements of vehicle safety have contributed significantly to the reduction of road deaths and injuries and will continue to do so, especially by introduction of new technology (for example, ITS).

It is recognized that there is still a substantial potential for safety improvements concerning design, equipment and maintenance of vehicles. Vehicle design will be developed to further improve accident prevention and protection provided to occupants, as well as to minimize the hazard to non-occupants struck by a vehicle.

The motor industry is both international and competitive. Unless there is a consumer demand, strictly enforced legislation or mandatory international regulations for a safety feature, it is not likely to be offered. So, improvements in vehicle design and equipment will be driven by consumer demand and by regulation and enforcement.

Therefore, it is important to supply the consumers with relevant information about the relative safety of new and used cars, and for Turkey to support international work on

regulations on safety features and to complete the ongoing technical legislation adaptation works as soon as possible.

Within the European Union directives are being developed which identify "minimum requirements" for each product. Turkey is also harmonizing its national legislation with the EU directives.

Strategy:

- Improve accident prevention ("active safety"), protection of car occupants ("passive safety"), and protection of other road users struck in collisions, mainly by actively taking part in international cooperation concerning vehicle design and equipment, and by implementing relevant international regulations.
- Develop and implement better safety information to consumers.
- Improve the periodic vehicle inspection and its organization.

4.3.6 Safer road users ─ children and youths

In many countries, research has shown that road accidents are the leading cause of accidental injury amongst children and young people:

- child pedestrian casualties peak at about the age of 12, and child cyclist casualties at the age of 14. Boys are more frequently injured than girls,
- a substantial part of the injuries occurs on the way to and from school, and in the child's local area,
- children in the lowest socio-economic groups are often over-represented,
- a child cycling could be almost 50 times more likely to be injured than a child travelling by car and 3 times more likely than a child walking.

Strategy:

- Children and youths should be able to walk and cycle in safety. Appropriate action should be taken for all age groups.
- Give sufficient and relevant safety education to pre-school, primary-school and high-school students. Promote parents' involvement. Improve cooperation on education with other involved organizations.
- Improve safety education for prospective teachers.
- Local authorities and KGM should take a more active part in creating safe routes for children.
- EGM and Jandarma should carry out special enforcement around schools.
- Inform about accident problems for children and youths and suitable safety interventions.

4.3.7 Safer road users – driver training and licensing

There is clear evidence in many countries that young drivers have poor safety records and are over-represented in accident statistics:

- young, novice drivers are estimated to be more than 5 times more likely to be involved in an accident than middle-aged and experienced drivers,
- male novice drivers are more frequently involved than female novice drivers.

Some reasons for this could be that:

- learner drivers are often more interested in passing the test and getting the license than in preparing themselves for a safe behavior for their whole driving career,
- young men often consider a driving license as a proof of adulthood and personal independence. The social responsibility towards other road users is often ignored,
- driving instructors are too few and not sufficiently trained,
- driving school curricula, training tools and examination tests are not fully developed.

In some countries, many drivers continue to drive after their privileges have been suspended. In most countries, the number and proportion of older drivers will increase substantially over the next decades. Older drivers can have certain perceptive and cognitive driving problems, which contribute to the fact that injury rate for the oldest drivers can be 4 times that of middle-aged drivers, and the severity much higher.

It is normally considered that improved attitudes and better driving behavior would make a substantial improvement to reducing the number of accidents and casualties.

Strategy:

- Prepare the learner drivers by improved school traffic education (in high-school).
- Develop and implement new curricula for driving education and training. Raise the standards of tuition offered by driving instructors. Improve the tests, especially the practical one. Address the special needs of professional drivers.
- Improve surveillance and enforcement of license suspension and revocation.

4.3.8 Safer road users - alcohol, drugs and drowsiness

To drive safely, drivers need to be physically and mentally alert. Alcoholic beverages, drugs/medicines and ordinary tiredness can contribute to road accidents. Sudden illness and suicides could also increase the number of accidents and casualties. In some countries, it is estimated that these latter cases can make up for more than 5 percent of all fatalities.

It is well known that even small amounts of alcohol impairs driving. It is also generally assumed that illegal and prescribed drugs impair driving performance. In some countries, drunken driving is estimated to be a factor in 40 percent of all fatal crashes. Driving under the influence of illegal drugs is becoming a serious problem in several countries.

According to some research, fatigue may be a main contributing factor in almost 10 percent of all accidents. This can affect any driver, but people driving as part of their job may be more at risk, for example, drivers of heavy goods vehicles and busses. However, ordinary drivers during long-distance driving can also be affected. There are also other factors involved, such as monotony and reduced visual stimulus.

Strategy:

- Adopt drink-driving alcohol limits according to the EU or tougher.
- Enforce and punish drunk-driving harder.
- Develop effective ways to tackle "drug-driving".
- Strengthen and enforce laws on driving time working hours for commercial drivers.
- Inform about the dangers of alcohol and other drugs, and how much tiredness can contribute to accidents.

4.3.9 Safer road users ─ vulnerable road users

Making it easier and safer for people to walk or cycle is an important part of an integrated transport strategy. This will reduce car dependency, congestion and local air pollution, and it will also improve people's health and fitness.

However, pedestrians and cyclists are vulnerable road users with very high risks compared with car occupants. Injury risks can be 5 times for pedestrians and 7 times for cyclists compared with car drivers. Fatality rates can also be much higher. Pedestrians and cyclists are especially vulnerable in mixed traffic environments, and where there are no proper sidewalks and bicycle tracks/lanes.

The safety problems for pedestrians and cyclists are common to many countries. This is a result from a mix of factors, but underlying all other problems is the fact that traffic systems are designed mainly from a car perspective. In most countries there has been a lack of coherent planning of route networks for pedestrians and cyclists. Some of the accident contributing factors are:

- mix of motor vehicle traffic, pedestrians and cyclists etc.,
- lack of proper facilities, such as pedestrian and cyclist routes, sidewalks and cycle tracks,
- pedestrians and cyclists are much more vulnerable than car occupants,
- pedestrians and cyclists are very "flexible" and unpredictable in their movements. They can appear almost anywhere (behind cars, taking short-cuts etc.) and are sometimes difficult to see,
- pedestrians and cyclists have varying physical and mental abilities (young/old etc.),
- especially pedestrians are often doing other things when walking (using mobile telephones, window-shopping, chatting, etc.),
- lack of awareness of drivers, pedestrians and riders of the risks and responsibilities all parts have when interacting.

Motorcycles and mopeds are sensible means of transport for some journeys. However, motorcycle and moped riders represent a large proportion of road casualties in relation to their numbers and kilometers traveled. The victims are frequently young males. Alcohol and speeding is often involved. Some studies indicate that the injury risk for motorcyclists and moped riders can be 15─20 times higher than for car drivers.

Strategy:

- Local authorities should give priority to the safety of walking and cycling, and develop and implement local transportion plans, including networks for pedestrians and cyclists.
- KGM should develop and implement plans for improved facilities for pedestrians and cyclists, especially for city-passings.
- Encourage vulnerable road users to take responsibility for their own safety.
- Encourage NGOs to take part in traffic training for pedestrians and cyclists, and promote the use of retro-reflective devices and safety helmets.
- Inform car drivers about the vulnerability of pedestrians and cyclists.
- Strengthen legislation and enforcement to improve car driver behavior towards pedestrians and cyclists, especially when they are crossing the road.
- Inform about the dangers of motorcycle and moped riding, and promote the use of safety equipment for riders.

4.3.10 Safer road users – safety information and campaigns

Proper safety information and awareness campaigns can change attitudes and behavior, and create a climate where people understand and accept traffic safety measures. It must be noted, however, that in order to be effective, campaigns have to be well targeted, designed and implemented, and that they should preferably be coordinated with other safety interventions, for example, introduction of new legislation, specially focused enforcement, and road and traffic management activities. They should be repeated within reasonable time intervals. It is also important that safety information and campaigns are carried out professionally. These activities should be followed up and evaluated.

Strategy:

- Strengthen the organization for general traffic safety information and campaigns.
- Develop and implement a long-term plan for safety campaigns, so whilst continuing to target many different issues, a new understanding of everyone's social responsibility in road traffic is being built.
- Design and implement well targeted and focused safety awareness campaigns with high quality according to the long-term plan.
- Evaluate the results of the campaigns in terms of increased knowledge, changed attitudes and behavior, and, if possible, reduced accidents.
- Build partnerships with NGOs to obtain a strong, powerful and sustainable safety opinion.

4.3.11 Better traffic legislation

If legislation is correctly used, it can be a powerful tool in the traffic safety work. There are, however, a number of prerequisites for successful use of legislation. Most important is that the legislation has to be known, understood, found meaningful, and supported (or at least tolerated) by the public, and that it must be coupled with strict enforcement and suitable punishment. It is also preferable that changed legislation is preceded and supported by efforts to increase the awareness of safety.

Legislation must be supported by social norms and values among the general public. The changing of laws and regulations could be said to be the last step, when there already is a

general understanding that adjustments are necessary. It must be recognized that legislation, public understanding and enforcement are deeply interrelated. The solution for the present problems must therefore be sought in more than one area.

The legislation should be continuously adjusted to the demands of safety, both nationally and internationally.

A general problem with the present traffic legislation and enforcement is that the road users (mainly drivers), do not follow even the most obvious and simple rules, for example, not to drive against red light.

Strategy:

- Make traffic legislation better understood, supported and accepted (or tolerated) by the public.
- Improve enforcement of the traffic legislation. Educate and train police officers.
- Review and implement revised versions of some identified parts of present legislation*) .
- Develop and implement a "transportation law" to regulate road transport.

4.3.12 Better surveillance and enforcement

Road traffic legislation sets the framework for using the roads safely. Enforcing the laws is an important task in reducing road accidents and casualties. Therefore, EGM and Jandarma have a central role in improving traffic safety.

There is evidence that enforcement is much more effective if it forms a part of a systematic approach to safety and is backed up by information and engineering measures.

It must be observed that the main objective of enforcement is traffic safety, and not to maximise the number of infringement notices issued. Police activities should serve as a deterrence for drivers inclined to commit offences through increasing road users' perception of the risk of being caught. Among other things, this means that the police should be highly visible in traffic.

The responsibility for surveillance and enforcement is at present shared by Police (EGM) and Jandarma. It appears that EGM is responsible for all motorways, most state roads and some provincial roads, while Jandarma is responsible for some state roads, most provincial roads and all village roads. It is doubtful that this is the most efficient solution. Therefore, it is suggested that a study should be carried out to find out the most efficient distribution of responsibilities. It could, for example, be better to give the full responsibility for all motorways and state roads to EGM and let Jandarma have the full responsible for all provincial and village roads. This would probably improve the efficiency and decrease the problems with non-uniform accident reporting and statistics.

Enforcing the law does not only imply surveillance and enforcement. It also includes proper penalties, effective court procedures and suitable rehabilitation schemes for offenders.

*) See "Problem".

Traffic offences range from minor, careless errors to serious, deliberate offences with devastating consequences for other road users and the road users themselves. This has to be taken into account and there has to be a correspondingly wide range of effective penalties.

Strategy:

- Maximize the contribution that traffic surveillance and enforcement can make to reducing road casualties.
- Make penalties and court procedures more effective.
- Investigate if the present sharing of responsibility for surveillance between EGM and Jandarma is the most suitable.
- Improve existing cooperation and joint training between EGM and Jandarma.
- Try to obtain better public understanding of, and respect for, traffic law.
- Develop, test and introduce new surveillance technology.
- Improve working conditions for traffic police officers.
- Always enforce the law when traffic offences are observed.
- Every EGM/Jandarma officer must act as a "good example" in traffic.
- Apply "equality before the law" as a basic principle.

4.3.13 Reduced speeding and aggressive driving

Too many people take a cavalier attitude to *speed and speeding* despite that research has clearly shown that speed is a major contributory factor in a large number of accidents. Some studies indicate that too high and inappropriate speed is the main factor in about one third of all road accidents.

Research has also shown that (especially for rural roads and speeds):

- the number of fatalities is proportional to speed to the power of four,
- the number of serious injuries and fatalities is proportional to speed to the power of three,
- the number of injuries is proportional to speed to the power of two.

Studies have also shown that when a pedestrian is hit by a car, the likelihood of being killed rises dramatically with the impact speed, for example, from about 5 percent at 30 km/h to 90 percent at 65 km/h.

Speeding is a huge safety problem. In many countries, more than 50 percent of all vehicle kilometers traveled are in excess of the maximum permitted speed. It must, however, also be observed that even speeds within the limits can be too high and lead to crashes, especially when driving conditions are not perfect.

It seems as if many people do not regard exceeding the permitted speed as a breach of law, even if they can understand that higher speed creates higher risks. On the other hand, many people can express concern about speeds around their homes or when they are walking, and still they themselves drive too fast.

In many countries, *aggressive driving* leading to accidents and casualties is becoming more prevalent. This aggressive driving often manifests itself as a combination of speeding and reckless driving, for example, violations of red light, stop sign and one-way regulations,

driving too close in front of signalized junctions, dangerous overtakings, driving too close to the vehicle in front, driving on shoulders to pass, and shouting and gesturing at other drivers.

In order to improve the situation, public attitudes, values and behavior have to be changed substantially.

Strategy:

- Widely publicize the risks of high speed and speeding and the reasons for speed limits.
- Develop and implement national guidelines for determining appropriate speed limits on all roads and streets.
- Enforce speed limits strictly, and increase the fines in relation to increased risks.
- Strictly enforce red light, stop sign, one-way regulations, dangerous overtakings, driving too close to the vehicle in front, and other kinds of aggressive driving.

4.3.14 Increased use of safety equipment

Wearing seat belts is the most important single action that can be taken by a vehicle occupant to minimize the risk of personal injury in a road accident. In many countries, the introduction of seat belt wearing legislation has had a demonstrable significant effect upon fatalities and the average severity of injuries.

The seat belt is among the most effective and inexpensive safety innovations ever made. It is also very simple to use. In some countries, the belt usage amounts to 90 percent in front seats and 70 percent in rear seats, but for killed occupants the wearing rates are much lower. Based on this, it can be concluded that it is important to increase wearing rates and to monitor the rates continuously by a reliable sampling system.

Child restraint systems, such as special cradles and seats for children, booster cushions etc., have shown remarkably good results in many countries. It is therefore important to introduce and implement such simple, inexpensive and effective safety equipment.

Air bags in modern cars are an efficient complement to seat belts. They should, however, never be used close to children's seats.

Safety helmets for motorcyclists, mopedists and bicyclists are effective in reducing head injuries in both single accidents and crashes with other vehicles.

For all road users, it is important "to see and be seen". In some countries, special retro-reflective devices are used for pedestrians and cycles/cyclists. The experience is that they are very effective and inexpensive, and can therefore be highly recommended.

Strategy:

- Promote the use of seat belts and child restraint systems in cars.
- Strengthen legislation concerning the use of safety equipment.
- Enforce strictly the use of mandatory restraint systems in cars.
- Promote and enforce the use of safety helmets for motor cyclists and moped riders.
- Promote the use of safety helmets and retro-reflective devices for cyclists as well as reflective devices for pedestrians.

4.3.15 Improved emergency rescue, medical care and rehabilitation

While prevention is the ideal solution to the problem of road injuries, an effective emergency service and trauma care system is also essential. This includes:

- first aid actions by people at the accident site,
- alarming emergency services, and emergency services finding the site,
- cooperation between emergency services (e.g., traffic control, extrication, fire extinguishing and first attendance and treatment),
- first emergency medical treatment,
- transport to hospital,
- emergency treatment at hospital,
- rehabilitation at hospital or rehabilitation center.

Research has shown that survival is increased and injuries reduced by qualified first aid, short response time for emergency services, better access to first medical treatment and better quality of emergency medical treatment at hospital.

The minutes directly following the injury are often critical to saving the victim's life or ameliorating the effects of injuries, sometimes called the "golden hour" (from injury to qualified emergency treatment). It is believed that "ideal" improvements in emergency services can reduce fatalities by up to 20 percent.

There are several organizations involved in emergency services:

- Alarm organization
- Rescue/Fire brigade
- Ambulance
- Police
- Civil defense
- NGOs

In order to improve performance, effective organization and cooperation between the different services is important as well as competent staff and suitable equipment.

First aid knowledge of emergency services personnel, motorists and the general public is also very important to improve the quality of the first aid actions taken at the accident scene.

It should be observed that emergency trauma care in rural areas is especially troublesome, because of more severe injuries due to higher speeds, longer time for emergency services to arrive, usually lower standard of first treatment, and less equipped hospitals.

(In section 4.3.15, improvements in emergency <u>medical and psycho-social</u> treatment and rehabilitation have not been included).

Strategy:

- Develop and implement one joint emergency alarm system.
- Improve first aid knowledge of emergency services personnel, students, teachers, road users and the general public.
- Follow up and evaluate the results of the ongoing EAPP.
- Develop and implement an improved system for emergency services, including improved cooperation between different types of emergency services.

4.3.16 Improved registration of vehicles and driving licenses

Even if it is not directly connected to traffic safety, it is important to have fast access to relevant and correct information about vehicles and driving licenses.

Strategy:

- Change the Turkish categories of motor vehicles to comply with the Vienna Convention and the EU Directives.
- Change the categories of vehicles a license holder is authorized to drive in accordance with the Vienna Convention and the EU Directives.
- Improve the present registration system and database.

4.3.17 Safer commercial traffic

In many countries, large trucks are involved in severe accidents, in which many other road users than truck occupants are injured. Poor driving performance, including fatigue, is one contributing factor. Overloading, unsafe braking and steering systems are other serious concerns. It is possible, that similar deficiencies apply also to some kinds of long distance bus traffic.

Strategy:

- Strengthen regulations on professional drivers' working hours.
- Improve regulations of heavy vehicles brakes and other safety related equipment.
- Enforce speeding, overloading, work hours, and regulations on heavy vehicles safety equipment.
- Design roads and road equipment to reduce crashes resulting from loss of alertness and driver fatigue (e.g., by applying shoulder rumble strips).

4.3.18 New technology

Emerging technology will be used to improve traffic safety. This technology, commonly known as Intelligent Transport Systems (ITS), involves engineering systems built into the vehicle and/or to the road that intervene when drivers suffer lapses of concentration or make unsafe decisions. The systems have the potential to:

- give route guidance,
- require the driver to perform a breath test before starting the car,
- ensure that the driver's license conditions are adhered to,
- ensure that restraints are used,
- prevent speed limits being exceeded (automated speed enforcement),

- maintain safe following distances between vehicles,
- control adherence with lane markings and stability on wet surfaces,
- monitor driver alertness,
- control variable message signs (VMS),
- detect the occurrence of a serious crash and automatically notify emergency services.

In the future, safety will most probably also be improved by:

- intelligent seat belts and airbags,
- vehicle radar and other risk-reducing systems (e.g., Adaptive Cruise Control (ACC) and intelligent speed adaptation),
- road pricing schemes, mainly within major metropolitan areas.

It should be observed that the development of such systems should not be left entirely to market forces, as the market does not necessarily select the option most beneficial to safety.

One very important problem is that ITS need international standards. Otherwise the systems will not work when a car crosses a country border.

Strategy:

- Take part in international cooperation concerning ITS in order to build competence.
- Carry out tests with some types of ITS*) .

4.3.19 Reduced regional problems

In some regions and especially during certain seasons, there are many agricultural tractors and animal-drawn carts on the roads, also during night-time. These vehicles can contribute to hazardous situations and accidents, for example, by not using proper lighting or retro-reflective devices at night.

In western and southern Anatolia there are many tourists, especially during the warm seasons. This could create special accident problems.

Strategy:

- Strengthen and enforce legislation on the use of agricultural tractors on public roads.
- Inform tourists about the special risks in Turkish traffic and Turkish road users about the special dangers with tourist drivers and pedestrians.

*) It should be mentioned that some types of ITS have already been introduced by KGM, for example, VMS and digital speed signs.

5 Plan

Basic principles:

In this Plan section, mid- and short-term targets are developed. It is also proposed what actions should be taken in order to attain the targets in an efficient way.

5.1 General principles and top priorities

In the Plan, a number of safety interventions for different areas are proposed. For each area, targets have been set.

The proposed interventions are listed in tables.*) The suggested starting time for the interventions are classified in three groups:

- "Immediately", which means that the intervention should start within 6 months from the date the Program is authorized.
- "Medium-term", which means that the intervention should start within 2 years.
- "Long-term", which means that the intervention should start within 5 years.

In the tables, "Deadline" indicates when the actual intervention should be finalized at the latest. "Responsible agency(-ies)" shows which organizations have the main responsibility for the interventions.

In this Program, it is proposed that two new agencies should be established:

- a Traffic Safety Secretariat (TSS), supporting the two safety Councils,
- a Center for applied traffic safety research and development (R&D),

In the tables below, it has been indicated (by using the abbreviations) to which interventions these agencies could contribute, when they are established.

The following interventions should ***be started immediately, given top priority and finalized before the "Deadline"*** (see more detailed descriptions in Appendix H).

Intervention	**Deadline**	**Responsible agency(-ies)**
1. Increase the awareness of, and interest in, traffic safety of high-level decision-makers in the Parliament, the government and the administration.	Immediately	SHSC and HTSC Involved agencies
2. Establish a Traffic Safety Secretariat to support the existing safety Councils, the Parliament and the government. Investigate if it is suitable to establish a special Traffic Safety Directorate.	2002-12	Parliament Government SHSC and HTSC

*) In Appendix I, some other possible traffic safety interventions are specified.

3. Strengthen university education on traffic safety and arrange special courses for safety staff.	2002-09	MoNE HEC Universities Involved agencies
4. Develop a nationwide comprehensive traffic safety database.	2003-12	SHSC and HTSC EGM Jandarma KGM MoH Involved agencies
5. Establish a national Center for applied traffic safety research and development (R&D).	2003-12	Parliament Government SHSC and HTSC EGM Involved agencies
6. Strengthen the organization for traffic safety information and campaigns.	2002-12	Parliament Government SHSC and HTSC MoNE Involved agencies
7. Improve traffic safety education in schools.	2002-12 revisions	Government MoNE Involved Agencies

5.2 "Institutional/administrative" actions

5.2.1 Improved transport policy

Targets

- Finalize proposed intervention before the deadline. After that, recurrent revisions should be made.

Intervention	Imme-diately	Medium-term	Long-term	Deadline	Responsible agency(-ies)
a. Develop and implement a comprehensive national transport policy. The policy should, among other things, indicate what balance should be achieved between different transport modes and what relative value should be given to safety improvements compared with other types of improvements. The strategic direction should be towards less road traffic and increased emphasis on traffic safety.	(x)	x		2004-12 revisions	Parliament Government SPO

5.2.2 Improved attitudes towards safety

Targets

- Carry out at least one major, international traffic safety congress in Turkey before 2003-12.

- Carry out at least two major, national traffic safety congresses/seminars per year up to and including 2006.
- Carry out at least two major, nationwide safety information campaigns per year up to and including 2006 (see section "Safety information and campaigns").
- Carry out at least one major activity per year up to and including 2006 aimed at informing high-level politicians and other decision-makers about the accident problem and traffic safety.

Intervention	Imme-diately	Medium-term	Long-term	Deadline	Responsible agency(-ies)
a. Promote awareness of, interest in, and attitudes towards, the accident problem and traffic safety by organizing congresses/seminars and implementing repeated and focused information campaigns in TV and other media. Target politicians and other high-level decision-makers as well as the general public.	x			continuous	SHSC HTSC MoNE TSS Involved agencies NGOs Media
b. Inform about cost-effective countermeasures and that road accidents and casualties are not results of fate and destiny.	x			continuous	TSS Involved agencies NGOs Media

5.2.3 Improved organization, cooperation and coordination

Targets

- Finalize proposed interventions before the deadlines (all relevant interventions).
- Establish partnership and form at least one joint working committee/group on safety topics before 2004-12 (f).

Intervention	Imme-diately	Medium-term	Long-term	Dead-line	Responsible agency(-ies)
a. Review and, if necessary, revise the function/duties and composition of the two Traffic Safety Councils with the view to make them more committed, competent and effective[*)]. Change the traffic law accordingly.	x			2002-12	Parliament Government
b. Establish a national Traffic Safety Secretariat to support the two Councils, the Parliament and the government on safety matters. Define the duties of the Secretariat[*)]. Supply the Secretariat with resources needed to fulfill its duties.	x			2002-12	Parliament Government
c. Supply the national public safety organization with sufficient authority, in terms of resources, position, statutory powers and high level support.	(x)	x		continuous	Parliament Government

d. Review and, if necessary, redefine the function and duties of other involved public organizations (e.g., KGM, EGM, Jandarma, MoNE and MoH).	x			2002-12	Parliament Government
e. Review the function, duties and composition of present provincial and local safety organizations. Propose and implement necessary changes, with the view to make the organizations more effective and efficient.	(x)	x		2003-12	Parliament Government SHSC HTSC TSS
f. Establish partnership and cooperation with private enterprise, non-governmental organizations and media, for example, by organizing joint working committees and groups on different safety topics.	(x)	x		continuous	SHSC HTSC TSS

*) see Appendix H.

5.2.4 Improved safety staff

Targets

- Finalize proposed intervention before the deadlines. After that, recurrent improvements should be made (a, b).
- Finalize a first step of proposed interventions before 2004-12. After that, continuous improvements should be made (c).

Intervention	**Imme-diately**	**Medium-term**	**Long-term**	**Deadline**	**Responsible agency(-ies)**
a. Strengthen university education on traffic safety*), preferably with invited international lecturers.	x			2002-09 continuous	MoNE Universities Involved agencies TSS
b. Develop and start courses for basic and continued safety education for existing staff, preferably with invited international experts.	x			2002-09 continuous	Universities Involved agencies TSS
c. Increase the number of staff working with safety issues within involved public organizations. Create attractive positions for people interested in safety work.	(x)	x		continuous	Parliament Government Involved agencies TSS
Promote the prestige of working with safety (e.g., by promotion and other benefits).	(x) (x)	x x			
Send national experts to important international safety events (e.g., PIARC and other congresses).	(x)	x			
Participate in international cooperation concerning safety issues (e.g., OECD and CEN).					

*) see Appendix H.

5.2.5 Improved funding of safety activities

Targets

- Carry out at least one course per year up to and including 2006 concerning effects, cost-effectiveness and efficiency of safety interventions for staff at all involved organizations (a) (see section "Improved safety staff").
- Inform Parliament and government at least once a year about safety issues and apply for increased funding by well motivated applications (b). Inform all provincial governments and major local authorities at least once before 2004-12 about the need for more safety interventions (b).
- Finalize proposed intervention before the deadline (c).
- Finalize first step of proposed intervention before 2004-06 (d).

Intervention	Imme-diately	Medium-term	Long-term	Deadline	Responsible agency(-ies)
a. Use available funds in a more cost-effective and efficient way for traffic safety interventions by developing a systematic approach and using suitable appraisal methods and relevant monetary values.	x			continuous	Involved agencies TSS
b. Increase state, provincial and municipal funding for safety by awareness campaigns, special information and direct contacts with high-level decision-makers.	x			continuous	HTSC Involved agencies NGOs TSS Media
c. Study if "commercializing" safety is a suitable funding option. Study especially if some kind of special fund for safety interventions could be re-established and made efficient and if it is suitable to develop a system which makes it possible to use some of the fine revenue to cover the costs for automatic camera enforcement, etc. Implement if suitable.		x		2004-12	Parliament Government SHSC HTSC TSS
d. Increase safety funding by private enterprise and NGOs by focused information and discussions about the benefits of "safety advertising". Discuss, develop and implement principles and levels for private funding of traffic safety.	(x)	x		continuous	HTSC Involved agencies TSS Private enter-prises NGOs

5.2.6 Improved data banks and accident statistics

Targets

- Finalize proposed interventions before the deadlines (all relevant interventions).
- Carry out recurrent courses at least one per year for EGM/Jandarma officers to ensure quality of reports and data (d).

Intervention	Imme-diately	Medium-term	Long-term	Deadline	Responsible agency(-ies)
a. Develop and implement a reliable and usable nationwide data bank for traffic safety, available for all involved agencies (EGM, Jandarma, MoH etc.). The system should, besides accident and casualty data, allow links and analyses of information on roads, traffic, vehicles and driving licenses, enforcement activities and other factors affecting safety*). Agree upon which data are needed for each organization, which data are obtained by which organization and in which periods the data should be updated. Provide access for all involved bodies and organizations and partly (if possible) also the general public via Internet. Settle access limitations to the data bank for each organization.	x			2003-12 revisions	SHSC HTSC EGM Jandarma KGM MoH Involved agencies SIS
b. Develop and implement an improved national statistical yearbook including data from EGM, Jandarma and MoH as well as information on roads, traffic and other factors affecting accidents and casualties.		x		2004-12	HTSC SIS EGM Jandarma MoH KGM TSS R&D
c. Implement the 30-days definition of a road fatality. Before this is finalized, include deaths during transport to medical care and in hospital (within 30 days) in the accident statistics, by compiling available statistics and making estimates.	x			2002-12	HTSC EGM Jandarma MoH TSS R&D
Investigate if it is suitable to divide the category of injured persons into slightly and seriously injured (= hospitalized).	(x)	x		2002-12	
d. Improve the quality of accident reports and records, especially concerning location of accident.	x			continuous	EGM Jandarma
Investigate if it is suitable to improve the accident report form. Implement if suitable.	x			2002-12	
Perform a training program for EGM and Jandarma officers in order to ensure sufficient quality of the accident reports and data in the accident database.	x				

e. Improve cooperation between EGM/Jandarma statistics and MoH statistics concerning deaths and injuries in hospitals, and treatment and rehabilitation time.		x		2004-12	HTSC EGM Jandarma MoH TSS
f. Develop and implement methods for accident analysis as a basis for changing strategies and prioritizing safety interventions, etc.		x		2004-12 continuous	Involved agencies R&D TSS
g. Develop and test in-depth investigations of severe accidents in order to get better knowledge of casualty contributing factors. Implement if suitable.	(x)	x		2003-12	KGM EGM Jandarma TSS R&D
h. Develop and implement standard comparisons of accident and casualty outcomes (safety indicators) for provinces and municipalities. This will create improved awareness and demand for improvement (a kind of safety "competition").	(x)	x		2004-12	KGM EGM Jandarma TSS R&D
i. Develop and implement systems for measuring: • the number of vehicle-kilometers traveled on all rural and urban roads, • the numbers of person-kilometers and person-hours traveled by motorists, pedestrians and cyclists (preferably by travel habit surveys).	(x)	x (x)	x	2004-12 2007-12	KGM Local authorities TSS R&D

*) see Appendix H.

5.2.7 Improved safety research and development (R&D)

Targets

- Finalize proposed interventions before the deadlines (all relevant interventions).
- Take part in some international cooperation on safety R&D before 2004-12.

Intervention	**Imme-diately**	**Medium-term**	**Long-term**	**Deadline**	**Responsible agency(-ies)**
a. Establish a national Center for applied traffic safety R&D*). Define the duties of the Center. Establish a scientific library for safety literature.	x			2003-12	Parliament Government Involved agencies
b. Increase state and private funding for safety R&D.	(x)	x		continuous	Parliament Government

c. Improve cooperation and coordination between: (i) safety R&D-organizations and universities in order to up-date education and training with the latest R&D-findings, and (ii) R&D-organizations and executing agencies. Increase collaboration between different scientific disciplines.		x		continuous	SHSC HTSC Involved agencies Universities R&D TSS
d. Develop and implement a national safety R&D-program, preferably integrated into the next (revised) national Traffic Safety Program and supported by the two Safety Councils. Some important R&D areas are: • accident statistics and analysis, • methods/models for evaluation of safety interventions, • up-dates of so-called safety effect catalogues.		(x)	x	2005-12 revisions	SHSC HTSC Involved agencies TSS R&D
e. Take part in international cooperation on safety R&D (e.g., within OECD and the EU).	(x)	x		continuous	Involved agencies TSS R&D

*) see Appendix H.

5.2.8 Other "institutional/administrative" actions

Targets

- Finalize proposed interventions before deadlines (all relevant interventions).

Intervention	Immedi-ately	Medium-term	Long-term	Deadline	Responsible agency (-ies)
a. Examine a system with low or no VAT on safety related equipment, e.g., tires and safety helmets. Implement if suitable.		x		2004-12	Parliament Government SHSC HTSC TSS
b. Investigate and, if necessary, change the principles concerning the effects of drivers' and vehicles' accident records on insurance premiums with the view to increase the motivation to avoid accidents. Discuss methods to improve incentives for safer driving with insurance companies.		x		2004-12	HTSC TSS Insurance companies

5. 3 "Technical" actions

5.3.1 Improved modal split

Targets

- Road transport totals, expressed as percentages of all transport (incl. pipelines for freight), should be reduced by the following percentage points, compared with the numbers for 1999:

	2006	*2011*
passenger	1 %	3 %
freight	2 %	5 %

Intervention	**Imme-diately**	**Medium-term**	**Long-term**	**Deadline**	**Responsible agency(-ies)**
a. Promote transport systems that reduce road transport, for example, systems that integrate different transport modes to improve the quality and efficiency of transport. This will especially reduce road freight transport.		x		continuous	Parliament Government SPO
b. Promote rail and other kinds of public transport (urban and rural), walking and cycling and other means to reduce car traffic, for example, tele-communication.		x		continuous	Government Involved agencies Local authorities

5.3.2 Safer infrastructure ─ rural roads

Targets

- Finalize proposed interventions before the deadlines (all relevant interventions).
- Develop a general program to improve road markings, delineators and signs, roadsides and guardrails, junctions, and control points for enforcement on state roads before 2002-12. Implement the program before 2006-12 (d).
- Improve at least 100 black spots per year up to and including 2006 (f).
- Check all new state road projects through safety audits starting 2002-07 (g).
- Check all existing state roads with more than AADT 5000 through safety audits before 2003-12. Improve them according to the audit results before 2006-12 (g).

Intervention	Imme-diately	Medium-term	Long-term	Deadline	Responsible agency(-ies)
Land-use planning:					
a. Develop and implement improved principles and methods for rural land-use planning, which take safety into account. Land-use planning should aim at reducing the amount of transport necessary, integrating transport systems, and promoting public transport. It should also consider suitable location of development and activities, including access to road network.		(x)	x	2004-12 continuous	Government KGM Local authorities
Develop and disseminate guidance papers on land-use planning, highlighting the need to take the safety of all road users into account.		(x)	x		
Road planning. Economic appraisal:					
b. Develop and implement improved methods for road planning, which take safety more into account.	x			2003-12	KGM R&D
Investigate the suitability of developing and implementing a special road safety plan for all state and provincial roads.		x			
Investigate the suitability of specific allocations for safety interventions for rural roads.		x			
Improve the general understanding of "cost-effectiveness and efficiency" in road planning, design and maintenance, including the use of limited resources.		x			
Up-date methods, models and values for CBA for road investment and black spot elimination, including: • values for estimated accident and casualty reductions, • monetary values for accident and casualty reductions,[*)]	x			2002-12 continuous	
Guidelines and practices for road design and road equipment:					
c. Develop and implement comprehensive guidelines for road design and road equipment, which take safety into account.	(x)	x		2004-12 revisions	KGM R&D
Awaiting this, review, develop and implement revised guidelines for the following identified items: • values for sight distances, vertical and horizontal radii, standard intersection types (incl. modern roundabouts),	x			2002-12	

• principles and methods for selection of intersection type, • principles for and design of roadside areas and guardrails, • principles for design and use of yielding supports, • principles for and design of city-passings (especially facilities for vulnerable road users), • rules for access control to roads of petrol stations and other roadside facilities, • guidelines for climbing lanes. Revise guidelines regularly by taking into account the experiences from black spot analysis and safety audits.		x		continuous	
d. Develop and implement a general program to improve: • road markings and delineation, • roadsides and guardrails, • junction safety by improved design and better road equipment, • control points for enforcement.	x			2002-12	KGM
e. Carry out test with: • median barriers on 1 plus 2 lane roads (with medium traffic flows). Implement if suitable, • shoulder rumble strip program on major routes for long-distance traffic. Implement if suitable.		(x) (x)	x x	2005-12 2006-12	KGM R&D
Black spot identification and elimination: f. Develop and implement improved methods and models for identification and elimination of black spots. Develop and implement the conflict technique to study and evaluate hazardous locations, especially junctions (preferably in cooperation with local authorities).	x (x)	x		2002-12 2004-12	KGM R&D
Safety audits: g. Develop and implement principles and methods for mandatory safety audits of all planned state roads (already started at KGM). Develop and implement principles and methods for safety audits of existing state roads. Implement proposed interventions.	x x (x)	x		2002-12 2002-12 2006-12	KGM R&D

Maintenance and operation:					
h. Develop and implement improved guidelines for (in cooperation with local authorities):		x		2004-12	KGM R&D
• snow and ice removal,	x			2002-12	
• markings, signs, signals, guardrails and lighting,		x		2004-12	
• work zone signing.					
Organization:					
i. Establish a special unit for guidelines (road design and equipment) within KGM Head Office.	x			2002-12	KGM
Improve cooperation between KGM and local authorities concerning safety related matters. KGM should give advice to local authorities concerning all aspects of engineering for safety and encourage local authorities in their safety work.	(x)	x		continuous	
Improve cooperation within KGM Head Office and between Head Office and Regions concerning safety. Increase the use of working groups with members from different organizational units and different disciplines in the safety work at KGM.	(x)	x		continuous	
Develop and start to implement a special safety education and training program for KGM staff.	x			2002-12	

*) these values could also be used for other safety interventions.

5.3.3 Safer infrastructure – urban roads and streets

Targets

- Finalize proposed interventions before the deadlines (all relevant interventions).

Intervention	Imme-diately	Medium-term	Long-term	Deadline	Responsible agency(-ies)
Land-use and town planning:					
a. Develop and implement improved principles and methods for urban land-use and town planning, which take safety into account. This planning should aim at reducing the amount of transport necessary, integrating transport systems, and promoting public transport, walking and cycling. It should also consider suitable location of development and activities, including access to road network, as well as parking facilities.		(x)	x	2004-12	Government Local authorities KGM
Develop and disseminate guidance papers on land-use planning, highlighting the need to take the safety of <u>all</u> road users into account.		(x)	x		
b. Develop and implement local transportation plans, including safety targets and actions, for local authorities. The plans should include rules for the provision of safer neighborhoods, public transport, and facilities for vulnerable road users and car parking etc.		x		2004-12	Local authorities KGM
Road/street classification and planning. Economic appraisal:					
c. Develop and implement improved principles and methods for road and network classification.	x			2002-12	Government Local authorities
Develop and implement improved methods for road/street planning, which take safety into account.		x		2004-12	KGM
Develop and implement methods and values for economic appraisal of urban safety interventions.		x		2004-12	
Develop and test methods for state grants to local authorities for road safety improvements. Implement if suitable.		x		2004-12	
Guidelines and practices for road/street design and road equipment:					
d. Review present guidelines and, if necessary, revise them, with the view to take safety better into account.	x			2002-12	Local authorities KGM
Develop and implement guidelines based on improved road and network classification.	x			2003-12	
Revise guidelines regularly taking into account the experiences from black spot analysis and safety audits.		x		continuous	

Black spot identification and elimination:					
e. Develop and implement methods for identification and elimination of urban black spots (incl. "black routes and areas").	(x)	x		2004-12	Local authorities KGM R&D
Develop and start to implement the conflict technique to study and evaluate hazardous locations, especially junctions (preferably in cooperation with KGM).		x		2004-12	
Safety audits:					
f. Develop and implement principles and methods for safety audits of planned and existing roads/streets.	(x)	x		2004-12	Local authorities KGM
Develop and implement special safety audits for childrens' routes to schools.	(x)	x		2004-12	R&D
Facilities for vulnerable road users:					
g. Develop and implement improved principles and guidelines for facilities for vulnerable road users, including sidewalks, bicycle lanes/tracks, pedestrian and cyclist crossings, and under- and over-passes. Give special consideration to disabled persons.	x			2002-12	Local authorities KGM R&D
Traffic calming. Speed reducing devices:					
h. Develop and introduce principles for traffic calming, incl. 30 km/h-zones around schools and in residential areas.	(x)	x		2003-12	Local authorities KGM
Develop and implement improved principles for the design and use of speed-reducing devices.	(x)	x		2003-12	R&D
Arrange demonstration projects, preferably funded by state grants. Evaluate and disseminate results.		x		2004-12	
Maintenance and operation:					
i. Develop and implement improved guidelines for (in cooperation with KGM):					Local authorities KGM
• snow and ice removal,		x		2004-12	
• markings, signs, signals, guardrails and lighting,	x			2002-12	
• work zone signing.		x		2004-12	

Organization:					
j. Improve cooperation between KGM and local authorities concerning safety related matters.	(x)	x		continuous	Local authorities KGM
Improve cooperation within and between local authorities/major cities concerning safety. One way to achieve this is to create an association for local authorities for technical cooperation.		x		continuous	
Develop and start to implement a special safety education and training program for urban traffic engineers.	x			2003-12	

5.3.4 Safer vehicles

Targets

- Finalize proposed interventions before the deadlines (all relevant interventions).
- Carry out at least one major nationwide safety campaign about seat belts annually up to and including 2004 (d) (see section "Increased use of safety equipment").
- Produce relevant information booklets to consumers concerning the safety of different cars types and makes before 2004-12 and after that revise biannually (e).
- Start improved, reorganized periodic vehicle inspection, in accordance with international standards, for the whole country from 2003-01 (g).

Intervention	**Imme-diately**	**Medium-term**	**Long-term**	**Deadline**	**Responsible agency (-ies)**
Design and equipment:					
a. Make compulsory: (i) rear underrun and side underrun protection (according to EEC 70/221 and EC 89/297) for new heavy trucks and trailers and introduce a retrofit program for existing vehicles, and (ii) the use of a big red triangle in reflective material at the rear of tractors and trailers drawn by tractors when driven on public roads (EEC 69). Follow up the implementation. Finalize the ongoing adaptation study of design and equipment items according to European harmonization.	(x)	x		2002-12	Government MoIC HTSC Automotive Industry Association Undersecreta-riat of Foreign Trade KGM SIS
b. Take part in international cooperation concerning vehicle design and equipment. Back EC proposal for safer front design in order to reduce serious casualties in collisions, especially with vulnerable road users. Support work to introduce seat belt reminder systems, universal ISOFIX child restraint anchorages and improved front and side impact tests for cars etc.	(x)	x		2002-12	Government MoIC HTSC

c.	Investigate the suitability of introducing mandatory daytime running lights (e.g., dipped headlights) both for cars and motorcycles. Implement if suitable.	x			2003-12	Government HTSC TSS R&D
d.	Increase using rates of seat belts and especially child restraint systems by information campaigns and focused enforcement (see section "Increased use of safety equipment").	x			continuous	MoNE EGM Jandarma TSS
e.	Give better information to consumers concerning safety characteristics of different car types and makes, both regarding active and passive safety (e.g., crashworthiness). The drawbacks with four-wheel-drive multi-purpose vehicles should be treated. Disseminate the results of European New Car Assessment Program (Euro NCAP).		x		2004-12 revisions biannually	HTSC TSS R&D EI Private enterprises
f.	Investigate if it is suitable to introduce a system to encourage scrapping of old motor vehicles in order to reduce accidents and casualties as well as environmental impact.		(x)	x	2004-12	Government MoIC KGM

Vehicle inspection:					
g. In order to join the European Union, Turkey has to implement a periodic vehicle inspection system according to EC Directives (EEC 77/143 as amended by 96/96 EC and standards for new passenger cars and motorcycles corresponding to European Whole Vehicle Type-Approval requirements). Improve the periodic vehicle inspection system in accordance with international standards. Increase funding for staff, sites/buildings and equipment. Develop and implement guidelines for the inspections and how to cover the costs. Check exhaust emissions in the normal periodic vehicle inspection. Develop and implement a reorganization (preferably privatization) of the periodic vehicle inspection. One way to do this is to create one or a few Turkish vehicle inspection company(-ies), owned and operated by private enterprise either jointly with the government as a majority shareholder or with the government holding just a "golden" share with a right of veto and a permanent Board membership. Another way to organize is to invite for tenders (fully privatized) and that KGM controls the quality and price of vehicle inspection.	x x			2002-12 2002-12	Government MoIC KGM
h. Increase the number and the quality of roadside inspections and include all categories of vehicles. Develop and implement guidelines for such inspections.		x		2004-12	KGM EGM Jandarma

5.3.5 Safer road users – children and youths

Targets

- Finalize proposed interventions before the deadlines (all relevant interventions).
- Carry out at least one nationwide safety campaign concerning the safety of children and youths before 2005-12 (i).
- Start to hand out retro-reflective devices to all school children at no charge before 2002-12 (h) (see section "Vulnerable road users").
- Start to hand out child seats at no charge with all new passenger cars (voluntary commitment by car dealers is needed) before 2002-07 (h) (see section "Increased use of safety equipment").

Intervention	Imme-diately	Medium-term	Long-term	Deadline	Responsible agency(-ies)
Education:					
a. Take appropriate action for all ages: • babies and toddlers, by advising their parents and pre-school teachers on protection in cars and safe routes and behavior on the road, • primary school children, by pedestrian and cycling schemes and alerting parents and children to the risks in traffic, • older children, by providing safety information and education as they go on longer journeys on their own, • older teen-agers, by providing advice as they contemplate much more independent mobility.	x			continuous	MoNE Involved agencies TSS
b. Give sufficient safety education and training to pre-school, primary-school and high-school students: • develop modern curricula, contents and educational materials, • educate and train teachers, • develop training aids for parents and volunteers, • involve parents in the education, • examine the suitability of introducing school safety patrols. Introduce if suitable, • examine the possibility of using experienced driver examiners and EGM/Jandarma officers for education in high-school. Introduce if suitable.	x			2004-12 revisions	MoNE TSS
c. Strengthen the organization for traffic safety and information and campaigns*). Investigate if this organization also could assist in improving safety education in schools (see section "Safety information and campaigns").	x			2002-12	Government MoNE Involved agencies
Other actions:					
d. Promote the development, implementation and use of safe child chairs/cradles, which can be borrowed or purchased at maternity hospitals (see section "Increased use of safety equipment").	(x)	x		continuous	MoH TSS
e. KGM should: • develop and implement child-friendly areas on state roads which pass near schools.		x		continuous	KGM

f. Local authorities should: • promote safe school travel (e.g., by bus), • create more 30 km/h zones as well as suitable traffic calming and parking restrictions around schools and in residential areas where many children are moving (together with police and residents), • provide safe sidewalks and crossing facilities on major roads/streets, especially around schools, • carry out special child route safety audits, especially around schools.		x		continuous	Local authorities Involved agencies
g. Strictly enforce speed limits in areas where many children move, especially around schools.	x			continuous	EGM Jandarma
h. Involved agencies should (in collaboration with NGOs): • promote the development and use of safe child restraint systems in cars, • promote the use of retro-reflective devices for pedestrians and cyclists, and helmets for cyclists, e.g., by focused information and campaigns, • study the possibility of developing a magazine for parents to teach the basic lessons about how to avoid accidents and first aid if they occur, to be sent to parents of children up to three years old. Implement if suitable, • start to hand out one retro-reflective device to each school pupil every autumn (no charge).	x x x	x		continuous continuous 2004-12 2002-12	MoNE MoH Involved agencies TSS Private enterprises NGOs
i. Carry out special awareness campaigns to inform about child and youth safety.	(x)	x		continuous	MoNE TSS

*) see Appendix H.

5.3.6 Safer road users – driver training and licensing

Targets

- Finalize proposed interventions before the deadlines (all relevant interventions).

Intervention	Imme-diately	Medium-term	Long-term	Deadline	Responsible agency(-ies)
Driver education, training, testing and examination: a. Make it possible for experienced driving instructors, examiners, EGM/Jandarma officers and KGM/local authority specialists to give traffic and safety lessons in high-school classes.		x		2004-12	MoNE
b. Develop and implement new curricula for driver education and training in order to improve the safety records of young novice drivers in particular. It should: • include a detailed description of objectives, • focus more on understanding risks in traffic and less on engine and vehicle techniques, • be composed in accordance with modern pedagogical theories, • be in accordance with EU Directives, • include sufficient driver training on roads outside built-up areas, on motorways and urban streets, • include sufficient driver training in dark and in slippery conditions, • instill in the learner drivers the right attitudes towards safe driving, and that training is aimed at preparing them for their whole driving career and not just to pass a test.	x			2002-12	Government MoNE TSS Private driving schools
c. Develop and implement new standardized theory tests and practical tests for driver examination, uniform for the whole country. It should include: • defensive driving skills, knowledge and behavior, • driving tests on roads outside built-up areas, on motorways and on urban streets, • a theory test of a shorter duration than at present (about 45 min.) (the theory test should be reviewed annually), • a practical driving test of a longer duration than at present (about 45 min.). Start to monitor and evaluate the immediate post-test period for novice drivers.	x			2002-12	Government MoNE TSS

d. Strengthen the organization for traffic safety information and campaigns*). Investigate if this organization also could assist in improving driver education (see section "Safety information and campaigns").	x			2002-12	Government MoNE Involved agencies
e. Extend the training and testing for people who are going to drive heavy vehicles (trucks and buses).	(x)	x		2002-12	MoNE
f. Examine and carry out a test to evaluate the effects of learner drivers beginning their training at the age of 16 years. Introduce if suitable.			x	2007-12	MoNE R&D TSS
g. Examine the suitability of introducing psycho-technical testing of license applicants, re-offenders (especially for drunk driving) and old license-holders. Introduce if suitable.	x			2003-12	MoNE TSS R&D
h. Develop and implement programs for new and present instructors and examiners. This should include: • special "refresher" courses for present instructors and examiners, both courses should have a duration of at least 5 days, • courses for new instructors and examiners, both courses should have a duration of at least 6 weeks, • update qualification requirements for those who want to become instructors and examiners, • update the way instructors and examiners are supervised, • recruit and train new driving examiners, especially for the practical driving test. (an estimate has shown that at least 600 examiners are necessary for the whole country).		x		2004-12	MoNE TSS
i. Develop and implement a comprehensive approach to assist older drivers (incl. refresher courses).			x	2008-12	MoNE TSS

Driver licenses:					
j. Change the Turkish categories of motor vehicles to comply with the Vienna Convention and the EU Directives.	x			2002-12	Parliament MoNE EGM
Make the classification of driving licenses for different types of vehicles in compliance with the Vienna Convention and the EU Directives (91/439/EEC), which stipulates the conditions for the community model of driving licenses, driving tests and medical minimum standards.	x			2002-12	
Change the validity period of a driving license not to exceed 10 years. (EGM has already prepared some proposals which have been submitted to the Parliament).	x			2002-12	
Study if it is suitable to design and implement a new driving license card with the highest level of security and durability, adapted to the European Union Model Driving License. If suitable, this should be done at the same time as the change of vehicle categories and the classes of driving licenses (see section "Improved registration of vehicles and driving licenses).	x			2002-12	

*) see Appendix H.

5.3.7 Safer road users – alcohol, drugs and drowsiness

Targets

- Finalize proposed interventions before the deadlines (all relevant interventions).
- Carry out at least 2.6 million alcohol controls per year*) (number of checked drivers) up to and including 2006 (b).
- Carry out at least one nationwide safety information campaign about drunk-driving before 2006-12 (d) (see section "Safety information and campaigns").
- Carry out at least one nationwide safety information campaign concerning the dangers of fatigue and driving before 2006-12 (i) (see section "Safety information and campaigns").

Intervention	**Imme-diately**	**Medium-term**	**Long-term**	**Deadline**	**Responsible agency(-ies)**
Drunk-driving:					
a. Adopt drunk-driving alcohol limits (BAC-limits etc.) according to the EU or tougher.		x		2004-12	Government EGM Jandarma

b. Enforce and punish drunk-driving harder. Encourage the police to breath-test people driving at locations where it is reasonable to assume that drunk-driving occurs.		x x		2004-12	Government EGM Jandarma
c. Make sure that penalties for drunk-driving match the seriousness of the offence and act as a powerful deterrent. Increase the minimum disqualification period for first time offenders. Introduce special mandatory rehabilitation courses for high-risk offenders and make it possible for courts to send offenders to such courses. Introduce special penalties for "high risk offenders" (e.g., people found with very high BAC-levels, or re-offend several times within a certain time period, or refuse to provide samples for analysis).		x x x x		2004-12	Parliament Government EGM Jandarma MoH
d. Implement comprehensive public awareness campaigns to inform the general public, especially drivers, about the dangers of alcohol and driving.		x		continuous	MoNE Involved agencies TSS
Drug-driving: e. Develop and implement methods and equipment for roadside screening for drugs. Train police officers in techniques for recognizing and testing drivers who may have taken drugs.			x x	2007-12	Government EGM Jandarma MoH
f. Implement comprehensive public awareness campaigns to inform the general public, especially drivers, about the detrimental effects of drugs on safety.			x	continuous	MoNE Involved agencies TSS
g. Develop and start to implement (hand out) information leaflets etc. for all legally prescribed drugs, which can adversely affect driving.		x		2004-12	MoH TSS
Drowsiness: h. Review the laws concerning work hours for professional drivers (trucks and buses). Strengthen if necessary. Enforce these laws (see section "Safer commercial traffic").		x		2004-12	Government EGM Jandarma
i. Implement comprehensive public awareness campaigns to inform the general public, especially drivers, about the dangers of fatigue and driving. Focus on the risk of commercial vehicle crashes resulting from loss of alertness and driver fatigue.		x		continuous	MoNE Involved agencies TSS

j. Examine the suitability of using shoulder rumble strips on fatigue-prone major rural roads. Implement if suitable (see section "Safer infrastructure").	x			2003-12	KGM R&D

*) Corresponding to about 20 percent of all license holders. According to information from EGM, the present number of controls is about 4.8 million per year. If this is correct, the target is already attained. Internationally, the control level is considered to be good if the annual number of controls amounts to 30 percent of the number of license holders.

5.3.8 Safer road users – vulnerable road users

Targets

- Finalize proposed interventions before the deadlines (all relevant interventions).
- Start to hand out retro-reflective devices to school children at no charge before 2002-12 (i). Before 2003-12, at least 25 percent of all school children (grades 1-8) should have one retro-reflective device.
- Carry out at least one nationwide safety information campaign concerning the safe interplay between vehicle car drivers and vulnerable road users before 2005-12 (f, g, h).
- Start to hand out safety helmets at no charge with all new motorcycles (voluntary commitment by mc dealers is needed) before 2002-07 (j).

Intervention	**Imme-diately**	**Medium-term**	**Long-term**	**Deadline**	**Responsible agency(-ies)**
Pedestrians and bicyclists:					
a. Develop and implement local transportation plans, including among other things improved separation of vulnerable road users from car traffic, improved facilities for pedestrians and cyclists, and better parking facilities.		x		2004-12	Local authorities KGM
Develop and implement plans for such facilities on select city-passings (included in KGM safety plans). (Such plans are the key to improving the safety conditions for pedestrians and cyclists. The plans have to be developed in collaboration with police and others) (see section "Safer infrastructure").		x		2004-12	

b. Develop guidelines for local transportation plans, including: • separation of different road user categories, • well planned pedestrian and cyclists routes, such as, networks linking schools, shops and public transport, • traffic calming to reduce speeds in key areas, • proper sidewalks and cycle lanes, • well located, designed and equipped crossings, • adequate lighting for safety and security, • parking restrictions on sidewalks. Monitor and control the local authorities to check if they develop and implement such plans.	x			2004-12	Local authorities KGM Involved agencies R&D
c. Promote bicycle helmet wearing. Monitor wearing rates (see section "Improved use of safety equipment").		x		continuous	MoNE, TSS R&D Private enterprises NGOs
d. Inform pedestrians and cyclists about the dangers in traffic. Encourage them to take responsibility for their own safety and their behavior towards other road users. They should, for example, observe traffic rules, cross the roads at suitable sites, use well equipped and maintained cycles (e.g. lights), helmets, and retro-reflective devices at night.		x		continuous	MoNE TSS NGOs
e. Encourage NGOs to take part in developing and implementing improved traffic training for pedestrians and cyclists, and to promote the use of retro-reflective devices and helmets.	(x)	x		continuous	MoNE Involved agencies TSS Private enterprises NGOs
f. Inform drivers about how vulnerable pedestrians and cyclists are, and how they behave. Drivers should be aware of, and take proper consideration to, these groups of road users (see section "Safety information and campaigns").		x		continuous	MoNE Involved agencies TSS
g. Improve legislation concerning the rights of car drivers versus pedestrians and cyclists with the view to strengthen the position of pedestrians/cyclists.	x			2003-12	Parliament Government

h. Enforce the law to improve car driver behavior towards pedestrians and cyclists, especially when they are crossing the road.	x			continuous	EGM Jandarma
i. Start to hand-out retro-reflective devices to school children every autumn. Monitor wearing rates (see section "Children and youths").	x			2002-12	MoNE TSS R&D Private enterprises NGOs
Motor cyclists and moped riders: j. Promote and enforce the use of approved safety helmets. Monitor wearing rates.		x		2004-12	MoNE EGM Jandarma TSS R&D
k. Inform about the dangers of motorcycle and moped driving, especially in connection with alcohol.			x	continuous	MoNE Involved agencies TSS
Other: l. Study travel habits to monitor accident risks per km or hour traveled for pedestrians and cyclists (see section "Improved data banks and accident statistics").			x	2007-12	KGM Involved agencies TSS R&D
m. Study the possibility of introducing lower or no VAT on safety related equipment (e.g., helmets). Implement if suitable (see section "Other institutional/administrative actions").		x		2004-12	Government Parliament
n. Promote safer car fronts to reduce injuries for vulnerable road users struck by cars (see section "Safer vehicles").		x		continuous	Government MoIC HTSC

5.3.9 Safer road users – safety information and campaigns

Targets

- Finalize proposed interventions before the deadlines (all relevant interventions).
- Carry out at least the following nationwide safety campaigns:

2002
- speed
- seat belts

2003
- speed
- seat belts

2004
- speed
- seat belts
- child and youth safety

2005

- child and youth safety
- interplay between car drivers and vulnerable road users (pedestrians and cyclists)

2006

- drunk-driving
- fatigue and driving

Intervention	**Imme-diately**	**Medium-term**	**Long-term**	**Deadline**	**Responsible agency(-ies)**
a. Strengthen the organization for general traffic safety information and campaigns*). Improve cooperation with other involved agencies. Investigate if this organization also could assist in improving safety education in schools and driver education. Define the duties of the organizations. Implement.	x			2002-12	Government MoNE Involved agencies NGOs
b. Invite all stakeholders to a joint working group to discuss publicity plans. Hold regular up-dating meetings with this group. Seek contact with car makers to encourage them to design their advertising responsibly, for instance, not to stress maximum speed and acceleration.		x		2003-12 continuous	MoNE TSS Private enterprises NGOs
c Develop a long-term plan for national information and publicity campaigns. Target areas where there are high numbers of casualties and where publicity can have a positive effect on understanding, attitudes and behavior. Use special methods for different topics and categories of road users. Repeat the campaigns at regular intervals. During the first years the campaigns should be focused on: speed, seat belts, and child and youth safety. Later, they could also include: pedestrian and cyclist safety, drunk-driving, novice drivers and driver fatigue. The use of information campaigns is only effective if they are continued and maintained for several years. Therefore, it is important to focus on relatively few and important subjects during a certain time period. Campaigns should preferably be carried out in connection with other activities, such as increased enforcement. Use professional advertising specialists to focus and design the campaigns. Use different media, national and local newspapers, in-store promotions, distributions, school activities, mailings, radio, TV	(x)	x		2003-12 revisions biannually	MoNE Involved agencies Private enterprises NGOs TSS

and web-sites/Internet.					
d. Carry out the campaigns according to the long-term plan.		x		continuous	TSS Involved agencies
e. Produce guidelines for campaigns which should be used by all participating partners for their own campaigns.		x		2004-12	MoNE TSS
f. Encourage similar information activities on provincial and local level, to which provincial and local businesses, voluntary groups and specialists should be invited.		(x)	x	2007-12	HTSC MoNE TSS
g. Improve funding for certain information activities through cooperation with private sector, working with, or related to, safety (e.g., car makers, insurance companies, equipment manufacturers).		(x)	x	continuous	MoNE TSS Private enterprises NGOs

*) see Appendix H.

5.3.10 Better traffic legislation

Targets

- Finalize proposed interventions before the deadlines (all relevant interventions).
- Develop a long-term plan to make traffic legislation understood and tolerated by the general public before 2002-12. Start to implement the plan immediately (a).

Intervention	**Imme-diately**	**Medium-term**	**Long-term**	**Deadline**	**Responsible agency(-ies)**
a. Improve the obedience to the law by making the legislation understood and, to the extent possible, supported and accepted (or tolerated), by the public. This should be an objective when developing new legislation.	x			continuous	Government EGM Jandarma
b. Improve law enforcement, by educating and training EGM/Jandarma officers about traffic legislation.		x		continuous	EGM Jandarma
c. Form a "working committee" with participation from the Ministries of Justice, Interior and National Education, KGM, EGM and Jandarma. The task should be to review and rectify the following identified parts of present legislation: • ascertain the compatibility of the legislation with the Vienna Conventions and other pertinent international instruments, • rectify ambiguities between the traffic legislation and the penal code, as well as between the traffic law and the traffic regulations,	x			2002-12	Government Involved ministries Involved agencies

• develop a sustainable fine system for the traffic legislation based on a classification of offences according to their significance for safety, and propose a penalty system from this classification, • develop and implement a more efficient system for revocation of drivers' licenses, • evaluate and improve the rules and penalty system for drunken driving. Propose and implement necessary improvements, • evaluate the legislation on safety equipment. Propose and implement necessary improvements.					
d. Authorize and implement a "transportation law" to regulate road transport, for example, operating permits and tariffs.	(x)	x		2004-12	Parliament Government Involved agencies

5.3.11 Better surveillance and enforcement

Targets

- Finalize proposed interventions before the deadlines (all relevant interventions).
- Make a comprehensive evaluation of the present principles for the target-oriented way of working for the PP roads before 2002-07 (a). Implement suitable principles nationwide from 2003-01. The ratios describing the productivity of the police should be continuously increased.
- Procure 100 laser guns (or differentiating radar guns) and train a sufficient number of police officers in their use before 2002-12 (b).

Intervention	**Imme-diately**	**Medium-term**	**Long-term**	**Deadline**	**Responsible agency(-ies)**
a. Continue to develop and implement a more advanced target/result-oriented way of working. Develop, teach, train and implement new strategies, tactics and working methods for traffic surveillance (both stationary and mobile).	x			continuous	EGM Jandarma
b. Procure effective surveillance equipment, for example, laser guns for high volume roads, evidential roadside breath testers, and roadside drug screening devices.	x			continuous	EGM Jandarma
c. Introduce penalties that better fit the offence. Serious offences merit strong penalties (from careless to dangerous driving). In general, penalties should be increased (see section "Better traffic legislation").		x		2004-12	Government EGM Jandarma
d. Develop and implement more efficient	x			2003-12	Government

prosecution and other court processes as well as fine collecting systems.					Justice sector
e. Force serious and habitual offenders (e.g., drunk-drivers and speeders) to pass an extended education and re-training, as well as a new driving test, before getting their licenses back.	x			2003-12	Government EGM Jandarma MoNE
f. Influence the general public that traffic offences are breaches of law and should be regarded with the same degree of condemnation as other crimes. This is partly a question of social attitudes but also affected by a lack of general understanding and appreciation of other road users' situation. Improve public understanding of the reasons for traffic laws, especially about drunk-driving, speeding, and the use of safety belts and child restraint systems (see section "Better traffic legislation".).	(x)	x		continuous	EGM Jandarma TSS
g. Investigate if the present sharing of responsibility for traffic surveillance and enforcement between EGM and Jandarma is the most suitable.	x			2003-12	Government EGM Jandarma
h. Improve cooperation and joint training between EGM and Jandarma concerning traffic policing.		x		continuous	EGM Jandarma
i. Start to test automatic cameras to enforce speeding and red light driving. In many countries, such cameras are considered to be effective. If suitable, start to implement on a large scale.	(x)	x		2003-12	EGM Jandarma R&D
j. Inform EGM/Jandarma officers about the great importance of their surveillance task and encourage them to carry out this task efficiently. Develop a program to keep traffic police officers longer within the traffic police force, for example, by improving the prestige of the traffic tasks. Improve working conditions concerning support of senior officers and Head Office and salaries etc.	x (x) (x)	 x x		continuous	Government EGM Jandarma
k. Train police officers: (i) always to enforce the law when they observe traffic offences, (ii) always to be "good examples" in traffic, and (iii) always to apply the principle "equality before the law".	x			continuous	EGM Jandarma

l. Introduce a more suitable road environment to facilitate law enforcement, for example, more control points along major roads (see section "Safer infrastructure").	(x)	x		continuous	KGM
m. Encourage EGM/Jandarma officers at national and provincial level to give higher priority to traffic safety.	x			continuous	EGM Jandarma

5.3.12 Reduced speeding and aggressive driving

Targets

- Finalize proposed interventions before the deadlines (all relevant interventions).
- Carry out at least one nationwide safety information campaign about speed and speeding per year up to and including 2004 (a) (see section "Safety information and campaigns).
- Develop and implement a reliable nationwide system for measuring speeds, covering both rural and urban areas, before 2004-12 (l).

  Awaiting this, EGM and KGM has to form a joint working group before 2002-07 to assess the speed situation. The group should consist mainly of representatives of the Traffic Research Center at EGM and the Traffic Survey and Measurement Division section at KGM. This group should monitor and annually compile the speed development and check if the following *preliminary* targets are attained:

  - the percentage of speed checks with more than 50 percent violators (above the speed limit) should in 2006 be less than 50 percent for passenger cars, 50 percent for buses and 10 percent for trucks,
  - the average speed of those vehicles exceeding the speed limit should be continuously reduced,
  - the average speed of passenger cars on state roads with AADT more than 5000 should be reduced by 3 percent (about 3 km/h) from 2002 to 2006,
  - the percentage of speed violators on state roads should be reduced by 15 percentage points from 2002 to 2006.

- Develop and implement a reliable nationwide system for measuring red light, stop sign and one-way violations, covering both rural and urban areas, before 2007-12 (m).

  Awaiting this, the Traffic Research Center at EGM should be responsible for monitoring and annual compilation of red light, stop sign and one-way violations and checking if the following *preliminary* targets are attained:

  - the percentages of drivers violating red-light, stop-sign and one-way regulations respectively, should be continuously reduced (j, k, m).

Intervention	Imme-diately	Medium-term	Long-term	Deadline	Responsible agency(-ies)
a. Widely publicize the risks of excessive and inappropriate speed and the effect it has on safety, environment and other vital quality-of-life characteristics. Influence the general public's, and specially drivers', attitudes to speeding, responsibility and behavior through repeated and targeted awareness campaigns.	x			continuous	MoNE Involved agencies TSS
b. Develop national guidelines (state, provincial and local roads) for determining appropriate speed limits with regard to function, location and other characteristics of roads, and the safety of all who use it. Take into account environmental, economic and social effects. One aim is to obtain consistent and uniform speed limit policies. Speed limits should also be reasonably accepted by the drivers. Take into consideration that some 90 and 70 km/h road sections most likely are not suitable for these speeds and that for those roads, speed limits have to be reduced. Start to implement the guidelines.	x			2003-12	KGM EGM Local authorities Involved agencies
c. Make speed limit signing more effective. Introduce more speed activated signs to warn of hazards and remind of speed limits.		x		continuous	KGM Local authorities
d. Local authorities should introduce 30 km/h speed limit to a greater extent than at present, for example, around schools and other spots with many vulnerable road users. This could be included in local transportation plans (see section "Safer infrastructure").		x		continuous	Local authorities KGM
e. Design roads which clearly indicate by their appearance the speed that is appropriate, so-called self-explaining roads. This is particularly important for city-passings, which often are too wide, and invite to higher speeds than the speed limit.		(x)	x		KGM Local authorities R&D
f. Investigate the suitability of introducing differentiated speed limits, for example, 10─20 km/h lower speeds during the winter season. Implement if suitable.			x	2007-12	KGM EGM R&D

g. Avoid roads and streets with mixed functions, because they present a unique combination of accident and speed limit problems. Use traffic calming and speed reduction measures, such as humps, chicanes and rumble strips, to a greater extent than at present. Develop and implement design standards for speed reducing devices (see section "Safer infrastructure").	 (x) (x)	x x x		continuous	Local authorities KGM R&D
h. Investigate the suitability of introducing speed limiters on heavy vehicles, incl. busses. Start to implement if suitable (see section "New technology").		x		2004-12	Government KGM EGM R&D
i. Enforce speed limits strictly. Adjust fines and other penalties to the seriousness of speeding. Consider how to punish those who drive far in excess of speed limit (possibly by creating a new offence) (see section "Better surveillance and enforcement").	x	 x x		continuous	Government EGM Jandarma
j. Improve speed enforcement by using modern equipment, such as laser guns. Start tests with automatic cameras to enforce speed limits and red light violations (see section "Better surveillance and enforcement").	x (x)	 x		2002-12 2003-12	EGM Jandarma R&D
k. Strictly enforce red light, stop sign, one-way regulation, dangerous overtakings, driving too close to the vehicle in front, and other kinds of aggressive driving.	x			continuous	EGM Jandarma
l. Develop and implement a nationwide system to monitor speeds (on rural and urban roads).	(x)	x		2004-12	KGM EGM Jandarma Local authorities
m. Develop and implement a nationwide system to monitor red light violations (on rural and urban roads).		x		2004-12	KGM EGM Jandarma Local authorities
n. Investigate the suitability of introducing a financing system using part of the fine revenue to pay the operational and administrative costs of speed and red light camera activities incurred by the police, courts and local authorities (see section "Improved funding of safety activities").		x		2005-12	Government EGM (Jandarma)

5.3.13 Increased use of safety equipment

Targets

- Finalize proposed interventions before the deadlines (all relevant interventions).
- Develop and implement a reliable nationwide system for measuring seat belt use, covering both rural and urban areas before 2004-12 (g).
- Develop and implement a reliable nationwide system for measuring use of safety helmets for motorcycle, moped and bicycle riders, and use of retro-reflective devices in darkness by school-children, covering both rural and urban areas, before 2005-12 (g).

  Awaiting this, EGM and KGM has to form a joint working group before 2002-07 to monitor the development concerning the mentioned safety performance indicators. The group should consist mainly of representatives of the Traffic Research Center at EGM and the Traffic Survey and Measurement Division section at KGM. This group should monitor and annually compile the development and check if the following *preliminary* targets are attained:

  - the percentage of drivers of passenger cars using seat belts should be continuously increased up to and including 2006,
  - the use of child restraint systems should be continuously increased up to and including 2006,
  - the use of safety helmets for each rider category should be continuously increased up to and including 2006,
  - the use of retro-reflective devices in darkness by school-children should be continuously increased up to and including 2006.

- Carry out at least one nationwide safety information campaign about safety equipment per year up to and including 2005 (b, d, f) (see section "Safety information and campaigns").

Intervention	Imme-diately	Medium-term	Long-term	Deadline	Responsible agency(-ies)
a. Strengthen legislation concerning the use of safety equipment in cars (e.g., seat belts in rear seats, child restraint systems and baby cradles, as well as seat belts for taxi and police drivers etc.).	x			2002-12	Government Involved agencies
b. Promote the use of seat belts and child restraint systems through information, awareness campaigns and demonstrations etc.	x			continuous	MoNE MoH Involved agencies TSS
c. Strictly enforce the use of mandatory restraint systems in cars.	x			continuous	EGM Jandarma
d. Promote the use of safety helmets for motor cyclists and moped riders through targeted information and campaigns.		x		continuous	MoNE Involved agencies TSS
e. Enforce the use of safety helmets for motor cyclists and moped riders.		x		continuous	EGM Jandarma

f. Promote the use of cyclists safety helmets and retro-reflective devices through information, campaigns and demonstrations in schools etc.	x			continuous	MoNE Involved agencies TSS Private enterprises NGOs
g. Develop and implement a system to monitor the use of safety equipment on rural and urban roads, including seat belts and helmets for motor cyclists and moped riders.		x		2005-12	EGM Jandarma KGM

5.3.14 Improved emergency rescue, medical care and rehabilitation

Targets

- Finalize proposed interventions before the deadlines (all relevant interventions).
- Carry out a survey about the present knowledge of first aid before 2002-07 (b).
- Develop first aid courses for different target groups: emergency services personnel, students, teachers, road users and the general public before 2002-12 (b). Test, evaluate and improve the courses before 2003-12. Implement the courses on a large scale 2004-01 and onwards.
- Develop and implement a reliable system for measuring response times from alarm to arrival of emergency services.

  Awaiting this, MoH together with some emergency trauma centers should be responsible for monitoring response times and checking if the following *preliminary* target is attained:

  - the average response time should be continuously reduced.

(In section 5.3.14 improvements in emergency <u>medical and psycho-social</u> treatment and rehabilitation have not been included)

Intervention	**Imme-diately**	**Medium-term**	**Long-term**	**Deadline**	**Responsible agency(-ies)**
a. Develop and start to implement a joint alarm emergency system, in order to reduce the time for alerting the emergency services and to improve cooperation between involved organizations. This could be done either by creating a new organization or by extending the tasks of the present 112 system.	x			2002-12	Government MoH Involved agencies

b. Improve the knowledge of first aid of emergency services personnel, students, teachers, road users and the general public. A survey should first be made to study the present knowledge of first aid. Develop education and training courses for different target groups. After the first test courses, an evaluation should be carried out. Extend the training on a large scale.	x			continuous	MoH Gazi Univ.
c. Follow up and evaluate the results of the ongoing EAPP, concerning among other things: • time from accident to arrival of emergency services and to emergency treatment, • experiences of improved emergency services and trauma care (staff and equipment).	x			2002-07	Gazi Univ. MoH
d. Appoint, a "working committee" to develop an improved system for emergency services at all levels (national, provincial and local). The task should include: • cooperation and collaboration between all emergency services, concerning, e.g., emergency tactics, joint training, use of equipment, "on scene commander", use of a joint alarm system, coordination of procurement, implementation of new regulations, follow-up and evaluations, • coordinating bodies for all emergency services (e.g., if EGM/Jandarma could serve as such bodies), • the lowest acceptable level of service, e.g., the maximum acceptable time from emergency call to arrival of emergency services, • necessary changes of legislation, e.g., an overall emergency services law, • seminars and workshops to promote understanding and cooperation among the different emergency organizations, • proposal on how to improve emergency services in Turkey including, e.g.: where new emergency stations should be located and how they should be equipped and staffed, where emergency trauma		x		2003-12	Government MoI MoH Involved agencies

centers should be located and how they should be staffed and equipped, how alarm centers should be organized, how local cooperation should be improved, how education and training should be carried out, and how emergency services should be monitored and evaluated. • handling of information, e.g., operational information between the actors on their way to and during work at the scene of an accident, handling of media on the spot, spreading of professional information regularly and also information to the general public about rational behavior in emergency situations. Implement the improved system.					
e. Carry out a study to see if it is suitable to create a helicopter ambulance system in some parts of Turkey. Helicopters should probably be used on a regional base in response to the request of emergency personnel at the scene or at a primary receiving hospital (secondary responder role). This study should include the possibility of using military helicopters and pilots. If suitable, such a system should be tested and evaluated. Implement on a large scale if suitable.			x	2008-12	MoH Involved agencies R&D

5.3.15 Improved registration of vehicles and driving licenses

Targets

- Finalize proposed interventions before the deadlines (all relevant interventions).

Intervention	Imme-diately	Medium-term	Long-term	Deadline	Responsible agency(-ies)
Vehicles:					
a. Change the Turkish categories of motor vehicles to comply with the Vienna Convention and the EU Directives (see section "Driver training and licensing").	x			2002-12	Government EGM
b. Replace the two current vehicle certificates by one document. The new certificate should consist of two parts and be in accordance with the EU Directive 1999/37/EC. The computer system at all registration offices should be able to print out the certificate. Make the registration paper secure against forgery.		x		2004-12	Government EGM

Improve service to applicants so that any registration office could be used for application etc. Make it possible to mail applications to the registration office. Fees should not be charged for applications that are important to keep the data up-dated. File all type-approval certificates in the computer system. As a prospective EU member, Turkey has to accept all type-approval certificates issued in other EU countries. Make mandatory preregistration of vehicles, by producers or importers.					
Driving licenses:					
c. Change the categories of vehicles a license holder is authorized to drive in accordance with the Vienna Convention and the EU Directives.	x			2002-12	EGM
Introduce a learner-driving license (currently category K) of a different kind, easy to separate from a normal license.	x				
Change the validity period of a driving license not to exceed 10 years. (see section "Driver training and licensing").	x				

5.3.16 Safer commercial traffic

Targets

- Finalize proposed interventions before the deadlines (all relevant interventions).
- The percentage of drivers of heavy vehicles violating regulations on speeding, overloading, work hours and heavy vehicles' safety equipment should be continuously reduced (c).

The Traffic Research Center at EGM should be responsible for monitoring and annual compilation of surveillance results.

Intervention	**Imme-diately**	**Medium-term**	**Long-term**	**Deadline**	**Responsible agency (-ies)**
a. Review and if suitable strengthen regulations on professional drivers' work hours to reduce the risk of accidents caused by driver fatigue.		x		2004-12	Government MoL
b. Adopt the regulations for characteristics and equipment related to heavy vehicles' safety in accordance with international norms within the scope of the technical legislation adaptation study.	x			2003-12	Government MoIC KGM
c. Enforce speeding, overloading, work hours and regulations on heavy vehicles' safety equipment (incl. brakes).		x		continuous	EGM Jandarma

d. Start operating a number of permanent and mobile weighing scales under the control of KGM and implement with the support of Police and Jandarma. Construct permanent overload checkpoints (preferably close to border crossings). Develop and implement guidelines for overload checks at permanent and mobile overload checkpoints.	(x) (x) (x)	x x x		2004-12	EGM Jandarma KGM
e. Design roads and road equipment to reduce crashes resulting from loss of alertness and driver fatigue (e.g., by applying shoulder rumble strips) (see section "Safer infrastructure").		x		2006-12	KGM R&D
f. Introduce quality assurance of commercial transport, especially for public contracts.			x	2007-12	Government Involved agencies

5.3.17 New technology

Targets

- Finalize proposed interventions before the deadlines (all relevant interventions).

Intervention	Imme-diately	Medium-term	Long-term	Deadline	Responsible agency(-ies)
a. Take part in international cooperation concerning ITS in order to build competence (e.g., OECD and EU).		x		2004-12	Involved agencies TSS R&D
b. Carry out tests with some types of ITS in Turkey (e.g., speed limiters on heavy vehicles) (see section "Reduced speeds and aggressive driving"). If suitable implement on a large scale.		x		2004-12	Involved agencies R&D

5.3.18 Reduced regional problems

Targets

- Finalize proposed interventions before the deadlines (all relevant interventions).

Intervention	Imme-diately	Medium-term	Long-term	Deadline	Responsible agency(-ies)
a. Review and if necessary strengthen and enforce legislation on the use of agricultural tractors on public roads, especially concerning mandatory safety equipment (e.g., lights and retro-reflective devices).	x			2003-12	Government Involved agencies EGM Jandarma

b. Inform tourists about the special risks in Turkish traffic and Turkish road users about the special dangers with tourist drivers and pedestrians through special campaigns and brochures at tourist sites.		x		2004-12	Involved agencies TSS Private enterprises NGOs Customs

5.4 Safety effects and costs

5.4.1 Estimated safety effects

The estimated reduction in fatalities for different types of actions in the Plan is illustrated in the following table. Values are given for both year 2006 and the time period 2002 – 2006.

Actions/Areas	**Reduction of fatalities in 2006**	**Reduction of fatalities in the period 2002 – 2006**
"Institutional/administrative" actions	+	++
"Technical" actions		
Improved modal split	100	150
Safer infrastructure – rural roads	170	360
Safer infrastructure – urban roads and streets	90	150
Safer vehicles	75	120
Safer road users – children and youths	75	140
Safer road uses – driver training and licensing	25	40
Safer road users – alcohol, drugs and drowsiness	70	140
Safer road users – vulnerable road users	80	140
Safer road users – safety information and campaigns (other)	70	140
Better traffic legislation	35	65
Better surveillance and enforcement (other)	70	140
Reduced speeding and aggressive driving	480	1 400
Increased use of safety equipment	430	850
Improved emergency rescue, medical care and rehabilitation	100	200
Improved registration of vehicles and driving licenses	5	10
Safer commercial traffic	70	140
New technology	5	5
Reduced regional problems	5	10
Total	**1 955 +**	**4 200 ++**
Percentage of 1999 value	20.6	

The reduction in 2006, compared with the estimated value for 1999 (9 500 fatalities, with the 30-days definition of a road fatality), will be more than 1 955 fatalities, corresponding to the 20 percent reduction which was the target for year 2006 (see "Strategy"). During the

period 2002 – 2006, a total of more than 4 500 lives will be saved if the Plan is implemented.

The most effective interventions are reduced speeding and agggressive driving, and increased use of safety equipment. It must be observed that the most effective interventions for the period up to 2006 are those which yield good effects also in the short-term perspective. Other interventions, such as, improved institutional actions, extensive major road constructions and school education etc., need a longer time to become really effective. Such interventions will therefore be more effective in the next 5-year period and in the following future.

The estimated reduction in fatalities are based on the following general assumptions:

- Most institutional/administrative actions will take some years to be fully implemented and will therefore not yield any substantial safety benefits before and in 2006. In the long-term perspective, however, these actions will contribute substantially to a more efficient traffic safety work and thus a reduced number of fatalities.
- Some technical interventions could be started almost immediately, while others need more time to be implemented on a large scale. This is why the reductions for the period 2002 – 2006 is not one single multiple of the numbers for 2006.
- The effects of safety information and campaigns as well as surveillance and enforcement have been included in the specific items, for example, reduced speeding and aggressive driving, and increased use of safety equipment. The remaining values under safety information and campaigns, and surveillance and enforcement concern other types of such actions.
- It is estimated that reduced speeding and increased use of safety equipment will have a significant effect on the number of fatalities when implemented. Therefore, all the other interventions will affect a smaller number of fatalities. This has been taken into account in the estimates.
- The basic estimates are based on international knowledge and experiences. It must be observed, however, that they may not always be applicable under Turkish conditions. Therefore, follow-up and evaluation has to be carried out to gain more experience applicable for Turkey.

For the period 2007 – 2011, it is roughly estimated that the number of fatalities will go down further by at least 1 800 – 2 000 fatalities (per year) by the end of 2011. This estimate, however, must be checked and if necessary changed during the proposed revision of the Program in 2006.

5.4.2 Estimated costs

The annual, additional costs for the proposed interventions according to the Plan are estimated to be around USD 130 million in year 2006. As this is a rather uncertain value, it should be said that the total additional costs in 2006 are between USD 100 and 150 million per year. The additional costs for the period 2002 – 2006 are estimated to be USD 250 – 350 million.

It is difficult to estimate the costs of the interventions. The rough estimate is based on the following general assumptions:

- It is assumed that "normal" traffic safety work is carried out at the same level in the future as it has been in the past (up to and including 1999). The given estimated costs are additional costs for the proposed interventions in the Plan. These costs should be added to the "present" annual costs for safety interventions in order to get the total public costs for all traffic safety interventions in Turkey.
- The costs are mainly costs for public agencies. Private costs, such as, costs for improved safety equipment and improved periodic vehicle inspection, as well as socio-economic costs, such as, increased costs for travel time due to lower speeds, are not included. Nor are environmental benefits included, for example, less exhaust emissions and lower traffic noise because of reduced speeds.
- For increased engineering actions, it is assumed that almost all costs are additional, as these interventions usually require construction works and materials. For improved surveillance and enforcement, it is assumed that some additional staff and equipment are needed, but that a substational part the the proposed activities is performed within the present Police and Jandarma organizations.

If these estimates are used, it could be concluded that for an additional cost of about USD 130 million per year more than 1 955 lives per year can be saved, that is, less than USD 70,000 per life. Within the EU it has been stated that EURO 1 million could be spent on safety measures to save one life. Based on this, it could be said that the monetary price to save one life in Turkey is very reasonable.

The additional costs for the period 2007 – 2011 are estimated to be of the same order of magnitude as for the first period, that is USD 100 – 150 million per year.

5.5 Implementation, follow-up and evaluation

5.5.1 Implementation

During the implementation of safety interventions, it is necessary to monitor accidents and casualties as well as different safety performance indicators (e.g., conflicts and other behavioral indicators) to ensure that the situation is under control and that no unexpected safety or other problems have been created.

5.5.2 Follow-up and evaluation

Follow-up and evaluation of this Program
The follow-up and evaluation of this Program should include:

- implementation of proposed interventions according to Plan (incl. deadlines etc.),
- safety targets according to Strategy,
- safety performance indicators and other targets according to Plan.

It would be valuable if the costs of the interventions could be recorded in order to facilitate for future revisions of the Program.

The "monitoring group" (see "Introduction") should be responsible for the monitoring and evaluation. Parts of the work could be carried out by the proposed Center for applied traffic safety research and development. Involved agencies should be obliged to supply the group

with required data and statistics. Parts of the long-term evaluation could be published in the proposed statistical yearbook on accidents, roads and traffic etc.

Follow-up and evaluation in general
It is important to follow up and evaluate safety interventions in order to:

- learn if forecasted effects (and costs) were obtained and if targets were attained,
- gain knowledge for future safety projects and programs.

The follow-up must be planned in advance. This is very important since when the intervention already is implemented, it is too late to make any before measurements.

In order to be able to follow up and evaluate, it is necessary to keep track of what has been done by documenting the interventions. This should include a short description of the intervention, where, when and how it was carried out etc.

One way to distinguish between different kinds of follow-up and evaluation is to differentiate between:

- initial short-term evaluation (or monitoring),
- long-term evaluation.

Just after the implementation of an intervention has been finished it could be suitable to carry out the first *initial, short-term evaluation*. The aim of this is to see if the intervention is working as planned and to ensure that no unexpected safety or other problems have been created.

Such initial evaluation cannot normally be carried out in terms of safety indicators (accidents and casualties) because the time-period after the implementation is finalized is usually too short. Possible follow-up variables (or safety performance indicators) could be attitudes and knowledge, compiled by interviews or questionnaires, and behavior, in terms of speed and seat belt usage, etc.

After some time, *long-term evaluation* could be carried out. The aim is normally to estimate the safety effect of the intervention. Such long-term evaluation could concern accidents and casualties as well as attitudes, knowledge and behavior.

Some common problems with evaluations
There are several problems connected with evaluations. Studying attitudes, knowledge and behavior are difficult tasks. There are also many statistical methods and pitfalls to be considered. Therefore, the assistance of experienced persons (behavioral scientists and statisticians etc.) is valuable and often necessary.

The basic principle with evaluation is usually to try to compare the before situation with the after situation. One general problem is that there are always many different changes taking place in the road traffic environment. The modal split is changed, roads are improved, traffic volumes are changing, cars get stronger engines and more safety equipment, drivers and other road users become more educated, traffic legislation is changed, surveillance and enforcement is increased, and emergency aid improved, etc. In addition, the weather and other external variables are changing. All these changes affect the overall safety situation and makes evaluation more complicated.

Therefore, if one wants to study the effect of a special safety intervention, it is necessary to try to isolate the safety effect of this intervention from all other changes. This can be done by using different behavioral and statistical methods, for example, "matched pairs" or "control groups" (see Ref. 52).

Matched pairs means that a number of very similar (preferably identical) sites or groups are selected. For each pair, one site/group is selected at random and improved by the actual intervention and the other site is left unchanged. The difference in the after situation can then be said to be caused by the intervention.

The general idea with *control groups* is to select sites/groups that are similar to the improved sites but for which no safety interventions have been applied. The changes, for example, in terms of accidents, for these sites from the before situation to the after situation are then assumed to reflect all the other changes that have taken place in the traffic environment. It is then assumed that the improved sites/groups would have had the same development if they had not been improved. Based on this, it is possible to estimate the effect of the studied intervention.

Evaluations based on number of accidents and casualties
There are some important statistical methods to use (see Ref. 52):

- The test of independence to see if the change in accidents etc. could have occured by chance. The test normally used is the chi-square-test.
- When the test of independence gives significant results, it is interesting to estimate the magnitude of the effect and the confidence limits for that effect. This could be done by studying the values in a 2x2 cell matrix with the values for improved sites/groups and the control sites/group on the one hand, and the before and after situation on the other.

There are also some important requirements to consider:

- the before and after periods should be sufficiently long in order to take any annual and monthly variations into account,
- the number of observations (e.g., number of accidents) should be sufficient to give statistical reliability,
- the control groups should be sufficiently large (to reduce variance).

It is not uncommon that the *initial effects are not as good as the long-term effects*. One reason for this is that the road users could be unfamiliar with the improved situation, and that when the road users get familiar with the improved situation fewer accidents happen. To avoid this complicating the long-term evaluations, the first time after the finalization of the intervention could be treated separately.

It is quite common that some safety interventions result in *increased speeds*. This will affect the outcome concerning accidents and casualties. Therefore, it could be valuable to measure speeds to be able to explain an unexpected increase in number of accidents etc.

Another problem is the so-called *regression-to-the-mean* effect. This effect is caused by the randomness of accidents. In a group of 100 sites/groups, for example, there are always some sites with high numbers of accidents (and some with low numbers). The reason could be either that these sites are really dangerous or that the high numbers are caused by random fluctuations. If the latter is the case, the numbers will decrease to the next year even if

nothing is done. If these sites are selected for treatment because of the high numbers of accidents, the forecasted effect will overestimate the real outcome.

Another problem, which specially can occur for road safety interventions, is so-called accident *migration.* This means that accidents after the intervention can be transferred to other sites, normally adjacent to the treated site. This results in overestimated decreases of accidents.

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