

Review of Ireland's Road Safety Strategy

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Summary

For about thirty years now, the annual number of road deaths in Ireland has decreased. However, towards the end of the 1990s the annual number was judged to be too high. Moreover, it was established that Ireland was in the middle bracket when compared with other member states of the European Union. In order to reduce this number further, a strategy was developed (*Government Strategy for Road Safety 1998-2002*) and this strategy has been implemented during the last few years. For the coming period, the Irish government is considering drawing up a new strategy and implementing its proposed actions. This strategy is meant to lead to a further reduction of road accidents.

Seen from this perspective, SWOV has been requested to carry out a review of Ireland's Road Safety Strategy. This review should pay attention to three aspects:

1. review developments and progress made under the current National Road Safety Strategy 1998-2002;
2. place Ireland's performance in an appropriate international context;
3. suggest options for priorities for the next Strategy to cover period 2003-2007, paying regard to recent developments (including relevant international developments).

The target of the National Road Safety Strategy was a reduction in the annual number of deaths of 20%, from 472 in 1997 to 378 in 2002. It is likely that the target in relation to deaths will not be achieved. The target for the number of injuries (also a reduction of 20%) has already been achieved.

The *Government Strategy for Road Safety 1998-2002* is to be regarded as a large step forward in Irish road safety policy. The following elements of the Strategy are regarded as being positive:

- a) the formulation of a national target,
- b) the definition of a limited number of well-founded spearheads,
- c) the policy co-ordination at the national level in the shape of a High-Level Group on Road Safety,
- d) the publication of an annual progress report.

Judged by the policy results it must be concluded that the Irish ambitions have not completely been achieved. A certainly successful area of policy is formed by the achievements of the NRA, because they have really met their pledges. The publicity activities of the NSC are also carried out well (large awareness and influence on the attitudes of the Irish). Less successful are the other main areas for special attention (speeding, drink-driving, and seat belt wearing). This is not so much a question of too ambitious targets, but of not implementing the intended policy. It is possible that having to adjust the speeding target over the past years, and not achieving the drink-driving and seat belt targets, damaged the credibility of the policy, and it could put the actors responsible in a vulnerable position.

The Irish road safety policy strongly relies on positive effects of traffic enforcement and (strict) punishment of offenders. It also strongly relies on public information: more than 70% of the casualty reduction targeted should

be reached here. The implementation of the policy in this area is, at the most, to be characterised as a first step, and the expectations here have not fully been met.

Various points of further improvement have surfaced which could be used in order to continue along the chosen road for the 1998-2002 period. First of all, the national target may be transformed in a realistic way to 'supporting targets' (also known as performance indicators): from road safety targets to targeted road safety programmes. A further recommendation is that it is necessary to make efforts in Ireland to monitor the policy carried out, in order to bring it to a higher level.

During the past period, the implementation of the policy lagged behind its own ambitions for a number of reasons. In this period there were evidently not enough possibilities for implementation. To make improvements, agreements will have to be made so that intended policy is really carried out. Such agreements should be included in the coming policy programme so as to create possibilities for pledges to be met.

If we look at the emphases in policy carried out during the Strategy lifetime, it can be concluded that there are still considerable improvement possibilities in relation to existing areas for special attention. This means that the present level of police enforcement should increase considerably. This level is modest in comparison with several other countries, and it is not to be expected that marginal increases will lead to behavioural changes of Irish road users. Gaining public support, especially through the mass media, will have to create a sound base for considerably higher enforcement levels.

Although the NRA has performed extremely well in the 1998-2002 programme it may be wise to examine whether the contribution of infrastructural improvements could be intensified. On the one hand this means examining whether 'more safety' can be achieved with the existing budgets and, on the other hand, it means reserving a larger part of the investment budget for road safety.

The National Strategy has shown many possibilities of further improving road safety. However, one is also very conscious of the potential obstacles to further improvement. Ireland has started down the right road, and this road has been explored here and there, but not all opportunities are fully exploited. In the next Strategy large steps forward can be made!

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Foreword

The assignment itself was not so complicated: to evaluate road safety in Ireland, and to make suggestions for further improvements.

As I come from a country that differs from Ireland in many ways, I wonder why I dare to present a review of road safety in Ireland. Of course I have done a great deal of road safety research work in my own country, and I have a good idea of all that has been done to reduce the number of traffic deaths: from more than 3000 in 1970 to less than 1000 now, whereas the amount of motorised traffic has trebled. Of course I studied the relevant literature, and studied road safety in many different countries. But what has all this taught me about road safety in Ireland? My approach is to play the role of 'enquirer' and, armed with the necessary background as reference point, attempt to formulate answers.

I have carried out the assignment as follows: first of all I studied the road safety strategy formulated by Ireland. With this national strategy *The Road to Safety* (DoELG, 1998) the attempt was made, during the period 1998-2002, to carry out a certain programme in order to reduce the number of road deaths by 20%. Then I read the three progress reports for the years 1998, 1999, and 2000. During a working visit to Ireland I talked with representatives of a number of key road safety organisations. I received a great deal of background information, data, insights, and opinions during these meetings. They also gave me a lot of material, or sent it to the Netherlands. I very much appreciated the constructive and pleasant atmosphere in all these meetings. During the discussions I sensed a clear desire to improve road safety further. They gave me a first insight into road safety problems in Ireland, and how they are approached. However, the information was also rather confusing: why had *this* been tried out but not *that*?

I felt it would be a good idea to experience Irish traffic for myself and, therefore, I drove several thousand miles on Irish roads. This experience added a lot to the reports and office discussions. For example: I was told that police enforcement was a key-issue in the Irish approach to improve road safety. However, during these thousands of miles I had not seen any police activity along the roads. That was until the very last day on my way back to the airport: I saw a policeman alongside the road who was controlling speeds with a speed gun.

Finally, I wrote this report. I will start right away with my conclusions: there are many possibilities to further improve Irish road safety. In my opinion, Ireland is well on its way 'down the right road', but at the same time I ask the question: do the Irish really want more safety? If you ask them, they say they do. They expect the government to also take action, and that they will support government initiatives. But is this really the case? Are the politicians sufficiently interested? Where are the road safety 'champions' of Ireland?

The national strategy has shown many possibilities of further improving road safety. However, one is also very conscious of the potential obstacles to further improvement. Ireland has started down the right road, and this

road has been explored here and there, but not all opportunities are fully exploited. This can be the time to make large steps forward!

Fred Wegman
December 2002

1. Introduction

1.1. Terms of reference

For about thirty years now, the annual number of road deaths in Ireland has decreased. However, towards the end of the 1990s the annual number was judged to be too high. Moreover, it was established that Ireland was in the middle bracket when compared with other member states of the European Union. In order to reduce this number further, a strategy was developed (*Government Strategy for Road Safety 1998-2002*) and this strategy has been implemented during the last few years. For the coming period, the Irish government is considering drawing up a new strategy and implementing its proposed actions. Hopefully this will lead to a further reduction of road accidents.

Seen from this perspective, SWOV has been requested to carry out a review of Ireland's Road Safety Strategy. This review should pay attention to three aspects:

1. review developments and progress made under the current National Road Safety Strategy 1998-2002;
2. place Ireland's performance in an appropriate international context;
3. suggest options for priorities for the next Strategy to cover period 2003-2007, paying regard to recent developments (including relevant international developments).

In the study design, a study was first of all made of *The Road to Safety*, the title of the Government Strategy for Road Safety 1998-2002, and the three progress reports that have since then been published (in 1999, 2000, and 2001 by the High-Level Group on Road Safety). At the same time, Ireland was compared with other European countries. Two international databases were used: IRTAD and SARTRE. IRTAD is the International Road Traffic and Accident Database. It includes data from all OECD countries with the German BAST acting as database host and administrator. SARTRE is the acronym for Social Attitudes to Road Traffic Risk in Europe. It is a survey, among European driving licence holders, of their road safety opinions and their reported behaviour. SARTRE has been carried out twice (in 1991/92 in 15 countries and in 1996/97 in 19 countries). Ireland participated in both surveys. Of course we also used the international literature, in particular the draft report of the SUNflower project (Koornstra et al., to be published). In this report, the road safety of three relatively safe countries of the European Union (Sweden, the United Kingdom, and the Netherlands) is compared.

During my working visit in July 2002, I came into contact with a number of important road safety 'actors'. They were all represented on the High-Level Group on Road Safety and were: the Department of the Environment and Local Government, An Garda Síochána, the Medical Bureau of Road Safety, the National Roads Authority, and the National Safety Council. In the summer of 2002, responsibility for road safety policy was transferred from the Department of the Environment and Local Government to a newly formed Department of Transport.

In this report I have made an analysis of the policy followed during the past years. This is based on information gathered in the meetings during my working visit and on the background information which was made available. This concerned the policy as a whole, as well as specific policy aspects. The analysis also uses general road safety knowledge. This analysis forms the basis for making a number of recommendations for the future road safety policy of Ireland.

1.2. Structure of the report

Chapter 2 begins with providing a brief description of those aspects of Ireland that are of importance in influencing road safety in Ireland, and the possibilities of understanding them better. Then, in the same chapter, there are three sections about generic road safety knowledge, specifically directed at the road safety situation in Ireland. For the rest of the report, these sections are a reference and, as such, make it easier to understand the situation in Ireland and to make a comparison between Ireland and other countries.

Chapter 3 introduces, in different dimensions, the road safety problem in Ireland. It also contains a description of Ireland's road safety position in comparison with several other countries.

Chapter 4 characterises Irish road safety policy as laid down in the Government Strategy for Road Safety 1998-2002. Also a study of a summary of the three progress reports of the High-Level Group was made. This chapter concludes with an assessment of Irish road safety management.

Chapter 5 goes from broad outlines to details of policy implementation and consequently to concrete measures in which the spearheads of Irish policy are central. Not all activities being undertaken to improve road safety can be dealt with in this chapter. I limit myself to several main points.

Chapter 6 deals with a number of separate matters like organisation, finance and research

Finally, the report concludes with *Chapter 7* which contains conclusions and recommendations.

2. The context

2.1. Ireland: some background

Ireland is a unique country with unique features, an eventful history, and a rich culture that is still nurtured. Seeing this background, an economic miracle has taken place in the last decades. Ireland has become a prosperous country in which, during the 1990s, the Gross Domestic Product has grown by 7.7% a year, whereas the EU average was only 2.0%. Ireland thus had the fastest-growing economy ('the Celtic Tiger'). Its inhabitants had ever more money to spend, and they did it as well. With a GDP per head of \$US 31 400 in 2001, Ireland is now one of the leading countries of the EU. The economic growth has been extremely rapid, and Ireland is now confronted with the consequences of the rapidly-growing material welfare. Looking at road traffic and road safety, a number of observations can be made which will be dealt with later in this report. First of all the car ownership: this has grown from less than 200 motor vehicles per 1000 inhabitants in 1970, to nearly 450 in 2000; during the last ten years the growth in car ownership was over 50%. The economic growth has led to the situation in which many of the young have a car at their disposal. In some parts of the country, especially in Dublin, there is the problem of traffic congestion; a problem confronting all highly-motorised countries in the world.

Ireland is a thinly-populated country: a population of nearly 3.8 million on an area of 70,000 km² means a density of 54 people per km², i.e. about half the EU average (compare, for example Sweden with 20, the United Kingdom 244, and the Netherlands 390). This density, however, is an average value and the regional differences are great.

Ireland has only got one big city, and that is Dublin. The population lives mainly in small cities, villages, and in the countryside. There is a large distribution of settlements and activities. That is why the road network is so extensive, especially when related to the population. In Ireland there are 25 metres of road per head, which is just as high as Sweden, but, for example, 3-4 times more than the Netherlands or the United Kingdom. This means, for example, that there are low traffic intensities on very many roads. The road network is nearly 96,000 kilometres long (Source: IRTAD). In 2000, about 100 kilometres of this was motorway, and nearly 3,300 kilometres (3.4%) was in urban areas. The rural roads are divided into a small share of national roads, 5,200 km. (5.5%), and more than 87,000 km. (91%) are 'other rural roads'. This distribution shows that by far the greatest part of the road network consists of ordinary countryside roads with relatively low intensities.

There are also large quality differences. It quite often happens that during one trip a road user is confronted by a stretch of road with everything from the highest quality where it is possible to drive at (very) fast speeds (which actually happens!), followed by a stretch along which the road profile and surface require not driving any faster than 20-30 mph. These roads comprise local non-national roads.

The Road Traffic Act is very important (S.n., 2002). The written constitution gives rise to the idea that the extent of guilt can only be established by a judge, and not by the police. New road safety measures are often announced in laws. Between 1961 and 2002, the Road Traffic Act was altered seven times. Two themes are central in the most recent change in 2002: the introduction of a penalty point system and greater support for traffic surveillance (e.g. extended use of breath testing, greater use of speed cameras, introduction of a fixed charge system, and increase in financial penalties).

Ireland has one police force, the Garda Síochána which is headed by a Commissioner. This Commissioner is responsible to the Minister of Justice. In the police there are 12,000 personnel in 700 police stations; no specific traffic police corps exists. This in spite of the fact that in 1997, following a review of the Garda traffic operations, the Garda National Traffic Bureau was established at Garda Headquarters to give greater focus and direction to Garda traffic law enforcement generally. The Gardai have 30 full-time traffic units with nearly 500 Gardai.

2.2. Causes of accidents and remedial measures

“Human action is a contributory factor in over 90% of road accidents. The principal emphasis of all road safety strategies must therefore be on improving road user behaviour. This behaviour needs to be informed and trained, and to be modified, so as to improve interaction between road users, to ensure consideration for others and to reduce risk. In this way a culture of road use is created that is both precautionary and pro-active in relation to road safety”. These sentences are to be found in the Government Strategy for Road Safety 1998-2002; and international research supports the truth of these statements.

Human errors (in observations, decisions, and actions) play their part in just about every accident, and the point is to eliminate these errors. And if they still do occur, not to let them lead to severe consequences. The place of these sentences is striking, viz. in the chapter ‘Safer Human Behaviour’. In the chapter ‘Safer vehicles’ we read “In Ireland the vehicle is estimated to be the primary contributory factor in about 1% of all road accidents”. In the chapter ‘Safer roads’ the opening sentences read that “It is estimated that a road factor contributes to some 25% of all accidents. Engineering measures are an appropriate response to these cases.”

These statements give the impression that human errors are much more important than errors in road design, and that vehicle factors hardly play a part in causing accidents. A second conclusion for a superficial reader could be that accidents should mainly be prevented by behavioural changes which are to be achieved by police surveillance, education, public information, and driving courses. Furthermore, it could be concluded that technical measures could prevent a maximum of 25% of all accidents. These conclusions are not logical and, moreover, do not reflect the most recent road safety insights.

During the years of motorised traffic, there have been very many different ways of explaining traffic accidents, and how they can best be avoided. *Table 1* presents the dominant thoughts (paradigms) in the OECD countries by means of a few words (see also OECD, 1997).

Period	Characteristic
1900 - 1920	Accidents as chance phenomenon
1920 - 1950	Accidents caused by the accident-prone
1940 - 1960	Accidents are mono-causal
1950 - 1980	A combination of accident causes fitting within a 'system approach'
1980 - 2000	The person is the weak link: more behavioural influence
2000	- Better implementation of existing policies - 'Sustainably Safe': adapt the system to the human being

Table 1. *Accident 'causes' as seen in time (derived from OECD, 1997).*

Without dealing with them extensively, a number of interesting conclusions can be drawn from this historical overview. First of all the 'accident-prone theory'. This theory dates primarily from the phase in which the legal guilt question was the main one: which road user has broken which law and is, thus, both guilty and liable. This question was answered by the police on the registration form, finally decided inside or outside the court room, and used by insurance companies to determine how to compensate damages. In-depth studies have shown that there are few mono-/single-cause accidents; they are usually caused by and the result of a combination of circumstances. To illustrate this, take a 'known' type of accident. During a weekend night, a group of friends drive home from the pub. The car is quite old and the tyres and brakes are rather worn-out. The driver has just recently got his driving licence. After having a few drinks in the pub, the young man drives home fast. His friends are impressed. In a sharp bend he loses control, cannot brake sufficiently, and crashes into a tree. All the occupants are thrown out of the car because they are not wearing seat belts. The casualties are only discovered many hours later. Medical help arrives too late.

What was the cause of the accident here and how was the seriousness determined? Young and inexperienced, drink-driving, poor tyres and brakes, a sharp bend, a tree in the bend, and no wearing of seat belts? It is clear that this accident can not be attributed to *one* cause. Furthermore, all sorts of possible intervention could have prevented this accident or made it less severe. These are: strengthening social interaction, preventing drink-driving, speeding policy, promoting seat belt wearing, eliminating sharp bends, no fixed objects in bends, better car inspection, etc.

Two other conclusions are relevant here. More 'education' is not the only, nor the best way of preventing human errors. A postal-delivery company incurred a lot of damage to parcels because the employees threw them around. Throwing parcels was then forbidden and, because it still happened, they were often told not to do it anymore. In spite of this..... When the management decided to pack the parcels better, the company's damage decreased. In traffic, the question has been for decades: should man adapt to traffic or traffic to man? Nowadays, the answer to this is 'both'. This means that we can not prevent human errors only by educating road users better, informing them, and if necessary punishing them. We must provide people with surroundings in which the chance of human errors is limited. This is the essence of the philosophy in Sweden (Vision Zero) and the Netherlands (Sustainable Safety).

Finally: do accident-prone road users really exist, i.e. is a small number of road users responsible for a large number of accidents? The answer is: only to a very limited extent. Situations with an increased risk are well-known (alcohol, speed, poor visibility, inexperience, etc.). But: we know that having had an accident is not a good predictor for going to have an accident. Committing traffic offences, however, does correlate with accident frequency: the more offences the higher the accident frequency. The question must be asked about the extent in which the accident-prone approach can be more effective, not just for the accident-prone themselves, but, by paying attention to this group, trying to promote good driving behaviour in general.

What does this mean for Ireland? In the first place it is possible that, just as in other countries, there are various ideas among Irish road safety professionals about which are the most important accident causes, and what is the best way to prevent them. A discussion about these paradigms can possibly uncover a difference of insight and then lead to a consensus being achieved.

I recommend a discussion on road safety paradigms among road safety professionals to be organised as a start of the preparations of the next Road Safety Strategy.

2.3. Approach to road safety

There is an enormous amount of evidence that the annual number of road accident casualties is not an unassailable phenomenon, but can indeed be influenced. This is, however, a complicated problem. This refers to the complexity of accident causes - such as indicated in 2.2. - as well as of road safety management. A study of road safety policies in various countries shows that there is a certain pattern in their approaches (Mulder & Wegman, 1999). Characteristic of this pattern is the phased approach, in which each phase is based on a previous phase. According to this model, eight phases can be distinguished, and in *Appendix 1* a brief description of these phases is given. The application of this model in Germany where the old Federal Republic of Germany (West Germany) and the German Democratic Republic (East Germany) were compared, showed that the model developed by SWOV can well be used for a description of the approach of road safety in 'both' Germanies (Wegman, Vollpracht & Schutt, 2002).

An important conclusion from this study is that it has not yet been established that phases can be omitted. It would be interesting for Ireland to position itself in these phases. A second important conclusion is the fact that it is inevitable that road accidents will take place and road casualties will be experienced in advance of road safety measures being taken. This seems to be the political reality in societies where so many manifest problems require attention. The severity of the road safety problem can be expressed in different ways (OECD, 2002). These include:

- comparing the risks on the roads with other social activities and other modes of transport;
- emphasising their economic consequences;
- positioning road safety as a public health problem;

- calculating the number of people killed every year;
- calculating the chance of being injured in a collision during a lifetime.

For a particular jurisdiction, it can not be determined beforehand which of these possible approaches should be chosen to achieve the intended result ('road safety is an important social problem'). It should be mentioned that public opinion, and consequently political opinion, are influenced by dramatic accidents: a well-known personality killed in an accident, a large accident with many casualties (e.g. the bus accident in Beaune in France in which many children were killed), or a dramatic combination of circumstances (e.g. a drunk motorist who kills 'innocent' pedestrians). It is cynical to have to acknowledge that the saying "locking the stable door after the horse has bolted" is a reality in road safety. The so-called 'black spot approach' is the living proof in road safety. However, sufficient knowledge has become available to enable us to anticipate negative future developments.

In any case it is good to realise that there is a certain stratification of the road safety problem, and the Swede Kare Rumar has explained it once again (Rumar, 1999). The first level of problems can be directly traced back to the registered safety (in terms of accidents, casualties, rates, traffic behaviour, and the quality of parts of the road traffic system). In *Appendix 2*, Rumar's seventeen most important first level problems are summed up. There are also two other problem levels to be distinguished. The second level problems give an explanation for the first level problems. It involves problems that influence the quality of possible safety interventions. The third level problems do not depend on the traffic circumstances or the immediate way of making them safer. They are on a deeper level: how have responsibilities in society been defined: what is the government's role, how are decisions taken, how do we obtain knowledge, etc.? When analysing road safety problems we begin, of course, at the first level. However, possible explanations for unsafety and for defective possibilities for solving them, are mostly to be found on both other levels.

The most recent road safety policy developments are reported from the Netherlands, Sweden, the United Kingdom, and New Zealand. This does not mean that no interesting measures are being taken or concepts being tried out in other countries. This statement means that the countries mentioned are the most innovating, as far as vision and strategy developments are concerned.

Two main points should be mentioned here. The first point is the question of whether developing a vision is helpful in road safety positioning in the eighth phase of the SWOV model: complete anchoring of road safety in decision making processes, take road safety into account in a prominent manner in transport policy combined with a high readiness to implement road safety measures. It is also worth mentioning the visions developed in Sweden (Vision Zero) and in the Netherlands (Sustainable Safety). In the Netherlands, the vision of Sustainable Safety has lifted the road safety approach on to a higher level, more measures have been taken, and investments made than seemed possible without a vision. (*Appendix 1*, phase 7 from the already-mentioned SWOV model: increasing readiness to carry out approaches). However, a successful country as the United

Kingdom does not see the necessity of formulating and using such a vision as starting point.

I recommend that Ireland also considers if deriving a strategy from a defined and accepted vision would be helpful.

A second main point is the rational decision making in road safety. Its distinctive feature is setting concrete targets (casualty reduction) during a given period with an indication of the efforts needed to achieve these targets. Road safety targets (nearly always stating the annual casualty reduction: i.e. numbers of deaths and injured) are becoming more common. This is in spite of the fact that scientific proof that working with quantitative targets is 'better' has not been given (and is probably very difficult to provide). In any case, positive results of target setting have been reported: better policy, better acceptance of policy, and more efficient spending of available resources.

Two approaches can now be distinguished: a top-down approach in which political and often idealistic statements are made about the level of improvement (50% less deaths) and the speed of improvement (within 10 years). The idea behind this is that a political statement will generate the financial means and the necessary co-operation to achieve the stated targets and that sufficient measures are, or will be, available. The second approach is the bottom-up approach: in this a statement is made about the targets to be achieved, based on an inventory of measures and their expected results. This is a realistic approach, but can result in less ambitious targets being formulated. In many countries it would seem that a combination of idealism and realism go hand in hand. The targets aimed at have a certain level of ambition, and the ambitions in Ireland (20% less in 5 years or approximately a 4.4% annual reduction) lies within the range of several OECD countries (OECD, 2002).

Quantitative targets should go together with targeted programmes. Targeted programmes should be monitored and the progress achieved should be compared with the targets. That is why New Zealand has developed a very useful target hierarchy (National Road Safety Committee NRSC, 2000). The keywords for this target hierarchy are:

- credibility (knowledge used and choices made are visible),
- transparency (other assumptions and choices can be calculated),
- consistency (the basis is formed by the same data and logics),
- disaggregation (targets for parts can be defined), and
- accountability (performance indicators can be derived for all actors).

This hierarchy is one of the building blocks of the ETSC report *Transport Safety Performance Indicators* (ETSC, 2001). In the meantime, the European Commission, after consultation in the European High-Level Group on Road Safety, has decided to use this concept as starting point for benchmarking purposes within the European Union. Since then, the SUNflower project (in which benchmarking is an important component) has adopted the target hierarchy as part of the research method (*Figure 1*).

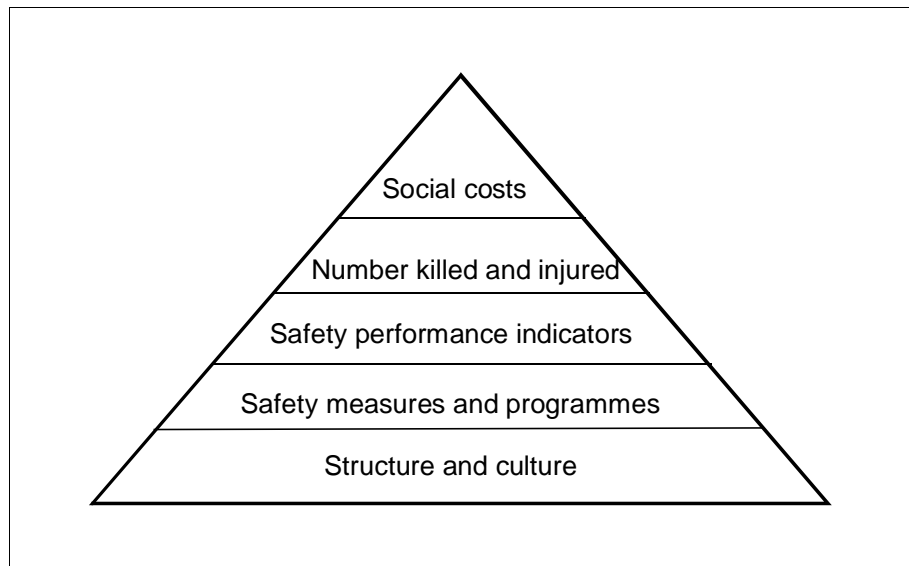


Figure 1. *The target hierarchy based on the New Zealand model and adapted for the SUNflower study (Koornstra et al., to be published).*

At the top of the hierarchy are the social costs of road safety. These costs are the consequences of accidents that took place and in which there were casualties. The social costs are not only the economic costs, but also the resulting pain and suffering. At the second level final outcomes are expressed in numbers of casualties: deaths and (severely) injured. Targets are formulated mostly at this level. In Ireland this has been done with Primary Targets.

The safety performance indicators are at the next level. In the already-mentioned ETSC report, safety performance indicators have been defined as “Any measurement that is causally related to crashes or injuries, used in addition to a count of crashes or injuries in order to indicate safety performance or understand the process that leads to accidents”. The ETSC report defines eight performance indicators (on behaviour: speed, alcohol, seat belts, on vehicles: passive safety, on roads: road design quality and road network quality and on trauma management: arrival time and quality of medical treatment). In Ireland this level is called Supporting Targets. A level deeper, we find the safety measures and safety programmes. In essence, these are concerned with delivering a safety policy together with measures. The bottom of the pyramid is labelled ‘structure and culture’. ‘Structure’ means the general social and institutional structures that exist in a country and which influence the possible policy organisation. ‘Culture’ includes matters as: how society deals with targets they themselves have set, which role do traffic laws play with regard to traffic behaviour, and how does traffic surveillance fit in here, etc.

The relationship between the different layers of the pyramid is as follows. A safety programme is carried out (what, who, how, when; e.g. alcohol surveillance). This is meant to lead to a change in a safety performance indicator (the percentage of drink-driving above the limit). A change in the performance indicator should lead to a change in the final outcome (the

number of alcohol-related accident casualties) and in the road safety social costs (those costs related to alcohol accidents). Obviously the influencing and disturbing factors should be taken into account in order to be able to accept the causal chain.

I recommend examining if the future strategy for Ireland could make use of such a target hierarchy.

2.4. Deaths, casualties, and their rates

The development of the annual number of road deaths in most of the countries shows inexplicable fluctuations at first sight. However, trends are often visible, but it is not really clear how they are to be explained. Road safety influence factors can be sequenced in five groups:

1. growth in exposure,
2. layout of the road infrastructure,
3. road safety measures,
4. autonomous developments,
5. incidental factors.

Autonomous developments are those that influence road safety, which are to a certain extent predictable, but can not be influenced from a road safety perspective. Examples are population size, age distribution, and driving licence possession. Incidental factors are those that can fluctuate in time, in which there is no structural development, and for which no long-term predictions can be made; such as extreme weather conditions. The first three factors are self-evident.

Apart from these 'deterministic' factors, there is also the random component, leading to accident frequency having a certain dispersion.

SWOV has developed models in which a relation has been made between the development of exposure (mobility growth), the number of accident fatalities, and fatality rates. By simply multiplying the exposure (in kilometres travelled) and the rate (the number of fatalities per kilometre travelled), the number of fatalities is calculated. The mobility growth is S-shaped and the decrease in fatality rate is proportionally constant (over a longer period). However, the decrease is not constant if relatively short periods are compared with each other. The deviations from this constant decrease are, in fact, what makes them interesting for policy, because it can be possible that a sharper decrease of the fatality rate can be explained by policy measures.

If we study the road safety development over a period of 30 years, the following conclusions can be drawn (see *Figure 2a* and *2b*). First of all, the development of the annual number of road deaths seems to consist of three periods. The first 10 years fatalities was a more or less stable number of 500-600 a year, during the next 10 years there was a decrease to 400 a year, and during the last 10 years the number varied between 400-500 a year. If we choose a rough analysis (an exponentially declining curve, meaning a consistent annual decrease), then this means a decrease over the whole 30-year period of 0.86% a year. If one is attempting to reduce the number of deaths by 20% during a period of 5 years, it is clear that

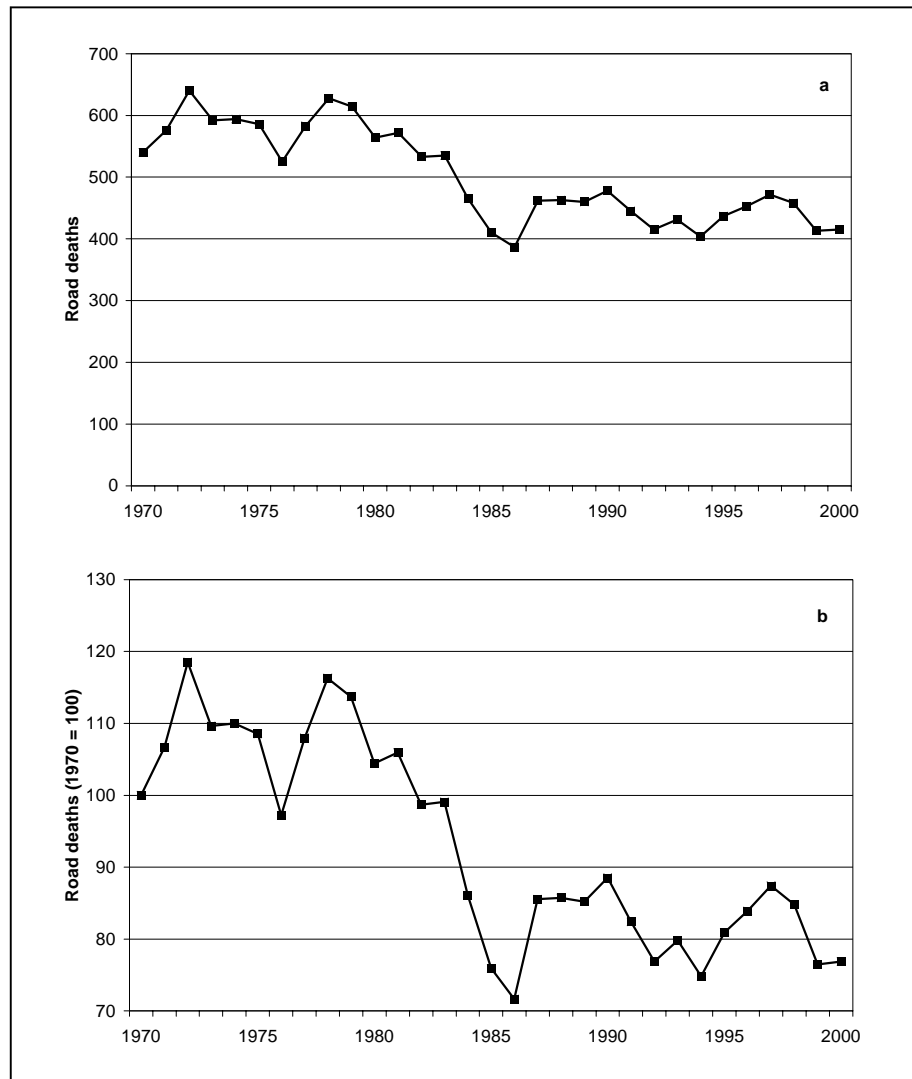


Figure 2. Development of the number of road deaths in Ireland 1970-2000 (a), and compared with 1970 (b). Source: IRTAD.

something extra needs to be done. Seen from this background, it was vital to propose additional policy, as was done in the Government Strategy.

If we divide the development in time in an increase in mobility and a decrease in the fatality rate, a number of interesting conclusions can be drawn. First of all I must point out that to estimate the distances travelled I chose the 'number of licensed vehicles' because these figures were available and there were doubts about estimates of distances travelled. The vehicle growth can be described as an exponential growth curve of 3.43% a year during the whole period. Over the last few years, the growth was higher. The decrease in the fatality rate (deaths per licenced motor vehicle) was 4.2% a year during the whole period. The actual numbers and the fitted curve can be found in *Figure 3*. The decrease for the Netherlands was approximately 7% a year during the same period.

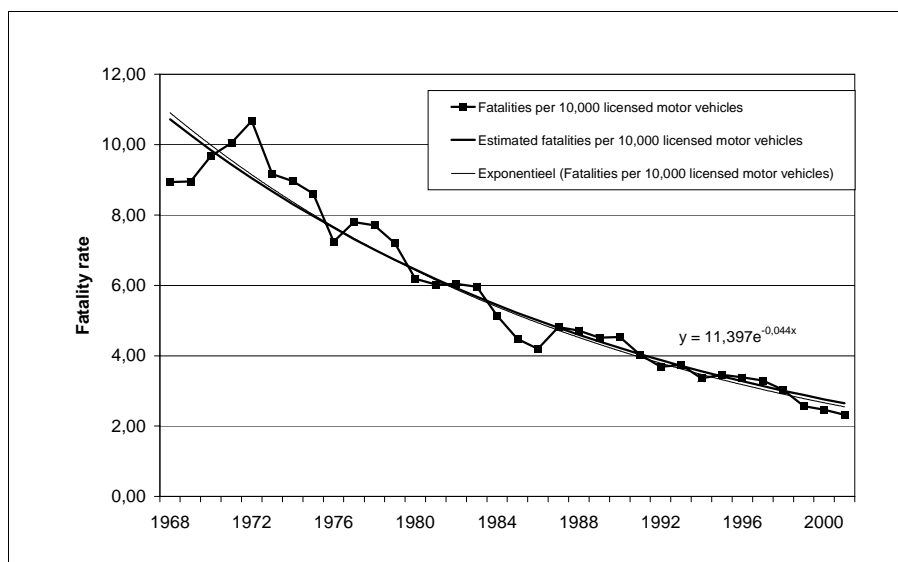


Figure 3. *Reduction of the fatality rate in Ireland (fatalities per 10,000 licensed motor vehicles), observed and estimated.*

Logically the next question is: why did the fatality rate decrease? The possible factors are dealt with in this section, but it is impossible to determine which factor contributed to the decrease to what extent in a particular year, without detailed, local knowledge. A first glimpse is obtained if the 30-year period is divided into 5-year periods (see *Table 2*).

Period	Decline in fatality rate (deaths/10,000 vehicles)
1971-1975	2.31%
1976-1980	6.37%
1981-1985	6.26%
1986-1990	0.23%
1991-1995	5.26%
1996-2000	6.55%

Table 2. *Fatality rate decline per 5-year period in Ireland (1971-2000).*

We can derive here that, during the 30-year period, there was no bigger decrease than during the last 5-year period. For individual years, the decrease of the fatality rate in 1999 was striking (-15.28%). Such a large decrease had only happened once before (in 1976) and it is interesting to discover why this happened.

If we combine the curves of both estimates (mobility and fatality rate) it appears that the actual numbers during the last few years were lower than the estimated numbers. A clearer picture would appear if we were to choose the developments since 1986 as a starting point; this is because the fit from that year onwards is much better than if we include the previous years.

I recommend making use of knowledge on fatality rate reduction and mobility growth when making future estimates for the new targets.

The precondition is that there are good registrations of accidents by the police, i.e. without any changes in definitions or registration practice.

3. The road safety situation in Ireland

3.1. Introduction

Without political commitment, a subject such as road safety will quickly end up bogged down and forgotten. There are many examples where political commitment really makes a difference, in the sense that communication with the road users takes place, and that there are means and an organisation available to promote road safety. Real political commitment makes a world of difference in the ever difficult struggle to improve road safety.

In Ireland, just as in all other countries, the responsibility for improving/increasing road safety is spread over many bodies, both inside and outside government. As is the case all around the world, in Ireland also competences are found, sometimes set down in law, in formal agreements, and in financial (subsidy) relations etc. The foundation for these competences has a far broader basis than just road safety. The following institutions fulfil key roles in Irish road safety:

- a part of central government that fulfils a co-ordinating role; that was the Department of the Environment and Local Government, and since the summer of 2002 the Department of Transport;
- various other 'professional departments' such as, in Ireland, the Department of Health and Children, the Department of Justice, Equality and Law Reform;
- the police;
- the national, regional, and local road authorities, in particular the National Roads Authority;
- an organisation that is concerned with public information and education, in Ireland the National Safety Council;
- local governments;
- interest groups: the goods transport industry, the vehicle manufacturers, the car insurance companies, the alcohol industry, consumer representatives (motorists, motorcyclists, cyclists, pedestrians, etc.).

With so many bodies involved who all want to play a role, it is essential that their efforts are co-ordinated. Given good co-ordination, agreements should also be made about policy implementation. The combination of co-ordination and wide-spread responsibilities for policy implementation is a central problem of modern road safety policy. As far as this is concerned, two important steps have been made in Ireland: the establishment of the High-Level Group on Road Safety means there already is a platform, where knowledge and plans can be exchanged. Second, by the agreement of a National Strategy and its implementation, the efforts of the various parties can be more effectively and efficiently aimed. The main question here still is whether it is possible for the stakeholders to decide in this position that their efforts are optimally tuned to the accepted strategy.

The next essential point is knowledge and information. It cannot be emphasised strongly enough how important the basic data are for a good policy; this means the police registration of road accidents. Background

data to understand the road accident developments are also of immense importance. This is in addition to the monitoring of policy carried out and studies of the results of that policy. Specialist knowledge about the possibilities of increasing road safety is also necessary; this knowledge must be gathered and maintained. Without this knowledge, there is the chance that a wrong direction will be taken and that resources are not spent effectively and efficiently.

A recent OECD report (OECD, 2002), concluded that an effective road safety management should contain the following elements: political commitment, co-ordination, leadership, safety planning, data sharing and data quality, evaluation, accountability, marketing, outreach and public education and equipped staff. In the following chapters it will be examined whether these elements are present in Ireland, and where improvements are possible.

The following organisations fulfil key roles in road safety policies:

- the Department of Transport: overall policy, legislation, vehicle and driver standards (incl. driver testing);
- An Garda Síochána: enforcement, collection and analysis of data;
- the National Roads Authority: safety engineering of national roads, analysis/research/evaluation;
- the National Safety Council: promotion of road safety awareness, publicity, education;
- the Medical Bureau of Road Safety: analysis of alcohol/drugs, approval/supply of equipment.

These, with the Department of Health and Children, the Department of Justice, Equality and Law reform, and the Irish Insurance Federation form the High-Level Group on Road Safety. In 2002 a representative of the City and County Managers Association was nominated to the Group in order to represent the road safety function of local authorities. The High-Level Group was established in 1990, and has as its task promoting the importance of road safety between the different national agencies. In addition to this, the Government has given the High-Level Group the task of monitoring the implementation of the Government Strategy for Road Safety, and to make recommendations for improving the strategy.

3.2. Road accidents

Table 3 gives an overview of two important road safety indicators in all European Union countries. As can also be seen in Irish publications, Ireland occupies a middle position. The number of deaths per 100,000 inhabitants (i.e. mortality) is a well-known public health indicator and indicates to what extent a society suffers from a particular threat to the quality of public health, in this case road accidents. The number of deaths per kilometre travelled (i.e. death rate), is a measure of the quality of road traffic safety. The lower the rate, the greater the number of kilometres that can be travelled before being killed in a road accident, the higher the road traffic quality. Road safety policy aims at reducing the death (and injury) rates. The more successful it is, the quicker the death rate decreases. The death rate appears to relate with motorising. You could say that countries with the same degree of motorising are expected to have the same death rate.

	Mortality (2000)	Fatality Rate (1999)
Austria	12.0	14.9
Belgium	14.4	15.7
Denmark	9.3	11.1
Germany	9.1	12.2
Finland	7.7	9.4
France	13.6	16.2
Greece *	20.3	
Ireland	11.0	
Italy	11.1	
Luxembourg	17.5	
Netherlands	6.8	8.9
Portugal *	18.9	
Spain	14.6	
Sweden	6.7	8.3
United Kingdom	6.0	7.4

* Data of 1999.

Table 3. *The mortality (deaths per 100,000 inhabitants in 2000) and death rate (deaths per billion motor vehicle kilometres in 1999) for the countries of the European Union (source: IRTAD).*

Different groups of countries can be distinguished by their road safety level. There is a factor of 3.5 between the safest and the least safe country. The leading group consists of the SUNflower countries: Sweden, the United Kingdom, and the Netherlands; they have a mortality of less than 8. The next group includes Ireland, together with Denmark, Germany, and Italy; they have a mortality of 9-11. A comparison between the SUNflower countries and Ireland in *Table 4* shows that the speed of improvement in the leading group is faster than in Ireland. It is worthwhile to study possible explanations for this (e.g. changes in the degree of motorisation and demographics in Ireland).

	Number of deaths in 2001 (1970 = 100)
Ireland	77
United Kingdom	46
Sweden	45
Netherlands	34

Table 4. *The number of road deaths in 2001 compared with 1970 for Ireland, the United Kingdom, Sweden and the Netherlands (source: IRTAD).*

In the SUNflower study, it was determined that all three SUNflower countries are fighting a determined battle to improve road safety, and that this battle has led to a considerable reduction in the number of road deaths. Simultaneously however, the study taught us that each problem has its own character, but they still have many similarities. There are striking differences in the approaches to these problems. For Ireland this means

that it must find its own way to improve road safety, but there are certainly possibilities to do so.

3.3. Costs of road accidents

During the last years, a growing interest for expressing road safety performance in monetary terms can be seen in international literature. This presents a possibility of comparing road safety costs with other social problems. In the Netherlands for example, a comparative study showed that the social costs of road safety were €8.2 billion, environmental damage by traffic was nearly €5.9 billion, and congestion on main roads was €0.8 billion. This way of putting a price on a problem makes it possible to compare road safety with other health threats or other problems in society. The idea behind this is to produce a clear picture of road safety social costs and to use them to influence political decisions or to supply decision makers with data on expected profits and costs when preparing policies.

In 1997, the ETSC published its report *Transport accident costs and the value of safety* (ETSC, 1997). Later, the European Commission introduced the so-called '1 million (ECU) Euro test' to select socially profitable measures. In the meantime, to produce road safety cost estimates, a considerable amount of agreement has been reached on the methodology to be applied. This involves adding road safety economic costs to the Value Of Statistical Life (VOSL). Ireland has in the meantime also carried out a study in which road safety costs have been estimated (Bacon & Associates, 1999). The total cost of reported road accidents in 2000 is worked out to be approximately IR£600 million (€762 million). The extent of underreporting is unknown. If we compare the total cost in the Netherlands (€8.2 billion) with the total estimated cost in Ireland, and we take into account the differences in the number of accidents and casualties, the cost estimated for Ireland seems to be rather low.

There is a second area of growing interest, viz. the socio-economic evaluation of road safety measures in order to effect the taking of the most cost-effective measures. Three complementary formal procedures are available to this end. The cost-effectiveness analysis offers the possibility within road safety of ranking measures according to their estimated cost-effectiveness ratios; this is based on the necessary investments per casualty saved. This approach can be extended to a multi-criteria analysis where a number of goals (policy criteria) can be included. The third, and probably strongest, procedure is the cost-benefit analysis. This procedure integrates the supply side (safety measures) with the demand side (which safety level does society want) and requires all costs and benefits to be measured in monetary terms. It can lead to a statement whether a measure is socially desirable.

The growing interest for this approach, however, has not in many countries led to a choice for this rational approach in the actual decision making on road safety measures. However, the cost-effectiveness analysis is increasingly used to order measures. Application of this procedure also forces road safety actors to make an estimate of the expected number of casualties saved. This is essential if policy chooses a quantitative target. That the cost-benefit analysis is not yet often applied in the actual decision making process can sometimes be explained by the complicated and

fragmented financing of road safety measures (each government department has its own priorities). Finally, it can not be denied that, in many countries, the necessary data are missing, so that (rough) estimates have to be made. A cost-benefit analysis of the implementation of the strategic plan has also been carried out in the so-called Bacon-report and these results seem to be a firm basis for rational decision making on road safety issues in Ireland.

3.4. **Attitudes towards road safety**

There are two sources available that clarify the views of the Irish on road safety and measures to improve it. The most recent study is by Lansdowne Market Research, commissioned by the National Safety Council (2002). We also have at our disposal two SARTRE studies (1994 and 1998).

First of all, road safety has to 'compete' with other social problems to get attention from the public and the media. Although one has to be aware of the fact that public attention varies in time, the recent Lansdowne Market Research study shows that road safety is considered as important a problem by the Irish (18 year olds and older) as problems of health, crime, education, drugs, the environment, and unemployment. Looking at a result of the SARTRE II study, we see that, after the Greeks (69%), the Irish (65%) are very concerned about road safety. In relatively safe countries, this concern is a lot less (Sweden 14% 'very concerned', the Netherlands 28%). Moreover, it seems that the vast majority of Irish motorists is of the opinion that the government should pay more attention to improving road safety. As much as 82% are worried about improving the road quality; making the Irish on this item the most concerned of all countries. The Irish regard influencing drink-driving and exceeding speed limits (more than 80%) as the most important items. As far as the Irish are concerned, all ways imaginable of increasing road safety: greater investments, stricter laws, more police surveillance, stricter punishments; can all count on a great deal of support. It is striking that they are in favour of any necessary extra budgets being spent to increase 'driving offences fines'. From these opinions expressed it can be concluded that, in Irish society, road safety is a source of concern that supports a policy aimed at improving road safety. Anyway, experience teaches us that this does not mean support for every possible measure. Whatever the truth is; the opinions expressed by the Irish form a strong basis for further road safety improvement.

4. Government Strategy for Road Safety 1998-2002

4.1. Summary of the plan

In *The Road to Safety*, as the Government Strategy for Road Safety 1998-2002 (DoELG, 1998) is entitled, the Irish Government has stated that at present road safety is at an unacceptably low level, and that economic and demographic developments could even lead to a further decline: an increase from 472 traffic fatalities in 1997, to 550 in 2002 is predicted if no additional policy is carried out. Partly based on "strategic initiatives for road safety in a number of other countries", the plan formulates *the primary target* to reduce Irish road deaths by 2002 by a minimum of 20% of their 1997 level and to achieve a similar reduction of at least 20% in the number of serious injuries from road accidents.

To reduce the number of road accident casualties, *supporting targets* have been formulated:

- to reduce the incidence of excess speeding by 50% from present levels;
- to increase the wearing rate for front and rear seat belts to at least 85%;
- to reduce the number of fatal accidents (commonly drink related) occurring during the hours of darkness by 25%; and
- to implement specific accident reduction measures at more than 400 additional road locations.

For the first three supporting targets it is interesting to examine the data of 1997. In the strategy document for speeding it is determined that the only data available is for inter-urban sections of national roads. The percentage of cars exceeding the limits is 40% on roads with a limit of 60 mph and 26% on 70 mph roads. For alcohol, there are no data that indicate the share of alcohol related accidents/casualties. As a rough estimate it is assumed that in accidents in the period 21-03h., alcohol is involved. The number of accidents during these hours in 1997 was 125 (i.e. 29% of the total of 424), and this number must be reduced by 25%, according the supporting target. This means not more than 94 fatal accidents during nighttime hours. It is evident that this '29%' is only a rough estimation, most probably too low. The strategy document itself is stating that "International research demonstrates that alcohol is an important factor in up to 40% of road accidents. It is conservatively estimated that in Ireland alcohol is the primary cause of 25% of all road accidents and 33% of fatal accidents; assessments from some Garda Divisions suggest much higher figures". No seat belt wearing data are available for 1997. There are data for 1991, and these show 51% of the drivers wore one at that time. The reference for the fourth supporting target (number of specific accident reduction measures at national road locations) is the easiest, i.e. zero.

Expectations about the relative contribution to the casualty reduction of the three themes mentioned before, are expressed in the strategy:

- speed 29%;
- seat belt wearing 20%;
- alcohol 23%;
- and others 28%.

In the plan itself, no foundation for these expectations can be found. The implementation of the strategy should result in a reduction of 172 road deaths in 2002. As 'business as usual' would lead to 550 road deaths in 2002, a reduction of 172 would lead to 378 road deaths in 2002. This equals the target reduction of 20% on the number of fatalities of 472 in 1997.

The strategy explores these supporting targets by outlining a large number of areas in which activities could take place in order to achieve the targets set out. These new road safety policies and measures are additional to the road safety measures already being carried out. A distinction is made between measures involving: safer human behaviour, safer vehicles, safer roads. The strategy concludes with a chapter 'Organising and financing road safety'. In this chapter, the five most important actors are mentioned: the Department of the Environment and Local Government, An Garda Síochána, the National Roads Authority, the National Safety Council, and the Medical Bureau of Road Safety. The financial efforts sometimes are very precisely known (e.g. the annual budget of the Medical Bureau of Road Safety) and sometimes the costs are hidden (e.g. in the NRA or police budget).

The strategy report contains (in chapter 2) a short description of the current road safety situation in Ireland (i.e. the situation as it was in 1998). A considerable improvement can be observed (from 628 deaths in 1978 to 472 in 1997), in spite of the fact that traffic has grown. Simultaneously Ireland still has a higher fatality rate than some of our EU partners as is shown in *Table 5*. Furthermore, the report contains a short indication of: who is involved in road accidents, and where and when do they occur?

EU member states	Number of deaths in 2000 (1978 = 100)
Germany	43
Austria	45
Netherlands	47
United Kingdom	50
Belgium	57
Sweden	57
Denmark	59
France	61
Finland	65
Ireland	66
Italy	75
Luxemburg	75
Portugal	75
Spain	83
Greece (1999)	129

Table 5. *Deaths in 2000 (1978 = 100) in all European Union member states.*

The analysis of why there are accidents with casualties leads to the conclusion that "excessive speed and alcohol are the most common contributory factors to road accidents in Ireland". Deaths and injuries are also increased due to a relatively low rate of seat belt wearing.

The High-Level Group on Road Safety was set up in 1990 to promote co-ordination between the different national agencies involved in road safety (see the first Progress Report, 1999). In this group, besides the five already mentioned organisations, the Irish Insurance Federation is also represented. The task of the High-Level Group is, apart from monitoring the implementation of the government strategy, to make recommendations for possible changes. The group is independent and its findings can be made public.

In the second progress report of July 2000, the High-Level Group proposed to extend the three defined major problems (speeding, alcohol use, and seat belt wearing) with one more: vulnerable road users. This addition was not motivated by the argument that the targets would not be achieved with the anticipated measures, but because an international comparison showed the vulnerable road users did badly in Ireland: “relatively high levels of casualties in Ireland among pedestrians, motorcyclists and other vulnerable categories of road users”. It is noticeable here that a quantitative target has not been formulated for this group. The subject is further explained in the third progress report (July 2001) without, however, being explicit about the policy to be followed.

4.2. Progress reports

Since the publication of the strategy document, three progress reports have been made public (in 1999, 2000, and 2001). In the first one of July 1999, the tone is set for all three. The reports are systematic and each deals with three subjects: the progress on primary and supporting targets, progress on implementation of policies and measures and recommendations for the future.

In *Table 6* the results on the primary targets and the supporting targets are summarised. First of all it has been determined that the annual number of road deaths shows a downward trend, whereas the number of serious injuries shows a stronger decrease. If no changes in the methods of collection of road accident statistics have taken place, it can be determined that the target for the severely injured was already achieved by 2000.

	Target for 2002	Realisation 2000
Persons killed	- 20%	- 12.1% ¹⁾
Persons injured	- 20%	- 24.8%
Speeding	from 51% to 40% (on specific roads in 1999) ²⁾	??
Alcohol	- 25% fatal accidents (9pm-3am)	- 16%
Seat belt wearing	85%	55% (in 1999)
Engineering measures	400 locations	268 (end of 2000)
Mortality	less than 116	110

1) From the provisional fatal collision statistics 2002 of the Garda National Traffic Bureau it appears that the number of road deaths in the first eight months of 2002 (267) was approximately equal to the number in the first eight months of 2001 (266).

2) It should be mentioned that the High-Level Group softened the speeding target for 2002, and narrowed it to the category ‘single carriageway national primary routes’. A comparison with the 1991 data makes it conspicuous that the percentage of offenders on all road types increased in 1999.

Table 6. *Targets for 2002 and their realisation in 2000.*

First of all, it is striking that data were not available for all subjects of the supporting targets for the reference year. The target for the number of road deaths has not yet been achieved (411 if the 2001 figure is correct) and since then there has been no further improvement. The target for the number of injured has already been achieved. As far as the supporting targets are concerned, it is striking that progress can not be reported for each year, simply because no data are available. Of neither the original target for exceeding speed limits, nor for wearing seat belts it can be concluded (even by estimation) that the targets have been achieved. As far as drink-driving is concerned, it is observed that the number of fatal accidents between 21-03h. in 1999 and 2000 was slightly more than 100, a decrease of some 16% when compared with 1997. Finally, it is striking that, as far as engineering measures are concerned, there was a steady growth in the number of implemented measures: 400 were announced, and at the end of 2000, 268 measures had been implemented and another 88 had been approved. Here it is expected that the 'promised production' will be achieved in 2002.

4.3. Review of the strategy

If we look at the approach in the strategy document and the progress reports, the following observations and evaluations can be made.

The main line of the approach that has been followed in Ireland is to be regarded as positive; it forms a solid basis for a successful road safety policy. In particular the forming of quantitative targets (as primary targets), the indication of supporting targets, and the monitoring of actual developments are positive steps. From these steps possible new and adapted measures can be derived if considered necessary. This has indeed been the case (new priority for vulnerable road users).

International literature indicates that setting ambitious targets works better than less ambitious ones because 'more and better' policy is formulated. Moreover, it is a well-known fact that action plans generally lead to results which are delayed and less than had been anticipated beforehand. Furthermore, there is a lot to be said for expressing targets in terms of numbers of deaths and injuries, rather than as a ratio between casualties and the amount of traffic. In practically all countries, a ratio-target is not seen as very attractive politically; although a ratio-target is independent of the exposure growth and, therefore, more easily 'predictable'.

In Ireland, 1997 was chosen as the reference year. With hindsight we see that in that year there was a relatively (compared with adjacent years) large number of road deaths. This should make it relatively easy to achieve the targets in 2002. It could be considered making the reference point more solid by choosing the average number over a few years (e.g. of 3 years).

Now the time horizon: in 1998 the Road Safety Strategy was published with 2002 as target year and 1997 as reference year. This means that there were only four years to carry out an effective policy. For some more complicated areas of policy, this is short, too short. This can lead to two reactions:

- a) only 'simple' action plans that can lead to results within a few years are formulated
- b) no investments are made in more radical long-term measures.

Also from a perspective of financing policies and programmes a longer time horizon is more attractive.

I recommend extending the period to, for example, 10 years, with two interim evaluations, and an annual progress report each year.

From the information received, it is not clear to what extent probably not achieving the target for road deaths has led to public reaction in the sense that more government support was demanded. The progress reports were published and that was right. A public discussion about the results of the policy carried out is a desirable feature of working with targets. In Ireland it can be investigated how to strengthen this element of a 'targeted approach'.

The progress report often gives a statement like "12.1% less people died on our roads in 2000 than in 1997". What was actually determined was that $472 - 415 = 57$ less deaths occurred on Irish roads. This is an irrefutable fact if we assume that there has been no change in the registration of road deaths. But the question is how to interpret this sentence? Accidents are spread over time and they should be regarded as realisations of a probability distribution that is known as a Poisson process. If you want to establish whether 415 is significantly less than 472, statistics teaches us that the so-called Z-value is larger than 1.65; in this case $(472-415)/\sqrt{(472+415)} = 1.9$. That means that the difference between both numbers can not be attributed to chance and we can speak of a significant difference. But with smaller differences this might not be the case.

I recommend including simple statistical tests when making policy statements on a possible decrease or increase in casualties.

The question must be asked how it can be explained that the number of injured decreased twice as fast as the number of deaths. This question is relevant because, in general, effective policy leads to the number of deaths decreasing faster than the number of injuries. This can be explained by the fact that effective measures do not only influence the chance of an accident, but often also have an effect on the severity (consider, for example, measures meant to control driving speeds). Consequently, this could be a good reason for not aiming to decrease deaths and injuries by the same percentage. It should be determined if there has been a change in the practice of accident registration in the period under consideration.

The build-up of the targets (a hierarchy of targets) in Ireland is an excellent approach that could also be continued in the future. The existence of a High-Level Group on Road Safety is another excellent way of setting up a tuned and cohesive programme. This means that within a hierarchy as described in *Section 2.3.*, the parties involved have to be committed. Maybe here lies the key to the fact that successes have indeed been achieved during the period of the strategy, but that one cannot talk of a complete success. After commitment one has to 'deliver' and organisations must get the resources needed and know they will be held accountable. If we look at the balance in the programme between the various areas of policy where one could be active, there is a heavy emphasis on influencing behaviour, and within that a heavy emphasis on police surveillance. This

heavy emphasis does not, in reality, seem to have been converted into concrete actions. This will be further dealt with in *Chapter 5*. As Ireland is now in a period in which large sums of money are available for improving the road infrastructure, a heavier emphasis could be laid on that aspect. In the future, more coherent 'packages' could also be considered: i.e. not police surveillance or technical measures, but both. Shifting emphasis in the course of time in order to influence certain traffic behaviour, is also an interesting option. An attempt to put together the most cost-effective package, apart from the political angle, is worthwhile when drawing up the next strategy.

To summarise: the present approach in Ireland is definitely a step in the right direction, and many preconditions have been met to be able to implement a successful policy. In accordance with policy, this could mean that a quantitative target is accompanied by a concrete implementation programme. In this programme it must be clear that targets will be achieved when it is carried out. In the present structure this is not made visible in the official documents. Another conclusion which follows logically is that a commitment must be undertaken by the stakeholders involved to realise the implementation programme, partly based on them delivering a particular element of the strategy themselves. Which target to formulate, which measures to choose, who is responsible for implementation, and which resources are necessary; are, when all is said and done, a political responsibility.

5. Road safety policies and measures

5.1. Introduction

Achieving the target in Ireland leans heavily on what is internationally regarded as the three most unsafe behaviours: speeding, not wearing a seat belt, and drink-driving. This chapter will deal with these subjects in more detail. A rational model as described in *Section 2.3* is assumed. The question here is whether action plans have been set up, whether they contain measurable goals, whether intended action plans have really taken place, whether implementation of these plans have led to changes in the performance indicators (see 2.3), and whether it is, as a result, to be expected the carrying out of these plans has led to a reduction of the number of casualties. It is also interesting to know whether the mechanism 'target setting - monitoring - and, if necessary, adaptation of action plans' has been effective during the last few years.

This chapter will briefly characterise and evaluate the most important parts of the Irish road safety policy. This evaluation uses the perspective just now sketched. Its background is general knowledge of the road safety approach. It can be concluded in general that the rational model has *not* been followed. This means that an evaluation of the policy followed is difficult, if not impossible. Furthermore, it is noticeable that no 'implementation machinery' was available to carry out all measures introduced. This means that, in general, policy had to be developed into action plans at programme level, before implementation could begin. This resulted in (un)expected problems arising during implementation, which at least led to delays. The feeling has risen that, because of this, there has been some mutual friction. The most striking example of this concerns the introduction of IT-systems needed by the police for carrying out the penalty point system. In the progress report of 2001 it can be read that "the improved IT systems necessary for a penalty point system should now be progressed as quickly as possible and should coincide as far as possible with the enactment of the legislation so as to further intensify enforcement in relation to these areas". That there certainly were serious problems can be illustrated by the opening of *The Irish Times* of 27th August 2002. Under the headline "Further delays hit drivers' penalty system" it was reported that the introduction of the penalty point system in Ireland has been delayed by financing problems of the Garda computer system. It was suggested that the system should then be introduced in phases (manually, for some offences).

The various progress reports feature a positive tone. The reports refer to an intensifying of police surveillance. That does not appear to be the case from the police's own efforts - no factual information is available - but an increase in enforcement can be seen from the number of fines. These numbers have indeed increased, and if we assume that there has been no worsening of behaviour, one can conclude that the surveillance did increase. The question can not be answered whether this increased level has influenced behaviour and the number of casualties.

Two other important areas are mentioned in the Strategy document: information campaigns and infrastructural measures. These areas are also discussed in this chapter.

5.2. Speed

The system of speed limits in Ireland has three classes: 30 mph in urban areas, 60 mph on rural roads, and 70 mph on motorways. If we compare these limits with those in the rest of Europe, two matters meet the eye. First of all, Ireland has no separate, lower speed limit for residential areas. In the United Kingdom the possibility of imposing a 20 mph speed limit exists, in metric countries this is 30 km/h. Furthermore it is noticeable that, apart from the speed limit on motorways, there is only the one limit of 60 mph. on rural roads. There are two concepts in speed behaviour: driving faster than the speed limit and driving too fast for the circumstances. Measuring speeds and comparing them with the local limit is the traditional and, practically speaking, the only way to obtain an impression of the speeds driven. Driving too fast for the circumstances is a matter of judgement. Based on my own experience in Irish traffic, I have come to the opinion that on very many roads, especially rural non-motorways, the speed limits are too high, even much too high for the circumstances. Driving at a speed as fast as the limit is often unsafe and even practically impossible. This means that on such roads the speed limit does not offer any support to the driver in choosing a safe speed; it leaves the choice to the driver. From a road safety point of view, this is an undesirable situation.

I recommend a review of the system of speed limits as well as the application of limits to concrete conditions.

Here it can be mentioned that, in the Lansdowne study, the vast majority of the Irish (84%) support the idea of lowering the speed limit on 'narrower roads'. The recommendation to review the system could possibly be included in the next road safety strategy. The government has said that Ireland will convert to the metric system for speed limits.

I suggest to make use of this conversion to the metric system as a unique opportunity for further improving road safety and I recommend to review the speed limit system and also the speeds driven.

As far as the actual driving speeds are concerned, it is quite normal to drive faster than the speed limit in Ireland. This breach of speed limits depends on road type, on the limit applied and also on the vehicle type (NRA, 2000). An illustration can be found in *Table 7*, where key-data are presented on speed measurements in two years, 1991 and 1999.

	1991	1999
Cars		
Percentage in excess of 60 mph limit	36	51
Percentage in excess of 70 mph limit	8	13
Rigid vehicles		
Percentage in excess of 50 mph limit	40	66
Percentage in excess of 60 mph limit	5	5
Articulated vehicles		
Percentage in excess of 50 mph limit	40	75

Table 7. *Speed exceeding by vehicle type in 1991 and 1999.*

The results of both years show that there is an increase in offenders. Based on:

- a) the results of the NRA data
- b) the consideration that more than 40% of the accidents occur on single carriageway/two-lane national roads
- c) the consideration that on these roads there is a 50% greater accident chance than on two-lane roads

it has been decided to review the target for driving speeds. This target is now to reduce the number of vehicles exceeding the 60 mph limit on single carriageway national primary routes, from 51% to 40% by 2002 (Second progress report 2000). There are no data about this altered target yet. Neither is it known whether the police have now focussed on 'national primary routes' only; which would be logical, having regard to the target. It could, however, lead to an increase in driving speeds on roads where there is no (more) control.

The Irish themselves consider the reduction of speeding as one of the two most important factors for increasing road safety. Together with the Greeks, they score highest in the EU on this point. The SARTRE II data show that drivers rarely admit to driving faster than the limit. Either the Irish do not know the limit, or they do not dare to confirm their actual behaviour in an interview! Ireland scores favourably on the point of reported behaviour, when compared with the rest of the EU. Is this a reason to be satisfied? As already indicated, it strikes me that in Ireland there is not only a speeding problem, but the level of the speed limits themselves is a problem: existing limits can only be exceeded with difficulty. This means that the police control is also a problem. Perhaps an explanation can be found here for the relatively low level of surveillance. The Irish themselves report that the chance of being caught is negligible (3%) and the number of fines likewise (5%). Here Ireland has one of the lowest scores in the EU. And if we look at the number of fines issued in practice (c. 350,000 annually), then the chance per journey of being caught is 1:1400. Namely: 30 billion kilometres a year make 1 billion journeys a year with an average distance of 30 km. When, of those, 50% exceed the limit, that is 500 million journeys. If 350,000 fines are issued, the chance of a fine is 1:1400 per journey. In the Netherlands this chance is 5 times greater!

What levels of enforcement must be achieved in order to influence speed behaviour? This is a core question and one that is difficult to answer. In the draft report by the Monash team, estimates have been made (Smith et al.,

2002). The philosophy behind this approach has been proved to work in Victoria, Australia (see *Figure 4*). As a concept it is worthy of support. It is not possible to determine in advance the necessary level of surveillance in Ireland to keep drivers within the existing limits. This problem was solved in Victoria by raising the number of enforcement hours until a clear decrease in offences was found. This is to be recommended for Ireland as well.

I recommend setting up a 'targeted speed surveillance programme'.

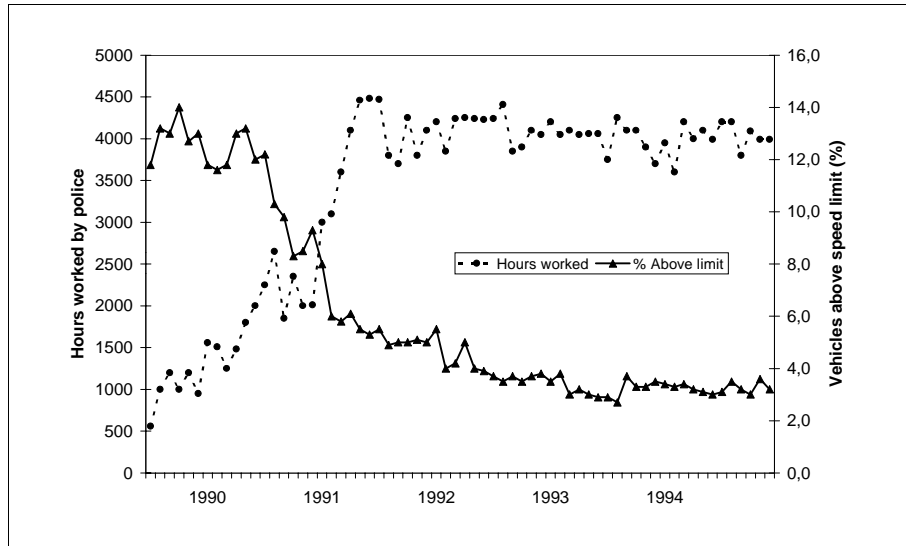


Figure 4. *Police efforts in speed enforcement versus the percentage of speed offences in Victoria (Cameron et al., 1995).*

This should be part of a 'chain approach' (this is further dealt with in *Section 5.6*). In Ireland, it would probably be impossible in practice to considerably increase the chance of being caught if use is not made of modern technology (speed cameras, segment control, etc.). The correctness of this statement could be examined further.

I recommend the step-by-step approach to increased surveillance.

What I mean is:

- a) to achieve a surveillance level,
 - b) to evaluate the behavioural changes which result from the surveillance,
 - c) then to decide whether the surveillance intensity needs to be changed.
- To achieve a considerably higher level of surveillance, communication (to road users) in the mass media is necessary to get the population's support. Such an approach must be explained: the Irish must see the present driving speed behaviour as their own problem, and they must accept that surveillance is being intensified. After this, information about the surveillance should be given.

In summary: the speed limits in Ireland are relatively high, there is too little variety in the limits, driving (when the circumstances are taken into account) is relatively fast, and the present level of surveillance is low. This means that speed management can make a considerable contribution to increasing road safety. According to surveys, the Irish are quite positive about such an approach. Surveillance placed in the police - law court chain must be supported by public information. Modern technology can be helpful. Of course it is essential that the police, law courts, and information bodies are given the possibility to make a success of this approach. This means that they must be given the necessary resources. Where the additional resources should come from is obvious for a majority of the Irish population: according to them, an 'increase of on-the-spot-fines for driving offences' is an effective measure. Why not use the combination of higher fines with the larger number of these fines to finance the extra efforts of the police, law courts, and public information bodies? A political and social debate about this subject is needed in which, of course, it should be made crystal clear that this is not a disguised tax increase. After all, it is a measure to increase road safety! Even more important is political support for such an approach.

5.3. Alcohol and drugs

It is an undeniable fact that driving while intoxicated by alcohol (drink-driving) impairs the ability to drive, and therefore increases the risk of an accident. Driving under influence is a (very) important, if not the most important, road safety problem in many countries. Efforts to reduce this problem therefore play a central role in very many countries.

The estimate in Ireland is that about one-third of all fatal accidents is alcohol-related, 40% is also quoted. There is no official registration of their number (and thus their share). The strategy document uses the number of casualties during night-time hours as an estimate, based on the assumption that many of these accidents are alcohol-related. This is, of course, nothing more than a surrogate.

The problem of drink-driving must be seen against the background of the attitude a society adopts towards alcohol, and what the population's habits are. In the interim report of the Strategic Task Force on Alcohol (Department of Health and Children, 2002), some data about alcohol consumption in Ireland have been included. These data show that during the period 1989-1998, the consumption per head increased by 41%; which gives Ireland the highest increase of the EU. This increase means that, after Luxembourg, in 2000 Ireland had the highest alcohol consumption of all EU Member States. The observed increase is seen in relation to the economic growth during the same period, and to the drinking culture (Department of Health and Children, 2002).

Although this, in itself, does not have to have any effects on drink-driving, the SARTRE project throws some other light on this (SARTRE, 1998). Based on the results of the survey, the conclusion on Ireland is: "Drivers from Ireland hardly drink daily but they drink many units and drive after drinking big amounts. Irish drivers want the limit to be raised (again - has been lowered recently) and think driving after several units of alcohol should be permitted. They are not afraid of breathalysing and support alcohol meters in cars". What does this teach us? A picture can be derived from this of a part of the Irish population that claims hardly or never to

drink, a part that does drink and when it does, it drinks quite a lot (also referred to as the Nordic drinking culture), and, moreover, it is not unusual to drive afterwards. There is no fear of getting caught; in which they are quite right, as will appear. It is also of importance to break down the problem: problem drinkers, habitual drinkers, and incidental drinkers. The young are a separate category.

In 1994, Ireland introduced a drink-driving law: a maximum BAC of 0.08% instead of 0.1%. Perhaps significant is the fact that Ireland has introduced laws much later than countries such as Sweden (1951, 0.05% and in 1990 reduced to 0.02%), the United Kingdom (1967, 0.08%), and the Netherlands (1974, 0.05%). Ireland is one of the few EU countries with a relatively high limit; Irish policy has made it known that it rather spends time on enforcing the present limits than sharpening them. Although Ireland has a BAC of 0.08%, Ireland has a strict disqualification policy in relation to drink-driving offences.

The Medical Bureau of Road Safety was established under the Road Traffic Act 1968. The Bureau's tasks include carrying out analyses of blood, urine, and breath specimens to determine the alcohol or drugs contents. Its annual report (Medical Bureau of Road Safety, 2001) shows that the number of analyses has increased during the last few years (by about 50% since 1997). This indicates an increased police activity. The introduction of the Evidential Breath Testing programme has, anyway, led to a decrease in the number of blood and urine analyses. Seen in an international perspective, it is very noticeable that the analysed BACs are (very) high. First of all, nearly all the specimens offered to the bureau were above the legal limit, and often very much so (about 60% were twice the legal limit). This indicates that the police only intervene where there is overwhelming evidence of drink-driving (under the current legislation, the police can only intervene where they have formed the opinion that an intoxicant has been consumed).

Ireland has no registration of the number of casualties of alcohol-related accidents. But if we use the Irish approach as a starting point, and we compare Ireland with a few other countries, it must be concluded that Ireland has a serious drink-driving problem. Let us compare Ireland with the three SUNflower countries. It is estimated in these countries that drink-driving is involved in between 10 and 15% of all fatal accidents. In Ireland this is a factor 2 to 3 higher. It is striking that in the three countries mentioned, the size of the problem has been halved in 20 years (there are no Irish data for this period). Furthermore, it is noticeable that the three countries did not achieve their 50% reduction in the same way. There are large differences that seem to reflect the way a society copes (and wants to cope) with drink-driving. Different possibilities are imaginable: influencing the social acceptance of drink-driving, introducing laws, organising police surveillance, and punishing offenders. Although there are large differences between the three countries, several common conclusions can be drawn.

First of all the laws: establishing a legal limit and organising an adequate level of enforcement are essential. The level of the legal limit seems to be a reflection of how a society regards the problem: Sweden has a relatively low limit (0.02%) that is enforced very rigorously, which appears from the large number of tests per inhabitant (1 in 9). The Netherlands has a 0.05% limit with a 1:20 chance of being caught, and the UK has a 0.08% limit and a

1:65 chance of being caught. In spite of this, the level of drink-driving in the UK is as high as it is in the Netherlands. The researchers in the SUNflower study suggest that there is perhaps a relation with the possible penalties in the two countries (higher in the UK than in the Netherlands). International research, however, does not confirm this. Apart from this, in the three countries the penalties vary depending on the BAC and the recidivism (in the UK the definition of a high risk offender is even used). In order to simplify the police task and make their appearance more efficient, all three countries have the possibility of evidential breath testing. In Ireland, this is being introduced step-by-step, in which the Medical Bureau of Road Safety plays an important part. It can lead to increasing the chance of being caught because less police-time is needed per 'suspect'.

I recommend to continue along this line vigorously and rapidly.

The possibility of Random Breath Testing does not exist in Ireland as it does in the UK; a policeman must suspect someone of drink-driving. Analysis results indicate that the policemen 'play safe' as far as this is concerned.

The general deterrence of drink-driving with Random Breath Testing is a proven fact and it is recommended to discuss this as a potential road safety measure in Ireland.

A second aspect is the chance of getting caught. In Ireland, this chance is very low: 12,000 detections a year with a population of 3.7 million means 1:300, in which practically all suspects were above the legal limit, even considerably above. This means that the police strategy appears to be more of a case of removing 'the very drunk' from traffic. In those cases the judges do impose heavy penalties. The SUNflower countries are attempting, via a high level of surveillance, to have a deterrent effect on drink-driving. If Ireland was to consider something similar, it is crucial to realise that the chance of being caught must increase by a factor of 5 (UK) to 40 (Sweden). This means a drastically different approach must be taken by the Garda and the Courts.

Another aspect is the burden on the courts. Measures aimed at unburdening police and law courts appear to be very welcome. That there is a serious problem in law courts is apparent from a statement by Prof. Cusack, Director of the Medical Bureau: "Drivers' attitudes are against drink-driving. Their behaviour is not. Prosecutions for drink-driving make a substantial proportion of District Court cases. They are the most hotly contested proceedings by defendants in the Irish criminal legal system. The presumption of innocence is quite properly paramount in Irish jurisprudence. Yet there is a perception that lawyers frustrate the saving of lives by road safety legislation through legal technicalities and manoeuvres within a flexible court system. Fairness must be applied to both parties to the proceedings: the People and the Defendant. Drink-driving is a personal choice and the driver's responsibility" (Cusack, 2001). This problem is possibly temporary (sufficient jurisprudence will increase the police/courts quality) and suspects and their lawyers will possibly have less reason to take a case to court in the future.

A fourth aspect in Ireland could be to attempt to influence the social acceptance of drink-driving. An evaluation of the anti drink-driving campaign SHAME shows that its acceptance has been halved (from 70% to 35%); this is an encouraging first result. Drinking alcohol is part of the Irish culture, and the young also want to become part of it. It will be a challenge to Irish society to reduce drink-driving.

As far as the issue of drugs in traffic is concerned, there are practically no data. But this subject is certainly one to be kept in mind and monitored. In the first instance there is a new category of drug users that are also road users. Moreover, there are strong indications that drugs used in combination with alcohol lead to extremely high risks.

In summary: drink-driving is a very important road safety problem in Ireland; that much is obvious from estimates.

Improvement can be achieved along three lines:

- a) further reducing the social acceptance of drink-driving,***
- b) considerably increasing the chance of being caught, and***
- c) making police/law courts more efficient so that the increased chance of being caught and the greater number of those being caught does not lead to a blocking up of the legal system.***

5.4. Seat belt wearing

Wearing a seat belt is a simple and very effective road safety measure: the effectiveness is estimated at c.40%, i.e. that motorists have a 40% smaller chance of being killed in a road accident. There are also higher estimates of their effectiveness (50-60%). EU legislation obligates the presence of seat belts in cars and stipulates that seat belts have to be worn properly, not only by the driver and front passengers, but also by rear passengers. Child seats/restrain systems are very important as well. Their effectiveness is said to be more than 90% (rear-facing) and 60% (front-facing).

The SARTRE II-study of 1996/97 showed that in two-thirds of Irish cars, seat belts had been fitted on all seats. The 'reported' wearing rates in Ireland were 62% in urban areas, 76% in rural areas, and 85% on motorways. Thus, Ireland is about average for the EU. Actual measurements in Ireland show that only 55% of drivers had their seat belt on. Wearing rates of other car occupants were most probably lower. If we assume this last percentage to be correct, Ireland scores relatively low in the EU. In the SUNflower countries, for example, the measured rates are between 80% and 90%. These percentages simultaneously illustrate that the target for Ireland in 2002 (85%) can certainly not be regarded as unreachable. The Irish, in the SARTRE survey, said that in the mid 1990s the chance of getting caught not wearing a seat belt was practically zero; then the lowest in the EU. It is interesting to learn how the Irish now experience that the police also enforce seat belt use and can issue on-the-spot fines for not wearing one. But there is a footnote: if we assume that 1 billion journeys are made in Ireland every year, and we assume that in 50% of these journeys no seat belt is worn, then the number of fines (less than

100,000 a year) for 500 million journeys without a seat belt is very modest indeed.

In 1999, there were 236 deaths in cars, with a 55% wearing rate. If nobody had worn a seat belt there would have been 302 deaths. If Y is the number of deaths when nobody wore a seat belt, and the seat belt effectiveness is 40%, Y can be calculated as: $0.55Y \times 0.6 + 0.45Y \times 1 = 236$, and $Y = 302$. If the wearing rate increases to 85%, the number of deaths is: $(0.85 \times 0.6 + 0.15 \times 1) \times 302 = 198$. Another 38 lives would then have been saved. This is in agreement with information from the Strategy document from 1998: 0.2×172 saved lives = 35 saved (see *Section 4.1.*).

There is a relatively small number of ways imaginable to increase seat belt wearing (apart from self-enforcing belts). First of all, the introduction of a law, and with it the necessary publicity, can increase seat belt wearing by tens of percentages from one year to the next. Examples of this can be found in Sweden and the UK. Next, one can try using information and enforcement to prevent driving without a seat belt. It appears that a long-lasting effort is needed for an increase of 20-30%; in Canada there are interesting examples (the NORP programme). Given that there is already a law in Ireland, an adequate enforcement level accompanied by good public information, can lead to the required goal. But there must be an all-out effort.

In summary:

I recommend:

- ***more intensive enforcement (no more contact between a driver and a policeman without explicit attention to seat belt wearing);***
- ***a combination of enforcement & public information;***
- ***an annual seat belt wearing measurement (three road types, front and rear occupants distinguished, and separate attention for child seats/ restraint systems, which ultimately feeds back to an action plan.***

5.5. Legislation and enforcement

Road safety measures specifically aimed at changes in behaviour need a legal basis. Such laws also form the basis of police surveillance. The law regulates the legal alcohol limit (in 1994 lowered from 0.1% to 0.8%) and speed limits. At the same time it sets out the penalties which exist for certain offences. In the Strategy Document, a proposal to introduce a new Road Traffic Act was announced along with four other key measures: the extension of the use of automatic speed detection equipment (cameras), extension of evidential breath testing, the extension of 'on the spot' fines for not wearing seat belts and other offences, and, finally, the introduction of a penalty points system. The new Road Traffic Act provides primarily for the introduction of a penalty points system.

Proper police surveillance leads to improvements in behaviour and in the international literature, the principles of effective traffic enforcement are well known (ETSC, 1999). This does not involve the detection and punishment of offenders in the first instance; this deterrence is sometimes

referred to as specific. However, more important is the general deterrence. This involves an approach in which no offences are committed because there is a fear among road users that offences will be detected and punished. This is not only a matter of personally experiencing enforcement (estimating the objective chance of getting caught), but also the subjective chance. The overall preventive effects of police surveillance are generally greater if the subjective risk of the offender being caught is higher, if the penalty is more severe, if the certainty of punishment is increased, and if the penalty is imposed more rapidly (see for example Wegman & Goldenbeld, 1996). Each of these elements constitutes a link in the enforcement chain. The most important link is the subjective likelihood of the offender being caught, in other words, the personal perception on the part of the road user of his or her chances of being caught while infringing a traffic regulation. The level of punishment, the certainty of being punished and the speed with which the punishment is meted out will do little to prevent traffic infringements if the perceived risk of being caught remains very small.

The key principle underlying effective police surveillance is to increase the perceived risk of detection, no matter what type of road behaviour is being targeted. This can be achieved in several ways:

- combination of police surveillance and adequate publicity;
- utilising highly visible police surveillance;
- imposing unpredictable pattern of random controls;
- using selective controls at times and in locations where there is a good chance of catching offenders and where traffic offences are known to be a causal factor in accidents;
- selecting controls which are difficult to avoid;
- ensuring continued surveillance.

It is important to obtain an effective mix of these strategies. If publicity is not followed up quickly with police surveillance in practice, the effect will be counterproductive.

The conclusion can, therefore, be that the general principles are known and that the possibilities for actual application depend on the local circumstances. For example, the legal possibilities of randomly stopping people along the road, or only doing so if there is a suspicion. The evaluation of the Operation Lifesaver, commissioned by the NRA and carried out by Trinity College Dublin (Fuller & Farrell, 2001; see the NRA website), is in line with the general philosophy described here. In Louth-Meath, the police controlled more intensively (a 7% increase in the number of hours that the police spent on surveillance) and that led to an 18% reduction in the number of severely injured in comparison with an area (Carlow-Kildare) where no extra surveillance had taken place. This means that a small increase in invested time, apart from the media campaign carried out by the NSC, led to a considerable decrease in casualties. Also interesting are the researchers' general conclusions:

"The report concedes that the aim of 'Operation Lifesaver' is not so much to catch and punish offenders, although it accepts this process is necessary to change behaviour of some drivers, but to deter unsafe behaviour, by motivating road users to avoid new and punishing consequences, which include severe penalties. A higher level of enforcement can change driver behaviour according to the report, but it emphasises that from a road safety perspective, the measure of success of an enforcement strategy is not the number of offenders apprehended, but rather the level of compliance with the enforced rule or regulation - in this case safer driving." (Fuller & Farrell, 2001).

From this it can be derived that this recommendation is completely in line with the general findings in the international literature. This applies just as much to the approach used by the team from Monash (Smith et al., 2002).

The situation in Ireland leads to the following recommendations. First of all it is striking that the chance of getting caught in Ireland is so low. It has increased during the last few years and, simultaneously, penalties have increased. The first question is how much the chance must increase to be effective in changing behaviour. This question can not be answered from foreign research. Ireland will have to make a study of the level desired itself.

We can first of all establish that in the *Policing Plan 2002* (An Garda Síochána, 2001) “contributing to improving road safety and the reduction of casualties” is presented as one of the priorities. This goal is translated in four performance indicators. But they are not concrete enough to fit in with the concept as described in 2.3. It does not make clear what the police accomplishments will be and what behavioural changes could arise from that. If the *Policing Plan 2002* contains the words: “An Garda Síochána has doubled drunken driving enforcement, trebled speeding enforcement and increased seat belt enforcement by six times”, this does not in itself give insight in how this is related to the behavioural changes which are targeted in the Irish strategy. Using estimations on cost-benefits a set-up could be made of how much extra enforcement is desirable from a societal point of view. But if we compare the chances of getting caught that now exist in Ireland with those of the SUNflower countries (or Australia or New Zealand), then we should be thinking in terms of 50 times more rather than a doubling or trebling.

I recommend to explore the consequences of a much higher level of police enforcement for Ireland and to pay massive attention to gain public acceptance of higher levels of police enforcement.

Apart from this, as already stated, besides police activities information of the public is an essential part of this type of influencing traffic behaviour.

Next, of course, the question is posed how to achieve a considerably greater effort for enforcement. The answer to this lies in a combination of extra (financial) resources, greater efficiency, more application of technology and computerisation, good police management, and good training programmes. Quality and quantity. Taking this into consideration, it is interesting to look for possibilities for a dedicated traffic police force and ring fenced budgets.

In this framework, it is of course also worth looking at the possibility of ‘hypothecation’: in the Netherlands a start has been made with using part of the ‘income’ from fines to finance the costs of extra surveillance. However, this discussion goes beyond the scope of this report. The population will, of course, be regularly informed that this is not meant as a tax increase, but aimed at increasing road safety. This is done best by sound (and therefore independent) research.

Finally the penalty points system. The introduction of this system can be regarded as one of the central parts of the present Government Strategy. The basic assumption here is that road user behaviour is improved, not only by establishing a traffic offence and punishing the offender, but by severely punishing several offences by the same offender. This is an often heard argument in which recidivism is judged severely. As is the case in traffic surveillance in general, it is not only the 'problem drivers' one is concerned with, but with the general deterring effects of the penalty point system. This has partly to do with the many different ways of introducing such systems (point addition and point reduction, punishment severity, etc.). The chance of being caught offending seems to be crucial. Also of importance is the chance of a disqualified driver being caught driving without a licence. When the full penalty point system is introduced in Ireland:

I recommend conducting an accurate monitoring and evaluation of the penalty point system in order to determine the starting position for possible improvements.

5.6. Education and information

The improvement of road safety can only take place if the road users, the government, the interest groups, and (last but not least) the responsible politicians regard road safety as a problem. The media play a crucial role in influencing the realisation of the problem. Education and information can concentrate on specific behaviour components and on road safety measures. Here, the expression 'Marketing of road safety' is used (OECD, 2002).

First of all, road safety has to 'compete' with other social problems in attracting attention from the public and media. Although one has to realise that the public's attention may vary in the course of time, the recent study in Ireland (Lansdowne Market Research, 2002) indicated that 90% of the Irish (18+) consider road safety a very important social problem; as important as problems in the fields of health, crime, education, drugs, the environment, and unemployment. This seems to mean that paying extra attention to increase consciousness of the problem does not have any urgency. Apart from this it is often effective to deal with problems of road safety in the direct environment of the citizen. This is a task for the local authorities whose efforts should be facilitated (e.g. by appointing a Road Safety Officer). Local governments can be influenced by citizens' initiatives; it is then worthwhile to help them succeed by my means of organisation, finance, or expertise. The National Safety Council supports this idea, and in many countries this is already an effective approach. "It is vital that road safety is perceived and owned as a local issue. In this regard the role of the Road Safety Officer is crucial" is a quote of Eddie Shaw of the NSC. However, we are talking here of a vulnerable organisation because it appears to be so dependant on a small number of people. Moreover, volunteers often do this work during a limited period of time, and sometimes their expertise leaves a lot to be desired.

I recommend to explore citizen's initiatives as an opportunity to improve road safety in more detail.

As far as this point is concerned, the NSC encourages Local Authority Road Safety Together Working Groups. The information available does not show to what extent these initiatives have started, how effective they are, and what the factors are for success or failure. Anyway, the high level of general consciousness is no guarantee for 'safe behaviour'; this is clear, for example, in the case of fast and inappropriate speeds and the level of drink-driving. But without a certain level of consciousness it transpires to be even more problematic.

As far as road safety education is concerned, various activities have taken place in the recent past, such as the programme BE SAFE. Of course it is not possible to determine whether this type of activity has led to less casualties. It would, however, be interesting to learn what the targets were and whether - compared with the targets - BE SAFE can be called a success. In the Third Progress Report it is stated that 33,000 copies of the training material were circulated, but it isn't known if they are being used or tested to see if attitudes, knowledge, or childrens' skills have changed. Similar questions can be asked about the STAYING ALIVE programme. Were educational aims formulated beforehand and have they been realised? These questions do not change my opinion that it is good to carry out such programmes.

Four mass media campaigns have been carried out the last couple of years: CRUSH (vulnerable road users), DAMAGE (seat belt wearing), THUMP (young, male drivers and speed), SHAME (drinking and driving). These are regarded as 'hard-hitting television commercials'. Of course it isn't possible to express the effect of such campaigns in terms of casualty reduction, but they can have a particular effect in combination with police enforcement. The timing of the campaigns should coincide with intensified enforcement. If this did happen (there are no documents available) then this is extremely positive. It is of course possible to measure whether the campaigns have reached the population, and whether attitudes have been changed by them. These evaluations are taking place. In addition to television, the radio (and especially local radio) regularly pays attention to road safety matters.

5.7. Safer roads

As stated in *Section 4.1.*, infrastructural measures to make roads safer are one of the components of the existing safety strategy. First of all, it is important to mention that there is no clear picture of the problem of non-national roads and that the picture presented here concentrates on the national roads. In its own programme, the National Roads Authority NRA makes a distinction between two ways of improving road safety. First of all new roads are constructed according to 'best practice standards'. NRA estimates that if 900 km motorway/dual carriageways are constructed (as is intended in the *National Development Plan 2000-2006*) about 50 lives will be saved each year. The second way to improve road safety concerns the safety of existing roads.

	Road length	Fatalities (2001)
National roads	5,429	177
Non-national rural roads	89,345	152
Urban roads and streets		82
Total	94,774	411

Table 8. *Road lengths and fatalities by road type.*

Three large programmes can be distinguished. First of all the NRA programme in the *National Development Plan 2000-2006*. Apart from targets in the field of stimulating economic development by a better accessibility (shorter travelling times) and the environment (sustainable transport), a safety goal has been formulated “help to achieve the government’s Road to Safety strategy”. This concerns investments in the major inter-urban routes and national secondary routes. Chairman Malone of the NRA speaks of ‘the most ambitious national roads programme in the country’s history’. Driving through Ireland it can be agreed that there are construction activities of the infrastructure going on everywhere. This has partly been made possible by EU-funds, which is visible on the many billboards along the road. In the *Review 2001 and Programme for 2002* (NRA, 2002) the expectation is expressed that the *National Development Plan 2000-2006* will lead to a reduction in the annual number of road deaths by 50. The expectations are indeed justified that the large investments must lead to saving a substantial number of casualties. However, there are a number of footnotes. First of all, the road design must always be of high quality (design consistency as a leading principle). This is particularly important because Ireland has not chosen to design all major inter-urban routes as motorways and this must not lead to misunderstandings among road users about the road type there are driving on. They must be able to make the transition from one type of road to the other safely and at a relatively high speed. A second point of attention is the driving speed on motorways in relation to the speed limit of 70 mph. The large percentage of offenders (see *Section 5.1.*) demands attention from the road authority and the police. Finally: if urban through-roads are replaced by a by-pass, the existing route must be ‘downgraded’ to prevent the lower intensities on existing road profiles leading to faster driving speeds and, therefore, more accidents.

A second programme is the *Black spot programme with low-cost remedial measures*. This programme, led by the NRA, has been running since 1994 and is also an important part of the safety strategy. The ambition is to treat 400 high-accident locations. At the end of 2001, 342 had been completed, and 58 plans had been approved for 2002. The evaluation (Crowley & Vigers, 2001) shows that during the period 1994/95, the programme was very successful: a reduction in the number of road deaths of more than 63%, and severely injured, of 32%. It was striking that the number of slightly injured did not change. Elvik has studied evaluation reports of the effects of intervention on black spots (Elvik, 1997). He reaches the conclusion that two ‘confounding factors’ should be used for this type of study: ‘regression-to-the-mean’ and moving ‘unsafety’ to other locations. The NRA calculations do not take into account the possible ‘regression-to-the-mean’, a well-known term which, in this type of study, is the result of the selection

of those locations regarded as unsafe. This regression-to-the-mean effect means that the percentages mentioned (63% and 32%) are the highest imaginable. To get a good impression of the real effects, the regression-to-the-mean effect should be taken into consideration before coming to any far-reaching conclusions about this study and the potential effectiveness of this type of measure in the future.

It should be noted that the success of a black spot programme is that it makes itself redundant: there will be no black spots anymore. But this also means the efficiency of such a programme, if carried out properly, has to decrease in the future. Furthermore, success means that always other, more expensive measures must be taken. In the meantime a low-cost safety improvement programme has started on non-national roads. No data on its safety effects are available yet.

The third main programme in road safety engineering is the *Traffic calming programme*. This five-year plan is being carried out in parallel with the Road Safety Strategy. Traffic calming concerns national roads that pass through villages and towns. Here, a simple traffic engineering measure is used to lower driving speeds by (20%), and consequently reduce the number of accidents. At the end of 2001 traffic calming schemes had been carried out in 80 villages and towns.

An evaluation study has been carried out on the 21 traffic calming schemes constructed in the period 1993 to 1996 (Crowley & MacDermott, 2002). The statistics indicate that, for locations with traffic calming on both approaches, there has been an annual average accident reduction of 1.5 fatal accidents, 1.3 serious injury accidents and 2.8 minor injury accidents. A statistical test shows that these reductions are statistically significant. The AARR (Average Annual Rate of Return) is 293%.

Proper attention for this problem of through-traffic in villages and towns is very much justified: through-traffic should be kept out of villages and towns, and if it can't, driving speeds must be lowered. The first results are impressive if we assume no 'novelty-effect'. The design philosophy behind traffic calming is good. The level of the measures seems to be very modest, and this leads to lower safety effects than could be achieved if more stringent measures are taken. In the Netherlands, for example, speed reductions - also on traffic arteries - are tackled more substantially and it is virtually impossible to exceed the limit.

It is important to refer to the Road Safety Audit which is a relatively new concept and seems very promising. This appears to be the case from the international literature. However, it is extremely difficult to determine its effectiveness in terms of a casualty reduction. Safety audits are not only an instrument to improve road design, but they simultaneously are an excellent way of improving the quality of designers.

NRA's work on road safety research is discussed in *Section 6.2*.

In summary: if we look at this overview of activities, the conclusion is that road safety forms a large part of the NRA policy, and that it simultaneously delivers a substantial contribution to achieving road safety targets. Now that the road building programme is so large, there is every reason to allow road

safety improvements to weigh heavily. The available material does not make it possible to determine the extent to which this takes place. A second remark concerns the character of the measures: the last couple of years, hundreds of locations have been treated as a result of the idea that it is better to take 'low-cost remedial measures' at many locations than take expensive ones at a few locations. The assumption apparently is that low-cost measures are less effective but possibly more efficient.

I recommend to examine how to choose this balance and be prepared to accept more costly interventions in the future (with a good rate of return, of course).

There is every reason, seeing their efficiency, effectiveness, and modest budget required; to invest more in these safety programmes (NRA: expenditure on road investments €1 billion; road safety investments less than €10 million, i.e. less than 1%).

5.8. Safer vehicles

In the estimates of the Irish strategy plan there are no estimates of the effects of vehicles being safer. If there are any effects, then they have been brought about mainly as a result of EU regulations that contribute to ever more (collision) safer vehicles coming onto the market (e.g. via EuroNCAP). This observation, combined with the conclusion that vehicles are the 'primary contributory factor' in only 1% of all accidents, must lead to the conclusion that, according to the Irish strategy, this is not an interesting policy area from a road safety perspective. This conclusion is both true and not true. One can argue the 1% as in the international literature higher percentages are mentioned: vehicles are (partly) the cause in 8-12% of all accidents (Rumar, 1985). English research shows that better vehicles reduce the annual number of casualties by 1% (Broughton et al., 2000). If this also applies to Ireland, it would mean a 4% reduction during the period of the strategical plan (and is, therefore, almost as important as the other 'important' policy measures). It is however not possible for Ireland to achieve much on its own in this area as it is a matter for the EU.

Another measure is Daytime Running Lights (DRL). Within the EU, there have now been years of discussion, and this has been introduced on a pilot basis in the Dublin area. In an EU study (Koornstra et al., 1997) a meta-analysis of DRL effects was carried out of all the studies made up to then. This led to the conclusion that the introduction of DRL could result in considerable casualty reductions. The effects of DRL are dependant on the latitude; the further from the equator the greater the effect. If we assume that whole Ireland lies at 53°, that during the daytime no lights are used, and that this would increase to 100%, about 30% of the casualties of multiple daytime accidents would be saved. If we then assume that the application of DRL concerns 50% of all road deaths, then $0.5 \times 0.3 \times 400 = 60$ deaths would be saved. If it is decided to only make DRL obligatory on rural roads, about 45 deaths would be saved. DRL is obligatory in a number of countries (all Scandinavian countries and Denmark), and within the EU as well as some member countries there is an ongoing debate regarding this subject. The discussions have already clearly shown that there are also opponents of DRL. These are a) representatives of motorcyclist, cyclists, and pedestrians who are of the opinion that better car visibility is

detrimental to their visibility; thus leading to more casualties among themselves, and b) representatives of environmental organisations who claim that the extra use of energy will be a greater environmental burden. Nevertheless, it is an interesting subject for Ireland to discuss further.

6. Other matters

6.1. Organisation and finance

The publication of a National Strategy and the founding of a High-Level Group were two very important steps to improve road safety. The important pre-conditions for success were also created, viz. the monitoring of policy followed via progress reports and the publication of these reports. Are there any more bottlenecks to be solved? This has not been studied exhaustively in this report, but I have gained an impression; that is why a number of my following suggestions are partly in the form of questions.

First of all, political commitment is essential to ensure that road safety gets, and keeps, a high priority. Are there any road safety champions in Ireland? If there aren't any, can they be found? The Taoiseach, the co-ordinating Minister for Road Safety, a famous Irishman (or woman) who became a road accident casualty, a top journalist, etc.? Members of Parliament could also profile themselves as a road safety champion! Political commitment is not naturally present and needs to be confirmed regularly. If political commitment is expressed today, there is no guarantee for tomorrow.

The co-ordination and exchange of knowledge, which has in the meantime been developed within the High-Level Group, should be extended and deepened to organisations that commit themselves to plans to be carried out. This is an open door and simultaneously one of the most complicated matters there is, because organisations have their own decision-making procedures and ways. Nevertheless, it seems to be a key matter for Ireland. The co-ordination of knowledge concerns the central government in the first place, but not exclusively. If the contents of the coming strategy also puts a heavier burden on the activities of local government, then their plans will have to be included. As far as financing is concerned, the implementation of the programme in cost-benefit terms could define the investment level for the Irish programme. Whatever the contents of that programme will be, the expectation is justified that larger budgets could be spent in a socially profitable way.

6.2. Research

Important questions for Ireland are how to obtain the necessary knowledge for the policy preparation, and how to monitor and evaluate the implemented policy. Furthermore, it is of great importance that the up-to-date knowledge is made available for the actual implementation in action plans. As far as knowledge development and research are concerned, the National Road Authority traditionally plays an important role, because it is here that the tasks have been placed that used to be carried out by An Foras Forbartha in the past. This means that the NRA carries out its own research, or commissions it to others. For many years now, Ireland has published an annual review on road traffic accidents; during the last few years this has been done by the NRA entitled *Road accident facts* (NRA, 2000; 2001a). Besides this, monitoring studies of speeds and seat belt wearing can be mentioned. But also, for example, a study called *Young*

driver accidents 2000 (NRA, 2001b). Finally, the NRA conducts evaluation studies of its own investments and attempts to determine their effectiveness and efficiency. Apart from the NRA there are others who carry out research. The National Safety Council study led to, for example, the Bacon report about road safety costs and cost-benefit. Finally, the Medical Bureau of Road Safety regularly carries out research.

If we look at the situation in Ireland, what is striking is that no real policy has been formulated for building up knowledge, knowledge dissemination, and research, so no guarantee exists that the necessary knowledge is secured. Central in strengthening the knowledge infrastructure could be the concept of enriching the existing accident database with knowledge, thereby creating a 'knowledge base'. This knowledge base can be useful for the decision-making at the national, regional, and local government levels, as well as for policy implementation. The security should be built in that the data be acquired which are necessary for the progress of policy implementation, and for its effects on road safety. An example of such a system is the SWOV Road Safety Information System. Such a knowledge base could be arranged centrally and then be managed by one organisation. This could also, for example, be the secretariat of the High-Level Group, so that linking with the knowledge at the organisations involved could be part of the task. This would mean that there are a number of road safety professionals who are offered the possibility of keeping their knowledge up-to-date, and thus have international contacts; the EU will probably become an ever more important partner. These road safety professionals should also be capable of carrying out research themselves or commissioning it to others. Finally it should be mentioned that professionals have to be trained; this is not yet possible in Ireland.

It is beyond the scope of this report to present proposals about the contents, structure, financing, organisation, relations with existing road safety partners and universities etc. Visits to a number of other EU countries should assist in this area.

I recommend that the subjects 'knowledge, knowledge dissemination, and research' are given an explicit place in the next road safety strategy.

7. Conclusion and recommendations

Lack of road safety is not an unassailable phenomenon in a highly-motorised society. Even during a period of growing exposure it is possible to reduce the number of traffic casualties. In Ireland this has also proved to be possible during the last few years: in 1978 there were as many as 628 road deaths, in 2001 there were 411. During the same period, the motorised traffic (expressed as the number of motor vehicles, increased by 117%. But if we look at the last years in detail, there is no longer a decrease in the number of fatalities. Compared, for example, with the other countries of the EU, Ireland is somewhere in the middle. If Ireland was to score as well as the safest EU countries, the number of road deaths would be 40% less than it is now.

This was sufficient reason for the Irish Government to formulate new policy. The target was a reduction in the annual number of deaths of 20%, from 472 in 1997 to 378 in 2002. It is likely that the target in relation to deaths will not be achieved. The target for the number of injuries (also a reduction of 20%) has already been achieved. An examination of the 'accident registration practice' is recommended, because the results achieved (achieving the target for injuries but not for deaths) was unexpected based on the experiences in other countries. The question that must be asked is: was the target for road deaths not achieved because a) the strategy was no good, b) the implementation of the measures announced was not sufficient, or c) recent external circumstances have hindered, or made it impossible to achieve the target? The underlying question is: what can be learnt for the future from such an analysis?

An average road safety improvement in Ireland of 4.2% less fatalities a year (during a period of more than 30 years), is, internationally seen, a reasonable speed. During the last few years this casualty decrease was higher (6.5%). Why not proceed with this high speed of improvement in the coming years? If effective policy is carried out, a more rapid improvement is surely feasible. When formulating the coming road safety policy strategy, I recommend trying to obtain a good (quantitative) view of the 'business as usual' effects, then to add the effects of the policy to be carried out, and, finally, to base the targets on the results.

The *Government Strategy for Road Safety 1998-2002* is to be regarded as a large step forward in Irish road safety policy. The following elements of the Strategy are regarded as being positive:

- a) the formulation of a national target,
- b) the definition of a limited number of well-founded spearheads,
- c) the policy co-ordination at the national level in the shape of a High-Level Group on Road Safety,
- d) the publication of an annual progress report.

If we look at the policy results it must be concluded that the Irish ambitions have not completely been achieved. A certainly successful area of policy is formed by the achievements of the NRA, because they have really met their pledges. The publicity activities of the NSC are also carried out well (large awareness and influence on the attitudes of the Irish). Less

successful are the other spearheads (speeding, drink-driving, and seat belt wearing). This is not so much a question of too ambitious targets, but of not implementing the intended policy. It is possible that having to adjust the speeding target over the past years, and not achieving the drink-driving and seat belt targets, damaged the credibility of the policy, and it could put the road safety agencies responsible in a vulnerable position.

The Irish road safety policy strongly relies on positive effects of traffic enforcement and (strict) punishment of offenders. It also strongly relies on public information: more than 70% of the casualty reduction targeted should be reached here. The implementation of the policy in this area is, at the most, to be characterised as a first step, and the expectations here have not fully been met.

Various points of further improvement have surfaced which could be used in order to continue along the chosen road for the 1998-2002 period. First of all, I recommend that the national target be transformed in a realistic way to 'supporting targets' (also known as performance indicators): from road safety targets to targeted road safety programmes. A further recommendation is that it is necessary that efforts are made in Ireland to monitor the policy carried out, in order to bring it to a higher level. Without an adequate policy monitoring and evaluation, it is impossible to determine whether one is on the right road, or whether additional measures are needed. More in general, I recommend that 'knowledge, knowledge transfer, and research' be given an explicit place in the coming road safety strategy. This recommendation is based on the fact that the matter of knowledge is dealt with in a very fragmented manner. This can be detrimental to the quality of research carried out, and is not very efficient.

As was mentioned before, during the past period, the implementation of the policy lagged behind its own ambitions for a number of reasons. In this period there were evidently no possibilities of adjusting this. To make improvements, agreements will have to be made so that intended policy is really carried out. I recommend making such agreements as part of the coming policy programme so as not to have to be dependent on pledges that are/can not be met. This demands that the partners who should carry out parts of the policy indicate which resources, provisions, manpower, expertise, organisation etc. are necessary to deliver the requested performance. If they can not do this, then that should be reason to adjust the level of ambition for reducing the number of traffic casualties.

If we look at the emphases in policy carried out during the Strategy lifetime, it can be concluded that there are still considerable improvement possibilities in relation to existing spearheads. This means that the present level of police enforcement should increase considerably. This level is modest in comparison with several other countries, and it is not to be expected that marginal increases will lead to behavioural changes of Irish road users. The level of enforcement must increase a lot. On the one hand, this is a matter of the police assigning priorities. However, there is more: first of all it must be ensured that the whole chain of police and law courts process a greater number of cases/fines. A second important question is whether Irish society is prepared to accept a higher level of enforcement. When asked, the Irish say they do, but doubts about this are noticeable.

Public information, especially via the mass media, will have to create support for considerably higher enforcement levels.

Although the NRA has performed extremely well in the 1998-2002 programme, I recommend examining whether the contribution of infrastructural improvements could be intensified. On the one hand this means examining whether 'more safety' can be achieved with the existing budgets and, on the other hand, it means reserving a larger part of the investment budget for road safety; this is now 1% of the total 2001 budget. For the latter recommendation, an approach in which the economic benefits are determined (as was done in the Bacon report) is the designated way.

It is striking that in the present policy practice, the so-called 'vertical co-ordination' and the (local) pressure from the population to pay more attention to improving road safety, is missing. Although the management structure in Ireland is possibly to blame, there are possibilities of exploring it further.

Finally a rather tricky question: do Irish society and Irish politics really regard road safety as a problem, are they prepared to change their own behaviour, and are they prepared to accept (far-reaching) government road safety measures? Influential social groups could be invited (and perhaps forced in the position) to show the courage of their convictions: road safety would then simply have to be defined as a top priority. Recent research suggests that the Irish population would support this point of view.

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Websites

An Garda Síochána: www.garda.ie

National Roads Authority: www.nra.ie

National Safety Council: www.nsc.ie

Appendix 1

A conceptual approach to road safety policy

Source: Mulder, J.A.G. & Wegman, F.C.M. (1999). *A trail to a safer country*

1. Signalling of a problem

The first phase is one of *signalling and identifying* the problem. The way in which this is done, and who does it, can be extremely varied. The initiative can either be political, from social ('non-profit') organisations, journalists or interest groups. But it can also be from individual citizens (scientists or not) who are worried about (in their opinion) undesirable social developments.

2. Demand for social recognition of the problem

The second phase is characterised by the *demand for social recognition* of the problem. There are not only protests about the worsening of the problem, but also demands for action. Incidentally, measures are taken, mostly in a rather isolated manner. Accidents are seen as an individual responsibility of road users, and no active role for a government is considered.

3. Initial social recognition of the problem

The third phase shows the *initial social recognition* of the problem: this phase is the start of public consciousness and awareness. The government takes up a certain responsibility to prevent accidents and develops the initial ideas for (counter)measures. Partly as a result of external pressure, legal measures are prepared. Furthermore, a start is made in developing a vision of future policies.

4. Introduction of legal instruments

The *emphasis on the legal instrument* as an important aid to tackling the problem, is the essence of the fourth phase. Not only the government, but also others involved, are convinced that laws are essential to halt and reduce the size of the problem.

5. Broad preventative approach to support legal initiatives

The fifth phase begins with the understanding that laws and rules on their own are not sufficient for an effective and long-lasting approach: *a broad preventative approach* is seen as essential. This preventative approach forms part of a formal policy and is aimed at specific parts of the problem.

6. Widening of the preventative approach

The sixth phase begins as soon as the approach to the problem, together with the necessary instruments, is deeply anchored in society. This sixth phase is characterised by a *broadening of the initiatives* for an effective approach. More and more organisations who feel involved with the problem are prepared to undertake initiatives. In this phase, more and more attention is paid to the need for insight into the effects of measures, activities and into optimisation-questions.

7. Increasing readiness to carry out approaches

The seventh phase is not only one of an increasing broadening of initiatives, but there is also an *increasing readiness to carry them out*.

8. Comprehensive social acceptance of approach to problem

The eighth phase is the last one, and is one of a complete anchoring in social activities of the approach to the problem. One can here speak of it having become 'everyday'. When reaching this phase it has just become normal practice when taking decisions, which could influence road safety, to take into account road safety considerations and weigh these seriously.

Appendix 2 The three levels of road safety problems

Source: Rumar, K. (1999). *Transport safety visions, targets and strategies: beyond 2000*.

First order problems

First order problems emerge directly from the way we analyse our crash and injury statistics. The ranking of the problems is not identical but they seem to be common problems, which each country tries to reduce. It is difficult to give a general ranking list of the most important first order road safety problems in the EU. An attempt is made to list 17 problems that seem to constitute a group of common top-priority direct road safety problems for the fifteen EWU countries.

- Speeds, especially in built up areas, are too high.
- Alcohol and drugs are too frequently used in traffic.
- Road safety is too low in urban areas.
- The road safety of children is inadequate.
- The road safety of unprotected road users is too low.
- The crash risk for young drivers is too high.
- Driving of cars is too widespread especially in urban areas.
- The standards of roads and streets is not correct in many places.
- The crash and injury risks for elderly road users are too high.
- Too many roads and vehicles are inadequate from an injury prevention or crash protection point of view.
- The usage of protective devices (belts, helmets etc.) is too low.
- The rescue service and medical treatment of traffic victims is not effective enough.
- The conspicuity of road users is insufficient in daylight; their conspicuity at night is much worse.
- The crash risk in reduced visibility conditions such as darkness and fog is too high.
- The crash risk in wintertime is too high.
- Heavy vehicles are over-represented in serious crashes.
- Some intersection types have crash risks which are too high.

Second order problems

Second order road safety problems are not equally obvious but they show up after closer analysis of first order problems. One way of defining them is to say that they reduce the effectiveness of countermeasures aiming at solving first order problems. Such second order problems include:

- Road traffic rules (legislation) are not clear, not logical and not consistent.
- Enforcement of licence requirements and traffic rules is not efficient enough.
- The control of road condition from a safety point of view is insufficient.
- The control of vehicle condition from a safety point of view is insufficient.
- Training and examination for driver licencing is not good enough.
- The traffic and traffic safety education of citizens is not adequate.
- The way traffic offences and crimes are treated in court is irregular and not in tune with the corresponding risks.

Third order problems.

Third order (hidden) road safety problems are those that do not become immediately obvious from studying crash or injury statistics. These problems are often of a more general character. Not dealing directly with the traffic situation but with underlying processes or conditions. Third order safety problems prevent or block the possible solutions to the first and second order problems. An improvement of third order problems would facilitate the implementation of much of the knowledge we have today about effective countermeasures which for one reason or another are not implemented. Some of the more important third order road safety problems are:

- There is not enough awareness of the seriousness of road safety problems; the value of safety measures is too low among decision-makers and road users.
- The present management system for road safety work is inadequate.
- When it is possible to create a vision of the future that most people in a company or society stand behind, it is the most efficient way to lead people in the right direction and to create creativity, energy and participation.
- At least as important as visions are quantitative targets.
- The present information and diagnosis system for road safety is very crude and partly incorrect
- There is limited co-operation between financiers of research; research on implementation problems (third order) is limited.
- We must ensure that consumers, communities and companies become more actively involved in the road safety effort.