State of the art with respect to implementation of daytime running lights

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INSTITUTE FOR
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Study in the framework of a European Commission project, Work Package 1

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Summary

This report is part of the documentation of a project funded by the European Commission, designed to assess the effects of Daytime Running Lights (DRL) and possible strategies for implementing the use of DRL in the European Union (EU).
The objectives of the present report are two-fold:

1. to provide an inventory of the currently legislated requirements for the use of DRL in the EU and elsewhere, and how that legislation has been implemented in these countries.
2. to assess what has been learned from the existing implementations, so as to take these findings into account in the later development of realistic implementation strategies.

To this end, the relevant questions and issues to be addressed were identified and formulated, and a questionnaire was written and sent to the following countries:

- all fifteen member states of the EU;
- the future EU countries where DRL has been implemented;
- the remaining countries where DRL has been implemented and where the safety effects of DRL have in some form been evaluated.

The inventory of the currently legislated requirements for the use of DRL in the EU and elsewhere shows that DRL has been implemented both as a technical and as a behavioural measure. So far, the majority of DRL countries chose to impose DRL as a behavioural measure. However, most cars in the Scandinavian countries (Denmark, Finland, Norway and Sweden) are sold with an automatic DRL switch as well. The countries which currently have legislation on the use of DRL can be further distinguished in whether they impose DRL during the entire year or in winter time only, and on all roads or on rural roads only.

When setting up European guidelines for the implementation of DRL, it is important to take the arguments against DRL into account. These arguments are enumerated in the present report. Since most of the adverse effects mentioned in these arguments can be minimised or even completely solved by the implementation of DRL as a technical measure, it is recommended to make the installation of automatic dedicated DRL on new cars –combined with a light sensitive switch automatically activating the low beam headlights in reduced visibility conditions (and deactivating the DRL)- at least part of the DRL implementation scenarios to be developed later in the project.

In DRL countries the use of media campaigns during the introduction of DRL was found to range all the way from no media campaigns at all in Hungary to massive media campaigns in Canada. Since all DRL countries indicate not having met with much resistance and opposition against DRL after its implementation, there does not seem to be much that can be learned in terms of what type of media campaign would be optimal when introducing DRL in a non-DRL country. However, the Canadian expert on DRL recommends that other countries intending to implement DRL policies take steps to inform their population about the basic workings of visual perception relative to the driving task, since some of the comments from the Canadian

public about DRL seemed to reflect a lack of understanding of the role and importance of contrast in aiding visual perception.

Most DRL countries used a gradual approach to the implementation of DRL, either by encouraging the voluntary use of DRL before the introduction of DRL legislation, or by a gradual extension of compulsory DRL usage over more and more types of roads, over more and more months of the year, and/or for more and more types of road users.
Such gradual implementation strategies allow road users to gain personal experience in the visual workings of DRL, thus probably also contributing to obtain broader public acceptance for DRL legislation.

These findings, combined with the experience that most of the opposition against DRL greatly subsided in countries after DRL legislation was implemented, leads us to recommend that the implementation of DRL in non-DRL countries is preceded with a period of recommended DRL usage, accompanied with media campaigns clearly explaining how the visual workings of DRL contribute to the improvement of road safety.

Contents

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Last but not least, all the people mentioned in *Appendix 3* of the present report who were found willing to respond to all of our questions.

1. Introduction

This interim report is part of the project for the European Commission on Daytime Running Lights (DRL) with Contract No. ETU/B27020B-E3-2002-DRL-S07.18830. The objectives of the present report are two-fold:

1. to provide an inventory of the currently legislated requirements for the use of DRL in the EU and elsewhere, and how that legislation has been implemented in these countries.
2. to assess what has been learned, in these respects, under the existing implementations, so as to take these findings into account in the later development of realistic implementation strategies.

To this end, the relevant questions and issues to be addressed were identified and formulated, and a questionnaire was written and sent to the following countries:

- all fifteen member states of the EU;
- those future EU countries where DRL has been implemented;
- those remaining countries where DRL has been implemented and where the safety effects of DRL have in some form been evaluated.

Since not all of these countries have implemented DRL, two questionnaires were written: one specifically for “DRL countries” and the other specifically for “non-DRL countries”. These two questionnaires can be found in *Appendix 1* and *2*, respectively, of the present report.

Before sending them the questionnaire, first a preliminary email was sent to knowledgeable individuals and institutes in the different countries announcing the objectives of the present work package, and requesting for the name(s) of national experts on DRL to which the relevant questionnaire could be sent for completion. A complete list of the countries that were finally contacted is shown in *Table 2.1*, including the (non-)response.

Table 2.1 shows that of the EU countries that currently have DRL legislation (i.e., Denmark, Finland, Italy, and Sweden), all returned the completed questionnaire. Of the EU countries that currently have no laws concerning DRL (i.e., Austria, Belgium, France, Germany, Greece, Ireland, Luxembourg, the Netherlands, Portugal, Spain, and the United Kingdom), all countries returned the completed questionnaire except for Greece, Ireland, and Portugal (although they did receive the questionnaire). In Luxembourg, we were not able to locate any knowledgeable person to send the questionnaire to.

A list of the people contacted as well as the organisations or institutes they are affiliated with is given in *Appendix 3*.

The work includes an inventarisation of the original arguments pro and con in the current DRL-countries as well as the views on these arguments after implementation. This report does not discuss the strictly statistical aspects of DRL in terms of accident savings, etc. This is the subject of a separate report.

The questionnaires were also used to identify additional national experts on DRL in the different countries.

Country	DRL compulsory for all motorized vehicles?	Questionnaire sent?	To:	Filled-in questionnaire returned?
EU members				
Denmark	Yes	Yes	Lars Klit	Yes
Finland	Yes	Yes	Veli-Pekka Kallberg	Yes
Italy	Yes	Yes	Francesca la Torra	Yes
Austria	No	Yes	Klaus Machata	Yes
Belgium	No	Yes	Karel Hofman	Yes
France	No	Yes	Sylvain Lassarre	Yes
Germany	No	Yes	Ursula Einsfelder	Yes
Netherlands	No	Yes	Rob Wegman	Yes
Spain	No	Yes	Monica Colás	Yes
Sweden	Yes	Yes	Kåre Rumar	Yes
United Kingdom	No	Yes	Jeremy Broughton	Yes
Non-EU members				
Canada	Yes	Yes	Jim White	Yes
Czech Republic	Yes	Yes	Jaroslav Heinrich	Yes
Hungary	Yes	Yes	Peter Holló	Yes
Israel	Yes	Yes	Victoria Gitelman	Yes
Norway	Yes	Yes	Richard Muskaug	Yes
Switzerland	No	Yes	Ulrich Salvisberg	Yes
USA	No	Yes	Richard Vaniderstine	No, but sent three reports
Non-response				
EU members				
Greece	No	Yes	abek@certh.gr	No
Ireland	No	Yes	des_coppins@environ.irlgov.ie hilary_dalton@environ.irlgov.ie	No
Luxembourg	No	No	--	--
Portugal	No	Yes	almacedo@lnec.pt	No
Non-EU members				
Poland	Yes	Yes	Krzystof Jamrozik	No
Lithuania	Yes	Yes	vidmantas.pumputis@lra.lt	No

Table 1.1. *Overview of the countries contacted and their (non-) respons*e.

2. Results

2.1. DRL countries

In *Section 2.1* the answers to the DRL questionnaire are discussed for those countries where the use of DRL is compulsory for all motorized vehicles by law. Of the nine countries which responded to the questionnaire, four are currently members of the EU (Denmark, Finland, Italy, and Sweden), two are future members of the EU (Czech Republic and Hungary), and three are not a member of the EU (Israel, Norway, and Canada). These so-called DRL-countries are discussed in alphabetical order, starting with the four EU members. For all these countries, the answers to the questionnaire can be found in *Appendix 4*; the answers in *Appendix 4* are presented in tables, where the first column of each table contains shortened versions of the questions in the questionnaire. For the complete questions we refer to *Appendix 1*. A summary of the respondents' answers is presented below.

2.1.1. *Denmark*

The answers to the DRL questionnaire for Denmark are summarized in *Appendix 4.1*.
In Denmark the use of DRL has been compulsory for all motorized vehicles on all roads since October 1990. There are no requirements on how to switch on DRL. However, most cars are sold with an automatic on switch. The implementation of DRL was accompanied with spots on national television and information in the main newspapers, as well as with police enforcement campaigns during the first year of the introduction. The penalty for not using DRL is about € 65, but the usage seems to be very high and currently there are no police enforcement activities specially aimed at DRL. According to the respondent from Denmark, even though the Danish Cyclists Federation at some point opposed the introduction of DRL, and there was some debate in the media concerning the extra costs for car owners (increased fuel usage and more frequently burned-out lamp bulbs), the law was introduced nevertheless, and now seems to be accepted by most road users and organizations.

2.1.2. *Finland*

The answers to the DRL questionnaire for Finland are summarized in *Appendix 4.2*.
Compared to Denmark, Finland clearly used a more gradual approach in the implementation of compulsory DRL for all motor vehicles. At first it was only required during the five winter months in 1972. Then this was extended to a period of seven months in 1973. Next this was again extended to the entire year outside built-up areas in 1982, and finally to all roads during the entire year in 1997. In most vehicles DRL are automatically switched on when the engine is started. However, manually operated DRL are also allowed. According to the respondent from Finland, DRL were generally well accepted in Finland and there was no serious opposition, neither before nor after their gradual implementation. Only some individuals raised questions about the added costs due to higher fuel consumption with DRL.

2.1.3. *Italy*

The answers to the DRL questionnaire for Italy are summarized in *Appendix 4.3*.
Of all the countries discussed in the present report, the implementation of compulsory DRL in Italy in June 2002is the most recent: . Since that date, DRL have become mandatory during the entire year for all vehicles on motorways (urban and rural) and primary rural highways, and for motorcycles and scooters on all roads (urban and rural). Since DRL for four-wheeled vehicles are not required on all roads in Italy, they are switched on manually.
The implementation of DRL was introduced with media campaigns in all the newspapers, on television and on radio. In addition, for approximately one month after the introduction, the police gave no tickets but only warnings to drivers not using DRL when required. Nowadays tollway companies use messages and boards at the entrance of tollways reminding drivers to switch on their lights during daytime.
At this moment drivers not using DRL when required can be fined, € 32 according to the Expert from Germany (GRE, 2003), but from June 2003 onwards this will be replaced with a new “driving points” system. Out of the initial amount of 20 points, two points will be deduced if drivers do not use DRL when required, and four points if also their licence is less than 5 years old.
According to the respondent from Italy, apart from some individual complaints, there was no opposition against DRL in Italy, neither before nor after its implementation. Interestingly, before the introduction of DRL in Italy, car drivers could even be *fined* for switching on their lights during the day.

2.1.4. *Sweden*

The answers to the DRL questionnaire for Sweden are summarized in *Appendix 4.4*.
In Sweden the use of DRL has been compulsory for all motorized vehicles on all roads during the entire year since 1977. Although there are no legal requirements on how to switch on DRL, most modern cars are sold with an automatic ‘on’ switch.
All the media were used to inform the public during the introduction of DRL. Since the army, the railways, and some companies already were using DRL before 1977, by 1977 the public was already used to DRL and media campaigns were therefore not as strong as when this had not been the case.
The penalty for not using DRL is about € 45. Initially there were some police enforcement activities aimed at the use of DRL, as well as at drivers forgetting to switch from reduced low beams to plain low beams in darkness. Currently enforcement is no longer necessary in Sweden due to the automatic switching on of DRL.
Both before and after the implementation, some groups are of the opinion that anybody who cannot see a motor vehicle in full daylight should not have a driver license, and other groups are of the opinion that the environmental damage and extra petrol consumption of DRL is a larger disadvantage than the reduced number of crashes. Motorcyclists often oppose general DRL because they would like to be the only category of road users having DRL.
Right after the implementation of the mandatory use of DRL, the automatic switching on of DRL was unusual, and many individuals complained about dead batteries because they had forgotten to turn off the lights when

parking. However, with time, the opposition towards DRL has diminished substantially. One obvious reason is the improved technology (primarily automatic switching). Currently, DRL is not a political issue and all parties seem to agree on the present legislation. The main opposition is focused on the negative environmental effects of DRL, and many motorcyclists are still negative, for the reason mentioned above.

2.1.5. *Canada*

The extensive answers to the DRL questionnaire for Canada are given in *Appendix 4.5*.
In Canada, DRL were implemented by making automatic DRL systems compulsory on all new four-wheeled vehicles from December 1989 onwards. Automatic operation of the headlamp and rear position (tail) lamp of new motorcycles sold in Canada had already been made compulsory in 1975. Since DRL are switched on automatically, they are used on all roads and during the entire year.
The federal government decided to pursue the development of a new vehicle regulation as the least costly and most reliable long-term solution. According to the respondent of the questionnaire, it was obvious that all vehicles on the road should have DRL or switched-on headlamps to maximize the safety benefits and minimize the “masking” of unlit vehicles by lit ones. Therefore the provinces and territories, assisted by the federal government, undertook publicity campaigns stressing the safety merits of daytime lights use.
These DRL measures were introduced by the Canadian federal government which only regulates vehicle safety through laws applying to vehicle manufacturers and importers. Except for the Yukon Territory, however, provincial and territorial governments (which are responsible for regulations concerning road users and road use) have not yet introduced laws requiring lights to be switched on in daytime, except during inclement weather. Therefore, the *use* of DRL is not compulsory in Canada, except for the Yukon Territory where road users can be fined about € 60 when not using DRL on rural roads. Outside the Yukon Territory, there are no penalties for not using DRL, and there are no special police enforcement activities. Even so, because they are switched on automatically in practice, DRL are used by all motorized vehicles on all roads during the entire year. DRL must switch off automatically when headlights are switched on (e.g, at night).
From about 1987 to 1995 (that is, even before the implementation of automatic DRL systems on all new vehicles in 1989), Transport Canada and the provincial/territorial transportation authorities cooperatively produced and distributed a common design pamphlet and poster. The message, directed to drivers of pre-DRL vehicles, was to drive with low beam headlamps switched on at all times or to have a DRL switching kit installed for convenience. Transport Canada staff gave numerous press interviews and responses to direct requests for information from the public and other interested parties. The public (provincial) vehicle insurance corporations advertised in the media, primarily newspapers. Also, vehicle manufacturers mentioned DRL in their advertisements, particularly for models with DRL installed voluntarily before it became mandatory. Insurers also supported DRL with publicity of various kinds. Of particular note was Saskatchewan Government Insurance’s “Lights on for Life” campaign. This initiative included a) newspaper and television advertising, b) message signs on highways, c) publicity materials such as brochures, stickers, key fobs, and d) information delivered by post, for example with licence renewal notices.

Transport Canada measured the daytime lights usage in several annual traffic surveys beginning in 1981, when 10.3 percent of vehicles were operated with lights on in daytime. Publicity campaigns raised the voluntary lights usage in daytime, in the four years (1986-89) before introduction of DRL on new vehicles, to between 17.5 and 21.7 percent.
Thus, before the implementation in 1989 all the publicity undoubtedly helped to ensure broad acceptance for the DRL regulation. Consequently, the public generally perceived DRL as sensible, although there were some concerns about glare.
After the implementation, DRL did not become a political issue. None of the political parties at the federal or provincial/territorial levels opposed it. There was not a lot of reaction from lobby groups, although some (but not all) vehicle manufacturers initially opposed the proposed regulation. The Canadian Automobile Association supported DRL. The Canadian Motorcycle Association initially opposed DRL on the basis that motorcycles would become relatively less conspicuous, even though motorcycles had been equipped with automatic headlamp systems since 1975 and thus were on an equal basis to DRL vehicles. However, there was little opposition from individual motorcyclists, perhaps because they recognized the benefit to themselves of seeing other vehicles better.
Some of the comments from the Canadian public about DRL seemed to reflect a lack of understanding of the role and importance of contrast in aiding visual perception. Some people thought that clear vision (usually expressed as an ability to see distant objects) somehow gave them a faultless ability to discern moving vehicles in visually complex surroundings including multiple targets. The Canadian respondent of the questionnaire therefore recommends that other countries intending to implement DRL policies take steps to inform their population about the basic workings of visual perception relative to the driving task.
As concerns acceptance after the implementation in 1989, DRL is not an issue any more. It is well accepted by all except a few who object to glare or see DRL as unnecessary government intervention in the driving process. The Road Safety and Motor Vehicle Regulation Directorate of Transport Canada receives few, if any, complaints about bulbs burning out, engine starting problems, etc.
There have been some complaints that rear position lamps (tail lamps) should be automatically activated with the DRL. The Canadian Motor Vehicle Safety Standard 108 allows tail lamps to be either on or off with DRL – in fact, vehicles with both arrangements are on the market. The occasional vehicle can be noticed at night being driven without tail lamps. Usually the driver notices, after a short distance, that the instrument panel is dark or that the DRL do not illuminate the road well, and so switches on the headlamps and position lamps.

2.1.6. *Czech Republic*

Appendix 4.6 summarizes the answers to the DRL questionnaire for the Czech Republic.
In the Czech Republic, the mandatory use of DRL was implemented in 1982 for motorcycles on all roads during the entire year, and in January 2001 for all four-wheeled motorized vehicles on all roads, but during winter months only. There were no media campaigns at the time of introduction. Fines for not using DRL during the required period range from € 7 to € 70, and police

enforcement is mostly applied at the beginning of winter time when DRL become compulsory again.
Since they are mandatory during winter time only, DRL can be switched on and off at will by the driver.
The respondent does not mention any opposition against DRL in the Czech Republic, either before or after its implementation, and notes that compliance is very high (an estimated more than 95%).

2.1.7. *Hungary*

Appendix 4.7 contains the answers to the DRL questionnaire for Hungary.
Just like Finland, Hungary also took a gradual approach to the implementation of compulsory DRL for all motor vehicles. First, in 1984 it was made mandatory for motorcycles only on all roads during the entire year. Then, in 1993 this was extended to passenger cars, buses, and goods vehicles during the entire year, but on rural main roads only. Next, in 1994 this was again extended to passenger cars, buses, goods vehicles, tractors, slow vehicles, and mopeds on all rural roads. Finally, in 1995 mopeds had to carry DRL on all roads, just like motorcycles. Since DRL for four-wheeled vehicles are only mandatory on rural roads, these lights can be switched on and off manually by the driver.
According to the respondent, only leaflets were used in order to raise public awareness of the introduction of DRL.
Unfortunately, nothing is mentioned in the answers about the acceptance levels of DRL before and after its implementation. However, the respondent refers to his paper (Holló, 1998), which states that:
“As the authorities anticipated that a gradual phasing-in would make acceptance of the measure easier, DRL-usage became compulsory [...] only on one part of the road network outside built-up areas; that is, on the main roads and semi-motorways, as of March 1993.”
The paper also mentions that, in the period directly after the new law was introduced in 1993, nearly 75% of drivers switched on their dipped headlights, even in extremely good visibility conditions in daylight. Moreover, according to Holló (1998):
“Positive results and the better than expected DRL-usage rates motivated the legislators to extend the earlier only partial DRL-obligation outside built-up areas to all roads outside built-up areas after 1 June 1994. The decision was partly based on the experience that a proportion of drivers –at first only negligible, but later steadily increasing- were additionally using their dipped headlights on motorways and side roads outside built-up areas in daylight, in good visibility conditions, so the extension of the obligation was hardly opposed [...].”
This shows that the gradual approach to the implementation of DRL in Hungary was consciously applied by the legislators in order to facilitate the acceptance of the measure by road users.

2.1.8. *Israel*

Appendix 4.8 summarizes the answers to the DRL questionnaire for Israel.
In Israel, DRL were introduced in 1996 and are mandatory during winter time only. For two-wheeled vehicles, taxi’s, buses, and commercial vehicles they are required on all roads, while all other motorized vehicles have to use DRL on rural roads only. Therefore, the DRL are switched on manually.

The implementation of DRL was preceded by an experimental period accompanied by an evaluation study in the winter of 1989/90. When DRL were implemented, there was a 3-month media and road-side campaign promoting the use of DRL.
Every year, during the winter period, there are reminding announcements in the media. Not carrying DRL during winter time in Israel can result in fines ranging approximately between € 20 and € 50, or in penalty points. DRL enforcement is part of regular police enforcement.
The measure seems to be well accepted, and some road users even use DRL voluntarily in summer time. Moreover, no lobbies or government parties have opposed DRL over the last years.

2.1.9. *Norway*

Appendix.4.9 contains the answers to the DRL questionnaire for Norway. In Norway, DRL was made compulsory on new motorized vehicles from January 1985 onwards, and on all vehicles from April 1988 onwards. Up to 1994 they had to be switched on automatically when starting the engine, but since 1994 this rule has been relaxed, and they are now also allowed to be switched on manually. In Norway, the measure applies to all roads during the entire year. Not carrying DRL can result in a fine of approximately € 125. There are no special police enforcement activities aimed at carrying DRL. The introduction of mandatory DRL was accompanied with brochures as well as newspaper advertisements and stickers on buses. Before the implementation of DRL, vulnerable road users (pedestrians, cyclists, and motorcyclists) were afraid that they would not be seen when DRL was introduced. However, this opposition apparently has evaporated, since DRL is now well accepted in Norway, and it is not on the political agenda. Moreover, the use of DRL is now close to 100%. It is interesting to note, however, that about one third of the motorized vehicles already used DRL voluntarily even before the introduction of this measure.

2.2. **Non-DRL countries**

In *Section 2.2*, the responses to the DRL questionnaire are discussed for those countries where the use of DRL is not compulsory for all motorized vehicles. Countries which currently only have DRL legislation for mopeds and/or motorcycles (e.g., Austria and Belgium) are considered as belonging to this category in the present report. Of the nine non-DRL countries who responded to the questionnaire, seven are member of the EU (Austria, Belgium, France, Germany, the Netherlands, Spain, and the United Kingdom), and two are non-EU members (Switzerland and the United States). In the following sections, these nine non-DRL countries are treated in alphabetical order. For all these countries, the answers to the questionnaire can be found in *Appendix 5*; the answers in *Appendix 5* are again presented in tables, where the first column of each table contains shortened versions of the questions in the questionnaire. For the complete questions we refer to *Appendix 2*.

2.2.1. *Austria*

Appendix 5.1 contains the answers to the DRL questionnaire for Austria.
In Austria, where DRL is already mandatory for all motorized two-wheelers on all roads during the entire year, several attempts have been made to

implement compulsory DRL for all four-wheeled motor vehicles outside urban areas during winter time, the latest attempt being in 2002. Since they will not be required on all roads, and only in winter time, there are no plans in Austria for introducing automatic DRL on all four-wheeled motor vehicles. As the current voluntary use of DRL is concerned, observations of 31.000 cars in 2001 showed that 25.8% was carrying DRL in good weather conditions, 51.9% in cloudy weather, and 72.8% in rainy weather. In a KfV survey of 1000 citizens in December 2002, it was found that 75% think that DRL is a good or very good safety measure.
KfV strongly supports DRL, whereas Auto Clubs (and many others) are opposed. This was the reason for the rejection of the draft law in 2002.

Enclosed with the answers to the questionnaire, the respondent from Austria also sent us the Austrian road safety programme 2002-2010 (see the References). According to this document, the Austrian government introduced an extensive road safety programme in January 2002 that establishes the following target: to halve the number of deaths by the year 2010. Also according to this document, DRL belongs to one in the list of 26 priority areas that should be addressed in order to achieve this target. The Austrian Road Safety Board will discuss the medium-term introduction of DRL in rural areas during winter time, as well as the long-term support of implementing EU regulation ECE R87 regarding DRL lamps with lower power consumption (ECE, 1993).

2.2.2. *Belgium*

The answers to the DRL questionnaire for Belgium are summarized in *Appendix 5.2*.
In Belgium, the use of DRL has been mandatory since 1984 for two-wheeled mopeds and motorcycles which should carry a dipped headlight and red rear light at all times on all roads. Not complying to this legislation can be punished with a heavy fine of € 50 to € 500 or a prison sentence of 8 days to 1 month.
Due to a misunderstanding, the questionnaire for “DRL countries” in *Appendix 1* was sent to the representative of Belgium. After receiving the answers of this questionnaire shown in *Appendix 5.2*, we also sent the questionnaire for non-DRL countries in order to obtain information on possible plans in Belgium for the introduction of DRL for all vehicles. The answers to the latter questionnaire were that there are no such plans in Belgium, that there is no information on the current voluntary use of DRL in Belgium, and that DRL for all vehicles will only be implemented in Belgium if this should be decided at a European Union level.

2.2.3. *France*

The answers to the DRL questionnaire for France are given in *Appendix 5.3*.
In France, the use of DRL for motorcycles has been mandatory since 1975, but there are no plans for the implementation of the compulsory use of DRL for four-wheeled motorized vehicles. Motorcycle associations are strongly against the implementation of DRL for four-wheeled motorized vehicles. The French ministry of environment is concerned about the 1% of increase in CO_2 in the atmosphere due to more fuel consumption. Even the French ‘Direction pour la circulation et la sécurité routière’ (Directory for traffic and road safety) is not sustaining this measure.

In the French Département Les Landes, an experiment was carried out from June 1999 until June 2000, encouraging road users to use DRL (Lassarre, 2002). To this end, a brochure was sent to every household in Les Landes, 100,000 brochures were left in public places often visited by road users, a total of 49 board signs were installed along roads, and the campaign was supported by the local newspapers, radio, and television. In the first quarter of 2000 the campaign resulted in an observed average 22% voluntary use of DRL on main roads, and in an observed average 14.5% voluntary use of DRL on secondary roads. Moreover, in a questionnaire sent to all households of Les Landes in December 1999, 46% of the road users stated often using DRL, while 12% stated they used them all the time.

In the filled-in questionnaire from France, reference is made to the extensive French evaluation report 'La question de l'allumage des feux de croisement de jour' (The issue of daytime running lights) by Robert (2000). Because they have implications for the definition of realitistic future implementation scenarios, we have translated the most important conclusions concerning acceptance levels and possible implementation scenarios in Robert's report (see *Appendix 5.3*).
In the context of the objectives of the present report, the main point in these conclusions is that, if DRL should be proven to be effective in improving road safety, Robert (2000) estimates that the best strategy for rallying the different French organisations in favour of implementation would be a technical measure where special daytime running lights with an intensity somewhere between dipped headlights and parking lights are switched on automatically when the motor is started. According to Robert, this system has three advantages:

1. Vulnerable road users are not hindered while still improving their perception of cars and trucks.
2. It allows for the differentiation of motorcycles which could continue to ride with dipped headlights (which could moreover be coloured lights).
3. It is easily combined with the installation of receptors which switch on the dipped headlights when the ambient light is reduced (and automatically switch off the dedicated daytime running lights).

2.2.4. *Germany*

Appendix 5.4 contains the answers to the DRL questionnaire for Germany.
In Germany, there are no plans of implementing the compulsory use of DRL for all motorized vehicles.
Germany sent us an informal document prepared by the official experts from Germany (GRE, 2003) entitled 'Summary of the discussion concerning daytime running lights in Germany'. Here, we quote the summary of this document verbatim:

"It is difficult to assess the further development of the discussion on the potential benefits of switching on the light during daytime. At the moment it seems rather unlikely that a regulation at European level is adopted imposing the obligation to use dipped headlights during daytime. Anyhow, the Federal Government will reject such a variant. But Germany still considers it necessary to perform further research work with regard to special daytime running lamps with a luminosity ranging between parking lights and dipped headlights.

There is currently no evidence indicating whether a benefit for road safety can be expected from such a measure and, if so, the extent of the benefit to be assumed. The mandatory equipment of motor vehicles with such additional lamps will certainly mean higher costs for vehicle buyers, the amount of which can, however, currently not be estimated. The fuel consumption will rise, too, although it might be significantly lower than it would be if dipped headlights were used as daytime running lights.
If the research work to be performed now resulted in a sufficiently positive cost-benefit ratio, the German proposal submitted to the ECE in 1999 concerning the regulation of the technical requirements to be placed on a "light sensitive switch" would remain of present interest. The fact that motorists switch on dipped headlights too late in the case of an insufficient ambient light could be improved by the automatic activation of the light if the brightness drops to a certain level.
This would, presumably, account for the essential part of the positive effects of daytime running lights so that this type of light could be dispensable in the future. But even if it was possible to prove the positive effects of special daytime running lamps, the "light sensitive switch" will remain an appropriate option. Daytime running lamps which are automatically activated would presumably result in the fact that motorists switch on dipped headlights too late, knowing that they use daytime running lamps, thus proceeding only with these lamps of a low light intensity when dipped headlights would already be required."

In the context of the objectives of the present report, the main point of the arguments above is that, if and only if dedicated DRL are proven to be effective in improving road safety, Germany would be willing to consider a technical measure where special daytime running lamps with a luminosity ranging between parking lights and dipped headlights are combined with light sensitive receptors activating the dipped headlights as soon as the ambient day light falls below a certain predetermined level; this is the same option as discussed by France.
The only difference with France is that, should the dedicated DRL not be proven effective, Germany would still be interested in the separate installation of the light sensitive receptors for dipped headlights.

2.2.5. *The Netherlands*

Appendix 5.5 summarizes the answers to the DRL questionnaire for the Netherlands.
In the Netherlands, plans were discussed in the early 1990s to make DRL mandatory for all motorized vehicles on all roads during the entire year, where the DRL would be switched on automatically. At this moment, the voluntary use of DRL in the Netherlands is estimated to be quite high (about 50%). DRL are used more often outside than inside built-up areas, and also more often in reduced daytime visibility conditions.
Public acceptance of DRL seems high (especially with car drivers). There is strong opposition from organizations of pedestrians, cyclists, and motorcyclists, who are afraid they will become relatively less conspicuous when DRL are made obligatory for all motorized vehicles. There are also concerns about extra fuel consumption and CO_2 emission.
In the early 1990s the voluntary use of DRL in the Netherlands was extensively monitored for a number years on a monthly basis, differentiating between weather conditions, regions, road types, city sizes, and inside

versus outside built-up areas (see Lindeijer & Bijleveld, 1991, 1994). However, these monitoring activities were later stopped when it became clear that the mandatory use of DRL would not be implemented soon.
The extensive and often referred to Koornstra, Bijleveld & Hagenzieker (1997) report not only presents the (positive) results of a meta-analysis of the available studies on the effects of DRL on road safety, but also discusses possible adverse effects, and ways of implementing DRL in non-DRL countries. The main conclusion of the report is that: “It is recommended on technical, practical and legal grounds that compulsory DRL, when implemented in the EU, should be an automatic in-vehicle DRL that uses either low beam headlights or special DRL-lamps. Because of the large safety effects from full DRL in the EU with a benefit-cost ratio of at least 1.8, it is recommended to make plans for a EU regulation on automatic in-vehicle DRL for new motor vehicles from a particular year onward. The year to be chosen is preferably decided after the political and public acceptance of the DRL-regulation has become clear. However, any acceptance of a DRL regulation probably will not emerge, unless prior to a DRL regulation, intensive DRL campaigns and social marketing of DRL in the EU, initiated by the CEC, has raised the political and public awareness of the safety effects and benefits from DRL in all countries of the EU” (Koornstra et al., 1997, p.166).
The Ministry of Transport, Public Works and Water Management of the Netherlands are in favour of implementing DRL as a technical measure consisting of automatic dedicated DRL for new motor vehicles; additionally, an automatic light-sensitive switch for dipped headlights in reduced visibility conditions is considered to be a sensible option.

2.2.6. *Spain*

Appendix 5.6 contains the answers to the DRL questionnaire for Spain. In Spain, the use of DRL is only compulsory for motorcycles. At this moment, whether or not to extend this regulation to other motorized vehicles is only a matter of consideration. If the latter measure should be introduced, the idea would be to apply it to all motorized vehicles during the entire year, but only outside built-up areas. According to the study by Robert (2000), this is due to concerns in Spain about an increase in pollution in built-up areas.
According to the respondent, currently the voluntary use of DRL in Spain is becoming more and more frequent on roads outside built-up areas, and vehicles of the traffic police have already been using DRL for a long time. Also according to the respondent of the Dirrección General de Tráfico of the Ministerio del Interior, it would “not be extremely difficult” to implement the compulsory use of DRL in Spain, except for opposition from motorcyclists and, perhaps, ecologists.

2.2.7. *Switzerland*

The answers to the DRL questionnaire for Switzerland are given in *Appendix 5.7*.
In Switzerland, the *voluntary* use of DRL was introduced in January 2002 for all motorized vehicles on all roads during the entire year in a joint campaign organized by the Swiss Federal Roads Authority, Swiss Insurance Association, automobile associations, automotive trade, public transport authorities, associations of driving school instructors, police, traffic authorities, Fonds für Verkehrssicherheit (Road Safety Fund), and

Schweizerischer Verkehrssicherheitsrat (Swiss Council for Road Safety). This was accompanied with a media campaign consisting of radio announcements before and after traffic information, posters nationwide, flyers, Internet, and Infomedia under bfu's supervision (bfu is the 'Beratungsstelle für Unfallverhütung', i.e., the Swiss Council for Accident Prevention). Since the use of DRL is recommended (and not compulsory) in Switzerland, there are no penalties for not using DRL, nor police enforcement activities, and DRL are switched on and off manually.
In surveys conducted by bfu it was found that 21% of the Swiss population would tend to be in favour of compulsory DRL for cars in 1999, while these percentages increased to 38% in 2000, 56% in 2001, and 64% in 2002. Moreover, according to bfu the actual voluntary use of DRL has, on the whole, risen from 16% in 2001 to 26% in 2002 in all weather conditions, and from 9% to 25% in good weather conditions. The aim of the bfu, however, is to achieve a voluntary use of DRL of 60% of all vehicle users (Infomedia 2-7-2002).
Opposition to the measure was expressed by some individuals in the form of letters to newspapers or in e-mails/letters to the bfu or other partners in the joint campaign.

2.2.8. *United Kingdom*

Appendix 5.8 contains the answers to the DRL questionnaire for the United Kingdom.
Clearly, the United Kingdom has no plans of implementing the compulsory use of DRL, and the issue of DRL has received virtually no public discussion. The answer on the current voluntary use of DRL in *Appendix 5.8* suggests that only cars manufactured in countries with mandatory use of DRL (mainly Volvos and Saabs) typically drive with DRL all the time, because the lights are switched on automatically. Drivers of other vehicles only turn their lights on in daytime with poor visibility conditions.
According to Robert (2000), the UK is quite concerned about the possible detrimental effects of DRL on vulnerable road users, especially since this country has a relatively higher number of accidents involving vulnerable road users (child pedestrians, for example) than other European countries.

2.2.9. *United States of America*

Appendix 5.9 discusses the situation in the United States, as we deduced from an email and documents concerning DRL that we received from the official responsible for the U.S. Federal Motor Vehicle Safety Standard (FMVSS) 108 at the National Highway Traffic Safety Administration (NHTSA) of the U.S. Department of Transportation (NHTSA, 2002)

To summarize, the use of DRL in the U.S.A. is not compulsory, but a final rule was published in January 1993 amending Federal Motor Vehicle Safety Standard (FMVSS) 108 to explicitly allow the *voluntary* installation of DRL. This rulemaking was necessary because a multitude of conflicting state laws had the practical effect of prohibiting the installation of DRL.
General Motors began to install DRL on selected 1995 model year vehicles. By the 1997 model year, DRL was standard equipment on all General Motor vehicles sold in the U.S.A. To date, General Motors has sold more than 23 million vehicles in the U.S. equipped with DRL. General Motors, Saab,

Volvo, and Volkswagen were the first manufacturers to introduce DRL in the U.S.A.
In the U.S.A., DRL are provided in a variety of configurations. These include reduced intensity upper beams, reduced or full intensity low beams, dedicated DRL, or turn signal DRL. According to the official responsible for the U.S.A., FMVSS 108 of the NHTSA, one thing that is particularly important for public acceptance is to make sure that the DRL intensity is high enough to be conspicuous, but not so high as to be considered glaring. That is an issue that NHTSA is currently resolving, based on hundreds of complaints from the public. As a result, NHTSA is about to publish an amendment to substantially reduce the permitted intensity, which can currently be more than 3000 cd (candela). There will be an additional amendment to deal with further intensity reductions (to a maximum of 1500 cd) and some wiring and use issues. That may follow toward the end of 2003.

General Motors is opposed to the DRL photometric restrictions proposed in the amendment of NHTSA. They argue that: 1. the number of complaints about glare were overestimated because of repeats and multiple copies of letters, and because some complaints were solicited by organizations who opposed DRL in principle; 2. the few initial DRL complaints in Canada (where DRL has been mandatory since 1989) dropped to virtually zero by the early 1990's and continue to be virtually non-existent, even though they have the same photometric provisions as those specified in the current U.S. FMVSS 108.
Also, General Motors believes there is a strong general acceptance of DRL in the market. To support this, Bergkvist (2001) presents the results of surveys conducted to determine the consumers' perception of DRL as a safety feature. In a survey conducted in 1997, it was found that 23% of the respondents definitely wanted DRL implemented as a safety feature of motor vehicles. In a second survey conducted in 1998, it was found that 64% of the respondents were of the opinion that DRL is a beneficial feature, 26% that it is a neutral feature, 8% that it is a negative feature, and 2% did not respond. However, nothing is mentioned about the sample sizes used in these two surveys.
Finally, General Motors has formally petitioned NHTSA to amend the Standard to mandate the use of DRL. NHTSA has not made any decision yet on whether to act on that petition or not.

3. Conclusions

In this chapter we discuss what can be learned from the completed DRL questionnaires and from the literature mentioned in the questionnaires in terms of possible implementation scenarios for DRL. In *Section 3.1*, the reported arguments pro and con are enumerated both before and after implementation of DRL. *Section 3.2* discusses the types of media campaigns that were used during the introduction of DRL. In *Section 3.3* an overview is given of all the possible implementation scenarios that can be distilled from the completed questionnaires and the literature reported in the questionnaires. Finally, *Section 3.4* gives a summary in terms of the two objectives defined in the introduction of the present report.

3.1. **Arguments pro and con**

In this section we summarize the pros and cons mentioned in the questionnaires of the DRL countries both before and after DRL was legally implemented.

3.1.1. *Before implementation*

The pros and cons mentioned in the questionnaires of the DRL countries before implementation of DRL are the following:

Cons

- vulnerable road users are afraid they will be less conspicuous: Denmark (the Cyclists Federation), Norway, Canada (the Motorcycle Association), Sweden (motorcyclists)
- increased fuel usage: Denmark (in the media), Finland (individuals), Sweden (groups)
- environmental concerns: Sweden (groups)
- more frequently burned-out bulbs: Denmark (in the media), Canada (individuals)
- increased risk: Italy (individuals)
- concerns about glare: Canada

Pros

- seen as correcting a mistake in the law by motorcyclists and scooter users: Italy
- improved visibility of drivers approaching from behind: Italy (individual)
- generally well accepted; no serious opposition: Finland, Sweden

3.1.2. *After implementation*

The pros and cons mentioned in the questionnaires of the DRL countries after implementation of DRL are:

Cons

- vulnerable road users are afraid they are less conspicuous: Sweden (motorcyclists)
- increased fuel usage: Finland (individuals), Sweden (groups)

- environmental concerns: Sweden (groups)
- more frequently burned-out bulbs: Canada (individuals)
- concerns about glare: Canada (individuals)
- engine starting problems: Canada (individuals), Sweden (many individuals, due to empty batteries when forgetting to switch off the DRL when parking)
- complaints that occasional vehicles drive at night carrying DRL without tail lamps: Canada
- drivers use reduced low beams in darkness, forgetting to switch on the ordinary low beams: Sweden

Pros
- accepted by most road users and organisations, not an issue discussed in the media: Denmark
- generally well accepted; no serious opposition: Finland
- no comments and no complaints: Italy
- not an issue any more; well accepted by all except for a few individuals: Canada
- no lobbies or government parties opposed over a number of years before 2004: Israël
- well accepted and not on the political agenda: Norway
- the opposition towards DRL has been substantially reduced with time after the initial legislation; one obvious reason is the improved technology (primarily automatic switching); DRL is not a political issue, all parties seem to agree on the present legislation: Sweden

On the whole, these reactions of the DRL countries suggest that protests against the introduction of DRL by organizations and lobbies were mainly raised before the implementation of the measure; after implementation complaints seem to be expressed by individuals only, with the exception of Sweden where concerns about increased fuel usage and the environment are still shared by groups of people. Moreover, all DRL countries indicate that acceptance levels were, and are, generally high after DRL legislation was implemented, irrespective of the type of implementation scenario used.

Table 4.1 contains an inventory of all the arguments against DRL that were mentioned in the completed questionnaires as well as in the reports sent to us both by DRL and non-DRL countries, including suggested solutions to resolve these problems if DRL are proven to be effective. This list is important because these are the arguments that will have to be dealt with if the project should result in a recommendation to implement DRL in non-DRL countries of the EU countries.

It may be noted that the solutions for avoiding decreased conspicuousness of vulnerable road users (pedestrians, cyclists, mopedists and motorcyclists) mentioned in *Table 4.1* only need to be considered if it is actually proven that the use of dipped headlights during daytime indeed results in vulnerable road users being less conspicuous or more often involved in accidents. The possible second solution mentioned in *Table 4.1* for the possible problem of motorcycles being less conspicuous if DRL are implemented for all motorized vehicles (special design of motorcycle DRL) was proposed by Rumar (2003a).

Arguments against DRL	Suggestions for (partial) solutions
Reduced conspicuity of pedestrians, cyclists and mopeds	Dedicated reduced intensity DRL on cars
Reduced conspicuity of motorcyclists	1. Dedicated reduced intensity DRL on cars plus dipped headlights for motorcyclists 2. Special design of motorcycle DRL, e.g. triangular form consisting of dipped headlight plus two somewhat lower-positioned dedicated reduced intensity DRL
Glare	Dedicated reduced intensity DRL on cars
Increased fuel consumption	1. Low-energy light sources such as LED 2. Dedicated reduced intensity DRL on cars 3. Light sensitive switch for dipped headlights on cars in reduced visibility conditions
Increased CO_2 emission	1. Low-energy light sources such as LED 2. Dedicated reduced intensity DRL on cars 3. Light sensitive switch for dipped headlights on cars in reduced visibility conditions
More frequently burned-out bulbs	1. Low-energy light sources such as LED 2. Dedicated DRL bulbs 3. Reduced voltage DRL
Flat batteries	1. Warning device 2. Automatic 'off' switching
Reduced conspicuity of brake lights	No tail lights in good daytime visibility conditions
If carrying dedicated DRL, drivers forget to switch on dipped headlights in reduced visibility conditions	Light sensitive switch for dipped headlights on cars
"Masking" of unlit vehicles by lit ones	1. Automatic on-switch for all motorised vehicles in all EU countries and/or 2. Obligation of using DRL for all motorized vehicles in all EU countries

Table 4.1. *Inventory of all the arguments against DRL, and suggested solutions if DRL are proven to be effective.*

It is also interesting to note that problems with glare are only mentioned by the respondents of Canada and the USA, where much higher luminous intensities for DRL are allowed than in European countries.

The term 'dedicated reduced intensity DRL' in *Table 4.1* is defined as: DRL using lamps with an intensity somewhere between low beam headlights and parking lights. As the table indicates, the use of dedicated DRL has a number of important advantages. It allows for the minimisation of the adverse environmental effects of DRL (i.e., increased fuel consumption, increased CO_2 emission, and more frequently burned-out bulbs). It prevents flat batteries (by automatically switching off the lights when the engine is stopped). It allows for the optimisation of the luminous requirements of the DRL in terms of glare, and in terms of the possibly reduced conspicuousness of vulnerable road users. Finally, it allows for dedicated daytime tail light specifications, and can be combined with the installation of

an automatic ‘on’ switch for the low beam headlights in reduced visibility conditions.

3.2. Media campaigns

In this section we summarize whether, and the ways in which, the implementation of DRL in DRL countries was accompanied with campaigns in the media. In the questionnaires discussed in *Section 3.1* the following types of media campaigns were mentioned:

- Spots on national television and information in the main newspapers. (Denmark)
- Cannot remember how it was introduced in the 1970´s. Probably nothing very conspicuous. Later changes were routine, no campaigning either. (Finland)
- All the newspapers, television, and radio announced this implementation. In addition, for approximately one month, the police gave no tickets but only “advertisements” to drivers with no lights on when required. Now tollway companies are using various messages and boards when entering the tollway to remind that you have to switch your lights on. (Italy)
- There was a lot of public interest in the run-up to the new vehicle regulation implementation date and for some time after it, i.e. from about 1987 through 1995. Transport Canada and the provincial/territorial transportation authorities cooperatively produced and distributed a common design pamphlet and poster. The message, directed to drivers of pre-DRL vehicles, was to drive with low beam headlamps switched on at all times or to have a DRL switching kit installed for convenience. Transport Canada staff gave numerous press interviews and responses to direct requests for information from the public and other interested parties. The public (provincial) vehicle insurance corporations advertised in the media, primarily newspapers. Also, vehicle manufacturers mentioned DRL in their advertisements, particularly for models with DRL installed voluntarily before it became mandatory. (Canada)
- No media campaigns. (Czech Republic)
- Only some leaflets. (Hungary)
- The implementation of DRL was preceded by an experiment accompanied by the evaluation study, in the winter of 1989/90. There was a three-month media and roadside campaign promoting the use of DRL. Every year, during the winter period there are reminding announcements in the media. (Israël)
- Brochures were used as well as newspaper advertisement and stickers on buses. (Norway)
- All media were used to inform the public. (Sweden)

From the above, it can be concluded that the use of media campaigns in order to raise the awareness of the public concerning the use of DRL ranged all the way from no media campaigns at all in Hungary, to massive media campaigns in Canada. Moreover, since the DRL countries report not having met with much resistance and opposition against DRL after its implementation (see *Section 3.1*), there does not seem to be much that can be learned in terms of what type of media campaign would be optimal when introducing DRL in a non-DRL country.

However, the person responsible for the answers of the questionnaire for Canada advises that “it is recommended that other countries intending to implement DRL policies take steps to inform their citizenry about the basic workings of visual perception relative to the driving task, since some of the comments from the Canadian public about DRL seemed to reflect a lack of understanding of the role and importance of contrast in aiding visual perception.” A similar issue is raised in Lassarre (2002), where it was found that young drivers were more inclined to accept the (recommended) use of DRL because they themselves experienced the improved visibility of other vehicles carrying DRL in practice, while elderly people were more inclined to a theoretical acceptance of DRL use based on the fact that the safety measure was recommended by the authorities (and therefore must be good).

In Canada publicity campaigns were used to raise the voluntary use of DRL to between 17.5 and 21.7% in the four years before the introduction of DRL on new vehicles. As mentioned in the Canadian answers to the questionnaire, before the implementation in 1989 “all the publicity undoubtedly helped to ensure broad acceptance for the DRL regulation. Consequently, the public generally perceived DRL as sensible.”

Therefore, it is clear that, in order to raise both the understanding and acceptance level of DRL in road users, information to the public concerning the reason why DRL contribute to the improvement of road traffic safety should be an essential part of any implementation strategy.

3.3. Implementation scenarios

In terms of current type of legislation, the countries that replied to our inquiries and had implemented DRL legislation can be classified as follows:

- compulsory on all roads during the entire year: Denmark, Finland, Norway, Sweden
- compulsory on non-urban roads during the entire year: Italy, Hungary
- compulsory on all roads in winter time: Czech Republic
- compulsory on non-urban roads in winter time: Israël
- compulsory automatic on switch for DRL on all motorized vehicles: Canada.

Whereas Denmark, Finland, Norway, Italy, Hungary, the Czech Republic, Israel and Sweden introduced DRL as a *behavioural* measure, Canada implemented DRL as a *technical* measure.
However, in practice most vehicles in Denmark, Finland, Norway, and Sweden also have an automatic ‘on’ switch for DRL, but this is not legally required. Moreover, Canada is considering introducing the legal obligation for the *use* of DRL as well (and this was already implemented in one of their territories).

Switzerland is the only country where the use of DRL is explicitly *recommended* instead of imposed. Also, from June 1999 until July 2000 an experiment was performed involving a recommendation for the use of DRL in the French Département Les Landes.

The purpose of this section is to provide a classification of all the different DRL implementation strategies discussed in the present report, as well as the arguments for and against these strategies. This classification scheme involves the following (partially nested) dichotomous factors:

- automatic (technical measure) versus manual (behavioural measure)
- gradual versus immediate and complete implementation
- if manual: voluntary versus imposed
- if manual: part of the year versus the entire year
- if manual: non-urban roads versus all roads
- if automatic: the entire car park versus new models only
- if automatic: when starting the engine versus using receptors (i.e., a “light sensitive on switch” for dipped headlights in reduced daylight conditions)
- dipped headlights versus dedicated DRL of lower intensity.

Figure 3.1 contains a schematic overview of the possible implementation strategies that can be distilled from the complemented questionnaires, as well as from the literature discussed in the present report. To this scheme we have added the names of three types of countries. Underlined countries are those countries that currently have DRL legislation (Canada, Czech Republic, Denmark, Finland, Hungary, Israel, Italy, Lithuania, Norway, Poland, and Sweden). The place of their names in *Figure 3.1* corresponds to the strategy that they used to implement DRL.

Although Lithuania and Poland did not return a filled-in DRL questionnaire (see *Table 2.1*), we were able to determine the implementation strategy that these two countries used by consulting the ECE document TRANS/WP.1/80/Rev.2 (ECE, 2003). Bold countries in *Figure 3.1* currently do not have DRL legislation for all motorized vehicles (Austria, France, Germany, the Netherlands, and Spain). Their place in the scheme is determined by plans or scenario preference if DRL should be proven to be effective, as expressed in the completed questionnaires or in the literature mentioned in the questionnaires. Finally, the third type of country is where there is currently no DRL legislation, but where the use of DRL is explicitly recommended. There is only one such country, which is Switzerland.

Therefore, *Figure 3.1* in fact provides two pieces of information at the same time. The first one is a schematic overview of the current status of DRL legislation in the DRL countries discussed in the present report; this is the part of the scheme only containing the underlined countries. The second piece of information consists of other possible implementation strategies mentioned in the questionnaires and accompanying literature of non-DRL countries.

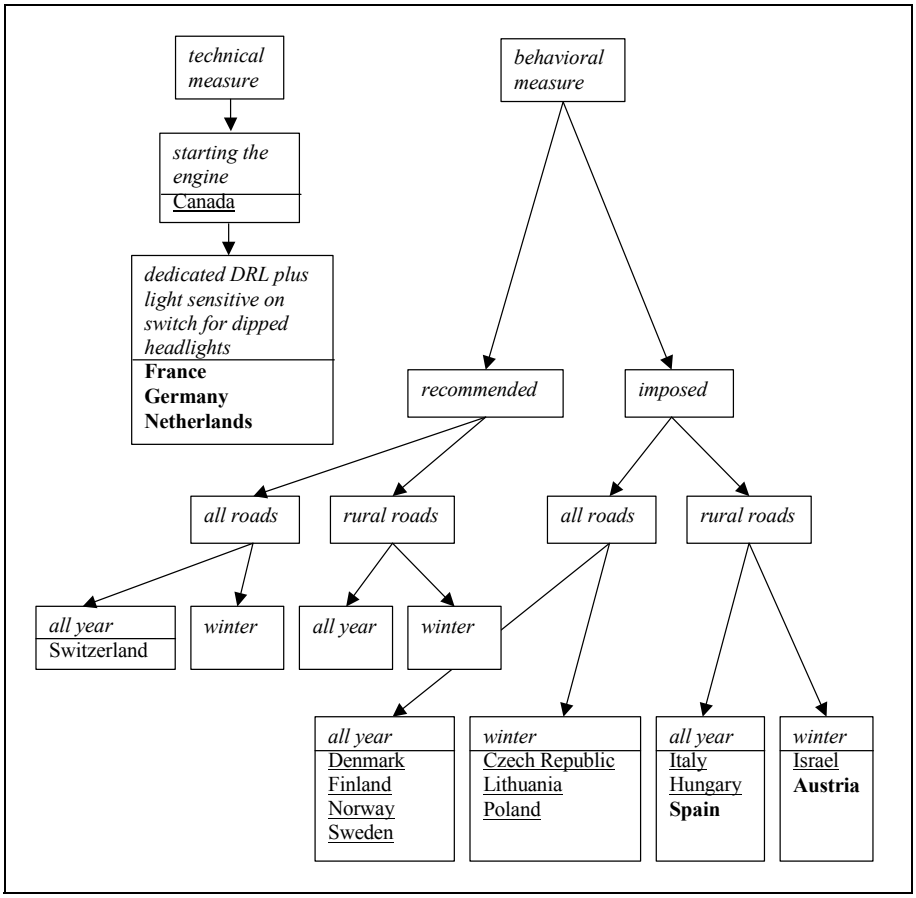

Figure 3.1. *Classification of possible DRL implementation scenarios, including those already applied in DRL countries.*
Underlined*: countries with DRL legislation.*
Standard*: countries without DRL legislation, but DRL recommended.*
Bold*: countries without DRL legislation; plans, or expressed scenario preference if DRL proven to be effective.*

The first distinction in *Figure 3.1* is that between the implementation of DRL as a technical measure versus as a behavioural measure. When implemented as a technical measure, the DRL are switched on automatically. In this case, DRL are de facto imposed on all roads during the entire year. The federal government of Canada is the only government that consistently decided for this implementation strategy, on the grounds that it would be the least costly and the most reliable long-term solution.

Figure 3.1 also shows an alternative technical measure, as discussed in France, Germany and the Netherlands. According to Robert (2000), if DRL are proven to be effective, then the implementation strategy with the largest acceptance level in France would be an automatic on switch of dedicated daytime running lights with an intensity somewhere between dipped headlights and parking lights, combined with the installation of receptors which switch on the dipped headlights in case of reduced ambient light (and automatically switch off the dedicated daytime running lights).
With a very strong emphasis on the condition that such dedicated DRL should first be proven to be effective in improving road safety, the position of

the experts from Germany is identical to that of France. If the latter condition is not satisfied, however, Germany would still be interested in the separate installation of receptors which switch on the dipped headlights in reduced ambient light conditions.
The Dutch authorities also favour automatic dedicated DRL, and view the light sensitive switch for dipped headlights as a sensible option.

If technical measures are only implemented on new car models, then this implies a possibly undesirable transition period with a mixed circulation of old and new cars. If it is found that the "masking" of unlit vehicles by lit ones imposes a safety risk, such a technical measure could either be combined with a second technical measure (e.g., the installation of a DRL switching kit, as was done in Canada) and/or a behavioural measure for older car models (i.e, the mandatory use of dipped headlights as DRL).
The advantages of a technical measure are that it results in uniform behaviour, and that it allows for the implementation of the solutions mentioned in *Table 3.1*. The disadvantage, of course, is the time lapse involved before all car models are equipped with automatic DRL, whatever the type of technical measure is chosen.

If DRL is implemented as a behavioural measure, there are several options. First, the measure can be either recommended or imposed, or even first recommended and then later imposed. Second, the use of DRL can be recommended or imposed on all roads, or on some roads only (in practice, these are always roads outside built-up areas), and during the entire year or only during part of the year (in practice, this is always winter time).
Moreover, the implementation of DRL as a behavioural measure can also be executed using a gradual approach, where, for example, DRL are imposed on rural roads and in winter time only in the first year, on rural roads during the entire year in the second year, and on all roads during the entire year in the third year. Such a gradual approach was applied in Finland and Hungary, for example.
As *Figure 3.1* shows, all Scandinavian countries currently impose year-round DRL on all roads, while the Czech Republic, Lithuania, and Poland impose DRL on all roads but during winter time only, Italy and Hungary impose year-round DRL but on rural roads only, and Israel imposes DRL on rural roads and in winter time only.
Moreover, Spain expressed plans for the strategy already implemented in Italy and Hungary, while Austria expressed plans for the strategy as implemented in Israel, at least in the medium term. Finally, Switzerland is the only country where the use of year-round DRL on all roads is only recommended.

Compared to a technical measure, the advantage of a behavioural measure is that the use of dipped headlights can be imposed straight away for all motorized vehicles, thus avoiding the possible problem of mixed circulation of lit and unlit vehicles. This advantage only applies on the condition that all vehicle drivers comply to the measure. The advantage also no longer strictly applies if the use of dipped headlights is only imposed on some roads, and/or part of the year. In the latter situation the risk of mixed circulation of lit and unlit vehicles may well increase due to inconsistent behaviour.
An argument mentioned by Robert (2000) against a year round behavioural measure on all roads is that the enforcement efforts required from the authorities could well be considerably larger than in the case of a technical

measure (see *Section 2.2.3*). However, the validity of this argument is questioned by Rumar (2003b). It is his experience that enforcement of DRL in the Scandinavian countries does not necessarily come from the authorities, but is also realized through the interaction between motor vehicle drivers themselves. Just as is common practice at night, by flashing their lights drivers warn another vehicle circulating without lights during the day also, and thus the drivers themselves enforce DRL.

It is interesting to notice that, of the nine DRL countries that responded to the questionnaire, seven used a gradual approach in the implementation of mandatory DRL. Over time, DRL were gradually made mandatory for more and more types of road in Finland and Hungary, and for more and more months of the year in Finland. In Sweden, DRL were already used by the army, the railways, and some companies years before the implementation of DRL legislation for all motorized vehicles. As mentioned before, in Canada publicity campaigns raised the voluntary use of DRL, in the four years before the introduction of DRL on new vehicles, to between 17.5% and 21.7%. In Norway about one third of the motorized vehicles already used DRL voluntarily even four years before the implementation of compulsory DRL on new motorized vehicles. In the answers to the questionnaire of the Czech Republic, it is mentioned that even before implementation of DRL, its acceptance had already been quite good, especially on motorways. In Israel, the implementation of DRL in 1996 was preceded by an experiment accompanied by an evaluation study in the winter of 1989/90.

Finally, since June 2002 the use of DRL in Italy is compulsory for all vehicles on motorways (urban and rural) and primary rural highways during the entire year, while in Switzerland the voluntary use of DRL was introduced in January 2002 for all motorized vehicles on all roads during the entire year. Therefore, in the present context the latter two countries could be considered to be in the first stages of a gradual DRL implementation strategy. In fact, after we received the filled-in questionnaire from Italy, the use of DRL became mandatory on all roads outside built-up areas in that country.

Besides the importance of raising the understanding of DRL by providing information concerning its visual workings (see *Section 3.2*), such gradual implementation strategies were probably helpful in getting road users used to DRL, and in obtaining broader public acceptance for DRL legislation.

These findings, combined with the experience that most of the opposition against DRL greatly subsided in countries after DRL legislation was implemented (see *Section 3.1*), suggest that it is sensible to apply a gradual approach to the implementation of DRL in countries which currently have no DRL legislation, even though this involves a transitional period with mixed circulation of lit and unlit vehicles. Therefore, it is recommended to start any implementation strategy with an introductory period of recommended voluntary DRL usage, accompanied with media campaigns explaining why DRL contribute to the improvement of road traffic safety, thus already raising both the understanding and acceptance level of DRL in road users before DRL are made mandatory.
Moreover, since the introduction of DRL as a technical measure on new cars will result in uniform behaviour, albeit in the longer run, and moreover allows for the minimisation or even complete solution of the adverse effects used in

the arguments against DRL, it is recommended to make the installation of automatic dedicated DRL on new cars –combined with a light sensitive switch automatically activating the low beam headlights in reduced visibility conditions (and deactivating the DRL)- at least part of the DRL implementation scenarios to be developed later in the project. As concerns the technical specifications of automatic dedicated DRL on new cars, these should be made in accordance with the already existing European ECE Regulation No.87 for daytime running lights (ECE, 1993).

3.4. **Summary**

The first objective of the present report was to provide an inventory of the currently legislated requirements for the use of DRL in the EU and elsewhere, and how that legislation has been implemented in these countries. Such an inventory is provided in *Figure 3.1* of *Section 3.3*. The figure shows that DRL has been implemented both as a technical and as a behavioural measure. So far, the majority of DRL countries chose to impose DRL as a behavioural measure. However, most cars in the Scandinavian countries (Denmark, Finland, Norway and Sweden) are sold with an automatic DRL switch as well. The countries which currently have legislation on the use of DRL can be further distinguished in whether they impose DRL during the entire year or in winter time only, and on all roads or on rural roads only.

The second objective of the present report was to assess what can be learned from the existing DRL implementations, so as to take these findings into account in the later development of realistic implementation strategies. When setting up European guidelines for the implementation of DRL, it is important to take the arguments against DRL into account. These arguments are enumerated in *Table 4.1* of the present report. Since most of the adverse effects mentioned in these arguments can be minimised or even completely solved by the implementation of DRL as a technical measure, it is recommended to make the installation of automatic dedicated DRL on new cars – combined with a light sensitive switch automatically activating the low beam headlights in reduced visibility conditions (and deactivating the DRL) - at least part of the DRL implementation scenarios to be developed later in the project.

In DRL countries the use of media campaigns during the introduction of DRL was found to range all the way from no media campaigns at all in Hungary to massive media campaigns in Canada. Since all DRL countries indicate not having met with much resistance and opposition against DRL after its implementation, there does not seem to be much that can be learned in terms of what type of media campaign would be optimal when introducing DRL in a non-DRL country. However, according to the person responsible for completing the questionnaire in Canada, “it is recommended that other countries intending to implement DRL policies take steps to inform their citizenry about the basic workings of visual perception relative to the driving task, since some of the comments from the Canadian public about DRL seemed to reflect a lack of understanding of the role and importance of contrast in aiding visual perception.”

Most DRL countries used a gradual approach to the implementation of DRL, either by encouraging the voluntary use of DRL before the introduction of

DRL legislation, or by a gradual extension of compulsory DRL usage over more and more types of roads, over more and more months of the year, and/or for more and more types of road users.
Such gradual implementation strategies allow road users to gain personal experience in the visual workings of DRL, thus probably also contributing to obtain broader public acceptance for DRL legislation.

These findings, combined with the experience that most of the opposition against DRL greatly subsided in countries after DRL legislation was implemented, lead us to recommend that the implementation of DRL in non-DRL countries is preceded with a period of recommended DRL usage, accompanied with media campaigns clearly explaining how the visual workings of DRL contribute to the improvement of road traffic safety.

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Appendices

Appendix 1 Questionnaire for DRL countries

A. DRL Legislation

1) When have Daytime Running Lights (DRL) become compulsory by law in your country (month and year)?

.....
.....
.....

2) To which type(s) of road users does DRL legislation apply (all motorised vehicles?, motorcycles only?, cars only?, etc.)?

.....
.....
.....
.....
.....

3) On which type(s) of roads is DRL compulsory in your country (all roads?, rural roads only?, etc.)?

.....
.....
.....

4) During which months of the year is DRL compulsory (the whole year?, only certain months?, if so: which months of the year?)?

.....

5) What type of lights for DRL are used in your country (dipped?, straight?, dimmed city lights?, etc.)?

.....

6) Are the DRL lights switched on automatically when starting the motor, or can they be turned on or off at will by the driver of the vehicle?

.....
.....

7) Is there a special type of light bulb used for DRL? If so what type of bulb is this?

.....
.....
.....

B. Implementation of DRL

8) Was the implementation of DRL accompanied with some form of introduction campaign in the media? If so, what kind of campaign was used (newspaper advertisements?, television advertisements?, advertisements on billboards along roads?, etc.)?

.....
.....
.....

9) If appropriate, what kinds of penalties or fines are issued in your country for road users not carrying DRL when they should be carrying it?

.....
.....
.....

10) Are you aware of any police enforcement activities especially aimed at carrying DRL in your country? If so, what type of activities?

.....
.....
.....

C. Acceptance of DRL

11) Is there anything you could mention about the acceptance of DRL by the public, lobbies and/or government parties in your country before the implementation of DRL (in terms of opposition or cooperation by certain (groups of) road users, lobbies or government parties)?

.....
.....
.....

12) And after DRL was implemented?

.....
.....
.....

13) Are there any official or unofficial evaluation reports available concerning the acceptance level of DRL in your country (either before and/or after implementation)? If so, could you supply us with the name(s) of the source(s)?

.....
.....
.....

D. National expertise on DRL

14) Are you aware of any other national experts -besides yourself- on DRL in your country that we could consult on matters of legislation and acceptance of DRL?

.....
.....
.....

Appendix 2 Questionnaire for non-DRL countries

A. DRL Legislation

1) Are there any plans of making Daytime Running Lights (DRL) compulsory by law in your country? Or were there plans for making DRL compulsory by law in your country in the past, but which have not been implemented?

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.....

If the answer to Question 1 is "No", you may ignore Questions 2 through 7, and continue with Question 8.

2) If so, to which type(s) of road users is/was DRL planned to be applied (all motorised vehicles?, motorcycles only?, cars only?, etc.)?

.....
.....
.....
.....

3) On which type(s) of roads is/was DRL planned to be made compulsory in your country (all roads?, rural roads only?, etc.)?

.....
.....
.....

4) During which months of the year is/was DRL planned to be made compulsory (the whole year?, only certain months?, if so: which months of the year?)?

.....

5) What type of lights for DRL are/were planned to be used in your country (dipped?, straight?, dimmed city lights?, etc.)?

.....
.....

6) Are/Were the DRL lights planned to be switched on automatically when starting the motor, or will they be turned on or off at will by the driver of the vehicle?

.....
.....

7) Are/Were there plans for using a special type of light bulb for DRL? If so what type of bulb will/would this be?

.....
.....

B. Voluntary use of DRL

8) To your knowledge, is there currently any amount of *voluntary* use of DRL by road users in your country? If so, could you provide us with any information you have on which and how many road users voluntarily carry DRL, on what type of roads, and in what kind of circumstances?

.....
.....
.....

C. Acceptance of DRL

9) Is there anything you could mention about the acceptance of the possible future implementation of DRL by the public, lobbies and/or government parties in your country about the possible future implementation of DRL (in terms of opposition or cooperation by certain (groups of) road users, lobbies or government parties)?

.....
.....

10) Are there any official or unofficial evaluation reports available concerning the acceptance level of the possible future implementation of DRL in your country? If so, could you supply us with the name(s) of the source(s)?

.....
.....

D. National expertise on DRL

11) Are you aware of any other national experts -besides yourself- on DRL in your country that we could consult on matters of legislation and acceptance concerning a possible future implementation of DRL in your country?

.....
.....

Appendix 3 Names of experts and institutes contacted

Klaus Machata
Austrian Road Safety Board
Austria

Karel Hofman
Directoraat-generaal Mobiliteit en Verkeersveiligheid
Belgium

James G. White
Vehicle Systems Research Division (ASFBA)
Road Safety and Motor Vehicle Regulation Directorate
Transport Canada
Canada

Jaroslav Heinrich
Road Traffic Technology, CDV
Czech Republic

Lars Klit
Road Safety and Transport Agency
Denmark

Veli-Pekka Kallberg
VTT Technical Research Centre of Finland
Finland

Sylvain Lassarre
French National Institute for Transport and Safety Research
France

Ursula Einfelder
Bundesministerium für Verkehr, Bau- und Wohnungswesen
Germany

Centre for Research and Technology Hellas, CERTH
Greece

Peter Holló
Institute for Transport Sciences Ltd (Kti), Road Safety
and Traffic Engineering
Hungary

Department Of The Environment
Ireland

Victoria Gitelman
Technion - Israel Institute of Technology, Haifa
Israel

Francesca La Torre
University of Florence
Italy

Vidmantas Pumputis
Lithuanian Road Administration
Lithunia

Rob Wegman
Ministry of Transport, Public Works and Water Management
The Netherlands

Richard Muskaug
Road Safety Section
Roads Directorate
Norway

Krzystof Jamrozik
Ministerstwo Infrastruktury
Poland

LNEC - Laboratório Nacional de Engenharia Civil
Portugal

Mónica Colás
Ministerio del Interior, Dirección General de Tráfico
Spain

Kåre Rumar
University of Uppsala, Department of Psychology
Sweden

Ueli Salvisberg
Beratungsstelle für Unfallverhütung (BFU)
Switzerland

Jeremy Broughton
TRL - Transport Research Laboratory
UK

Richard Vaniderstine
National Highway Traffic Safety Administration
USA

Appendix 4 Answers to the questionnaire for DRL countries

App. 4.1 Denmark

Legislation	
Date of introduction	1 October 1990. At that time it had already been mandatory for motorcycles for some years.
Type of road users	All motorised vehicles. Some motor driven vehicles are not equipped with lights, and for these DRL is not required.
Types of roads	All roads.
Months of the year	The whole year.
Type of light	The following types of light are allowed as DRL: dipped headlights, front fog lamps, dipped headlights with reduced voltage (11V or 12V for vehicles with 24V) or special DRL lamps. In all cases also the rear lamps shall be used. When dipped-beam lamps or front fog lamps are used lamps for marking must also be switched on. Dipped headlights seem to be used the most often.
DRL lights switched on automatically?	There are no requirements on how to switch on DRL. However, most cars are sold with an automatic on switch.
Special type of light bulb for DRL?	No. For DRL-lamps an intensity between 400 and 1200 cd is required. Lamps with an effective consumption between 15 and 21 W are accepted in all cases.
Implementation	
Media campaigns?	Spots on national television and information in the main newspapers.
Penalties on not carrying DRL	500 Dkr (about 65 euro).
Police enforcement?	No. The usage rate seems to be very high (my guess: > 95%). It is not likely that special police campaigns would be cost effective. However, in the first year after the introduction some campaigns were made.
Acceptance	
Before implementation	When first discussed in the Danish Road Safety Commision there was a broad acceptance. Later the Danish Cyclists Federation changed their mind and opposed against the introduction of DRL. In the media there was some debate on the costs for car owners: increased fuel usage and more frequently burned out bulbs.
After implementation	Today DRL seems to be accepted by most road users and organisations. DRL is not an issue discussed in Danish media. There seems to be an acceptable to high usage rate.
Evaluation reports	Not to my knowledge.
National expertise	
Any other experts?	No – it is not a big issue in Denmark!

App. 4.2 Finland

Legislation	
Date of introduction	1972: Use of DRL became compulsory for motor vehicles for the five winter months (November-March). 1973: Compulsory use was extended to cover seven months from September to March (included). 1982: DRL became compulsory for the whole year outside built-up areas (which are marked by road signs). May 1997: DRL became compulsory in built-up areas, too.
Type of road users	All motor vehicles.
Types of roads	All roads.
Months of the year	The whole year.
Type of light	Dipped headlights or specific DRL.
DRL lights switched on automatically?	In most vehicles DRL are automatically switched on when the motor is started. Manually operated DRL are acceptable, too.
Special type of light bulb for DRL?	In specific DRL, yes. “DRL must emit diffused light, so that they do not glare or disturb other road users”. Bulbs: ?, reference is made to E rule no. 7/02. If dipped headlights are used as DRL, normal bulbs for headlights.
Implementation	
Media campaigns?	Cannot remember how it was introduced in the 1970´s! Probably nothing very conspicuous. Later changes were routine, no campaigning either.
Penalties on not carrying DRL	Penalties are rare. If issued a petty fine (fixed penalty, max 200 euro) is most likely.
Police enforcement?	No enforcement targeted especially at use of DRL. Enforced in connection of normal police enforcement.
Acceptance	
Before implementation	Generally well accepted. No serious opposition. Some questions raised by individuals (no organisation opposed) about the cost (effect on fuel consumption).
After implementation	Same as above.
Evaluation reports	Effects on road accidents of recommended and compulsory use of DRL in Finland. VTT Road and Traffic Laboratory. Research report 64/1976. Marrkku Salusjärvi (VTT), Kjell Andersson (VTI), Göran Nilsson (VTI). In Finnish. The same in Swedish: VTI Rapport nr. 102/1976.
National expertise	
Any other experts?	No need for help from outside VTT, not at this stage anyway. Should we later need help regarding specific questions, I believe we (Juha and I) know whom to ask.

App. 4.3 Italy

Legislation	
Date of introduction	June 2002.
Type of road users	All vehicles on motorways (urban and rural) and primary rural highways. For motorcycles and scooters DRL are mandatory on all roads (urban and rural).
Types of roads	See answer above (depends on type of vehicle)
Months of the year	The whole year.
Type of light	We have 3 type of lights but I do not know the English names: * "position lights"; * "normal running lights" (which are the ones that you have to switch on to drive in the night or in motorways or primary rural highways); * "high intensity lights (probably your straight lights)" these should never be used if another vehicle is coming towards us as he will be flashed by our lights. There are needed only for very dark roads. We also have "anti-fog light" but these should be used only when driving in the fog.
DRL lights switched on automatically?	No: You have to switch them on yourself (also because you do not need them on all roads).
Special type of light bulb for DRL?	-
Implementation	
Media campaigns?	All the newspapers, tv and radio announced this implementation. In addition for approximately 1 month the police gave no tickets but only "advertisements" to drivers with no lights on when required. Now tollway companies are using variable messages and boards when entering the tollway to recall that you have to switch your lights on.
Penalties on not carrying DRL	Now you only get a fine (I don't know the exact amount). In June 2003 we will have the new system with "driving points". Out of the initial amount of 20 points you will have 2 point removed if you do not have your lights on when required (4 if your licence is less then 5 years old).
Police enforcement?	See answer to 'Media campaigns'.
Acceptance	
Before implementation	We had someone claiming that this will cost 1 euro per year per person more and multiplying this for the number of persons in Italy this makes a huge amount of money ….. I leave to you to decide how seriously this has to be taken. There was also someone claiming that this doesn't improve safety while, on the opposite, this will increase the risk. No data were offered to support this assumption so it did not get much credit. Personally I like them because you see much better the drivers arriving behind you. For motorcycles and scooters this was seen as solving a mistake in the law because everybody knew it was safer and all the experts kept on suggesting to switch on the lights also in daytime (and I always did so) but you could get a fine for that, before June 2002.
After implementation	No comments and no complains, as far as I know. I never heard any discussion on this.
Evaluation reports	As far as I know there is none.

National expertise	
Any other experts?	I'm afraid I would not define myself as an expert on DRL but an expert on road safety, if you wish. The person I would contact is Dr. Eng. Francesco Mazziotta of the Italian Ministry for Transportation and Infrastructures. For sure he is very much expert in transportation related legislation …. But unfortunately he doesn't use very much the e-mail. You can write him at: Ministero delle Infrastrutture e dei Trasporti Piazzale Porta Pia, 1 00198 – Roma – Italy

App. 4.4 Sweden

Legislation	
Date of introduction	1977, I believe in the Fall.
Type of road users	To all motorized vehicles.
Types of roads	On all roads.
Months of the year	The whole year.
Type of light	Most common DRL are standard low beams, but reduced low beams, special DRL lights and fog lights are also allowed.
DRL lights switched on automatically?	Automatic switching is standard on most modern cars, however that is not compulsory and on some old cars and on tourist cars driver switching is still normal.
Special type of light bulb for DRL?	No, there is no special light bulb used for DRL.
Implementation	
Media campaigns?	DRL was used as one of the measures to reduce crash probability already during our switch over from left to right hand traffic 1967. In the following years DRL was used by the army, the railways and some companies in order to enhance road safety. Therefore the public was used to DRL and the campaigning was not as strong as would have been necessary without that history. But all media were still used to inform the public.
Penalties on not carrying DRL	The fine is 400 Swedish crowns (about 45 EUR).
Police enforcement?	Initially there was some enforcement. But presently the automatic switching makes enforcement unnecessary. During the first years of DRL legislation reduced low beams were very common. Then there was some police enforcement of drivers using these reduced low beams in darkness.
Acceptance	
Before implementation	DRL is not a political issue, all parties seem to agree on the present legislation. However, there are always some groups who are of the opinion that anybody who cannot see a motor vehicle in full daylight should not have a driver license, other groups are of the opinion that the environmental damage and petrol consumption of DRL is a larger disadvantage than the reduced collisions. Motorcyclists often oppose general DRL because they would like to be alone having DRL.
After implementation	Because the automatic switching was unusual when the DRL was introduced, many individuals complained about dead batteries (because they had forgotten to turn off the lights when they parked). The opposition towards DRL has been substantially reduced with time after the initial legislation. One obvious reason is the improved technology (primarily automatic switching). Presently the main opposition is focused on the negative environmental effects of DRL. Many motorcyclists are still negative.
Evaluation reports	There were some studies in the beginning. However, I do not have them available. One study is referenced in my DRL report UMTRI-2003-11 (Engdahl, B 1976). There were several evaluation studies carried out concerning the effect of DRL on crashes. I think you have referenced most of them with the exception of Helmers (1988) and Stig Danielsson (????). The first one is referenced in my report, the second one I believe exists but do not have available.
National expertise	
Any other experts?	Lennart Dellby, Volvo, Gothenburg; Goran Andersson, Swedish Road Administration, Borlange; Goran Nilsson, VTI; Gabriel Helmers, VTI.

App. 4.5 Canada

Legislation	
Date of introduction	Automatic DRL systems were made compulsory on new vehicles manufactured from 1 December 1989 onwards. The regulation, actually an amendment to CMVSS 108, was published in *Canada Gazette Part II* on 2 September 1987. Link to regulation on TC website: http://info/acts-regulations/GENERAL/M/mvsa/regulations/mvsrg/100/mvsr108.html
Type of road users	The 1989 regulation applies to all new "4-wheeled" vehicles - passenger cars, passenger vans, sport-utility vehicles, buses, trucks, cargo vans and motor homes. Automatic operation of the headlamp and rear position (tail) lamp of new motorcycles sold in Canada has been compulsory since 1975. Thus, effectively, all motorized vehicles sold in Canada and manufactured after 1 December 1989 have automatic DRL.
Types of roads	The brief answer is that in practice however, DRL is used on all types of roads. DRL is automatically activated (see response to question on 'DRL lights switched on automatically?') and it is not possible for the driver to switch it off. Therefore, almost all vehicles except for very old ones operate with lights on at all times. The longer answer is that the use of DRL is not actually compulsory in most places. That is because, with one exception (see answer to question on 'Penalties for not carrying DRL'), provincial and territorial governments have not yet introduced laws requiring lights to be switched on in daytime, except during inclement weather. (The provinces and territories regulate road users and road use, including the licensing of drivers and vehicles, whereas the federal government only regulates vehicle safety through laws applying to manufacturers and importers.) In fact, DRL is generally maintained in good working order. Provincial/territorial laws require that all federally-regulated safety equipment, including DRL, must work properly when a used vehicle is sold to a new owner.
Months of the year	DRL are used year-round because the systems are automatic.
Type of light	CMVSS 108 specifies the following types of DRL: • low beam headlamps at normal light intensity, • low beam headlamps at reduced light intensity, • high beam headlamps at reduced light intensity, • turn signals, • brighter parking lamps, • fog lamps, and • completely separate DRL units. The various DRL types have been found to be bright enough to provide the essential conspicuity without causing discomfort glare. Technical requirements for the different types are given in CMVSS 108: http://info/acts-regulations/GENERAL/M/mvsa/regulations/mvsrg/100/mvsr108.html.
DRL lights switched on automatically?	The switching requirements are as follows: DRL must be on whenever the engine is operating and the master lights switch is in any position other than "headlamps on". This requirement effectively forbids override switches on new vehicles. DRL must switch off automatically when headlights are switched on. Optional "DRL off" conditions: (a) Automatic transmission in Park or Neutral, (b) parking brake applied, (c) during the interval between engine start and vehicle first being set in motion.

Special type of light bulb for DRL?	There are no special, preferred or obligatory bulbs for DRL. The DRL function is almost always fulfilled by the headlamps or direction indicators, using the normal bulbs. The regulations allow headlamps used as DRL to operate at a reduced voltage, which greatly extends the bulb life. Reduced-voltage DRL is very common on new vehicles.
Implementation	
Media campaigns?	There was a lot of public interest in the run-up to the new vehicle regulation implementation date and for some time after it, i.e. from about 1987 through 1995. Transport Canada and the provincial/territorial transportation authorities cooperatively produced and distributed a common design pamphlet and poster. The message, directed to drivers of pre-DRL vehicles, was to drive with low beam headlamps switched on at all times or to have a DRL switching kit installed for convenience. Transport Canada staff gave numerous press interviews and responses to direct requests for information from the public and other interested parties. The public (provincial) vehicle insurance corporations advertised in the media, primarily newspapers. Also, vehicle manufacturers mentioned DRL in their advertisements, particularly for models with DRL installed voluntarily before it became mandatory.
Penalties on not carrying DRL	None of the provinces/territories except the Yukon Territory have introduced specific laws requiring drivers to use DRL, so there are no penalties either. In the Yukon, headlamps or DRL must be used on all roads outside of towns. The fine for non-use is about 60 Euros.
Police enforcement?	We are not aware of any specific enforcement activities targetting the use of DRL on the roads. Transport Canada is responsible for enforcing the DRL requirements on new vehicles. The department purchases between 50 and 100 vehicles every year and tests them for compliance with many different CMVSS. Many other vehicles are audited through visits to manufacturers. Failure in any tests or inspections conducted either by Transport Canada or manufacturers may indicate the presence of a safety defect. Transport Canada also investigates vehicle defect complaints from consumers. When it is determined that a safety defect exists, the *Motor Vehicle Safety Act* requires manufacturers to advise owners of affected vehicles of the steps needed to remedy the defect. Several recalls have been made to replace DRL switching modules that failed or provided insufficient voltage. Photometric problems with the lamps themselves are rare.
Acceptance	
Before implementation	There was some voluntary use of headlamps in daytime in Canada, particularly on highways, at least since the 1960's. Many bus and truck fleets adopted policies to drive with headlamps on at all times to improve safety. Following upon the research and regulatory experience in Finland and Sweden in the early 1970's, Transport Canada began its own research into the effects of DRL on visual perception in 1975. The research clearly showed that headlamps were effective in improving visual detection distances, and the effect increased as ambient light level decreased. The federal Minister of Transport recommended in 1982, as a first step towards DRL, that the provinces and territories extend the mandatory lights-on period by two hours, i.e. from one half hour after sunset to one half hour before sunset, with a corresponding change at dawn. The subsequent regulatory changes played a role in sensitizing the public to the potential to improve safety through the simple means of switching on headlamps. After reviewing the evidence of collision benefits, the federal Minister

	of Transport and his provincial and territorial counterparts agreed in October 1985 to work towards a Canada-wide program for the use of DRL. The federal government agreed to pursue development of a new vehicle regulation as the least costly and most reliable long-term solution. It was obvious that all vehicles on the road should have DRL or switched-on headlamps to maximize the safety benefits and minimize the “masking” of unlit vehicles by lit ones. Therefore the provinces and territories, assisted by the federal government, undertook publicity campaigns stressing the safety merits of daytime lights use. To ensure that DRL systems would be kept operational as vehicles age, and to reduce the risk of “masking” of unlit vehicles in certain situations, Transport Canada encouraged the provincial authorities to consider mandating daytime lights use for all vehicles even before the federal regulation for DRL on new vehicles took effect. In 1987, the Yukon Territory became the first Canadian jurisdiction to introduce a daytime lights-use law. The other jurisdictions have preferred not to follow until such time as nearly all vehicles are DRL-equipped. (About 75 percent of vehicles are now equipped with DRL.) Transport Canada measured the daytime lights usage in several annual traffic surveys beginning in 1981, when 10.3 percent of vehicles were operated with lights on in daytime. Publicity campaigns raised the voluntary lights usage in daytime, in the four years (1986-89) before introduction of DRL on new vehicles, to between 17.5 and 21.7 percent. Insurers also supported DRL with publicity of various kinds. Of particular note was Saskatchewan Government Insurance’s “Lights on for Life” campaign. This initiative included newspaper and television advertising, message signs on highways, publicity materials such as brochures, stickers, key fobs, and information delivered by post, for example with licence renewal notices. Another notable DRL campaign was carried out, somewhat surprisingly, by a lifestyle magazine. The publicity noted above undoubtedly helped to ensure broad acceptance for the DRL regulation. Consequently, the public generally perceived DRL as sensible, although there were some concerns about glare. These concerns may have stemmed from incorrect aiming of headlamps on some vehicles, or the inadvertent use of high beam headlamps by some drivers who were unaware they had selected the incorrect beam. DRL did not become a political issue. None of the political parties at the federal or provincial/territorial levels opposed it. There was not a lot of reaction from lobby groups, although some (but not all) vehicle manufacturers initially opposed the proposed regulation. The Canadian Automobile Association supported DRL. The Canadian Motorcycle Association initially opposed DRL on the basis that motorcycles would become relatively less conspicuous, even though motorcycles had been equipped with automatic headlamp systems since 1975 and thus were on an equal basis to DRL vehicles. However, there was little opposition from individual motorcyclists, perhaps because they recognized the benefit to themselves of seeing other vehicles better. Some of the comments from the public about DRL seemed to reflect a lack of understanding of the role and importance of contrast in aiding visual perception. Some people thought that clear vision (usually expressed as an ability to see distant objects) somehow gave them a faultless ability to discern moving vehicles in visually complex surroundings including multiple targets. It is recommended that other countries intending to implement DRL policies take steps to

	inform their citizenry about the basic workings of visual perception relative to the driving task.
After implementation	DRL is not an issue any more. It is well accepted by all except a few who object to glare or see DRL as unnecessary government intervention in the driving process. The department receives few if any complaints about bulbs burning out, engine starting problems, etc. There have been some complaints that rear position lamps (tail lamps) should be automatically activated with the DRL. CMVSS 108 allows tail lamps to be either on or off with DRL – in fact, vehicles with both arrangements are on the market. The occasional vehicle can be noticed at night being driven without tail lamps. Usually the driver notices, after a short distance, that the instrument panel is dark or that the DRL do not illuminate the road well, and so switches on the headlamps and position lamps.
Evaluation reports	Transport Canada has not conducted any official research on the public acceptance of DRL. The department has carried out research and published reports about the effects of DRL on collisions. These are listed in the references of the attached document, and are available by contacting Vehicle Systems Research Division.
National expertise	
Any other experts?	Marcin Gorzkowski Senior Regulatory Development Engineer Road Safety and Motor Vehicle Regulation Directorate Transport Canada 330 Sparks Street Ottawa, ON K1A 0N5 E-mail: gorzkom@tc.gc.ca Tel. +1-613-998-1967 Fax +1-613-990-2913 Additional general information on DRL in Canada is contained in the enclosed .pdf file.

App. 4.6 Czech Republic

Legislation	
Date of introduction	From 1982 motorcyclists only . From January 2001 all users in so called winter time.
Type of road users	1982: motorcyclists during the whole year. 2001: all users in winter time.
Types of roads	Both acts are for all roads.
Months of the year	Motorcyclists the whole year, others in winter time only (mostly from the last Sunday in September till the last Sunday in March).
Type of light	Need a bit more time to check that I am not so familiar with this specific terminology.
DRL lights switched on automatically?	They can be turned on or off at will by the driver of the vehicle.
Special type of light bulb for DRL?	There are no special regulations comparing to other European countries.
Implementation	
Media campaigns?	Not at all.
Penalties on not carrying DRL	It may be very different (from ca. 7 Eu up to 70 Eu).
Police enforcement?	The enforcement is applied mostly in the beginning of October, where it comes to the force again.
Acceptance	
Before implementation	Even before implementation the acceptance has been quite good especially on motorways.
After implementation	Compared to other rules compliance is very high (certainly above 95%).
Evaluation reports	No.
National expertise	
Any other experts?	Mr. Jaroslav Tesarik at the Police Directorate of the Czech Republic.

App. 4.7 Hungary

Legislation	
Date of introduction	Dipped beam at daytime: 1984. 02. for motorcycles – on all roads 1993. 03. for automobiles (i.e.: passenger cars, buses, goods vehicles) – on rural main roads 1994. 06. for automobiles, agricultural tractors, slow motion vehicles and mopeds (if the last two categories have passing lamp) – on all rural roads. 1995. 12. for mopeds, equipped with passing lamp – on all roads 2001. 05. special DRL of automobiles can be used alternatively.
Type of road users	Presently to all power-driven vehicles (motorcycles, automobiles, agricultural tractors, slow motion vehicles) and mopeds. To rail-borne vehicles this decree is not applied, but internal regulation prescribes the use of DRL.
Types of roads	On rural roads only; except for motorcycles (from 1984) and mopeds (from 1995) which are obliged to use DRL on all roads.
Months of the year	Throughout the year.
Type of light	Generally dipped beam; special daytime running lamp is permitted in the case of automobiles.
DRL lights switched on automatically?	Manual switching on and off.
Special type of light bulb for DRL?	No special requirement.
Implementation	
Media campaigns?	Only some leaflets.
Penalties on not carrying DRL	Practically there is no enforcement. Hopefully it will be considered in the framework of the further developed point demerit system.
Police enforcement?	No. There are other important offences (speeding, non wearing of safety belt, driving under the influence of alcohol) which also need better police enforcements.
Acceptance	
Before implementation	The rate of DRL-users is continuously observed and measured as an important road safety performance indicator (by road categories).
After implementation	See previous question.
Evaluation reports	Péter Holló: Changes in the legislation on the use of daytime running lights by motor vehicles and their effect on road safety in Hungary, Accid. Anal. and Prev., Vol. 30, No.2, pp. 183-199, 1998.
National expertise	
Any other experts?	No.

App. 4.8 Israel

Legislation	
Date of introduction	In 1996.
Type of road users	All motorised vehicles.
Types of roads	a) For a two-wheeled vehicle, a taxi, a bus & a commercial vehicle – on all roads b) For all other vehicles – on inter-urban roads
Months of the year	Between the 1st of November and the 31st of March.
Type of light	Headlamps - dipped lights (low beam).
DRL lights switched on automatically?	At will by the driver.
Special type of light bulb for DRL?	The regular one – headlamps.
Implementation	
Media campaigns?	The implementation of DRL was preceded by an experiment accompanied by the evaluation study, in winter 1989/90. There was a 3-month media and road-side campaign promoting the use of DRL. Every year, during the winter period there are reminding announcements in the media.
Penalties on not carrying DRL	There are fines of 100/ 250 NIS (NIS - New Israeli Shekel; $1 = 5 NIS), and penalty points.
Police enforcement?	DRL enforcement presents a part of regular police enforcement. Besides, from time to time, the police carries out one-two day blitz operations on specific issues, including DRL.
Acceptance	
Before implementation	Field observations demonstrate high level of public acceptance; even in the summer period, some part of vehicles continues using DRL.
After implementation	No lobbies or government parties opposed the DRL, over the last years.
Evaluation reports	"The use of daytime running lights during the winter months – follow up and evaluation", by Hocherman I. and Hakkert S. Research report No. 91-160, TRI, Technion, 1991 (in Hebrew).
National expertise	
Any other experts?	Dr. Dan Link from the National Road Safety Authority (E-mail: noaba@mot.gov.il).

App. 4.9 Norway

Legislation	
Date of introduction	Compulsory on new cars from 1 January 1985, and on all cars from 1 April 1988.
Type of road users	All motorised vehicles.
Types of roads	All roads.
Months of the year	The whole year.
Type of light	Dipped lights or special DRL lamps.
DRL lights switched on automatically?	Up to 1994 they had to be switched on automatically when one started the engine. Since we entered the EEE in 1994 this rule was revised. Now the lights have to be lit, but they don't need to be switched on automatically.
Special type of light bulb for DRL?	No.
Implementation	
Media campaigns?	Brochures were used as well as newspaper advertisement and stickers on buses.
Penalties on not carrying DRL	A fine of 1000 NOK is applied.
Police enforcement?	No.
Acceptance	
Before implementation	Pedestrians, cyclists and motorcyclists were afraid that they would not be seen when DRL was introduced. Otherwise I can not remember any particular opposition.
After implementation	The measure is well accepted and it is not on the political agenda.
Evaluation reports	The use of DRL has been assessed and it was 30-35% in 1980-81, then it was 60-65% in 1984-85 and 90-95% in 1989-90. Today it is close to 100%.
National expertise	
Any other experts?	Dr. Rune Elvik at the Institute of Transport Economics.

Appendix 5 Answers to the questionnaire for non-DRL countries

App. 5.1 Austria

Legislation	
Are/were there any plans?	There have been several attempts to launch DRL, the latest one in 2002.
Type of road users	DRL is already mandatory for all motorised 2wheelers on all types of roads on all times. The plan was to extend DRL to powered four-wheelers.
Types of roads	The plan was rural roads and motorways (everywhere except urban areas).
Months of the year	The plan was winter time (according to European summer time regulations): late October till late March .
Type of light	Dipped beam, but according to the Austrian Road Safety Programme, the implementation of ECE R87 is supported at European level.
DRL lights switched on automatically?	No plans for automatic solution.
Special type of light bulb for DRL?	According to the Austrian Road Safety Programme 2002-2010, the implementation of ECE R87 is supported at European level.
Voluntary use	
Current status on voluntary use?	KfV-Observations 2001 (31.000 Cars): 25,8% DRL in bright sunshine, 51,9% in cloudy weather, 72,8% in rainy weather.
Acceptance	
Acceptance level of possible future implementation	KfV strongly supports DRL, whereas Auto Clubs (and many others) are opposed. This was the reason for the rejection of the draft law in 2002.
Evaluation reports	KfV-Survey (n=1000) December 2002: 75% of population think that DRL is a good or very good safety measure.
National expertise	
Any other experts?	Legislation: Christian Kainzmeier, Bundesministerium für Verkehr, Innovation und Technologie, Radetzkystraße 2, 1030 Wien, Christian.KAINZMEIER@bmvit.gv.at

App. 5.2 Belgium

Legislation	
Date of introduction	March 1984.
Type of road users	Two wheeled motorbikes and motorcycles have to carry a dipped head light and red rear light all the time.
Types of roads	All roads.
Months of the year	The whole year.
Type of light	Dipped head light and red rear light.
DRL lights switched on automatically?	Neither in the Road Traffic Regulations nor in Technical Regulations is it regulated that the lights should be switched on automatically, i.e., when the motor is started. Both options are therefore possible.
Special type of light bulb for DRL?	No.
Implementation	
Media campaigns?	I suspect that these new regulations were mentioned on television and in the newspapers at the time, but I can't provide any more information since it's such a long time ago.
Penalties on not carrying DRL	This is considered to be a serious offence and can therefore be punished with a fine of 50 to 500 euro or a prison sentence of 8 days to 1 month.
Police enforcement?	I don't know of any special actions concerning the assessment of such offences.
Acceptance	
Before implementation	-
After implementation	-
Evaluation reports	I don't think so.
National expertise	
Any other experts?	-

App. 5.3 France

Legislation	
Are/were there any plans?	No.
Type of road users	NA
Types of roads	NA
Months of the year	NA
Type of light	NA
DRL lights switched on automatically?	NA
Special type of light bulb for DRL?	NA
Voluntary use	
Current status on voluntary use?	In the Département des Landes during an experiment, 89% of drivers have declared to be in favour of voluntary use of DRL. See INRETS research report 244 (2002) by S. Lassarre: Évaluation de l'expérimentation des feux de croisement dans les Landes.
Acceptance	
Acceptance level of possible future implementation	Motorcycle associations are strongly against. The ministry of environment is concerned about the 1% of increase in CO_2 in the atmosphere due to more fuel consumption. Even the Direction pour la circulation et la sécurité routière is not sustaining this measure which has been proved to be highly effective in Les Landes on main rural roads.
Evaluation reports	C. Robert (2000). La question de l'allumage des feux de jour. Rapport pour le Ministre de l'équipement, des transports et du logement. Conseil Général des Ponts et Chaussées, Paris
National expertise	
Any other experts?	Jean Chapelon has conducted a consensus group on the subject, last year (jean.chapelon@equipement.gouv.fr).

Below follows a translation of the French summary of the most important conclusions concerning acceptance levels and possible implementation scenario's discussed in the extensive French evaluation report "The issue of daytime running lights" by Robert (2000).

Evaluation studies from other countries
With the notable exception of F.F.A.C. (see below), the organisations representing the consulted road users in France are not very convinced by the foreign evaluation studies (or by what they hear about them).

The DG VII (direction B) on its part has just brought a case before the new commissioner of Transport for a set of road safety measures containing a series of six priority measures and a series of five secondary measures. Daytime running lights are part of the second series. It is proposed to

continue the preceding studies on two issues: the cost-benefit ratio and the estimation of the effect on pollution. This, while the competent officials of the DG VII actually continue to think that the European Union has legitimate reasons only to interfere in the equipment of vehicles and that the best solution would be, for *new* vehicles only, either to impose the automatic switching on of daytime running lights or to impose “an” automatic system leaving the member states the choice between the automaticity at starting the engine or the automaticity through the use of receptors (i.e., a “light sensitive on switch”). To all appearances, a decision is not to be expected soon.

The equipment of vehicles

1. When it is proved that the visibility should be improved by day, even in good weather conditions, the best solution seems to be the one where the vehicles are equipped with a device which switches on special daytime running lights automatically when the engine is started. This lighting device should be constructed in such a way that the visibility of other vehicles is improved without hindering the drivers. Moreover, this system has the following three advantages:
   - it does not hinder the most vulnerable road users (cyclists, pedestrians) while improving the visibility of cars and trucks (this should be verified of course).
   - it allows for the differentiation of motorcycles which could continue to ride with dipped headlights which could moreover be coloured lights.
   - it is easily combined with the installation of receptors which switch on the dipped headlights when the ambient light is reduced (and automatically switch off the daytime running lights).
2. When it is estimated that no serious problems arise during daytime with reduced visibility conditions (bad weather conditions, dawn, dusk), the use of receptors is a suitable solution, under the condition that this new technology is reliable. This equipment has a gold colour and is already proposed by certain manufacturers of top quality vehicles. Be this as it may, the automatic on switching of daytime running lights also contributes to solving the problem by harmonising the behaviour (of road users). These lights (which are by definition switched on all day long) will be even more conspicuous during times of reduced visibility.
3. These solutions concerning the equipment of vehicles serve the general purpose of not distracting the driver and of improving his concentration on the essential, which is driving.
4. The rules of vehicle equipment correspond to European standards.

The period of transition

Especially due to the costs involved, it is difficult to conceive how the installation of new electrical or electronic equipment could be imposed on all cars. Therefore, if DRL were implemented, the problem of a transition period will arise, required for the renewal of all cars. To deal with this period there are three possible options

- do nothing (at least not immediately, until 30% of all cars has been renewed for example),
- recommend the use of DRL,
- impose the use of DRL (after a period of adaptation).

The latter two solutions could be applied to all roads outside agglomerations.

If a technical measure is combined with a behavioural measure, the choice between recommendation and obligation is a difficult one. Recommendation has the main virtue of helping the adaptation of road users to the measure and has the connotation of an active sense of public responsibility. However, it also implies the mixing of vehicles using and not using DRL, which is considered dangerous by some experts, but not by others; it also makes the evaluation more difficult and less meaningful.
Obligation has the opposite characteristics: it makes the measure more general and its evaluation easier; however, it also poses a tremendous enforcement problem. Even after a long notification period, should the police fine the opponents and the forgetful? And what to do if there are many of them?
Clearly, if a behavioural measure should be considered, a massive communication campaign would have to be started and relaunched periodically. It is to be foreseen that this will raise objections from individuals.

Mixed traffic
The issue of mixing vehicles with and without lights must be considered carefully. Some experts (whose advice seems to be shared on this point with ophtalmologists) are afraid of a negative safety effect. However, experiences abroad do not seem to give evidence to this risk. It would be a good idea to make use of the current experiences (in Les Landes, the Netherlands, Austria) to elucidate this point.

If recommended or imposed, all roads or outside built-up areas?
The choice between a general measure and a measure limited to the areas outside agglomerations is not easy in France.
The general measure has the advantage of simplicity of implementation and enforcement but raises the justified fears of the vulnerable road users especially in agglomerations where there are many of them, while it is the only means to actually evaluate the real effects on these types of road users, a contradiction.
Limiting the measure to rural roads should partially reassure the vulnerable road users (pedestrians and urban cyclists) without mollifying, however, the hostility and fears of the motorcyclists and cyclists circulating on rural roads. One may also question whether such a partial solution is suitable for France with its geography characterized by very scattered cities and villages. It is to be foreseen that not many drivers will acquire the reflex to adapt their lights when seeing the road signs for entering and leaving agglomerations, and that there will be different reactions.

The impact of a recommendation or obligation on the current car stock
The current car stock has not been built for this task. Moreover, the experience in Les Landes has shown the risk of empty batteries (due to their running out) in vehicles not equipped with alarm systems (approximately half of the car stock).

The current acceptance levels of French institutes and organisations
With the notable exception of the F.F.A.C., whose president thinks it imperative to implement any measure whose positive effect on road safety is scientifically proven, the discussions with the parties involved does not give the feeling that daytime running lights are of primary importance. Neither the administrations (except for the police), nor the organizations seem to think it worth the effort; they have other priorities. Against this background, the fears

of the organizations representing the so-called vulnerable road users are strong and expressed with vehemence.
Supposing that the present report (i.e., by Robert) opens up discussions at the ministerial level, it should not be too difficult to obtain an agreement between the three Ministries of Equipment, of Internal Affairs, and of Defense concerning a national experiment. However, one should expect serious objections from the Ministry of Environment.
Schematically, positions of the different French organisations concerning the voluntary or compulsory use of dipped headlights during the day by the existing car stock can be arranged in the following three categories:

1. Very much in favour or rather in favour are:
   - Fédération Française des Automobile-Clubs (F.F.A.C.)
   - Fédération Française de Motocylisme (F.F.M.)
   - Syndicat des médicins ophtalmologistes (with reservations concerning motorists)

2. Very much opposed or rather opposed are:
   - Fédération Française des Motards en Colère (F.F.M.C.)
   - Fédération Nationale des Usagers des Transports (F.N.A.U.T.)
   - Fédération des Usagers de la Bicyclette (F.U.B.I.C.Y.)
   - Droits du piéton
   - France Nature Environnement

3. The following organisations have reservations:
   - Prévention routière
   - Constructeurs
   - Laboratory of Accidentology, Biomechanics and human behaviour (L.A.B.)
   - Fédération Française de Cyclotourisme (F.F.C.T.)
   - Consultant ophtalmologiste des Armées et des Transports
   - Association Nationale pour l'Amélioration de la Vue

The system of automatic DRL mentioned above, seems to have the potential of rallying the different organizations in favour of implementation, with the exception of the F.F.A.C. which raises the issue that the time lost in the decision and implementation process of this system is unacceptable.

App. 5.4 Germany

Legislation	
Are/were there any plans?	No.
Type of road users	NA
Types of roads	NA
Months of the year	NA
Type of light	General remark: this question shows that one must clearly define what is meant by “Daytime Running Lights” (i.e., whether automatically switched on, or manually).
DRL lights switched on automatically?	NA
Special type of light bulb for DRL?	NA
Voluntary use	
Current status on voluntary use?	An evaluation of the quantative numbers of voluntary users of DRL (dipped headlights) is not possible. There are indications that dimmed lights are also used with stronger environmental light, but until now there is no representative research on this subject. The obligation of using light for all vehicles is generally laid down in §17 of the German Road Traffic Regulations. According to article 2a of this law motorcycles must carry dipped headlights also during the day. All other vehicles have to use the light devices prescribed when the visibility conditions so require – especially during darkness and during dusk, but also when visibility is impaired by rain, snowfall or fog as well as by smoke or other comparable influences caused by human beings. Please note that no prohibition of the use of dipped headlights even during daytime can be derived from §17 of the German Road Traffic Regulations.
Acceptance	
Acceptance level of possible future implementation	Neither from the country (Länder) nor from the big car companies is there any pressure on the government to dedicate itself to the introduction of DRL. The general conviction seems to be that there is no actual significant benefit. Sometimes voices of citizens are heard asking for the reasons why there is no DRL in Germany, but as many citizens speak against such an obligation. (It should be noted here that motor vehicle users are free to carry lights also during the day, see the answer to the previous question.) The motorcyclists lobby has spoken against the introduction of DRL for all motorised vehicles. Until now the interest groups for more vulnerable road users have also not spoken in favour of the introduction of DRL.
Evaluation reports	No.
National expertise	
Any other experts?	This subject is coordinated with the appropriate bodies of the government through Report S 32.

App. 5.5 The Netherlands

Legislation	
Are/were there any plans?	Yes, there were plans.
Type of road users	Cars and motorcycles.
Types of roads	All roads.
Months of the year	The whole year.
Type of light	Dipped beam headlights or daytime running lamps.
DRL lights switched on automatically?	Automatically.
Special type of light bulb for DRL?	Not so far. In the future we would like to use energy-efficient (specific DRL) lamps, that work independently from rear, dashboard and number plate lighting.
Voluntary use	
Current status on voluntary use?	Voluntary use is about 50%; more outside than inside built-up areas; it varies with the weather conditions (less used in sunny weather).
Acceptance	
Acceptance level of possible future implementation	Public acceptance seems high (especially with motorists). There is strong opposition from organisations of pedestrians, cyclists and motor cyclists. They are afraid they will be relatively less conspicuous. There are also concerns about extra fuel consumption and CO2 emission.
Evaluation reports	No.
National expertise	
Any other experts?	The SWOV Institute for Road Safety Research.

App. 5.6 Spain

Legislation	
Are/were there any plans?	In Spain, we are considering the convenience or not of using DRL. Nowadays it is exclusively compulsory in the case of motorcycles.
Type of road users	Our idea “totally provisional” would be applicable to all kind of vehicles.
Types of roads	If one day it would become compulsory, our intention would be to make it compulsory for all kind of roads, except built-up areas.
Months of the year	In principle it would be for all months of the year.
Type of light	Not studied.
DRL lights switched on automatically?	Not studied, because of the problems which could ensue from the fact of making it compulsory for some roads, and not for others.
Special type of light bulb for DRL?	Not studied.
Voluntary use	
Current status on voluntary use?	Yes, the voluntary use of DRL is increasingly frequent on roads outside built-up areas. It has also been used for a long time by members of our traffic police.
Acceptance	
Acceptance level of possible future implementation	There are no studies on this area. We think that it would not be extremely difficult to implement that measure, except for opposition from bike riders and, perhaps, ecologists.
Evaluation reports	Not studied the level of acceptance. There is a study on the measure in itself developed by the Center Zaragoza, Address: Crtra. Nacional 232, Km 273, 50690 Pedrola (Zaragoza).
National expertise	
Any other experts?	Executive Director Legislation and Complaints (DGT) Edificio General Aranaz 86 28027 Madrid (vhernando@dgt.es)

App. 5.7 Switzerland

Legislation	
Are/were there any plans?	Voluntary use of DRL introduced on January 1, 2002. It is a recommendation and is not compulsory, that means that non-compliance does not incur a fine. Link: http://www.lichtein.ch/.
Type of road users	Recommended for all motorized vehicles.
Types of roads	Not compulsory, they can be used on all roads.
Months of the year	Not compulsory, but recommended at all times.
Type of light	Dipped headlights.
DRL lights switched on automatically?	The DRL lights are not switched on automatically.
Special type of light bulb for DRL?	There is no special type of light bulb in use.
Introduction	
Media campaigns?	Introduction of voluntary use of DRL with a joint campaign (radio announcements before and after traffic information, posters nationwide, flyers, Internet, Infomedia) under bfu's supervision. http://www.test-luci.ch/ http://www.demarrerallumer.ch/
Penalties on not carrying DRL	No fines (see 1).
Police enforcement?	No police enforcement activities.
Voluntary use	
Current status on voluntary use?	
Acceptance	
Acceptance level of voluntary use before introduction	Prior to introduction, widescale support of the Swiss Federal Roads Authority, Swiss Insurance Association, automobile associations, automotive trade, public transport authorities, associations of driving school instructors, police, traffic authorities, Fonds für Verkehrssicherheit (Road Safety Fund), Schweizerischer Verkehrssicherheitsrat (Swiss Council for Road Safety). All were partners in the joint campaign. Acceptance by the public: In 1999, 21% of the Swiss population would tend to be in favour of compulsory Daytime Running Lights for cars (bfu survey, autumn 2002). In 2000, the proportion of those in favour was 38% and in 2001 56%.
Acceptance level of voluntary use after introduction	Opposition: Opposition to the measure was expressed by individuals in the form of letters to newspapers or in e-mails/letters to the bfu or other partners in the joint campaign. Acceptance by the public: 64% of the Swiss population would tend to be in favour of compulsory Daytime Running Lights for cars (bfu survey, autumn 2002).
Evaluation reports	No evaluation available. 9 to 25 percent increase in the use of DRL in fine weather. Link Infomedia 2.7.2002: http://www.bfu.ch/medien/infomedia/infomedia_2002/2114.htm
National expertise	
Any other experts?	None, apart from some of our partners.

App. 5.8 United Kingdom

Legislation	
Are/were there any plans?	No.
Type of road users	NA
Types of roads	NA
Months of the year	NA
Type of light	NA
DRL lights switched on automatically?	NA
Special type of light bulb for DRL?	NA
Voluntary use	
Current status on voluntary use?	Cars in GB that were manufactured in countries with mandatory use of DRL (mainly Volvos and Saabs) typically drive with DRL, because the lights come on automatically, but drivers of other vehicles only turn on in daytime in conditions of poor visibility.
Acceptance	
Acceptance level of possible future implementation	The issue of DRL has received virtually no public discussion in GB. There is some prejudice among the general public against Volvo drivers, who are sometimes perceived as aggressive, and this association may have created a slight hostility.
Evaluation reports	None that I am aware of.
National expertise	
Any other experts?	VSE Division of the UK Department for transport deals with vehicle lighting and other issues concerning vehicle standards and equipment, I do not know which official is currently responsible. TRL has carried out research into vehicle lighting for the Department of Transport, and when I carried out a review of the Koornstra report some years ago I consulted the one remaining person who had been involved. He had only limited knowledge, and has since retired.

App 5.9 United States of America

Here we discuss the situation in the United States, as we deduced from an email and documents concerning DRL that we received from the official responsible for the U.S. Federal Motor Vehicle Safety Standard (FMVSS) 108 at the National Highway Traffic Safety Administration (NHTSA) of the U.S. Department of Transportation (NHTSA, 2002).

According to a document written by Bergkvist of General Motors (2001), the use of DRL in the US is not compulsory, but a final rule was published in January 1993 amending Federal Motor Vehicle Safety Standard (FMVSS) 108 to explicitly allow the *voluntary* installation of DRL. This rulemaking was needed because a multitude of conflicting state laws had the practical effect of prohibiting the installation of DRL.
General Motors began to install DRL on selected 1995 model year vehicles. By the 1997 model year, DRL were standard equipment on all General Motor vehicles sold in the U.S. To date, General Motors has sold more than 23 million vehicles in the U.S. equipped with DRL. General Motors, Saab, Volvo and Volkswagen were the first manufacturers to introduce DRL in the U.S.
Also according to Bergkvist, DRL are provided in a variety of configurations. These include reduced intensity upper beams, reduced or full intensity low beams, dedicated DRL, or turn signal DRL. A Notice of Proposed Rule Making (NPRM) was issued by the NHTSA in August 1998 intended to address glare. NHTSA explained that the proposal to limit DRL photometric output was prompted by numerous driver complaints regarding DRL glare. The National Highway Traffic Safety Administration (NHTSA) planned to address glare according to the following plan:
Phase 1 – DRL using the upper headlamp beam would not be permitted to exceed 3,000 cd at any point. Starting one year after publication of the final rule.
Phase 2 – Reduce the intensity to 3000 cd anywhere in the beam and for lower beam DRL to maximum 3000 above horizontal. Starting two years after publication of the final rule.
Phase 3 – Reduce the intensity to 1500 cd anywhere in the beam and for lower beam DRL to maximum 1500 cd above horizontal. Starting four years after publication of the final rule.
Again according to Bergkvist of General Motors (2001), an analysis of the complaints that NHTSA had received revealed that the number of complaints were overestimated because of repeats and multiple copies of letters. Some complaints were solicited by organizations who opposed DRL in principle. When the solicited and redundant comments were removed, the actual number of unsolicited complaints fell dramatically.
Also according to Bergkvist of General Motors, in Canada where DRL has been mandatory since 1989, the few initial DRL complaints dropped to virtually zero by the early 1990s. Canadian complaints continue to be virtually non-existent even though they have the same photometric provisions as those specified in the current U.S. FMVSS 108. This suggests that perceived glare may be a novelty effect. Accordingly, General Motors is hopeful that NHTSA does not adopt the DRL photometric restrictions proposed in the NPRM.
Finally, Bergkvist mentions that General Motors believes there is a strong general acceptance of DRL in the market. To support this he presents the

results of surveys conducted to determine the consumers perception of DRL as a safety feature. In a survey conducted in 1997, it was found that 23% of the respondents definitely wanted DRL implemented as a safety feature of motor vehicles. In a second survey conducted in 1998, it was found that 64% of the respondents were of the opinion that DRL is a beneficial feature, 26% that it is a neutral feature, 8% that it is a negative feature, and 2% did not respond. However, nothing is mentioned about the sample sizes used in these two surveys.

According to the official who is responsible for the U.S. FMVSS 108 of the NHTSA, DRL appear to reduce crashes in the U.S., although a study that the NHTSA performed is not robust enough to use for deciding whether mandating DRL would be cost effective (NHTSA, 2000). The NHTSA are now revising that study with a few more years of data. The new study should be published in May 2003. Additionally, there is a General Motors sponsored study described in Bergkvist. It has the same small data sample problem. GM is also redoing the study with more recent data and the result should also be available in May 2003.
Again according to the official at NHTSA, one thing that is particularly important for public acceptance is to ensure that the DRL intensity is high enough to be conspicuous, but not so high as to be considered glaring. That is an issue that NHTSA is currently resolving based on hundreds of complaints from the public. Information about this may be read at: http://dms.dot.gov/search/searchFormSimple.cfm searching for 3319 and 4124 as the two docket numbers. As a result, NHTSA is about to publish an amendment to substantially reduce the permitted intensity. There will be an additional amendment to deal with further intensity reductions and some issues concerning wiring and use. This amendment will follow toward the end of this year. Also, General Motors, based on its study of the data, has formally petitioned NHTSA to amend the Standard to mandate the use of DRL. NHTSA has not made any decision yet on whether to act on that petition or not.