Informal document No. **1**
(50th GRE, 7-11 April 2003,
agenda item 6.5.)

~~Distr.~~
~~GENERAL~~

~~TRANS/WP.29/GRE/2003/…~~
~~31 January 2003~~

~~Original: ENGLISH~~

~~ECONOMIC COMMISSION FOR EUROPE~~

~~INLAND TRANSPORT COMMITTEE~~

~~World Forum for Harmonisation of Vehicle Regulations (WP.29)~~

~~Working Party on Lighting and Light-Signalling (GRE)~~
~~(Fiftieth session, 8 -11 April 2003,~~
~~agenda item 6.5.)~~

SUMMARY OF THE DISCUSSION CONCERNING DAYTIME RUNNING LIGHTS IN GERMANY

Transmitted by the Experts from Germany

Note: The text reproduced below was prepared by the experts from Germany, in order to give a summary of the discussion concerning daytime running lights in Germany.

The pros and cons of daytime running lights

The studies on daytime running lights reveal different findings. The author summarizes the state of the discussion. *By Christine Kramer*

Since the 90s, the question of whether it will be possible to significantly improve road safety if all motor vehicles generally use their lights – even with the best lighting conditions during daytime – has been more and more intensively discussed.

Before considering in more detail the arguments of the supporters and critics of such a legal obligation, it is first of all necessary to present the current legal situation in Germany and to define some terms.

Lighting in accordance with § 17 of the German Road Traffic Regulations

In paragraph 3 of this section, motorcycles are required to drive with dipped headlights switched on also during the day, irrespective of the ambient lighting. All other vehicles have to use the lighting devices prescribed when the visibility conditions so require – especially during darkness and during dawn but also if the visibility is impaired by rain, snowfall or fog as well as smoke or other comparable influences caused by human beings. The other provisions concerning main beam and fog lights contained in § 17 can be neglected here.

It is, however, important to state that no prohibition of the use of dipped headlights even during daytime can be derived from § 17 of the German Road Traffic Regulations. Whereas a share of the road users already today uses dipped headlights on motorways it must, however, be mentioned on the whole, that at the same time a noticeable share of the motorists does not always comply with the legal provisions on lighting by switching on the dipped headlight too late, especially with the onset of dawn.

Daytime running lights and daytime running lamps

In the mid-90s, the discussion on the benefits of the obligatory use of light also during daytime or properly speaking "around the clock", began in Germany, too. At first, the term daytime running lights designated the use of the passing beam during daytime while, for the time being, the question remained open of whether for the introduction of such an obligation the vehicle driver should be responsible for the manual switching on of the light or if – at least in the medium run – an automatic activation of the light coupled to the ignition of the engine should be provided for. In the meantime, further options, such as dimmed passing beam or fog light and mainly special daytime running lamps in accordance with ECE Regulation No. 87[1] with a significantly reduced intensity of light have been included in the discussion. Today, the term "daytime running lights" is regarded as the generic term for several conceivable options of the obligatory use of light during daytime.

The pros and cons

From the point of view of the supporters, there is especially the following argument in favour of daytime running lights: daytime running lights may help to better recognize other road users – but only motor vehicles – to better distinguish vehicles driving from those in stationary traffic and to better assess their direction of movement. These presumed benefits are based on:

a) Generally positive results of fleet trials in the USA, Sweden and Canada in the 60s, which could, however, not be confirmed by later fleet trials performed in Austria. Furthermore, the Federal Highway Research Institute has shown in a study that due to methodical shortcomings and the low number of random checks carried out during these earlier studies, the results at the most permit a tendency statement. Moreover, daytime running lights only bring about safety gains for only a part of motor vehicles because they stand out against other traffic.

   But this effect might be essentially lower in the case of the obligation to generally use daytime running lights.

1 This ECE Regulation is like all Regulation of the ECE in general optional and not obligatory, i.e. these special lamps are approved but not prescribed.

b) Positive results from Scandinavia (Finland, Sweden, Norway) where at first the use of daytime running lights was recommended and then prescribed. There, a reduction in the number of accidents involving personal injury in broad daylight by 6% - especially in the case of head-on collisions - was detected; when driving in the same direction (e.g. overtaking) this effect was only small and partly contradictory, since the number of such accidents rose in Finland. The results were also contradictory for accidents involving motor vehicles and cyclists as well as motorcyclists and pedestrians. A Danish study carried out after the introduction of daytime running lights also in Denmark (cf. c.) showed a slight to considerable increase in such accidents. The authors of the Swedish study themselves asked to take the lacking statistical significance of their study into consideration. Moreover, the range of the results might largely be attributable to the phase of dawn which lasts two to three times longer in Scandinavia than in Central Europe.

c) Positive results in Denmark; but instead of the expected effect of 5%, a reduction of altogether 2.5% of accident figures was observed, with the number of accidents involving pedestrians rising considerably and that of accidents involving motorcyclists slightly. Furthermore, technical problems became evident in Denmark: daytime running lights (passing beam) lead to a higher wear and tear of lamps so that it was increasingly the case that even during night-time more and more vehicles were only lit on one side, largely unnoticed by the driver. On the whole, daytime running lights in the variant of the passing beam would significantly reduce the working life of lamps.

d) Positive results in Hungary; these results are, however, scientifically not usable since a too low number of cases was assessed there and the trials involving daytime running lights were simultaneously accompanied by legislative and practical measures (traffic surveillance) in order to enhance road safety.

e) According to a survey made by DEKRA involving 1,600 motorists in Germany, 79% of them would hope for an improvement of road safety from the use of daytime running lights. But this survey is also not representative and has no scientific value.

f) Of special importance for the discussion of this subject is still today the report prepared by the SWOV[2] in 1997:

On behalf of the European Commission, the SWOV has reanalyzed all foreign studies known so far on the subject of daytime running lights, i. e. has developed a common methodological basis for them. By means of correction factors, among other things depending on the geographical degree of latitude, the rate of use of daytime running lights and the accident situation, the findings achieved were converted for each EU Member State.

The astonishing result was: daytime running lights used throughout the EU would very significantly improve the accident situation. For the EU, a reduction of 5,500 fatalities, 155,000 injured persons and 740,000 accidents was calculated; for Germany alone, a reduction of fatalities by about 1,500 per year was forecast.

The level of these calculated positive effects gave, however, rise to doubts. A review by the Federal Highway Research Institute showed that the positive effects were significantly overrated, since the potential negative collateral circumstances (safety loss for motorcyclists, reduced consciousness of the brake lights, dazzling effect, negative effects during introduction) were hardly taken into consideration, and the times where light is used during daytime already today – e.g. bad weather conditions – were not taken out of the calculation. The study was, on the other hand, essentially based on analyzes in such countries (Northern Europe, Canada) where the outline conditions of traffic are less comparable with the conditions in Central Europe and the importance of national conditions, such as the accident structure, the design of the road environment, traffic density and the characteristics were underestimated (for example, daytime running lights might scarcely be of significance for rear-end collisions and accidents on motorways).

Therefore, the reduction of the fatality figures calculated for Germany seemed to be misleading. Taking the SWOV methodology as a basis, for 3,453 fatalities in road traffic in Germany in 1995, an accident situation would have to be assumed where daytime running lights might have been relevant. In order to achieve the effect forecast by SWOV, daytime running lights would have prevented 45% of these fatal accidents, 88% thereof during the winter months when this light is anyway used more often.

2 Dutch research institute comparable to the Federal Highway Research Institute.

g) Convincing findings can neither be derived from the more recent Canadian studies (1997 Tofflemire Study). Since 1989, new vehicles in Canada have been equipped with special daytime running lamps. With this measure, a reduction in the number of head-on collisions and angle collisions by 10 to 20% was expected. But the reduction actually achieved ranged only about a hardly significant 5%.

Statistically significant effects for the accident constellation "opposing collisions" could only be determined in two out of a total of nine Canadian provinces analyzed and for the constellation "angle collisions" only in one province. From the point of view of the Canadian authors, these differences are presumably to be attributable to regionally different outline conditions, especially the varying degrees of urbanization as well as climatic and road constructional differences.

After a review of this study, the Federal Highway Research Institute concluded that the doubts concerning the SWOV study are in addition supported by this Canadian study.

Opinion of the German legislator

In consideration of these factors, there is a mostly disapproving view in Germany with regard to the obligatory use of daytime running lights by all motor vehicles. The essential arguments were and are:

- The safety gains achieved by the obligation for motorcycles to use daytime running lights (§ 17 para. 2a of the German Road Traffic Regulations) for these road users would be called into question if daytime running lights were made mandatory for all motor vehicles[3]. According to analyzes made by the Federal Highway Research Institute, this disadvantage could at the most be compensated for or at least reduced if differently bright light was prescribed for motorcyclists and other motor vehicles.
- This fear of an impairment of safety for motorcycles was confirmed by a pilot project where trials were made with test persons in order to find out the effect which the general obligation to use daytime running lights would have on the perceptibility of motorcycles. The result was: especially in complex and potentially accident-prone traffic situations the motorcycle was less frequently recognized by the test persons[4]. In addition, reference is made to the already mentioned Danish studies.

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3 See also: Statement of reasons concerning the 9th Ordinance amending the German Road Traffic Regulations, in force since 1 October 1988.
4 VDI reports Nos. 1159, 1194, p. 283.

- Moreover, fears concerning the influence of simultaneously used rear position lamps on safety are expressed in scientific papers. A negative effect could be that the consciousness of the brake lights and the turn signals is reduced. A possible shift of accidents (e.g. more rear-end collisions) cannot be excluded. Further shifting effects are possible if, according to the stipulations underlying the obligation to use daytime running lights, this type of light will over many years only be partly used.
- Further negative effects could result from the reduced consciousness of road users not using lights, since the attention is drawn to the now more conspicuous motor vehicles with lights switched on. This fear is in particular supported by the above-mentioned Danish studies (increase of accidents involving pedestrians). The Dutch studies of the SWOV, however, do not expect an essential impairment of the more vulnerable road users since the perceptibility of the motor vehicle traffic would be facilitated. But this would mean that a higher level of attention is demanded from the more vulnerable road users since they are to observe the quicker motor vehicle traffic which they can do better with the introduction of mandatory daytime running lights.
- In the ophthalmologic literature, the dazzling effect of headlamps of conventional passing beam is mentioned since these beams in many cases deviate from the ideal line (at crests, in bends etc.). This dazzling effect is still enhanced by a wet road, ice or snow during daytime. The fears that the consciousness of the more vulnerable road users will be even more restricted are, thus, further supported.
- Efforts only at national level inevitably result in a mixing of vehicles using daytime running lights and vehicles not using such light. This may bring about disadvantages especially for the safety of pedestrians and cyclists because they misjudge situations because of the overwhelming part of the vehicles using daytime running lights mixing with the few vehicles not using this light, so that the safety benefits of daytime running lights which are anyway not convincingly proven, are again called into question.
- These disadvantages with regard to safety would, moreover, support a technical solution, since a rule of conduct alone will not approximately achieve a compliance of 100%. When the use of daytime running lights was recommended at regional level (Minden, Northrhine-Westphalia), the level of compliance ranged between 20 and 35% with decreasing tendency the longer the measure lasted. A legal obligation would certainly result in a higher rate of compliance than a mere recommendation. Full compliance would, however, even then surely not be achieved, if motorists have to switch on the light on their own. This impression is still enhanced by the fact that, according to letters from

citizens received by the Federal Ministry of Transport, a high level of acceptance of such a legal regulation might not be expected.

- The benefits which have up to now not been very much proven are accompanied by relatively high costs. In relation to the German motor vehicle fleet, the Federal Highway Research Institute and the Association of the German Automobile Industry have jointly calculated an additional fuel consumption of approximately 498 million litres when using dipped headlights as daytime running lights which would enhance the CO_2 emissions by 1.2 million tonnes. This additional consumption could, however, be reduced if special daytime running lamps with a lower light intensity were used.

Development in other European countries

At the end of the 90s, a recommendation was made in Austria to switch on the light when driving during daytime. The evaluation of the accident situation (report of the year 2000) found out that a general obligation to use daytime running lights cannot be endorsed. The result here was only that the types of driver, the one using light and the one not using it, differed. Whereas the drivers observing the recommendation to use daytime running lights were, as a rule, non-aggressive drivers who are not involved in many traffic accidents either, the great majority of the more aggressive ones did not comply with the recommendation. Neither negative nor positive effects on the more vulnerable road users were detected. The evaluation suggests to identify the benefits of daytime running lights "in very special situations in order to recommend its use for certain ambient and traffic conditions (such as winding roads through wood sections)."

Since 1 January 2002, daytime running lights have been urgently recommended in Switzerland. Motorists "are to" switch on the light even during daytime. Non-compliance with this directory provision is, however, not punished. There have up to now been no findings with regard to the effects on the accident situation.

In Italy there has been the obligation, since summer 2002, to switch on the light also during daytime on motorways and motorway-like roads. Non-compliance is punished by a fine of 32 €. After such a short period of time, no experience is, of course, currently available. At the moment not even the grounds for this new regulation are known.

Further regional trials

In the case of special local circumstances – for example in avenues there may be diffuse lighting conditions due to change between light and shadow which already today require the use of dipped headlights in accordance with § 17 of the German Road Traffic Regulations – informative signs to this effect may be quite useful in order to remind motorists of their duty. But regional measures cannot contribute to new findings on daytime running lights: without an approximately 100% compliance of all vehicles with this obligation and thorough analyses of the situation before and after its introduction in a wide area, no new findings are to be expected. The limited local special situation "using light during daytime" may, in the short run, bring about benefits, but do not permit, right from the outset, any generalization. This is confirmed by the current experiences in connection with trials made in Germany:

- Isle of Rügen: since March 1994 motorists have been urged on posters and in the media to permanently use light. The initiative was supported by the local accident prevention organization, a traffic engineering school and the police. After a relatively high acceptance at the beginning, motorists hardly observed the recommendation later on. In 1995, the initiators had reported considerable accident reductions. But an evaluation of the data made by the Federation of the Insurance Industry showed that this statement is not tenable. During the same period, the accident figures in a comparative area without daytime running lights decreased more strongly than on the Isle of Rügen. For that reason alone, the analysis made there does not stand up to scientific evaluation standards. The reduction of accident figures rather seems to be attributable to other measures (traffic surveillance, public relations work).
- Lower Saxony: from October 1998 to September 1999, the use of daytime running lights was recommended for certain roads. According to the statistical evaluation of the road accidents, there were in fact 25% less fatalities during the pilot scheme on the roads included in the project than during the comparative period of the preceding year. For the whole federal state of Lower Saxony the reduction amounted to 1.2 %. But this result is also hardly usable since the case figures are very small. On the roads where posters required the use of daytime running lights, there were only 72 fatalities instead of 96 in the preceding year. In view of the altogether more than 900 road deaths during the pilot scheme in the federal state of Lower Saxony, a generalization or a projection to the whole of Germany should, also in the opinion of the federal state itself, not be made. A few

accidents involving several fatalities during 52 weeks might have changed the result completely. Moreover, in the case of serious accidents there was a reverse trend: during the pilot scheme there was an increase of 3.3% of such accidents in the whole of the federal state and of 2.7% on the roads included in the scheme. Thus, the development of these accidents considerably deviates from the development of fatal accidents on the roads under trial and throughout the federal state. Moreover, if one considers the data calculated for accidents with the use of daytime running lights and during dawn (without single accidents) the transferability of the figures becomes more and more doubtful: on the test roads, the number of such accidents increased even stronger than on average for the whole of the federal state (4.8% and 3.0% respectively). Since motorists could not be obliged to actually switch on dipped headlights, there was a mix of vehicles with light and without light on the roads during this action in Lower Saxony. In the case of accidents, the police did not record whether the motorists involved had used the light or not.

Voluntary agreement

In July 2001, the European Commission informed the Council and the European Parliament that the ACEA, the European Automobile Manufacturers Association, had offered to accept a voluntary agreement in order to prevent the far progressed project of a directive on an improved pedestrian protection by imposing strict requirements for the design of the front parts of motor vehicles[5].

Part of this voluntary agreement was also a paragraph containing the offer to immediately equip new vehicles with daytime running lights. These lights should be in compliance with the requirements of the ECE Regulation No. 87 and should be activated automatically. Thus, the discussion on daytime running lights got new dynamics. But the current road safety programme of the EU still contains the statement that with regard to daytime running lights further research work is required.

5 Document COM(2001)389, final of 11 July 2001

Summary and prospect

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 lighting 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.