

## THE ESTIMATION OF THE INCREASED LIMITATION OF THE VISIBILITY IN THE LIGHT COMMERCIAL VEHICLES

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### **Abstract**

*In the report there is discussed the problem of changing demands in the binding rules concerning the technical conditions. During maintenance, the lack of information from the surrounding of the vehicle is one of the reasons of collisions and accidents. There is a radical limitation of unobstructed observation of the whole area surrounding trucks of N1 category in comparison to the car of M1 category. Vehicles which have the same body and which are designed to transport people – M1 category or load – N1 category, they have different equipment, such as side glazing and back walls. Those who are driving these vehicles do not have comparable and identical visibility. The open load-carrying body in the truck creates the screen obscuring of the big part of the vehicle's surrounding which precludes the direct observation of the considerable area. The devices of the indirect visibility enable to observe only the part of the area, which is directly invisible. There is an important need to change the regulation as far as construction and vehicles equipment is concerned. This paper offers the change of the philosophy of the regulations requirements in the area of visibility. Technical progress and development in the area of visual transfer devices helps to use them in the vehicles in order to improve the possibility of observing the surrounding of the vehicle. There is no reason to tolerate the worse visual transfer in the vehicles N1 category.*

**Keywords:** *maintenance, demands, visibility, construction of the car*

### **1. Introduction**

Transport is a life-giving bloodstream of the economy. When developing, it also has negative effects on the environment. Besides contaminating the atmosphere by automobile pollution, it also causes new road expansion, sudden increases in the driving population, and an increase in accidents. Therefore, taking part in traffic leads to ones' own risk and endangerment. It is essential for drivers to diagnose and predict premature developing phases of unwanted occurrences [1, 2]. In spite of creating new regulations and educating drivers, accidents still happen. Using appropriate procedures, it is necessary to aim, at decreasing the number of accidents as well as enabling to lower weightiness of accidents, originating in road transport. Retrofitting means of road transport, we reduce their susceptibility to accidents and collisions. Ensuring the visibility of the road and around it, conforming to the regulations does not always guarantee the good visible transfer for drivers (inside the vehicle) – sufficiently good visibility. Often the regulations on the road formation do not cater for the limitations of visibility resulting from the constructional features of the vehicle [4, 5]. The open load-carrying body in the truck creates the screen obscuring of the big part of the vehicle's surrounding which precludes the direct observation of the considerable area. The devices of the indirect visibility enable to observe only the part of the area, which is directly invisible. There is an important need to change the regulation as far as construction and vehicles equipment is concerned.

The regulation should compel the vehicles manufacturers to ensure such construction of the vehicle that the driver will have a possibility of observing the surrounding of vehicle in the range of scope and placement visible area would be comparable to the car. Setting this kind of requirement will force the producers to ensure visibility from the trucks comparable to that of cars. This will help avoid collisions and accidents, which are caused by the substantial

limitation of the possibility to observe the surrounding of the vehicle. These facts speak for the necessity and need of changes to the regulations. This paper offers the change of the philosophy of the regulations requirements in the area of visibility. The novelty is the definition of the needs and possibilities of changes in the regulations concerning visual transfer for trucks. There is no reason to tolerate the worse visual transfer in the vehicles  $N_1$  category. It is possible and is imperative to introduce regulations, which will obligate the vehicles manufacturers to equip trucks in such a way that the possibility of observing the surrounding will be the same as in the passenger car version

### 1.1. The subject of the tests

The subject of the tests is the car construction aimed at ensuring possibility to observe the car surroundings while driving. The Fig. 1 presents the areas around the vehicle, which the driver should have the possibility to observe while driving it (making various manoeuvres) during a day and at night – with the street lighting and without it.

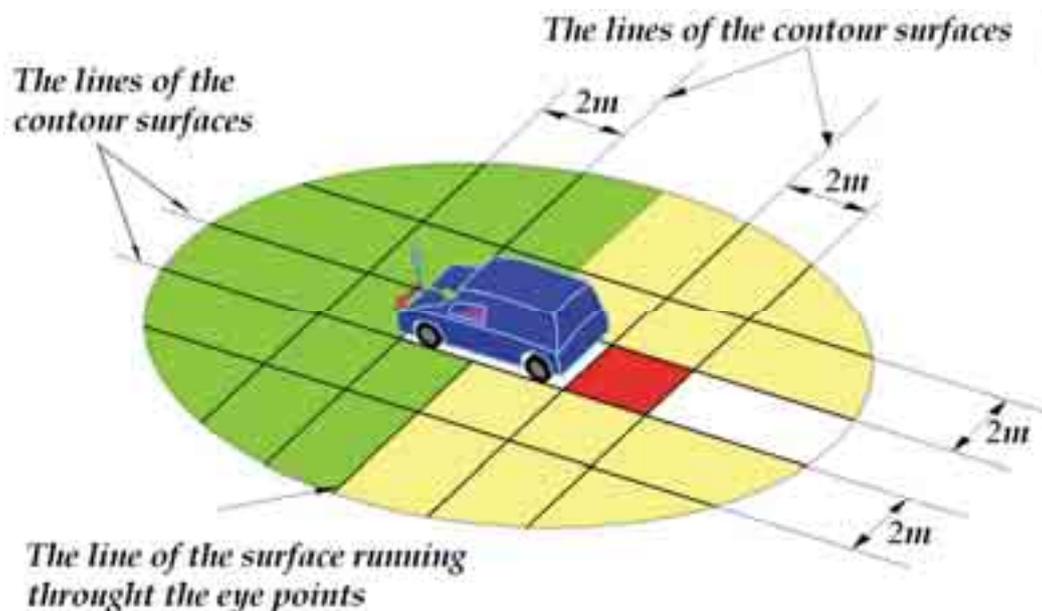


Fig. 1. The areas around the vehicle which must be visible

The practical realization of the need to have a visibility of surroundings (according to the current regulations in force) is considerably different from the ideal. In spite of the installation of indirect visibility devices in the cars, the big part of directly invisible area is still invisible. The Fig. 2 shows the area surrounding the vehicle of  $N_1$  category, observed directly by the driver through the windows forward and on each side and also indirectly through the mirrors. Areas A and B – observed areas. Areas D – minimal areas demanded by regulations. Areas C – areas the observation of which is impossible until now. In order to estimate the degree of divergence between the ideal and the real situation the visibility of surroundings of the  $M_1$  category car and the  $N_1$  category truck were tested. The estimation was conducted on the example of the Renault Kangoo vehicle in the passenger car version and in the truck version. The similarity exists between the vehicles of categories  $M_1$  and  $N_1$  of the same brands and models in the range of the external resemblance of the body but big differences in the visibility outward. The cars with the identical bodies dedicated for the transport of people – category  $M_1$  and goods – category  $N_1$ , have the various sets of equipment, among other thing, as far as glazing of sidewalls and rear wall are concerned. The test was made using the method presented in the directive 2003/97 EC, 77/649/EC.

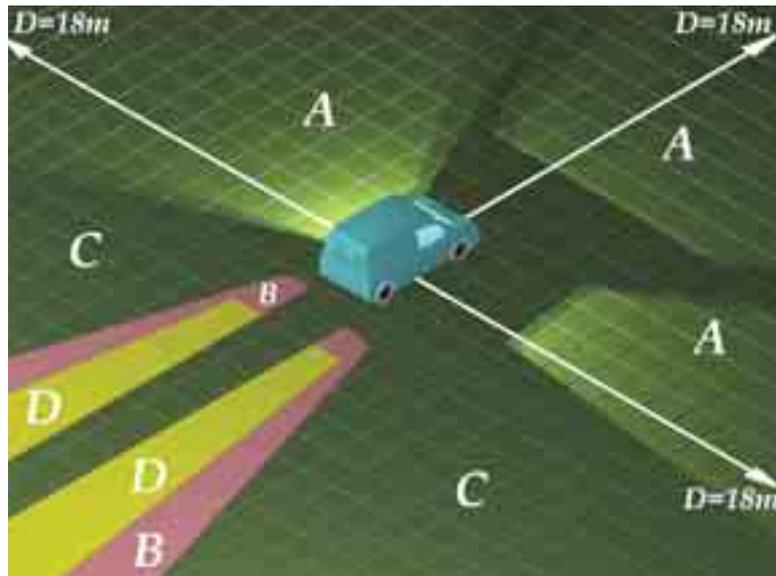


Fig. 2. The areas around the vehicle category N1 which are visible

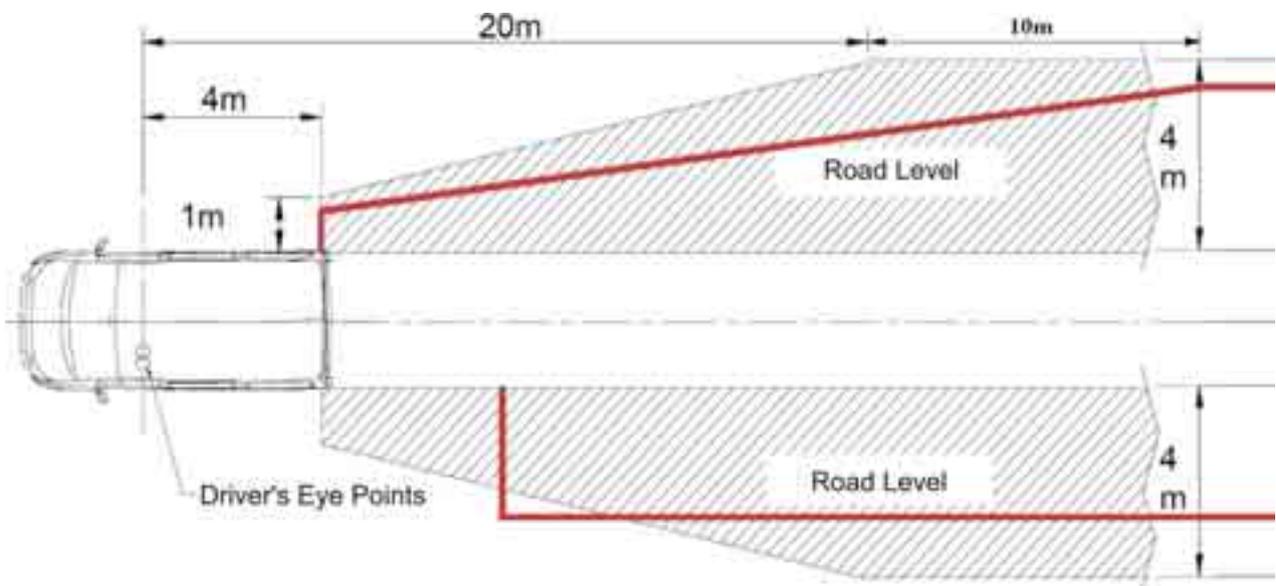


Fig. 3. Placement and vastness of the visibility field for the main rear view mirrors of class III – by thickened line denotes requirements hitherto in force -  $dmc \geq 2000$  kg [3]



Fig. 4. Vehicle Renault Kangoo – truck and car body versions

The results of visibility tests of car surroundings were presented at the Fig. 5. From the comparison of Fig. 1, 2 and 3 it transpires that the driver does not have any possibility to observe this part of the area around the car which should be observed during manoeuvring of the car to avoid the collision and accident. Moreover, the drivers of the above do not have identical possibilities to observe the surroundings. In the truck of category  $N_1$ , the area which can be observed by the driver is radically reduced.

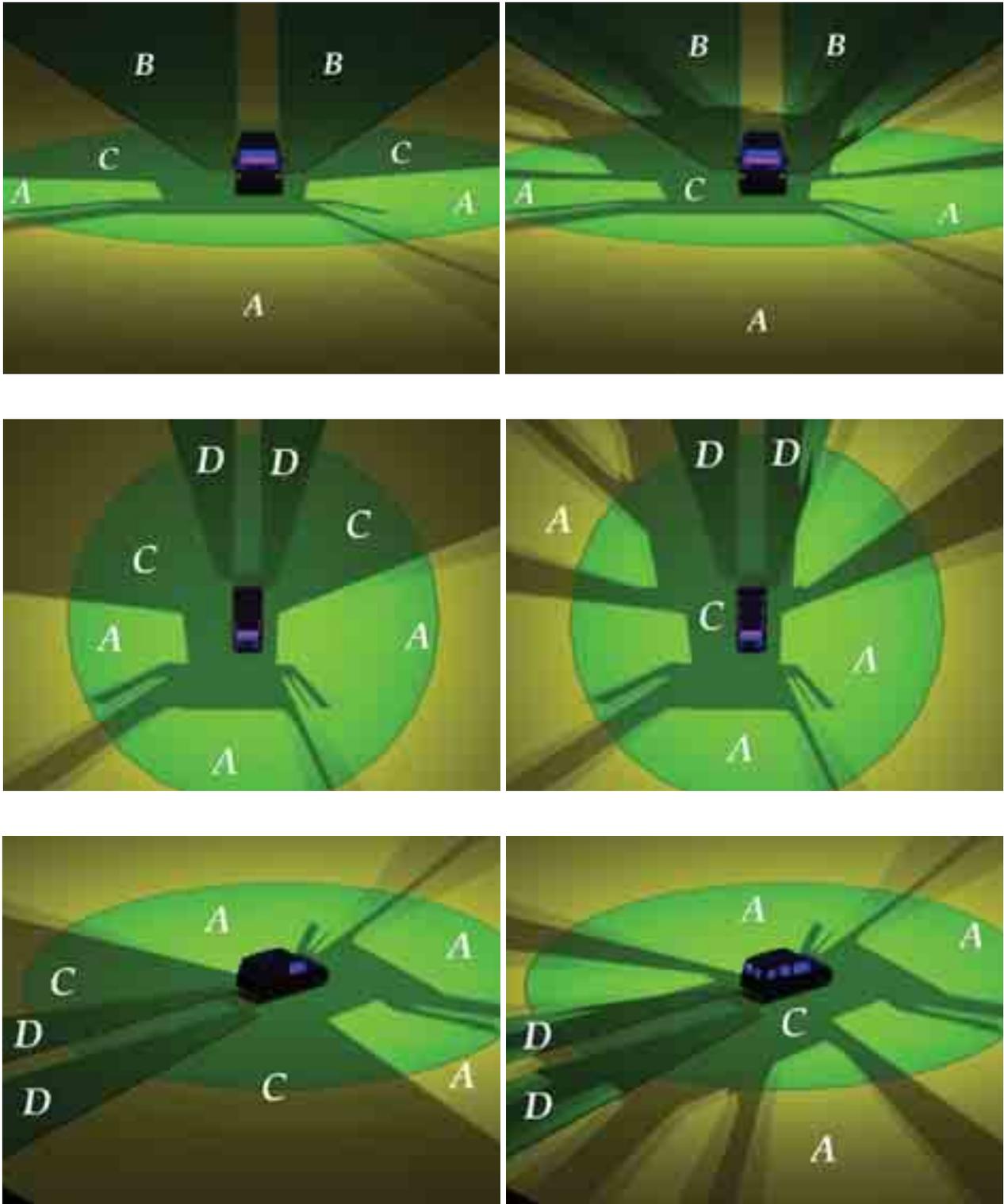


Fig. 5. The direct and indirect visibility field for – Renault Kangoo truck category  $N_1$  and car category  $M_1$

Is it needed, is it necessary, and is it possible to eliminate the difference in the “surroundings visibility” of trucks in comparison with the passenger cars, especially these which are based on the identical body. The lack and also insufficient information from the cars surroundings during driving are one of the causes of the rise of collisions and accidents. Unobscured observation of all the area surrounding the vehicle is radically limited, in the small trucks of category  $N_1$  in comparison with passenger cars of  $M_1$  category. It is particularly easy noticeable and perceptible in the vehicles of categories  $M_1$  and  $N_1$  of the same brand whose bodies are similar. In the vehicle of the passenger car version, the sidewalls and the rear wall have the glazed windows, through which the driver can observe surroundings. Additionally it is equipped with the indirect visibility devices which are identical as in the version of the truck except the interior mirror. In general, the interior mirror is not mounted in the truck. In the truck, in the area behind the driver, in general the windows in the sidewalls and in the rear wall are not fitted or used. As a result, the driver can observe considerably smaller area of his surroundings.

The perceptible technical progress and the development of the visibility devices allow equipping the vehicle in such a way that the driver of the truck could observe the areas surroundings comparable with passenger cars.

## **2. Recapitulation and conclusions**

The vehicle the driver does not have any chance to receive the visible transfer from the significant part of the area surrounding and thus to have the possibilities to act adequately to the situation during the car driving. This problem is particularly important on oblique road crossings when the angle of the cutting of their axles is considerably different from the right angle – difference exceeds the value of  $15^\circ$  [6]. With reference to vehicles in use, insufficient (for the most part of cases) visible transfer from the surroundings is the essential cause of rise of collisions and accidents taking place in the road traffic. The increase of possibilities to observe areas of the vehicle surroundings (in the newly designed constructions), which until now could not be supervised, is the step in the proper direction. It is possible to change the regulations and to change the vehicles equipment by the manufacturers. It is expected to radically extend the visibility and to diminish the danger of accidents in the vehicles of  $N_1$  category which were caused by the previous visibility limitations. Analyzed and discussed propositions in the article are actions directed towards reducing number of collisions and accidents in developing road transport. Without radical decisions it is impossible to limit accidents (especially fatal), which are originating in traffic. Aspiration after achieving safety for traffic participants should be most important while executing road transport needs

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