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ASSESSMENT OF REGULATED AND UNREGULATED PEDESTRIAN CROSSINGS

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Abstract

Drivers belonging to groups 3 and 4 who, when analyzing accidents that occur at unregulated crossings of pedestrians, ignore the requirements of the relevant traffic rules, should be considered potentially guilty. It is possible to consider the movement of infantry from Group 3, which does not take into account the effect of the implicit risk factor as a human factor that is in co-existence.

Introduction

Drivers belonging to groups 3 and 4 who, when analyzing accidents that occur at unregulated crossings of pedestrians, ignore the requirements of the relevant traffic rules, should be considered potentially guilty. It is possible to consider the movement of infantry from Group 3, which does not take into account the effect of the implicit risk factor as a human factor that is in co-existence.

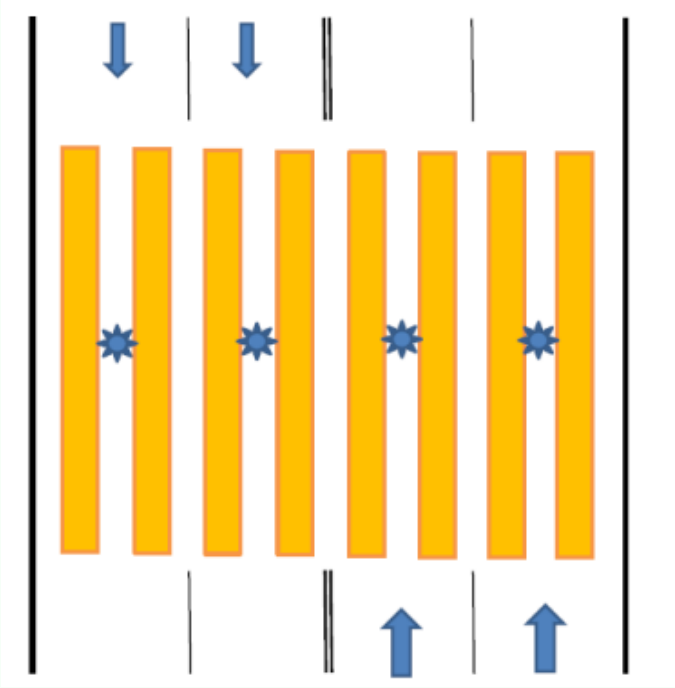

Figure 1 - Location of collision points at an unregulated pedestrian crossing

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Taking into account the fact that the annual indicator of accident risk at the point of I-collision of an unregulated pedestrian crossing in time can be considered as follows:

$$p_i = \frac{n_{iyth} k_{p3} k_{ia3} k_{ia4} V_i k_{iv}}{N_p M_{ia} k_{du} l_{ost}}, \qquad (1.1)$$

NI accidents here - the average annual number of YTHs at the I-collision point of the pedestrian crossing;

kp3 - the coefficient of consideration in the total flow of pedestrians of group 3 carrying out implicit danger-insensitive crossings, determined by the ratio of the total intensity of pedestrian traffic from group 3 to the total intensity of pedestrian traffic Np3,

$$k_{p3} = \frac{N_{p3}}{Np}; \qquad (1.2)$$

KIA3 and KIA4 are the factorial coefficients of considering cars of groups 3 and 4, respectively, determined by the ratio of the intensity of cars coming from group 3 as their drivers exceed the speed mode along the i-collision point and 4-Mia3 and Mia4 are the total intensity of the vehicles passing along the i collision point

.

$$k_{ia3} = \frac{M_{ia3}}{M_{ia}}; \; k_{ia4} = \frac{M_{ia4}}{M_{ia}} \qquad (1.3)$$

Vi is the current maximum speed limit of a transport port on the I-lane of km/h;

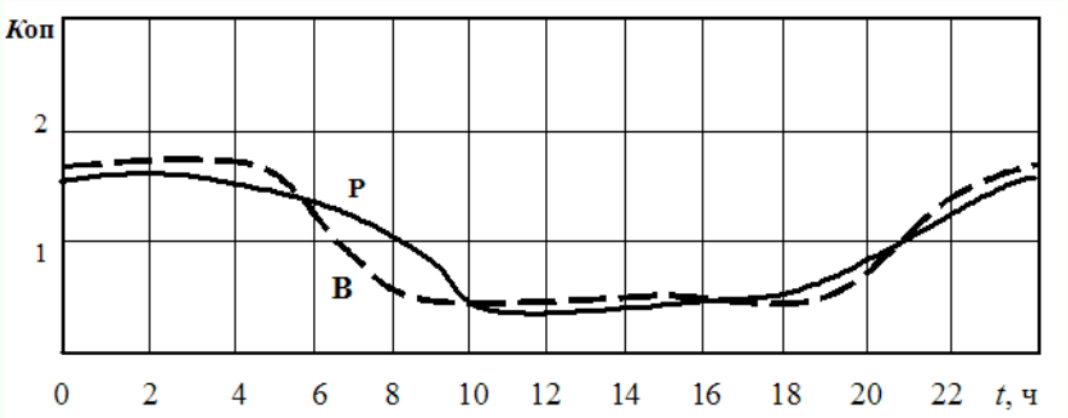

Figure 2. Change in the risk coefficient of an unregulated pedestrian crossing during the day: P - on weekdays; C – weekends.

Since the current probability of an accident at Kop = 1,0 coincides with its average annual value, it is necessary to maintain parity.

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$$\int_{min}^{1,0} K_{op}dt = \int_{1,0}^{max} K_{op}dt$$

i.e. the area of the curve above the Kop = 1.0 line must be equal to the area above the curve below the Kop = 1.0 line.

During the period from 9 a.m. to 6 p.m. on weekdays and from 8 a.m. to 7 p.m. on weekends, the transition risk coefficient varies slightly between 0,3 and 0,5, which is explained by a fairly high level of discipline. The dependence of the risk coefficient of an unregulated pedestrian crossing with the stability of all other indicators on the intensity of pedestrian flow is shown in Figure 3.

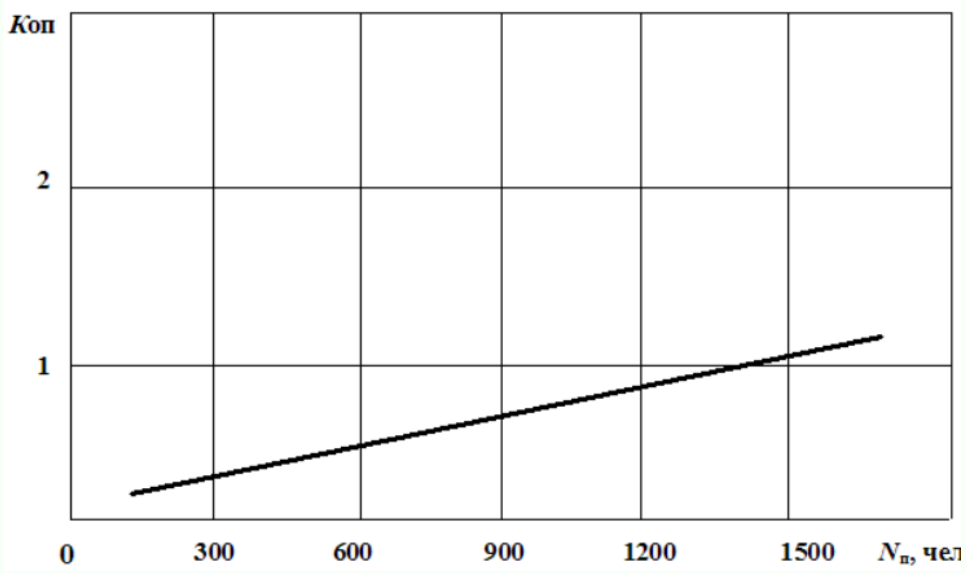

Figure 3. The dependence of the risk coefficient of an unregulated pedestrian crossing on the intensity of pedestrian traffic

In this case, as shown in the figure, there is a linear dependence of the crossing risk coefficient on the intensity of pedestrian traffic. However, the average annual risk level at Kp = 1 begins to exceed when the Np intensity exceeds 1450 people/hour.

The main purpose of pedestrian crossing regulation is to coordinate time intervals in the direction of reducing the risk of pedestrian and vehicle traffic accidents. In contrast to the process of operation of an unregulated pedestrian crossing, in this case as an accidental phenomenon, it can be considered as a process characterized by the following four functions, the probability of an accident in which the probability of an accident varies with a certain period of time:

- the number of pedestrians moving across the crossing at a prohibited signal;

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- the number of vehicles passing at the prohibitive traffic signal;
- the total number of pedestrians moving through the crossing in a time period;
- the total number of vehicles passing through the crossing during the time period.

The risk of traffic speed and collisions with pedestrians

The speed at which a motor vehicle travels affects both the risk of accidents and their consequences. The risk of accidents is largely related to the correlation between speed and stopping distance. The higher the speed of the vehicle, the less time the driver has to stop the car and avoid accidents, including collisions with pedestrians. Taking into account the time required for the driver to react to an emergency and apply the brakes, as a rule, a car moving at 50 km/h stops only after 36 m, and a car moving at 40 km/h stops after 27 m.

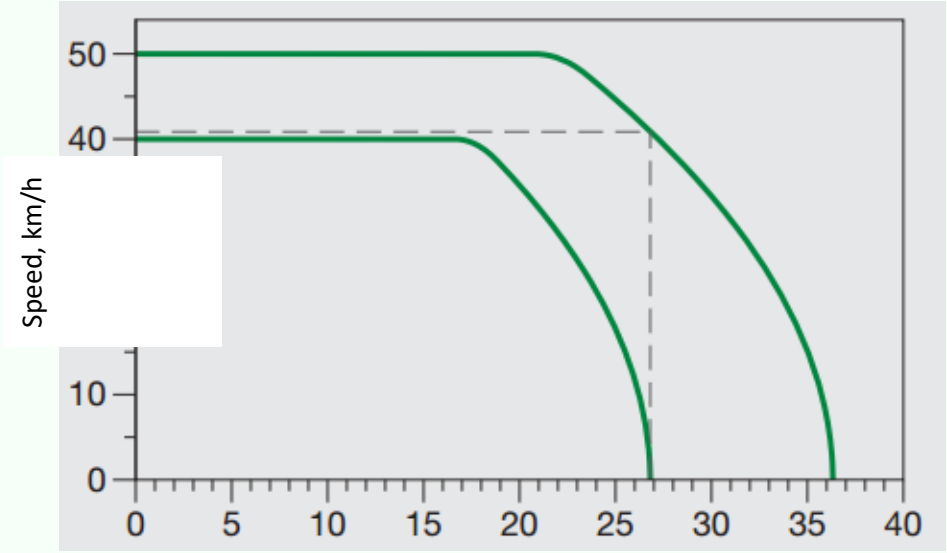

Figure 4. Travel speed and brake distance during emergency braking

Figure 4 illustrates a typical situation where the driver needs 1.5 seconds to be aware of the danger of a collision with pedestrians and apply the brakes. On hard braking, the vehicle stops at 0.7 g after an initial delay of 0.2 seconds before the brakes are fully applied.

In some cases, the driver can react faster, so the car stops earlier; But in other cases, if the driver's attention is not fully focused on the road, or if the road is wet, it will take longer for the vehicle to stop.

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