

Driver Visibility and Pedestrian Detection Distance in Nighttime Traffic Accident Reconstruction [†]

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Abstract

Traffic accidents involving pedestrians during the hours of darkness pose a serious threat to road safety due to reduced visibility and drivers' delayed perception of the traffic situation. Accurate estimation of the detection distance for pedestrians is essential in the reconstruction of traffic accidents. This study analyzes the relationship between driver visibility, environmental conditions, and the ability to detect pedestrians in a timely manner during nighttime driving. The study examines the main factors influencing the driver's "perception–reaction" process, including the illumination provided by the vehicle's headlights, the illumination of the road environment, the contrast and reflective properties of the pedestrian's clothing, as well as the driver's level of attention. Using a graph-analytical method, the detection distances for pedestrians under nighttime conditions are estimated. A real-life accident scenario was reconstructed to determine whether the driver had sufficient time and distance to perceive the danger and take action to avoid a collision. The results show that pedestrian visibility depends on lighting conditions, which directly affect the driver's reaction time. These findings contribute to the refinement of the methodological approach to reconstructing traffic accidents and can assist experts in conducting automotive technical examinations.

Keywords: traffic accident; pedestrian; night visibility; driver perception and reaction; reconstruction of traffic accidents; road safety

1. Introduction

Traffic accidents involving pedestrians remain one of the most critical challenges facing global road safety and public health. According to the latest data from the World Health Organization (WHO), more than 1.3 million people lose their lives in road traffic accidents each year, with pedestrians accounting for approximately 23% of all fatalities [1]. Within the European Union, despite the overall downward trend in driver fatalities, fatal accidents involving vulnerable road users are decreasing at a significantly slower rate, highlighting the need for more detailed research into the factors leading to these incidents [2–4].

A particularly alarming aspect of this problem is the high incidence of fatal collisions in low-light conditions. Statistical analyses show that the risk of a fatal pedestrian accident is between three and seven times higher at night than during the day, despite the significantly lower traffic volume during the night [5,6]. The main reason for this imbalance is the



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limitations of human visual perception and the technical limitations of automotive lighting systems, which often do not provide sufficient detection range at high speeds.

In forensic engineering practice and the reconstruction of traffic accidents, determining visibility is a key factor in establishing whether the collision could have been prevented. The effectiveness of detection depends on the delicate balance between the contrast of the object, the ambient lighting, and the human eye's adaptation. Classic studies by Olson and Sivak have found that when using standard low beams, pedestrians wearing dark clothing are often noticed at a distance of less than 30 m [7]. This distance is critically insufficient for a timely reaction and stopping if the vehicle is traveling at a speed exceeding 50 km/h, since the total stopping distance under such conditions exceeds the visibility range [8].

Technological advances in automotive lighting, including the introduction of High-Intensity Discharge (HID), LED, and adaptive systems (Adaptive Driving Beam—ADB), have significantly improved light distribution and increased the illumination range [9,10]. However, these innovations do not fully resolve the issue of the driver's psychophysiological stress. Studies show that brighter headlights often give drivers a "false sense of security," leading them to drive at higher speeds that do not correspond to their actual ability to react to the sudden appearance of an object with a low reflectivity coefficient [11].

An additional complicating factor is the phenomenon of being blinded by the headlights of oncoming vehicles. This process sharply reduces the retina's contrast sensitivity and requires a significant amount of time to recover from adaptation to darkness [12]. In urban environments, the situation is further complicated by so-called "light pollution" and the numerous sources of ambient lighting, which can create a camouflage effect that obscures pedestrians in areas with complex shadows [13].

Despite the extensive literature on the subject, there is a significant research gap regarding the integration of objective photometric measurements with dynamic environmental changes under real-world driving conditions. There is no unified methodology that allows traffic accident reconstruction experts to calculate the probable recognition distance while simultaneously taking into account the technical condition of the headlights, the specific spectral composition of the light, and the individual characteristics of the pedestrian's clothing in real time [14].

The purpose of this study is to propose a graph-analytical approach for refining visibility calculations in the analysis of traffic accidents that occur during the night. By analyzing speed and distance, the study aims to provide a more accurate framework for forensic experts, thereby minimizing subjective errors in determining whether the accident could have been prevented.

2. Exposition

This study presents a detailed analysis of how a pedestrian is perceived by a passenger car driver in a traffic accident occurring at night in an urban area where street lighting is not functioning. According to the available data, the visibility of the drivers in the area of the accident at the time of the accident was ensured by the vehicles' lights. The road section, measured from the reference point for the first 165.50 m, is straight; thereafter, a horizontal curve begins—a left turn. The radius of the curve, measured along the outer edge of the roadway relative to the selected direction of the curve, is 44.00 m. There is a 3.00 m-wide crosswalk in the area of the accident. The road surface consists of dry, fine-grained asphalt with slight unevenness. The roadway consists of one lane in each direction, separated by a double solid line. The lanes are of varying widths. Following the accident, an on-site inspection was conducted; the findings are shown in the scaled diagram presented in Figure 1.

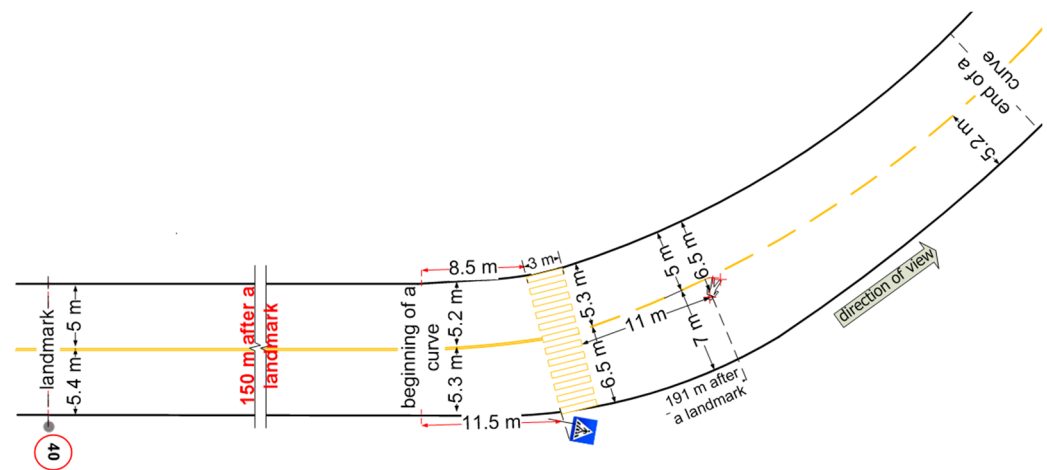


Figure 1. Site plan of the incident.

From a technical standpoint, traffic conditions at the time and location of the traffic accident were good, requiring drivers to adjust their speed to their visibility.

The point of impact is the intersection of the vehicle's path of travel and, more specifically, the beginning of the section where evidence of contamination is collected from the vehicle and the victim's path of travel.

The collision in question is analyzed according to collision theory. The pedestrian's absolute velocity at the moment of impact is determined by the expression:

$$\vec{V}_a = \vec{V}_e + \vec{V}_r, \quad (1)$$

where $\vec{V}_e = \vec{V}_{\text{Audi}}$ is the velocity of the passenger car; $\vec{V}_r$ is the velocity of the pedestrian relative to the passenger car.

A similar vector expression also holds for the pedestrian's absolute velocity after the impact and will be written later.

Figure 2 shows a vector diagram where the velocities before the collision are $\vec{V}$, and after the impact are $\vec{u}$.

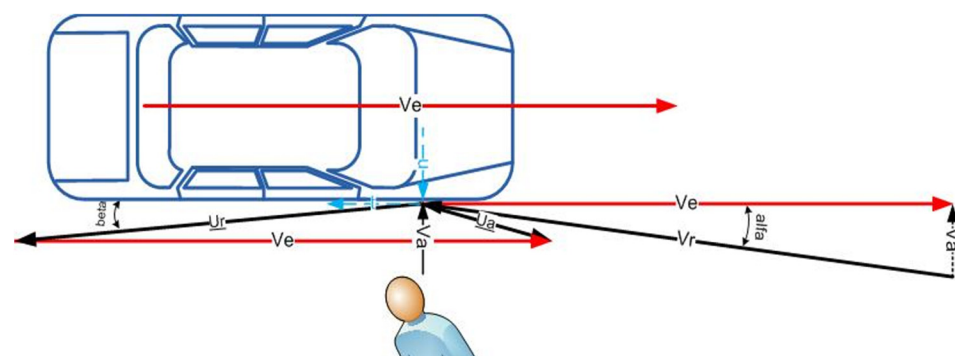


Figure 2. Speed chart.

The following relationships apply:

$$k = \frac{u_m}{V_m} = \frac{u_r \cdot \sin \beta}{V_r \cdot \sin \alpha}; 1 - \lambda = \frac{u_{rt}}{V_{rt}} = \frac{u_r \cdot \cos \beta}{V_r \cdot \cos \alpha}. \quad (2)$$

In this particular case, the coefficient of restitution, which evaluates the capacity of the impacting objects to recover after the impact, is $k = 0.1$ —in accordance with the mechanism of impact, and the instantaneous coefficient of friction $\lambda = 0.4$ takes into account

the deformation in the area of the car's side mirror and the length of contact between the pedestrian and the vehicle (scratches were found along the entire right side of the Audi passenger car).

After transformation, the following relationships are obtained:

$$\operatorname{tg} \beta = \frac{k}{1-\lambda} \operatorname{tg} \alpha; u_r = k \cdot V_r \cdot \frac{\sin \alpha}{\sin \beta}. \quad (3)$$

The pedestrian's absolute velocity after the impact is determined by the expression:

$$\vec{u}_a = \vec{u}_r + \vec{V}_e. \quad (4)$$

For a side-impact mechanism between the vehicle and the pedestrian's body, resulting in the body being propelled forward, an impact impulse must be generated, consisting of two components: the impact impulse of the normal impact force and a tangential component due to the tangential force of instantaneous friction, i.e.,

$$\vec{S} = \vec{S}_n + \vec{S}_\tau. \quad (5)$$

A necessary condition for the mechanism to operate (in the event of a side impact) is that there exists a relative velocity between the pedestrian and the vehicle in the direction of the pedestrian's path of travel—in this case, an absolute velocity $\vec{V}_a$. The absence of specific abrasions and the absence of scattered personal belongings suggest that, from a technical standpoint, it is more likely that the victim slid a short distance across the pavement following the collision with the passenger car. This implies that the body moved a short distance after the impact before coming to rest; given the significant difference in the masses of the two individuals, the long area of scraped-off dust on the vehicle, and the deformed right side mirror, corresponds to a relatively high speed of the pedestrian at the moment of initial contact with the vehicle. Otherwise, given the nature of the impact, the pedestrian's body should have been thrown a greater distance at low speed, resulting in a longer slide along the pavement, which in turn would have caused specific traumatic injuries that are not found. In light of the facts presented thus far, as well as the data indicating a high blood alcohol content in the pedestrian, this expert opinion adopts the legally prescribed lower speed limit of the pedestrian absolute velocity $V_a = 7 \text{ km/h} = 1.94 \text{ m/s}$, relating to a pedestrian walking calmly while under the influence of alcohol. The car's velocity V_e is the unknown quantity. From the graphical analysis in Figure 2, the pedestrian's relative speed V_r , appears to be:

$$V_r = \frac{V_e}{\cos \alpha}, \text{ m/s}. \quad (6)$$

Therefore, the angle of incidence is given by the expression:

$$\alpha = \arctg \left[\frac{V_a}{V_e} \right]. \quad (7)$$

After decomposing the vectors, the absolute velocity of the pedestrian's body after the collision is given by the expression:

$$u_a = V_e - u_r \cdot \cos \beta. \quad (8)$$

The distance the body is thrown is calculated using the formula:

$$L = \frac{u_a^2}{2 \cdot \mu \cdot g}, \text{ m}, \quad (9)$$

where $\mu = 0.66$ is the coefficient of sliding and rolling resistance of the body on the asphalt road surface; $g = 9.81 \text{ m/s}^2$ is the acceleration due to gravity.

Given the significant difference in the speeds of the two participants and their masses, as well as the directions of their velocities at the moment of initial contact, it can be concluded that the body was propelled primarily forward/toward the mirror/and to a much lesser extent to the right, which in turn accounts for the relatively small value of the angle α —within the boundaries of $5\text{--}10^\circ$.

Another condition that must be met relates to the vehicle's maximum possible speed at the moment of impact, which—in the absence of evidence of loss of stability while negotiating the curve (i.e., no skid marks)—must have been lower than the critical speed for the curve, above which, under the specific conditions, the vehicle would have skidded sideways.

Based on the determined radius of the outer edge of the right-hand curve of 44.00 m and given the described position of the pedestrian's body after the impact, it is determined that at the moment of initial contact, the center of mass of the passenger car was approximately at the centerline. This indicates that, given the width of the right lane in this section as 7 m, the vehicle was traveling along a trajectory with a radius of 37.00 m. The critical speed at which the passenger car would have lost lateral stability is calculated using the formula:

$$V^{cr} = \sqrt{\frac{\mu_{tr} + \tan\beta, rad}{1 - \tan\beta, rad \times \mu_{tr}}} \times g \times R, \text{ m/s}, \quad (10)$$

where $\mu_{tr} = \mu_{asp.} \times 0.8 = 0.56$ is the coefficient of lateral friction (slide friction factor); $\beta 1^\circ$ —angle of superelevation of the road at the turn; $R = 37.55 \text{ m}$ —the radius of the trajectory of the passenger car around the moment of impact.

After substituting in (10), we get: $V^{cr} = 14.65 \text{ m/s} = 52.74 \text{ km/h}$.

When solving (3) and (7)–(9) simultaneously, the requirements are satisfied only for values of $\alpha = 8, 9$, and 10 degrees: the speed of the passenger car is lower than the critical speed for the turn, and at the same time, the skid distance is within a narrow range—between 1 and 2 m. The results obtained are shown in Table 1:

Table 1. Analysis Results.

$\alpha = 8^\circ$;	$\alpha = 9^\circ$;	$\alpha = 10^\circ$;
$L = 1.81 \text{ m}$	$L = 1.42 \text{ m}$	$L = 1.15 \text{ m}$
$u_a = 4.84 \text{ m/s}$	$u_a = 4.29 \text{ m/s}$	$u_a = 3.86 \text{ m/s}$
$u_r = 8.98 \text{ m/s}$	$u_r = 7.96 \text{ m/s}$	$u_r = 7.15 \text{ m/s}$
$V_e = 49.72 \text{ km/h}$	$V_e = 44.12 \text{ km/h}$	$V_e = 39.63 \text{ km/h}$

The three solutions presented are mathematically correct, but the 10 km/h difference between the calculated limit values for the vehicle's speed at the moment of impact necessitates a more detailed analysis. The available data from the inspection report and the photo album prepared by the on-duty team, combined with known data on the vehicle's technical parameters, shown in Figure 3, with sufficient accuracy determine that the pedestrian's body made initial contact with the vehicle at a distance of approximately 0.75 m behind its front bumper, with the body being thrown to the right side of the vehicle approximately 0.45 m in front of its rear bumper.

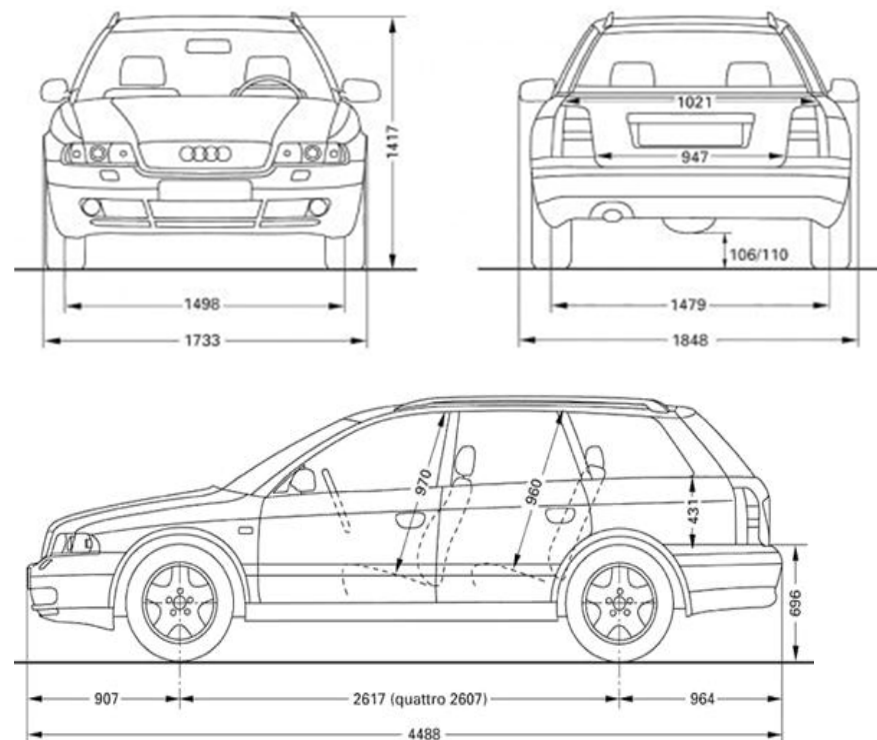


Figure 3. Overall dimensions of an Audi passenger car.

Given that the Audi passenger car is 4.488 m long, it follows that the pedestrian's body was in contact with the car over a distance of 3.29 m. In this case, the following relationship could be derived with sufficient accuracy:

$$V_e = \frac{L_{\text{contact}} \times V_a}{S_p}, \text{ m/s}, \quad (11)$$

where $L_{\text{contact}} = 3.29$ m is the area in contact with the vehicle; S_p 0.6 m—the length of a pedestrian's stride. After substitutions, the result is:

$$V_e = \frac{3.29 \times 1.94}{0.6} = 10.64 \text{ m/s} = 38.3 \text{ km/h}. \quad (12)$$

A comparison of the results in Table 1 and (11) shows that the closest result from the table is $V_e = 39.63$ km/h, with a difference in speed of just 1.33 km/h. Since the method used to calculate (11) determines the approximate speed of the vehicle at the moment of initial contact with the pedestrian, it was used solely to identify the most technically reliable speed from among the speeds calculated in Table 1, without being used in subsequent calculations.

Based on the analysis so far, it follows that the point of initial contact between the two parties was located approximately one meter before the spot where the vehicle came to rest following the traffic accident, and the vehicle's speed at the moment of impact was approximately 40 km/h.

The most likely coordinates of the pedestrian's center of mass at the moment of impact with the passenger car are approximately 9.5 m past the end of the crosswalk and approximately 0.5 m to the right of the centerline.

In the absence of other data regarding the vehicle's movement, the analysis assumes that the speed of the passenger car prior to the accident was equal to its speed at the instant of initial contact: $V_{\text{Audi}} = V_e = 39.63$ km/h.

The traffic accident occurred during the night, and the collected evidence does not indicate which of the vehicle's lights were on immediately before the accident.

It is known that the limit of the area illuminated by headlights, within which the average driver can detect an obstacle, is an illuminance of 2 to 3 lux. Figure 4 shows a schematic diagram of the boundaries of the illuminated area at the level of the optical axes of the low-beam headlights—blue outline (illuminance boundary of 2 lux)—for a technically sound lighting system on a vehicle with a European light distribution system.

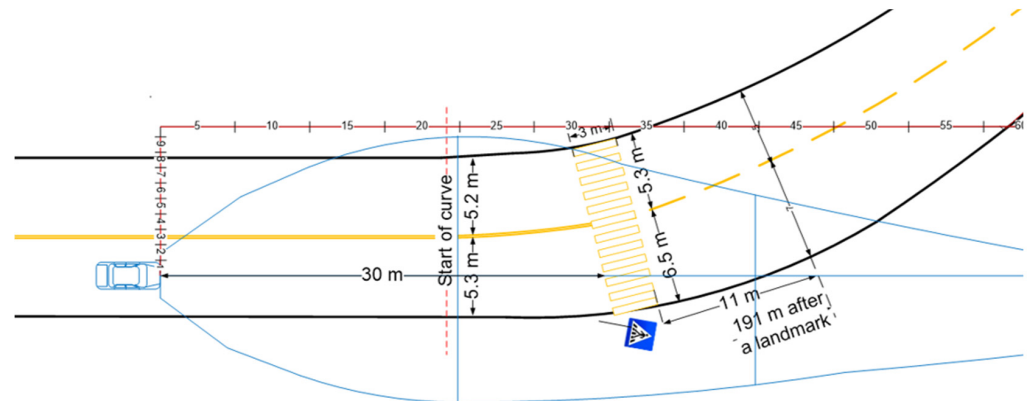


Figure 4. A schematic diagram of the boundaries of the illuminated area at the level of the optical axes of the low-beam headlights.

Assuming that the vehicle was positioned approximately in the middle of its lane before entering the curve in question, while traveling in a straight line with its low beams on, the driver should have been able to perceive unlit objects ahead and to the left, along the left edge of the roadway at the start of the M 8.1-type marking (crosswalk), at a distance of approximately 28 m in front of the vehicle, as at that moment its front end was 30 m before the start of the crosswalk. Ahead, on the right, again at the start of the M 8.1 road marking, but 0.5 m to the right of its right edge, the driver could have seen an unlit object more than 75 m away.

The minimal stopping distance of a vehicle is calculated using the following formula:

$$O_{sd} = t_{\Sigma} \times V_{Audi} + \frac{V_{Audi}^2}{2 \times j}, \text{ m}, \quad (13)$$

where $t_{\Sigma} = 1.8$ s is the total time for reaction of the driver under night driving conditions and actuating the brakes with maximum braking deceleration; $V_{Audi} = 39.63$ km/h = 11 m/s—vehicle speed; $j = \mu_{tr} \times 9.81 = 6.87$ m/s²—maximum braking deceleration for the specific road conditions.

After calculating (13), we obtain: $O_{sd} = 28.64$ m.

Comparing the shorter visibility distance to the left edge of the roadway relative to the M 8.1 marking, as shown in the diagram in Figure 4, on the one hand, and the vehicle's minimal stopping distance on the other, the following conclusion can be made. Assuming straight-line movement of an Audi passenger car with low beams on, under the specific road conditions, the speed at which the driver was operating the vehicle was correctly selected in relation to the visibility distance available to him at both edges of the roadway.

The above conclusions render meaningless any analysis based on the assumption of driving with high beams on, since given the described visibility distances at both ends of the roadway when driving with low beams and the calculated minimal stopping distance, it is clear that even when driving with high beams on, the vehicle's speed was again correctly selected in relation to the visibility distance provided by the high beams.

The following graphical-analytical approach was used to determine whether the driver of the passenger car was able to perceive the pedestrian entering the roadway:

The time during which the pedestrian was moving, from the moment he crossed the right edge of the roadway until the moment of impact, is:

$$t_p = \frac{S_p}{V_p}, \text{ s}, \quad (14)$$

where $S_p = 6.5 \text{ m}$ is the distance passed by the pedestrian (as shown on the scale diagram); $V_p = 1.94 \text{ m/s}$ —the pedestrian speed.

After substituting in (14), we obtain: $t_p = \frac{6.5}{1.94} = 3.35 \text{ s}$.

Accordingly, 3.35 s before the impact, the vehicle was at the following distance from the point of impact:

$$S_{Audi1} = V_{Audi} \times t_p = 11 \times 3.35 = 36.85 \text{ m}. \quad (15)$$

Figure 5 shows that when the front of the passenger car was positioned in the center of its lane at the moment when it had 36.85 m remaining to travel to the point of impact, or at the moment when the pedestrian crossed the right edge of the roadway, the driver had visibility of the pedestrian provided by his low beams.

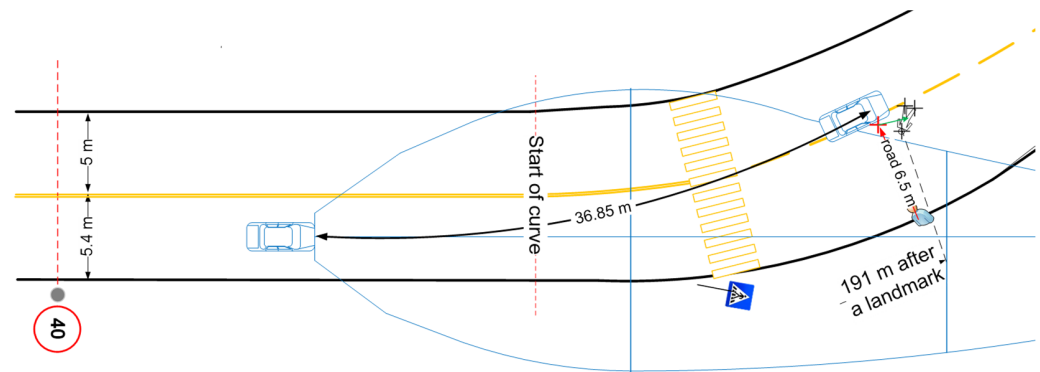


Figure 5. Visibility from passenger car positioned in the center of its lane to the pedestrian crossing the right edge of the roadway.

Since, at the moment of initial contact between the passenger car and the pedestrian, the passenger car's center of mass was located approximately on the centerline of the roadway, and the exact moment when the driver steered the vehicle into the oncoming lane cannot be determined, for the sake of completeness of this study, the driver's visibility 3.35 s before the accident will be examined, assuming that at that moment, the vehicle was positioned on the centerline—Figure 6.

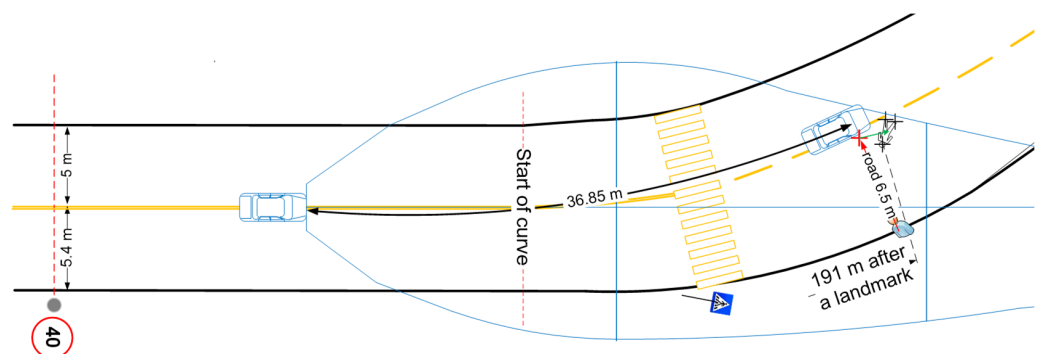


Figure 6. Visibility from passenger car positioned on the road centerline to the pedestrian crossing the right edge of the roadway.

Figure 6 clearly shows that even when the front of the vehicle was positioned on the centerline at the moment when it had 36.85 m remaining to travel before the point of impact, or the moment when the pedestrian crossed the right edge of the roadway, the driver again had visibility of the pedestrian, provided by his low beams, since the pedestrian was within the illuminated area. In view of the above, a comparison of the results from (13) and (15) shows that the next inequality is satisfied:

$$O_{sd} < S_{Aydil} \quad 28.64 \text{ m} < 36.85 \text{ m.} \quad (16)$$

From a technical standpoint, inequality (16) means that when the passenger car was traveling with its low beams on, and the pedestrian was walking at a steady pace, from the moment the pedestrian crossed the right edge of the roadway, the driver had the opportunity to stop before the point of impact at his actual speed and thus prevent the accident from occurring.

3. Conclusions

This paper presents a graph-analytical algorithm for the reconstruction of vehicle-pedestrian nighttime impact accidents, taking account of driver visibility and pedestrian detection distance.

The use of the method is illustrated by an example of a real-life nighttime passenger car-pedestrian accident, when the driver's visibility and pedestrian detection distance are decisive factors. The method receives values of important parameters, which determine the mechanism of the accident, such as:

- the position of the point of impact;
- the speed of the passenger car at the instant of impact;
- the speed of the pedestrian at the instant of impact;
- the distance of the passenger car from the point of impact at the instant of hazard occurrence;
- the distance of the pedestrian from the point of impact at the instant of hazard occurrence;
- the possibility of the driver perceiving the pedestrian at the instant of hazard occurrence.

Taking these factors into account, the investigator can assess each party's ability to have prevented the traffic accident.

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References

1. World Health Organization (WHO). *Global Status Report on Road Safety 2023*; WHO: Geneva, Switzerland, 2023.
2. European Transport Safety Council (ETSC). *Reducing Child and Pedestrian Deaths on European Roads*; PIN Flash Report 45; ETSC: Brussels, Belgium, 2023.
3. Andreev, I.; Saliev, D.; Damyanov, I. Traffic Flow Model for Coordinated Traffic Light Systems. *Eng. Proc.* **2025**, *100*, 45. [[CrossRef](#)]
4. Damyanov, I.; Mladenov, G.; Saliev, D.; Miletiev, R.; Dimitrov, K.; Hristov, V. Infrared Thermal Monitoring of Intersection Elements of Urban Road Infrastructure and Road Traffic Via Drone. *Civ. Eng. J.* **2025**, *11*, 1739–1755. [[CrossRef](#)]
5. Retting, R.A. *Pedestrian Traffic Fatalities by State: 2022 Preliminary Data*; GHSA: Washington, DC, USA, 2023.
6. Plainis, S.; Murray, I.J.; Pallikaris, I.G. Road traffic casualties: Understanding the night-time death toll. *Inj. Prev.* **2006**, *12*, 403–408. [[CrossRef](#)]
7. Olson, P.L.; Farber, E. *Forensic Aspects of Driver Perception and Response*, 4th ed.; Lawyers & Judges Publishing Company: Tucson, AZ, USA, 2014.
8. Wood, J.M.; Tyrrell, R.A.; Marszalek, R. Self-ratings of visibility do not predict registered pedestrian visibility at night. *Traffic Psychol. Behav.* **2019**, *66*, 145–151.
9. Bullough, J.D.; Skinner, N.P. Luminous Intensity Requirements for Pedestrian Detection at Night. *Transp. Res. Rec.* **2021**, *2675*, 1032–1040.
10. Reagan, I.J.; Brumbelow, M.L.; Flannagan, M.J. The effects of high-beam assist and adaptive driving beam headlamps on pedestrian detection. *Accid. Anal. Prev.* **2020**, *144*, 105634.
11. Sivak, M.; Schoettle, B. *The Effect of Headlamp Illumination on the Visibility of Pedestrians from the Perspective of a Driver*; UMTRI: Ann Arbor, MI, USA, 2020.
12. Mainster, M.A.; Turner, P.L. Glare's causes, consequences, and clinical challenges after a century of conflicting theories. *JAMA Ophthalmol.* **2012**, *130*, 1332–1340.
13. Riaz, M.S.; Hussain, A.; Cheng, S. Pedestrian safety at night: A critical review of the effectiveness of street lighting and other countermeasures. *Sustainability* **2022**, *14*, 12423. [[CrossRef](#)]
14. Zhu, M.; Manser, G.; Wang, Y. Pedestrian Detection Performance of Driver Assistance Systems in Low-Light Conditions: A Field Study. *Sensors* **2023**, *23*, 4567. [[PubMed](#)]

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