

VOICE SITES

LITHUANIA

TRAFFIC SAFETY ANALYSIS ON HIGH-ACCIDENT ROAD SECTIONS IN LITHUANIA

Introduction

For the traffic safety analysis two high-accident road sections were selected situated on the roads of different type, different traffic conditions, different road environment and infrastructure. The object of investigation was:

- typical Lithuanian high-accident rural junction;
- high-accident road section crossing a built-up area.

1. Traffic safety analysis on the road section across the Krosna village, in 34,477-36,851 km of the national road No. 131 Alytus-Simnas-Kalvarija

Analysis of the problem

For the analysis the Krosna village was selected located in 34,477-36,851 km of the road No. 131 Alytus-Simnas-Kalvarija. In the period 2003-2006 eight fatal and injury accidents took place within the territory of Krosna village, with three people killed and six people injured. Three vehicle collisions, four collisions with an obstacle and one pedestrian accident were registered.

The main traffic safety problems and their causes describing a traffic safety situation in the village are as follows:

- **high volume of transit traffic.** A national road crossing the village is convenient for the drivers of heavy vehicles travelling in the direction of Alytus – Kaliningrad or Marijampolė – Grodno. The average annual daily traffic (AADT) on this road section is almost 2400 veh./day, up to 30% of the total traffic flow. The drivers of transit vehicles, crossing the territory of the village (if this is allowed by road parameters), do not observe traffic restrictions and exceed the speed limit;
- **insufficient road infrastructure in the village.** The necessary road infrastructure has been developed insufficiently: pedestrian tracks, situated only on one side of the road, have deteriorated, pedestrian crossings, located inconveniently, are unsafe and hence are seldom used by the pedestrians;
- **road parameters are not suitable for the residential area.** Road parameters dictate driving speed and driving manner: at the entrance to the village from the countryside the road parameters do not change – the road pavement and the shoulders remain rather wide. This encourages drivers to exceed the speed limit and to engage in dangerous manoeuvring;
- **unsafe junctions.** The two main junctions within the village limits are extremely unsafe. They could be described by the prevailing high speeds, unclear turning trajectories and no infrastructure for pedestrian traffic

within the junction zone. The junctions have no additional traffic organization measures.

In order to improve traffic conditions within the village limits it is necessary to identify the objectives to be achieved:

- reducing the number of accidents and mitigating their severity;
- reducing speed;
- improvement of traffic conditions for pedestrians;
- creating a favourable social climate in the village through a ensuring safe and convenient living conditions.

Suggested traffic safety measures

For the analysis of accident causes, their character and distribution the road section, crossing the territory of the village, is divided into certain road segments or separate road infrastructure elements where the traffic character and the needs of the road users may differ.

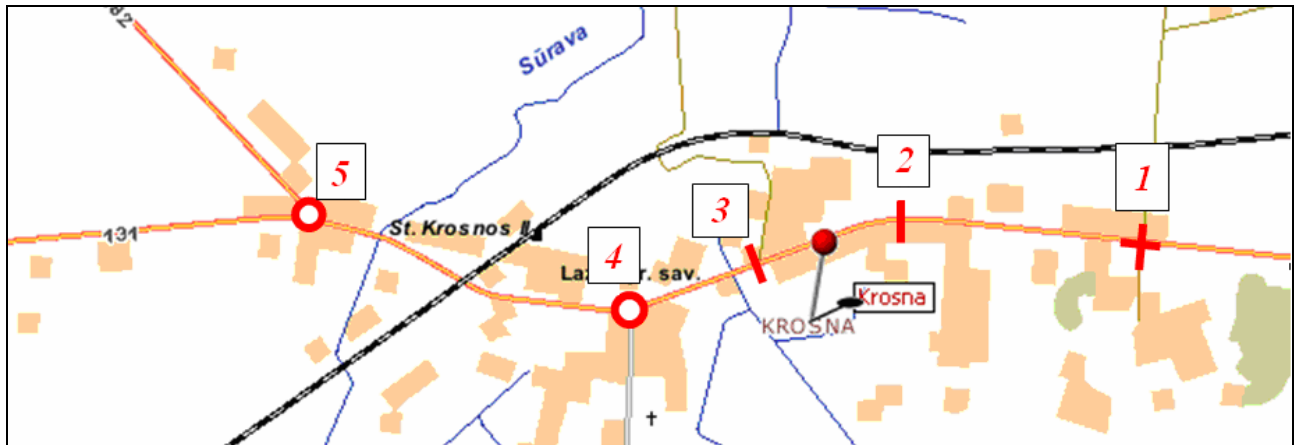


Fig. 1.1. Characteristic locations of the road section under consideration

1. A four-arm junction in the beginning of the village (1) could help reduce speed if it is properly built. In this case it is advisable to build a junction on a raised plateau. This would help to prevent speeding and careless driving while crossing the major road.
2. Behind the junction there is a rather long and straight road section (from the junction to the central area of the village – about 1300 m long) allowing the driver to speed up. Additional speed reduction measures shall be implemented up to the central zone of the village. As a speed reduction measure a pedestrian crossing on a raised plateau shall be erected. A pedestrian crossing shall be located at a three-arm junction at 35.00 km (2) or close to it (Fig. 1.2.). When selecting precise location for a pedestrian crossing the visibility and the needs and wishes of local residents should be taken into consideration.
3. An additional pedestrian crossing shall be also planned at a three-arm junction with the local road (3). In a close proximity to the junction the Krosna local administration and a bus-stop are located, thus, this part of the section has an intensive pedestrian traffic to and from the bus-stop (Fig. 1.3.).



Fig. 1.2. Pedestrian crossing at a three-arm junction to the group of residential houses (2).



Fig. 1.3. Pedestrian crossing at the bus stop behind the building of local administration (3).

4. The junction of the central part of the village with the road No. 2502 to Lazdijai town could also be used as a speed reduction measure (4). The traffic in this junction has not been organized: a wide junction zone, no pedestrian infrastructure (Fig. 1.4.). This segment of the road could probably have a rather intensive pedestrian traffic due to the public attraction centres situated on both sides of the road: church, shop, etc. When selecting the most suitable scheme for the junction it is necessary to make it especially safe from the point of view of all groups of the road users. Therefore, the most optimal alternative is a compact roundabout.



Fig. 1.4. Additional pedestrian crossings in the junction with the road No. 2502 (4)



The junction with the road No. 182 (5)

5. A three-arm junction with the national road No. 182 at the end of the Krosna village (5) must be reconstructed (Fig. 1.5.). Dangerous traffic conditions in this junction are caused by the following reasons:

- two national roads intersect at a sharp angle, therefore, the junction could be characterized by the prevailing high speeds;
- due to the closely located buildings the visibility conditions are extremely unfavourable.

Taking into consideration the fact that due to the layout of the buildings there is no possibility of changing the trajectory of the road and it is not possible to improve the visibility without demolishing the buildings, the junction shall be reconstructed into a compact roundabout.

To ensure a safe pedestrian traffic it is necessary to reconstruct the existing pedestrian and bicycle track stretching through the whole territory of the village and to lay a new pavement. Currently the track has lost its quality and aesthetic view and creates uncomfortable traffic conditions for pedestrians and bicyclists. Pedestrians and bicyclists mostly use the edge of the carriageway or the road shoulder. Wide gravelled shoulders within the limits of the village should be eliminated. Under the traffic a gravelled shoulder becomes deteriorated, asphalt concrete pavement is polluted with gravel particles, a skid resistance is reduced and a vehicle control becomes more complicated. Visually the wide gravel shoulders create an impression of a wider road making the influence on a psychological state of the driver and his driving manner – the driver increases speed or performs dangerous manoeuvres (U-turns, overtaking from the right). The shoulders should be narrowed and the kerbs should be installed instead of a gravel pavement. The shoulders should be paved with granite or concrete paving blocks or cobble stone paving.

2. Traffic safety analysis and identification of the need for traffic safety measures at 79,57 km junction of the main national road No. A16 Vilnius-Prienai-Marijampolė

Analysis of the problem

Based on 2003-2006 accident data, four accidents took place here resulting in one death and seven injuries. All the accidents were vehicle collisions.



Fig. 2.1. The junction at 79,57 km of the road No. A16 Vilnius-Prienai-Marijampolė

The main traffic safety problems and their causes describing a traffic safety situation of the junction are as follows:

- **Road pavement parameters.** Road pavement within the junction zone is very wide encouraging speeding on the major road and especially dangerous conditions for the vehicles driving from a minor road. Due to a wide carriageway within the junction zone, the drivers are allowed to perform dangerous manoeuvres – U-turns, overtaking from the right.
- **High traffic volume in all directions.** The junction is used by the traffic of both the main and the national road with a high traffic volume. An intensive re-distribution of flows takes place in the junction. The traffic volume on the road No. A16 amounts to 3400 veh./day, on the road No. 129 – 2500 veh./day. The traffic is high in all directions.
- **Design of the junction.** Design of the junction allows passing the junction at a high speed in any direction. The junction is provided with acceleration-deceleration lanes which increase a driving comfort but decrease safety.
- **Traffic separation in the junction.** Traffic separation with a horizontal marking is not safe (the left traffic lanes of the major road are used both for the left turn and for going straight).
- **Visibility.** The junction is situated on a hilly terrain, the road No. 129 within the junction zone runs along a slope, therefore the visibility at the junction is insufficient for the drivers. The prevailing high speeds at the junction lead to frequent conflict situations where the junction is entered without noticing the approaching vehicle on a major road;
- **bus-stops within the junction zone.** On the major road No. A16, in front of and behind the junction, bus stops are located. On a high volume road where the speed limit is high the solution to locate a bus stop so close to the carriageway is especially unsafe: pedestrians run on a carriageway trying to get to the bus stop and wait for the bus by standing very close to vehicles passing by at high speeds.

Suggested traffic safety measures

While analysing the existing situation it was determined that the junction must be redesigned. When selecting the most suitable model for the junction one shall take into consideration the distribution of traffic flows, the breakdown of the traffic by different type of vehicles, the needs of all road users. It is also necessary to ensure that the junction is safe from the point of view of all groups of the road users.

It was determined that the junction shall be reconstructed into a roundabout. A roundabout would ensure:

- low speeds within the roundabout zone;
- sufficient capacity;
- sufficiently safe traffic conditions for all groups of the road users.