

HIGHWAY P133 AND ZIEMELU STREET INTERSECTION SIMULATION AND CAPACITY ESTIMATION

Problem definition

Riga International Airport is treated as the biggest in the Baltic States. The passenger and cargo flow volume is growing according to statistics. The area near the airport is considered as a good place for development. In 2012 investors come with idea to set up a business center and exhibition complex near airport. These two objects should become a very intensive attraction point for citizens, guests of city and labor. This will lead to significant increase of traffic flow near the Riga International Airport. In this situation the most vulnerable could be treated an intersection (highway P133 and Ziemelu street) near airport from the point of view of its capacity. It is necessary to understand the loading level of intersection and propose changes in intersection infrastructure.



The main tasks of this project could be formulated as follows:

- * to develop, calibrate and validate microscopic model, which presents current situation;
- * to test different development scenarios, to forecast level of service (LOS) according to Highway Capacity Manual;
- * to develop a 3D animation of the model.

Proceeding

Microscopic model of the intersection has been constructed using PTV VISION VISSIM simulation software. As input data the following information is used: topology of the intersection; intensity and structure of the traffic flows; traffic lights working modes; public transport schedule and stops location.

The particularity of the implemented model is connected with need to realize the intelligence work of traffic light, which is based on detectors.

By itself the model consists of 162 link and connector objects, 76 conflict areas, 5 traffic input points, 12 signal

heads, 1 public transport route, 2 public transport stops and more than 100 3D objects.

In project frame 12 scenarios have been tested, using developed microscopic model, and LOS for intersection and for each direction has been estimated.

Scenarios include changes in:

- * topology of intersection (one lane and two lanes on Ziemelu street from north direction);
- * traffic light working program (three different traffic light working programs with fixed signal control);
- * traffic flow intensities (forecasted volumes of traffic according to SIA "imink 1" for different development scenarios).

All scenarios assume significant growth of traffic volume in intersection that is why the traffic light working programs have been changed to fixed signal control.

At the beginning the number of different scenarios was greater than 12, to decrease the number of scenarios to be tested on microscopic simulation model a pre-estimation of LOS was completed with SIDRA INTERSECTION software help. Scenarios, which had a high LOS during pre-estimation, were not tested on microscopic model. Finally, a 3D animation has been implemented for presentation purposes for investors.

Results

Main results of the project have been presented in tabular and graphical form with detailed information about LOS level and delay time for intersection and each direction of intersection. Also the average speed in simulated transport network for each scenario has been estimated. According to the obtained data, the following conclusion could be drawn: with forecasted volumes of traffic we still have an opportunity or to organize movement of traffic in a way having level of service equal to D. It could be done by implementing the second additional lane from north direction and by reprogramming signal control devices according to the proposed conceptual working schema.

