

## **TRANSPORT DEMAND FORECASTING IN SMALL CITIES USING SOFTWARE PACKAGE FOR A SPECIFIC EXAMPLE FOR GEVGELIJA TOWN<sup>1</sup>**

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### **Abstract**

The task of any modern traffic planning is creating such road network that will be reviewed, safe, with appropriate capacity, economical in terms of exploitation costs and cost for building, also designed to be compatible with structure of the city. Software tools for traffic planning enable this with the traffic forecasting.

In this paper, it will be presented output results from transport demand forecasting in small cities such as Gevgelija town, using software package PTV Vision – VISUM in which the base is standard four-step transport demand model.

***Keywords -traffic planning; transport demand forecasting; software package PTV Vision – VISUM; small city***

### **INTRODUCTION**

Since the beginning of civilization, sustainability and economical success of society largely has been based on the efficiency of their transport infrastructure. The need for efficient transportation has never been the key issues as it is today.

To take appropriate transport planning infrastructure decisions, planners and engineers need to be able to predict the reaction of transport demand, as well as the attributes of the transport system, the extent of the built environment and the use of the transport system. Transport demand models

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<sup>1</sup> Original scientific paper

used for this purpose, should include actual representations of human, activities of the household and the decisions to travel.

Prediction or transport demand forecasting enables transport planning of traffic network under future travel needs in order to achieve fast, efficient and safe movement through the road network, and reducing the impact on the environment.

#### TRANSPORT DEMAND FORECASTING FOR GEVGELIJA TOWN

The procedure for transport demand forecasting in small towns using the software package PTV VISUM is explained by a specific example of transport demand forecasting for Gevgelija town.

The procedure of transport demand forecasting using software starts with drawing a transport network of the city in the software defined with nodes and links and define the traffic zones. Gevgelija town is divided into 16 internal traffic zones and 3 external zones. The division of the city on traffic zones in the software is represented on Figure 1.



Fig.1.Dividing of Gevgelija town on traffic zones

For each traffic zone, entered data for attributes of network elements that define all activities and trips in each zone separately. Defined are 11 attributes, including: residents, jobs in the industry, jobs in education, jobs in recreational activities, jobs in commercial activities, jobs in administration, jobs in hospitality, all jobs, employees, from zone, in zone. Given that the calculation of transport demand have a great impact and external trips, while creating a demand model form are separate matrices for transit traffic, or matrices for travel between external zones, and whose data is obtained by cordon counting. The cordon counting is made in pick hour from 3 p.m. to 4

p.m. on three set points of the entry – exit corridors of the city, which were cutting the cordon line.

Set points where the cordon counting are represented on Figure 2.



Fig.2. Cordon line and cross sections of cordon line

The results from the counting are represented in the following two tables. In Table 1 are represented data for the number of vehicles on the cross section of cordon line according to the structure of the vehicles and the direction of movement. In Table 2 are represented results from the cordon counting obtained with accumulation of vehicles on the cordon line.

Table 1. Data for the number of vehicles on the cross sections of cordon line

	Greece - Gevgelija	Gevgelija - Greece	Negorci - Gevgelija	Gevgelija - Negorci	Moin - Gevgelija	Gevgelija - Moin
<b>Car</b>	212	312	150	125	20	39
<b>Bus</b>	19	22	6	6	1	1
<b>HV</b>	24	33	15	12	3	0

Table 2. Results from cordon counting

	Greece - Moin	Greece - Negorci	Moin - Greece	Moin - Negorci	Negorci - Greece	Negorci - Moin
<b>Car</b>	2	11	2	1	21	0
<b>Bus</b>	0	0	0	0	0	0
<b>HV</b>	0	4	0	0	4	0

The travel directions from the zones to certain roads are represented through internal and external connectors and the same in the software are represented as is shown on Figure 3.

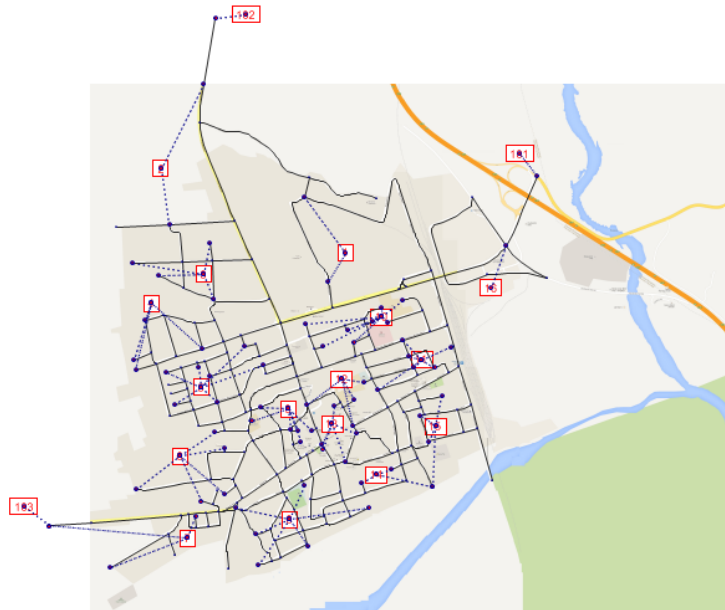


Fig.3. Display of connectors in the software

For creation of the model most important step are the procedures for calculation of transport demand, where is done generation, distribution and travel assignment on traffic network. In the software are defined six groups of activities (trips purposes) such as: n1 – home – work, n2- home – school, n3 – home – business, n4 – home – shopping, n5 – home – left and n6 –not home. For all six groups of activities are made six travel generations, whereas in previously imported attributes, and of intended travel, are imported factors of generation, for production and attraction.

For the six trips purposes except generation, is made and travel distribution. The values for the trips with creating model for transport demand in the software or modal sizes are actually traffic assignment on the traffic network or trip distribution on the roads.

In the software modal sizes are displayed numerically, but and with the width of the link, depending of the workload of the road. The modal sizes are shown on Figure 4 where traffic assignment on the roads is shown in red.

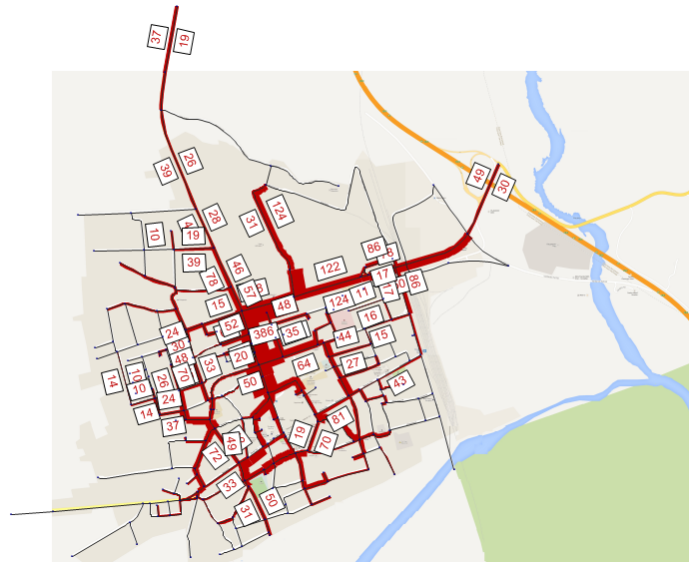


Fig.4. Modal sizes for Gevgelija town

For transport demand, forecasting for Gevgelija town is used standard four step transport demand model.

For traffic, assignment on current road network is used equilibrium assignment method.

The transport demand forecasting for Gevgelija town is made based of rate of growth of population. The rate of growth of 3 % annually is used and is made transport demand forecasting for 10 years.

The obtained predicted values are shown on Figure 5.

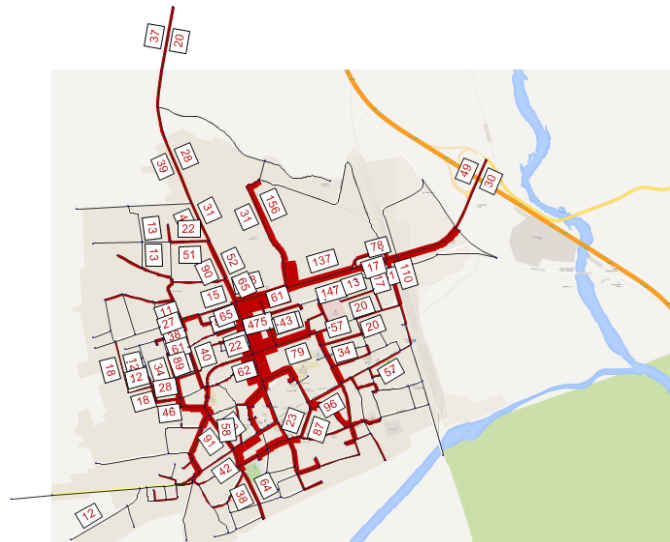


Fig.5. Predicted values for traffic flows for 10 years for Gevgelija town

### CONCLUSION

In the transport, demand forecasting for the real world and relatively large road networks the process of calculation is much more complicated than you can imagine. In order to simplify the process of calculation, in the practice are developed many software packages to automate the traditional four-step model for traffic demand forecasting.

One of this software packages is PTV Vision VISUM, who is a comprehensive, scalable and flexible macro software package that is used for traffic planning PTV Vision Visum is world-leading software in traffic analyses and forecasts. It covers all road users and their interactions and it is used for traffic planning in cities, regions and countries. Because it is designed for multimodal analysis, he brings together all relevant transport modes (car, trucks, and buses, walking and cycling) in a consistent network model. With more than 2000 customers and over 7000 users in more than 90 countries worldwide, PTV Vision has become a leading software system for transport planning. He allows displays of all relevant traffic data in one model; multimodal transport planning with all relevant transport data; analysis for user defined time periods (pick hour, movement of vehicle, traffic management, intervals of public transport, etc.); a number of effective treatments for calculations; level of detail defined by the user; display of the traffic on connectors, intersections, links, bus stops; route choice; statistics

on transport performance; application of GIS technology, and association with Vissim enabling simulation of traffic.

Through practical example for Gevgelija town in this paper is explained the procedure and are represented output results from transport demand forecasting in small city using software package PTV VISUM. In the software PTV Vision VISUM road network of Gevgelija town is defined with nodes and links. The town is divided into 16 main internal zones and 3 additional external zone covering internal – external corridors of the city.

The transport demand forecasting for 10 years in the software package PTV Vision VISUM is made using the standard four-step model, taking into consideration the population growth.

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