

CALCULATION OF TRANSPORT DEMAND BY APPLYING SOFTWARE PACKAGE PTV Vision VISUM

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Abstract: The contemporary lifestyle leads to rapid increase of number of motorized traffic participants thus, there is a need of traffic planning. 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. In the field of traffic engineering exist a wide range of software packages for different purposes, with different performance and quality. One of them is world leading software package for traffic analyzes and forecast of transport demand, PTV Vision VISUM.

In this paper will be represented the steps of the methodology for calculation of transport demand, starting from setting the background, drawing the traffic network until the forecast using an appropriate software package PTV Vision – VISUM in which the base is standard four step transport demand model.

KEYWORDS: METHODOLOGY, SOFTWARE PACKAGE PTV VISION - VISUM, TRANSPORT DEMAND

1. Introduction

The forecast has always been a big challenge for scientist who conduct research in the field of future prediction and for others. The forecast is a prediction of some scientific phenomena that are of great importance to human society.

In modern society, technology development occupies a larger swing. Today on market there are modern software packages and computer tools, based on advanced technology and a long experience. The application of modern software tools became inevitable part in solving a lot of concrete problems, allowing greater efficiency and accuracy in the process of finding appropriate solutions.

First in the paper, will be represented the background on which will be worked in the software, than follow defining on the traffic network. Third step from the methodology, which is most important step for calculation on transport demand, is creating a demand model. In the end will be described the procedures for calculation on transport demand. In the paper will be represented a lot of figures, in order to achieve a clearly vision of the work in the software.

2. Working background in the software

The process of calculation on transport demand using a software package PTV Vision VISUM begins by setting a background in the software. As recommended backgrounds for use in this software are backgrounds made in TIF format, as example Modal MAP (saved in AutoCAD), or CIVIL 3D (also saved in AutoCAD), also can in Corel draw or similar, or figure for a city made using Google Earth.

3. Defining on traffic network

3.1. Setting nodes and drawing links

The second step in calculation on transport demand is drawing of traffic network on the city in the software.

Traffic network can be defined as set of nodes and links on which conducted traffic – transport activity. Nodes are objects which define the position of stops and intersections in the network. Links connect nodes and thus describe the rail and road infrastructure. A link has a particular direction, so that the opposite link represents a separate network object. Links start and end at nodes.

For setting nodes was necessary to be active the tool "Nodes" and command "Insert mode".

To insert link we selected started (from) and end (to) node. By connecting two nodes are getting link. Drawing link was possible if are active the tool "Links" and command "Insert mode". For links are entering data for distance, capacity, number of lines, percent of heavy vehicles and travel speed $V_{o\text{ Prt}} = 30, 40$ and 50 km/h in

depends of rang of the street, for both direction of movement. For links we mark what type of transport systems are allowed in chosen direction of movement.

After drawing the links, and nodes connecting is defined all traffic network of the city. (Figure 1 and Figure 2).

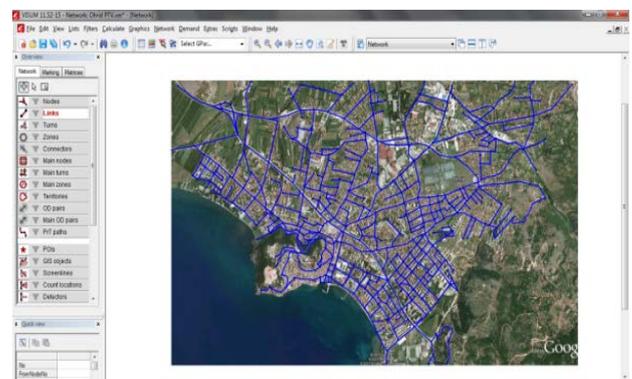


Figure 1. Traffic network of the city

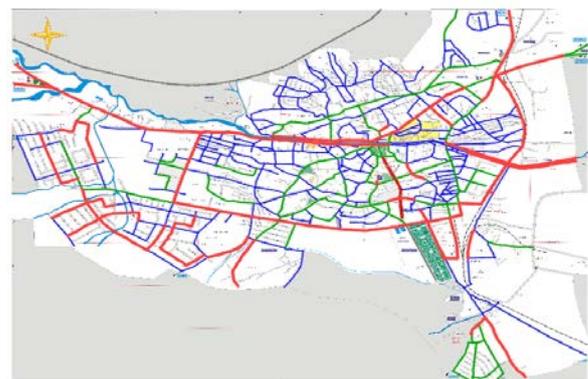


Figure 2. Graphic display of roads network with different speed

4. Zoning of the city

Zoning is the process of determining and drawing the zones of a city. Zones are origin and destination of trips within the transport network. They are objects which describe areas with a particular land use and their location within the network (e.g. residential areas, commercial areas, shopping centres, schools).

One of the most important procedures in zones is input data for attributes. Attributes are key component for creating the model. Usually, for the defined zones are included some attributes as follows: residents, WPindustry (work places industry), WPEducation (work places education), WPREcreation (work places recreation), WPShopping (work places shopping), WPAdministration (work places administration), WPCatering (work places catering), All work places, Employed, From zone and To zone.

The division of the city on traffic zones in the software is represented on Figure 3.



Figure 3. Zoning of the city on traffic zones

5. Setting connectors

Connectors can be defined as connections between zones and connect the zones with transport network. They actually are forwarders of traffic flows from zone to road in zone or out of zone. Connector must begin in node and end in node of road.

For insert connector was necessary to be active the tool "Connectors" and function "Insert mode". Setting all connectors is obtained network like on the Figure 4. On Figure 4 are setting internal and external connectors. The difference between these two types of connectors is that the internal connectors are placed on road inside the zones, and external connectors are placed on the outside or bordering roads. Also, are represented and additional external connectors which represented direction of traffic from and to input – output corridors of the city.



Figure 4. Display of connectors in the software

6. Creation of the demand model

After drawing the traffic network important step in forecast in transport demand is creation of the demand model. First performed defining on transport systems and modes of transport.

To set transport systems in the software is chose Demand → TSys/Modes/DSEgs → Transport systems. Here are input those transport system which are not, but we have necessary from them. In Demand → TSys/Modes/DSEgs → Modes are introduced modes for transport. In Demand → TSys/Modes/DSEgs → Demand segments are entered the purposes of zones, without residents. Included are

six purposes described on the following way: n1 (home – job), n2 (home – school), n3 (home – business trip), n4 – (home – shopping), n5 (home – another), n6 (not home).

Because in the six purposes does not enter the transit traffic, we added plus two segments of transport demand for the transit traffic, for transit heavy vehicles and for individual transit transportation. (Figure 5).

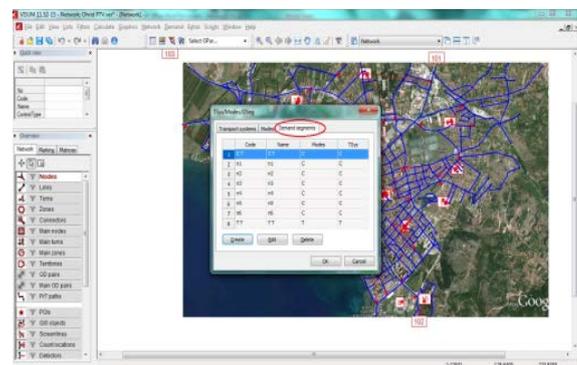


Figure 5. Input uses

Next step is input demand data. From tool bar we chose Demand → Demand Data. Here most important to set is the analysis period. In this section are created six matrices for six uses and plus 2 matrices for transit transport. We made separate matrix for transit heavy vehicles and one matrix for individual transport (TT transit и C transit) and to the same are entered data for trips between external zones. (Figure 6).

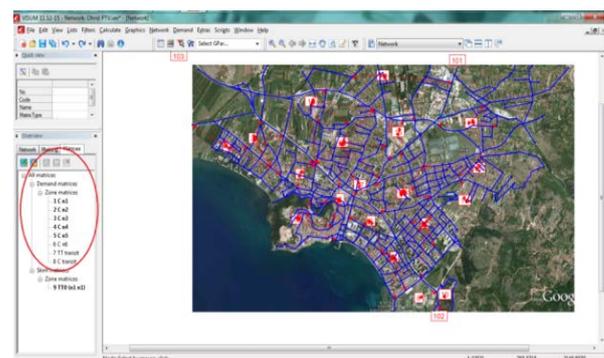


Figure 6. Created 8 matrices

Next is "Demand models", or creating of demand models. We chose Demand → Demand models → Basis → Type, where we chose standard four steps model (production – trip generation – distribution and trip allocation). (Figure 7). Demand models we made just for internal transport.

In Demand → Demand models → Person groups → Create, we entered prive transport, because doesn't work with public transport.

In Demand → Demand models → Activity pairs we setup all activities. On this way we formed six matrices.

In Demand → Demand models → Mode choice matrices → Demand Matrix we entered previously created appropriate matrices for the purposes and means of transport.

On this way we entered all necessary data and we made all necessary steps for creating the demand model.

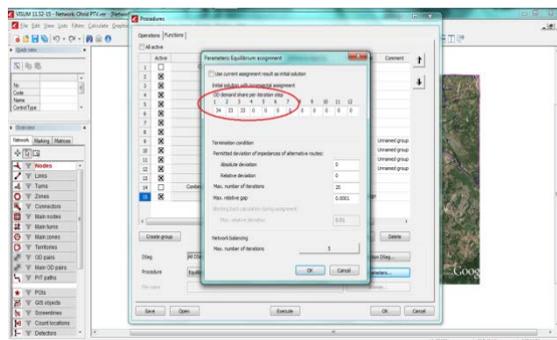


Figure 12. Entering the iteration steps

The last step from the methodology is calculation on modal values. These values are calculated by the software, choosing the commands Calculate → Procedures → Operations → Execute. In the dropdown menu which will be appearing, are entered generation and distribution and assignment and the same we made to be inactive. Outlaw Skim matrix, because previously we made calculation for them. Modal sizes are actually assignment of transport on certain roads, allocation of trips on roads, (Figure 13 and 14).



Figure 13. Calculated modal values

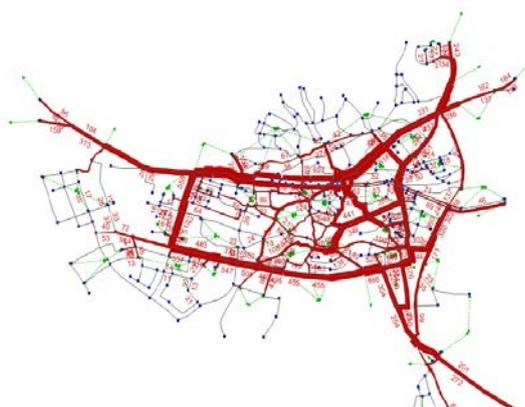


Figure 14. Calculated modal values

8. Conclusion

PTV Vision Visum is world leading software in traffic analyzes 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, buses, walking and cycling) in a consistent network model.

In the paper we represented in steps the methodology for calculation on transport demand. We started by setting the working background, than defining the traffic network, creating the demand model and finally calculation of the transport demand. With the help of the large number of represented figures we wanted to get clearly vision of the work in the software, for used steps, the location of used tools and commands.

Modal values represent the assignment of travels on certain roads, i.e. distribution on travels on road network. For modal values calculation with the fourstep model, it is necessary activation of all generation, distribution and assignment, while Skim matrix should be deactivated.

Intensity of travels on roads is shown on figures 13 and 14 with red color.

Unlike analytical approaches for calculating the transport demand and forecast , PTV Vision VISUM software provides fast and accurate computation and offers a graphical representation of output results.

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