STUDY OF STEPS IN THE VISUM SOFTWARE FOR CREATING A MACROSCOPIC MODEL FOR PUBLIC TRANSPORT, FOR EXAMPLE FOR THE CITY OF PRILEP

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Abstract
The PTV VISION VISUM software tool, which is the world's leading traffic analysis, forecasting and data management software that reliably models all road users and their interactions. The subject of analysis in this paper will be the planning of a sustainable urban transport system, in this case the public transport of the city of Prilep with the help of the software tool PTV VISION VISUM. In the paper that is dedicated to public transport, i.e. the steps that must be taken to obtain the sizes, from the creation of an operator, type of public transport, coordination group, placement of stands, lines of public transport, matrixes, uses, rewritings and similarly. The outputs will be shown as a combination of private and public transport and the application of the modal distribution of trips with the help of a legend and a detailed description of the elements of the pad. In addition to the VISUM software tool, the VISSIM tool will also be shown, with the help of which we will simulate the movement of the public city transport in the city of Prilep.

Keywords: model, planning, forecast, software, public transport, Prilep.

Macroscopic traffic models for the creation of transport demand are widely used in traffic engineering for the analysis and assessment of the projected transport system, traffic operations, the selection of alternative solutions, forecasts of transport demand, etc. Traffic and planning are closely related to each other, therefore there is an increasing need for traffic engineers to use modern software tools and packages. VISUM works with all non-rail, rail and other public transport systems. It is the only integrated software package that integrates complex transport demand, traffic planning and passenger behavior simulation. It enables sustainable management of public transport quality. Public transport has a great potential for transport planning. The optimal planning process creates a balance between demands (transport demand) and technological capacities (transport supply). [1] In this paper, the emphasis will be placed on the public transport in the city of Prilep, by applying the software tool PTV VISION VISUM, where on an already created base and a traffic transport network, we will create the public city transport by setting up stops and public transport lines in Prilep, i.e. modeling, and then a connection with private traffic and a display with simulation.

1. CREATION OF A MACROSCOPIC MODEL FOR PUBLIC TRANSPORT OF THE CITY OF PRILEP

Public transportation is a system of transportation of passengers for group trips that is available for use by the general public in contrast to private transportation, with a predefined schedule of driving, along established routes and with the charging of a price for the trip. Public transportation affects everyone. It is an integral and essential part of the contemporary world. In addition, the pollution of the environment where we live is significantly reduced, because, compared to all world analyses, one bus that can hold 60 passengers actually replaces 20-30 individual motor vehicles, reducing the level of pollution by about 10 times. From an economic point of view, public transport is much cheaper than transport with your own vehicle. In addition to fuel consumption, in this segment parking spaces, which are expensive for daily use, as well as the smaller number of them, as a consequence of the increase in the number of vehicles, must be considered. [2]

1.1 Public passenger transportation in Prilep

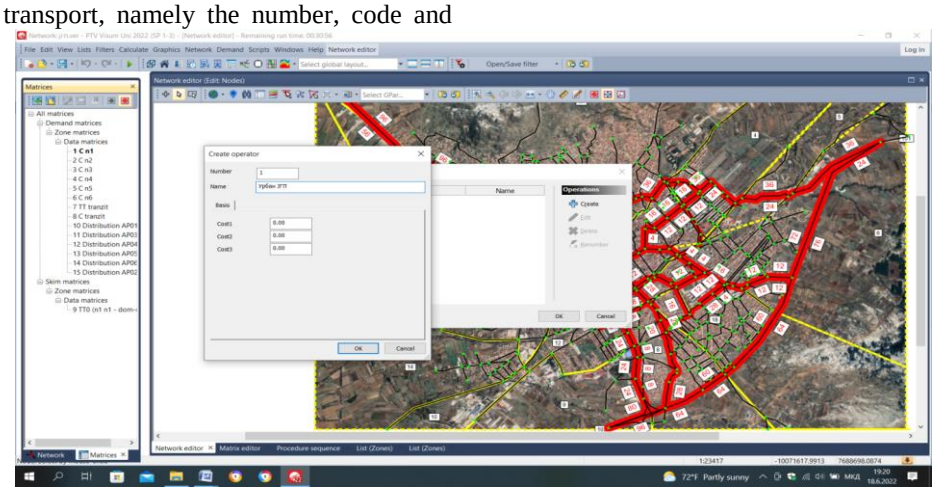
Public city transportation as a department of the Public Enterprise for Spatial and Urban Plans has been operating since April 2014. [4] Prilep is the first city in the country to get environmentally friendly and cheaper city transport. Part of the vehicle fleet that is used for transportation is diesel, while there are also four buses that run on methane. [11] There are 3 bus lines in Prilep, payment is made through a card, which can be purchased at JSP Prilep, it can be topped up, and control is carried out electronically through a monitored appartment, for people who do not have a card, payment is made with coins of 5 and 10 denars, where he receives a fiscal bill, the vehicles are equipped with video surveillance, double-winged doors, low floors, the possibility of wheelchair access and space intended for disabled people. The vehicles are modernly equipped, 12 meters long, double-winged, with 27 seats, with a ramp for passengers with wheelchairs, that is, they have the capacity to transport 78 passengers standing. The main benefit of these buses is that they do not pollute the environment, because they are Euro 6 standard. [3]

Pic.1.1.1 Bus for public passenger transportation in Prilep

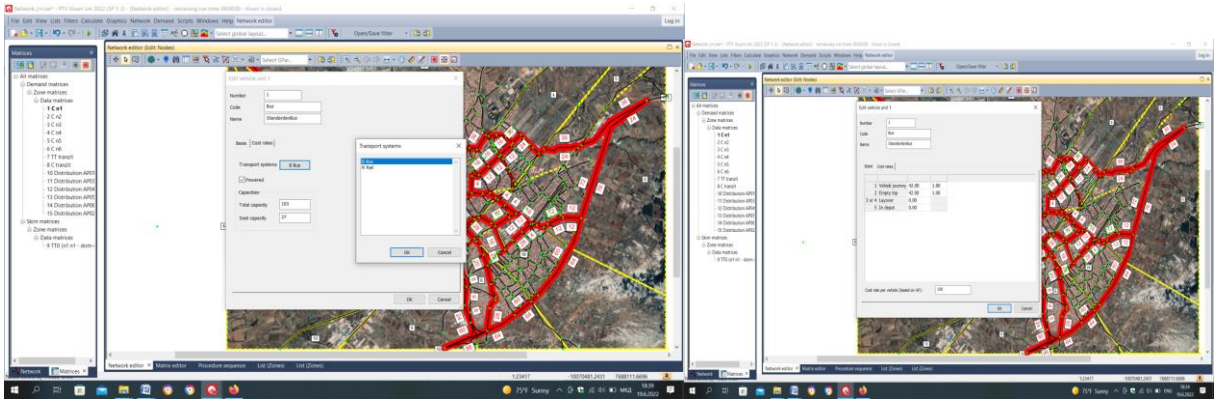
1.2 Creation of operator, type and coordination group of public city transport

By creating an operator we enter the name, number and costs of the operator. Here we can create multiple types of operators like urban or rural public transport. It is shown in figure 1.2.1 In terms of type, public city transport can be created by bus and combined (eg bus - railway). We enter the characteristics of the type of transport, namely the number, code and name of the type of transport, type of transport system, seating and standing capacity, costs (costs per hour - kilometer, full trips, empty trips, vehicle parking).

It is shown in Figure 1.2.2 Coordination groups are a fundamental step in advancing the rewriting of route journeys.



Pic.1.2.1 Creation of an operator of public urban transport

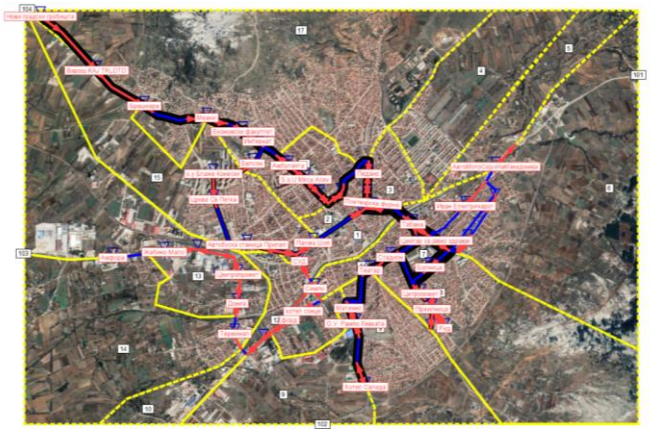


Pic.1.2.2 Creation of a type of public urban transport

1.3 Creation of stops and lines of public city transportation in Prilep

The placement of the stands and the territory in which the stands are located are always created together because they cannot function without each other. Figure 1.3.1 shows the public transportation stops in Prilep. Drawing a line route is done by selecting the first station and dragging to the end where the line ends, i.e. the last station. Figure 1.3.2 shows all the lines and stops of the public transport in Prilep.

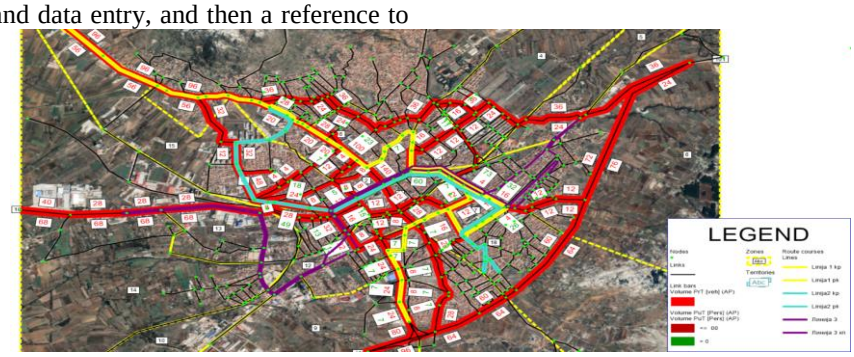
Pic. 1.3.1 Public transport stops in Prilep have been created



Pic.1.3.2 Presentation of created lines and stops of public city transport in Prilep

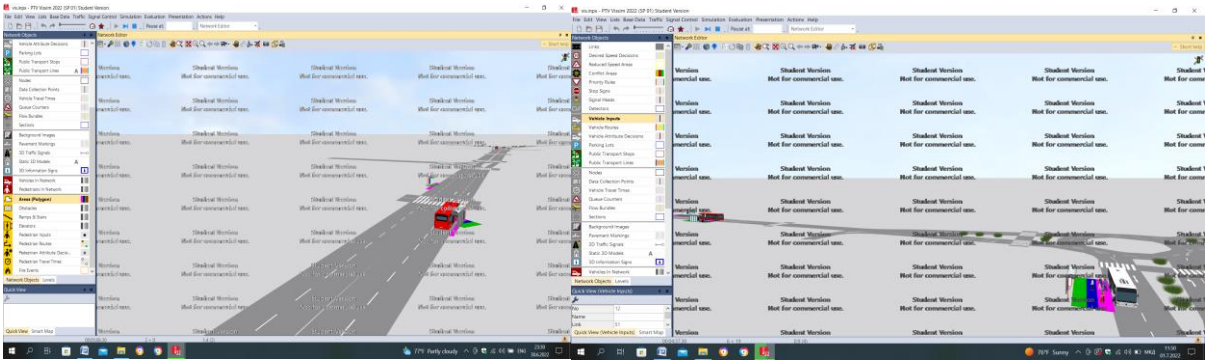
1.4 Calculation of the modal sizes for public transportation

Before the step for the calculation of modal sizes is shown, it is necessary to enter a purpose named as public transport, a period in which we are analyzing it, a travel matrix and data entry, and then a reference to the matrix. To calculate the sizes we create a skim matrix for public transport and rewrite public transport trips. The calculated sizes are given in figure 1.4.1, together with the private traffic, where the number of lines with different colors, stands, zones and sizes are shown.[6]



Pic.1.4.1 Presentation of the calculated sizes for public and private traffic for the city of Prilep

Figure 1.4.2 shows images that simulate the movement of public city transport vehicles using the PTV VISION VISSIM tool.



Pic.1.4.2 Simulation of public city transport vehicles at stops in Prilep city

2. CONCLUSION

Prilep is a city that has a well-built and connected traffic network, where the needs for travel are met with different transportation systems. The development of private journeys along the primary traffic network, train journeys along the built railway network and public city transport according to a pre-determined timetable, price and route of movement. [8]

With the help of the software tool PTV Vision VISUM, which is a professional software for traffic planning and detailed display of all modes of transportation, trips with private vehicles and public transportation, a calculation and forecast of the transportation demand for the city of Prilep was performed. To show the modal distribution of trips in a paper, in a pioneering way, the steps for calculating the modal sizes for public city transport were shown, from creating an operator that performs the transport, adding a bus to the section of transport systems, setting up a coordination group, stands by full length, placement of public transport lines, model creation, matrices and calculation of modal sizes for public city transport. All the placed elements were shown through a legend and a simulation of the movement of public transport vehicles in the territory of the city of Prilep. The simulation was done with the software tool PTV Vision VISSIM. [9]

By comparing the output results from the calculation of the modal sizes, we can conclude that in this paper the modal distribution of trips is made by analyzing private cars and trucks versus public city transport. We can conclude that private trips on the transport network of the city of Prilep prevail. The largest number of private trips are on the entrance-exit routes of the city and in the central city area, where the most numerous activities for meeting human needs are concentrated. Regarding the public city transport, we can conclude that we have the largest number of trips on the part where the movement routes coincide, that is, 1, 7 and 11 zones. During the period of analysis, the public city transport line number 3 has the smallest amount of passengers transported per hour.

Prilep deserves a modern vision for traffic, a vision for a different modal distribution, a vision for sustainable transport, a vision for a green city, for a greater participation of public, bicycle and pedestrian traffic in the total, and less of the car. We need to plan a city for people, not for cars. [7]

We live in a new time and our values should be progressive. Let's learn from positive examples in the world, create new concepts. Software tools and packages are of great importance for traffic engineers because they allow us to review the current situation and forecast future needs, without going out into the field, simulating the movements and seeing the problems. [5]

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