Presentation of the results of the project "Development of Slavu-Krasta Maskavas node simulation model"

LogOn Baltic Workshop meeting

October 25th 2007, Riga

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Project part-financed by the European Union (European Regional Development Fund) within the BSR INTERREG III B Neighbourhood Programme

Problem Definition

- For the past 30 years in the EU states the number of cars has been increasing for three times and is increasing to 3 million cars annually (European Commission work, 2001).
- The congestions and traffic jams are the typical problems of contemporary city
- The poorly designed transportation system is one of the reasons of traffic jams

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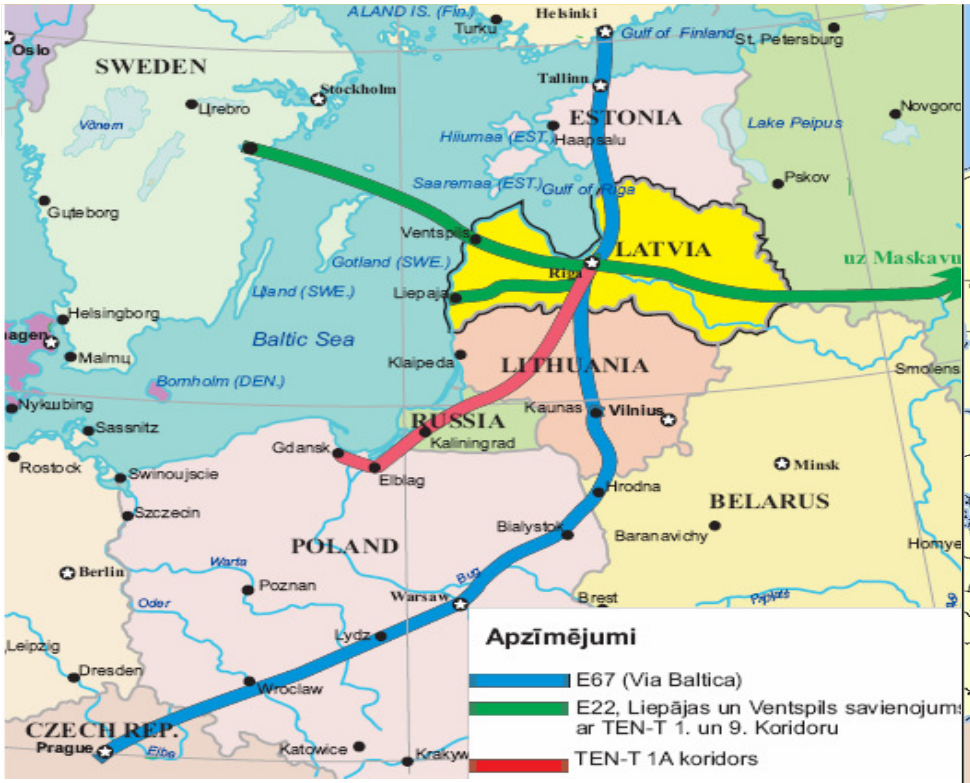
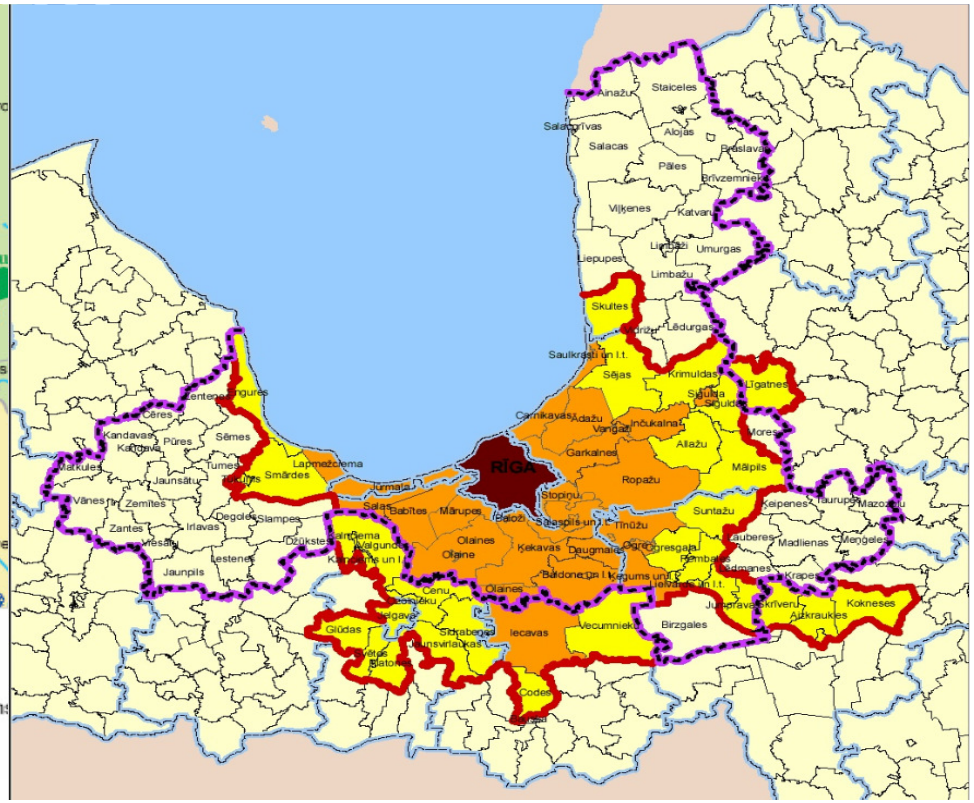
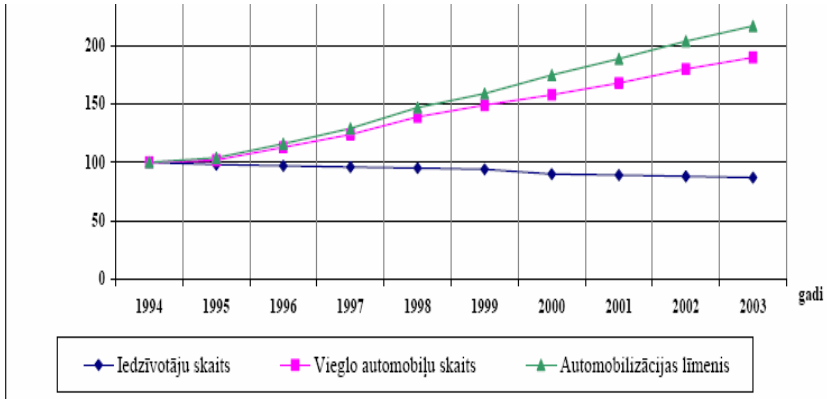
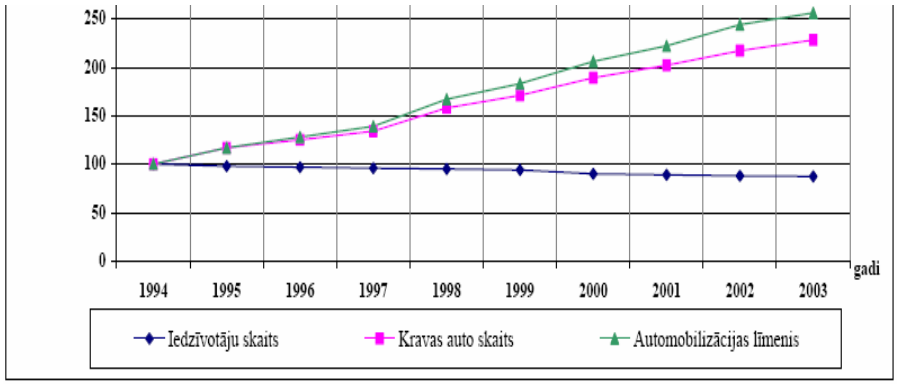




Dynamics of Motorization Level in Riga Private Cars



Dynamics of Motorization Level in Riga Cargo Flow



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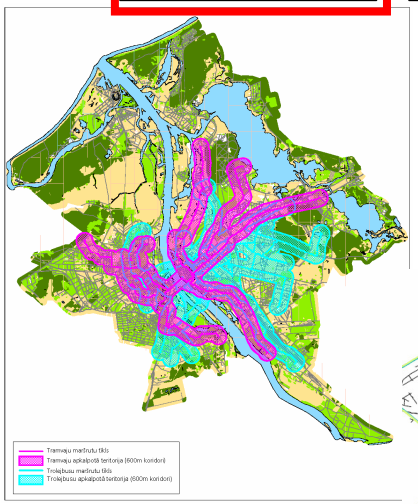
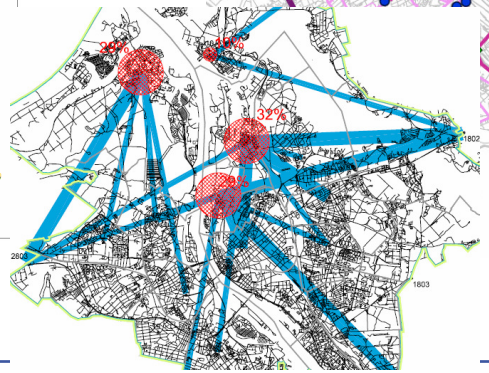
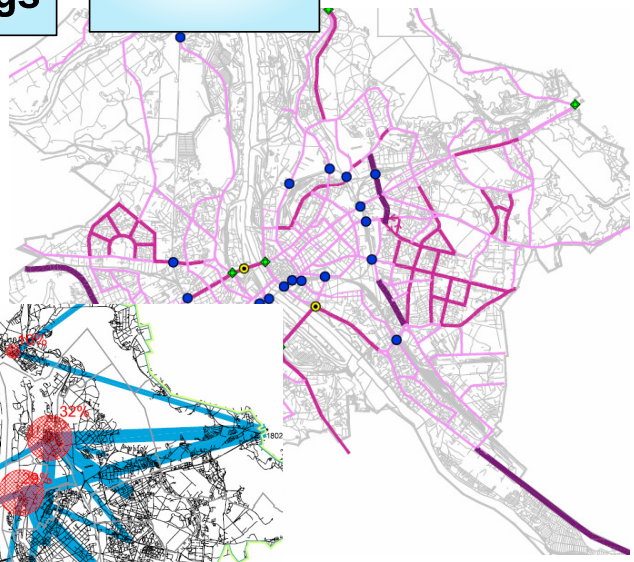
Riga TS Problems

- Accidents
- Environment Pollution
- Overloading of:
  - Bridges Branch-lines
  - Railway Crossings
  - Crossroads







Reasons of Riga TS Problems

- Stare-shaped Type of:
  - Public TS
  - Private TS
  - Cargo TS
- Absence of highways by-pass for:
  - Cargo Traffic
  - Transit Traffic
- Fragmentary character of highways and main roads
- Capacity limitation of branch-lines at the centre
- Deficiency of Parking Place

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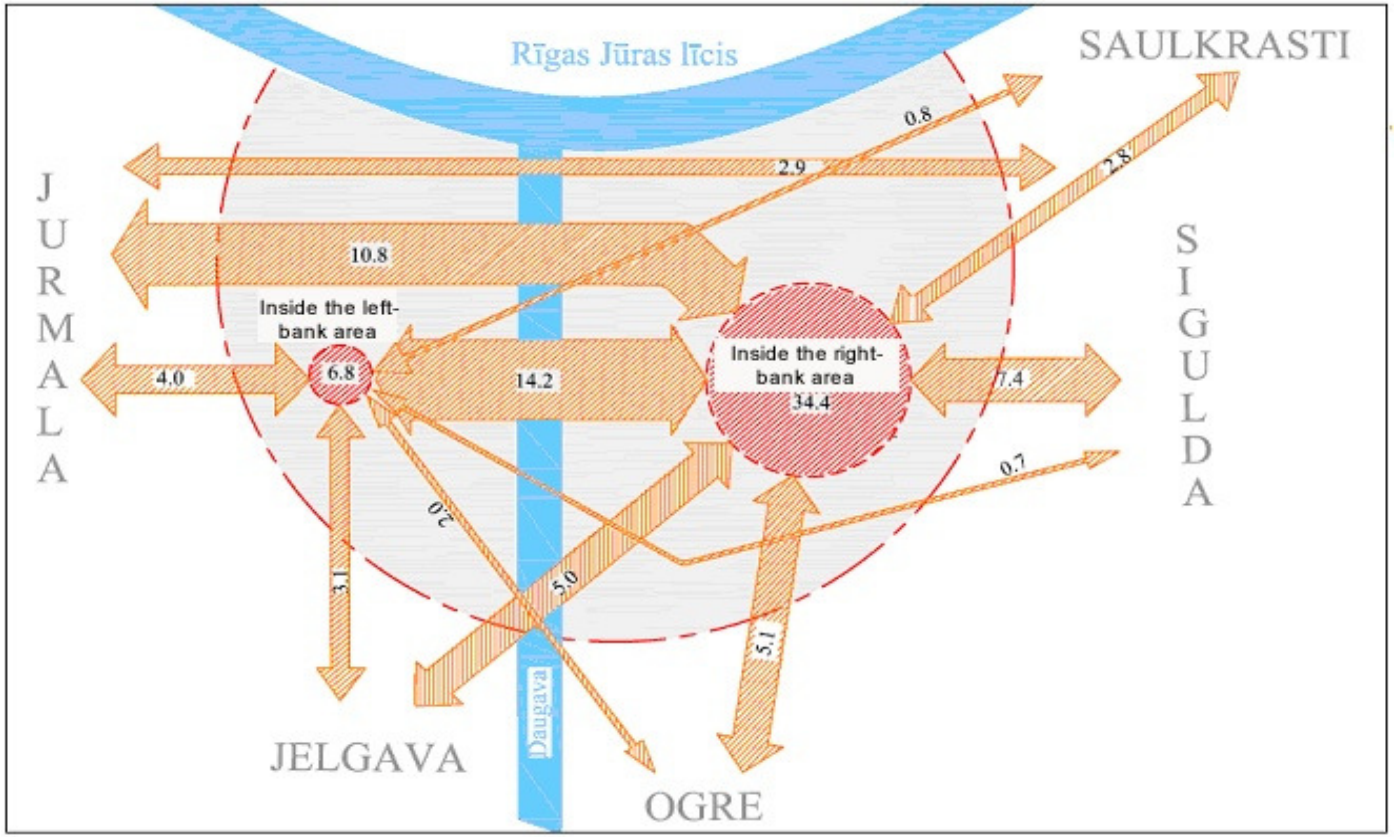
Main Traffic Flows in Riga (Private Vehicles and Public Transport)



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Approaches of Transport System Design Improving

- addition of new streets,
- introduction of the transit system,
- new arterials meant for relieving congestion,
- moving the centers of the population attraction, etc.

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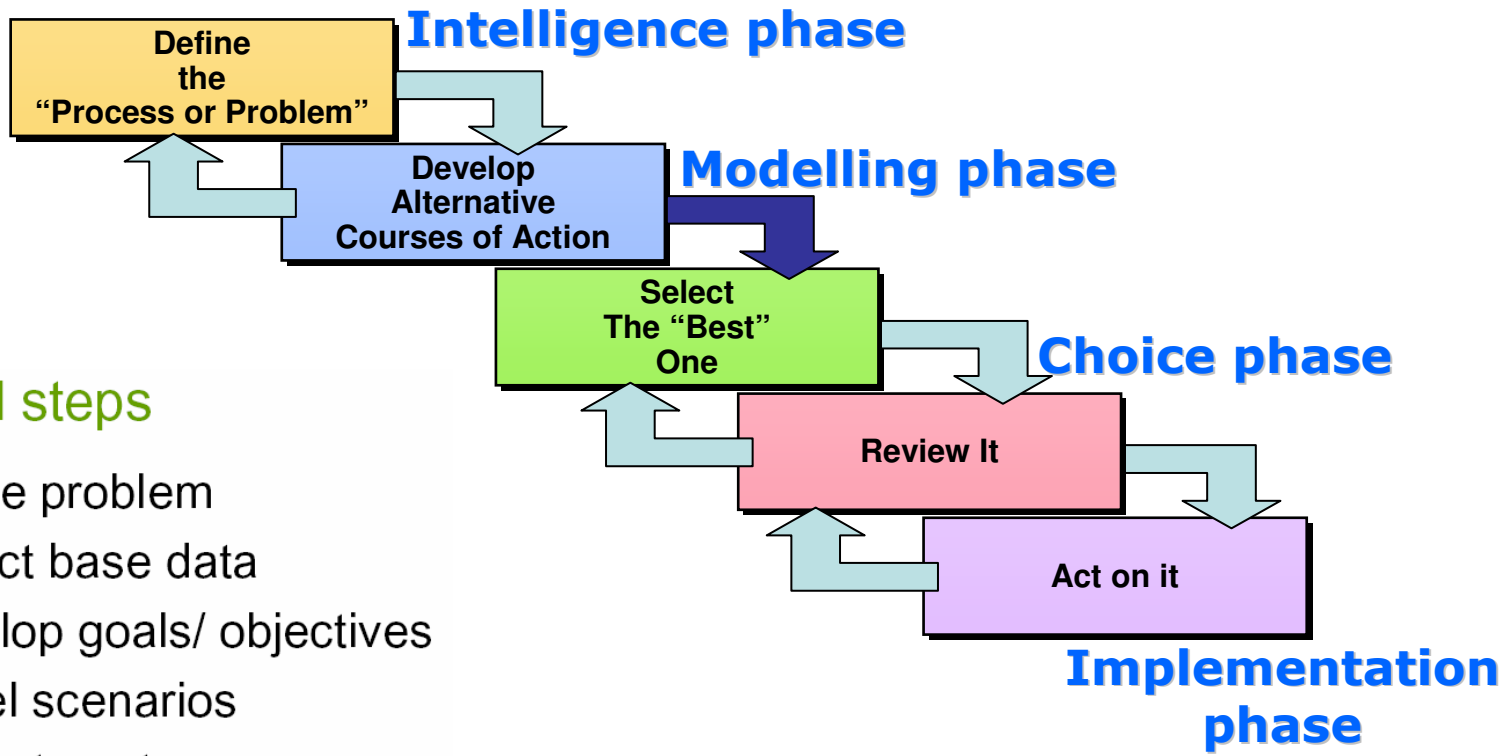
Decision Process

Decision makers go through a fairly systematic process.



General steps

- Define problem
- Collect base data
- Develop goals/ objectives
- Model scenarios
- Evaluate outcomes

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Three Stages of South Bridge Implementation

The Southern Bridge building stages	Length, km	Terms of realization
First stage – from Bauskas street to Slavu railway overpass	2.5	2004-2008
Second stage – Slavu railway overpass reconstruction and building of the three-level overhead road of the Slavu rotation circle	1	approximately 2008-2010
Third stage – from Vienibas gatve street to Bauskas street	4.5	approximately 2010-2012

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Project Tasks

- The analysis of load on the basic directions of the three-level trestle of Krasta Street - Maskavas Street - Slavu bridge
- Development of the animation film
- Comparing the capacity of the transport node from the point of view of a today's situation (2004 year) and possible increase of the intensity of vehicles travelling in the future (in 2012)

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Steps of the Project Implementation

- South bridge transport network model development
- Traffic structure and flow distribution (itinerary) description in the model
- Traffic control rules assignment
- 3D model development and animation video recording
- Experimentation with the model, the data collection and interpretation

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The Sources of the Data

- **JSC "*imink*"**
- **JSC "Tiltprojects"**

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Project Participants

Riga City Council

Telemātikas un loģistikas institūts

Laboratory of Applied Systems

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Development Tools

For simulation model creation:

PTV Vision VISSIM 4.30

The tool for the urban and regional traffic analyzes, it's reengineering and optimization

For 3D model creation:

PTV Vision V3DM

The tool for 3D objects creation and editing

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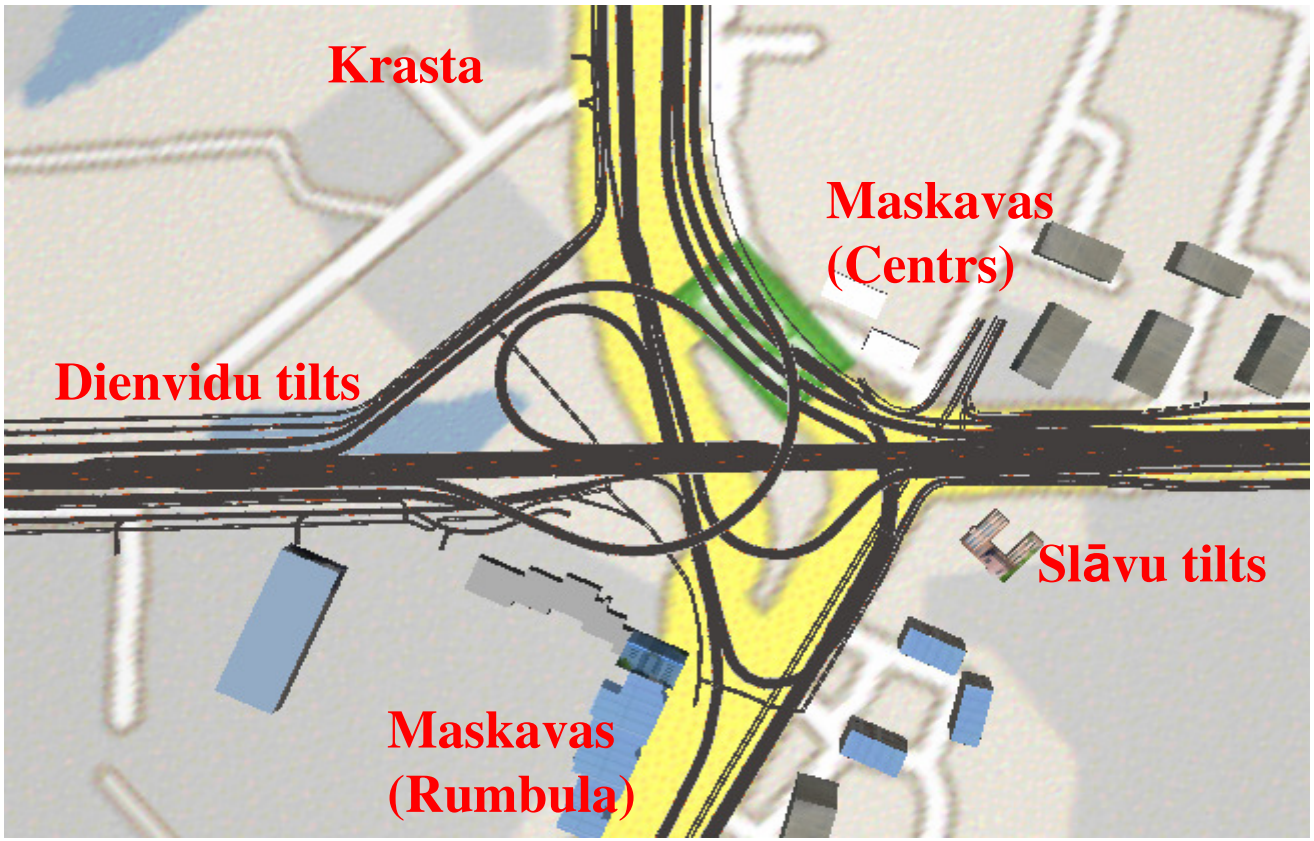
Stages of the Model Implementation (1/6)

The Development of the Transport Network Model



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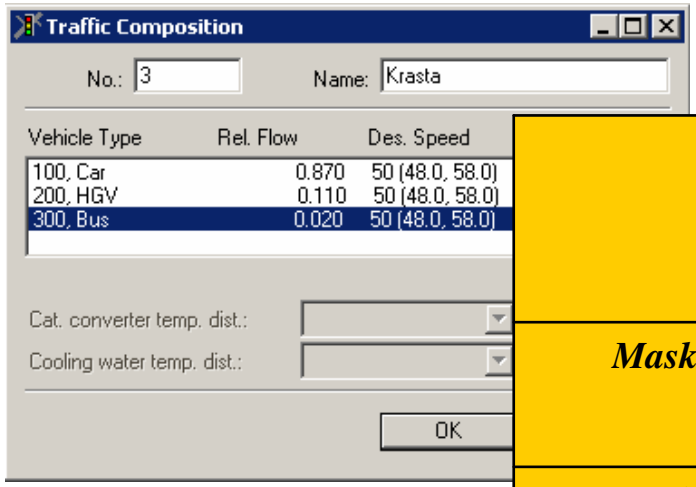
Stages of the Model Implementation (2/6)

Description of the traffic structure and the traffic flow distribution



	Maskavas	*Dienvidu tilts*	*Slavu tilts*	*Krasta*
Maskavas	-	31%	7%	63%
Dienvidu bridge	4%	-	85%	11%
Slavu bridge	0.1%	31.2%	-	68.8%
Krasta	73%	3%	24%	-

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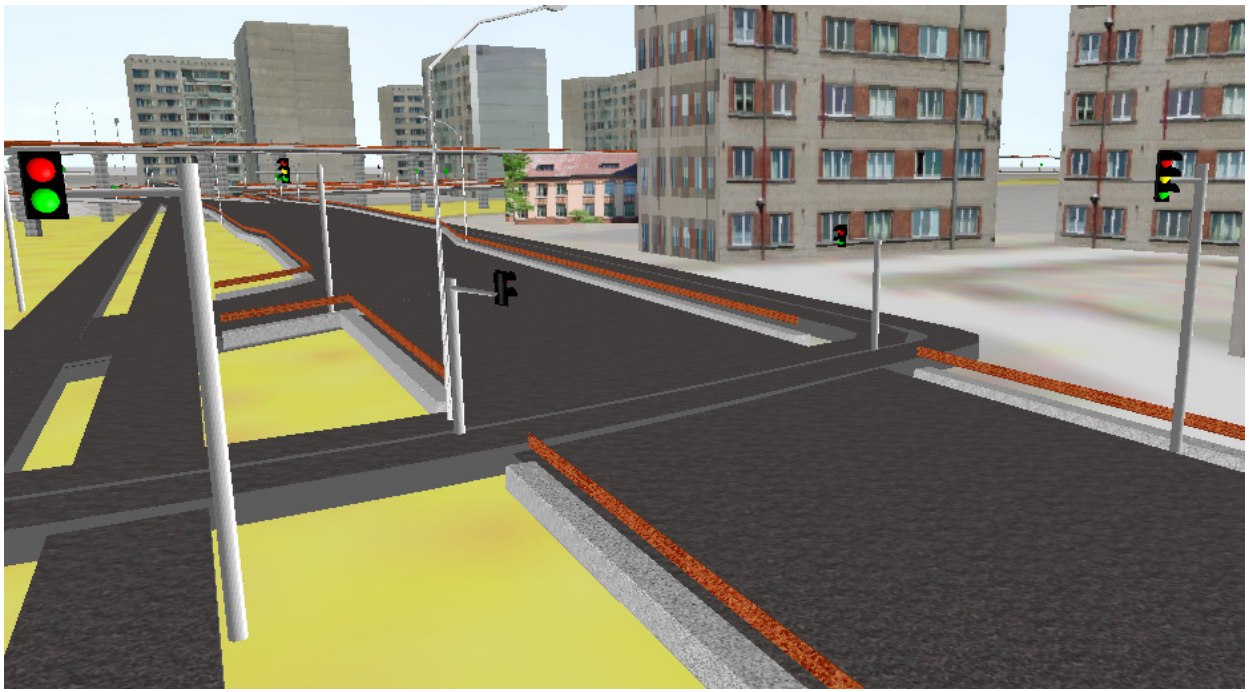
Stages of the Model Implementation (3/6)

Description of the priority rules and the traffic light cycles



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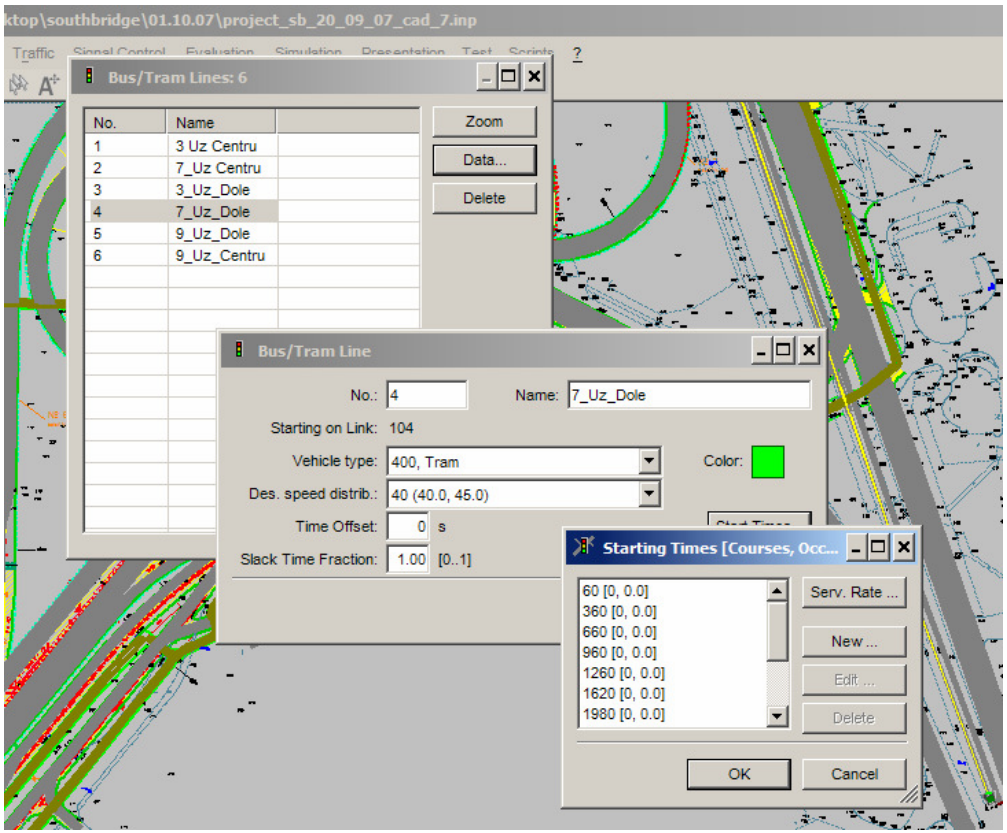
Stages of the Model Implementation (4/6)

Implementation of the trams route schedule



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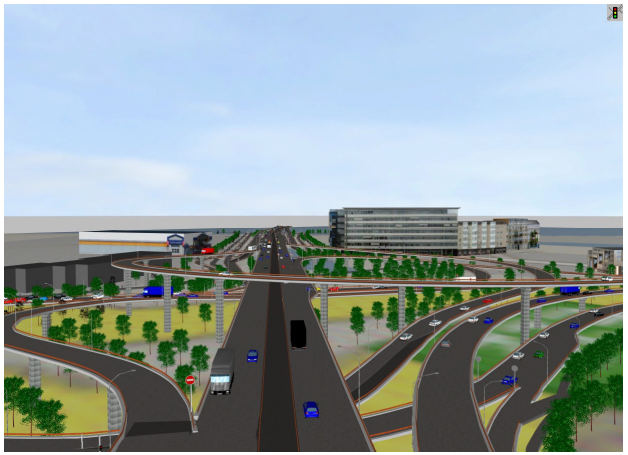
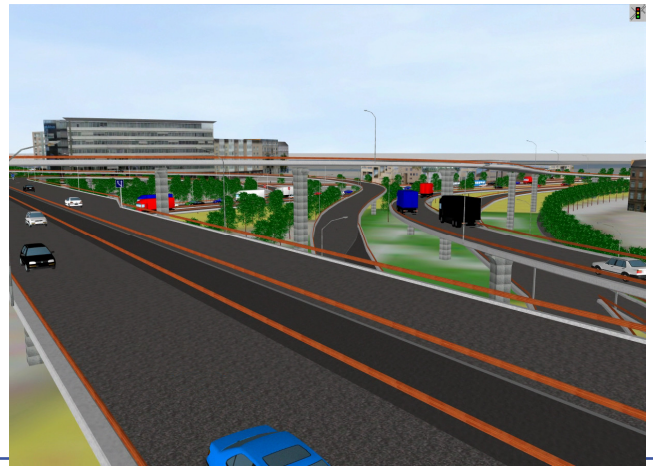
Stages of the Model Implementation (5/6)

3D Model creation and the animation video recording





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Stages of the Model Implementation (6/6)

Description of the data collection scenarios

Collected data:

- Delay time and level of service
- Queue length and time
- Travel time
- Total Characteristics of the network

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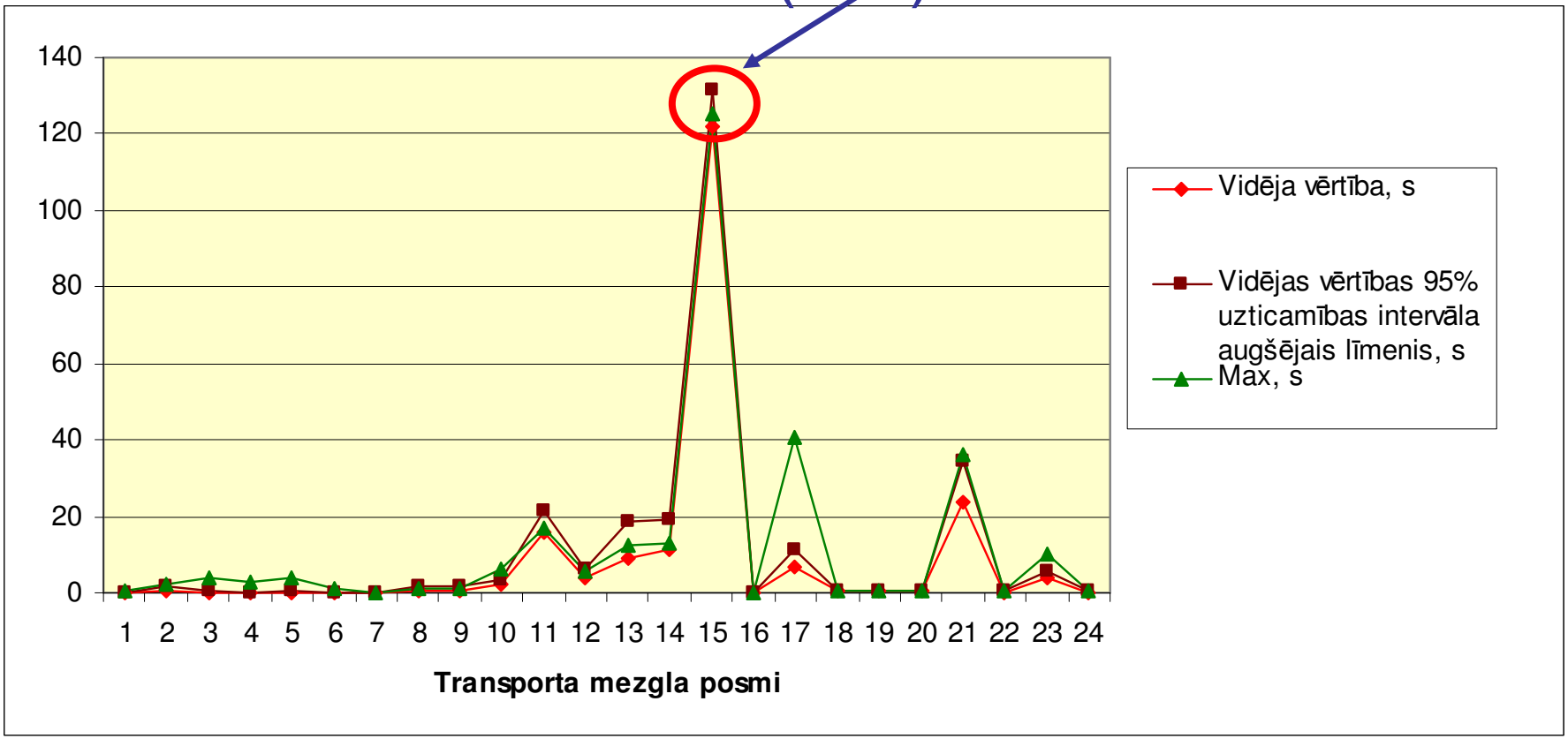
Results of Simulation (1/3)

Maskavas - Krasta



The vehicles delay time on the parts of the transport node

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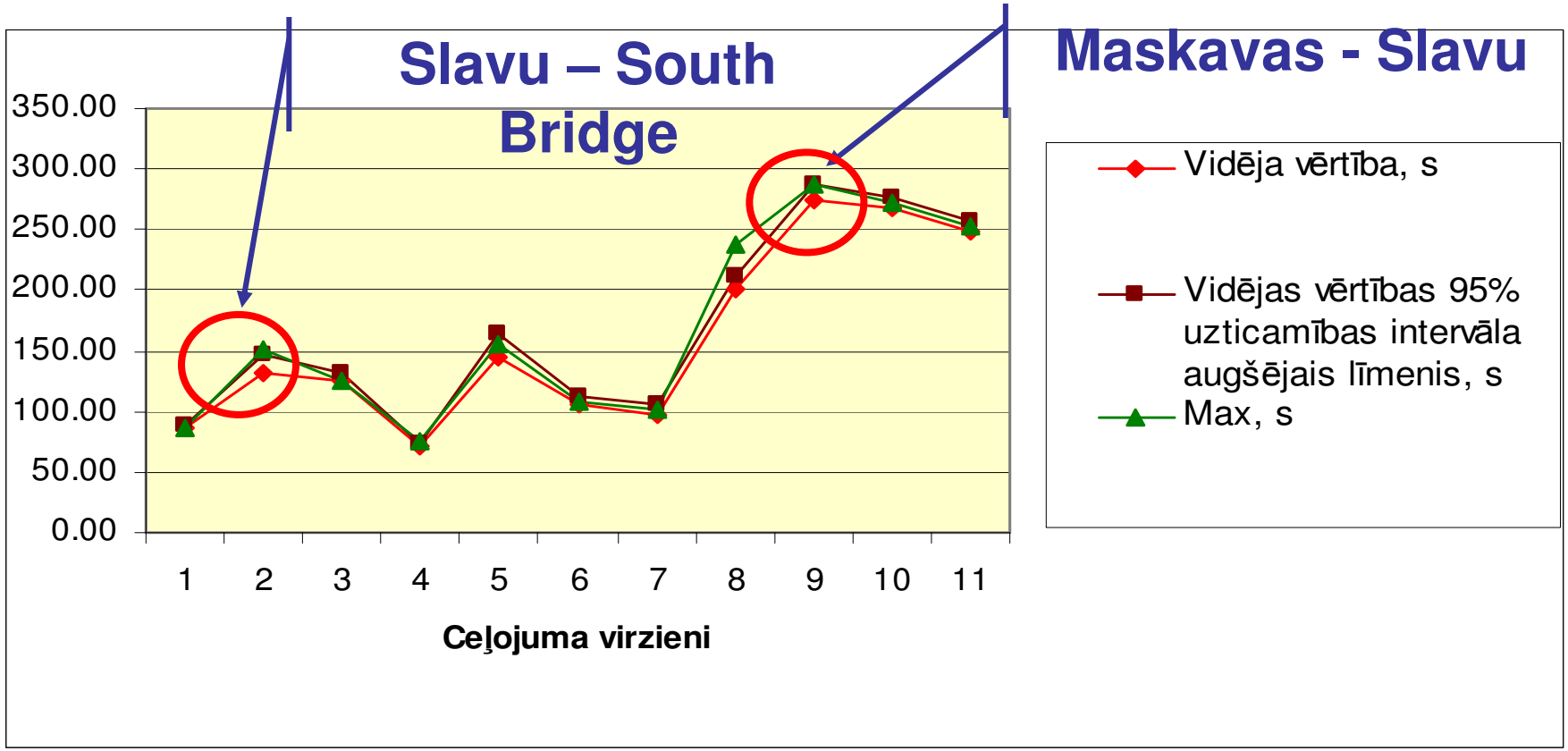
Results of Simulation (2/3)



The vehicles travel time on the main routes

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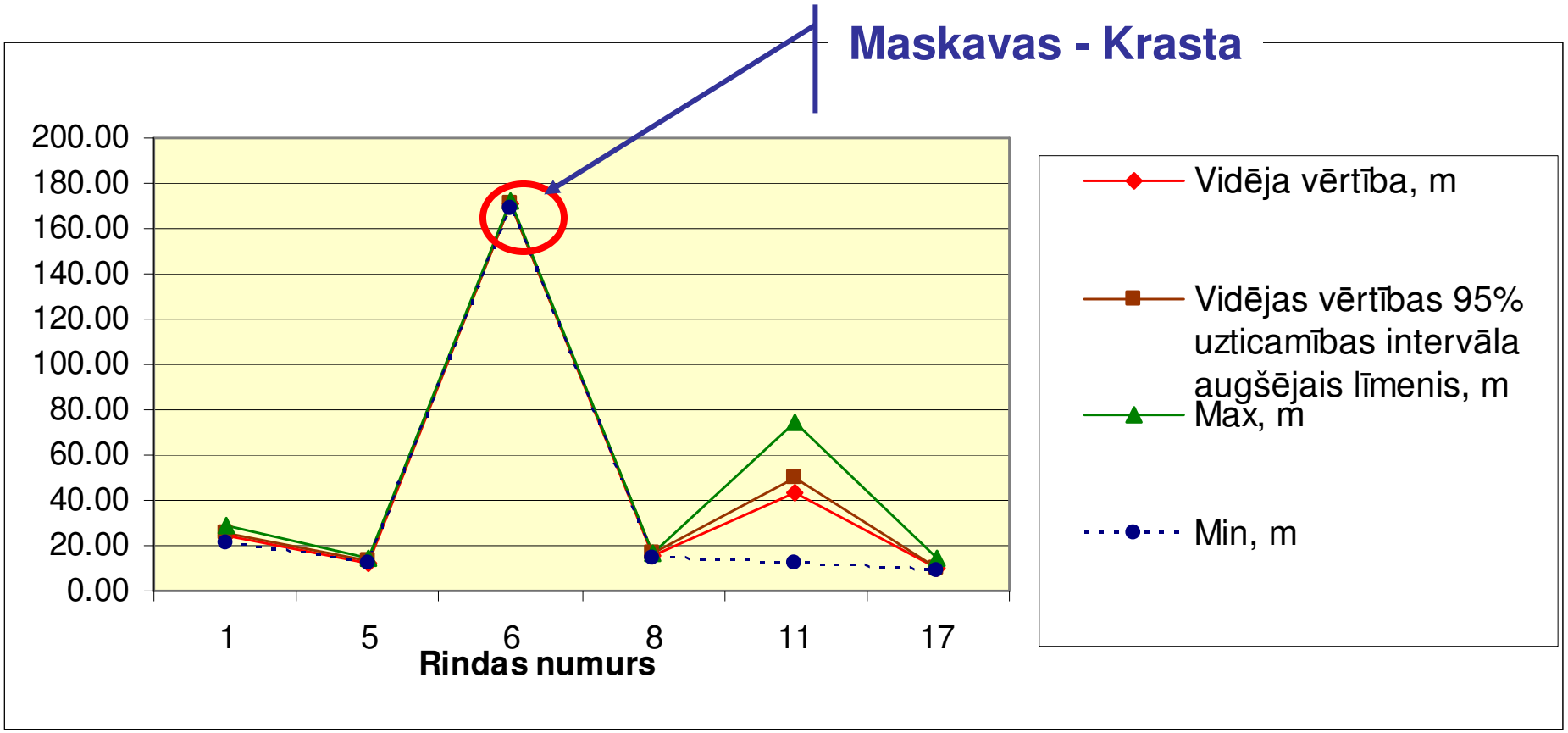
Results of Simulation (3/3)



The queue length

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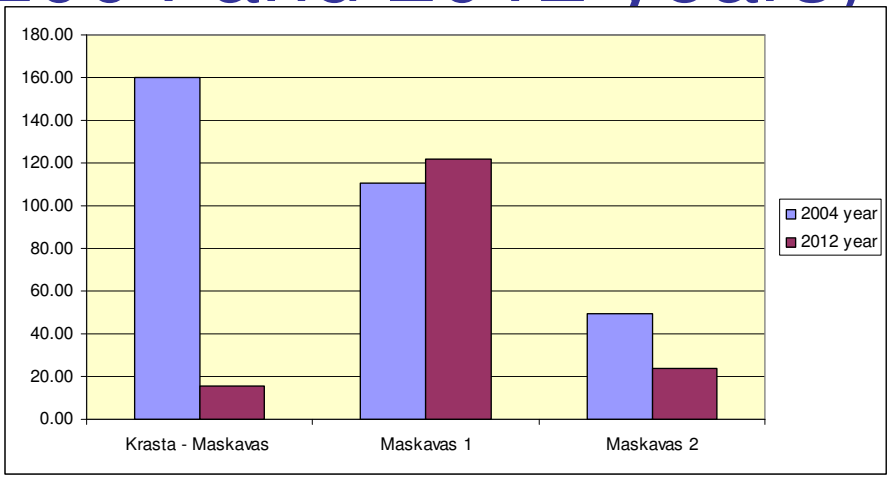
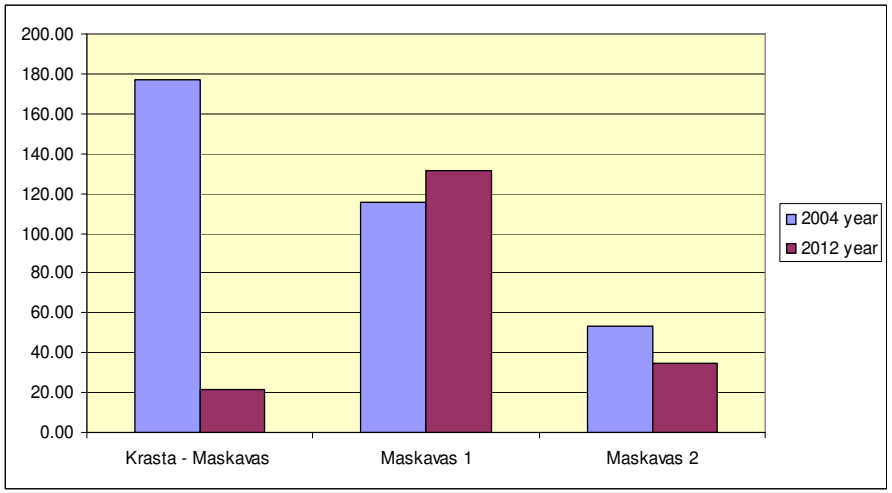
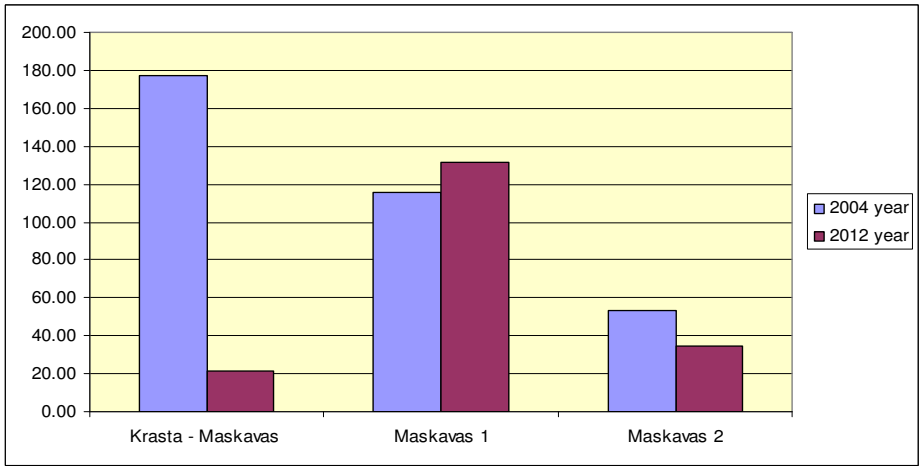
Analysis of the Transport Node Capacity (2004 and 2012 years)



The average of the delay time



The upper limit of the 95% conf.int. for the mean of the delay time



The maximum of the delay time

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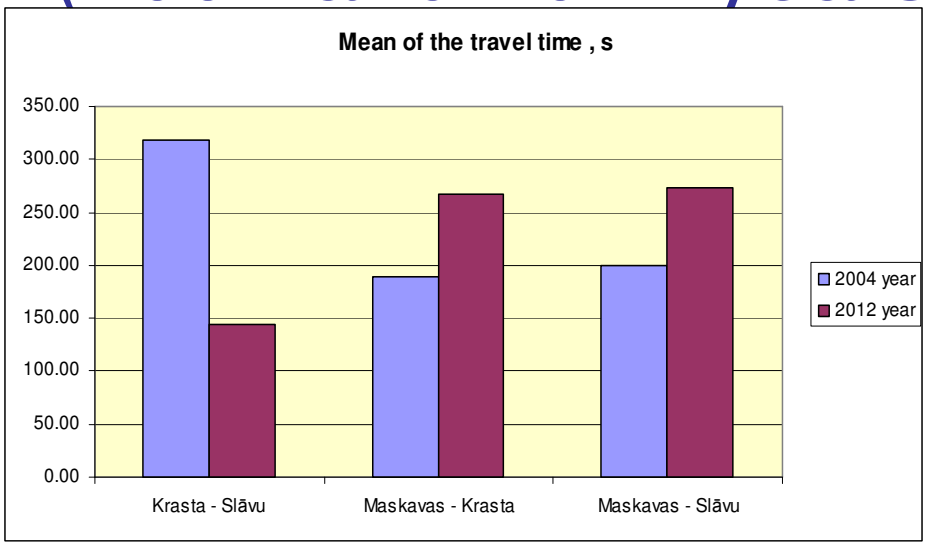
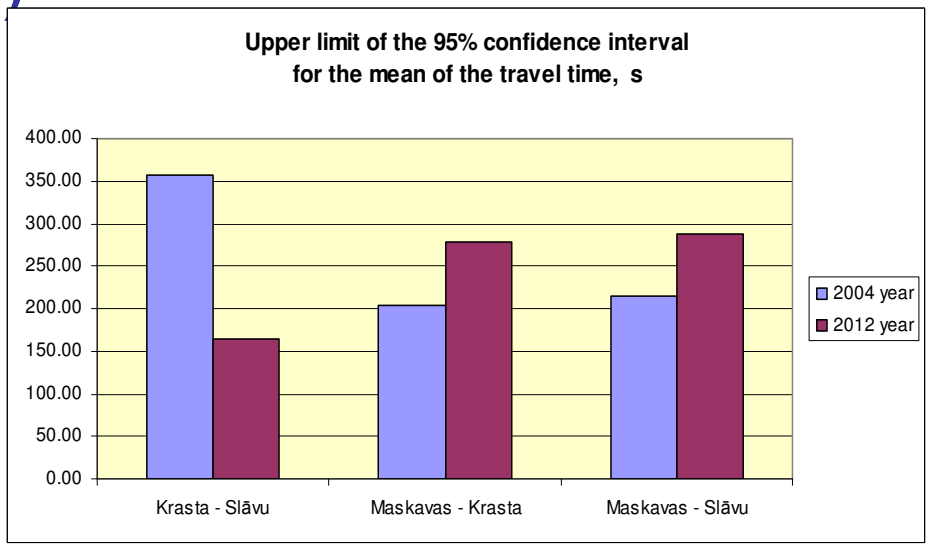
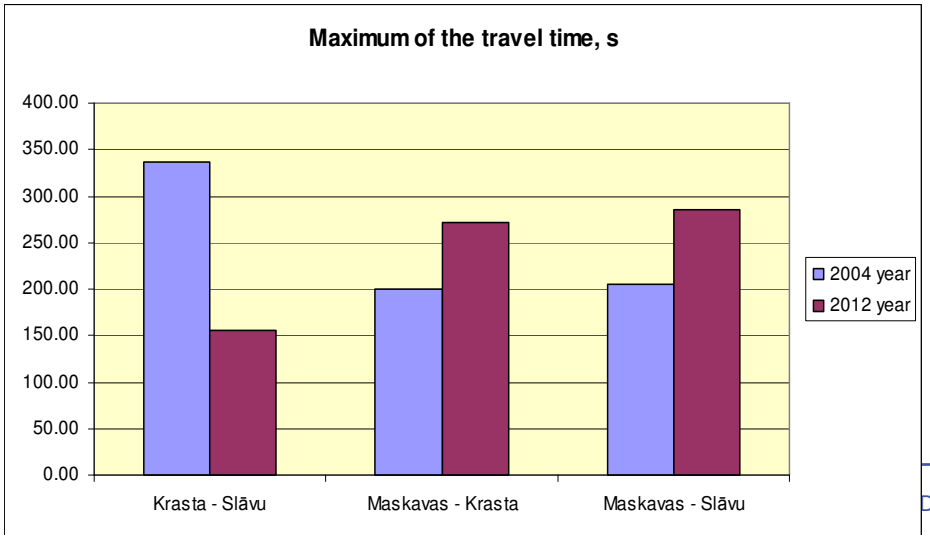
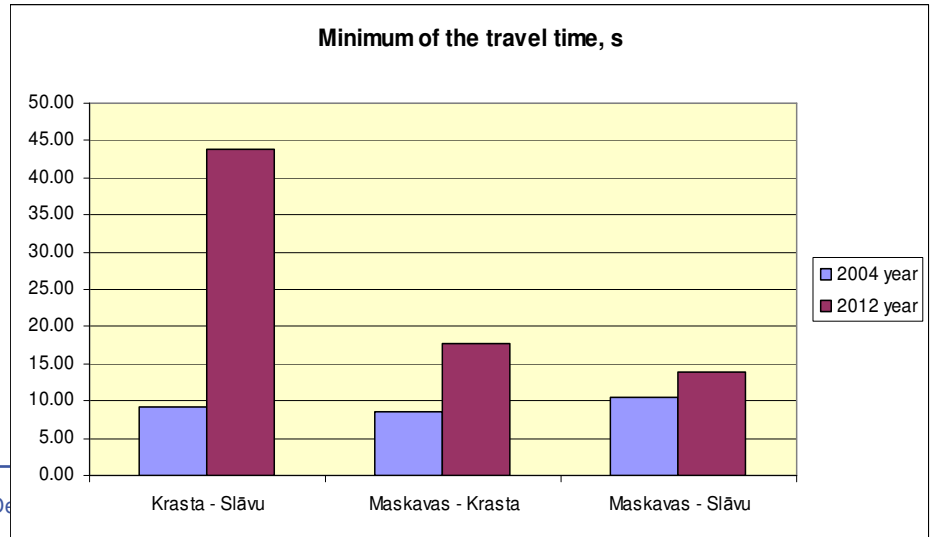
Analysis of the Transport Node Capacity (2004 and 2012 years)









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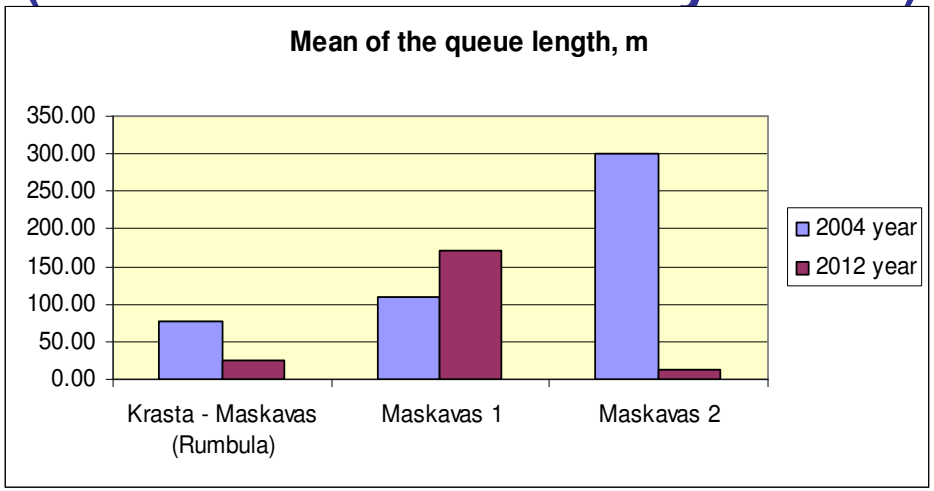

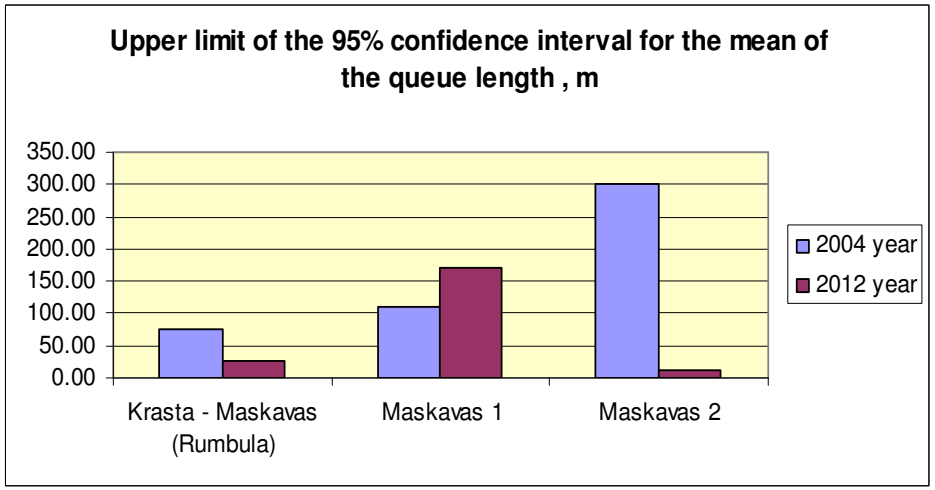

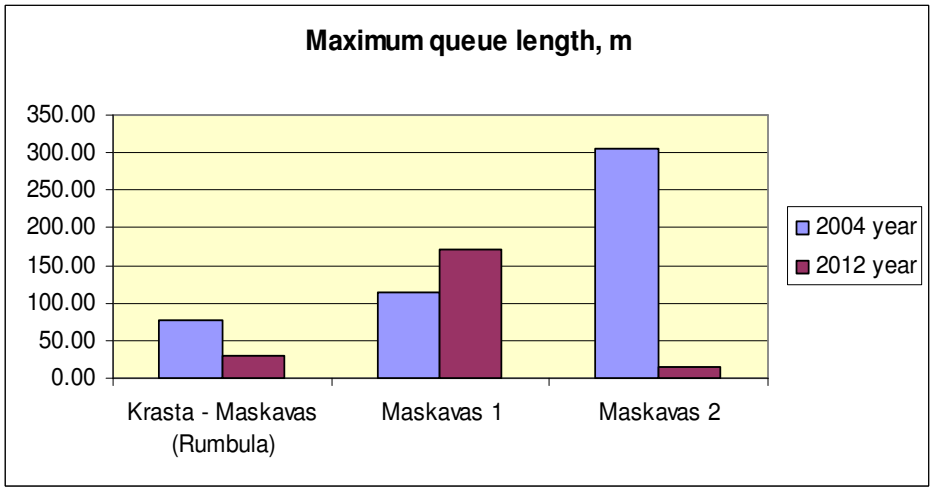

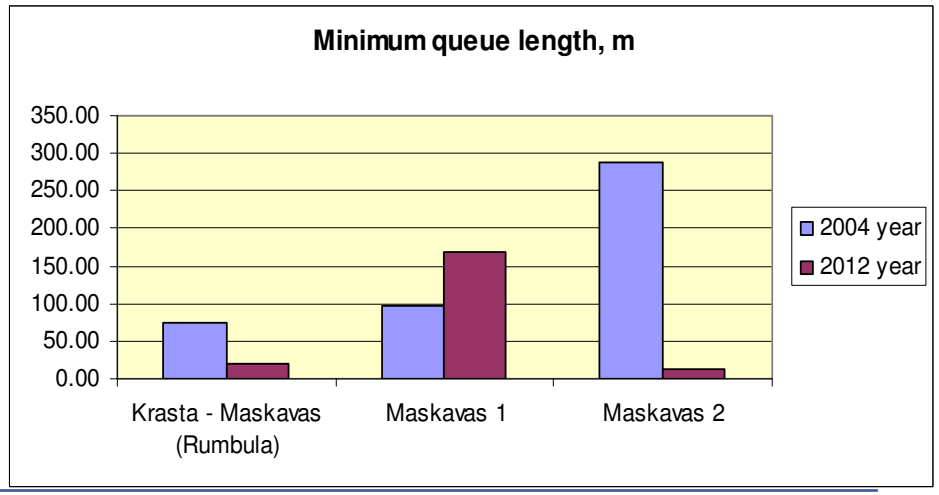

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Conclusions (1/2)

- The simulation approach allows designing the model of the transport network, reproducing its structures, the organization of crossroads, characteristics of transport traffic with a high degree of the detailed elaboration
- The simulation approach makes is possible to analyse the efficiency of the system's functioning on its model, to collect the data about its functioning and to experiment not destroying the real system

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Conclusions (2/2)

- An analysis of loading on basic directions of three-level trestle of Krasta street - Maskavas street - Slavu bridge is fulfilled
- Animation film in 3D dimension is developed

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Thank you for your attention!

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