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OPTIMIZATION OF THE PROCESS OF MODELING THE SUPPLY OF GOODS

In many areas of transport logistics, cargo delivery can increase its value by an amount equivalent to the value of the goods themselves. Of particular relevance are studies that allow to accurately calculate the volume of cargo transportation, calculate the number of transport units required to ensure cargo flows, determine rational routes for the movement of vehicles with cargo, as well as optimize the total cost of transportation. Besides vehicle routing, real transport companies also need to solve the problem of vehicle loading [1].

The use of simulation modeling allows you to determine the maximum load of vehicles, minimize transportation costs, and also calculate the probability of exceeding costs.

One of the most effective software platforms for creating a model and conducting simulation experiments today is the AnyLogic system. Transportation management includes many different aspects, such as planning and organizing transportation and fleet maintenance, human resource management, and risk management [2]. These issues can be solved by software AnyLogic, and therefore the main task of transportation management can be solved.

A simulation model of the process of transportation of spare parts from the manufacturer to airports was developed using the method of agent modeling in the AnyLogic environment. During the construction of the model, a GIS map of the OpenStreetMap resource was used, which allows you to add coordinates of objects and build routes as close as possible to real ones. The imitation model was built for the Antonov Serial Plant and seven Ukrainian airports, which need spare parts for

aircraft maintenance and repair twice a week. The order comes from the airport to the factory via notification. After that, the truck is loaded, the maximum number of cars for transportation is seven. The time for loading and unloading is two to three hours. After receiving the spare parts, the airport notifies this enterprise by the message "Delivered!". Then the truck is sent back to the enterprise. During the development of the simulation model, the single agent for the factory "Manufacturing", the population of the agent "Airport", which contains a collection of airports with their coordinates, the population of agents "Truck" and the agent type "Order" are created. The process of placing an order for new spare parts is described, given that each airport sends a request of the same form. The logic of order processing by the plant is described, which takes into account: receiving an application, time for loading the truck, sending it to the customer, unloading the truck, notification of delivery and returning the truck to the company. An optimization experiment was created and conducted to minimize the number of cargo vehicles for the supply of spare parts to Ukrainian airports, the loading of which is no more than 85%. An optimization experiment was created and conducted to minimize the number of cargo vehicles for the supply of spare parts to Ukrainian airports and presented in Fig.1.

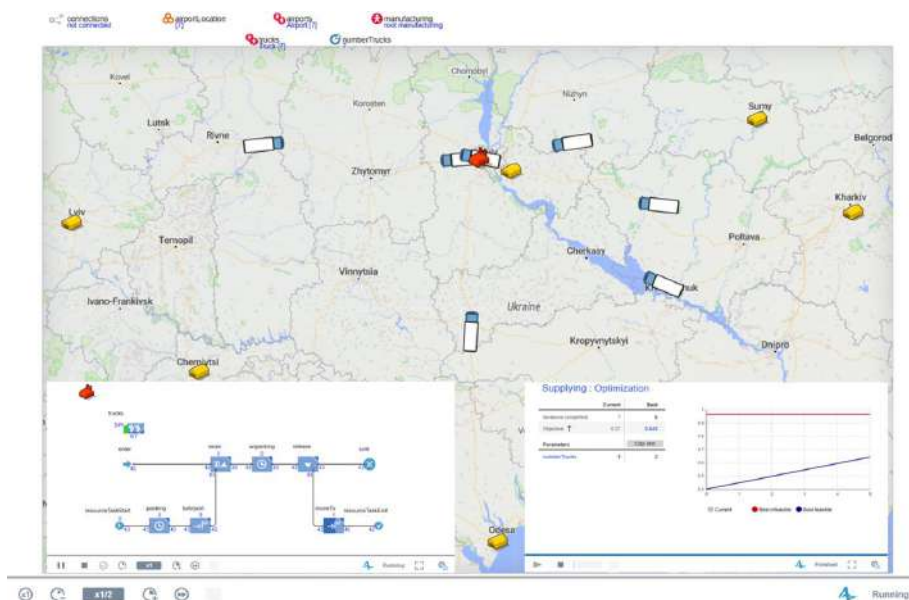


Figure 1 – Simulation model and Optimization for delivering spare parts to airports

The results of the experiment showed that the best allowable value for the use of resources is about 64% when using 2 trucks, the average value of resource use at the enterprise will fluctuate within 60-85%.

REFERENCES

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