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IMPROVEMENT OF CUSTOMS CARGO OPERATIONS
ON UKRAINE'S STATE BORDER

Ugnenko J.K. (Kharkiv)
Scientific advisor: Potaman N.V.
Language supervisor: Storchak O.

Summary: The article considers the improvement of customs cargo operations on Ukraine's state border. Shown a model of the process of customs cargo processing.

Key words: custom cargo operations, process.

Анотація: У статті розглядаються удосконалення митних обробок вантажу на українському державному кордону. Показано модель процесу митної обробки вантажу.

Ключові слова: митна обробка, процес.

Аннотация: В статье рассматривается усовершенствование таможенных обработок груза на украинской государственной границе. Показано модель процесса таможенной грузовой обработки.

Ключевые слова: таможенные обработки груза, процесс.

The European integration of Ukraine has set to solve a number of current tasks for the State Customs Service of Ukraine. One of them is to improve quality and accelerate the process of cargo handling at the state border checkpoints. Customs policy must ensure the implementation of economic, social, financial, trade and political intentions of the state.

Last years the principles of logistics have frequently been applied to deliver cargo in international traffic. An important role is played by the effective interaction of all the parts of logistics chains which include the process of customs processing of goods [1, p. 128].

The comparative analysis of the flows of cargo, vehicles and peoples through the check point Uzhgorod is made. At present in Ukraine there are three international check points on the Ukrainian border with Hungary. They are Chop, Vilok, Solovka check points. As of 2008-2010, the largest amount of cargo transported via the international checkpoints of Ukraine falls on the shoulders of Chop and Vilok checkpoints. Within the mentioned period 10,835,000 tons were transported in both directions. Comparison of the results of 2008-2010 indicates that the amount of imported cargo is growing by 23% [2, p. 60].

The research object is the process of customs cargo processing, and the subject is the impact of hourly customs cargo processing parameters on the overall delivery time of cargo in international traffic.

The paper objective is to build a model of the process of customs cargo processing, which allows making technological, design and management decisions, changing the input parameters, carrying out long-term planning based on information about the employment of customs checkpoints, customs teams and types of customs regimes. It gives an opportunity to analyze the time of carrying out customs procedures in different types of customs regimes. To create the model,

the Petri nets theory is used. It allows investigating processes taking into account the probability of failures and queues.

Time for customs check depends on appropriate types of checks: environmental, phytosanitary, radiological and veterinary. If a process of the customs processing of goods is presented as a model of "grey box", it will have the following external influence factors: checkpoint efficiency(P_{np}); quantity of lines(n_{CM}); availability of equipment to control and communication on the check points (In) to receive timely information about the theft of car, drugs smuggling or weapons smuggling, the number of employees of the customs post in a shift (Npp). Input parameters are the volume and type of cargo (Qv), the type of customs regime (RCI), type of vehicle (A) and frequency of vehicles approach (Ntz). The output is the time of carrying out customs procedures for different types of customs regimes (Tmp). Internal elements of the system are: the process of dispatching the car to the shipper, the process of loading, access to the internal customs, the process of drawing up documents for internal customs, entrance to the customs checkpoint, the process of customs control and clearance, access to the customs office of destination, delivery of cargo to the consignee.

The condition for efficient customs processing of goods is to minimize the time spent on the customs processing of goods:

$$T_{M\Pi} = \sum_{i=1}^{m} T_{Mni} \to \min$$

,

(1)

where T_{Mni} - time for customs processing of goods in the i-th phase, h;

m - number of phases.

To develop the model of the customs processing of cargo it is expedient to apply the system of information parallel processing and the objects which work in parallel. The processes can be modeled using Petri nets. Petri nets are a mathematical tool that can be used in any industry for any system where possible graphical representation of the object in the form of schemes and where needed means of representation of parallel processes are needed [3, p. 120]. The total model of Petri nets which describes the process of customs cargo processing, is shown in fig.2. A system of parallel operations of customs clearance and customs control is considered in details.
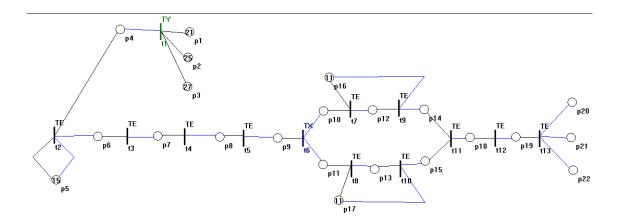
Fig.1. Process of custom cargo processing

The following model positions (R1-R25) represent the intermediate states of the system and each transition (T1-T13) - operation phases of the customs processing of goods.

The designation of the model position is as follows: P1, P2, P3 – the number of cars that are ready for dispatch carriers, P4 – the number of cars that came to the shipper and are ready to load;P5 – free handling mechanisms in the shipper; P6 – the number of loaded cars ready for shipment; P7 - the number of cargo, which was received by the internal customs; P8 – the number of vehicles have passed customs procedures at internal customs;P9 – the number of cars that are ready for implementation of customs procedures; P10 – the number of cars that are ready for customs clearance; P11 – the number of cars that are ready for customs clearance; P12 – the work of customs officers at customs control procedures, P13 – the work of customs officers at customs clearance procedures, P14 – customs control procedures completed; P15 – the procedure of customs clearance is completed; P18 - the number of cars that sends a customs office of destination; P19 – the number of cars that passed the procedure of customs clearance, P20, P21, P22 – the number of cars, as received by the consignees.

The designations of the transitions in the model are as follows: T1 – the intensity of the flow of cars from the carrier; T2 – the duration of load in shipper; T3 – the duration of delivery to internal customs; T4 – the internal customs;T5 – time to approach the vehicle to the checkpoint, T6 (transition- switch) – the distribution of performance of customs operations (procedures) T7 – time for customs inspectors to approach the car at customs control;T8 – time for customs inspectors to approach the car at customs clearance; T9 – downtime under customs control, T10 – downtime during customs clearance; T11 – time to approach the vehicle to the customs office of destination; T12 – time for customs clearance;T13 – the duration of delivery to the consignees.

Thus, the model enables to model and predict the whole process of customs processing and its separate components, such as time of customs clearance and control depending on the number of workers and cargo traffic. In perspective

the phases of the customs processing which take the largest amount of time will be studied.

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