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ELECTRONIC CONSIGNMENT NOTE IN THE COMBINED TRANSPORT OF GOODS

The combined transport of goods becomes a competitor for the road transport, especially, if it is supported by the fast growing telematic technologies. The example of this is electronic consignment-note. Described in paper the form of electronic consignment-note increase speed the information to be transferred and upgrade quality of service by information volume included in such letter. In consequence, the schedule of transport processes can be easier matched to the needs and expectations of actual and potential clients. So, it can be stated that proposed in the paper the solution becomes the way of participation increasing of combined transport in a whole transport.

ELEKTRONICZNY LIST PRZEWOZOWY W TRANSPORCIE KOMBINOWANYM ŁADUNKÓW

Zastosowanie szybko rozwijających się technologii telematycznych staje się czynnikiem polepszającym konkurencyjność transportu kombinowanego ładunków w stosunku do transportu drogowego. Przykładem takiego działania jest wprowadzenie elektronicznego listu przewozowego. Przedstawiona forma listu przewozowego zwiększa szybkość przekazywania informacji o przewożonym ładunku, a tym samym usprawnia organizację procesu przewozowego. W liście tym zwiększona jest ilość i jakość przekazywanych informacji oraz podany jest harmonogram procesu przewozowego dając zarazem możliwość kształtowania organizacji przewozu w zależności od aktualnych potrzeb potencjalnych klientów. Zaproponowane rozwiązanie może być elementem zwiększenia roli transportu kombinowanego w przewozach ładunków ogółem.

1. INTRODUCTION

In the last period, company business based upon broadly understood informatics solutions became a key condition or economic development of these companies. The company that does not use informatics and telematics elements in its business becomes less competitive and develops at a slower rate. This is especially true for the companies dealing in the transportation business market [3]. Application of advanced telematics technologies including those connected with quick information exchange about transported passengers and goods, becomes a factor increasing the competitiveness of a transport company on the transport service market.

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The telematics technologies play more and more important role also in the railway transport, including combined one. The combined transport is the most developed and competitive transport segment in the railway transport. An increased role of informatics and telematics in the organization and realization of forwarding process in the combined transport is a condition for further development of this transport segment, thus increasing the role of railway transport in the transport of goods. One of issues that increase the role of telematics in the combined transport is an electronic consignment note.

2. CONSIGNMENT NOTE AS A BASIC TRANSPORT DOCUMENT

The consignment note is the basic transport document. Fig.1 shows the sample of a consignment according to the appendix B (CIM) [2] to the Convention on International railway transport COTIF [1]. This convention governs the international transport of passengers and goods by railways between its states-signatories. Signatories of COTIF conventions are most of the countries of Europe, including Poland, states of Near and Middle East and Northern Africa.

The CIM consignment note contains among others the following information:

- sender and addressee,
- station of sending and receipt,
- type and weight of load,
- transport route,
- information about transport price,
- information identifying wagon(s) with the cargo.

The consignment note is being issued on the cargo sender's station and it is transported by train or trains together with the transported goods. In this way, the consignment note and the goods it is issued for are moving simultaneously. The rate of load information circulation depends then of speed of transport of these goods. Information about the goods arrives to each point of transport route at the same time that the goods. In the combined transport, where most of the loads are transported by direct trains between two intermediate loading terminals the information about a particular load unit appears at the receiving terminal at the moment of train's arrival to this terminal. Assigned railway services submit the consignment documents to the services managing the terminal. Load information circulation runs in parallel with the transport of the load itself. Large transport or forwarding companies dealing with railway transport has computer systems that "speed up" load information flow, but only within the organization structures of the company itself. They are just internal company systems and not general system solutions with formal and legal authorizations. Instance may be the system of advising the load units used by Polzug Company [6].

The image shows a complex, multi-sectioned form for a CIM (Combined Transport) consignment note. At the top left, it is labeled 'List przewozowy CIM1' and 'lettre de voiture combinée'. The form is divided into several numbered sections (1-25) containing various fields for data entry, such as sender and receiver details, vehicle information, and cargo descriptions. A large diagonal watermark across the center reads 'ORIGINAL LISTU PRZEWÓZOWEGO - ORIGINAL DE LA LETTRE DE VOITURE' and 'FRACHTBRIEFORIGINAL'. At the bottom left, there is a large number '1' indicating the first page. The form is densely packed with text and checkboxes, typical of a legal or administrative document.

Fig.1. Sample of first page of a CIM consignment note

3. CONCEPT OF ELECTRONIC CONSIGNMENT NOTE

Transfer of presently applicable consignment note from paper to electronic form results in the increased speed of load information transfer. However, possibilities of telematics technologies are much broader. The electronic consignment note should contain information about the entire transport process and possibilities of its realization it should be created at the stage of load's unit preparation for transport and to have a possibility of introducing revisions to the information entries over the duration of transport.

The proposed idea of electronic consignment note consists of three layers differing with information written to them and possibilities of their revisions.

- layer I – information about the load (load unit),
- layer II – information about the transport process (transport process schedule),
- layer III – information about realization of transport process.

Fig.2 presents the diagram of proposed form of electronic consignment note together with the dependencies between specific layers.

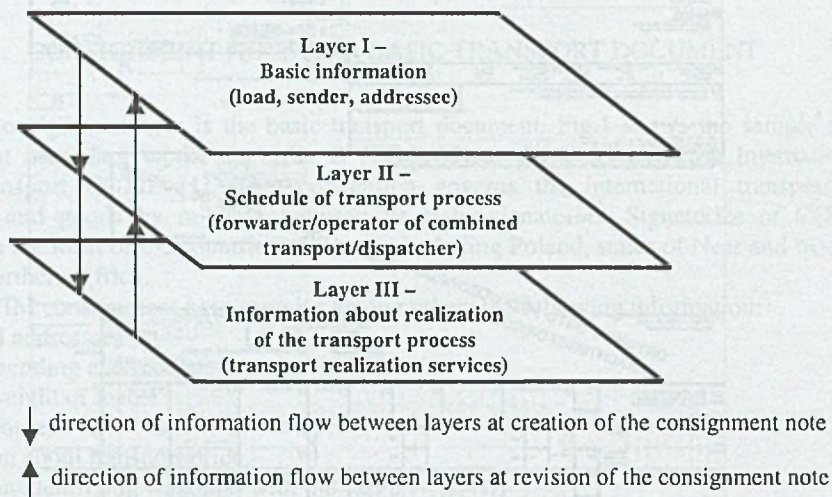


Fig.2. Diagram of layers of an electronic consignment note

3.1. LAYER I – INFORMATION ABOUT THE LOAD

This layer should contain information about the load and sender and addressee. In particular, this layer should contain the following information:

- type and quantity of load,
- information identifying the load unit,
- weight of the loaded unit,
- information about the sender,
- place of sending,
- information about the addressee,
- place of receipt,
- time frame of the entire transport process,
- price of the transport.

Most of the above information is contained in the CIM consignment note. We may assume that this layer reflects the present consignment note supplemented with the information concerning time frame of the entire transport process. Information in layer I is the customer's information and refer to the customer's dispositions concerning the load. Thus, all the revisions to this layer should be made only upon their approval by the customer.

3.2. LAYER II – TRANSPORT PROCESS SCHEDULE

This layer contains information concerning planned course of the entire transport process. This is, among others, information concerning:

- time of load unit's transport from the sender to the sending terminal,
- number of train and time of train departure from the sending terminal,
- time of arrival to the intermediate terminals and numbers of trains and departure times of train with the load unit from intermediate terminals,
- time of train arrival to the receiving terminal,
- time of unit's travel from receiving terminal to the addressee.

This information constitutes transport process realization schedule. This layer should be created after layer I, as information of layer I is superior in relation to the information of layer II. Changes in the entries within layer II should be made by the party issuing the consignment note (forwarder, combined transport operator, dispatcher) unless these changes collide with the information entries of layer I. In the contrary case, first the customer (disposing of the load) should be contacted in order to change the arrangements and revise the information entries contained in layer I.

3.3. LAYER III – REALIZATION OF TRANSPORT PROCESS

This layer contains information about the real realization of the transport process and information about reservation of place in the wagons for loading the load units in each train of the entire transport process. In particular, this information pertains to:

- arrival of the unit to the sending terminal (date and time of unit's taking over from the customer, date and time of arrival to the terminal, identification data of road vehicle),
- dates and times of train departure from the sending terminal and dates and times of train arrival to the intermediate terminals or receiving terminal,
- delivery of the unit to the receiving terminal (date and hour of departure from the terminal, date and time of delivery to the addressee, identification data of road vehicle),
- reservation of loading places in the trains and actual loading of the unit (train number, wagon location within the train, wagon number, location of unit's loading place in the wagon).

The layer III of the electronic consignment note should be created when the transport process schedule is known (layer II) as it depends of the latter. Information of layer III should be entered directly by the services realizing the transport process or directly by the issuer of the note. If the present transport process schedule cannot be realized in whole or in part, first of all the information of higher layers should be revised (II or I). Changes within the layer (such as change of the wagon number) should take place at the level of transport process realization services.

Information contained in layer III may be of importance during optimization processes of the superstructure (such as type of wagon, size of the train) and infrastructure (such as organization of intermediate loading terminals operation) of combined transport.

3.4. PARTICIPATION OF EACH LAYER OF ELECTRONIC CONSIGNMENT NOTE IN THE INFORMATION CIRCULATION DURING THE TRANSPORT PROCESS

Fig.3 represents a diagram of event dynamics during use of an electronic consignment note, with indication of role of each layer. At the beginning, layer I is being created. Taking into account information of layer I and information about the possible connection on this route (train timetables), transport schedule is being created (layer II). Information about realization of the transport creates layer III.

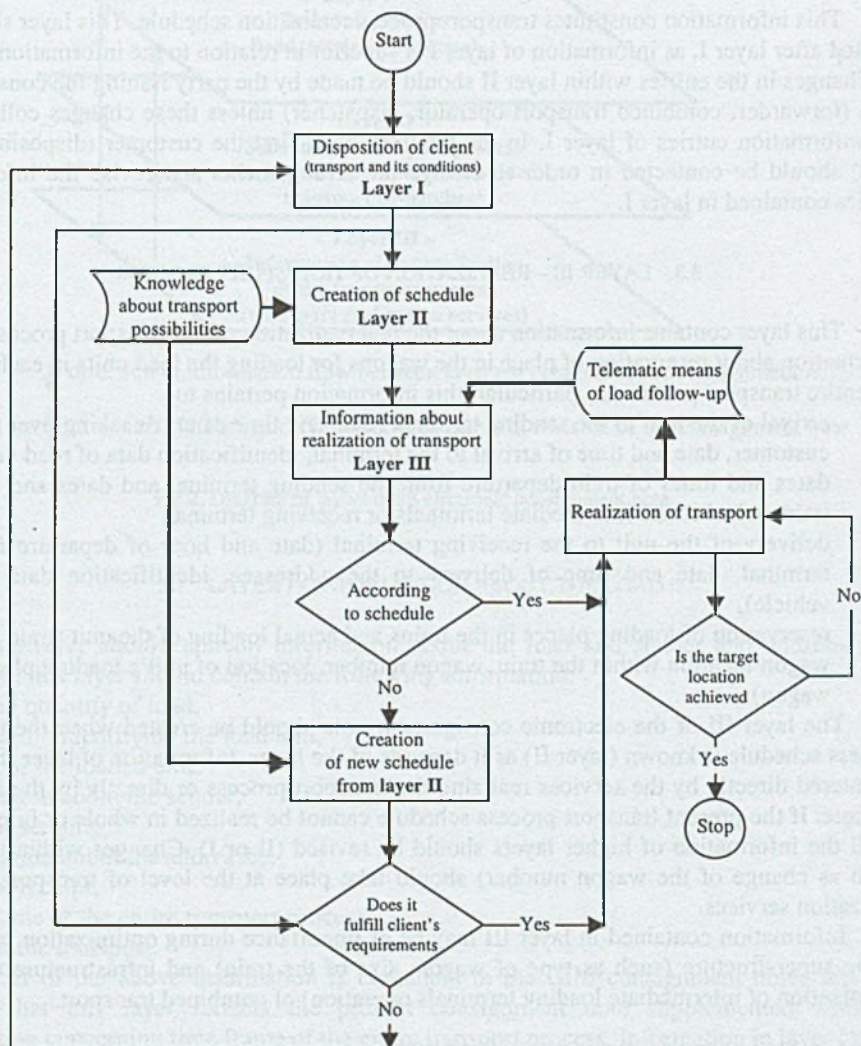


Fig.3. Diagram of event dynamics during use of an electronic consignment note, with indication of role of each layer

If the transport is being realized in accordance with the schedule, its realization continues till the target location. If there is a discrepancy between the real course with the schedule, a new schedule is being created to fit the recommendations of the customer. Then the transport takes place according to the new schedule. If the customer's recommendations are not fulfilled, a contact with the client is necessary to update them. The updated recommendations are taken into account during creation of the new schedule. Then the sequence of events is repeated till the load arrives to the addressee. An important feature of this solution is that the customer has a possibility to interfere in real time with the sequence of events in the course of transport process.

4. SUMMARY

The concept of electronic consignment note presented above is one of several proposals how to solve this issue. The proposed sample of electronic consignment letter contains many information about the load, transport process and realization of the transport. Expanding the "classical" consignment letter with the detailed information about the actual transport process and its realization increases the amount of information available to all the participants of the transport process, and the form of this letter gives a possibility to make revisions of entries during the transport period. By circulating the information about load, we will also include technologies for follow-up of load in real time, thus obtaining a possibility to locate and control in real time the load unit over the entire realization of transport process. This in turn will enable such shaping of transport process that the time flexibility of the transport and flexibility of places of load sending and receipt are ensured. Time flexibility represents a possibility of selection by the client the sending time, receipt time or duration of load transport process. Flexibility of places of load sending and receipt means a possibility to transport the load – load unit of combined transport – in any transport route. Time flexibility of transport and flexibility of load sending and receipt places give opportunities for selection of alternative routes for transport of load units within the transport connection – in respect of load sending and receipt time as well as duration and route of transport.

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