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A UNIFIED MACHINE FOR TECHNOLOGICAL ELECTRIC TRANSPORT LOAD-BEARING SYSTEM

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LOAD-BEARING SYSTEM****Pavol Božek**Slovak University of Technology, Faculty of Materials Science and Technology, Institute of Production Technologies,
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Russian Federation, zpm@istu.ru**Keywords:** load-bearing system, universal machine of technological electric transport, parameters**Abstract:** The paper presents such a research of one of the most important layout-forming parts of the unified machine for technological electric transport (UMTET), namely the load-bearing system. With all the variety of design criteria set for UMTET, the bearing frame must satisfy the following requirements: to be an installation base for the assumed units, UMTET mechanisms, as well as attached implements; to be technologically advanced and have a low production cost; to withstand operational operational loads with the minimum possible weight, which will allow to maximize the power and duration of UMTET operation without recharging.**1 Introduction**

The development of wheeled vehicles for general and specialized purposes requires a complex multi-vector combinatorial approach because of the multifunctionality of the projected facility. A lot of publications are devoted to this problematics [1-3]. At the same time, the search for the most optimal solutions, both for the design in general and for individual units and assemblies, comes to the fore. This determines the scientific and technical relevance of research in the sphere of the unified machine for technological electric transport (UMTET) especially in the application to its load-bearing system, as the main element that perceives workloads, and is the main component installation base.

It should be noted that the development of such a complex product as a load-bearing system is a complex iterative process of finding a solution based on a gradual modification of the design, aimed at step-by-step compliance with design and technological criteria. At the first stage it is necessary to determine the type of the load-bearing system, as a logical base for further design.

Consider the pre-design criteria that have been defined as the main ones for the development of the UMTET load-bearing frame, based on the standard operating modes of the product, design constraints and technological capabilities of the manufacturer:

1. General restrictions on the overall dimensions of the construction: 3400x1300, height 1550, the length of the load platform is not less than 2100 mm.
2. The load-bearing system must have a ladder structure.
3. Elemental composition of the frame structure profiles: channel, I-beam, Taurus, corner, square tube. The basic configuration of the frame is formed by the channel.
4. The choice of profiles material is carried out in accordance with GOST: 8240-97, 8278-83, 26020-83, 7511-73, 8509-72.
5. The load-bearing system should be assembled on a robotic welding system.
6. The possibility of a subsequent modification of the load-bearing system front and rear sections for the installation of hinged plates.

At present, there is a significant variety of wheeled and caterpillar vehicles of various functional purposes and as a result with a different set of workloads perceived by load bearing structures which determine the classification that has been formed to date:

- simple ladder load-bearing system;
- channelshaped load-bearing system;
- Box frame;
- Integral frame-in-body load-bearing system;
- Complex load-bearing system;

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- Backbone frame;
- Combined ladder-backbone frame;

Considering pre-project requirements, the most relevant in terms of UMTET equipment layout are a simple ladder load-bearing system and a combined ladder-backbone frame. We will carry out a comparative analysis of the developed projects of each type in the context of use in UMTSET, assessing their advantages and disadvantages, as well as some strength characteristics.

2 UMTET standard rolled profile ladder load-bearing system

The construction (Figure 1) is a complex space system consisting of a main frame and other load-bearing elements that are designed to provide the basing and assembly of all parts and assemblies, as well as reliable operation of the entire machine.

The advantages of UMTET ladder load-bearing system:

- Providing the required geometric dimensions (width - 1300 mm, length - 2750 mm, height - 397 mm);
- the design is developed from standard steel profiles (St3sp), which significantly reduces the cost of production;
- the possibility of assembly and basing most of the UMTET units and assemblies (Figure 2);
- manufacturability;
- low production cost.

The disadvantages of ladder load-bearing system:

- An additional load-bearing framework of the front attachment is needed;
- the complexity of traction batteries installation and maintenance;
- high load-bearing system mass - 230 kg;
- the necessity to change the entire load-bearing system to upgrade the vehicle.

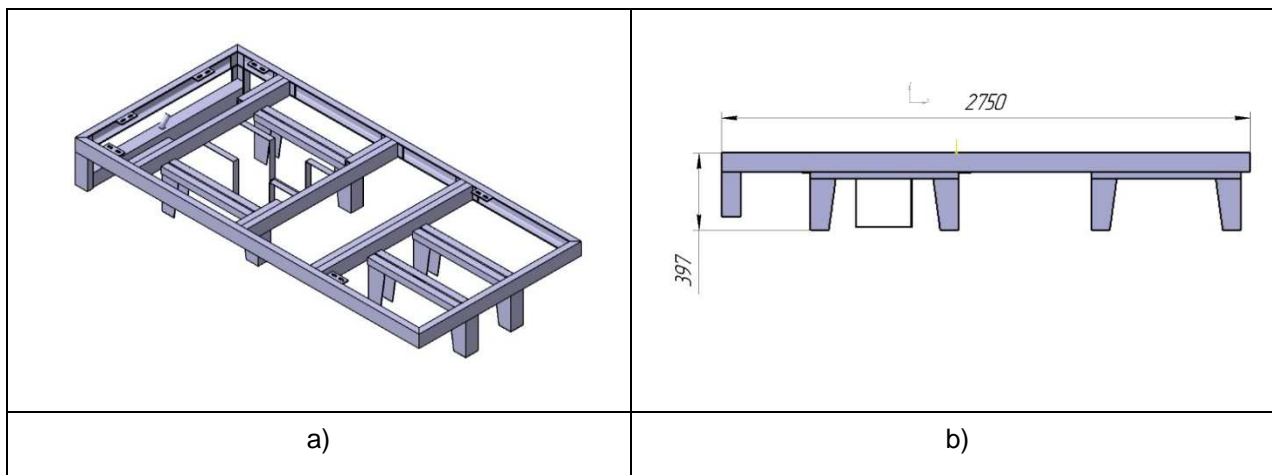


Figure 1 UMTET ladder load-bearing system a) geometric model b) overall dimensions

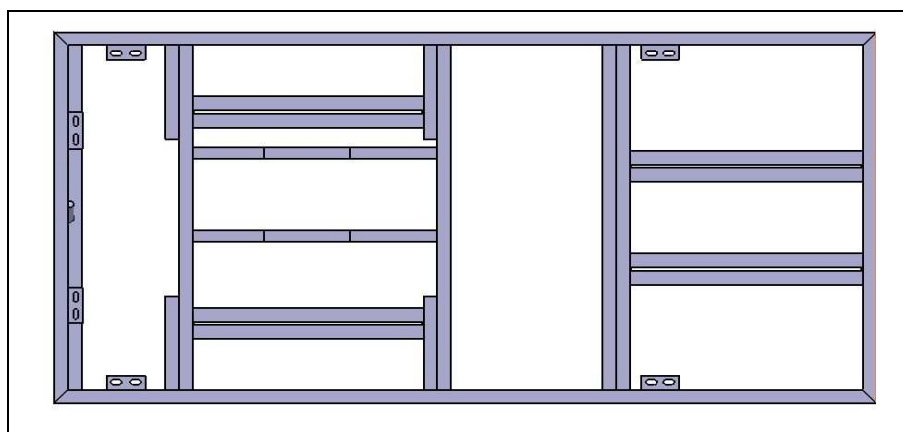


Figure 2 UMTET units allocation zones

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3 UMTET Workload Impact Numerical Strength Analysis

The UMTET load-bearing system like any other wheeled vehicle has a whole range of static and dynamic loads during operation [4-10]. The most critical in force is the alternating load with alternating diagonal hanging of the wheels. Therefore, for evaluating the numerical analysis, this particular type of loading was chosen. Figure 3 shows the mounting zones and the scheme for applying the forces of the computational model performed in the CATIA V5 software environment using the standard Generative Structural Analysis module. At the same time, the organization of the scheme for the application of forces is based on the following assumptions:

- Vertical load of 30000 N (nominal load-bearing capacity of UMTET) is applied to the upper surface of the

spars and crossmembers in the framework area of the load platform;

- on the mounting zones of the battery in the middle of the load-bearing system, the load is 6500 N (battery weight);
- the load of 3000 N (according to the weight of the cabin) from the cabin, the front attachment framework, the driver, the passenger and the units is applied to the front of the load-bearing system.

Figure 4 shows the results of a numerical analysis from which it is concluded that there are no failure stresses when subjected to specified loads with a maximum frame deformation of 12.7 mm, which indicates the overall operational capability of the structure.

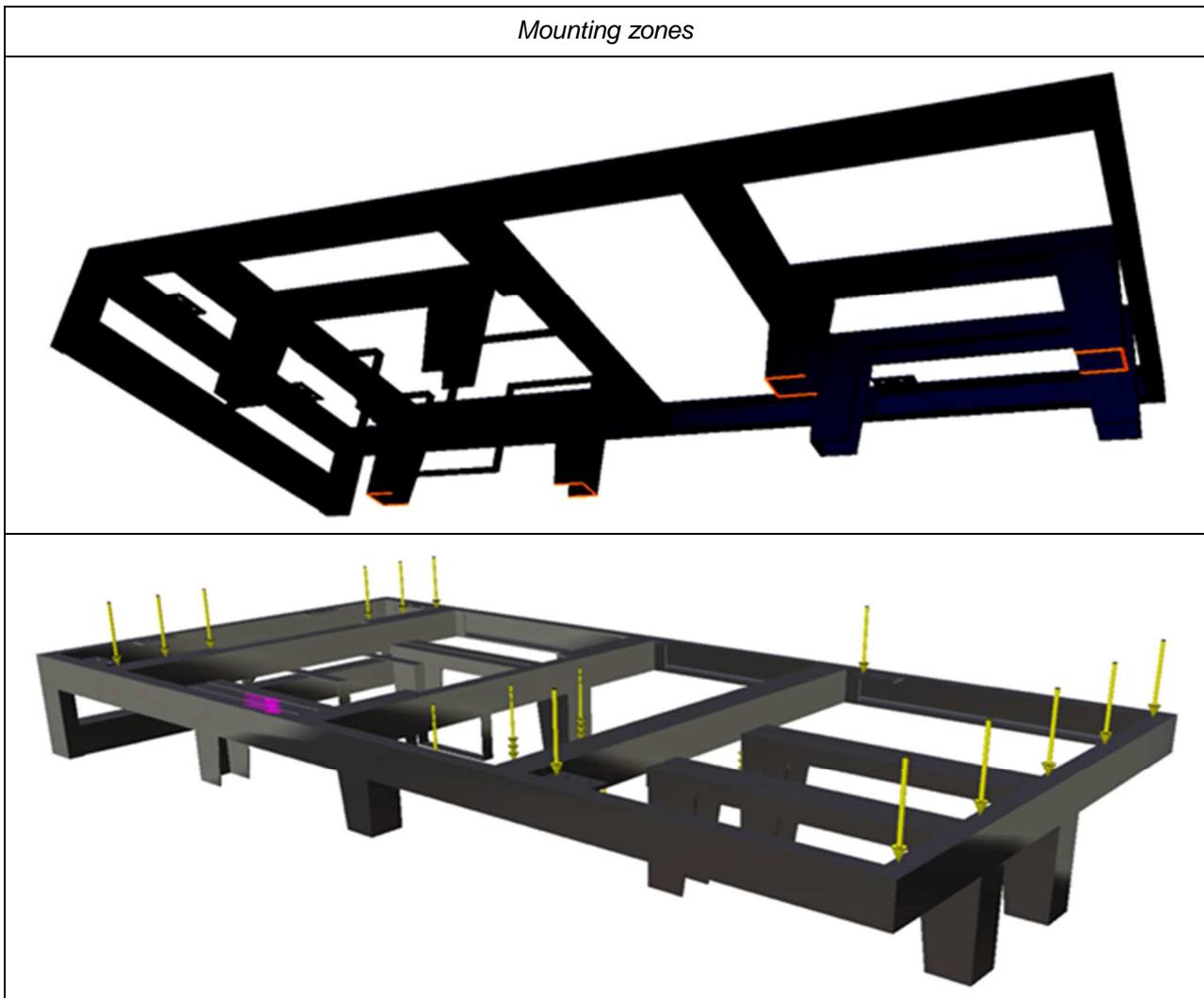


Figure 3 UMTET ladder load-bearing system calculated numerical model characteristics

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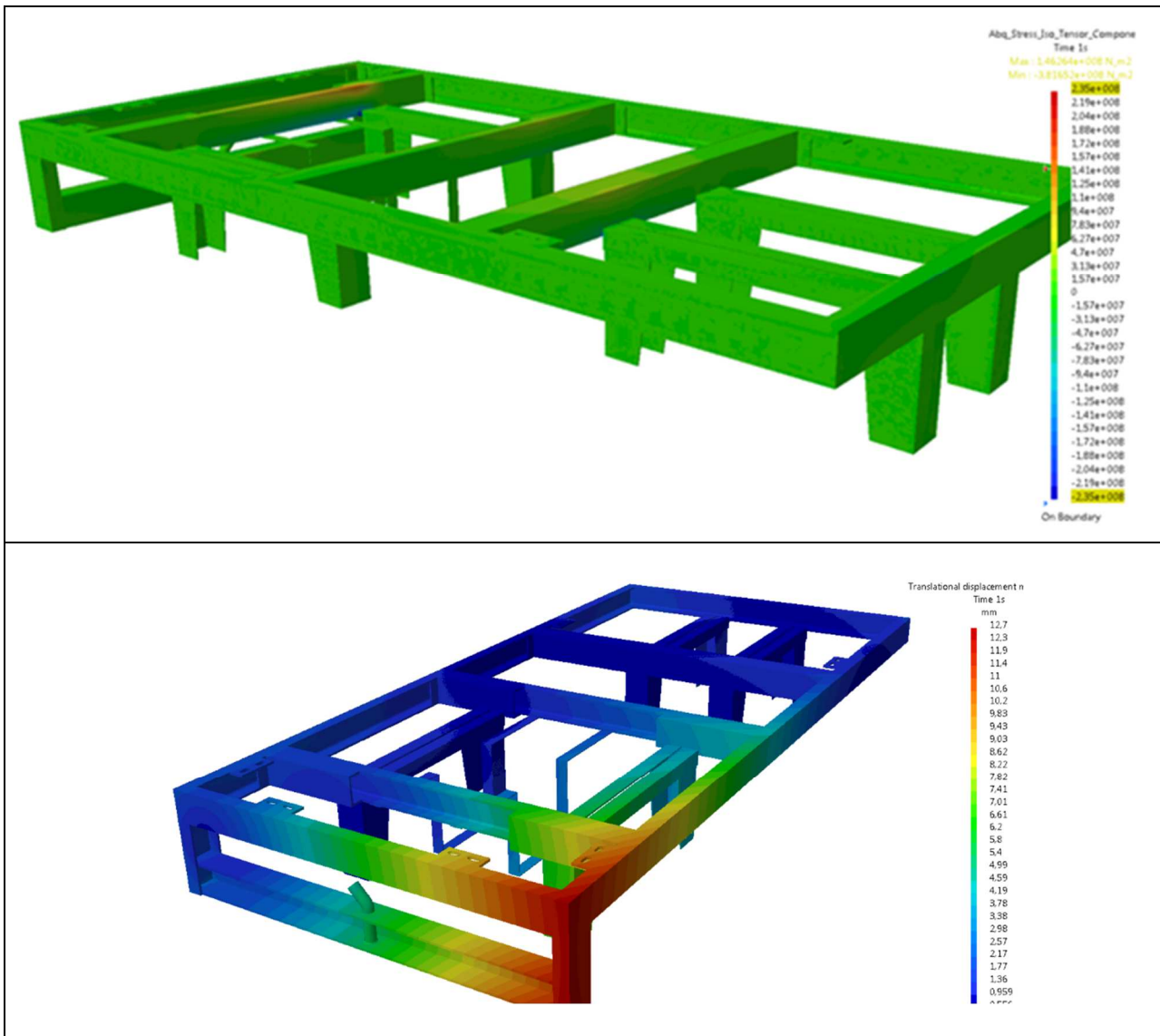


Figure 4 The results of the numerical analysis from which it is concluded that there are no failure stresses when subjected to specified loads with a maximum frame deformation of 12.7 mm

4 Conclusion

Estimating the UMTET ladder scheme of load-bearing system characteristics, the following conclusions should be drawn. Load-bearing system is preferable for a vehicle equipped with an electric motor since with sufficient strength characteristics.

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LIMITATIONS OF TRUST CONCEPT IN DESCRIPTION OF COOPERATION TERMS

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Keywords: cooperation, relationship, trust, reliance on partner of exchange, dependence on partner of exchange

Abstract: The intensification of competition, and difficulties concerning achievement of competitive advantage through development of technology affected the importance of quick delivery of products to customers. Therefore, the concept of integrated cooperation in supply chain was developed. In an effort to improve efficiency, the interest in cooperation with specialized service providers increased. Typologies of forms of cooperation and different types of relationships between cooperating parties presented in the literature show, that widening scope of cooperation and the related tightening of relationships between parties are increasingly important to convince both sides of cooperation, that the actions of partner lead to agreed, common objectives. Such a conviction may change over time, which affects the ability to achieve expected benefits of cooperation. The purpose of this article is to present determinants of trust in cooperation, together with restrictions on the use of trust in description and analysis of relationships between cooperating parties.

1 Introduction

Under the conditions of significant competition and difficulties of technological differentiation of products, the importance of fast response to needs of customers and low delivery times increased. As a consequence, the concept to integrate the cooperation in supply chains was developed. In an effort to improve efficiency, the interest in cooperation with specialized service providers increased.

Typologies of collaboration and types of relationships between cooperating parties, presented in literature indicate, that together with widening scope of cooperation and the associated strengthening of relations between companies the conviction of each party, that actions undertaken by partner are going to meet common expectations is becoming increasingly important. Under the influence of actions undertaken, such conviction between cooperating units may become stronger over time. In case of unfavorable actions such conviction can be reduced or even eliminated.

The purpose of this article is to present determinants of trust in cooperation, together with restrictions on the use of trust in description and analysis of relationships between cooperating parties. *(The publication was financed from the resources allocated to the Management Faculty of Cracow University of Economics, under the grant for the maintenance of the research potential).*

2 The sense of trust in cooperation

The increasing interest in the issue of trust in business and cooperation is influenced by contemporary conditions of activity of individuals and all organizations [12]:

- the need to cooperate with individuals who act on behalf of someone – in the context of market activity, it may concern distributors (wholesalers and retailers) who provide the manufacturer's products (representing the manufacturer) to the customers, it concerns also

cooperation with supplier of specialized services, acting on behalf of principal,

- growing interdependence in socio-economic life – it includes the need for closer cooperation to increase the scale of business and ability to adapt to changing market expectations,

- increased number of new threats and dangers – in response the size of organizational structures is reduced, the scope of cooperation with specialized units increases,

- increasing range of business opportunities in today's world – businesses are involved in raising funds, investing in different types of businesses, it facilitates the development of risk sharing in joint investments,

- limited transparency of operating conditions, related to the complexity of institutional, organizational and technical systems – companies cooperating in supply chains, as well as specialized service providers facilitate the acquisition of the expertise needed by each party to cooperate, but also co-create another complex organizational system,

- increasing anonymity of people involved in business activities – in terms of direct contacts between long-term partners, representatives of partners know each other, in broader cooperation, involving more representatives of different companies the contacts of all the representatives with each other can be difficult,

- increasing need to get in touch with new people – in business cooperation this can be related to the frequent rotation of employees, who are responsible for relationships between companies.

Presented, contemporary determinants of activity in socio-economic life can be regarded as the most important factors influencing the trust, particularly in business relationships.

Taking into consideration the issue of trust in relationships between cooperating parties it should be

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stated, that trust is closely related to risk and uncertainty of future events. In general, there are several approaches to risk and uncertainty [13]:

- hope – passive, indeterminated, unexplainable premise, that future events will follow as expected,
- conviction – a sense of hope combined with certainty, does not taking into account active involvement, only passive observation of events,
- trust – the assumption made about the uncertain future actions of other people, it consists of beliefs and their expression in the form of actions of the person who trusts.

While belief can be treated as feeling based on a stronger expectation for the development of events in the future than in hope, according to presented views both the hope and the conviction are accompanied by passive observation. Therefore, the use of trust seems to be useful to describe relationships between cooperating companies.

The interest in the issue of trust in the relationship between suppliers and recipients is primarily related to the development of theory and practical experience of relational marketing, as well as to growing interest in long-term marketing relationships with customers [3]. Nowadays, trust is treated as a component of the quality of relationship [2], [6]. Therefore, the issue of trust is often undertaken in the study of relationships between parties to cooperation [1], [6], [9].

On the basis of proposals to define the trust in the relationships between suppliers and recipients presented in the literature, several main features of trust included in definitions can be highlighted (*Summary of proposed definition of trust, proper for conditions of cooperation of companies, along with methods for measurement of trust shown in [6]*):

- belief of one party, that its needs will be met by the actions taken by the other party,
- belief, that partner will behave in a manner, that will serve the needs of client, even, if the client is not able to monitor the behavior of partner,
- belief of one party of the reliability, benevolence, honesty and fairness of the other party,
- belief, that other party will avoid opportunistic behavior and will not take unexpected action, that may have negative influence on the partner,
- expectation of one party, that partner will work in the interest of the relationship.

Examples of definitions, that take into account these features influencing the quality of cooperation are presented in the table (Table 1).

In addition to mentioned features, the use of trust in the joint review and supplementation of the contract (contract) is also emphasized. Due to regulations on reciprocal obligations and rights of parties, the contract is usually incomplete. There are shortages of information (resulted with bounded rationality) and uncertainty related to future conditions in the environment of cooperation .

Table 1 Description of trust reflecting terms of cooperation

Feature	Examples of definition
Belief, that needs of one party will be met by activity of partner	<ul style="list-style-type: none"> - trust is the belief of one party, that its needs will be fulfilled in the future by actions indertaken by the other party (Anderson and Weitz 1989), - trust is firm’s belief, that another company will perform actions, that will result in positive outsomes for the firm, as well as not take unexpected actions, that would result in negative outsomes for the firm (Anderson and Narus 1990).
belief, that partner will behave in a manner, that will serve the client needs, regardless of the ability to monitor the partner	<ul style="list-style-type: none"> - trust refers to the manufacturer’s expectation, that the supplier will act to benefit the manufacturer’s interests, regardless of the manufacturer’s ability to monitor such behavior (Joshi and Stump 1999), - trust concens confidence in the predictability of each other’s actions (Gulati and Singh 1998)
Belief of reliability, benevolence, honesty and fairness of the other party	<ul style="list-style-type: none"> - trust is conceptualized as partner’s honesty, reliability and and concern for the firm’s welfare (Cullen et al. 1995), - trust is defined as one party’s confidence, that the other party in the exchange relationship will not exploit its vulnerabilities, trust is characterised as a construct based on three components: reliability, fairness and goodwill (Dyer and Chu 2000)
Belief, that other party will avoid opportunistic behavior and will not take unexpected action	<ul style="list-style-type: none"> - confidence in the predictability of each other’s actions (Gulati and Singh 1998) - trust is firm’s belief, that another company will perform actions, that will result in positive outsomes for the firm, as well as not take unexpected actions, that would result in negative outsomes for the firm (Anderson and Narus 1990).
Expectation of one party, that partner will work in the interest of the relationship	<ul style="list-style-type: none"> - company trust is the belief, that the company will fulfill all its obligations, as understood by the buyer (Plank et al. 1999) - trust is confident belief, that a “trustee” will act beneficially because the trustee cares about the trustors welfare (Saparito et al. 2004)

Source: [6].

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It is important to highlight several dimensions of trust in cooperation relationships. The contractual dimension refers to the belief, that a partner will act in favor of mutual benefits, even, if some of the oral agreements have not been reflected in the contract. The dimension of competence trust is related to the expectation, that the exchange partner will meet the commitments made according to performance requirements. The third dimension concerns the confidence in goodwill of partner [6], [9] (*In contracting process the assumptions of the theory of incomplete contracts should be used [4]*). This issue was also taken into consideration

in the research on importance of trust in interorganizational management [7, 8].

Considering the use of trust in shaping and analysis of relationships between cooperating companies it should be noted, that trust is a mental, subjective relation of one entity to another [11]. It basically involves people's beliefs, their sentiments, intentions and may be more useful to describe and analyze personal relationships, than to relationships of economic nature (between enterprises) [10]. The argument for this approach is also the nature of organization. Organization itself has not emotions and attitudes. However there is a possibility to create certain atmosphere, that can provide context for emotions and behavior of members. Considering the issue of attitude it should be noted, that it is characteristic for a person treated individually, because it is the result of psychological processes, that take into account beliefs, influences and abilities [5].

3. Reliance and dependence in description and analysis of relationships between cooperating parties

Taking into account the limitations of utilization of trust to describe and analyze relationships between suppliers and recipients, other proposals of conceptual ideas as reliance on partner and dependency on partner can be used [6], [10]. Describing the importance of reliance on the other party of exchange it should be emphasized, that it is primarily related to the rationality of the choice of partner and it is not associated with commitment of partner. Such commitment is characteristic for trust. Reliance on an exchange partner can be defined as a positive expectation of one party that its specific needs will be met by the partner, taking into account its proven capabilities or existing, proven standards of exchange (*Wide range of features distinguishing the concept of reliance on partner of exchange from trust between the representatives of partners is outlined in: [6]*). Reliance on partner to cooperation is derived from the belief and desire to remain in the relationship. Such an approach supports the development of trust between the parties [1]. It can be also confirmed by example of definition of trust in cooperation, that apply the concept of reliance on other party, proposed by Scheer and Stern (1992). According to mentioned

authors trust is the belief, that one's partner can be relied on to fulfill its future obligations and to behave in a manner, that will serve the firm's needs and long term interests [6].

It is worth to highlight here the difference between economic rationality (assuming, that it is often necessary to rely on a partner for long-term goals, as well as satisfying current needs) and predictive rationality (derived from positive expectations towards the partner, justified by his proven capabilities or applied and observed exchange standards) [6].

The concept of dependence on other party involves the need to enter into a relationship with such entity, due to the lack of other possibilities [1], [6]. It can be treated as a result of small number of suppliers having resources, that are difficult to obtain by client but are important to run its own business. A party with such resources has the ability to influence the other side of the exchange (client, principal) and thus can adversely affect the trust between persons, representing the interests of parties to cooperation. However, if a supplier with unique resources makes these resources available and does not use a privileged position against dependent client, then client's involvement may grow over time, and the level of trust may increase [1].

4. Conclusions

While the notion of trust is often used in literature to describe and analyze relationships between cooperating parties, it should be emphasized, that this may concern primarily the behavior and attitudes of individuals, representing cooperating companies. Relationships between cooperating companies do not always reflect individual attitudes of representatives. Despite efforts to agree on common principles and mutual benefits of cooperation, partners may have different interests in other fields of activity outside the cooperation. Also the conditions in the environment of cooperation can be much differentiated. Individual interests, as the answer to the environment of activity influence decisions of managers and relationships between cooperating parties. Even if there is trust between representatives of partners, reflected in decisions concerning terms of cooperation opportunistic actions of one party can eliminate such belief of other party. It is often impossible to restore the trust between parties again.

Presented considerations are of preliminary nature. Further research should address the suitability of trust in various conditions of cooperation, identification of criteria for assessing the level of trust between the cooperating parties and determining the effects of confidence in the long-term cooperation.

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LOGISTICS TECHNOLOGIES IN AVIATION

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Keywords: logistics activities, logistics technologies, material handling, packaging, transportation

Abstract: The article is devoted to prospective logistics technologies, which are known in all sectors. One such branches of the aviation industry that uses these technologies to enhance development among other sectors. The article analyzes and specifies logistics technologies used in aviation. Planning and organization of air transportation is applied particularly due to the international nature of this transport, when typically great distances have to be overcome meeting the economic and physiological requirements, asking for fast, convenient and safe services. It raises the need for unification of the basic requirements and regulations for the establishment and operation of an air carrier, air traffic control, passenger check-in, construction and operation of airports and other aviation-related activities.

1 Introduction

Planning and organization of air transportation is applied particularly due to the international nature of this transport, when typically great distances have to be overcome meeting the economic and physiological requirements, asking for fast, convenient and safe services. It raises the need for unification of the basic requirements and regulations for the establishment and operation of an air carrier, air traffic control, passenger check-in, construction and operation of airports and other aviation-related activities. All of these requirements for air carrier are stipulated in the Civil Aviation Act of the State and national legislation based on the so-called. ICAO Annexes. In Slovakia, the Rules of the Air L1 - 18, are in the process of implementation in via the Joint Aviation Requirements of European aviation authorities of the association known as the JAR (Joint Air Requirements). It is essential that anyone engaged in air operations be familiar with the relevant regulations. The documents published are available at the Aeronautical Information Services of the Slovak Republic (address is listed in the AIP SR, the first paragraph of the first 3rd GEN 2) [1].

Logistics technology is a sequence of decision-making processes and procedures, which in this economic environment, respecting the interactions between components of the logistics system as logistics using optimization methods lead to the optimization of logistics costs.

2 Logistics technologies in aviation

Logistics technology include aviation in the planning, organization, administrative control and enforcement operations in air cargo supply chain. These individual components are connected to the carriage of cargo in collaboration with intermediaries of air freight, airports, airlines and air traffic services.

Logistics technology based on the interaction of among the various subsystems of the logistics chain. The momentum of logistics technologies is usually based on production, but it to be controlled by and market needs and options. Thus, market affects production, but this binding also applies as a feedback - i.e. production affects the market. This interaction affects the choice of logistics technology and vice versa, logistics technology can affect the connection between production and market [1].

2.1 Selection of logistics technology

The design and selection of appropriate technology, logistics must be based on the following facts[2]:

a) The trend of the ratio of total logistics costs to the manufacturing costs for final products has been decreasing. It is the result of reducing and optimizing inventory and the transport processes.

b) The requirements of the transport market in the small, precise and frequent deliveries, which results in increased use of automated handling, transport and information systems.

c) The requirements for improving the quality of services represent a burden on infrastructure that will be addressed by regulatory policies, also with regard to ecological load on the environment.

d) Manufacturing companies are increasingly involved in the development of logistics chains.

e) Carriers are becoming subcontractors transport service operators, who organize and carry out services in the transport chain.

f) Quality and potential of the infrastructure greatly influence the formation of logistic chain and selection of logistics technology. Due to the integration of Europe there arises the need to deal with the quality of infrastructure in the context of Trans-European Transport Network [3].

System approach and control procedures, which with the help of exact and heuristic methods which in the economic environment lead to minimization of costs in the specific link of logistics chain. In effect they mean optimization of the economic results of the logistics system [3].

2.2 The design of logistics technologic

System design of logistics technologies should be performed in steps as follows:

a) The analysis by logistic structures, with object in particular:

- General trends of logistics performance in the economic environment.

- Driving forces and factors that lead to the logistic.

- Factors affecting the differences in logistics performance by sectors and in terms of time.

- Adaptability of individual subsystems (production, trade, transport, information) of logistics requirements.

b) Analysis of economic interactions – focused on economic growth, trade and structural consequences of the introduction of new logistics technologies.

c) Social space interaction - impact on employment, changes in the structure of professional qualifications and all that with respect to the development of the region.

The design and subsequent implementation of appropriate technology, logistics, or a combination must take into account the specific economic conditions of the environment, in addition to their own understanding of their functions. Further, one should also be aware of material flows, labor flows and information. All decision-making processes make up and framework in the logistics system are of crucial importance to the effectiveness and efficiency of all processes of non-productive nature [3], [7].

3 The most commonly used logistics technologies

Logistics technologies are used in most of these concepts [1]:

a) **The concept of "Just in Time" (JIT) - (just in time delivery)**, means radical reduction of storage and inventory by exactly functioning transport (reduction of storage - not eliminating it!). A system based on small volumes of supplies of high frequency and high time reliability at a suitable geographical spread of sites of production and consumption.

b) **The concept of "sold earlier than made" - through production management**, rapid transport and orders made by means of rapid communication, your order can be classified primarily in the logistics chain. This will completely change the role of businesses and warehouses. Businesses assume the role of mediators without stocking, and the physical flow of goods can be routed directly from producer to consumer. The concept requires that the

transport infrastructure cope with small load currents with greater frequency when operating a large area.

c) **The concept of computer integrated manufacturing** to produce to order and communication systems also allow contracting production. Logistics chains are the result may be extended by a fine of up to networks that have high demands on information system.

d) **The concept of integrated warehousing and transportation terminals** deployed along the routes. Similarly as in the of JIT concept, the criterion of optimization is the reduction of overall costs, and generally increase in the cost of transport at the expense of far more substantial reduction of the cost of maintaining the inventory, storage and handling systems.

e) **The concept of vertical integration of logistics management**. In this concept, traffic becomes an integral part of the transformation process of production. Information systems and logistics coordination at a higher level of management will optimize the transport chain.

f) **The concept of "paperless transactions"** means that most documents will be replaced by communication via the computer network. This concept simplifies transport (especially in combined transport systems), the transmission tariff, tracking shipments, booking space for the shipment, payment and shipping etc. Implementation of the concept results in the reduction of human labour and logistics costs in the transport subsystem and forwarding services.

g) **The concept of a memory control and traffic management** is a concept that is based on the development and implementation of themes. The concept represents an automatic transmission of information about vehicles, containers and shipments based on identity cards, as well as automatic reading of data from relevant documents.

h) **The concept of "computerized transportation"** is a technology of network planning, capacity, loading and routes, which will increase the use of mobile means of transport at optimal load of transport routes.

i) **The concept of transport** is assumed in combination with other concepts, eg. JIT, or the concept of centralized warehouses, optimization of the organization in order to minimize transport costs. It can be divided into a system searching for the optimal combination of modes of transport and a system of optimal use of vehicles in the organization of transportation.

j) **The concept of transportation in the sphere of production** is designed to optimize inter-operational and technological services in the manufacturing process.

4 Logistics activities

In developing the logistics chains, i.e. when coordinating, linking and optimizing of material flow from the point of manufacture to the point of consumption, it is necessary to provide a range of activities [2] particularly those related to:

- Transportation,

- Packaging,
- Material handling,
- Storage,
- Customer service,
- Information flow, etc.

Set of logistics activities forms a logistics system. The separate logistics subsystems represent relatively independent economic activities, linked with other activities. Some of them activities may also function independently, without mutual interconnection. Such an approach can not be identified a system-based logical approach in managing the logistics flow processes.

Given the relatively large number of activities one has that ensure the product is delivered under optimum conditions to the right place. Further reference is made to those particularly related to the central topic of this work, knowing that all logistics activities more or less affect the logistics process as a whole.

Transportation is an integrating logistics activity linking different systems and ensuring their own moving material from the point of manufacture to the one of consumption. Providing transportation includes activities associated with the choice of the carrier or shipper (or operator), mode of transport, means of transport, mode of transport, transport routes and the like. In comparison to other logistics, these activities generally represent the largest cost items.

Packaging is a sum of the operations involved in preparing the goods for the circulation and consumption by means of packing. In terms of logistics, packaging and package provides protection of goods during storage, handling and transportation. Selection of the appropriate packing significantly influences the degree of damage to the goods and facilitates (or enables) transport and storage. It also fulfills the function of information and commercial.

Material handling represents the most extensive area of logistics activities involving all transactions related to the movement of material. In the production process, e.g. receipt, processing operations and dispatch of the material, while in the sphere of circulation it involves mainly loading operations. But handling of the material also includes activities associated with the storage, for example. storage material, but also packaging, palletizing, etc. Circulation, material handling (transfer of material) always incur certain costs associated with these activities, but usually does not increase the utility value of the goods handled. Handling activities should therefore focus on minimizing the costs associated, particularly by reducing transport distances, minimizing inventory, increasing the degree of mechanization of loading and storage operations and the like. The optimization of material flow and handling activities associated with the material can result in significant financial savings.

Storage has its specific logistics status depending on whether associated to the stocks in the production,

circulation and consumption. The activities carried out in different groups of stocks are generally similar, but warehouse features often differ. They include the storage processes: material receipt, material identification, material storage and shipping materials. In addition to them, storage can also include activities such as inventory management, storage system design, warehouse location, etc. [3].

The role of inventory management is to keep in stock such a quantity of material which would provide an adequate level of customer service while minimizing costs related to storage, that is to say non-committed funds to maintain inventory and warehouse operating costs.

Suitable storage location is a fundamental strategic decision of influencing the level of transport costs and the level of customer service.

Customer service is the output of the logistics system and its role is to ensure proper placement of the product at the right time at right place and if possible at the lowest possible total costs. Activities associated with the formation of customer service are mostly service aimed at customer satisfaction. Prerequisite of good customer service is sound marketing practices.

Information flow related to logistical communication is another prerequisite to the functioning of the individual subsystems and the system as a whole. Quality of the information flow is essential to the formation of the company's competitive advantage [6].

5 Forms and methods of air freight

Air freight began to develop in the postwar years as campaign freight - guaranteeing seasonal transport of agricultural crops (fruits, vegetables). The development of air freight depends largely on the development and composition of the airline fleets. In the present, the following forms of air freight are applied[1]:

- In the form of additional loads to transport passenger aircraft - bulk depending on the number of transported passengers (passengers);
- In the form of additional loads to transport passenger aircraft - in containers, depending on the number of transported persons (passengers);
- Transport of goods in the semi-mixed versions of the aircraft - SQC (Semi-Quick- Change) bulk and containers;
- Transport of goods in mixed versions of the aircraft - QC (Quick Change) in containers and on pallets;
- Transport of goods in cargo versions of pallets and containers.

The ratio of these forms of transport of goods by the airlines vary and depend on many factors:

- Build background airline for air freight;
- Volume of the network of international and domestic routes;
- Economic potentials of the airline.

6 Air carriers

The nature and extent of air freight also depends on the options, or orientation and size of the network carrier. By the applied methods, airlines can be divided into four groups: [1]

Group 1 - includes companies that are strong enough to establish their own freight as equal to the total air passenger traffic (Lufthansa, Aeroflot).

Group 2 - includes the companies that have introduced intermodal QC and continues to contribute to transport additional loads in passenger aircraft, or have available a limited small fleet of cargo aircraft (British Airways).

Group 3 - includes companies that operate only freight cargo aircraft (Heavy Lift).

Group 4 - includes companies in which goods are transported running additional loads in passenger aircraft, with the provisional measures applied to increase capacity for freight.

This distribution shows that aircraft are distinguished by carrying cargo in bulk, bulk cargo inserted in the space, or on pallets and in containers.

7 Air freight intermediaries

The complex of services by intermediaries in the air is now extensive. Not limited to the actual shipment, but includes a wide range of services associated with the formalities for the movement of goods through the customs border clearance of goods at the airport and handling it. Intermediaries are able to provide full shipment from sender to recipient without the sender having to enter into relations with other third parties. Intermediaries provide services:

- Own flight - the parcels, transfer of large (volume) of mail, express shipping, transportation, from "house to house";

- Special transportation – re-dispatch, replacement transportation, transportation of special goods [3].

7.1 IATA cargo agents

IATA Member States of the late 60s came up with the idea to establish an air cargo agency. They set minimum requirements to be satisfied:

- Professional knowledge and capabilities of the staff;
- Average level of office equipment;
- Turnover and sufficient funds for marketing;
- Cargo handling;
- Documentation.

After meeting all the requirements (IATA are controlled directly by the Office for agents) and having obtained IATA approval, they may use the name of IATA Cargo Agent.

Between the IATA and the agent a contract is concluded. It contains a provisions on the appointment, registration, extent of the agent's sale of air freight,

handling shipments, remuneration, reimbursement and payment obligations, compensation, communications, promotions carrier services, storage and filling out bills of lading.

Normal services offered by IATA agent:

- Provide necessary information regarding the upcoming realized export or import of the case;
- Provide facilities for receiving and picking up mail from the sender in accordance with its instructions;
- Ensure pick up mail from the sender's office;
- Prepare documents - bills of lading to fill, check invoices and other documents required for air transport and customs clearance;
- Check the export or import licenses;
- Check that packing lists and any statements or certificates of the sender (for dangerous goods and live animals) are in accordance with government regulations and IATA regulations;
- Provide assurance to the customer;
- Ensure the transport of goods, booking cargo space in airlines, make a schedule to send items to the airport;
- Track the movement of the consignment to its destination.

Air cargo agencies are intermediaries between senders and receivers and the airline and are characterized by providing a wide range of services.

IATA cargo agent represented by the designated airlines of acting on their behalf (includes space on the plane). Its mission is to prepare and arrange the shipment and all documents necessary to transfer the carrier. For his work receives a commission from the airline. The rights and obligations of the IATA cargo agent is completely processed by IATA decision in the manual, which will each registered agent. IATA cargo agent offers services related to the export shipper of goods, possibly assisted by the consignee (importer) on his side [1].

7.2 Air freight forwarder - consolidator

A wide range of activities and services than the IATA agent is offered by a consolidator - freight forwarder. It is an agent or agency dealing with air freight consolidation, benefiting from lower tariffs, set by airlines to transport larger items - collected many different items and sends them as one large shipment of a consignment note. Consolidation requires good technical support - for example, sufficient storage space.

Consolidator sets his own price – selling its own transportation system to their own tariffs, but also assumes the responsibility of the carrier. The price takes into account the tariff and its costs, expenses and profit (IATA cargo agent offers the normal fare). If sending several consignments as one bulk shipment at a certain point, at the addressee of the shipment there is his agent called: „ Drop-down agent. His role is to subdivide the bulk shipment again divided into the original single consignments and take care of them (delivering to the addressee).

Consolidator provides services related to export and import.

The Slovak transport market intermediary in the cargo transport several types of companies are active [4]:

- Independent freight forwarding companies – agents.
- Freight forwarding companies, which also deal with other types of transportation.
- Subsidiaries of foreign forwarding companies.
- Courier delivery services.

8 Air freight

For air transport the most favorable product is the one with high specific price at which the relatively high fees take effect less than at substrates of lower value. Consequently, the higher the price of transported substrate, the smaller the portion paid for transport of the total selling price of the product. This relationship does not always hold consistently, because there are many other criteria that affect it [5].

8.1 Air cargo

Product suitable for air transport must meet the requirements, both in terms of volume and weight, established for various types of aircraft. In terms of requirements for air travel, we distinguish the following groups of products [1].

1. Substrates with relatively low value. These include for example coal, wood, oil, grain and so on. This product is for their physical and chemical properties of aviation inappropriate.

2. Diverse range of goods such as appliances, precision engineering products, electrical and other motors, articles of clothing and textile industry. Currently, air transport of goods carried in a small scale in the future is taking shape as a very promising because they provide a uniform and regular utilization of aircraft.

3. Goods requiring quick transportation for economic reasons, such as. Parts (late delivery may result in increased costs due to penalties, loss of market - the economic losses the company).

4. Those requiring rapid transport of goods in terms of timeliness, for example. newspapers, magazines. Despite the low weight of the shipment by air is convenient for reasons of regular delivery of goods, thereby affecting the utilization even planes. They also include means for emergency aid, medicines, medical equipment, plasma.

5. Goods at the price of losing long-standing transportation and storage, for example. fresh vegetables, fruits, flowers, live animals and the like. The transport of animals is the high cost of the expenses for treating the time-consuming transport

6. Goods with high value that is to say precious metals, furs, jewelry, art objects, etc. .

8.2 Aircraft pallets and containers

The goods are in transit in most cases, palletized or stored in containers.

Palletization and containerization facilitates faster ground handling and loading and unloading of aircraft.

Aircraft pallets are matched to mechanized loading and also for fixation and fixation in aircraft cargo pallet. It is a platform made of compact material onto which individual items are stored so that the whole constitutes one shipping unit. It features handles a nets to hold the variety of goods..

The air container is a compact box that can be made from various types of material (pressed paper, fibre-board, metal, plastics). The walls of the container are fixed. The container is the unit cost for transporting large quantities of parcels.

The introduction of containers and pallets for air freight has brought significant advantages and benefits [4].

- Packages are transported in a single consignment, which is manifested: in reducing the cost of ground clearance, better utilization of the aircraft, a reduction in packaging costs, better control and registration of all movements in the handling of goods.

- Possibility of using standardized and mechanized equipment for handling, resulting in: check-in time reduction, reduction of physical effort, saving staff.

- Reduction the need for storage space and facilities at a faster movement of goods in containers and on pallets, better oversight of shipments.

- Possibility of application of combined transport

- Reduction in tariff rates.

The advantages of containerization and palletizing are not only advantageous for airlines but also users of air transport mainly in terms of economics and ground handling.

Currently a number of containers and pallets are used in aviation. It was caused by the great variety of aircraft types that have not been originally designed for this mode of transportation.

International Air Transport Association - IATA with the participation of experts, airlines has developed and announced a single programme for containerization and palletization. Standardization of containers and pallets covers a wide range of international organizations. The best known is the International Organization for Standardization - ISO, with IATA which works in this field [5].

Developed programs allow the application of the principle of common containers and pallets focusing on:

- Dimensional, volume and weight limits.
- Principles of labeling, freight rating.
- Technical specifications for production.
- Definitions of basic terminology.
- Principles for testing.
- Principles for circulation and use, etc.

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In the context of the tasks for the expansion of container traffic in organs was IATA recommended use of 17 standard sizes of containers outside the volume of 0.5 m³ to 11.5 cubic meters of container weight from 8.5 kg to 275.5 kg.

The basic conditions to be met by air containers (with attestation IATA and ISO) are:

- Light weight, made from aluminum, different types of plastics, paperboard or special impregnated fibrils (mass air container is 6 to 10% of its gross weight of cargo, such as low container type: Stennis IGLOO weighing 123 kg can be loaded with goods weighing 1,160 kg).

- Pressure at the bottom of the container, how to construct a surface or in the form of lysine (unacceptable are wedges of scissors) must not exceed 9.7 kPa.

- Resistance to cutting or deformation.

- Dimensions must not vary more than 2% (allowable manufacturing tolerance should not exceed 2-5 mm).

All types of containers and pallets on integral base are termed as ULD - Unit Load Devices, translated into the Slovak language as standardized loading unit. Aircraft ULD - are part of the aircraft, and units can be rented by the consignor for loading purposes. Those, however, must demonstrate that they are able to handle them professionally.

Non-aviation ULD - are not bound by the dimensions and design of aircraft. However, they must be registered by the IATA. They are owned by the shipper or agent. Consignment transported in ULD must remain all the time in the same ULD [4].

9 Tickets

The air transport of goods is necessary documents required:

- prior to shipment,
- during transport,
- following transport.

The basic document of carriage of goods by air, the air waybill - Air Waybill (AWB).

The air waybill is a contractual documents for air cargo transport between the shipper and carrier. The Warsaw Agreement it is accompanying the consignment from the airport of departure to the destination airport. Contract of carriage between the shipper and carrier can also be signed also by the air carrier agent. On the one hand, they are acting as agents in relation to the carrier and are authorized to sign transport documents. The consignment note is not purely a document on just having concluded the contract of carriage, but it also performs several other functions such as:

- Acknowledgment of receipt of the consignment.
- Order on dealing with the consignment .
- Order on transport routes.
- Field Declarations.
- Accounting documents.
- Proof of dispatch.

- Proof of insurance.

The consignment note shall be made in 14 specimens: 3 originals and 11 copies. The reverse of the original are printed in terms of the contract of carriage, which inform the sender of the rules under which goods are transported. The first original - green-is for the sending airline. The second original - red - is for recipient and accompany consignment of. The third original - blue - is for the sender. Use 4 to 14 copies (yellow) is indicated below the lower edge, are a confirmation of sending mail. The exact distribution is not specified, but one must get a copy of the document as an airline involved in the transport, IATA agent, office, airport and another destination. Subsequent orders (change of route, change of destination airport) can enter only the party who owns the original bill. Consignment notes are marked with a three-digit numeric code that the serial number for the sending air carrier.

All items loaded into one aircraft must be included in the CARGO MANIFEST, which is filed by the carrier sending the consignment of and the is attached to the Loadsheet informing about the distribution of the substrate for the specific flight. Before transporting the air waybill must contain:

- The destination airport if desired route of transportation.

- Weight and dimensions.

- Type and quantity of goods.

- Value of goods.

- Method of payment of fees.

- Whether it be insurance of goods.

- Notes.

- List of documents attached.

In addition to the air waybill this group also include:

- Documents required for customs clearance at departure and destination.

- Different documents depending on the nature of the goods (e.g. medical certificates).

- Various documents for purposes of payment (letter of credit, bill, payment to the bank).

Shipping documents during transportation: AWB for direct consignment of, MWB HWB along with the consolidated shipment, a list of items (CARGO MANIFEST). After transport to the customs documents for negotiations [2].

10 Air freight settlement system

In order to facilitate settlement between brokers and carriers the CASS-Cargo Accounts Settlement System have been developed. It is open to both members and non-members of the IATA.

The system consists in the fact that each of the air waybill copy is sent to a special account for processing. The settlement panel records all the necessary data for simple handling to the account of each bill of lading.

Each agent receives a bill for any one carrier with which it works and information on the total amount to be paid to all carriers. Everyone receives information about the accounts relating to its agents. The data used in the Settlement are ordered by AWB numbers to be checked easily. On the day of settlement, the agent will pay the total amount of account control panel. The money received from the agents are placed on the account from which a single payment is made to each carrier [1].

11 Conclusion

Transport and the activities associated with storage are the biggest cost items in the supply chain, and therefore due attention is to be paid to their design and optimization.

Air freight has recorded a long-term growth of their performances, despite some negative effects in the past or in the current period. This mode plays an irreplaceable role in the global, continental and intercontinental transport relations for certain types of supplies, particularly supplies of high value and low volume. In order to ensure high quality transport services, particularly in terms of quality and accuracy of delivery, further growth of the integrated express carriers can be expected, and creating strategic alliances and partnerships between individual carriers. Air freight is increasingly becoming an integral part of a more robust global supply chains adding to their values.

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STRUCTURAL DETERMINANTS OF CONFLICTS WITHIN THE LOGISTICS SYSTEM OF AN ENTERPRISE

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Abstract: Among the various determinants of conflicts arising during the organization and operation of logistics system of an enterprise, the most important are those that have their origin in the organizational structure of the enterprise. The aim of this article is to systematize and characterize such determinants. The first part of the article is devoted to the interpretation of both the logistics system of an enterprise and conflicts that occur within this system. Then the general typology of structural determinants of organizational conflicts is presented. The main part of the article characterizes these determinants in relation to the logistics system of an enterprise.

1 Introduction - the idea of logistics system of an enterprise

In its most general sense, the logistics system of an enterprise is a deliberately organized and integrated (cohesive) system consisting of several main subsystems such as supply, production and distribution (including storage), as well as markets for the supply, disposal and return of goods, waste and recyclable materials, the outlet market for potential customers, transport and forwarding processes, and possibly also the processes of procurement, sales, financing, etc., including relationships that occur between these elements and their properties, controlling the flow of goods, accompanied by the flow of funds and information. The above interpretation reflects the systemic approach of the logistics of an enterprise in response to changes in the conditions of market operation popularized, among others, in [2], [3], [7] and [8]. From the point of view of efficient management of activities in the logistics system, attention should be paid not only to its components but also to the objectives of its operation, output results (delivered goods - products and services, warranty and post-warranty service) and processes carried out within the system, enabling processing of the system supply factors into the delivered products [7].

Precisely defining the concept of enterprise logistics system based on a comparative analysis of the literature of the subject including, among others, [1], [2], [8] and [10], three main subsystems can be distinguished in this system, i.e. supply logistics, production logistics, distribution logistics, and additionally logistics of returns, waste and recyclable materials.

In a broader sense, given the resources used in the logistics system, its components can also include human

resources (number and structure of employees, their qualifications), computer software used, storage and transshipment facilities, their mobile equipment (means of transport and equipment for loading and unloading) and stationary equipment (warehouses, reloading facilities, factories, shops), connections between shipping and receiving points enabling the flow of material streams, road infrastructure, supplier and customer cooperation environment, and financial resources [7].

Depending on the nature of the company's activity (production, trade, service, etc.), some differences may occur in the configuration of the individual components of the logistics system. Between these elements there are specific functional relations and technical dependencies that guarantee the smooth running of the logistics processes, such as the flow of goods, information and decision, inventory management and logistics infrastructure, as well as the cost of these processes [11].

2 The definition of conflicts within logistics system of an enterprise

In the functioning of contemporary organizations, conflicts arise within all kinds of projects, processes and tasks carried out by co-operating organizational units, cells and positions. They are a natural and inevitable phenomenon, stemming from the essence of the enterprise as a special kind of organization.

It is worth pointing out a general interpretation of the notion of organizational conflict as a starting point for the concretization of the subject matter. J.A.F. Stoner and Ch. Wankel [12] define it as a dispute between two persons or between members or groups, resulting from the need to share limited resources or work, or from the different

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positions, different goals, values or perceptions. In the course of the dispute, the members or departments of the organization strive to make their case or point of view override the issue or viewpoint of others. According to R.A. Webber [14], the possibility of the occurrence of organizational conflicts is mainly determined by three factors: incompatibility of objectives, sharing of scarce resources and interdependence of activities.

Considering the conflict in the logistics system, one can assume that it is a hostile behavior aimed at hurting, creating obstacles or causing harm to another person or institution. It rests on a masked discord and grows out of the subjective perceptions of the participants. It is a situation in which one member of the distribution channel thinks that another member is his opponent involved in proceedings aimed at injuring, hindering or acquiring scarce resources at the expense of other members [4]. The basis for investigating the determinants of conflicts within the logistics system of an enterprise may also be D. Waters' approach [13], who has highlighted the problems of integrating logistics in the enterprise and in the supply chain. In general terms, the causes of the conflicts in question may stem from the lack of integration of all logistics activities. A symptom is the lack of one organizational unit responsible for the overall decisions regarding the movement of goods and accompanying information, in particular when logistics activities are subordinated to production decisions or to marketing and sales. In addition, conflicts relating to the competence of logistics decision makers may also be involved.

Among the main types of conflicts associated with the separate shaping of logistics subsystems, differences can be distinguished between:

- 1) sourcing and production by failing to properly match the quantity of raw materials, materials and semi-finished products to ensure continuity of production, production delays, restrictions on the flow of information from manufacturing activity to supply;
- 2) production and distribution activities caused by insufficient adjustment of quantitative and qualitative productive capacity to the needs reported by customers and delays in deliveries related to delays in production;
- 3) supply, production and distribution, and logistics of returns, waste and recyclables resulting from delays in the disposal of waste and recyclable materials, and restrictions on the flow of information on their quantities and types generated in the supply, production and distribution activities.

In addition, the company's logistics system faces conflict in the flow of resources within this system and in the supply chain [9].

3 The classification of structural determinants of organizational conflicts

As a methodological basis for systematizing and describing conflict determinants in the logistics system of an enterprise, we can adopt the concept of intra-organizational, direct determinants of business negotiations developed by A. Kozina [5], resulting from the seven typical functions of organizational structure [6]. This concept is described in Table 1.

Table 1 Internal direct determinants of business negotiations in a company (Source: own study based on [5])

Features	The dimension of cooperation (concord)	The dimension of competition (conflict)
Objectives	Formulation and alignment of goals (adequately to the capabilities and requirements of the environment) and their decomposition (aggregation) and prioritization.	Divergence between the objectives of the individual elements and the whole and between the individual elements, different priorities and incompatibility of the objectives with the needs of the environment.
Tasks and functions	Setting up tasks and functions (as a result of the decomposition of goals) and design and coordination of the task execution process.	Excessively detailed or generalized tasks, incompatibility of functions with objectives and related problems of implementation.
Grouping of items	Selection of criteria for company fragmentation adequate to tasks and functions and design of internal organization of teams.	Use of improper grouping criteria that causes duplication, failure to perform the tasks or incomplete execution of tasks, and over-diversity and incompatibility of team status.
Functional dependencies	Establishing the principles of co-operation, coordinating task execution and design of the necessary communication processes.	Interdependence of activities, inadequate coordination measures and communication problems (deficiencies, delays, poor quality of data, etc.) - horizontal conflicts.
Hierarchical dependencies	Preferred style of targeting and establishing superior - subordinate relationships.	Tensions in superior - subordinate relationships (vertical conflicts).

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Decision-making powers	Breakdown, specification and allocation of responsibilities appropriately assigned to tasks and responsibilities.	Pressures and constraints resulting from excessive (de) centralization of powers, ambiguities and/or too narrow or too wide powers causing conflicts of competence between managers.
Formalization of activities	Developing regulations (rules, procedures, guidelines, etc.) that condition the efficient execution of tasks.	Problems resulting from insufficient (too much freedom of action) or excessive (too rigorous) degree of formalization hindering the implementation of tasks.

The coexistence of the dimensions of cooperation and competition in negotiations makes the same traits of structure the basis for distinguishing the preconditions for both interaction between the elements of the organization and conflicts between them, and therefore in Table 1 both dimensions are taken into account. The difference between these two dimensions, and thus between the two types of determinants of business negotiations, is that in the first case they provide the basis for mutually agreed arrangements necessary to ensure interoperability, while in the second case they indicate the direction of the search for possible means to resolve conflicts in order to reduce or eliminate obstacles on the way to achieving the assumed level of effectiveness.

4 The characteristics of structural determinants of conflicts within logistics system of an enterprise

Taking into account the methodological approach outlined above, seven major types of structural conflicts in the logistics system can be identified and described.

1. Irregularities in the formulation of objectives. There are discrepancies between the objectives and/or priorities of each subsystem and elements of the logistics system. The goals can also be redundant, outdated, inadequate, etc., to the needs of the environment, or goals that from the standpoint of these needs should be achieved as significant in the changed operating conditions are not set. Most often, this is done through misdiagnosis of logistics strategy and plans resulting from this strategy concerning distribution, manufacturing and supply needs. There may also be an improper implementation of logistics management, i.e. planning, execution and control of activities related to the flow of goods, information and financial resources within the enterprise. The next case includes incorrectly defined objectives related to shaping the purchasing policy, choosing suppliers, negotiating prices, setting the terms of contracts with suppliers, ordering, coordinating delivery dates, controlling contract terms, and making current evaluation of suppliers. There are also errors in shaping the overall policy of the logistics system of an enterprise, including e.g. decisions to expand or build warehouses, purchase of machinery and equipment, outsourcing certain areas of service to service providers, etc.

2. Misrepresentation of tasks and functions of organizational units in the logistics system. Tasks and

functions may be overly aggregated or fragmented or inadequate for purposes that should be properly detailed. This is usually due to improper implementation and coordination of the supply of raw materials, materials, semi-finished products, parts, components and finished goods, and errors related to their use in the manufacturing process and in sales or service delivery. In addition, this situation may include improper management of returns, defects and imperfections in the organization of work, in planning and management of the production, sales and distribution, and disparities in procurement of materials and services, including, among others, preparation, review, approval and dispatch of orders.

3. The way of grouping elements of an organization as a whole and/or within a logistics system is not adapted to the specificity and conditions of its operation. This can lead to the use of inappropriate organizational structure, such as rigid team-linear structure instead of more flexible matrix or process structure. This often happens also through improper organization or harmonization of logistics processes between suppliers and manufacturers, or between producer and customer. There may be errors in the selection of technical resources, human resources, financial resources for the implementation of logistics process and imperfections in logistics control techniques, as well as lack of integration of materials management with the physical distribution of goods.

4. Incorrectly defined functional relationships, which usually result in mutual misalignment between individual components of the system and, consequently, in an inadequate performance of tasks. Coordination mechanisms are ineffective. There are also problems arising from communication constraints and barriers related to improper functioning of logistics channels and incorrect exchange of information between elements of the system. Consequently, the data used and transmitted are incomplete, unreliable, delayed, etc. There may also be conflicts arising from the incomplete integration of all logistics activities, e.g. lack of one organizational unit responsible for all decisions regarding the flow of goods and accompanying information, especially when the logistics systems are subject to production decisions, or marketing and sales.

5. Conflicts may also be caused by improperly designed hierarchical relationships, especially through tensions in relations between parent and child units of an organization, in particular interference in fulfilling by the selected unit its role of the leader/coordinator in the system

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and/or lack of respect paid to this unit by all its links. Then the pursuit of particular objectives and interests follows, the pursuit of subsystems in the logistics system to dominate over others, and also insubordination of the executive units to those responsible for coordinating and supervising the implementation of logistics process.

6. Disagreements and discrepancies may also be the result of misalignment of decision-making powers, i.e. their over-centralization or decentralization, which often happens as a result of discrepancies in the planning, organization, implementation and control of the flow of goods and accompanying information from suppliers of raw materials and materials to final recipients. Potential problems are also due to improper decision-making competencies in relation to the flow of goods and data between different cells and organizational positions responsible for the supply, production and distribution of goods. These competencies may be either too narrow or too wide, formulated in an unclear or ambiguous way, overlapping or divergent.

7. Conflicts may also result from the wrong scope and/or formalization of activities. Rules, regulations, laws and procedures governing the organization and operation of the logistics system may be insufficiently formalized, resulting in over-activity combined with non-formal and interfering interoperability between elements of the system, or they may suffer excessive formalization, which stiffens their activities and reduces their effectiveness. There are also conflicts between the principal and the carrier for not understanding the client's expectations, e.g. incomplete information on the terms of the transaction. There are also errors in the choice of suppliers and preparation of contracts, including in particular supplier selection, certification and validation of suppliers, contract negotiation and management of contracts.

5 Conclusions

The systematic and structural characteristics of conflicts in the logistics system presented in this article may provide useful tools for the identification and analysis of such conflicts. The proposed concept is complex, which means that it covers all sorts of structural determinants of the conflicts in question, and universal, which means that it can be applied in logistics systems of enterprises of different industries, sizes, locations, etc.

On the other hand, the presented concept requires refining, and as such is only a preliminary presentation of the issues under consideration. Within the framework of the studies carried out by its authors it will be necessary first and foremost to specify the structural determinants of conflicts in the logistics system of an enterprise by creating appropriate sets of dimensions and parameters. Also empirical research of a comparative nature is required to verify and possibly improve the proposed concept.

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THE POSITION OF DISTRIBUTION LOGISTICS IN THE LOGISTIC SYSTEM OF AN ENTERPRISE

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Keywords: logistics, distribution, theory, micrologistics, definitions

Abstract: Article deals with the focus on branch of logistics and special with focus on distribution logistics, theory, definition and position of distribution logistics in micrologistics model of an enterprise. Distribution logistics, of its range of solutions, is focused on the proposal of distribution systems for enterprises and companies, allocation and placement of companies, warehouses and distribution centres, storing and technical equipment, optimization and dimensioning of the elements of distribution systems, optimization and development of distribution plans, the selection and optimization of modern information and expert systems in the area of distribution, defining the distribution circuits.

1 Introduction

During the reign of the Byzantine Emperor Leontos VI (886 – 911) the term of logistics began to be used for the first time. The Swiss general H. Jomini (1799 – 1869) used the term of logistics as a specific military terminology. He understood logistics as the science of movement, supplying and accommodating of soldiers. At the beginning of the twentieth century, the term logistics started to be in use in the economic field and in the economic literature. At the beginning of the seventies, experts have started to apply the theory of logistics in a practical use. According to some authors logistics can be understood as a branch of science, which deals with comprehensive planning, management, implementation and controlling of material flows, creating of the necessary material flows and information systems for material processing. Logistics is a summary of all

activities for comprehensive management and implementation of material flow in the manufacturing processes and circulations of goods [1], [2].

To achieve the highest performance with maximizing production efficiency, logistics, from the levels of strategic, tactical and operational, defines respectively proposes actions that lead to achieve the required results by using all available means of science and technology, economics and computer science.

The aim of logistics is to create a united, integrated, optimized material flow, which is arisen from different parts of the system in the way to ensure a continuous exchange of goods and services. Logistics is gradually developed and many definitions were developed as well together with it (Table 1), while there are still formed new perspectives on its scope and its level of activity.

Table 1 Definitions of logistics from different point of view from many authors

The author	Year	Views of logistics
Council of Logistics Management [3]	1961	Logistics is the process of planning, management and implementation of effective, powerful flow and storage of goods and related information from point of origin to point of consumption, which aim is to satisfy customer requirements.
J.L. Heskett, N.A. Glaskowsky, R.M. Ivie [4]	1973	Logistics is the management of all activities that facilitate the movement and coordination of offer and demand in creating of time and place benefits.
Ch. Schulte [5]	1991	Logistics is an integrated, market-oriented planning, creation, implementation and control of flows of material, goods, information from suppliers to enterprises, in enterprises and from enterprises to clients at optimal costs.
I. Gross [6]	1995	Logistics is an organization, planning, management and execution of flows of goods, starting at development and purchasing through production and distribution according to the final customer so that all market requirements are fulfilled at minimum cost and minimum capital expenditures.
D. Malindžák [7]	1996	Logistics is the way, philosophy of flows management (material, information and financial), at which there are applied a systematic approach, methods of planning, algorithmic thinking and coordination in order to achieve the global optimization.
P. Pernica [8]	1998	Logistics is the discipline that deals with the overall optimization, coordination and synchronization of all activities in the self-organizing systems, their concatenation is essential to achieve flexible and cost effective final (synergistic) effect.

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Council of Supply Chain Management Professionals [9]	2005	Logistics is the process of planning, implementing and monitoring the efficiency and effectiveness of direct and reverse flow and storage of raw materials, materials in process, products and services, and related information between the point of origin and point of consumption in order to satisfy customer requirements.
M. Straka [1]	2013	Logistics is a system in which there is an affect to elements in order to set coordinated material, information and finance flow, resulting in, respectively, which aims to satisfy customer requirements and respective economic effect.

2 Logistic divisions

In terms of logistics development in a time, there were created and are still created various streams that Logistics and Supply Chain Management (SCM) understand from their point of view [10].

From “traditionalists” point of view (Figure 1a) the logistics is considered as the system which part or a special function is the Supply Chain Management. SCM provides the link between suppliers and customers to ensure a business performance.

From “identicalists” point of view (Figure 1b) the logistics is identical to the SCM. This direction perceives SCM as well as the logistics and it tends to cancel the term of logistics and it fully replaces with SCM.

From “unionists” point of view (Figure 1c) the logistics is a part of Supply Chain Management. SCM provides raw materials purchasing for a company, logistic activities in manufacturing process, sales, which includes marketing and advertising, product development and order fulfilment.

From protagonists of philosophy of “conjunction” point of view (Figure 1d) where logistics and SCM are understood as two separate units, which complement each other and they have separate as well as common parts.

The monograph, you have available, is written in the spirit of traditional philosophy, because the author himself is inclined to this direction. In terms of market and enterprise it can be said that it does not mind what philosophy is applied, important is to help to enterprises and companies to gain a competitive advantage in the market, to reduce costs, to ensure resources for running various enterprises, to ensure consumers and adequate increase of profits.

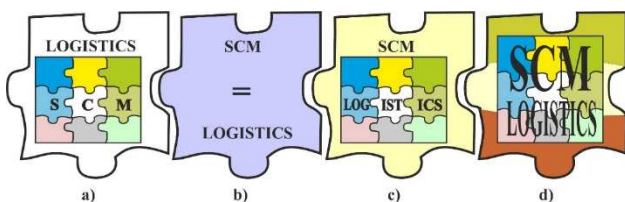


Figure 1 The perception of “philosophical currents” of logistics and SCM [1]

In terms of hierarchical levels and systems theory logistics can be classified as (Figure 2):

- macrologistics (an enterprise is an item in the logistic network, logistic chain),

- metalogistics (the logistics in the level of a region),
- micrologistics (the logistics of an enterprise),
- nanologistics (logistics of a technological process).

Under the term of macrologistics it is possible to understand the distinctive logistics at the supply chain level, where the elements are enterprises, companies and government and the links between them provide materials, information and financial flows (Figure 2).

Under the term of metalogistics it can be understood cooperation at different levels among micrologistic systems and regional specialized objects.

Under the term of micrologistics it is possible to understand the distinctive logistics at the level of an enterprise or a company, whose elements are the basic and supporting subsystems of an enterprise (Figure 3).

Under the term of nanologistics it is possible to understand the logistics of specific technological processes.

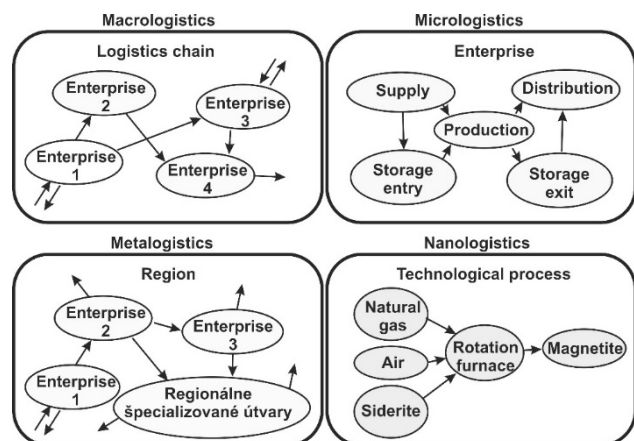


Figure 2 Hierarchic level of the logistics [1]

If assuming the micrologistic model of an enterprise and accounting systemic approach, then the logistics of a company can be divided in terms of sub-processes (Figure 3) [11]:

- logistics of purchasing,
- logistics of service processes,
- logistics of supplying,
- logistics of orders,

- logistics of manufacturing,
- logistics of information,
- logistics of sale,
- logistics of finance,
- logistics of distribution,
- logistics of personnel,
- strategy logistics,
- business service,
- reverse logistics.

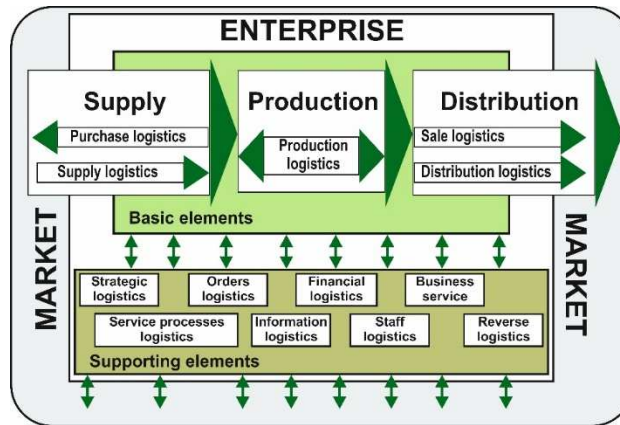


Figure 3 Basic and supporting parts of the micrologistic model of an enterprise [11]

3 The distribution logistics

The distribution logistics provides physical, organizational and information links between the source (output store of manufacturing enterprise) and consumers, the input store or point of acceptance [11].

Logistics of distribution (Table 2) can be understood as the subsystem of the logistics, where elements are the means of storing and packaging, product, service personnel and the links among the elements provide management of means of transport, information and financial flows related to distribution.

Table 2 Definitions of logistics from different point of view from many authors

The author	Year	Views of logistics of distribution
G.B. Ihde [12]	1978	Logistics of distribution deals with problems relating to time and spatial bridged transfers of real goods and among the systems of labour division.
Ch. Schulte [5]	1991	Logistics of distribution is responsible for all storing and transport movements of goods to consumers and related information, management and control activities.
M. Straka [13]	2004	Logistics of distribution has to ensure the most appropriate way, selection and analysis of transport, which is most suitable for transfer of products manufactured by enterprises to achieve failure-free performance of the market.
DHL Logbook [14]	2008	Logistics of distribution includes all activities related to the provision of finished goods and products to the customer. These products may be shipped directly from the manufacturing process or dispatch warehouse to a space of further processing or, where appropriate, through other regional distribution warehouses.
M. Straka [1]	2013	Logistics of distribution has to ensure the most appropriate way of analysis, selection and implementation of all activities and strategic and other decisions related to the provision of products to a customer in a way to achieve failure-free performance of the market.

Logistics of distribution provides a summary of logistical tasks and steps related to the preparation and implementation of distribution. The use of logistics of distribution in an enterprise depends on factors such as manufacturing program, the spatial distribution of production, on the largest cities to demand, on the structure of distribution centres, on the transport available (transport

fleet, quality of transport network), on the time of a distribution [13].

Logistics of distribution deals with the solution of problems in the following areas:

- the choice of location of distribution warehouses (storage allocation),
- storage of goods,
- packaging management of products,

- output of goods and provision of a loading,
- goods transportation.

4 Conclusion

At the strategic level, the logistics of distribution solves how to determine the topology of the distribution system of an enterprise, the system of distribution networks, selecting of the location of the distribution elements, proposal of distribution region, topology of distribution system, proposal of distribution policy. These decisions have long-term validity and high importance. At the strategic level, there are executed decisions about the composition of the entire distribution system. Here are provided decisions about the location of warehouses, choice transport means, definitions how to process orders. The strategic level gives a form for the entire distribution system.

At the tactical level, there are implemented decisions about the use of resources, the construction of warehouses, the equipment, the necessary equipment for materials handling, the specific type of vehicles. This level determines the effective use of the facilities that are available.

In the functional, operational level, it ensures the implementation of distribution in a defined distribution network in a distribution region, distribution management, storage, management of packaging, the output of goods and their loading, transportation.

Logistics of distribution, in terms of macrologistics, ensures physical links between subjects of logistic network and logistic chains.

Logistics of distributions answers the following questions [13]:

Where are resources? Where are customers? Where are warehouses and what kind of them are there? What kind of warehousing and distribution systems will be used? What means of transport should be for distribution? What will be the criteria for the distribution evaluation? Where are stocks and what kind of them? Where to place a distribution centres, an enterprise, a plant? Etc.

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