
20 SELECTED ASPECTS ASSOCIATED WITH PREPARING THE PRODUCTION AND INDUSTRIAL PERIOD-STORING

20.1 Introduction

Problems discussed in article are explicitly associated with system functioning in industrial enterprises and service. A comparative analysis of quality and logistics and their interrelation is a crucial factor, brought up in study.

The logistic system is it on purpose organised and integrated - in frames of determined economic layout - flow of materials and finished articles.

In literature on the subject it is possible to come across a lot ranking of logistic systems. All systematicss have character stipulated in contract and opened.

Logistic systems are the key to success today and of smooth functioning of company therefore one should implement right techniques and logistic methods, which to be fitted individually to every organization [1].

In contemporary manufacturing companies a problem of managing the manufacturing process of products is playing a basic role, with particular reference to technological problems. For that purpose specific examinations and analysis of individual technological stages and production treatments are being conducted in manufacturing processes of elements in a production unit. A foundry producing elements for the motorization can be an example. An aspiration to improving a production process is an aim of such action what serves the improvement of the quality produced elements, for improvement in safety of their use (elements a steering system, brake discs and the like) and of limiting production costs and material losses [3].

In foundry a functional criterion is an essential, and at same time universally used criterion of identity of logistic systems from a point of view of sphere being active in an enterprise and planned contents of tasks.

On account sphere of being active in an enterprise it is possible to distinguish the following subsystems:

- Subsystem in sphere of supply,
- Subsystem in sphere of production,
- Subsystem in sphere of distibution,
- Subsystem in sphere return of products and waste.

From a point of view contents of tasks associated with the flow goods and it is possible to distinguish information in scale of enterprise, following subsystems:

- Subsystem of transport,
- Subsystem of forming levels of inventories,
- Subsystem of management packages,
- Subsystem of commercial order processings [4].

20.1.1 Quality in the logistics

Quality of service logistic it is an ability to meet the needs of customer in sphere of logistics. Service quality logistic is being measured with many described features, reflecting the degree of the adaptation to needs of customer. In case of logistic services simultaneously valuable meaning service quality and meaning compliance services with arrangements and standards are applicable.

Logistic action is dispersed in inside and outside supply chain of every enterprise and tied together procesowo into the integrated logistic system.

We are ranking enterprises of logistic action shaping the quality among basic factors:

- The knowledge and classifications logistic staff - current level of knowledge, for her fitting to logistic natures actions carried out and planned; system of getting, deepening and the update knowledge - system of trainings and the development staff;
- Logistic infrastructure (quality, functionality, size) the conditioning appropriate quality service, the lead time, the capacity and bandwidth (quantity of transport fleet, size and the functionality magazine); these factors are conditioning the flexibility and the reaction rate of logistic action for the purposes customer of domestic and outside enterprise;
- Methodologies, procedures, instructions, techniques, principles - fixing the manner of logistic implementations of operations;
- Management style with logistics and organizational culture - including the quality of the planning, motivating and organising working conditions; the communication and the flow of information; the cooperation and supporting in the problem solving; principles of looking successes after and eliminating threats; strategic perceiving the quality and culture quality management and control and building the quality;
- Conditions and principles of cooperation with suppliers and recipients in supply chain -methods of communication, information exchange, flexibility of reaction, will of the cooperation, perceiving the quality in categories of shared success and the joint property of partners;

Budget limits of logistics and limiting in bearing the cost - making the concentration impossible often on the quality, and mainly on costs and frugalities. Diverse factors specialist, shaping the quality of logistic action, are appearing at every stage of flow product in supply chain [5].

From stages of the quality management a planning after which stages of the assurance and the quality check are coming is first. Planning the quality is a process of qualities concerning making fundamental decisions on individual rungs of the management, of drivers for implementation of strategies of the quality (strategic planning), of implementing the politics of the quality (tactical planning) and of execution of tasks of controlling and the guidance with quality (efficient and current planning) in the enterprise.

The process of planning the quality in the logistics includes all levels of planning in the logistics, thematic full scope of quality, in all areas of functioning logistics of the enterprise, and in it:

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- Planning the knowledge and the classification logistic staff - planning knowledge required for created and supported products - making plans for courses, trainings, studies, creating documentation, the instruction and procedures for purposes of self-education of employees, planning the recruitment of recruits,
 - Of planning the development and improving the logistic infrastructure - planning of technological level, the functionality and usefulnesses of devices conditioning appropriate quality of the completion of processes and limiting lead time and the elasticity of logistic action for purposes of outside and internal customer in enterprise,
 - Planning rules of operation, improving methodologies and procedures - appointing the manner of logistic implementations of operations and standards (models) of this action,
 - Planning principles of cooperation with suppliers and recipients in supply chain- services including planning principles and ways of supplies, methods communication, information exchanges,
 - Planning costs, budgets, a risk and restrictions - embracing procedures
 - Of budgeting, planning costs of processes, planning the risk of restrictions appearing in the situation (e.g. add financial means, capacity of the magazine, long lead times from suppliers) [7].

20.1.2 Basic tasks and principles of the logistics

Generalizing views described in literature, it is possible to distinguish 3 essential concepts logisticses:

1. Logistics is a process of physical flow tangible property - raw materials, materials, semi finished products, finished products in the enterprise, as well as among enterprises and flows of information streams, reflecting processes and used in their guidance,
2. Logistics is a certain concept, philosophy of managing processes (with flow of goods), based on integrated system including these processes,
3. Logistics is a field of knowledge economic, examining correctness of both the phenomenon flow of goods and information in economy, as well as in individual her links [8].

These concepts mutually are complementing each other. Because a flow of tangible property and information, intensity of their streams, the degree of continuity and reliability are a being of the logistics. Appearing of real processes of the flow and information processes only enables the certain concept to develop logistics of management, and even as the economic, examining discipline is driving the tide of goods and information in economy.

It is possible conventionally to rank among the technical infrastructure of logistic processes: the stock infrastructure, the transport infrastructure, packages and the computer infrastructure. This division results from objectives of logistics: of transferring and storing physical goods, the protection of supplies and the processing of information necessary in guidance with logistic processes.

The physical flow of goods, carrying inventory, investing capital in them and functioning of the technical infrastructure are reasons for coming into existence of costs logistic processes.

Logistics are being ranked among basic tasks:

- Streamlining managing processes flow of products and in consequence full satisfying the financial needs of participants in logistic processes,
- Subordinating logistic activities to requirements service of the recipient - of customer),
- Increasing the effectiveness of the flow what is being expressed above all with reduction of costs of flow, and including like most widely - of costs logistic processes.

The logistics as the concept is basing managing, that is planning, organising, the guidance of both controlling the physical flow of goods and his information conditioning oneself on principles:

1. "Thinking about the whole", that is of system approach, in addition a concept is being associated with this principle of total logistic costs,
- 2) "Flows", in addition and with this principle a concept is being associated of total logistic costs. [9].

20.2 The magazine and storing

The magazine is a link of the logistic system in the production engineering, which goods are temporarily stored and dispatched to next cells of the network of supplies in. Magazines can be both points of supplies and the receipt, and paragraphs of the concentration or the chapter of streams of goods in the logistic system. In the magazine processes storing and transferring are occurring. The dominance of determined processes depends on the function of the magazine. Required functions in the fundamental way influence the location, technology and organization of works applied.

Storing is a team of activities associated with temporary accepting, storage, storage, completing, transferring, conservation, inventorying, with controlling and issuing materials.

Functions and duties of magazines

Fundamental functions which the magazine is fulfilling in logistic system:

- Coordinating the magnitude of supply and demand,
- Reducing transport costs,
- Supporting production processes,
- Supporting marketing processes.

They are basic tasks realized by magazine:

- Storing goods,
- Manipulative action.

Storing goods is appearing at all times, which goods stay without the move in. Fundamental storing goods is associated with giving shelter to him in required storage conditions (temperature, humidity, cleanness of air, safeguard against the theft). The storage is appearing also in other stages in a process of storing between next manual operations.

Manipulative action is connected mainly with accepting and with giving goods. They always act while transferring goods, also in the zone of storage or in the allocated zone of com-

pletion. Activities which cause the change for figure of cargo are also responsibility of them [5].

20.2.1 Developing the warehouse

The majority of magazines has a space divided in zones corresponding to four basic stages in a process of storing. Four fundamental zones of the magazine are being distinguished:

- Parties,
- Storages,
- Completion,
- Editions.

A zone of parties is the allocated space intended for activities operating-technological, associated with accepting goods for the magazine. The zone of storage is an allocated space intended for storing stored goods. A completion can take place in the zone of storage. A zone of completion is the allocated space intended exclusively for completion of goods. In many magazines the completion takes place in the zone of storage. There is then no allocated zone of the completion. The zone of editions is allocated space intended for the organizational-technical activities associated with the edition and the shipment of goods.

Due to the process carried out, the zone of parties and the zone of editions are equipped with handling fronts. If the level of the floor in the magazine corresponds to the level of the area, then trans-shipments take place on the training yard. If the level of the floor is above the area, then handling fronts are acting in magazines ramp (equipped with ramps which are lengthening the floor of the magazine beyond the walls of a building).

The zone of the storage is a fundamental space in magazines. For her the size depends on the level of the stored supply and the applied technology of storing. On account of storage conditions, within the zone of the storage allocated rooms can be:

- About the different temperature (cold stores, carrying freezers),
- Safeties ensuring specific conditions (for hazardous materials, of chemical substances),
- Additionally protected against theft (due to the value of the supply),
- Required with provisions.

The zone of the storage can differ on account of the way of storing (drill and block storage), the applied technology and the equipment, the height or the structure of a building. The drill storage consists in arranging loading individuals in rows in the way which the free access enables to every of them. In the special accident a loading individual of every stack is approachable. The access is possible from corridors being located among rows. It is possible to store goods in one level, to stack up into stacks or to put in bookshelves on many levels.

They are advantages of drill storage:

- Free access to every assortment and most often to every loading individual,
- Transparency of deploying loading individuals,
- Simple organization of works.

The drill storage is applicable mainly at storing the substantial amount of selected positions about the understock, e.g. of single loading individuals.

The zone of completion is being allocated in order to shorten the time of the completion. The area of zone depends on size of the supply which lets complete all orders in determined time interval (e.g. one change, one day). The number of locations, from which goods are getting married, should be equivalent to a number of selected positions spent of magazine. Correct spreading goods is shortening the covered road through the employee and the time of taking. The access to the loading individual inside the block is possible after transferring charges which are separating it from the corridor. A block storage is meeting:

- Without devices in one level,
- Without devices in a few levels (at stacking loading individuals up into stacks),
- In blocks with using bookshelves

Effective using the storage space is an advantage of the block storage c 50-80 %). They are defects:

- A direct access is missing to loading individuals in the inside of the block,
- Difficulty with the application of rule of giving loading individuals in turn, in which they were provided the magazine.

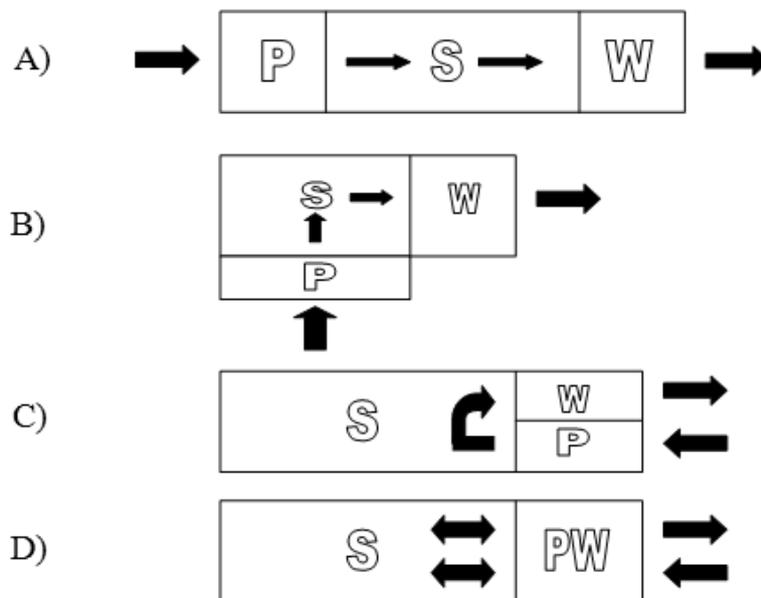


Fig. 20.1 Technological arrangements of magazine [5]:

a) arterial,

b) sack of angle,

c) with separated zones of parties and editions, sack of,

d) with the shared zone of parties - of editions,

**P - Zone of PW parties - zone of parties - of releases to the S - zone of the storage in
W - zone of editions**

The block storage is applicable particularly at storing the low figure of selected positions about the large supply, e.g. a few or of a dozen so loading individuals. As for technological arrangements of magazines, they differ in mutual arranging zones towards themselves. Three technological layouts of magazines are distinguished [6]:

- Arterial - zones of parties and editions on opposite sides of the zone of the storage (fig. 20.1a)
- Angle - is characterized by putting the zone of parties and editions by walls neighbouring oneself of the zone storages (fig. 20.1b)
- Sack - zones of parties and editions are located at the same wall of the zone of the storage. They can be separated from oneself or create one zone of parties – of editions (fig. 20.1c and fig. 20.1d)

If there is an allocated zone of the completion in the magazine, she is bordering directly around zone of editions and with zone of the storage [5].

20.2.2 Stock processes

A stock process is a team of connected operating activities with accepting, the storage, the completion and giving the tangible property in places appropriately adapted to it and at fulfilling organizational and technological named terms. The stock process consists of the flow of materials and information.

Taking goods from her sender is connected with a receipt confirmation. From that moment on the responsibility for goods is being transferred to the recipient. Two types of the admission are being distinguished:

- Outside - taking goods from the outside supplier
- Internal - taking goods from the domestic supplier as part of the enterprise.

Accepting goods to the magazine is an operation which is starting upon delivering it. At accepting goods they are included in fundamental tasks carried out:

- Unloading, supplies is taking place with using had means of the works transport (e.g. raising carts led) and of handling facilities.
- Sorting, is dividing goods into groups according to resemblance of physical properties.

In case of accepting goods to the magazine required conditions are an essential feature of storage. Therefore is separating goods which will find their way to zones different, separated from oneself *przechowalniczych* or to different parts of zone of the storage

- The identification, this stating the identity or explicit recognizing goods. At present the identification isn't bringing itself about exclusively for recognizing the name of goods. In accordance with the needs, the full identification should provide reading out name, producer code, date of the production, expiry date (permanences), of the serial number or the declared amount
- Quantitative and quality control, is being conducted after establishing the identity of delivered goods. The inspection of accepted goods includes checking of the selected and quantitative agreement goods with the order or with accompanying documents for delivery, and checking the quality of the delivery. The quantitative control is usually confining itself to count material, measuring him or weighing and comparing received values with records of the delivery. The quality control depends on requirements of legal and applied procedures. Mainly it is visual inspection. He/she is working, whether loading individuals and their securities (e.g. foil) don't have tracks of damage (dents, tears).

- Preparing goods for the storage can consist in reducing their height (e.g. through taking upper layers), forming loading units from scratch, trans-shiping into suitable containers, and the relevant label.
- Sending the supply to the zone of the storage is appearing in frames of the bevel of accepting goods then, when goods there are being transported by employees making the admission. A receipt of goods is an alternative option from the zone of parties by employees serving the zone of the storage. According to the PN-N-01800 norm: 1984 a storage is a set of activities associated with putting (with setting) on the surface of supplies or in the space of the storage stock building (e.g. in devices for storing), in the systematized way, appropriately to the appropriateness of the wrestling and existing conditions. Storing stock availabilities is associated with the basic function of the magazine their temporary storage is which.

From a point of view of the logistics of the supply a concentration of supplying the low distance from the enterprise on suppliers which are is advantageous. However they with reference to remaining suppliers are recommending creating the outside supply store in the vicinity of the place of the demand [10]. In frames bevels of storing goods belong to realized basic tasks:

- The receipt of goods from the zone of parties, in frames of the bevel of the storage is being carried out by employees serving the zone of the storage
- Arranging goods in the zone of the storage, will depend among others on required storage conditions, of type of the loading individual in the storage, technology of storing, parameters of the rotation of selected groups. Every goods must be put in such a part of the magazine which is ensuring adequate storage conditions
- Storage of goods, comes down fundamentally to keeping required storage conditions
- Periodic inspection,
- Sending goods to the zone of the completion is appearing in case of allocating in the magazine of such a zone providing goods is aimed at replenishing stocks in the zone of the completion.

According to the definition included in the PN-N-01800 norm: 1984 completing is an operation in the stock process, consisting in washing supplies from stacks or devices for storing supplies in order to create the set according to specification selected and quantitative for the described recipient. Phases of the completion are basic tasks:

- Preparing loading individuals for needs of the completion, provides for employees fastest and direct access to goods picked up.
 - Picking orders,
 - Quantitative control, a completeness of the created loading unit and a compliance with the order are confirming kompletacyjnym under the executioner of the assortment and the amount.
 - Packing and the forming of transport units, is running differently, depending on the type of completed goods. Packing is used above all for a protection of goods against damage or a protection of surrounding goods before the harmful influence,
 - Transferring editions to the zone.
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Giving goods is physical activities associated with giving goods from the magazine for the established recipient along with the confirmation of transferring goods through spending and picking up. Giving goods is an operation which is finishing the process of storing. At giving goods they are fundamental tasks carried out:

- Packing and the forming of transport units in the zone of editions are regarding loading individuals which rose in the process of completing and weren't packed and formed in the phase of the completion.
- The inspection of the edition consists in inspecting prepared goods with documents of the edition. A completeness of prepared transport units and a compliance of way forming them and marking with requirements are working for the recipient.
- The loading of means of transport is taking place based on the positive audit result. Loading individuals are staying grouped into batches of editions according to directions, of routes and of recipients [5].

20.2.3 Process analysis of completion

The process analysis of completion was conducted based on the card of the course of the activity and testing gauges qualities of logistic action.

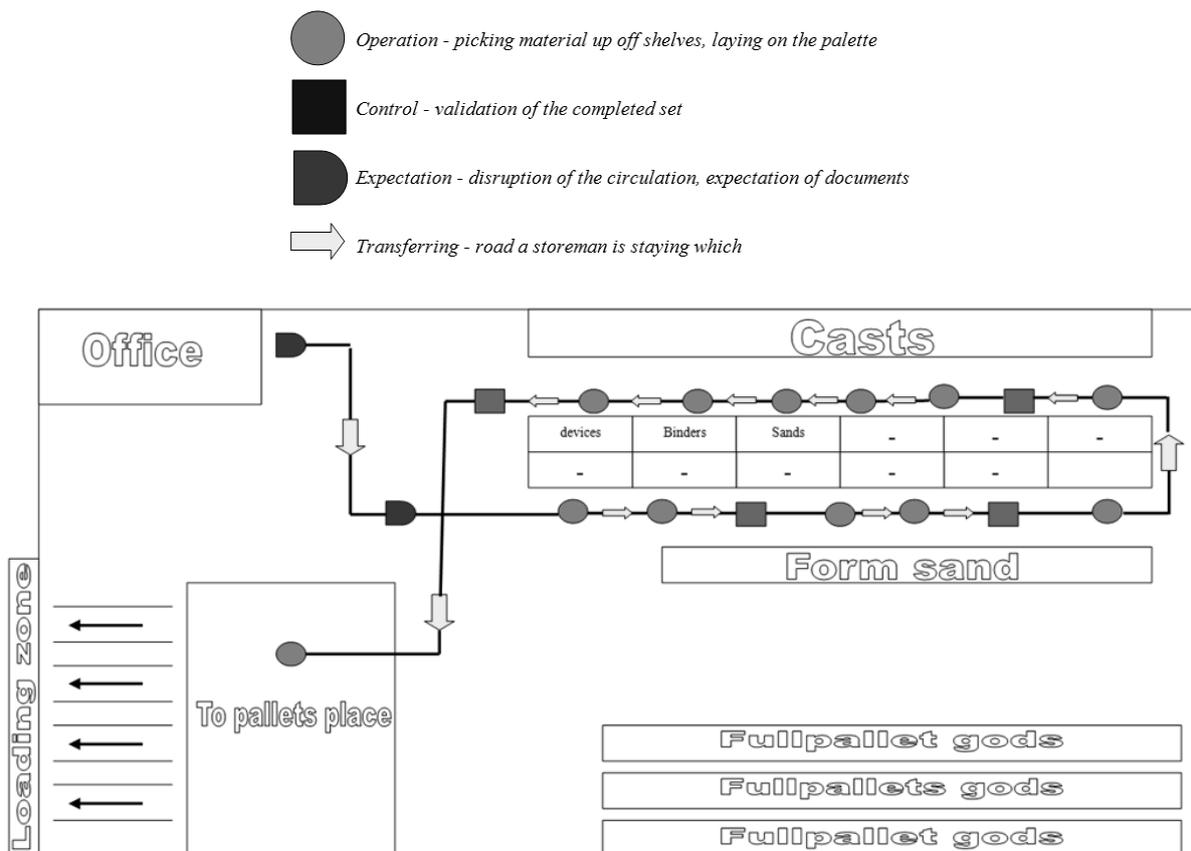


Fig. 20.2 Graph of the course of the activity - existing example of the completion - part of the A1 magazine

The card of the course of the activity constitutes the chronological record of all activities, during the completion of goods. Apart from putting together symbols of events appearing in chronological order and their record, contains such information, as:

- Duration of individual operations,
- Distances an employee is defeating which in the course of the order picking,

This card is pointing not only at it, what order the completed order is in, but also constitutes the basis of an analysis and assessments of time lost for reasons for stops, storage cost, transferring.

A chosen scope of products and materials and production tools was had tested.

They made analysis of the course of stock activities which fig. 20.2 depicts.

In the destination of improvement and the improvement in the handling of action, streamlining the circulation of stock activities which he is introducing was offered to fig. 20.3. Proposed change, will save the time of the completion as well as the covered road through the storeman above all. Graphic symbols of the course of the completion.

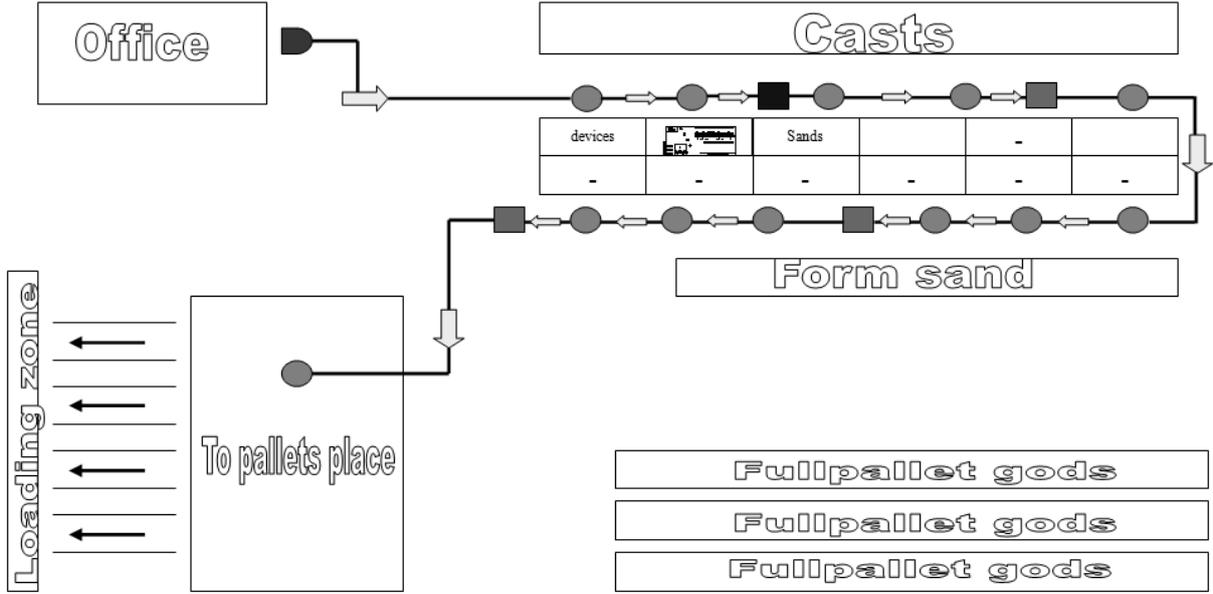


Fig. 20.3 Graph of the course activity - proposed change, example of completion - part A1 magazine

20.3 Summary

In problems of production engineering, seems indissoluble to be appearing of logistic elements.

Analysis of juxtaposing with oneself the quality and the logistics and their interrelation is one of aims of this publication. In article problems among others chosen were expressed from the scope of inventory management.

The magazine as the individual functional an important knot constitutes relations in logistic web, and which is taking place quantitatively with - temporary leveling material flows.

In implementation process of material flows an attention is being returned not only to problem of rational holding of supplies, but also to the rotation (flow) of supplies.

Correct functioning in enterprise demands the magazine or the system of magazines appropriate equipping with technical means for transferring and storing and support handling facilities [2].

Alterations suggested by authors in the organisation system of industrial magazines, can constitute the developmental crucial element for further deliberations and examinations, allowing for streamlining logistic action in this area.

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