QUALITY MANAGEMENT IN LOGISTICS PROCESSES IN METAL BRANCH

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Abstract

Quality is one of the basic elements influencing the final shape of the chosen logistic strategy. Low level of quality is one of the most visible indicators of efficiency of supply chain. The article presents the experience in documentation development of the logistic quality management system and use of quality assurance instruments in metallurgical industry. The process of quality and logistics management in metallurgical enterprise must be closely related. Quality management and logistic processes must interact with each other and mutually penetrate in order to ensure the effective implementation of logistic services. Presented results are based on analysis of Polish enterprises of metallurgical industry, as well as enterprises co-operating with this branch.

Keywords: logistic, quality, management, metallurgical industry

1. INTRODUCTION

The development of logistics systems is a consequence of the implementation of the system concept in logistics, which corresponds well with the process approach used in quality management systems. Presented assumption leads to the following statements [1, 2]:

- The modern logistics system is a new quality due to the relationships that exist between the elements constituting the system.
- The entire logistics system affects more on the functioning of the individual elements than vice-versa, with this assumption by the right combination of individual elements it is real to create a reliable continuity. It is assumed to be reasonable to isolate key areas, which have a decisive impact on the efficiency of the logistics system. These can be, for example, transport, and storage economy. We observe, however, the growing importance of the integration of logistics and quality assurance systems.

Quality management and logistics processes must interact with each other and mutually do not permeate. The very high quality of the product and the same logistics service effectively realized, will not affect the final success. Only the interaction of these elements will allow the organization to function effectively in the market and attract new customers. An important factor in determining the final quality is the cooperation and similar understanding of quality for all participants in the supply chain. Quality management should be understood as a sequence of actions, which result in the continuous improvement of internal processes based on the requirements of internal and external customers.

Analyzing the logistics system in terms of methodical procedures, it is necessary to specify the elements of which it is composed [3]:

- Goal - focused on the activities of all subsystems,
- Outputs - the results of system operation,
- Transformation process - the sequence of basic processing steps,

- Surroundings - created by customers, suppliers and widely understood market,
- Equipment - machinery, buildings, means of transport, etc.,
- Human Resources - employment structure, qualifications and skills.

Illustration (Figure 1) for this type of analysis is D.M. Lambert, who indicated in system presentation the elements of the input and output of the logistics. This model was extended by the authors of the publication of feedback between internal and external customers associated with the implementation of the quality assurance system (PN-EN ISO 9001:2009, ISO/TS 16949:2009) as well as the increasingly widespread safety assurance system (PN-EN 18001:2005 or BS OHSAS 18001:2007). Thanks to this solution has been preserved in this manner the convention of static and dynamic presentation of realized processes of the logistics system and quality assurance system.

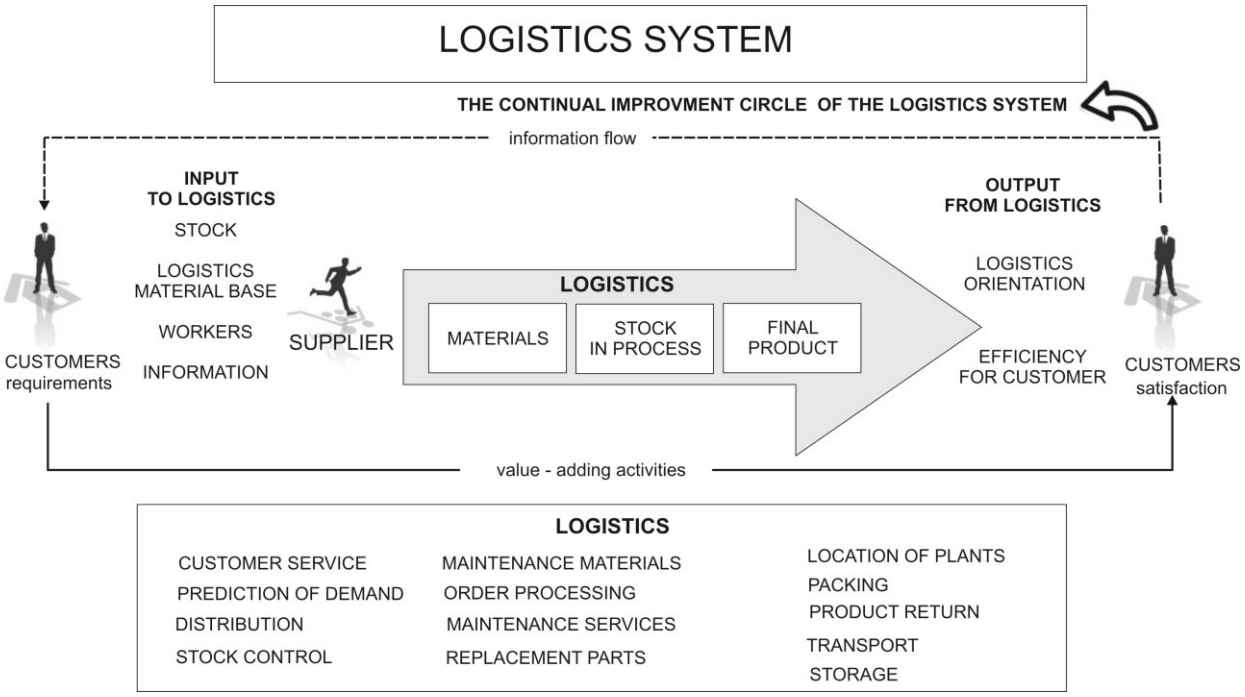

Fig. 1 Elements of the logistics system with implemented requirements of quality assurance system

2. ASSURANCE OF THE QUALITY OF THE SUPPLY CHAIN

The issue of the functioning of the supply chain is analyzed for many years, but still there is not so far developed clear systematics, when it comes to creating the conditions for supply chains, their performance goals or benefits from the implementation of the requirements of ISO 9001 standards. These are difficult and complex issues, however, all participants in the supply chain are agreed that the premises of creating supply chains are the benefits that reach the companies making the chain. However, there is a certain problem with the loss of autonomy by suppliers or the need to comply with the requirements of quality standards or safety standards. Strong competition in the markets means that more and more companies appreciate the functioning of the integrated supply chains, despite having to bear many hardships, as well as costs related to the necessity of implementation of certification of quality assurance system and security. This happens because when joining the supply chain or tightening cooperation through its participation in the supply chain, the company expects that profit and loss statement in this respect will prove be favorable to it. M. Christopher and M. Ciesielski in their publications indicate that the primary objective of logistics management and the entire supply chain is to meet customer requirements in terms of quality of service, quality of supplied materials at the

lowest cost possible [4, 5]. Continuing behind M. Ciesielkim [6] we can conclude that the quality of the logistics is combined in the following areas:

- Adoption of the optimal level of product quality, which depends on the quality of raw materials. In the steel industry, the quality of pig iron, fluxes, or other additives such as frothers, etc.
- Determination of the quality standards relating to the coordination of the flow of raw materials, information, the required level of customer service, as well as the level of quality of raw materials as well as responsibility for derogation from the technological specification.

Creating an optimal level of quality in the supply chain is dependent on the degree of involvement in this process of individual participants. The starting point is to establish common standard of quality it is usually quality assurance system based on ISO 9001 standard. However, in many cases, it is not sufficient, e.g. in the food industry HACCAP system requirements or whether BRC, and in the automotive industry ISO/ TS 16949 or whether German VDA standard. In metallurgical industry we observe trends of shifting responsibility for the quality and risks associated with it to suppliers. An example can be requirements of use of selected records of ISO/TS 16949 standards (automotive standard) by suppliers of metallurgical additives for steel plants. Implementation of quality standard requirements, e.g. ISO 9001 causes greater commitment, focus on improving internal processes and conducting quality activities leading to continuous improvement in quality, taking into account the customer's requirements.

3. STAGES OF IMPLEMENTATION OF QUALITY ASSURANCE SYSTEM

Total quality management in a company means the gradual improvement of the basic elements aimed at [7]:

- the customer - so the external and internal, including marketing activities,
- processes,
- and at preventive behaviours.

Quality management in the logistics system requires making purchases at the level free of defects and to extend this to the whole process of logistics management.
Ensuring continuity and reliability of supply has a strategic importance for the company's activities [8].
Quality assurance process in logistics consists of six stages [9]:

- Step 1. Involvement of the entire organization in actions aimed at quality. Particular importance has there the involvement of top management.
- Step 2: Understanding of needs and requirements of internal and external customers. Identification of the customers' needs can be done with the involvement of the internal service business, or an external consultant who guarantees the objectivity of this information.

• Step 3: Measurement of current results directly related to identified needs of internal and external customers. In this step there is detected the difference between the expected state (achieving customer satisfaction by meeting his needs) and the actual state (results achieved).

- Step 4: Developing the quality strategy. Development of quality strategy should focus on understanding customer needs, appropriate methods of employee training, measurement of achieved results and monitoring of variability of the process of quality assurance.
- Step 5: Formal implementation of the quality assurance process.

• Step 6: Improvement of quality in logistics processes, e.g..: increasing the product availability, shortening order processing time, invoicing accuracy, timeliness of carrying out works, deliveries free from damage, as well as realization of purchasing and material and information flows.
Improvement process requires from participants full involvement and knowledge of realized processes. Obstacles to improve quality in logistics include the most frequently [9]:

- poor support by the IT department,

- functional or organizational barriers inside the company, inter alia lack of understanding of the concept of process management,
- lack of management commitment to improve the quality and efficiency in the area of logistics,
- lack of training on how to improve the quality,
- lack of understanding of the actual needs of internal and external customers.

The costs of quality logistics are an important economic factor. We define three groups of costs: the cost of failure, the inspection costs and the costs of prevention. And that's where the most frequently question arises how to reduce the costs at the macroeconomic level? In many cases, we can achieve this by:

- reduction in the number of logistic activities,
- or by optimal selection of logistical technologies (packaging, type of unit load, type of transport).

Carried out pilot studies of logistics costs in the metallurgical industry have shown that logistics is in average from 18 to even 35% of the total production costs. For this reason, there is a desire for the metallurgical sector to strengthen cooperation within the supply chain in order to increase the efficiency of logistics processes. Each company in supply chain, regardless of its size, whether this is steel mill, foundry or a small craft business can only exist thanks to the fact that there will be customers who want to buy their products. Time of producer markets is irrevocably over, therefore the customer has almost always more choice. If the customer fails to buy the product manufactured in the given supply chain, the companies in this supply chain will not generate profit what in the confrontation with the costs incurred will lead them to bankruptcy [10÷12]. In case of metallurgical industry, we have to deal with the integration of logistics processes with quality, where each participant in the process get the benefit the greater the closer the product is the end of the production and distribution process to the customer (Figure 2).

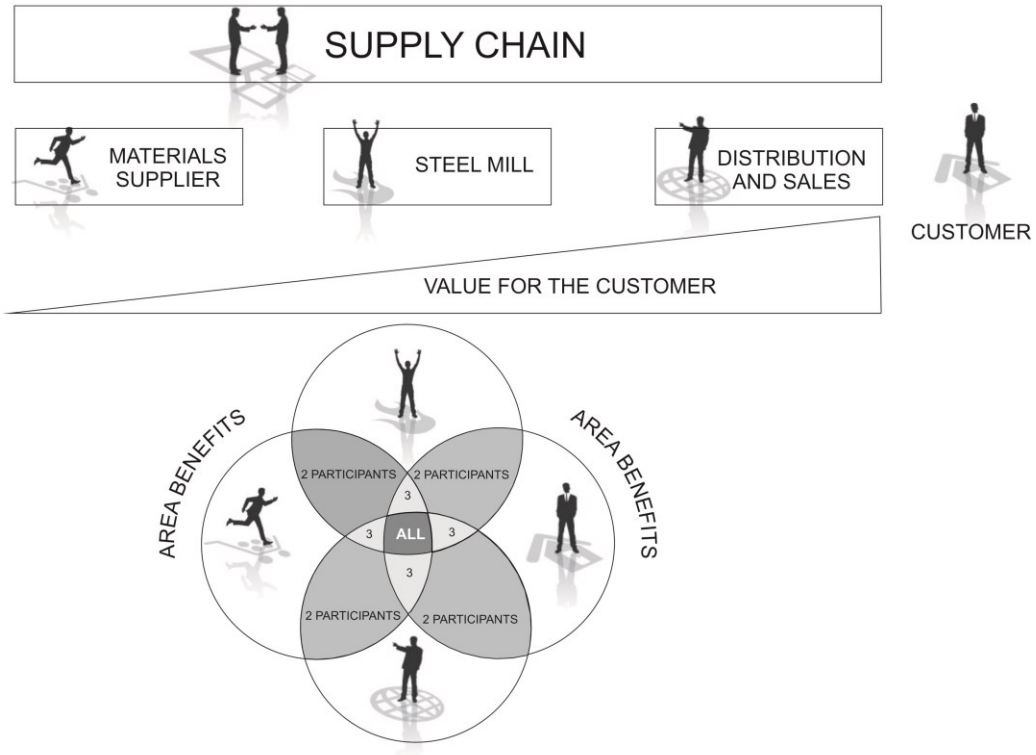

Fig. 2 Creating the value to the customer in the supply chain

When analyzing example of the company providing anthracite to steel mills, one of the requirements for suppliers is to have a quality assurance system. With the passage of time and the tightening of the cooperation, requirements for suppliers increased significantly. The company processing and delivering

anthracite had to implement Production Part Approval Process, as well as meet some of the requirements of ISO/TS 16949. When performing external audits by the steel mill it has proved necessary to have a safety management system OHSAS 18001 and PN-EN 18001. For reasons of image it is also expected to conduct pro-environmental actions (implementation of ISO 14001 standards) and also energy use analysis system (PN-EN ISO 50001. The studies performed in the metal sector companies have shown, however, that many management and quality assurance tools are used to a small extent. The main factor determining the change in this approach are the requirements of supply chain participants and in particular the requirements of the end customer. Fig. 3 shows a model of quality assurance system.

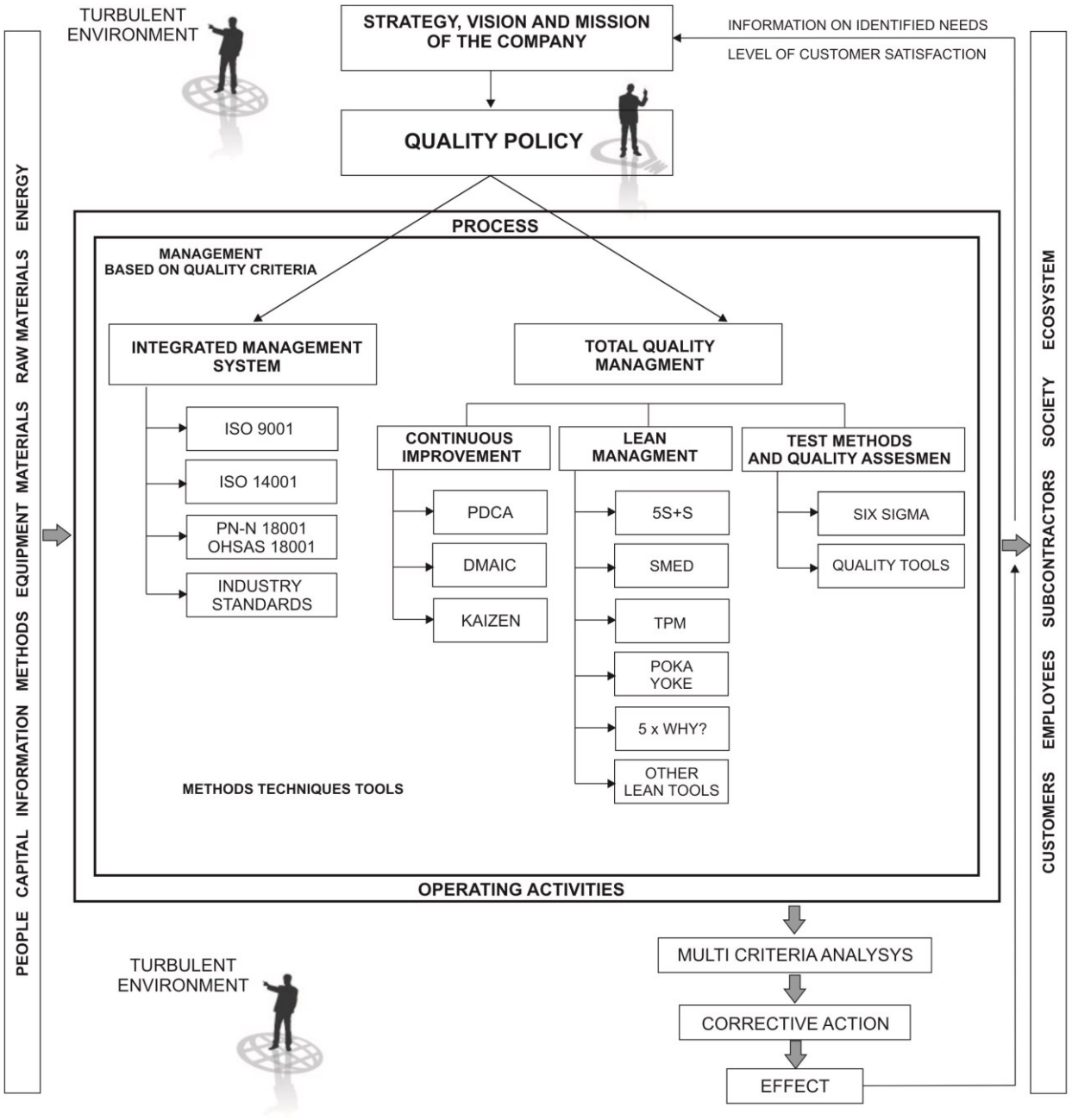

Fig. 3 The model of the quality assurance system

CONCLUSION

Forming and quality assurance in logistics management should be based on shortening the order processing time with simultaneous increase in the importance of quality across the supply chain. Quality is in fact one of the essential elements for the customer. It is important that quality formation was accompanied by the so-called synergistic effect resulting from the shortening of time with simultaneous increasing quality. Continuous process of improvement is a requirement to increase the emphasis on quality, which is reflected in the concept of continuous improvement, according to which small accumulating improvements can with time make a much greater efficiency (Kaizen). To meet the qualitative standards is one of the most important factors in smooth functioning of the supply chain. Presented in this paper possibilities of connecting the concept of logistics with solutions in the area of quality management perform very well, which contributed to an increase in the efficiency of organization functioning as well as the entire supply chain. In the company providing anthracite (in which is already in force standard ISO 9001) has been implemented Production Part Approval Process as well as OHSAS 18001, which greatly contributed to improving the quality of realized processes, customer service, security as well as reducing the time of delivery of the material. In addition to the implemented requirements of the steel mills in order to improve processes and increase the efficiency, the plant on its own attempts to implement 5S elements, identifies areas in which there is waste and improves cash flows in accordance with the concept of Lean. The conclusion is that the design of the supply chain must take into account from the very beginning quality problems.

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