

ASSUMPTIONS FOR THE REGULATION OF OPERATIONS IN REVERSE LOGISTICS

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Abstract

Return of products to supplier, as well as transfer of waste and recyclable materials to places of further use are treated as the last stage of the flow of goods through the enterprise. This stage of logistics activity is of particular importance in the company, especially in the conditions of the development of the concept of sustainable development. Legal regulations are distinguished between important factors influencing activity in reverse logistics. Regulations of internal law of each country must be adapted to international regulations, especially those respected in the union to which individual country has joined. Internal law regulations within the country should be also adapted to international conventions and agreements in which the country participates. Polish law regulations used in the area of reverse logistics are the examples of compliance with international regulations, adjusted according to regulations of European Union law. The objective of this article is to present the main issues that are regulated in the area of reverse logistics in Poland. Issues being the subject to regulation are grouped according to distinguished processes, implemented in reverse logistics. The main legal regulations in Poland, as well as international conventions and agreements are also included in this article.

Keywords: Reverse logistics, reverse logistics processes, waste, recyclable material, law regulation

1. INTRODUCTION

Return of products to supplier, as well as transfer of waste and recyclable materials to places of further use are treated as the last stage of the flow of goods through the enterprise [12]. This stage of logistics activity is of particular importance in the company, especially in the conditions of the development of the concept of sustainable development [6]. Along with the pursuit of sustainable development together with other cooperating companies, the concept of Green supply chain has developed, and as a result the role of reverse logistics was emphasized [9,15,24,25].

Legal regulations regarding the preparation and implementation of reverse logistics activities are the subject of consideration in the literature [2,11,14]. Legislation is distinguished between important drivers of reverse logistics [9,19]. There are three main groups of regulations: international regulations, legal regulations within individual countries, as well as international conventions and agreements. Regulations of internal law of each country must be adapted to international regulations, especially those respected in the union to which individual country has joined. Internal law regulations within the country should be also adapted to international conventions and agreements in which the country participates. Polish law regulations used in the area of reverse logistics are the examples of compliance with international regulations, adjusted according to regulations of European Union law. Polish law regulations consider also international conventions and agreements which Poland has committed to respect.

The objective of this article is to present the main issues that are regulated in the area of reverse logistics in Poland. Issues being the subject to regulation are grouped according to distinguished processes, implemented in reverse logistics. The main legal regulations in Poland, as well as international conventions and agreements are also included in this article. Considered legal regulations are influenced by regulations of the European Union as well as by provisions of the abovementioned conventions and international agreements. Results of research presented are of preliminary character.

2. ASSUMPTIONS OF RESEARCH

Considering all issues that may be subject to regulation in the area of reverse logistics of an enterprise requires holistic treatment of activities implemented in this area. Therefore, reverse logistics of the enterprise is presented in this study as organizational system. Such a system is also treated as a subsystem of whole organizational logistics system in the enterprise. In developing such a system, it should be allowed to integrate it with logistics systems of enterprises cooperating in supply chains. In this approach to reverse logistics, primarily the goals of this system and processes enabling the implementation of these goals are taken into account. Polish law regulations, included in further part of article can be treated as selected tools for management and operation of storage and flow of goods in reverse logistics. Another important aspect of description of organizational system, related to location of units responsible for decisions in the reverse logistics system is not included in this study.

There are several proposals for the typology of processes implemented in reverse logistics, presented in literature and in Internet sources. There is example of approach emphasizing functions related to waste and recyclable materials [23]. Other proposal includes only selected ranges of activities in reverse logistics, highlighting e.g. problems related to the return of goods to suppliers, while treating waste and recyclable materials in general [1]. In another approach, problems related to the disassembly of end-of-life products are primarily exposed [6]. There is also proposal of typology, that include handling of returns, as well as handling of waste and recyclable materials, but without clear distinction between specific features of handling of goods to be returned to supplier and handling of waste and recyclable materials [18]. On the basis on approaches presented in literature a proposal of typology of processes carried out in reverse logistics is presented in this article, covering all activities undertaken in this area with simultaneous separation of the specificity of the flow of goods to suppliers, as well as the flow of waste and recyclable materials to places of their destination.

Considerations in the article relate to actions beginning with planning of activity in the area of returns of goods to supplier, as well as planning of flow of waste and recyclable materials to transfer of goods to supplier and flows of waste and recyclable materials to places of their use. The last stage of activities in the field of reverse logistics included in this study concerns the flow of defective and used products, waste and recyclable materials to the places of their further use or disposal.

The article does not include law regulations in European Union separately. It was assumed that the legal regulations in Poland are being adapted to changes of legal regulations in the European Union on an ongoing basis. The Polish legal regulations used in reverse logistics take also into consideration international conventions and agreements to which Poland has joined. The inclusion of these conventions and international agreements in the article is due to the fact, that the content of regulations of Polish law refer to these conventions and agreements.

3. RESULTS OF RESEARCH

The main goals of the reverse logistics system of the company, taken into consideration in this article are as follows:

- receipt of goods resulting from product defects, surpluses or delivery of improper goods to the recipient, in accordance with the rules of product complaints and in accordance with regulations of agreements with recipients,
- the collection of defective and used products for recycling or disposal,
- transfer of waste and recyclable materials to places of further processing, in accordance with applicable law regarding handling of specific types of waste and recyclable materials.

Taking into consideration mentioned objectives of reverse logistics system, the consideration in this part of the article should start with the presentation of typology of processes identified in the field of reverse logistics,

which take into account the treatment of returned products, as well as with waste and recyclable materials. Typology of processes used in this article includes [own research based on: 1,5,18,20,23]:

- management of returns to supplier - process in the area of supply deliveries, applies to decisions regarding return of goods (mistakenly delivered, redundant, damaged) according to agreement with the supplier, includes such areas of activity as authorization and handling of returns, preparation and handling of unnecessary products, applies also warranty claims to suppliers, as well as returns of reusable packaging,
- collection of returns to supplier - process related to the identification of incorrectly delivered, redundant, damaged goods, but also to the identification of materials, damaged parts and the isolation of the number of units to be returned, this process may also apply to goods from recipients, if the complaint procedure provides for the transfer of the defective product to the supplier (characteristic for the trading company), (in APQC typology this process treated as a stage of the product manufacturing process),
- returns management for defective and used products, waste and recyclables (including client complaints) - process related to the preparation, organization and monitoring of collection and sorting of expired used and defective products, waste and recyclable materials, considered process also related to the qualification of mentioned types of goods for further actions (use of product components in re-manufacturing process, recycling, repair of product),
- collection of waste and recyclables - process including collection of used products and used parts of products, expired products, waste and recyclable materials from the place of origin (in the area of supply, during production, as well as received from customers) and transferring them to collection places, before transport for further use or disposal, implementation of tasks in considered process requires preparation of employees responsible for collecting waste and recyclable materials, the scope of tasks in this process may be reduced if the recipient of used and expired products, waste and recyclable materials collects them directly from the places of origin mentioned above,
- inspection and sorting - process regarding further handling of considered types of goods, important due to the possibility of product recovery, considered process is related to the collection of waste and recyclables, the connection results from the possibility of pre-qualifying received goods already during their collection and delivery to storage places, before handing them over to external entities, this process ends with a decision on further disposal of waste and recyclables,
- transport of returned products, waste and recyclables - process related to loading, moving and unloading of these types of goods, applies to both the movement of used and expired products and their parts, waste and recyclable materials between the places of their origin and storage, before sending for further use or disposal, as well as the movement outside the enterprise, to places of use and disposal, if the sender of these goods has he undertakes such an obligation to do so, it is also the process, that can be implemented with external entities (service providers receiving waste and recyclable materials).

A certain inconvenience characteristic for typologies of processes that were used as the basis for developing the list of processes is the equivalent use by the authors of typologies in description of the essence of individual process at the same level of detail such terms as planning and management. An example would be APQC proposal of process typology, in which in the process of manufacturing, the description of activities related to such a process at the same level of detail includes management of raw material inventories and execution of a detailed plan for the production line. In application of such typology of processes it may turn out, that the development of mentioned plan, from the point of view of necessary tasks will be similarly complex as the previously presented management of raw material inventories. However, it should be remembered that taking into account the differences in the scope of functions, resource inventory management includes, apart from planning (related mostly to the creation of plan), also organization, coordination and control of tasks. Such an approach proposed by APQC may, however, result from the belief that the presented list of processes including descriptions of processes is a proposal, that can be tailored to the individual needs of companies interested in

using this concept. The typology of processes proposed in the current article is an attempt to avoid misunderstandings associated with approach of APQC.

In the list of processes proposed in this article, the handling of products that are customer complaints applies both to returns from company customers whose value for the customer is restored in the enterprise in question, but also to others that are returned to the supplier for repair or replacement with a product of the same type, but without defects. The management functions mainly include organizing, coordinating and controlling returns. However, planning can be carried out on the basis of estimating the level of defectiveness of the products offered, which qualifies the product for complaint.

Basic issues regulated by law, that may be applied in the implementation of processes, taking into account the characteristics of each process separately are presented in **Table 1**. Among listed issues are both those that can be treated as characteristic of a single process, as well as other, universal, considered in several processes. Presented issues, subject to legal regulations are of essential nature, from the point of view of the correct implementation of activities in the field of reverse logistics. Main legal regulations and international conventions and agreements used in Poland, according to separate processes in the area of reverse logistics are listed in **Table 2**.

Table 1 Subject of regulation related to processes implemented in reverse logistics [own study]

Process	Subject of regulation
Management of returns for supplier	requirements related to maintaining returned goods and avoiding deterioration, according to their characteristics, resulting in ensuring appropriate conditions of storage, packaging, as well as solutions concerning loading and unloading, instructions for dealing with specific types of materials/products (including dangerous goods), types of documents, data and information regarding preparation for return, transport and receipt of products by supplier (including also the receipt claimed products), conditions of use of reusable packaging (durability, maximum number of delivery cycles in which such packaging is used).
Collection of returns for supplier	requirements resulting from the characteristics of the goods in the field of handling defective items intended to be returned and to avoid deterioration of their condition, including terms of storage, packaging, loading and unloading, marking the units / batches of goods prepared for return to supplier (applies to dangerous goods or its high susceptibility to damage), types of documents, data and information contained therein regarding the preparation for return, then the issue, transport and receipt of returned goods, documentation of delivery of reusable packaging, including delivery of pallets.
Returns management for defective and used products, waste and recyclables (including client complaints)	conditions for use of reusable packaging (durability, maximum number of delivery cycles in which such packaging is used), conditions for the use of products that lose usability over time, conditions for storage of individual types of waste and recyclable materials, as well as used, defective and out-of-date products, as well as parts, that cannot be reused, conditions for handling complaints from customers, types of documents regarding the classification of products, parts of products, as well as used packaging as waste or recyclable materials.

Collection of waste and recyclables	conditions for the storage of individual types of waste and recyclable materials, also used products, defective products and parts, that cannot be reused, durability of products that lose usability over time, types of documents and information regarding collection and separation of individual types of waste and recyclable materials, types of documents, data and information on the classification of used packaging as waste or recyclable materials.
Inspection and sorting	determination of type / classification of waste and recyclable materials generated in the activity of enterprise, marking the units / batches of goods to be returned (applies to dangerous goods or its high susceptibility to damage), standards / norms regarding the durability of the product / part of the product and the associated possibilities of reuse, requirements for handling waste and recyclable materials, resulting from their characteristics, including safeguards for storage (e.g. packaging), storage conditions (temperature, humidity, lighting), packaging (for storage and transport), loading and unloading, confirmation of competences of persons in the enterprise, as well as service providers (regarding work organization, procedures used, equipment used, including means of transport) responsible for collection of waste and secondary raw materials, transferring waste for disposal, and raw materials for further processing.
Transport of returned products, waste and recyclables	determination of the type / classification of waste / secondary raw materials, marking the units / batches of goods to be returned (applies to dangerous goods or its high susceptibility to damage), requirements related to handling of goods, resulting from characteristics of waste and recyclable materials, including safeguards for transport, loading and unloading, confirmation of competences of persons in the enterprise, including service providers (regarding work organization, procedures used, equipment used, including means of transport) collecting waste and secondary raw materials and transferring waste for disposal, and raw materials for further processing.

Considering information presented in **Table 2** it should be added, that among regulations related to the assignment of competences to employees responsible for handling of redundant goods, delivered in excess of the order, incorrectly provided and others, returned under agreements with suppliers, the assignment of separate, specific competences to employees was not taken into account. If employees' special competences are not required to deal with specific types of products, then usually the assignment of responsibility for the performance of specific logistics tasks is determined by the regulations of labor law and organizational solutions applied on this basis.

Table 2 Basic Polish law regulations, international conventions and agreements influencing reverse logistics operations [3,4,7,8,10,12,13,16,17,21,22,26-33].

Process	Main regulations
Management of goods returning to supplier	<p>legal acts: Kodeks cywilny (Civil code - parts of regulations concerning agreement, named agreements (templates): sales, delivery, storage),</p> <p>international regulations concerning treatment of dangerous goods: ADR convention (road transport), RID regulations (rail transport), IMDG Code (maritime transport), ADN (european agreement concerning the international carriage of dangerous goods by Inland Waterways), Dangerous Goods Regulations DGR (air transport).</p>

<p>Collection of goods returning to supplier</p>	<p>legal acts: Kodeks cywilny (Civil code - named agreements (templates): storage and sales), Prawo ochrony środowiska (Environmental protection act),</p> <p>international regulations concerning treatment of dangerous goods: ADR convention (road transport), RID regulations (rail transport), IMDG Code (maritime transport), ADN (european agreement concerning carriage of dangerous goods by Inland Waterways), Dangerous Goods Regulations DGR (air transport).</p>
<p>Returns management for defective and used products, waste and recyclables (including client complaints)</p>	<p>legal acts: Kodeks cywilny (Civil code - parts of regulations concerning agreements, named agreements (templates): sales, delivery), Prawo ochrony środowiska (Environmental protection act), Ustawa o odpadach (Act on waste), Ustawa o obowiązkach przedsiębiorców w zakresie gospodarowania niektórymi odpadami oraz o opłacie produktowej (Act on obligations of entrepreneurs in the scope of managing selected waste and product fee).</p>
<p>Collection of waste and recyclables</p>	<p>legal acts: Prawo ochrony środowiska (Environmental protection act), Ustawa o odpadach (Act on waste), Ustawa o obowiązkach przedsiębiorców w zakresie gospodarowania niektórymi odpadami oraz o opłacie produktowej (Act on obligations of entrepreneurs in the scope of managing selected waste and product fee),</p> <p>legal acts concerning treatment of specific types of products (examples): Ustawa o zużytych sprzęcie elektrycznym i elektronicznym (Act on electrical waste and electronic equipment waste), Ustawa o recyklingu pojazdów wycofanych z eksploatacji (Act on the recycling of end-of-life vehicles), Ustawa o substancjach chemicznych i ich mieszaninach (Act on chemical substances and mixtures)</p> <p>legal act concerning documentation: Rozporządzenie Ministra Środowiska w sprawie katalogu odpadów (Regulation of the Minister of the Environment on the waste catalog).</p>
<p>Inspection and sorting</p>	<p>legal acts: Prawo ochrony środowiska (Environmental protection act), Ustawa o odpadach (Act on waste), Ustawa o obowiązkach przedsiębiorców w zakresie gospodarowania niektórymi odpadami oraz o opłacie produktowej (Act on obligations of entrepreneurs in the scope of managing selected waste and product fee),</p> <p>legal acts concerning treatment of specific types of products (examples): Ustawa o zużytych sprzęcie elektrycznym i elektronicznym (Act on electrical waste and electronic equipment waste), Ustawa o recyklingu pojazdów wycofanych z eksploatacji (Act on the recycling of end-of-life vehicles), Ustawa o substancjach chemicznych i ich mieszaninach (Act on chemical substances and mixtures),</p> <p>legal act concerning documentation: Rozporządzenie Ministra Środowiska w sprawie katalogu odpadów (Regulation of the Minister of the Environment on the waste catalog).</p>
<p>Transport of returned products, waste and recyclables</p>	<p>legal acts concerning different types of transport: Ustawa o transporcie drogowym (Road transport act), Ustawa o transporcie kolejowym (Rail transport act), Kodeks morski (Maritime code), Prawo lotnicze (Air transport act), Ustawa o przewozie towarów niebezpiecznych (Act on the carriage of dangerous goods),</p> <p>international regulations concerning treatment of dangerous goods: ADR convention (road transport), RID regulations (rail transport), IMDG Code (maritime transport), ADN (european agreement concerning international carriage of dangerous goods by Inland Waterways), Dangerous Goods Regulations DGR (air transport),</p> <p>legal acts concerning documentation of transport: Rozporządzenie Ministra Środowiska w sprawie wzoru rejestru zgłoszeń i decyzji w zakresie międzynarodowego przemieszczania odpadów oraz sposobu jego udostępniania (Regulation of the Minister of Environment on the pattern of register of notifications and decisions in the field of international waste shipment and the method of making it available), Rozporządzenie Ministra Środowiska w sprawie katalogu odpadów (Regulation of the Minister of the Environment on the waste catalog).</p>

4. CONCLUSIONS

Considering the contemporary interest in organizing the operations of enterprises according to processes, it seems reasonable to group legal regulations according to individual, separate processes. The possibility of transferring the implementation of specific goals and related processes to specialized service providers results with easier determination of requirements, that the principal must meet himself in the conditions of such cooperation.

The regulations of Polish law included in the article are treated as basic for reverse logistics. The regulations of European Union law are not distinguished separately because the content of Polish legal acts reflects their adaptation to the requirements of the regulations of the European Union law.

Ways of implementing actions regarding the storage and shipment of waste and secondary raw materials are subject of regulations regarding the management of waste and secondary raw materials, regulations related to environmental protection, as well as international and international conventions regarding the handling of hazardous materials. The scope of issues taken into account in individual regulations may lead to difficulties in ensuring compliance with all requirements related to considered activities carried out in the field of reverse logistics. In addition, some regulations are used only in one process and others in several processes. This means that when preparing the process, it is important to specify exactly which laws, conventions and international agreements should be included. The list of processes, issues being subject to regulation and legal provisions presented in this article should be tailored to the individual needs of enterprises.

Further research should concern supplementing the lists of legal regulations dedicated to individual processes, as well as the characteristics of their periodic improvement in accordance with subsequent EU law regulations.

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