



THE ENVIRONMENTAL MANAGEMENT SYSTEM IN A BUILDING COMPANY IN THE ASPECT OF THE REQUIREMENTS OF THE PN-EN ISO 14001:2015-09 STANDARD

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Abstract

The article presents the environmental management system in a building company from the process perspective which meets the requirements of the international ISO 14001 standard. A new issue of this document from September 2015 introduced essentials changes in the attitude of building the system, its structure and in ways of documentation. The article is to precede an attempt of working out the criteria and parameters of the effectiveness of the assumed structure of processes, which will be a subject of next article. In the first part of the article, the justification for using the process approach in building the environmental management system was depicted – the modern concept which determines the effectiveness of action. The second part presents the theoretical model of the process structure of the environmental management system, which when adopted to the needs of a given building company may become a basis for the preparation of an effective system in practice.

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Introduction

One of the challenges faced by modern building practice is a system based approach to the issue of sustainable development, understood as a legal requirement and a necessity in a civil society. The practical realization of this concept should not only be restricted to the design of eco-friendly and energy saving buildings, but it should also involve a change of attitude of building companies in regards to environmental care. The tool, which fosters the limitation of the influence of processes and products used by a building company on the environment, and which rationalizes the utilization of environmental resources and its advantages, which is the environmental management system based on the requirements of the international ISO 14001 standard.

The problem of the creation of an environmental system in a building company has not been described sufficiently. In the literature on the issue, there are only general points, such as e.g. the formal requirements for environmental management systems in production organizations (EJDYS et al. 2012, ŁADOŃSKI et al. 2005, URBANIAK 2004), the development of the environmental management system and the stages of its introducing (LISOWSKA-MIESZKOWSKA 2007, ŁUCZKA-BAKUŁA 2009, MATUSZAK-FLEJSZMAN 2011, MISZTAŁ, JASIULEWICZ-KACZMAREK 2014, NIEMIEC et al. 2012). There is also a shortage of publications enabling to work out the practical aspects of an environmental management system. At the same time the specific operational features of a building company bring the realization that the undertaking is more difficult than in the case of industrial enterprises. From the analysis of the present state of best practices organizational external conditions have an adverse impact on this realization (instability of legal and financial environment of building companies, low profitability of building production, etc.) and internal conditions (the lack of engagement of the company's CEOs in introducing a system and making it work, the low motivation of the mid-level managerial staff to undertake tasks exceeding the scope of past duties). The difficulties to correctly interpret the requirements of the ISO 14001 standard are frequent occurrences in building companies.

Characteristics of the process approach in creating the environment management system

The environmental management system issues from the quality management system¹. In the literature on the subject, there are numerous definitions

¹ Because of the popularity of the ISO standards of the 9000 series it was decided to implant this concept in the sphere of environment protection in businesses.

of the system. According to the authors, it may be described as an intentionally designed and organized material, information and energy system, which is applied by a building company, and is used to make products and achieve the environmental goals which the firm is obliged to meet.

The basis of building the system may constitute the international standard, defining the necessary requirements to be met by the system and being a reference document in the process of its certification. In September 2015 the third edition of the standard was issued, which introduced important changes of the concept, as compared to its earlier publications (1996, 2004).

The foundation of the PN-EN ISO 14001:2015-09 standard is a model using the cycle of organized activities „Plan-Do-Check-Act” (PDCA), in which special duties connected with supporting of the environmental management in an organization are attributed to the CEOs (JASIULEWICZ-KACZMAREK, MISZTAL 2014). On the basis of a model of the system shown in Figure 1, which is very general and assumes that it should fit an organization of any kind and size, a building business ought to work out its own environmental system.

From the qualitative research done by the authors on real systems and according to (JASIULEWICZ-KACZMAREK, DROŻYNER 2013), it can be concluded that the effectiveness of the operations of the system depends on the method used in its design. In accordance with the process approach, which is recommended in the PN-EN ISO 14001:2015-09, mandatory in the Polish version of ISO 9001 standard 2008 and its amendments or the modern concepts of Total quality management (TQM), each organization, among them also a building enterprise, is a set of processes. According to the PN-EN ISO 14001:2015-09 standard, the process should be understood as a succession of interrelated or interacting activities which transforms inputs into outputs. The elements of the input can be constituted by e.g. the requirements of the investor determined in the offer query or in the contract and an attached documentation, legal requirements stated in the building standards and building law, work objects, binding principles of procedures in the course of a processor financial resources for its realization. The elements of an output can consist of: products of a building company (expenditure and/or organizational documentation of construction, building work, object elements, the entire object or a set of objects of a given building task, environmentally-adverse waste materials).

According to the authors, the process approach should be understood as an identification and linkage of all the key processes for the realization of products of building enterprises, and their inclusion into the environmental management system.

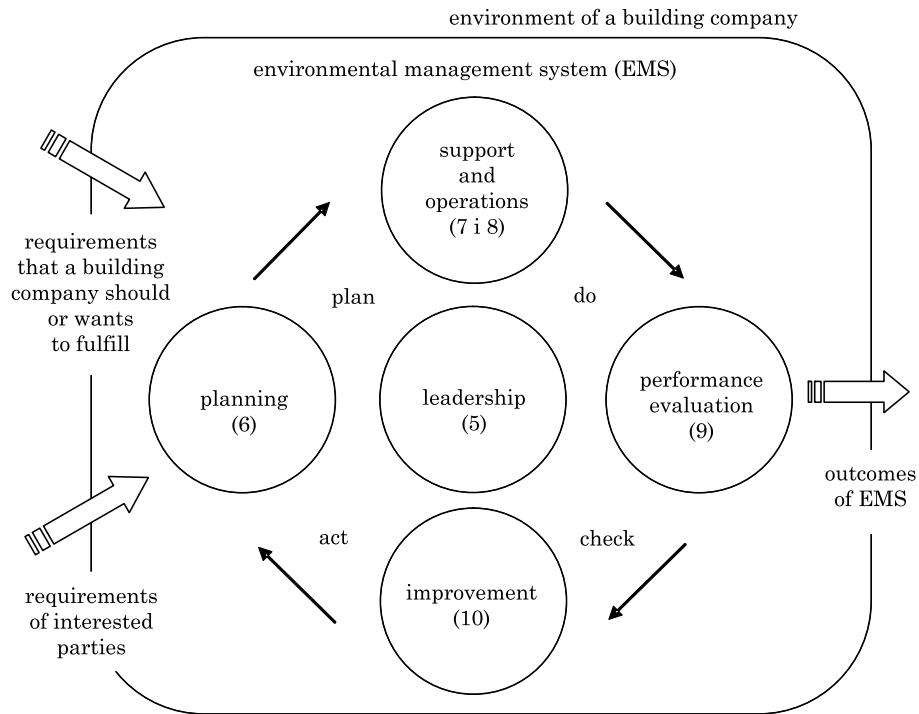


Fig. 1. The model of the environmental management system based on the Deming's cycle „Plan-Do-Check-Act”

Source: elaborated by the authors on the basis of PN-EN ISO 14001:2015-09.

All the processes to be planned according to all the requirements of the ISO 14001 standard applicable to this process, each process to have determined goals, and the effectiveness of its realization is to be monitored. Additionally, the amended ISO 14001 standard [ISO 14001 Revision ...] emphasizes the need for process planning with the consideration of threats and opportunities for the realization of the enterprise's business goals (FAHMI, GREENWOOD 2015, ZYMONIK et al. 2013).

A general model of the environment management system in a building company

A general model of the system was prepared for a medium-sized private enterprises, whose objective of operations is realization of building work and buildings objects.

The structure of the environmental management system is made up of processes and relations between them. A set of processes should embrace all essential processes on different levels of the hierarchy, because omitting some of them may result in dysfunction of the entire system (KARAPETROVIC 2002). A set of relations between processes should determine their order and mutual influence. In the structure of processes (Fig. 2), the following groups of processes may be distinguished: basic, auxiliary, managerial and maintaining the system of environmental management.

As the main processes are considered those indirectly connected to the realization of building tasks, creating so-called added value for an enterprises. These are processes conventionally called PP-1 – Obtaining an offer and signing a contract, PP-2 – Preparation of building activities and PP-3 – Realization of building activities with regard to the needs of environment protection. Each of these above-mentioned processes is a complex process, in which together with the activities characteristic for building operation, these which are required by the ISO 14001 standard are realized.

The PP-1 is a succession of interconnected activities which aim at obtaining an offer/order for construction works and at concluding a contract, which realization will fulfill the expectations of the customer (an investor, a general contractor) and will observe the regulations, as well as will prove advantageous for the enterprises.

The PP-2 process encompasses all the planned activities which are indispensable to create adequate conditions for completion of construction works.

The activity required in the course of the PP-1 and PP-2 processes from the viewpoint of the needs of the environmental system is identification and review of the requirements of environment protection, accompanying the realization of the planned building work. The following points should be registered by an authorized person: national and local environmental regulations, the investor's requirements as well as those of co-operators and other parties involved.

The nation-wide requirements are defined by parliamentary acts, decrees and instructions on environment protection which are passed by the Polish parliament, issued by the Cabinet and ministers. The local requirements may be given by resolutions, ordinances or decisions issued by local authorities (e.g. through a local land use planning, decisions of constructing conditions and terrain use, decisions permitting the felling of trees' and bushes', etc). The investor's requirements may be determined in a contract or a report on the impact of the undertaking on the environment. The requirements connected to the scope and form of environmental documentation may be also determined by a general contractor who is responsible for the entirety of work on a building site. All the identified requirements must be reviewed with the goal of elimination of possible discrepancies between the recognized requirements

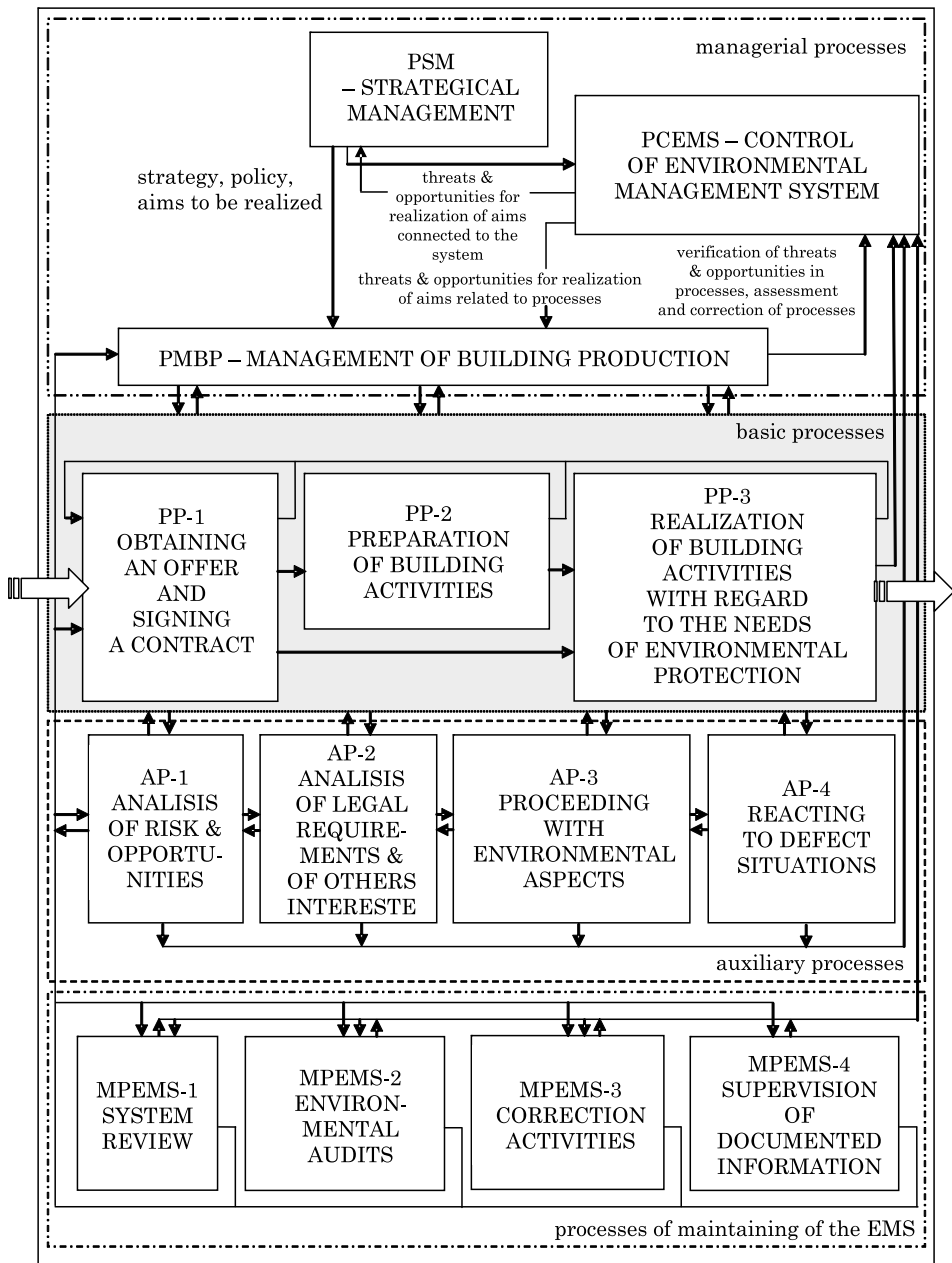


Fig. 2. A general model of the structure of processes in the environmental management system of a building enterprise

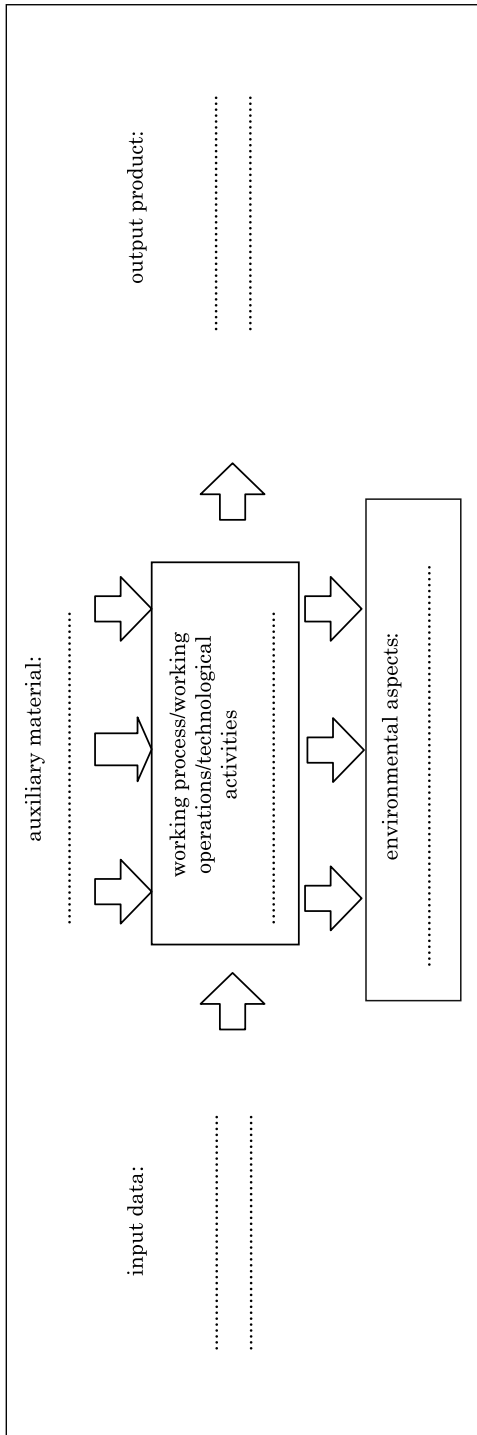
Source: elaborated by the authors.

on the preparation stage of building activities, and those determined earlier (on the stage of signing a contract or accepting an offer of building work). According to the assumed course of the PG-2 process, prior to the initiation of a new building activity, the environmental aspects (referred to in the literature also as environmental problems)² should be determined, which issues from an adopted organization and technology of realization of building work. Building activities may impact on the environment in many ways. The potential environmental outcomes are among other things: soil contamination, ground water pollution, noise, vibrations and offensive smells, usage of electrical energy, of water and natural raw materials, water, air, road and street contamination by the means of transport working on a building site, damage or the destruction of trees and shrubs. A register of environmental aspects for new building activities should be using the earlier prepared enterprise aspect register. For the aspects which lack in the register, identification cards of new environmental aspects should be worked out. A specimen of an exemplary card assigning environmental aspects to the processes being realized on a building site, on working operation or technological measures, is shown in Figure 3. The prepared criteria may apply to: legal and interested parties' requirements, costs, threats/opportunities for the principal activity of an enterprise, etc. An example of a form of the assessment of the significance of environmental aspects is shown in Table 1.

The PP-3 process – Realization of building activities with consideration of the requirements of environmental protection is a succession of organizational and technical actions, which are indispensable for the fulfillment of the requirements that are set by the binding contract, the design documentation and legal regulations. The process encompasses these actions:

- a) specific for the building trade, and among these:
 - organizing of operational management staff of building work,
 - initiating activities issuing from the project documentation and work schedule,
 - organizing of work for teams and gangs performing the building work,
 - distribution of means of production,
 - supervision of work done,
 - technical inspection and acceptance of work,
 - accounts settlement of the work done,
 - the final acceptance of the building task, taking over of work/a building in a guarantee service;
- b) required by the formalized system of environmental management, and among these:

² An environmental aspect – an element of activities of a building enterprises or its products, which may mutually react with the environment.



Source: the authors own studies.

Fig. 3. An example of a card for identification of environmental aspects

Table 1

An example of a form for registration and assessment of environmental aspects

No	Environmental aspect	Working process/ operation/ technological activity connected with the aspect	Impact of the aspect for environment	Criteria of aspect assessment						Assessment of the aspect (product significance)	Actions taken
				legal requirements	opinion of the interested parties	costs	occurrence of break-down situation	opportunities for the building enterprise connected with the aspect			
1	2	3	4	5	6	7	8	9	10	11	

Source: the authors own studies.

- review of environment requirements connected to the building work,
- recognition of new processes/operations or technological activities, which occurred during the construction works, and preparing for them identification cards as well as an assessment of environmental aspects,
- preparing an instruction of operational activities, which require particular principles of proceeding,
- signing a contract on using the environment (e.g. picking up building waste material – unless the investor was made obliged by the contract to take the responsibilities of producer of these waste materials on drawing water, on removing sewers, on supplying electrical energy and heat, etc.),
- giving over to the subcontractors of specialized work information materials on the environmental management system,
- organizing trainings for workers and subcontractors on the principles of the system operation and on the proceeding in the case of break-downs,
- controlling of observation of the instruction on operational actions and of the realization of the elaborated environmental programmes.

Among the processes, which support the functioning of the main ones in the environmental management system of a building enterprise can be distinguished:

1. AP-1 – Analysis of risks and opportunities. The process relies on a systematic approach to avoiding of losses (through: identification, assessment and determining possible variants of handling risk) and on taking an opportunity of advantageous situations for a company.

2. AP-2 – Proceeding with environmental aspects. This process encompasses a succession of correlated activities, such as: recognition of environmental aspects connected to enterprise's activities in the past and its present activities (among these, the aspects related to: the processes performed directly on a building site and to the auxiliary processes, which though not connected to the building work itself, but without which the performance of the work would not be possible or would not fulfill the technical requirements), preparation of an enterprise-wide list of identified environmental aspects, making an assessment of their significance according to the settled criteria, preparation of a list of essential environmental aspects³ and informing the employees involved in the realization of enterprise's processes about them, bringing up to date of lists according to the needs – before the introduction of the following items: new technologies, new operational techniques and before each new building work, monitoring of significant environmental aspects.

³ An essential aspect – an aspect recognized according to the criteria used in an enterprise as essentially effecting the environment.

3. AP-3 – Identification of legal requirements and of others. This process encompasses a succession of correlated activities, consisting of recognition and registration of all the environmental requirements connected to the enterprise operation and to the realized building work, with a special consideration for requirements of the interested parties.

4. AP-4 – Reaction to the break-down situation⁴. This process encompasses a succession of activities, such as: recognition of a potential break-down situation, working out of an instruction of proceeding in a break-down situation and submitting them for checking or validation by an authorized person(s) or institution (Fire Brigade, Environmental Protection Inspector), conducting instructional training at the workplace for the workers and the subcontractors of any specialized work, making a periodical evaluation of workers' preparation for a defect situation through doing practical exercises under simulated conditions, and the verification of actions on procedures after an occurrence of accidents or break-down situations.

The main processes, except for the mutual correlation ensuring the flow of information, must be linked with the process of management of a set of all the simultaneously planned and realized offers for building work. This process may be conventionally called PMBP – Management of building production. It encompasses activities related to the distribution of tasks and resources, to the assessment of their realization and usage, as well as to the undertaking of preventive action, eliminating sources of potential problems.

The second of the management processes, conventionally called PSM – Strategic management encompasses all the systematic activities related to: the determination of strategy and environmental policy, the management of development undertakings and changes issuing from the adopted strategy, the acceptance of accepted goals for the processes and the entire enterprises as well as the settlement of principles of assessment of their realization.

Apart from the above-mentioned management processes, one more process should be distinguished, which is related to the managerial staff of the highest rank in the structure of processes of the environmental management system. This is a PCEMS – Control of the environmental management system. Its aim is to ensure an effective operation of the system in such a way so that an environmental policy will be realized. This process encompasses activities related to: identification and recommendation to appropriate people of threats and opportunities connected with system/business goals/ processes as well as establishing the proceeding principles in the course of processes and formalization of these principles.

⁴ A break-down situation – a sudden event, which caused a serious threat to the environment (e.g. a leakage of oil derivate substance to the soil).

The processes of maintaining of the environmental management system consist of:

1. MPEMS-1 – Review of the environmental management system. This process embraces a succession of activities related to the assessment of the consistence of the operations of the environmental management system with the requirements of the ISO 14001 standard. It also assesses the consistence of legal regulations, as well as of the requirements of the parties involved and the own requirements of a building enterprise.

2. MPEMS-2 – Audits of the environmental management system. This process may be described as a succession of activities embracing: planning, conducting and reporting of the effects of audits realized in an enterprise and on building sites, which are to verify whether the activities related to environment protection and their results are in accordance with the planned ones.

3. MPEMS-3 – Correction activities. This process can be described as a succession of activities encompassing: initiation and realization by authorized people of correction activities of detected internal discrepancies (in products of a building enterprises or the environmental management system) and an external (problems with subcontractors of specialized work, or suppliers of building materials), making notes of each activity and making its review in order to assess the results obtained.

4. MPEMS-4 – Supervision of documented information. This process embraces a succession of activities aiming at up-to-date character of required documents both in the seat of an enterprises and on building site (among which: environmental policy and aims, building standards, legal regulations on environment protection, operational instructions, etc.) and storing appropriate documentation for a determined period of time (contracts' reviews and other documents which form basis of realization of building work, audit reports, certificates confirming conduction environmental training, etc.).

The enumerated processes may be described in the form of documented procedures, but it is not an absolute requirement. The PN-EN ISO 14001:2015-09 standard recommends to focus the documentation of the environmental management system on the results of activities grouped in processes, and not on the description of these processes (POCHYLUK 2015).

Summary

In order to satisfy the increasing requirements of customers, building enterprises must be ready for the necessity of extending their management systems by use of new thematic scopes. With the progressing degradation of

the environment and with the increased care of it, only the appropriately prepared environmental management system may present a trump card while obtaining orders [offers], in which the attitude of a building contractor towards environmental protection is considered.

The use of process approach in working – out of an environmental system increases the probability of its effectiveness on the condition of a suitable division of activities of a building company into appropriate processes.

Presented general model of the environmental management system fulfills the requirements of the PN-EN ISO 14001:2015-09 standard and it is also compatible with the PN-EN ISO 9001:2015-10 one, which make it easier to integrate both the environmental and the quality management systems.

The prepared model focuses on improvement of results in environment protection and on reducing the risk of doing a business in building companies, which should be reflected in an increase of interest in introduction of the environmental system to practice in their activities. The model may be used to preparation of a formalized and non-formalized environmental system in a given case in a medium-sized private building company. After an appropriate expansion of auxiliary and managerial processes, the model may be applied to prepare the system in a big company. The presented model of the environmental system eliminates the most frequent disadvantage of the formalized solutions, in which the role of documentation is over-emphasized.

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