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METHODOLOGY FOR ASSESSMENT OF ENVIRONMENTALASPECTS INENVIRONMENTAL MANAGEMENT SYSTEMS

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METODYKA OCENY ASPEKTÓW ŚRODOWISKOWYCH W SYSTEMACH ZARZĄDZANIA ŚRODOWISKOWEGO

ABSTRACT
In today'seconomicsituationitisnecessary to payattention to natural environment. In practice of sustainability the system approachisoftenused. Thereareusedenvironmental management systemswhichapplyCleanerProduction, the systemsbased on ISO 14001 and thosebased on the Decree of the Europe Council EMAS. The basis of thesesystemsaresignificantenvironmentalaspectsdetermined by the evaluation of allaspects of environmentalproblems in the organization. Both the ISO 14000 series as well as the EMAS Regulation do not providemethodology to evaluate the environmentalaspects. In the articleithasbeenproposed to create the concept of methodology to evaluateenvironmentalaspects .

KEY WORDS: *assessment of environmental aspects, significant environmental aspects, ISO 14001*

ABSTRAKT
W dzisiejszej sytuacji gospodarczej koniecznym jest zwracanie uwagi na środowisko naturalne. W praktyce zrównoważonego rozwoju stosuje się często podejście systemowe.Stosowane są systemy zarządzania środowiskowego, wśród których wykorzystuje się Czystszą Produkcję, systemy oparte na normie ISO 14001 oraz te bazujące na Rozporządzeniu Rady Europy EMAS. Podstawą tych systemów są tzw. znaczące aspekty środowiskowe wyznaczane w wyniku oceny wszystkich aspektów środowiskowych występujących w organizacji. Zarówno w normach ISO serii 14000 jak również w Rozporządzeniu EMAS nie podaje się metodyki oceny aspektów środowiskowych. W opracowaniu proponuje się stworzyć koncepcję metodyki oceny aspektów środowiskowych..

SŁOWA KLUCZOWE: ocena aspektów środowiskowych, znaczące aspekty środowiskowe, ISO 14001

Introduction

In 1972 in Stockholm at the UN conference the so-called Stockholm Declaration was formulated where the term sustainable development was introduced. It imposes on governments to protect and enhance the environment and the needs of not only those who are living today, but also future generations. The obligation to protect the environment and the Declaration to ensure adequate living conditions were adopted then by many countries and transferred them to the ground of legislation and laws. Philosophy of sustainability or sustainable development is described and regulated by the rule which are a set of basic directions of practical activities. Sustainable development, also known as eco-development is in the place where people expect limitations due to finiteness of the Planet and independent human rhythm of nature. It is a strategy for achieving a dignified life within the framework of what is physically and biologically possible. It guarantees the basic needs of present and future generations, while maintaining the sustainability of the natural environment and the functioning of the natural diversity of both species and ecosystems.

In order to protect the environment, a number of laws and regulations which require the cessation of harmful actions and prefer favorable ones have been introduced. The International Organization for Standardization issued ISO 14000 series of standards, whose aim is to provide organizations with guidance on managing the impact of their products and processes on the environment. The basis of compliance with the requirements of ISO 14001 is to achieve current environmental objectives. These objectives are derived from the significant environmental aspects, which in turn emerge from identified of all environmental aspects. The ISO 14000 series does not give a method for determining environmental aspects, they only say that these aspects should be determined. This fact is the cause of many different methods of assessing the environmental aspects. These are mainly score method based on similar evaluation criteria. Therefore, it is advisable to seek a universal way of aspects assessment. An attempt to create such a model (FLIPO) was taken by Heinz Werner Engel in the EMAS Easy™ methodology. Since a problem in the adoption of this methodology is the criterion of "practices", it has been proposed to change this criterion.

Analysis of selected methods of environmental aspects assessment

Once all environmental aspects have been identified and their environmental impacts determined, there is a need to evaluate them from the point of view of their importance and impact on the environment in order to point at the most significant ones.

In order to evaluate the environmental aspects, the scoring (with a specific gradation) is applied the most often and the evaluation criteria are as follows: the impact on the environment, legal requirements, frequency, environmental damage, environmental exposure and people.

Due to the ease of evaluation, the alternative assessment of the criteria adopted is also applied, but it is not recommended because of the very low accuracy. The literature suggests even a broader approach to assess the environmental aspects, which suggest taking into account the following issues [2, 3]:

- from the environmental point of view:
  - the severity of the impact,
  - the scale of the impact,
  - the duration of the impact,
  - probability of occurrence,
- from the point of view of organization which implements the system:
  - the cost of making impact changes,
  - possible impact of the law,
  - the impact of change on other activities and processes within the organization,
  - the difficulty of impact changes,
  - matters involving relevant stakeholders,
  - the impact on the assessment of the organization by customers and society.

The criteria, their number and the score (if this method of assessment is accepted) are set by the organization. When evaluating, the quantification can be useful (e.g. from 1 to 5). An example of point evaluation of the environmental aspect can be carried out according to the formula:

$$\text{ASSESSMENT ASPECT} = A \bullet B \bullet (C + D) \quad (1)$$

Where: A - The impact on the environment, B - Legal requirements, C - Frequency of occurrence D – Environmental harm.

The principle of the evaluation according to the five-grade gradation scoring from 1 to 5 has been adopted.
Another way to evaluate aspects of this model is for example "COWI" model based on the following principle:

$$\text{Significance of aspect} = \text{Number} \bullet \text{Range} \bullet \text{Environmental impact} \quad (2)$$

The criteria estimation is performed on a scale from 1 to 3 points.

When assessing the aspects the FLIPO method (Flow - Legislation - Impasto - Practices - Opinions or Quantity - Legal requirements - Effect - Practices - Opinions) can be also used [1]:

Significance of aspect = Number + Legal requirements + Influence + Practices + Opinions (3)
In this method the estimation of criteria also takes place on a scale from 1 to 3 points.

In the case of the criterion relating to meeting of legal requirements, the failure to comply with them is usually qualified as a significant aspect regardless of the result of other evaluation criteria.
A variation of the FLIPO method is FLIRO (Flow - Legislation - Impact - Reaction-Opinions, Number - Legal requirements - Influence - Impact - Opinions), which replaces the criterion of "practice" to "impact" from the FLIPO method. [5] When evaluating aspects one can use the following formula:

Significance of aspect = Number + Legal requirements + Influence + Impact + Opinions (4)

An evaluation of the results should be conducted in order to select from 1 to approx. 5 significant aspects. Too many aspects cause excessive diversification of resources, reducing the likelihood of achieving the goals of these environmental aspects. In practice, three major aspects with the highest number of points are selected. There are also known other methods in this regard, but because of their complexity and close matching to the specifics of a particular organization they will not be presented. Identification and evaluation of environmental aspects is usually performed once a year prior to the management review if in the organization any significant changes to the SZS are expected.

Practical guidelines for the identification and evaluation of aspects and the associated impact on the environment are included in the PN-EN ISO 14004, "General guidelines on principles, systems and supporting techniques."

The objectives set out in the environmental policy must be connected with these significant environmental aspects. The ISO 14001 standard says that one needs to provide important aspects in establishing, implementing and maintaining its environmental management system, and constantly update and document information related to significant environmental aspects.

The „Five criteria" method

In the presented methods, the aspects evaluation is carried out on the basis of assigning a point value to the selected criteria. In some of the methods these criteria are repeated. Thus the idea was born to create a universal method for assessing the environmental aspects that can be applied when assessing aspects in the implementation and application of environmental management system ISO 14001. This method is called a universal method of the Five Criteria (FCM). The assessment of the aspect significance would be according to the relationship:

$$\text{Significance aspect} = P \cdot W \cdot L \cdot S \cdot O \quad (5)$$

where:
P- probability of occurrence,
W - Impact on the environment,
L - legal requirements,
S - The efficiency of existing measures to change the impact,
O – The influence on the assessment of the organization by society.

These criteria should be interpreted in accordance with the structure shown in fig. 1 and table 1.

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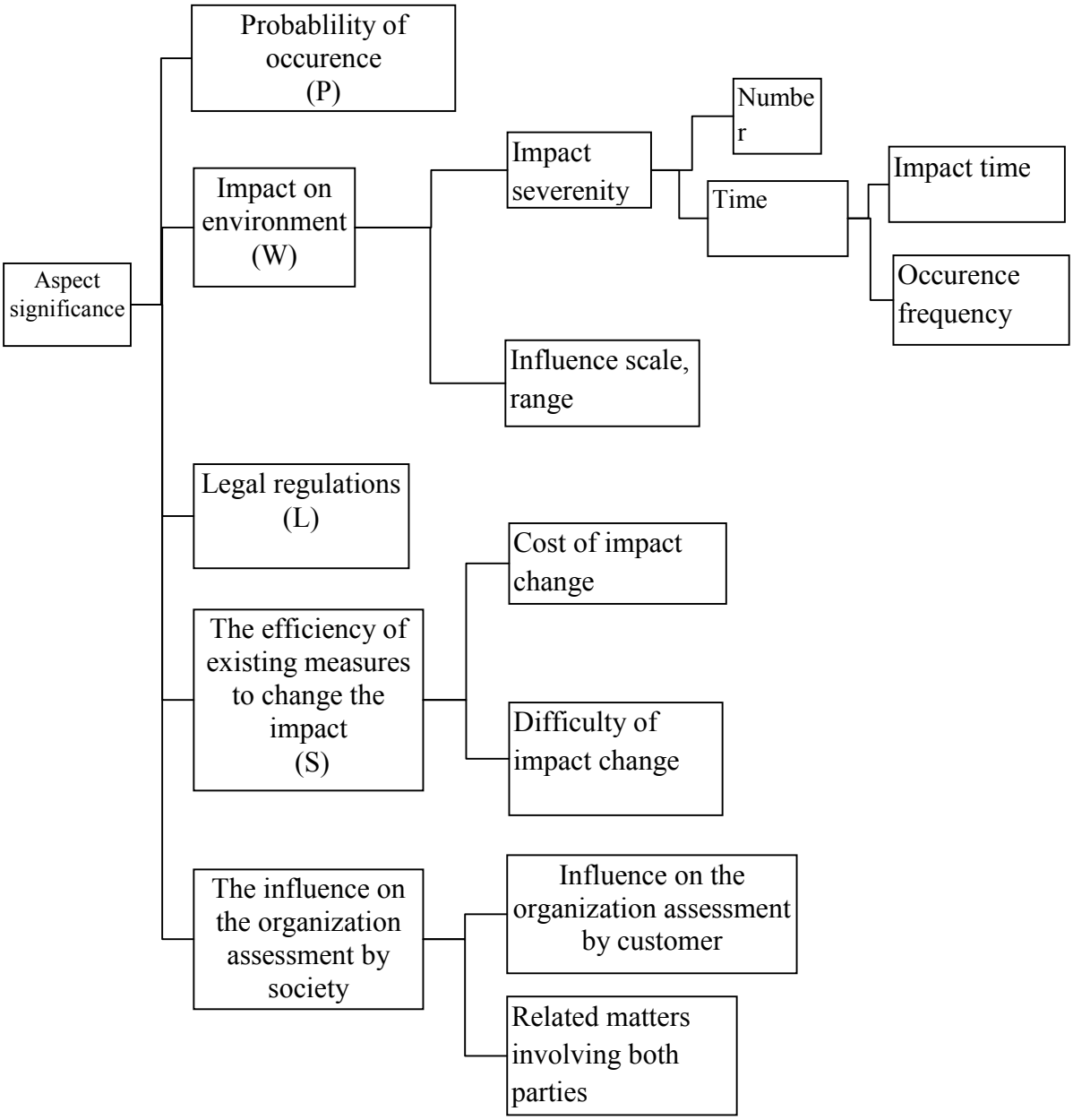

Fig. 1. The criteria for assessing the significance of the environmental aspects and their components

In this method, the criteria estimation would take place on a scale from 1 to 3 points - as in tab. 1.

Tab. 1. Notes for the assessment of environmental aspects

Probability of occurence (P)	**3** - probable	**2** – little probable	**1** - impossible
Impact on environment (W)	**3** - big	**2** - average	**1** - small
Legal regulations (L)	**3** – environmental allowance	**2** – administrative requirements	**1** – market requirements
The efficiency of existing measures to change the impact (S)	**3** – little	**2** - average	**1** - satisfactory
The influence on the organization assessment by society (O)	**3** - important	**2** - unnoticeable	**1** - irrelevant

Based on the above method one can evaluate environmental aspects, taking into account the listed five criteria, but also the components of these criteria.

Conclusions

With the rise of environmental consciousness of societies, it became important use of all possible methods to minimize the negative impact of the organization on the environment. Environmental management systems that provide activities in compliance with environmental regulations have been introduced, and the environmental approach in the organization has been generated. The most common one is an environmental management system based on ISO 14001. This system is based on the identification and assessment of environmental aspects, i.e. the impact elements of the organization on the environment. The standard requires to assess identified aspects of the objective to select so-called significant aspects, which then need to establish goals written down in environmental policy. This policy is then performed by an organization with the use of the implemented system. Thus, the basis for establishing the environmental objectives are significant aspects. The standard does not specify how to assess these aspects. Therefore, a number of methods have been developed. When making their review, an attempt to create a universal methodology based on the criteria used in the evaluation of the popular methodologies has been worked out. As the result the methodology initially called Five Criteria Methodology (FCM) has been developed. The set of criteria, the selection of tables and calculation formula have been determined. On this basis, it is possible to calculate the significance of the environmental aspects. In the next step this methodology should be tested and compared with commonly used ones.

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