

Determining Environmental Aspects In Company Economic D.O.O. Vitez, By Using A Flowchart Diagram Method

¹ **Mr.Sc. Alan Lisica, B.Sc. Mec. Eng.**

Environmental Systems Manager

Economic d.o.o. Vitez

Vitez, Bosnia and Herzegovina

^{*2} **Ass. Prof. Dr. Sc. Sabahudin Jašarević, B.Sc. Mec. Eng.**

Prof. Dr. Sc. Darko Petković, B.Sc. Mec. Eng.

University in Zenica

Zenica, Bosnia and Herzegovina

*Corresponding author: Address: University in Zenica , Zenica, Bosnia and Herzegovina E-mail address: sjasarevic@mf.unze.ba

Abstract

For many industries, pressure is now being exerted by many organizations and customers, who expect their suppliers to adopt environmentally-friendly practices, and may mandate ISO 14001 certification as a licence to operate.

ISO 14001:2004 is an environmental management standard (EMS). It specifies a set of environmental management requirements for environmental management systems. The purpose of this standard is to help all types of organizations to protect the environment, to prevent pollution, and to improve their environmental performance.

One of the keys to a successful registration for conformance with ISO 14001 is to accurately determine the organization's Environmental Aspects, arrive at which are the most significant and therefore require the most attention. The element of the standard 4.3.1 Environmental Aspects requires a procedure to identify environmental aspects and related impacts that the organization can control or have influence over, and determine those which are significant. The intent of this element is to help the organization identify how it affects the environment, prioritize aspects, and use the EMS to manage, control, and improve upon the aspects. So the organization must ensure that the significant aspects are taken into account in the EMS. ISO 14001 does not prescribe what aspects should be significant, or even how to determine significance. However, it is expected that a consistent and verifiable process is used to determine significance. The purpose of this article is to show how organizations can define their aspects and determine significance by using a flowchart diagram method. The practical use of this method will be shown on example of company Economic d.o.o. Vitez.

Keywords: ISO 14001:2004, Environmental Aspects, flowchart diagram metho

Doi:10.5505/apjes.2013.98608

1. Introduction

We are all becoming more "environmentally aware" of what we do and how we do it - so are our customers to the extent that, more and more users of our products and services question not only what we do but how we do it. In some parts of the world suppliers cannot even get on to a tender list unless they can demonstrate their "environmentally friendly" approach. Also, for particular industries, pressure is now being exerted by many large organizations, who expect their suppliers to adopt environmentally-friendly practices and may mandate ISO 14001 certification as a licence to operate. Company's environmental performance can have a significant impact on its success.

The key to a successful registration for conformance with ISO 14001 is to accurately determine the organization's Environmental Aspects and Impacts, arrive at which are the most significant and therefore require the most attention.

The concept of "Environmental aspect" is a key component in environmental management. An environmental aspect describes the relevant issue(s) that a management needs to address, irrespective of level of abstraction e.g. waste management, global warming, resource extraction, lack of knowledge about process emissions, toxic material management, and biodiversity.

The determination of aspects and impacts significance is not as well defined by ISO 14001 as the terms themselves. It is suggested that evaluation of significance can consider the scale of the impact, the severity of the impact, its probability of occurrence, and the duration of the impact, as well as business factors such as the economic and operational consequences of altering the impact, potential legal liability, and impact on the public image of the company. However, a company has a great deal of flexibility in how it determines which aspects and impacts it deems significant.

This work is intended to describe the development procedure for identifying environmental aspects and impacts in Economic d.o.o. Vitez, which are associated with products and services as well as determining which of those aspects and impacts is significant (and therefore requires further consideration). Also it shows how environmental aspects are dealt with today, in practice, and how a more transparent and practical way can be implemented.

2. Economic D.O.O. Vitez

The principal activity of the company is trading with technical equipment (electrical installation and equipment, water installation and equipment, thermal installation and equipment, building material and tools and home and office equipment) and production of interior equipment made of

chipboard. Production of the bathroom furniture is the main focus of our production and we confirm the leading position in Bosnia and Herzegovina with the widest range of bathroom furniture. One of the most important projects is building of the franchise network, not only on the territory of Bosnia and Herzegovina, but also in neighbouring countries.

The sale network with about 60 franchises spreads all over Bosnia and Herzegovina offering a complete range of electrical, water and thermal installation and the rest of the equipment for home. Economic aims to cultivate and develop the highest standards of social responsibility.

In order to become a good business partner, we implicit:

- environment protection
- production and selling of products in accordance of healthy way of life
- integrated activity and following of the highest ethical standards.
- promotion of a partnership with a various suppliers and customers
- ensurance of a safe and healthy workplace

In 2000. certificate of the conformity of quality management system with the requirements of ISO 9002:1996 was introduced, and then in 2009. a new norm ISO 14001:2004 was introduced.

3. Iso 14001:2004 Environmental Management Standard

ISO 14001: 2004 is an internationally accepted environmental management standard that sets out how you can go about putting in place an effective Environmental Management System (EMS). It specifies a set of environmental management requirements for environmental management systems. The purpose of this standard is to help all types of organizations to protect the environment, to prevent pollution, and to improve their environmental performance. The standard is designed to address the delicate balance between maintaining profitability and reducing environmental impact. With the commitment of your entire organization, it can enable you to achieve both objectives. As the EMS accepted around the world, the EMS according to the standard ISO 14001 has been developed, presenting a formalized structure for the environmental

management system which can be independently assessed for compliance.

The ISO 14001 EMS exist to help organizations to:

- minimize how their operations (processes etc.) negatively affect the environment (i.e. cause adverse changes to air, water, or land),
- comply with applicable laws, regulations, and other environmentally oriented requirements, and
- Continually improve in the above.

Some of the documentation required for this standard is the same as is needed for ISO 9001 with no duplication necessary, thus there is a cost saving if both standards are introduced at the same time. Certification of the ISO 14001 aims to decrease the waste and pollution that a company produces and aims to reduce their environmental footprint.

4. Environmental Aspects And Impacts

ISO 14001 element Planning - 4.3.1 Environmental Aspects requires a procedure to identify environmental aspects and related impacts that the organization can control or have influence over, and determine those which are significant to the organization. The intent of this element is to help the organization identify how it affects the environment, prioritize aspects, and use the EMS to manage, control, and improve upon the aspects. So the organization must ensure that the significant aspects are taken into account in the EMS. "The organization shall establish and maintain (a) procedure(s) to identify the environmental aspects of its activities, products, or services that it can control and over which it can be expected to have an influence, in order to determine those which have or can have significant impacts on the environment. The organization shall ensure that the aspects related to these significant impacts are considered in settings its environmental objectives. The organization shall keep this information up to date. "

ISO 14001 does not prescribe what aspects should be significant, or even how to determine significance. However, it is expected that a consistent and verifiable process is used to determine significance.

According to the international standard ISO 14001 environmental aspects are "elements of an organization's activities, products or services that can interact with the

environment". The environment is defined as "surroundings in which an organization operates, including air, water, land, natural resources, flora, fauna, humans, and their interrelation". Additionally, environmental impact is "any change of the environment, whether adverse or beneficial, wholly or partially resulting from an organization's activities, products or services". The environmental aspects of the organisation must be identified and assessed to determine those that are the most significant. This then enables resources to be focused on addressing specific aspects. ISO 14001 requires this to be an on-going process. Therefore the aspects must be reviewed on a regular basis to ensure that all current aspects have been identified and that they are correctly prioritised.

Significant environmental aspects are the most important environmental aspects which cause the highest environmental impact or are important due to legislation and other requirements (environmental policy, customer demands). Significance equals the prioritising (not relative) between chosen environmental aspects at a company. In addition to those environmental aspects an organization can control directly, an organization should also consider aspects that it can influence. However, in all circumstances it is the organization that determines the degree of control and also the aspects it can influence. Environmental impacts are categorized in the same way.

Annex A to ISO 14001 state: "The process to identify the significant environmental aspects associated with the activities at operating units should, where relevant, consider:

- emission to air,
- releases to water,
- waste management,
- contamination of land,
- use of raw materials and natural resources,
- other local environmental issues."

Identifying and clarifying environmental aspects relevant to an organization also has an educational importance. Education is a prerequisite to be able to change peoples attitudes and increase the awareness of environmental and sustainability issues. When identifying relevant aspects the analysis indicate how an organization can improve in an environmental point of view.

Ideally, a list of environmental aspects defines the identified scope of the responsibility of an EMS as well as gives input to other actions, e.g. in sustainability strategy development. The aspects on one specific company's list are the ones that the company has identified, and are therefore also the only ones that the company can focus the environmental work on. The environmental aspect concept should be well established in companies using an EMS. It is suggested that

all companies explicitly identify their environmental aspects. Environmental aspects is the term that can on the one hand be used for the important issues in the environment that an organisation should take into consideration in their environmental work, things that we care about due to individual human aspects (e.g. noise, smell) laws and regulations, complaining neighbours etc. Environmental aspects on the other hand can also be a product's or production process's environmental impact, e.g. emissions to a nearby river and use of energy. Other examples of aspects are emissions of a chemical, waste generation, production leakage, recycling, different materials, hazardous materials, electromagnetic fields, impact on flora and fauna etc. The final list of significant environmental aspects will provide the basis for the Environmental Policy statement, and the Environmental Objective(s) and Targets. In other words the list of significant environmental aspects drives the entire content and scope of the operational portion of the environmental management system.

5. Process Flowchart Diagram Method

There are many methods for identifying and prioritizing significant aspects, only a few of them are documented in public available documents.

Process flowchart diagram method is the easiest and most comprehensive way to identify the environmental aspects. The focus is on "breaking" the organization into smaller parts/processes that can be controlled [5]. This method is performed on the principle that the organization is "broken" into smaller manageable parts/processes so that each organization's activity is presented with process flow diagram. It is followed by the identification of related aspects in every single process so that every process and activity is individually considered in detail in order to identify associated aspects.

6. Determining The Organization's Environmental Aspects And Impacts

The analysis of aspects and impacts is one of the most important components of an EMS. First, the process itself can be enlightening in that it requires a comprehensive analysis of activities, processes and products from an environmental perspective, and this can identify areas of environmental impact that had not been previously realized. This process is also enlightening in that it changes the focus of environmental thinking from a regulatory perspective (which is typically the primary area of focus of existing environmental functions) to an objective perspective where

impacts are considered in light of their probability and severity instead of their regulatory significance. The methodological framework set by standards ISO 14001 and ISO 14004 gives only general principles for environmental aspects assessment, which is regarded as one of the most critical stages of implementing environmental management system [3].

The other reason that the aspects and impacts analysis is such an important component of an EMS is that much of the content of an EMS flows from this analysis. For those aspects and impacts that are deemed significant, objectives and targets can be established with regards to their management, environmental programs are established to obtain those objectives and targets, and measurement systems are maintained to determine if the objectives and targets are being met. Thus, the requirements for establishing programs, objectives and targets and measurement systems all flow from the determination of those aspects and impacts that are deemed to be significant. All of the organization's activities, products and/or services must be included within the environmental aspects review framework.

The environmental impacts could be identified in the same way as the environmental aspects.

To assist in the identification of the organisation's environmental aspects process flow diagrams will be used. If they are to be used a flowchart will be required for each process, e.g. maintenance, production, sales...

Steps in determining the organization's environmental aspects and impacts are:

Step 1: SELECT AN ACTIVITY, A PRODUCT OR SERVICE

Step 2: IDENTIFY NAME AND DEFINE AS MANY DIRECT AND INDIRECT ENVIRONMENTAL ASPECTS ARISING FROM NORMAL, ABNORMAL OR REASONABLY FORESEEABLE EMERGENCY CONDITIONS ASSOCIATED WITH THE SELECTED ACTIVITY

The purpose of this activity is to create a complete listing of how the organization interacts with the environment. The purpose of this activity is not to determine the importance of each aspect. The organization must include the effect of non-routine situations in the listing such as emergency conditions, start-up and shutdown activities. The procedure that is developed to produce the list of environmental aspects must recognize the concept of continual improvement. The procedure and the list of aspects can be influenced by future actions such as new legislation, changes in operations, etc. The Management Review (4.6) section mandates continual improvement because the

environmental management system must be reviewed on a periodic basis to insure that it is still effective based upon the organization's activities, products and/or services.

The organization only has to identify those environmental aspects that it "can control and over which it can be expected to have influence". Control includes fiscal control (financial ability that can affect aspect) and organizational control (decision making authority that can effect aspect)

Step 3: WHERE APPROPRIATE, GROUP TOGETHER SIMILAR ASPECTS OF A MINOR NATURE AS A SINGLE ASPECT FOR FURTHER CONSIDERATION

Step 4: IDENTIFY AS MANY ACTUAL AND POTENTIAL, POSITIVE AND NEGATIVE, ENVIRONMENTAL IMPACTS ASSOCIATED WITH EACH IDENTIFIED ASPECT

Step 5: ASPECTS ASSESSMENT

The aim of an aspects assessment is to determine which of the identified environmental aspects are significant. In many circumstances, professional judgement will play an important role in determining how to address significance and this can be helped through consultation with appropriate stakeholders. It is the significant aspects that will be controlled within the EMS. Significance is determined by identifying the level of control on each environmental aspect and the severity of the environmental impact related to each aspect.

Step 6: PRIORITIZING ENVIRONMENTAL ASPECTS AND DETERMING SIGNIFICANT ENVIRONMENTAL ASPECTS

A list of environmental aspects can define the scope of responsibility of an environmental management system, as mentioned in the introduction. The aspects on the list are the ones the company should focus the environmental work on, other aspects are often not considered. Due to economic and practical reasons the chosen aspects needs to be prioritised. Each prioritised aspect, named significant aspect by ISO, requires a specific, well-structured investigation and work. All organizations have to choose the aspects the most relevant and important for them.

Environmental impacts could be estimated and evaluated in several ways. Every organization has it's own procedure for the impacts assessment due to its specificity – either to the staff or because of the organization's activities. It is usual to give the numerical values (e.i. intensities) to the different criteria of the environmental aspects and impacts or describing attributes – like minimal, low, high, catastrophic, etc...

The process of arriving at a list of significant Environmental Aspects must be a reasonable and understandable procedure. The procedure could be based upon the following criteria:

- perceived risk(human health vs. ecosystem),
- impact analysis (internal, local, regional, global),
- probability of occurrence,
- direct or indirect control,
- regulated or non-regulated,
- resource utilization,
- community interest,
- etc.

In the case of using numerical values, it is commonly used the numerical scale with 3, or more frequently, with 5 different numbers, e.i. levels of the intensity.

The most used criteria in the process of the environmental impact assessment are severity, probability and frequency. Severity is related to the level of the exposition of the environment to the impact, including air, water, soil, natural resources, flora, fauna, humans, etc.

Scale of severity (5-catastrophic, very dangerous, must be repaired or regenerated, 4- serious, hard to repair, 3-moderate, could be repaired, 2-minor effects that are easily remedied 1-harmless, negligible impact)

Probability is used as the indicator of the possibility of something to happen.

Scale of probability (5-almost certain, 4-likely, 3-possible, 2-rare, 1-almost incredible).

Frequency describes how often some impacts could occur in the environment of an organization.

Scale of frequency (5-continuous – more than 3 times per week, 4-very oft, 1-2 times per week, 3-regular – it happens once a month, 2 intermittent – 3 to 4 times per year, 1-rare less than one time a year)

Other common criteria are: geographical borders (global-local-isolated), control (totally uncontrolled-totally controlled), compliance to the legislation (in compliance-without legal requirements), reporting, concern of shareholders, duration, etc.

Determining the significant environmental aspects and associated impacts allows a facility to focus its time and resources on those issues with the greatest potential for environmental impactfor impact.

7. Determing The Environmental Aspects And Impacts In Economic D.O.O. Vitez

Criteria for evaluation of aspects used in Economic d.o.o. Vitez are:

1. The strength and seriousness of the environmental impact
2. Legislation
3. The likelihood of appearance

4.	The existence of control over environmental aspect			not under control or it is not possible to control	
The strength and seriousness of the environmental impact					
10	= serious impact / disaster	long – term environmental contamination or threatened safety of many people	3	= probably	due to process specifics aspect is not continuously monitored, is not under constant control
8	= serious impact / critical	lokal environment and people at risk			we monitor and track aspect, but loss of
5	= significant	largely using non-renewable resources, use of hazardous substances, not applying waste management measures	2	= possible	control is possible due to the failure, neglect etc
3	= moderately significant	more effective utilization of natural resources possible or less environmental pollution			measures have been taken to control and
1	= very small significance	no potential for cusing harm	1	= not possible	monitor aspect, elements of control are defined and so the possibility of losing control is removed

Legislation

The likelihood of appearance

- 5 = high probability that the aspect will result in a distinctive influence
- 4 = likely – more likely
- 3 = moderate likelihood
- 2 = mlow likelihood
- 1 = very small or no likelihood

Working conditions

- (N) = usual - normal conditions
 - normal conditions of work
 - focus on the process flow
- (P) = planned – unusual conditions
 - planned conditions during general system maintenance, closure and commissioning
 - unplanned situations, an accident
- (IS) = emergency
 - such as fire, unplanned breakdowns and ruptures spilling

The existence of control over environmental aspect

- 5 = very likely

Points are calculated as follows:

Points = the strength and seriousness of the environmental impact + legislation + (the likelihood of appearance x the existence of control)

If the total number of points is greater than or equal to 23 environmental aspect is considered significant.

Results of environmental aspects assesment are given in Table 1:

8. CONCLUSION

Environmental aspects within Economic d.o.o. Vitez have been identified and evaluated according to the standard ISO 14001. Thirty six (36) Environmental aspects have been identified and Nine (9) aspects – coal, chlorine, grove from boiler, toner (irreversible), sludge from the separator, laundry and dishwasher detergents, electrical energy, fuel (tank) and neon bulbs have been evaluated as significant.

Within the domain waste management – two significant aspects have been recognized – waste toners from the printers/photocopy machines and waste electrical and electronic equipment including fluorescent light bulbs, which belong to the hazardous waste.

During the significance assessment both approaches (addition method and multiplication method) were used to evaluate the significance of the aspects and showed similar results in ranking the aspects, but the clearer differences are noticed using the multiplication method. It could be assumed that for an academic institution and for the chosen attributes for the ranking, since the measured attributes are not closely related to each other, multiplication method could give better results in aspects evaluation

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Table 1: List of Environmental Aspects in Economic
d.o.o. Vitez

Num.	Aspect	Process or a part of process in which aspect is situated	Impact (actual and potential) on the environment	Working conditions	1. The strength and seriousness of the environmental impact	2. Legislation	3. The likelihood of appearance	4. The existence of control over environmental aspect	The total number of points 1+2+(3*4)	Significant aspect YES/NO
1	coal	technical maintenance	consumption of resources and air pollution	N	8	3	5	5	36	Yes
2	chlorine	transmission to the point of application	threat to human health and pollution of soil and water	IS	8	5	4	5	33	Yes
3	grove from boiler	technical maintenance	pollution of soil, water in case of uncontrolled waste	N	5	5	4	5	30	Yes
4	toner (irreversible)	all	pollution of soil, water in case of uncontrolled waste	N	5	3	4	5	28	Yes
5	sludge from the separator	hotel and related services	pollution of soil, water in case of uncontrolled waste	N	5	5	5	3	25	Yes
6	laundry and dishwasher detergents	hotel and related services	pollution of soil and water	N	3	1	4	5	24	Yes
7	electrical energy	all	consumption of nonrenewable resources	N	5	3	5	3	23	Yes

8	fuel (tank)	office building	pollution of soil and water, possibility of causing fire	IS	10	5	2	4	23	Yes
9	neon bulbs	all	pollution of soil in case of uncontrolled waste	N	5	3	3	5	23	Yes
10	water consumption	all	consumption of nonrenewable resources	N	8	3	3	3	20	No
11	wastewater	all	pollution of soil and water	N	5	3	4	3	20	No
12	waste cooking oil	kitchen	pollution of soil and water, possibility of causing fire	N	8	5	3	2	19	No
13	oil from the truck	shipping	pollution of soil and water in case of an accident	IS	5	5	3	3	19	No
14	stored fuel (for forklifts)	material storage, customer service	pollution of soil and water, possibility of causing fire in case of emergency	IS	8	5	1	5	18	No
15	clorine	hotel and related services - pool	threat to human helth and pollution of soil and water	N	5	5	3	2	16	No
16	ph minus	hotel and related services - pool	threat to human helth and pollution of soil and water	N	5	5	3	2	16	No
17	PVC packaging films	all	pollution of soil in case of uncontrolled waste	N	5	1	3	3	15	No
18	metal waste	material storage, customer service	pollution of soil in case of uncontrolled waste	N	5	3	3	2	14	No

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19	exhaust emissions - fuel	shipping	air pollution	N	5	3	3	2	14	No
20	styrofoam	wholesale, retail, material storage, customer service	pollution of soil in case of uncontrolled waste	N	3	1	3	3	13	No
21	tires	shipping	pollution of soil in case of uncontrolled waste	N	8	3	2	1	13	No
22	IT/electronic waste	all	pollution of soil in case of uncontrolled waste	N	5	3	2	2	12	No
23	chipboard - formaldehyde	production	threat to human health and pollution of soil and water	N	5	5	2	1	12	No
24	battery	all	pollution of soil in case of uncontrolled waste	N	5	3	2	2	12	No
25	toner (renewable)	all	pollution of soil in case of uncontrolled waste	N	5	3	4	1	12	No
26	pvc packaging	all	pollution of soil in case of uncontrolled waste	N	5	1	2	2	10	No
27	chips	production and related services	threat to human health and pollution of soil and water	N	5	3	2	1	10	No
28	glue	production and related services	pollution of soil and water in case of uncontrolled waste	N	3	3	2	2	10	No
29	metal packaging (cans)	hotel and related services	pollution of soil in case of uncontrolled waste	N	5	1	1	2	8	No
30	fire alarm systems -	all	threat to human health and	N	3	3	2	1	8	No

	waste		pollution of soil and water							
31	organic waste	kitchen	pollution of soil and water in case of uncontrolled waste	N	1	2	2	2	7	No
32	donau multiflokulant – pool clarity	hotel and related services - pool	pollution of soil and water	N	3	1	3	1	7	No
33	glass packaging – non-refundable	hotel and related services	pollution of soil in case of uncontrolled waste	N	3	1	1	2	6	No
34	carton	all	pollution of soil and water in case of uncontrolled waste	N	3	1	2	1	6	No
35	noise	production and related services, customer service, material storage	noise emissions	N	1	3	1	2	6	No
36	paper	all	pollution of soil in case of uncontrolled waste, use of resources	N	3	1	1	1	5	No