



# PROCEEDINGS



*27th*  
*International*  
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*Ecological*  
*Truth and*  
*Environmental*  
*Research*

**EDITOR**

*Prof. Dr Snežana Šerbula*

18-21 June 2019, Hotel Jezero, Bor Lake, Serbia



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**27<sup>th</sup> INTERNATIONAL CONFERENCE**

**ECOLOGICAL TRUTH AND ENVIRONMENTAL RESEARCH – EcoTER'19**

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## **PREFACE**

*Today's growing environmental and ecological imbalances require a multidisciplinary approach in finding adequate sustainable solutions. That is why environmental and ecological issues are at the focus of the 27<sup>th</sup> International Conference Ecological Truth and Environmental Research 2019 (EcoTER'19), which will be held at Bor Lake, Serbia, 18-21 June 2019. On behalf of the Organizing Committee, it is a great honor and pleasure to wish all the participants a warm welcome to the Conference.*

*The EcoTER'19 is organized by the University of Belgrade, Technical faculty in Bor, and co-organized by the University of Banja Luka, Faculty of Technology, University of Montenegro, Faculty of Metallurgy and Technology – Podgorica, University of Zagreb, Faculty of Metallurgy – Sisak, University of Pristina, Faculty of Technical Sciences – Kosovska Mitrovica and the Association of Young Researchers, Bor.*

*The primary goal of EcoTER'19 is to bring together academics, researchers, and industry engineers to exchange their experiences, expertise and ideas, and also to consider possibilities for collaborative research.*

*These proceedings include 105 papers from authors coming from universities, research institutes and industries in 15 countries: Russia, Belarus, Turkey, Kazakhstan, Czech Republic, Portugal, Sweden, Switzerland, Slovenia, Bulgaria, Croatia, Bosnia and Herzegovina, North Macedonia, Montenegro, and Serbia.*

*The support of the donor and their willingness and ability to cooperate has been of great importance for the success of EcoTER'19. The Organizing Committee would like to extend their appreciation and gratitude to the donor of the Conference for their donation and support.*

*We would like to thank all the authors who have contributed to these proceedings, and also to the members of the scientific and organizing committees, reviewers, speakers, chairpersons and all the Conference participants for their support to EcoTER'19. Sincere thanks to all the people who have contributed to the successful organization of EcoTER'19.*

*On behalf of the 27<sup>th</sup> EcoTER Organizing Committee,  
Snežana Šerbula, PhD Full Professor*



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## APPLICATION OF STANDARD ISO 14001 IN THE ENVIRONMENTAL PROTECTION SYSTEM

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### Abstract

*Implementation of ISO 14001 standards - The environmental management system, following the ISO 9001 standard, is becoming increasingly common in our organizations. This is particularly true for construction companies that are significant waste generators and environmental pollutants. On this, they are bound by increasingly stringent legislation, on the one hand, and a more favorable position in public vacancies if they have introduced a standard, on the other. Bearing in mind the experience of the author in the implementation of the ISO 14001 standard, the paper will present the basic procedures for the efficient functioning of the environmental management system.*

**Keywords:** standard, management, environment, aspects and impacts, waste

### INTRODUCTION

In order to ensure sustainable development, it is essential to strike a balance between the environment, society and the economy. Social expectations for sustainable development, transparency and accountability have evolved with increasingly stringent legislation, growing pressures on the environment from pollution, inefficient use of resources, improper waste management, climate change, degradation of ecosystems and loss of biodiversity [1].

This has led organizations to adopt a systematic approach to environmental management using the environmental management system according to the ISO 14001 model.

The purpose of this international standard is to provide organizations with a framework to protect the environment and respond to changing environmental conditions in balance with socio-economic needs. It specifies requirements that enable an organization to achieve the intended outcomes it sets for its environmental management system. A systematic approach to environmental management can provide top management with information to build success over the long term and create options for contributing to sustainable development by [2]:

- protecting environmental by preventing or mitigation adverse environmental impacts;
- mitigation the potential adverse effect of environmental conditions on the organization;
- assisting the organization in the fulfillment of compliance obligations;
- enhancing environmental performance;
- controlling or influencing the way the organization's products and managing and services are designed, manufactured, distributed, consumed and disposed by using a



life cycle perspective that can prevent environmental impacts from being unintentional shifted elsewhere within the life cycle;

- achieving financial and operational benefits that can result from implementing environmentally sound alternatives that strengthen the organization's market position;
- communicating environmental information to relevant interested parties.

The following text will describe aspects of the environment, environmental impact assessment, and the waste management process for a company engaged in the design and execution of construction works.

## **ASPECTS OF ENVIRONMENT AND IMPACTS**

### **Definitions**

Environmental definitions are given in the Law on Environmental Protection [3], and for the purpose of this work only some of the following will be listed:

- Environment - the environment in which a particular organization operates, including air, water, land, natural resources, flora, fauna, people and their mutual relationships. In this context, the environment extends from the one within the organization to the global system.
- Environmental aspect - an element of an activity, product or service of a given organization, which can be in a mutual relationship with the environment.
- Environmental Impact - Any change in the environment, deterioration or improvement, which is completely or partially the result of the environmental aspects of the organization.
- Evaluation of the significance of environmental aspects - determining the significance of environmental aspects based on legal regulations, frequency, severity, location and level of control.

### **Identification of aspects**

Identification of aspects is done in such a way that for every business process of the enterprise all activities with environmental aspects are listed. For the analysis of the aspects, technical documentation is used, as well as other documentation of the management system (QMS, EMS, OHSAS).

Impacts that are of importance in the construction company are:

- Emissions of gases into the air (transport means and working machines on the construction site),
- Discharge of technical, sanitary and atmospheric waters into the wastewater system,
- Wastes (solid and liquid) that arise as a result of activities in the realization of the service of export of construction works,
- Pollution of soil and groundwater,
- Use of natural resources

### **Determining the importance of the environmental impact**

The intensity of the environmental impact is based on the following five criteria [4]:

The frequency of the occurrence of the impact is calculated in relation to the periodicity of the occurrence of the impact. Depending on the frequency, grades 1 to 4 are given, where 1 is the smallest and 4 with the greatest influence.

- U = 1 - rarely (once a year and less),
- U = 2 - 1-2 times a year,
- U = 3 - 1 times a week to 1 time a month,
- U = 4 - every day.

The severity of the environmental impact. Depending on the severity, estimates are given from 1 to 4, where 1 assesses a situation without a serious environmental impact, and grade 4 is given for major environmental impacts.

- O = 1 - without affecting the LC,
- O = 2 - small seriousness, doesn't require remedy,
- O = 3 - medium seriousness, greenhouse effect, natural resources,
- O = 4 - great influence, flora and fauna disorder, expensive remediation.

The location where it occurs, the impact is estimated from the point of view of the geographical spread of the impact on the ZS. The smallest rating is given for the impacts that affect the place where the facility/equipment is used/built, and the largest estimate for the effects that are spreading beyond the location, the location of the construction/use of the facility.

- L = 1 - at the place of construction/use,
- L = 2 - in the circle of the location,
- L = 3 - immediate environment,
- L = 4 - wider surroundings.

The pressure of the stakeholders (lawmaker, buyer, etc.), is the criterion where the legislator or other interested party exerts pressure on the company. The smallest rating is given when the activity being monitored has no correlation with legal requirements, and the largest when there is a violation of the law, and no measures are taken.

- Z = 1 - without legal and other requirements/compliance with legal and other requirements,
- Z = 2 - requirements are not respected but are planned, or are in progress, an annual measure, in accordance with the law.
- Z = 3 - requests are not respected despite the measures taken,
- Z = 4 - requests have not been complied with and no measures have been taken.

Control of aspects and impacts is the criterion of evaluating aspects in relation to the control of operations occurring in the enterprise. Aspects that are not controlled, and they do not happen often, must be addressed through reaction in emergency situations.

- K = 1 - the aspect is completely under control;
- K = 2 - rare corrections, corrective / preventive measures;
- K = 3 - frequent corrections, corrective / preventive measures;



- K = 4 - the aspect is not under control

The overall significance is the product of all five criteria, and the significance of which is the value of  $\geq 48$ . An example of an analysis of aspects and impacts, for a construction company is given in Table 1.

**Table 1** Analysis of aspects and impacts [4]

Process	Activity	Aspect	Influence	Eligibility criteria					Rank of character
				U	O	L	Z	K	
Waiting and contracting	Telephone and e-mail communication, mail, reception of parties, presentations	Power consumption	Use of natural resources	4	1	1	1	1	4
		Consuming paper for printing	Use of natural resources	4	2	1	1	1	8
	Tour of potential buyers and construction sites	Emission of exhaust gases from the vehicle	Air pollution	4	2	2	1	1	16
Designing	Telephone and e-mail communication, generic documentation	Electricity consumption	Use of natural resources	4	1	1	1	1	4
		Consuming paper for printing	Use of natural resources	4	2	1	1	1	8
		Printing (toners)	Pollution of the environment	4	2	1	1	1	8
Procurement	Procurement Administration	Electricity consumption	Use of natural resources	4	1	1	1	1	4
		Consuming paper for printing	Use of natural resources	4	2	1	1	1	8
		Transport material to site	Emission of exhaust gases	Air pollution	4	2	3	1	1
Construction work	Craftsmanship in construction (mason, carpenter, armor, locksmith, auxiliary worker)	Electricity consumption	Use of natural resources	4	1	1	1	1	4
		Emission of exhaust gases	Air pollution	4	2	3	1	1	24
		Fuel consumption	Use of natural resources	4	2	1	1	1	8
		Creating dust	Air pollution	3	2	3	1	1	18
		Construction of construction waste (shot, brick, concrete, stone, wire,...)	Pollution of the environment	4	2	2	1	2	32
Great significance		R > 48							
Monitoring and control		12 < R < 48							
Tolerant significance		R < 12							

## WASTE MANAGEMENT

### Definitions

Definitions used in the field of waste management are given in the law [5] and subordinate acts (ordinances). For this occasion we will mention only some of the most important in our opinion:

- Waste - any matter or item contained in the list of waste categories that the owner discards, intends or must discard, in accordance with the law.

- Waste management - implementation of prescribed waste management measures in the context of collection, transport, storage, treatment and disposal of waste, including monitoring of these activities.
- Characterization of waste - a test procedure that determines the physico-chemical and biological properties and composition of waste and determines whether the waste contains one or more hazardous characteristics.
- Waste Generator - enterprise, other legal or natural person or entrepreneur, registered for the performance of a waste-generating activity, which owns waste, or in whose territory the waste is located.

### **Waste management activities**

Waste management is carried out in accordance with the Law on Waste Management and must define the following:

- Waste disposal sites at the headquarters and at the site,
- The dynamics of waste disposal,
- Different containers for certain types of waste,
- Agreement with the communal institution on the takeover of municipal waste,
- Agreement with the company for the purchase of secondary raw materials.

**Selection of waste** - Waste arises as a result of the development of the work process at the headquarters of the company, as a result of the performance of services (execution of works) on the site itself. The following types of waste have been identified:

- Construction waste,
- Waste,
- Other waste

All employees in the company are responsible for the selection of waste. The responsible person for the collection and proper disposal of certain types of waste in his organizational unit is the manager of this organizational unit. The site manager is responsible for the proper collection and disposal of waste at the site.

**Waste storage** - Temporary disposal of collected, classified waste is carried out in accordance with the Rulebook on conditions and manner of classification, packaging and storage of secondary raw materials [6]. The selection of waste sorting is done at the place of origin. All waste shall be disposed of in places for the temporary disposal of waste to the appropriate amount of generated waste for the period until the next disposal by the authorized institution in the following manner:

- *Construction waste* - Construction waste and demolition wastes, including excavated land from contaminated sites (index 17 from the Catalog of Waste) is created on the site and collected and deposited in a separated and marked place. The removal of this waste from the casing is regulated between the construction company and the authorized company (possessing a permit) for the removal and storage of this type of waste.
- *Municipal waste* - Municipal waste generated at the company's headquarters is collected and deposited in polyethylene bag baskets, which are located in each office. Waste from the basket is discharged at the end of each shift by placing bags in

municipal waste containers outside the company's scope and within the jurisdiction of the Public Utility Company. The removal of municipal waste from the container is regulated between the construction company and the Public Utility Company.

- *Other waste* - Expired parts of equipment, old furniture and the like, it is deposited in a designated place in a warehouse, from where it is controlled remotely outside of the company. The disposal of this waste is regulated between the construction company and organizations for the purchase of secondary raw materials.

**Shipments of waste** - The commercial function organizes waste dispatch and the necessary documentation.

## CONCLUSION

The implemented ISO 14001 standard in organizations is the tool of management for efficient waste management that the organization generates, resulting in a reduction in environmental pollution. The paper presents, for a construction company, aspects of the environment and their environmental impacts, as well as types of waste and method of waste management. In response to emergency situations, which are not considered due to space constraints, these are the key requirements of ISO 14001 standards.

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