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RESEARCH CRITERIA FOR SUCCESSFUL PROTECTION OF ENVIRONMENT

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Abstract. *Environmental management system provides structural process of continual improvement of the environment along with the use of clean technologies. The suggested model of the environment protection development planning is compatible with the strategy and the principles of the sustained development and environmental protection projects. Conclusions derived from the research are liable to generalization; respectively, they are valid in a wider area of study of the processes of the social, industrial and economy development.*

Key Words: *Recycling, Protection of Environment, Energy, Clean Technologies, Accident*

INTRODUCTION

Modern governing processes in the environmental area tend to make the basic aims, principles and the instruments of governing universal. The international organisations, of regional character, are taking over the leading role in the creation of governing method, while the countries within those areas exhibit substantial specific features.

The research criteria for successful protection of environment are regulated by numerous international agreements, conventions, different level contracts, which directly or indirectly refer to the environmental issues. A great importance is attributed to the 'PRTR' Protocol- Protocol on pollutant release and transfer register – which actually represents the international contract, adopted at the Fifth Ministerial Conference, "Environment for Europe" which was held in Kiev (Ukraine) in 2003.

In 2006, the Environmental Agency started activities registering pollutants and implementing the PRTR protocol of the Arhusk Convention (the full name of the convention

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is: Convention on Information Availability, Involvement of the Public in decision making and Availability of Legal System in relation to the Environmental Issues; the convention is actually the international contract adopted at the Fourth Ministerial Conference, "Environment for Europe", which was held in Arhusk, Denmark, in 1998). The register enables study of quantitative and qualitative changes in the natural environment at the Republic level, as well as the particular operations for protection of environment.

CRITERIA AND METHODS FOR ANALYSIS

The criteria and methods for analysis of successful protection of environment at the organization level can be classified into: **quantitative** and **qualitative**. Because it is difficult to get more precise estimate of the examined system, the quantitative methods of the analysis and estimation are not developed enough in practice.

Based upon the specific character of production process, the adopted plans cannot be represented by the marking factors only, but also, due to the inextricable objective risks-accidents, they have to include limits of acceptable operation irregularities.

Therefore, when a deviation is found on time, it is very important to have the alternative plans for overcoming and solving the problem with production.

Risk has multidisciplinary meaning, it has general importance, and it can be related to beings, things, numbers, etc. Risk is an important parameter with decision making; it is flexible in relation to the particular system in particular conditions and it cannot be instrumentalised so easily. Risk is probability of casualties, illnesses, material assets loss, and natural values degradation.

Risk can be quantified as a product of two factors:

1) Probability of an unwanted event (V)

2) Price of average consequences caused by the unwanted event (P)

$$R = (V \times P)$$

Regarding this approach, risk can be observed as endangering and injuring to the system or objectives which are the object of observation. Endangerment is related to the possibility that in a specific system there may come undesirable events, while injuring includes the possibility that undesirable events "produce" undesirable consequences, in other words, characteristics in the sense of all material and non material consequences.

Integral risk is determined for a specific danger factor. Such narrow orientation is made because on this stage the effect of combined influence of heterogeneous and different danger factors is not established [7]:

$$R = RF.RA.RE$$

where

RE is the differential risk of dangerous phenomenon occurrence, determined through the risks of life cycle phases Rlc, RER of the ergotechnical system and RE of emissions of dangerous factors;

RA - the differential risk of dangerous action occurrence, determined from the risks RD for dangerous factors distribution, RIM of immissions and REXP of dangerous interactions;

RE - the differential risk of dangerous effects occurrence, determined from the risks RH for occurrence of a kind of harm, RLOC for occurrence of harm localization, RSIZ of harm seriousness.

To determine the risk of the life cycle phase RLC, we assume that the critical events, appearing in the different phases, are incompatible. This is an objective assumption. It is impossible for a critical situation or an event in one phase (for example natural resources extraction) to cause and provoke a critical event in another phase (for example in case of neutralization and destruction of products). The risk of phases remains because they are the required causes and if they do not exist, there will be no danger, either, respectively. In fact, they form a full group of events, which can expand when defining new phases, but, nevertheless, it is final.

Judging from the meaning of the connecting operator OR, the risk RLC is determined through the dependence:

$$RLC=\{1-[(1-P(Flc1))(1-P(Flc2))(1-P(Flc3))(1-P(Flc4))(1-P(Flc5))(1-P(Flc6))]\}$$

where

P(Flc1) is the probability of dangerous events occurrence during extraction and processing of natural resources;

P(Flc2) - probability of dangerous events occurrence during production of products;

P(Flc3) - probability of dangerous events occurrence during storage, safe-keeping and distribution;

P(Flc4) - probability of dangerous events occurrence during use;

P(Flc5) - probability of dangerous events occurrence during recycling;

P(Flc6) - probability of dangerous events occurrence during neutralization and destruction of the products.

Research of critical situations and events may cover different productions. They can also be interpreted as a full group of events of the research. Then the probability PF/c2 may be presented analogically [8]:

$$R(Fflc2)=\{1-[(1-P(Flc2.1-P(Flc2.3))(1-P(Flc2.4))(1-P(Flc2.5)(1-P(Flc6))]\}$$

The risk of the ergonomic system RERG reflects the basic interactions between its components.

Quality methods of analyses and marks of specific elements of danger of the living environment are grouped and often used in practice.

Preliminary or previous marks of the element of danger of the living environment lead to the starting phase in research of ecological risk. Basically, the method of preliminary marking of the elements of danger leans on the existing marks or on the analysis of danger by which the dangerous elements of the living environment are identified.

Preliminary analyses of the elements of danger of the living environment can be presented in the following way:

– In the shape of columns with specific entries,

– Branch notices and

– Narrative description.

The policy of prevention of technical risks is organized within 4 basic principles:
– Reduction of risks in the source,
– Advanced means of intervention and protection,
– Informing the public,
– Theoretical development.

In this kind of understanding the study of danger is built (or the report of safety), pointers are defined, which make the identification of risk possible, the definition of preventive measures and the description of the influence of damage. The problem of disposition of biohazard waste and its following products has a long development road and depends on production strength, economy development, the level of expert and scientific thoughts and the level of development of the human society. Waste of biohazard origin has the characteristics of dangerous waste because of its toxic nature, mutagens I cancer in regard to biohazard characteristics; hence it affects people's health, the bio system and enhances the risk by polluting the living environment.

In order to estimate the danger in the living nature we use methods that are based on: *the theory of possibility, statistics, the state of diagnostics, expert methods, the theory of decisiveness, the theory of evaluation, mathematical theory of engineering experiments, etc.*

The methods for evaluating the elements of danger in the living environment, following the methodological approach, can be divided into the following groups: the deterministic methods, the methods of possibility and statistic and methods of expert marks.

The quality of the material factors of the living environment is a very important and complex component for the determination of the elements of danger of the living environment system. The negative action of the elements in the living environment manifests itself as:

– Physical elements of danger and damage: noise, vibrations, dangerous and damaging rays, climate parameters;
– Chemical elements of danger and damage: harmful and dangerous evaporations, aerosol, smoke, dust, fog, gas;

Biological elements of danger and damage: micro organisms and macro organisms.

CONCLUDING REMARKS

In all of the methods of identification, analyses and evaluation of the elements of danger within the systems of the living environment it is important that the ecological risk is recognized and estimated. Although there are many different approaches, because of so many elements affecting it, no universal quality method has been developed yet.

Many of the events that are related to breakdowns, damages and accidents are relatively little known; that is why the use of empirical formulas can test those far removed from the realistic estimates.

Informative technology gives many options in the field of planning, calculations, standards, norms and projections. The use of informative accomplishments in organizations is characterized by speed, reliability and greater possibility of capacity usage.

The defined methodology implies the procedure for risk point identification, the evaluation of its characteristics, estimation of the risk and the development model for controlling the risk. The use of many precautions in the computer system creation considering risk and involving companies using new technologies must be based on appropriate software packages which would give optimal and right answers.

The greatest level of the controlling structure without an agent takes control of the function (thus the function of the control is separated from the function of the informant) and communication of all the participants is possible.

The use of information technology directly reduces the number of employed in an administration and brings about changes in the control function on all levels. The transmission system is reduced between the strategic point and the operational nucleus and the organization pyramid is shallower and wider. The function of the middle level of the control structure is changed and so are its volume and activity. The middle level of the control function is reduced of its functions and its business can be done by lower leadership.

The reduction of the usage of energy has its economic implications which go as far as the consumption level as well as ecological significance in the lower pollution during the conversion of fossil fuels into energy, reduction of the surface diggings as well as the reduced risk of accidents in the production or transport of energy.

REFERENCES

1. Bartzokas A.: *Environmental regulation and industrial restructuring, the case od the fertilizer industry,* Proceedings: Environmental Regulation in the New Global Economy, Edward Elgar, 2002.
2. Constanza R.: *Ecological Economics – The Science and Management of Sustainability*, Irvington, NY. 1991.
3. Corselius, K., Wisniewski, S., Ritchie, M.: *Comprehensive research studies comparing conventionalana sustainable systems, Sustainable Agriculture, The Institute for agroculture and trade policy, SAD,* 2001.
4. Glišović S., Vojinović Miloradov M., Janković Ž: Facta universitatis Series: Working and Living Environmental Protection, Vol. 2, No 5, *Household appliance waste management- external drivers, legal and safety concerns*, pp. 355 – 361. 2005
5. Seitz D. W.; Nelson. C. G.; Halcrow. G. H.: *Economics of recorces, agriculture and food*, Mc Graw-Hill, New York, 2002.
6. Simpson S.: *Guide to the Environment*, Times Books, London, 1990.
7. Tomov V.: *Technology of safety, Book one, Critical situations and events,* Monography, Rousse, University of Rousse, 2004.
8. Tomov V.: *Theory of risk, Risk analysis and assessment in production,* Monography, Rousse, University of Rousse, 2003.

KRITERIJUMI ZA PRAĆENJE UČINAKA NA ZAŠTITI ŽIVOTNE SREDINE

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Sistem upravljanja zaštitom životne sredine obezbedjuje strukturisan proces stalnog poboljšavanja stanja životne sredine uz primenu čistih tehnologija. Predloženi model razvojnog planiranja zaštite životne sredine kompatibilan je sa strategijom i principima održivog razvoja i upravljanja projektima zaštite životne sredine. Izvedeni zaključci podložni su uopštavanju odnosno relevantni su u široj oblasti izučavanja procesa društvenog, privrednog i ekonomskog razvoja.

Ključne reči: *Reciklaža, zaštita životne sredine, energija, čiste technologije, akcident*