

THE CONSEQUENCES OF INTRODUCTION OF NEW ISO-14000 STANDARDS ON ENVIRONMENTAL PROTECTION IN SERBIA

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Abstract — *The introduction of new ISO-14000 standards to the environmental protection and preservation in Serbia is presented and discussed in this paper. The appearance of foreign competition in the present moment makes a problem in terms of loss of domestic production share because of the possibility of a much higher product exploitation quality offered for the same price and in accordance with the strict environmental protection requirements. All of this imposes an urgent need for coordination of quality of a domestic product and environmental protection management system with that of the world due to overcoming possible trade barriers. This methodology will provide opportunity for coordination between domestic and international standards (EU standards). It will also provide opportunity for improvement of environmental protection in the course of production and use of the products, as well as harmonization of domestic development and world market demands and requirements. As the environmental protection development influences other social areas in a significant manner and the society in general, the efficient environmental protection management should be of national nature and significance.*

1. INTRODUCTION

WORLD PROCESSES AND OUR COUNTRY

International standards figure prominently and crucially in removing the obstacles considering trade, as well as in gaining the trust at the market. The increase in trade in the world at the end of the XX Century exceeds the increase of production by three times. It requires imposition of demands that soon become obstacles in trade due to the lack of coordination among standards, technical regulations and procedures for determination of coordination for specific products. Our country, as well as our economy has no prospects at the world market if they are excluded from the world processes and international financial institutions that have clearly defined cooperation conditions. Fundamental changes should be made for further development, market expansion, as well as for the capital investment in our economy. Our

organizations must therefore begin with the processes of transformation, as soon as possible. Those processes of transformation do not mean the transformation in proprietary terms only, but also, and at the same time the planning, technological, organizational and management one. The acceptance of the world's best experiences that should contribute to more successful business operations of our economy at the world market is conditioned by the fulfillment of the following initial two conditions:

- transformation of the economy in terms of property
- development of the market atmosphere that implies the harmonization of the regulations as well as the openness of the market for international competition.

2. METHODS

NEW STANDARDS AND ENVIRONMENTAL PROTECTION MANAGEMENT

These standards constitute the so far most modern approaches to solving the piled up ecological problems of the company. They appear as a consequence of the shortcomings reported in the ecological strategy, as well as through the passive relation of the company to the environmental protection and business operations in accordance with the standards of the ISO 9000 series that do not include any of the ecological requirements. Ecological management, as well as the supporting standards of the ISO 14000 series represents the consequence of the severe legal provisions that have as a goal the identification of the responsibility for the ecological risk of the actual activity. These are not technical but developmental regulations from a field that deals with company organization management. The series of the ISO 14000 standards provides the efficient elements that optimize the activities in field of environmental protection with the parallel agreement with other management requirements so that there would be a fulfillment of the desired ecological and economic goals. Unlike the standards of the ISO 9000 series the standards of ISO 14000 series include a wider subject, application domain and the period of duration. The standards of the quality management are developed towards the interests of the consumers, and the standards of the ecological management are oriented towards the increasing requirements for the protection of the environment.

From the very beginning of the activities concerning the development of the ISO 14000 standards for environmental protection management, there were two separate and clearly defined employment domains. On the one hand that is a domain of the company organization, and on the other that is domain of products and company services. The first group of the coordinated management methods was created and it includes the following:

- environmental protection system management (JUS ISO 14001¹, 14004², 14061³)

- auditing (ISO 14010⁴, 14011⁵, 14012⁶) and
- evaluation of the environmental protection practice (JUS ISO 14031⁷).
- accreditation of the organizations for certification in accordance with JUS ISO 14001¹ - Instruction 66⁸
- environmental protection management dictionary (14050⁹)

The other group of methods, that was developed for the purpose of products and services, included the following:

- eco - labeling (JUS ISO 14020¹⁰, 14024¹¹) and
- evaluation of the life cycle (from JUS ISO 14040¹² to 14043¹⁵ and Instruction 64¹⁶)

The other group of methods represents a response to the need for a unique and rational basis for different national and regional schemes for the ecological certification of the products. Namely, every product or service influences the environment. The idea to evaluate a life cycle is to draw up an inventory and make an evaluation of these influences. The result of the study is a report that is used for decision-making, and it can also be shown to the public. Serbia and other developing countries have an interest to show that their products satisfy the demands in terms of environmental protection, through standards for the life cycle analysis. By the application of these methods, they will be able to show that their products meet the criteria used by the other countries in the world, and therefore demonstrate they accept the obligation of environmental protection, as well as of the development of the degree of ecological awareness. It should be pointed out that ISO standards, concerning the field of environmental protection, are successively translated, adopted and published as JUS ISO from the 14000 series in the national committee by the serious efforts of the members. In that way, our being one-step behind the world is minimal at least in this segment.

It is clear that the global development of the ecological consciousness means that the attention should be passed on to other segments. Rising of the local, industrial and individual ecological consciousness (Figure 1) must be achieved.



FIGURE 1 – ECOLOGICAL CONSCIOUSNESS DEVELOPMENT

All kinds of organizations put their effort to achieve and clearly show their result in the field of environmental protection via controlling

the influence of their activities, products or services to the environment, in accordance with their policy and their environmental protection goals. These organizations conduct their manners in such a way because of the strict laws, the development of the economic trends and measures for the improvement of the environment, as well as because of the overall increase in care of the interested parties for environmental protection issues, including the sustainable development.

International standards for environmental protection management should provide elements for the effective environmental protection management system to the organizations; elements that can be integrated with the other management requirements, so as to help the organizations to reach the environmental protection aims, as well as the economic ones. These standards, as well as the other international standards should not be used either for making trade barriers (technical) exempted from duty or for imposing the new ones or changing the current legal obligations of the organization.

The requirements for the mentioned environmental protection management system are determined by this international standard (JUS ISO 14001¹). The standard is written so as it can be applied by the organizations of all kinds and sizes, and it can be adapted for different geographic, cultural and social conditions. The basis of the approach is shown in Figure 1. The success of the system depends on the obligations on every level and function, and especially on the top management. Such a system makes it possible for the organization to determine and evaluate the efficiency of the actions for environmental protection policy and goals determination, to achieve coordination with them and the others, as well as to show that coordination. The main goal of this international standard is to support the environmental protection, as well as the prevention of pollution of the environment, and it should all be done in balance with social and economic needs. It should be pointed out that many of these requirements could be made at the same time, or reviewed at any time.

This international standard includes principles of the management system, and those principles are valid for the quality management systems as well in accordance with the standards of the ISO 9000 series. Organizations can decide to use the present management system according to standard ISO 9001¹⁷ as bases for their environmental protection management system. However, one should take into account the fact that the application of different elements of the management system can vary due to different goals and different interested parties. While the quality management systems deal with the needs of the consumers, the environmental protection management systems are oriented towards the needs of the broad spectrum of the interested parties, as well as towards meeting the increasing needs of the society as to protect the environment.

It is not necessary to establish the environmental protection management systems, determined by this international standard,

independently considering the elements of the existing management systems. In some cases, adapting the elements of the existing management systems can fulfill these requirements.

3. DISCUSSION

STAGES OF PRODUCT AND MANAGEMENT SYSTEM

PLANNING ON THE BASIS OF THE SERIES OF JUS ISO 14000 STANDARDS

Besides standards for products and demands for conception and construction of the products, via the life cycle (LC) of the product, evaluation of the life cycle (LCA), as well as the influence of the life cycle (LCI), the instruction JUS ISO 64¹⁶ bonds quality management systems JUS ISO 9001¹ and protection of the environment JUS ISO 14001¹, as well as the standards of the JUS ISO standards from 14040¹² to 14043¹⁵. On the basis of all of these relations and requirements it is possible to divide the products development and management system planning into stages.

The first stage — This stage refers to the products planning. On the basis of the trends listed above in the specifications (instruction JUS ISO 64¹⁶), and because of the harmonization with all of the needed requirements, there is a need to adopt European standards as national (with certain amendments) as well as to adopt trends of the development of these specifications at other stages.

The second stage — This stage refers to desired technology planning as well as the management system planning. Increasingly strict standards for quality of the products determine the kind and type of the applied technology the consequence of which is the management and organization system through quality management (JUS ISO 9001¹⁷), and on the basis of the sustainable development and environmental protection management (JUS ISO 14001¹) concept. The environmental protection management cannot be observed separately from quality management, but one cannot say that the former is a part of the latter or vice versa. These systems overlap, but each of them has its' own specific issues besides a significant number of similar elements. Unlike the quality of the product the ecological performance cannot be evaluated by testing the product itself. Besides that, there is no final goal in the environmental protection management system, only continuous improvements, because there is no human activity that is safe enough in terms of environment.

There should be a parallel development of the practice and systems of quality management and environmental protection management on the one hand, and improvement of the existing and introduction of the new production technology on the other. Modern catalytic processes have a direct function to reduce negative influences on the environment. It primarily refers to the possibility of more efficient removal of the product compounds that contaminate the environment, and the maximum content of which is determined by a valid standard.

Generally speaking, every organization should invest in plants and modern technological processes in production in order to achieve at least a lower point (limit) of quality of the product that is anticipated by the standard. This will also provide opportunity for reductions in noxious emissions:

- into air (above all carbon dioxide and sulfur)
- effluents into water (via a high-quality treatment before they exit the plant)
- and to define the ways of postponing and treating the waste material from the technological processes in accordance with the standards and law on hazardous waste.

The third stage - This stage refers to the product and organization. The study about Evaluation of the life cycle (LCA) "from cradle to grave" of a product should be conducted so that the subject and goal of the analyses would be defined, the inventory analysis done, influence of certain stages evaluated and finally, so that there would be some activities conducted over the immediate ecological evaluation of the product when making a final investment decision. This evaluation is conducted on the basis of standards of the 14000 series where those standards refer to a product. The mentioned standards are the following ones: JUS ISO from 14040¹² to 14043¹⁵.

The principles and frameworks of LCA¹⁸ (JUS ISO 14040¹²) - This is the means for creating a standard approach for evaluation of the influence on the environment, continuously during the whole lifetime of the product. Goal and subject defining (JUS ISO 14041¹³) - The evaluation of the life cycle through defining the general goals of the study, the product it refers to, the intended audience, the subject of the study, required data and the type of the critical reexamination that is to be conducted begins at this stage of the process. The inventory analysis (JUS ISO 14041^B) - The life cycle of a product represents a sequence of interconnected processes and systems with a mutual purpose of creating a product. The inventory analysis is a list of these processes and systems, their limits, as well as the potential influences of each and every process and system. Influence evaluation (JUS ISO 14042¹⁴) - When the list of potential influences is obtained from the above-mentioned step, then the classification and quantification of the anticipated influences should be conducted. This stage may be rather complicated and may require employment of scientific analytical methods, as well as attentive anticipations. Interpretation of results (JUS ISO 14043¹⁵) - The purpose of this stage and referent standard is to show the relations that can exist between the life cycle evaluation and other eco-management methods and to explain the limits of professional responsibility of the LCA in terms of possible employment of the LCA study.

The next issue is realization of ecological evaluation of the organization performance by means of Environmental protection management standard - Environmental protection performance

evaluation -Guidelines JUS ISO 14031⁷. This international standard provides the guidelines for designing and employment of the evaluation of the performance of the environmental protection in the frameworks of organization. It can be applied to every organization regardless of their type, size, location or complexity. Environmental protection performance evaluation (EPE) is a process which makes the decision making easier to the management, where those decisions refer to organization environmental protection performance via indicator selection, data gathering and analysis, information evaluation in terms of criteria of the environmental protection performance, reports and communication, as well as periodical reexamination and improvement of this process. Environmental protection performance evaluation is done on the basis of this standard via:

- environmental protection performance indicators (EPI) - a specific term that provides information about performance of the environmental protection of the organization
- management performance indicators (MPI) - environmental protection performance indicator provides information about management efforts regarding possible influencing the performance of the environmental protection of the organization
- operative performance indicators (OPI) - environmental protection performance indicator provides information about performance of the environmental protection of the organization activities and operations

A considerable number of organizations search for the ways, which would make it possible for them to understand, demonstrate and improve their own environmental protection performance. This can be achieved by efficient control over the elements of their activities, products and services that can have a significant influence on the environment (Table 1).

Environmental protection performance evaluation (Environmental Performance Evaluation - EPE), the subject of this standard, represents the internal process and mechanism of the management that is designed to ensure continuous control over reliable and verifiable information for the purpose of determination whether the performance of the environmental protection of the organization meets all criteria that were established by the organization management. The organization that has its environmental protection management system established should validate environmental protection performance with regard to the policy of the environmental protection, general goals of the environmental protection, specific goals of the environmental protection, and other criteria of the environmental protection performance with regard to the organization. In case that organization has no environmental protection management system, then EPE can be of help in terms of:

- identification of its environmental aspects;
- determination of the aspects that might be treated as significant;

- establishing the criteria for its environmental protection performance;
- evaluation of its environmental protection performance with regard to those criteria.

This international standard (JUS ISO 14031⁷) supports the requirements in JUS ISO 14001¹ and guidelines in JUS ISO 14004² but it can also be employed independently. EPE and verification of the environment helps the organization management to evaluate the state of their environmental protection performance and to identify the areas that need to be improved. EPE represents a constant process of gathering and evaluation of data and information for a momentary environmental protection performance, as well as the trends of the performance during a certain period of time. On the other hand, environmental protection audits/verifications were conducted periodically for the purpose of verification of the coordination with the defined requirements. Additional guidelines for environmental protection (audit) are provided in JUS ISO 14010⁴ and 14011⁵.

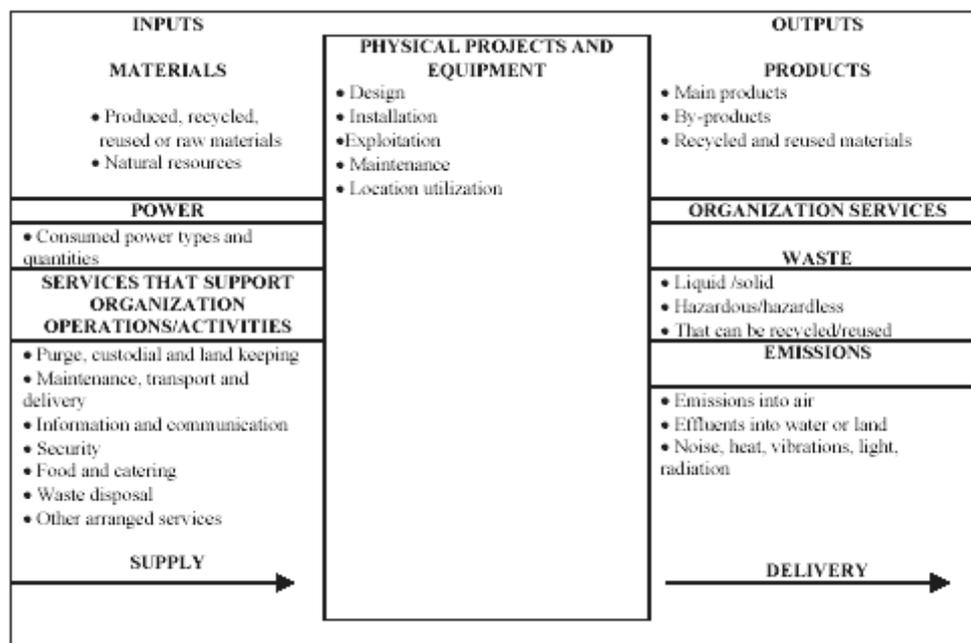


TABLE 1 – ORGANIZATION OPERATIONS/ACTIVITIES (WITH ADDITIONAL DETAILS)

Examples of other mechanisms that can be used by the management for the purpose of providing for additional information for EPE include environmental protection re-examination, as well as life cycle evaluation (LCA). While EPE is oriented towards description of the performance of environmental protection of one organization, LCA represents an evaluation technique regarding environmental aspects, as well as potential influences related to production and service systems. Additional guidelines for LCA are provided in JUS ISO from 14040¹² to 14043¹⁵. The relevant information from these guidelines and other data sources can be of help as support in EPE employment, as well as in conduction of other management mechanisms.

It should be pointed out that this methodology is still not perfect, but it represents great help in improvement of the product development planning function, analysis of the influence of the products on the environment (throughout all of the life cycle stages⁷), as well as in indication of the ecological efficiency of the organization. LCA is definitely one of the best employment methods regarding planning and decision-making in the scope of eco-management systems. This method is not the only means of evaluation of influence on the environment, and that is why this evaluation (for the purpose of a better idea about it) has to be elaborated by evaluations of other methods such as risk analysis, costs and gain analysis, quality functions development, experiment planning, etc.

4. CONCLUSION

Since all of these are strategic courses of the development and investment cycle, there is a need for a completely different concept of product planning and development. It implies more looking ahead through current and future trends of world progress and globalisation process, world market development and demands, development of the systems of standards, as well as harmonization of sometimes even opposed and competitive requirements and demands. The appearance of foreign competition in the present moment makes a problem in terms of loss of domestic production share because of the possibility of a much higher product exploitation quality offered for the same price and in accordance with the strict environmental protection requirements. All of this imposes an urgent need for coordination of quality of a domestic product and environmental protection management system with that of the world due to overcoming possible trade barriers. This methodology will provide opportunity for coordination between domestic and international standards (EU standards). It will also provide opportunity for improvement of environmental protection in the course of production and use of the products, as well as harmonization of domestic development and world market demands and requirements. As the environmental protection development influences other social areas in a significant manner and the society in general, the efficient environmental protection management should be of national nature and significance.

REFERENCES

- [1.] JUS ISO 14001 (1998): Environmental protection management – Specification with the application manual, Belgrade, S.Z.S.
- [2.] JUS ISO 14004 (1998): Environmental protection management – General guidelines for principles, systems and procedures, Belgrade, S.Z.S.
- [3.] ISO/TR 14061 (1998): Information to assist forestry organizations in the use of Environmental Management System standards ISO 14001 and ISO 14004
- [4.] JUS ISO 14010 (1998): Guidelines for environmental protection verification – General principles, Belgrade, S.Z.S.

- [5.] JUS ISO 14011 (1998): Guidelines for environmental protection verification – Verification (audit) procedures - Environmental protection management system procedures, Belgrade, S.Z.S.
- [6.] JUS ISO 14012 (1998): Guidelines for environmental protection verification – Criteria for qualification of the of the environmental protection auditors, Belgrade, S.Z.S.
- [7.] JUS ISO 14031 (2002): Evaluation of the environmental protection performance, Belgrade, S.Z.S.
- [8.] JUS ISO Instruction 66 (2000): General requirements for bodies operating assessment and certification/registration of environmental management systems (EMS), Savezni zavod za standardizaciju (National standardization institute), Belgrade, S.Z.S.
- [9.] JUS ISO 14050 (2000): Environmental protection management, Rečnik (dictionary), Belgrade, S.Z.S.
- [10.] JUS ISO 14020 (2001): Designations and declarations of environmental protection – General principles, Belgrade, S.Z.S.
- [11.] JUS I SO 14024 (2001): Designations and declarations of environmental protection – Ecological Type I designation –Principles and procedures, Belgrade, S.Z.S.
- [12.] JUS ISO 14040 (2000): Environmental protection management – Life cycle evaluation – Principle and frameworks, Belgrade, S.Z.S.
- [13.] JUS ISO 14041 (2000): Environmental protection management - Life cycle evaluation – Inventory analysis goal and subject defining, Belgrade, S.Z.S.
- [14.] ISO 14042, Environmental protection management - Life cycle evaluation – Life cycle influence analysis.
- [15.] JUS ISO 14043, Environmental protection management - Life cycle evaluation – Life cycle interpretation, Belgrade, S.Z.S.
- [16.] JUS ISO Instruction 64 (2000), Instruction for inclusion of the environmental aspects into standards for products, Savezni zavod za standardizaciju (National standardization institute), Belgrade, S.Z.S.
- [17.] JUS ISO 9001 (2001): Quality management systems, Requirements, Savezni zavod za standardizaciju (National standardization institute), Belgrade, S.Z.S.
- [18.] MILOIČIĆ D.: Application of standards for life cycle evaluation (ISO from 14040 to 14043), Quality 1, 2 Belgrade 2000.