



PREPARING A CORPORATE SYSTEM OF STANDARDS TO DIGITIZATION

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ABSTRACT

The digitization economy requires represent information in digital form. What are the first steps to prepare for the digitization of the corporate standardization system? On the example of the standardization system of Rosatom`s enterprise "Institute of Nuclear Materials", are consider the first steps to prepare a corporate system for standardization to digitization.

Key words: digitization, organization standard, acting system of standards, modified system of standards, structure.

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1. INTRODUCTION

At the Saint Petersburg International Economic Forum in June, 2017 Vladimir Putin, the President of the Russian Federation, has mentioned one of the main strategic aspects for

Russian development: development of the economic cyberspace, which means implementation of digital technologies in all the life areas [1]. Such an approach supposes to use achievements of information and communication technologies at all the stages of the product life cycle from its development till its implementation and maintenance, along with fast and proper provision of different services [2, 3].

2. TOPICALITY AND SCIENTIFIC IMPORTANCE

Development of the cyberspace supposes complete digitization of the information accompanying products and services since they appear. This statement is related to documents of all types, including vast number of regulations: standards of different levels, regulations, recommendations, instructions; every enterprise has a vast number of them.

An expected question arises, what kind of standard should be in digital economics? What are the requirements to the form and content of standardization documents in new conditions? In general, what are the requirements of the digital economics to digital standardization?

According to specialists in this field, a qualitative changeover from traditional standard form to innovative one will not happen at once, but it should start, and step-by-step consistent changes should change the conventional approach [4].

In this situation standards become good initial data to form the best practices in any field.

What are the first steps to develop digital standardization documents for a particular small enterprise?

According to Peter Shchedrovitsky, Russian methodologist and political technologist, these days new industrial revolution determines three main development trends,

- - everything transforms into digital form,
- - development of materials with controlled properties,
- - development of control systems compensating human incapability of fast thinking.

Also according to P. Shchedrovitsky, digitization trend is passing away in the world, but in Russia it seems to become an overtaking trend enabling development of the process control model. Development of the control model requires digital twin of the object or process, while further development will be much slower without digital self-renewing information. Nowadays there is general view on the digital standardization issues given by a number of Russian experts: A. Zazhigalkin, V. Pugachev, and A. Petrosyan [6]. There have not been any recommendations by Rosstandart on actions to be taken.

3. RESEARCH OBJECTIVE

Due to lack of information the authors had an idea to discuss the steps to prepare digitization of the corporate standardization system in the context of one of Rosatom enterprises - Joint Stock Company "Institute of Nuclear Materials (JSC "INM").

Rosatom State Corporation is one of the leading companies in terms of digitization with 65 % of information digitized for the last 10 years. These impressive results are mostly related to cooperation at more global corporate level, but they haven't changed the particular standardization system of the small enterprise [7].

The authors consider the following steps should be taken to start digitization of the standard system:

- review all the current documents to be up-to-date,
- review and revise the standardization system structure,
- identify the main standardization objects,
- to make provisions for possible causes to change information in standards and response to them.

4. THEORY

Patterns, principles, methods and forms to achieve optimal level of order, by wide and multifaceted use of the established regulations and requirements, to solve existing, planned and potential economic and social issues represent standardization theory subject [8]. Continuing scientific, production and social processes are the standardization object. The following principles are related to standardization theory [9 -14]:

- composition principle, suggesting development of the system of goals and their structuring using system, functional and structural approaches;
- order principle, reflecting interactions established in a particular way;
- analysis and synthesis principle, with analysis focusing on the structure and showing the work of the parts of the whole and synthesis focusing on functions and explaining element activity;
- synergy principle, showing that the sum of system properties is greater than the sum of its elements.

To discuss the standard digitization issues in the context of the particular enterprise it is relevant to focus on the analysis and synthesis of the parts of the whole and the role of elements.

5. STUDY RESULTS

The review of the current standardization system structure at JSC "INM" gives the following results.

Table 1 The acting system of standards of the company. Institute of Nuclear Materials

Symbol of standards group	Standardization objects in a group	The number of standards
1	Quality management system (QMS)	4
2	Documents	6
3	Preparation of research works	1
5	Design solutions, special equipment, design documents	6
6	Procurement (QMS)	1
9	Technological process, equipment, management processes (QMS)	10E
10	Special purpose machines, equipment, product control	3
11	Metrological control	6
13	Nonconforming products (QMS)	1
14	Corrective and preventive actions (QMS)	2
15	Nuclear and radioactive	13

	materials	
16	Records (QMS)	1
17	Audits (QMS)	2
18	Personnel	3
19	Building	1
21	Occupational Safety and Health. Fire safety	3
22	Technological process, monitoring of ecology (QMS)	3
23	Technological process	7
24	Documented procedure (QMS). Visitors	2

There are 75 standards in the current corporate system, which are divided into 19 groups. Standardization objects in each group probably were classified historically, when new standards were developed and this way or another joint to existing ones. Some groups of standards contain one or two standards which are not independent objects. As a result a diverse mixture of objects, often containing requirements to products and different processes at the same time. Table 1 shows brief description of the current standard system at JSC "INM".

In the modified structure of the corporate standard system an effort to classify current standards by standardization objects, dividing them into product and process groups, was taken. As a result 11 groups were formed out of 75 current standards, their brief description is given in Table 2. Suggested changes in the structure are first of all focused on the structure type separating products and processes. As a result of changes in the structure we have significantly less number of standard groups (the number decreased more than by 40 %: from 19 to 11).

Table 2 The modified system of standarts of the company «Institute of Reactor Materials

standardization system Symbol of standards group	Standardization objects in a group	The number of standards
A	Quality management system	16
B	Special purpose machines	3
C	Documents	5
D	Building	4
E	Documents for construction	4
F	Technological process	16
G	Metrological control	6
H	Reactor materials	15
I	Personnel	3
J	Occupational Safety and Health. Fire safety	3
K	Visitors	1

Fig. 1 gives the relationship between the number of standard groups in the current and modified structures of the corporate standard system of JSC "INM". The modified structure is more complete, with apparent basic groups: «A» (QMS), «F» (technological process) and «H» (reactor materials).

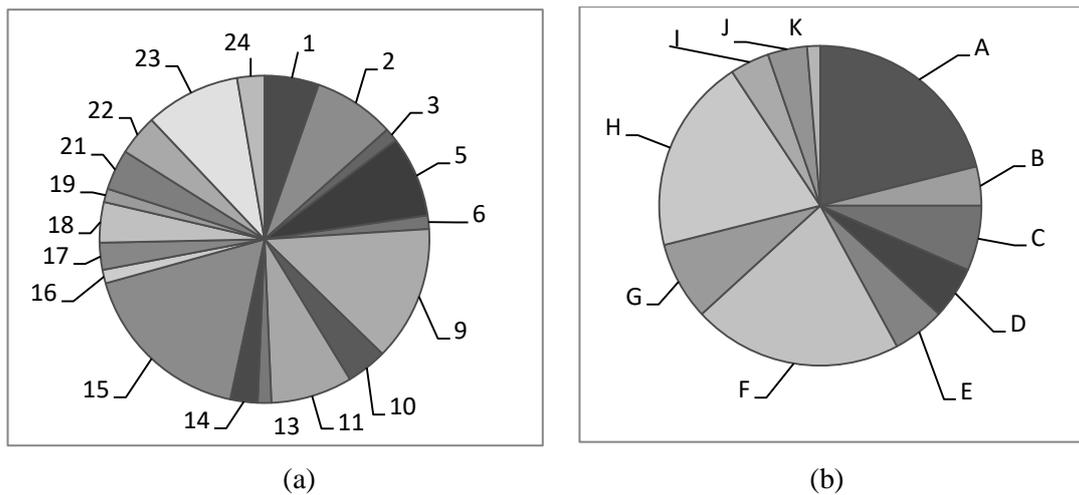


Figure 1 Number of company standards in the groups

- a) - The acting system of standards of the company. Institute of Nuclear Materials
- b) - The modified system of standards of the company «Institute of Nuclear Materials

The modified structure of the corporate standardization system forms standard groups with general information in the regulations section of the standard. This is demonstrated in the context of the group 2 of the current corporate standard system and group «C» of the modified corporate standard system at JSC "INM" with similar standardization objects.

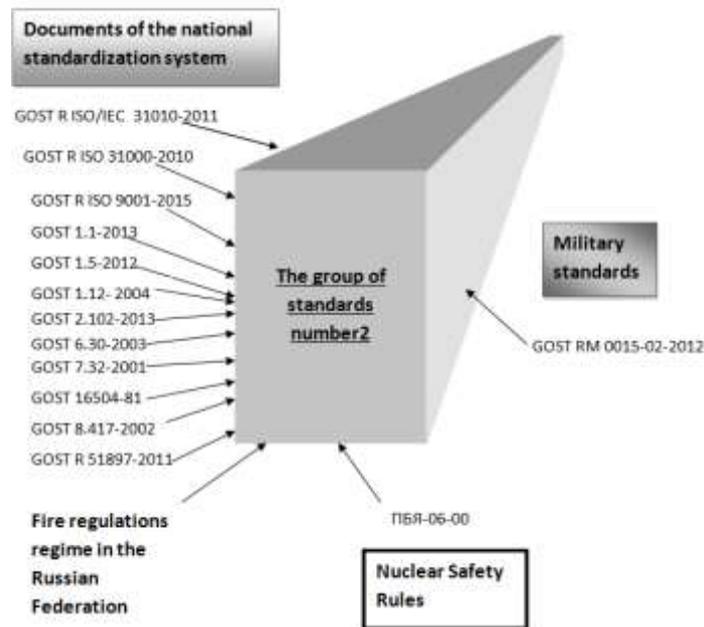


Figure 2 The acting structure of standards system

The suggested changes should facilitate the procedure of the standard information review in case National standards or other documents from the regulations section are amended [15]. Fig. 2 gives different kinds of regulations for the group 2 of the current structure, while Fig. 3 gives those for group «C» of the modified structure of the corporate standard system at JSC "INM".

There are several reasons to change the standard content:

- update of the information in regulations section,
- review of the organizational structure of the company,
- resolution of the identified non-conformances,
- expiration of the standard.

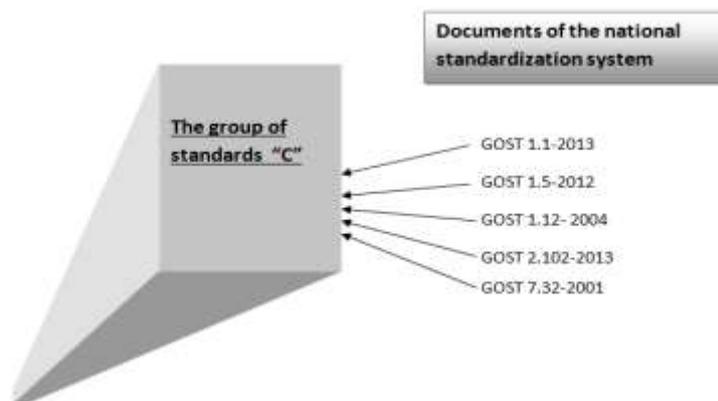


Figure 3 The modified structure of standards system

From all the possible reasons to review the standard system the first one is an external reason and the most troublesome one, which in the modified structure of the corporate standardization system can be much easier implemented. In group «C» of the modified corporate structure of the standard system at JSC "INM" the number of documents affecting the standard content is significantly reduced, as compared with the current structure: only 5 standards against 12 in the current structure. Standard content management in the modified structure, depending on national standardization system documents or other regulations, is simplified, therefore possible changes are reduced by 65 %, which can be considered a good result.

6. CONCLUSIONS

Development of digital economics and implementation of digital technologies require digitization of the regulation documents at all management levels.

In terms of corporate standard system it is important to develop the structure with clear division of the standardization objects into products and processes.

Such an approach allows reducing possible reviews of standard regulation section by 65 %, in case of changes in regulations in the Russian national standardization system.

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