Integration and implementation of quality systems at melioration enterprises

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Abstract. The introduction of an integrated management system at the enterprises of the reclamation profile in the form of a merger of three basic systems - a quality management system, a health and safety management system has substantiated. The features of the application of a complex of interrelated standards at an enterprise with a melioration profile have described. The advantages, the construction algorithm, the main stages, the procedure for organizing activities for the development and implementation of an integrated management system at a land reclamation enterprise have given.

1. Introduction
The activities of reclamation enterprises are currently aimed not only at strict requirements for the quality of work performed, but also closely related to the environment and labor safety, therefore, the development and implementation of only a quality management system (QMS) at the enterprise in accordance with the requirements of the international standard ISO 9000: 2015 you can't do it here.

An integrated management system (IMS) is understood as a part of an organization's general management system that meets the requirements of two or more international or national standards for management systems and functions as a whole.

The advantages of using an integrated management system compared to using separate management systems have an improved focus on business, a more holistic approach to management, less contradictions between individual systems, less duplication of work and bureaucracy, and more efficient audits.

The purpose of the study is to prove the feasibility and develop a scientifically grounded sequence for the development and implementation of IMS at reclamation enterprises [1].

2. Methodological aspects of the study
The analysis of the possible structure of the IMS for an enterprise with a reclamation profile showed that in modern conditions, the best option is to include in the IMS of the enterprise individual systems presented in table 1.
Table 1. Consolidation of requirements of individual management systems in the IMS of a reclamation enterprise.

| The name of the management system | Normative document, system requirements |
|----------------------------------|-----------------------------------------|
| Quality Management System (QMS)  | GOST R ISO 9001–2015                     |
| Environmental management system (EMS) | GOST R ISO 14001–2016               |
| Occupational health and safety management system (HSE MS) | ISO 45001: 2018 |

By combining a set of several standards for specific management systems, the IMS eliminates their duplication with each other and removes possible contradictions between them. The organizational and methodological basis for the creation of IMS should be ISO 9000 series standards. This is due to the fact that the basic concepts and principles formulated in these standards are most consistent with the concepts and principles of general management [2].

An additive (sequential) approach based on the identification of general and specific requirements has become the most widespread in the creation of IMS of enterprises and organizations. The process of developing an IMS is similar to the creation of a QMS in accordance with the requirements of the ISO 9000 series [3]. The algorithm for constructing the IMS of an enterprise with a reclamation profile based on the identification of general and specific requirements is shown in figure 1.

![Algorithm for constructing IMS of an enterprise with a reclamation profile based on the identification of general and specific requirements](image)

**Figure 1.** Algorithm for constructing IMS of an enterprise with a reclamation profile based on the identification of general and specific requirements.

### 3. Research results

When creating an IMS of an enterprise with a reclamation profile, it is necessary to use the QMS as a basic management system, since it is aimed at a more comprehensive coverage of the enterprise in comparison with EMS and HSE MS [4, 5]. This approach guarantees the most effective implementation of the quality system at technical service enterprises [6, 7, 8]. Below is a possible variant of the process of creating an IMS of an enterprise with a reclamation profile, which includes six stages shown in table 2.

Table 2. Stages of the process of creating an IMS at a land reclamation enterprise.

| Stage name | Stage content |
|------------|---------------|
| 1. Preparation of the plan and creation of the IMS infrastructure | 1.1. Development of the concept of IMS for a reclamation enterprise  
1.2. IMS project development  
1.3. Creation of IMS infrastructure  
2.1. Management training for a reclamation enterprise |
| 2. Training of employees of the enterprise by categories | 2.2. Training of a temporary working group and personnel of a reclamation enterprise  
2.3. Training of internal auditors of IMS |
3. Development of IMS
   3.1 Identification of general and specific requirements
   3.2 Establishing procedures for implementing requirements
   3.3 Documenting general and specific requirements

4. Implementation of an integrated management system
   4.1. IMS approbation at the enterprise and fixing inconsistencies
   4.2. Correction of IMS documentation from the standpoint of improvement
   4.3. Summing up and preparing IMS for certification
   5.1. Analysis of the functioning and implementation of IMS, development of corrective actions

5. Analysis of the results of the implementation of IMS at the enterprise and making a decision on certification
   5.2. Development of a development plan and forecasts for improving the IMS
   5.3. Making a decision on the need and feasibility of IMS certification
   6.1. Selection of the IMS certification body
   6.2. Organization of interaction with the IMS certification body
   6.3. IMS certification and obtaining a certificate of compliance with the requirements of modern international standards

6. Certification of IMS

The practice of creating an IMS at Russian enterprises has shown that the creation of an IMS on a turnkey basis by a consulting organization does not allow obtaining an efficient and effective system. The specifics and numerous features of the activities of a particular reclamation enterprise can be taken into account only when creating an IMS by its own employees and departments with the involvement of highly qualified consultants in necessary situations. The main participants in the work on the creation of an IMS at an enterprise with a reclamation profile are shown in figure 2.

Figure 2. Participants in the creation of IMS reclamation enterprises.

Each of the participants in the creation of the IMS performs the corresponding functions determined by the provisions on divisions and job descriptions. The work on the creation of the system begins with the formation of the organizational structure of the IMS management. The specified activity should include the following types of work:

- appointment of a representative of the IMS management;
- creation of a quality service, an environmental service, a labor protection service (at small enterprises - a joint IMS service);
• creation of a coordinating council for IMS;
• appointment of persons responsible for IMS in structural divisions;
• formation of a working group.

For the period of creation of the IMS, a temporary joint working group must be formed and approved by order for the enterprise [9, 10]. The lower level in the organizational structure of IMS management of a reclamation enterprise is represented by those responsible (authorized) for the IMS of structural units. They are the agents of quality, environmental and health and safety policy at all levels of the management structure. Together with the relevant services, the authorized persons participate in the development of IMS documentation for their division, in self-assessment, internal audits, collect and process information on the IMS in their division, develop and ensure the implementation of corrective and preventive action plans, ensure the preparation and conduct of internal audits in the division and etc.

When analyzing the process indicators by outputs, the process owner evaluates the effectiveness of the process, the satisfaction of consumers and suppliers of the process, the fulfillment of process requirements, identifies existing and anticipated process problems, identifies the causes of problems and possible solutions to problems, selects the most effective and efficient way, and plans corrective actions for improvements.

The effectiveness of the process is calculated by the formula (1):

$$Q_{\text{at}} = \sum_{i=1}^{n} R_i K_i$$

where $Q_{\text{at}}$ is the actual efficiency of the process in %; $R_i$ – the level of achievement of the planned value by the $i$-th indicator in %; $K_i$ – the coefficient of importance of the indicator; $i$ – the ordinal number of the criterion ($i = 1 \ldots n$); $n$ – the number of indicators.

Continuous improvement of QMS processes increases the ability to respond to internal and external risks and opportunities; ensures customer satisfaction, increasing the efficiency and effectiveness of processes and QMS in general, the image and prestige of the reclamation company.

4. Conclusions
The development and implementation of integrated management systems (in the field of quality management, ecology, safety, as well as other areas of production management) that meet the requirements of modern international standards should be considered as a significant contribution to the sustainable development of reclamation enterprises. The introduction of an integrated management system at the enterprise increases the ability to respond to internal and external risks, ensures customer satisfaction, increases the efficiency and effectiveness of processes and the prestige of the enterprise as a whole.

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