Theoretical foundations of industrial safety in modern conditions

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Abstract. The service sector in the industrialized countries throughout the world has taken a leading position in the socio-economic life. Thereby, ensuring the improvement of the provided service quality and the expansion of service range are becoming a nationwide business. Service is the economy development as well as the public employment and the basis of stability in society. Moreover, service should be under control; and one of the most efficient ways to provide it with supervision is an expert review. In all countries with a market economy, such expert review (the notion of “inspection” is used abroad) has long taken its place and its influence on the regulation of production activities is quite favorable [1].

1. Introduction
The service sector gives from 60 to 75% of the national income and employs more than 70% of the working-age population. In Russia, this area provides about 1/2 of the national income. When joining the WTO, domestic enterprises will be obliged to withstand strong competition from Western partners as well as the expansion of foreign goods in the markets.

Due to the rapid development of market relations on the territory of the former USSR, the liberalization of foreign trade and the weakening of the administrative regulatory state role, the traditional market regulation and control methods for product reproduction are becoming more important. One of the most important mechanisms for such regulation and control is an objective and competent expert review. The world-famous companies such as “Lloid”, “Veritas”, TUV and others, as well as the associations of inspection companies, for example “IFIA”, operate in this area.

2. Materials and methods
As for the Russian industry, the use of the expert review instrument is carried out within the framework of the industrial safety management system. The industrial safety expert review, in accordance with the law “On industrial safety of hazardous production facilities”, forms the basis of industrial safety, being an integral safety management instrument. For the first time in Russia, the concept of “industrial safety expert review” was introduced by the Federal Law of July 21, 1997 No. 116-FL [2], expanding the previously existing concept of the expert review of industrial plants (facilities), equipment and works that were under the jurisdiction of the activities licensed by the Russian Federation Oversight Committee for Mining and Industry.
The main expert review tasks include determining the safety degree of the decisions in the area of design and all other documentation regarding technical devices, buildings and structures at a hazardous production facility; and also the industrial safety expert review declarations and other documents related to the operation of a hazardous production facility.

The industrial safety expert review is carried out in accordance with the rules established by the Federal Service for Technological, Environmental and Nuclear Supervision [3] by organizations that have licenses to carry out industrial safety expert review at the expense of the organization (customer), assuming or operating a dangerous production facility. The industrial safety expert review declarations is carried out in accordance with the rules [4, 5].

The most important condition for the examination is its reliability, independence and enhanced quality of expert work. The fulfillment of these conditions is achieved by the proper organization of expert work, the selection of qualified personnel, the provision of expert organization of normative-technical and legal documentation, technical equipment, awareness of economic and legal responsibility. The regulation of activities in the industrial safety expert review by the state is carried out through the scope of licensing (issuance of documents authorizing this activity type) and subsequent supervision (control) over compliance with the requirements and conditions by the license holder. Such regulation does not completely solve the problems arising in the quality of the industrial safety expert review.

The law “On Technical Regulation” provides for the concept of accreditation that is “an official recognition by an accreditation body of the competence of a natural or legal person to perform work in a specific area of conformity assessment. Conformity assessment is a direct or indirect determination of compliance with the requirements for the object” [6].

The Supervisory Board is formed from representatives of the Federal Service for Environmental, Technological and Nuclear Supervision (FSETNS), its territorial bodies and its subordinate organizations. It monitors the activities of the commission of ISER. The composition of the Supervisory Board is approved by FSETNS. The Advisory Board consists of representatives of organizations interested in the work of the commission of ISER and has a consultative view. The composition of the Advisory Board is approved by the Supervisory Board. Sectoral commissions are created by the Supervisory Board and solve specific, professional tasks in areas corresponding to their competence. The coordinating body ensures the detailing of the entire Accreditation System, in particular, it analyzes the performance of expert organizations, the regulatory and methodological basis of the commission of ISER.

3. Results and discussion
The industrial safety expert review is carried out at the expense of the customer on the basis of his application or other documents in accordance with the conditions agreed by the expert organization and the customer. The expert organization starts to conduct an inspection only after receiving a set of necessary materials and documents in full in accordance with the requirements of the current regulatory technical documents. The result of the industrial safety expert review is the conclusion. The decision to issue a positive or negative expert opinion is made on the basis of the review and analysis of the documents obtained during the expert review, checking the condition of the object or conducting the necessary tests.

The organizations involved in the provision of industrial safety expert review services are expert organizations that are business services enterprises. The creation of such service enterprises is an integral trend of a market economy. In today's economic environment, consumer requirements, supported by relevant legislation on consumer protection, are becoming increasingly weighty and stringent, which leads to significant changes in the structure of product quality indicators, and, consequently, to an increase in the socio-economic significance of the problem of improving the quality of technical services. Experts point to different attitudes of consumers to assess the quality of products and to assess the quality of services. The consumer considers the quality of the service not only as a result of the receipt of a product or service, but also as the process of providing this service.
and the nature of the interaction that takes place. Thereby, quality management services is a connecting element of each process of activity and an integral component of the overall management of the technical service enterprises. Wherever possible, the process, product and service should be certified.

The degree of implementation and the nature of the production goals set by the enterprise help to make economic and scientific-technical forecasts. Forecasting allows you to identify ways and directions of development of the enterprise, to determine the timing of their implementation. Initially, a technical forecast is carried out, the specific needs of the market are identified, in this case, in the production of safe products and meeting certain industrial safety requirements. The main operational parameters of technical devices are determined in accordance with the requirements of the industrial safety expertise conducted at the design stage. Economic forecasting is carried out in order to identify the needs of the market for a new product; the cost of manufacturing the product and the price on the market (taking into account the costs of meeting the requirements of technical regulations and conducting expertise). Thus, the technical and economic forecast in this case is made on the basis of the specific needs of the market for technical devices used in the HIF, describes possible methods (technologies, organization) of production and the development of the object of forecasting.

4. Conclusion
Since the marketing as a creative management function intends to conduct scientific research aimed at meeting the needs and requirements of customers, the results obtained at the forecasting stage using industrial safety expert review and the study of the market requirements (state, legislation) for the manufactured goods (equipment, technical devices), are an essential element of marketing research. At the stage of operational marketing, manufacturers determine the ability of the manufactured equipment to undergo industrial safety expertise. The required characteristics of safe operation are determined at this stage of the product life cycle.

Certain safety requirements are also imposed on the material and technical supply of the production of machinery in accordance with the law on technical regulation. Such requirements include the availability of a certificate of conformity from suppliers of raw materials, i.e. Confirmation of compliance of objects with the requirements of technical regulations ensuring industrial safety.

At the design stage of the production process (preparation and development of the production process), among other things, the tasks of ensuring the established profile and characteristics of the manufactured product and compliance with technical regulations are solved. Thus, the safety expert review, carried out at the design stage, and high-quality, certified raw materials obtained at the material and technical supply stage shall make it possible to develop an industrial process that is safe for society and the environment.

At the next phase of the product life cycle, at the stage of production of technical devices, the Law "On Technical Regulation" establishes requirements for the processes of production of technical devices used in HIFs. It comes to the established special technical regulations (art. 8) for those particular types of products and their processes of production, operation, storage, transportation, sale and disposal, the risk of harm being higher than the risk of harm taken into account by the general technical regulation. This type of product includes technical devices used in HIFs (Table 1).

It has been revealed that at all stages of the life cycle of technical devices used at HIFs, within the framework of the legislation of the Russian Federation, ISER is necessary. The expert review is one of the instruments to ensure industrial safety, along with standardization, certification and declaration of industrial safety. The industrial safety expert review allows the state to control the level of risk for employees of the enterprise (reduce it) and the degree of environmental risk in the production of technical devices.

Certainly, for the manufacturer of the equipment for obtaining certificates of conformity, fulfilling the requirements of technical regulations and forecasting the requirements imposed within the ISER, there is an increase in production costs (increased costs for ensuring industrial safety, advertising,
creating a brand of such a high-level manufacturing company, a distribution network and etc.), but also:

- increase the efficiency of production activities. Due to the rising costs of ensuring industrial safety, the quality of production of technical devices improves, this leads to an increase in the price of products; for the consumer (the company operating the HIF and the technical devices used on it), working with a manufacturer of this level allows you to minimize the risk and possible damage from the consequences of accidents;
- advertising and brand awareness for the manufacturer contribute to an increase in market share, sales volume and level of competitiveness in the market for goods.

**Table 1.** Industrial safety expert review functions.

| Production of technical devices used at hazardous production facilities | Operational marketing Accounting expert review requirements for technical devices | Design Project documentation expert review |
|---|---|---|
| Storage, disposal ISER during storage and disposal | Provision of materials, components conformity certificate provided by suppliers of raw materials |
| Installation ISER during installation and maintenance | Technology development and implementation |
| Preparing for sale / sale: ISER when selling a hazardous production facility | Compliance with technical regulations in the design of technical processes Implementation of special technical regulations in the production |

| Documenting HIFs |
|---|

| Accounting of possible risks and accidents in the declaration of industrial safety subject to industrial safety expert review |

The Law on Industrial Safety also establishes a number of requirements for conducting industrial safety expertise and defines the procedure for its implementation, i.e., in fact, the requirements for the provision of services are established. A number of specialists consider the industrial safety expert review of technical devices as an assessment of product conformity [7, 8]. In this case, the timing, procedure for conducting the safety expert review itself are also contained in the technical regulations.

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