

# TECHNOSPHERE SAFETY



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## Improvement of Interaction Mechanism between Oil Refining Enterprises and Contractors

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**Introduction.** Major projects in the oil refining industry require the involvement of contractors. Cooperation with qualified and responsible contractors can be considered as a competitive advantage, allowing timely delivery of objects with the proper level of quality and safety.

Significant injury rates in contracting organizations operating at oil refining facilities attract attention. This leads to an interest in safety of working conditions in the industry. One of the approaches to solving the problem is to use the occupational health and safety management system in the interactions of the customer and the contractor.

**Problem Statement.** The objective of this study is to improve the mechanism of rating contractors from the point of view of occupational and industrial safety.

**Theoretical Part.** The paper uses the official statistical reports on injuries and the data on injuries of employees of contracting organizations at an oil refinery of a large Russian company. A mechanism for rating contractors in this area has been developed. It includes three sections with their own criteria and weight coefficients. The automatically generated and periodically updated rating is proposed to be placed in open access on the website of the Federal Service for Labor and Employment.

**Conclusions.** The use of the proposed rating will allow customers working in the field of oil refining to reasonably judge the risks generated by the industrial safety system of potential contractors.

**Keywords:** contractors, oil refining industry, accidents, rating, criteria, information card, interaction between the customer and the contractor.

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**Introduction.** Companies of the oil refining industry attract contractors during the construction of facilities [1]. In most cases, the customer wants to minimize the expenses. At the same time, many contractors intend to win the tender at all costs. One of the tools is the reduction of the economically sound contract price, dumping. This not only affects the quality and timing of work, but also causes violations, including in the field of industrial safety (IS) and occupational safety (OS) [2]. Thus, inappropriate cost reduction is one of the causes of injuries. Dumping in tenders for the performance of work at hazardous production facilities (HPF)<sup>1</sup>, including at oil refineries, creates special risks.

Figure 1 shows data on injuries over the past ten years in the field of petroleum products production<sup>2</sup>.

<sup>1</sup> Nguen O. Kak obespechit' bezopasnost' podryadnykh organizatsii [How to ensure the safety of contractors]. Available from: <https://journal.ecostandard.ru/ot/opinion/kak-obespechit-bezopasnost-podryadnykh-organizatsiy/> (accessed 14.01.2022). (In Russ)

<sup>2</sup> Rosstat. Information about victims in production according to OKVED code 19.2 — Production of petroleum products in 2010–2020. Working conditions, industrial injuries (by certain types of economic activity). Available from: [https://rosstat.gov.ru/working\\_conditions](https://rosstat.gov.ru/working_conditions) (accessed 14.01.2022). (In Russ)

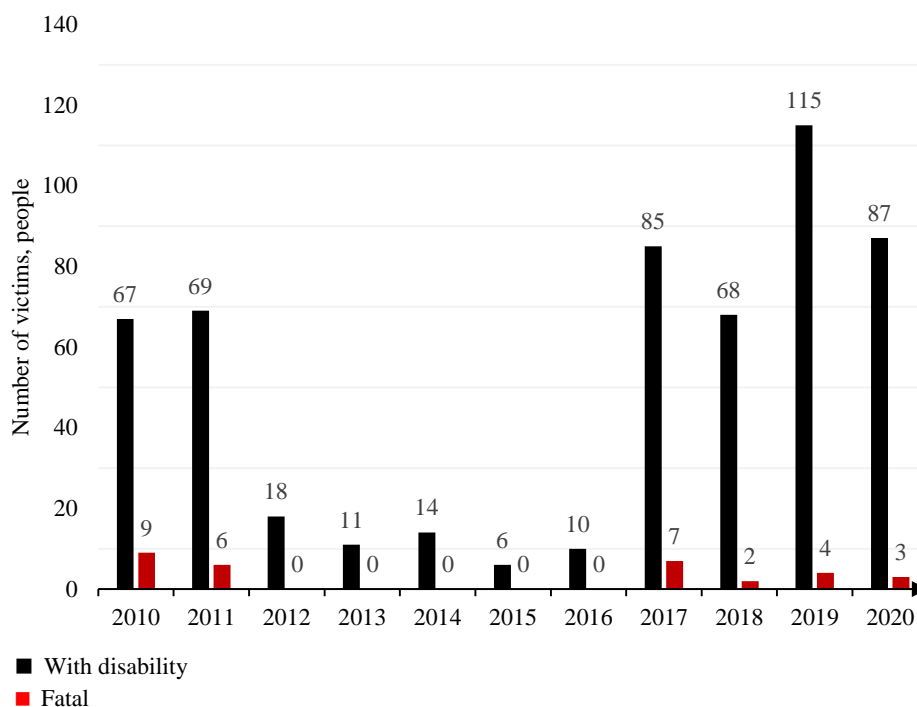


Fig.1. The number of victims in the field of petroleum products production (Russia, 2010-2020).

Figure 2 shows data on injuries of employees of contracting organizations at an oil refinery of a large Russian company in 2019-2021. This indicates problems in the field of safety and occupational safety management.

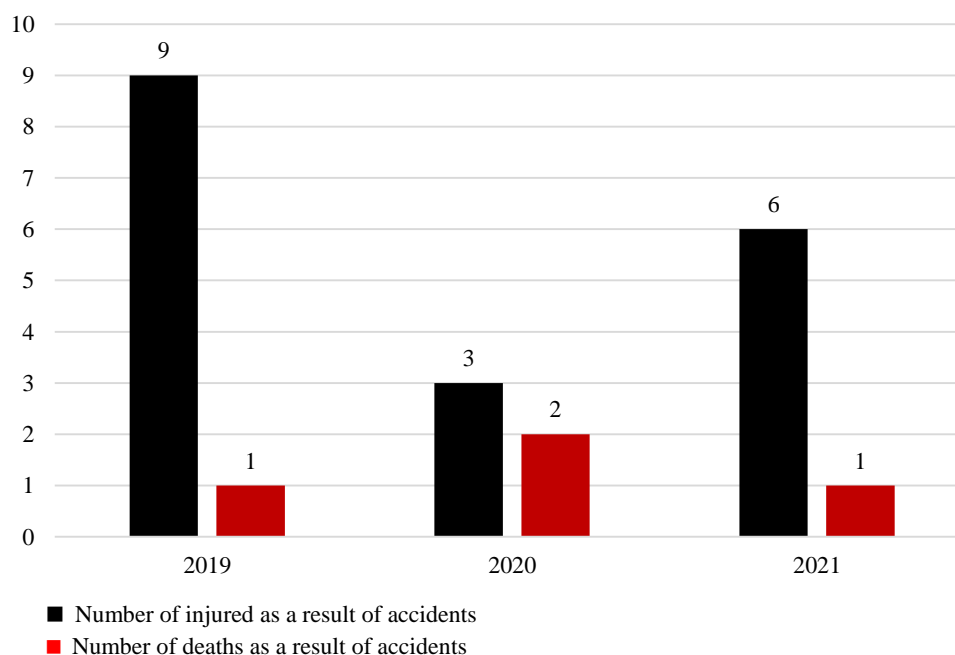


Fig. 2. Injuries and related mortality in contractor organizations of the Russian oil refinery (2019-2021)

**Problem Statement.** The main task is to improve the mechanism of interaction of oil refining industry enterprises with contractors based on an objective assessment of the contractor's activities in the field of IS and OS.

**Theoretical Part.** In most cases, contractors engaged in the HPF of the oil refining industry perform four types of work:

- basic (installation, repair, reconstruction, etc.),
- preparatory and commissioning,
- logistics,
- transportation (including personnel transportation) [3].

The main reasons for safety regulations violation:

- failure to take measures to ensure safety of work on the customer's territory;
- use of faulty tools, devices, technical devices, mechanisms and other technical means;
- low qualification of the contractor's personnel;
- staff turnover among the contractor's staff;
- insignificant production experience of the contracting organization<sup>3</sup>;
- lack of motivation of the staff to observe safety regulations [4].

The interaction of the customer with the contractor takes place in several stages:

- 1) preparation of technical specifications,
- 2) evaluation of contractors' applications,
- 3) contractor selection,
- 4) interaction with the contractor,
- 5) analysis of the work [5].

Let us take a look at the examples of erroneous behavior of the customer at different stages.

1. When preparing the terms of reference, the requirements in the field of IS and OS are described in general terms, which does not reflect in detail the specifics of the work.

2. Evaluating applications, the customer cannot reliably find out how potential contractors comply with the requirements of IS and OS.

3. The winner of the tender in most cases becomes the participant who offers the minimum price [6]. As practice shows, customers do not consider it a weighty criterion to ensure a high level of compliance with the requirements of IS and OS.

4. Certificates of admission and transfer of the object are drawn up with the contractor. In the part of IS and OS, only data on penalties imposed by state organizations are checked. Counterparties do not discuss and, accordingly, do not carry out preventive measures to ensure safety.

5. At the end of the contract, the customer does not analyze the work and, when announcing a new tender, makes the same mistakes.

The situation can be significantly improved if, at the 2nd stage (evaluation of applications), the level of provision by the applicant for IS and OS is taken into account.

As a solution, a rating mechanism is proposed that objectively reflects the situation with IS and OS that has developed in the company participating in the tender [7, 8].

For the corresponding rating of organizations, an assessment is provided in three sections:

- 1) risk category,
- 2) local regulatory documents,
- 3) statistics on IS and OS.

Rating should be carried out on the platform of the Federal Service for Labor and Employment (Rostrud). To participate in the rating, the contractor will have to send an application to Rostrud with a package of required documents. According to section 1, Rostrud assigns points in accordance with the risk category calculated on the basis of a risk-oriented approach<sup>4</sup>. For section 2, documents are analyzed and verified using the developed algorithm. In this case, points are awarded as follows: "present" — 1 point, "absent" — 0. The algorithm receives part of the data from the portals of state authorities.

For section 3, Rostrud analyzes the statistics of data from various departments. The points are summed up; the rating is published on the Rostrud website and is regularly updated. For greater clarity, you can use three colors that will indicate a high, medium and low level of IS and OS provision. The high reliability index of the contractor corresponds to 42-50 points, average — 32-41, low — 0-31 (Table 1).

<sup>3</sup> Simonova N. I., Vikhrov S. V., Ivanov V. V. Povyshenie bezopasnosti rabotnikov podryadnykh organizatsii na osnove upravleniya professional'nymi riskami [Improving the safety of employees of contracting organizations based on occupational risk management]. Klinskii institut okhrany i uslovii truda. Available from: <https://www.kiout.ru/info/publish/29114> (accessed 14.01.2022). (In Russ.)

<sup>4</sup> Rules for classifying the activities of legal entities and individual entrepreneurs and (or) the production facilities used by them to a certain risk category or a certain class (category) of hazard: Decree of the Government of the Russian Federation No. 806 of 17.08.2016 (with amendments and additions), of 21.03.2019) No. 806 Available from: <https://docs.cntd.ru/document/420372694> (accessed 16.02.2022). (In Russ.)

Table 1

Contractor reliability rating scheme

Place	Contractor's number	Contractor's details	Sum of points	Reliability index
1	1	—	50	<b>High</b>
2	2	—	...	
3	3	—	...	
4	4	—	...	
5	5	—	42	
6	6	—	41	<b>Average</b>
7	7	—	...	
8	8	—	...	
9	9	—	...	
10	10	—	32	
11	11	—	31	<b>Low</b>
12	12	—	...	
13	13	—	...	
14	14	—	...	
15	15	—	0	

The ranking system and evaluation criteria are described below.

1. The risk category of the contractor is determined on the basis of the Rules for Assigning its Activities and (or) Used Production Facilities to a certain risk category or a certain hazard class (category) approved by the decree of the Government of the Russian Federation<sup>5</sup>. The points are assigned as follows: extremely high risk — 1, high — 2, significant — 3, medium — 4, moderate and low — 5.

2. Local regulatory documents of the contractor in the field of IS and OS (for the presence of each report — 1 point, absence — 0).

2.1. The existence of a policy in the field of occupational health and safety, in the field of quality, in the field of environmental protection, in the field of energy, as well as a corporate policy of social responsibility (for the presence of each policy — 1 point, absence — 0).

2.2. Conducting an assessment of working conditions.

2.3. Operational accident reporting system.

2.4. Internal procedure for the organization and investigation of incidents.

2.5. Occupational risk assessment measures.

2.6. Provision (more than enough) of employees with means of individual and collective protection.

2.7. Periodic medical examinations of employees.

2.8. Procedure for informing employees about working conditions at their workplaces, levels of occupational risks, as well as guarantees and compensation for work in harmful and hazardous conditions (monetary incentives and health resort treatment).

2.9. Organization and conduct of additional training in the field of occupational safety.

2.10. Certificates of compliance with the requirements of international standards ISO 9000:2008, ISO 14001:2004 and GOST R ISO 45001-2020.

2.11. Positive reviews, letters of thanks, certificates, etc.

2.12. Procedure for admission to high-risk work.

2.13. Commission for checking employees' knowledge of the requirements of IS and OS.

3. Statistics on IS and OS.

<sup>5</sup> Rules for assigning the activities of legal entities and individual entrepreneurs and (or) production facilities used by them to a certain risk category or a certain hazard class (category).

3.1. Working time on the market (less than 5 years — 0 points, 5-8 — 1, 8-10 — 2, more than 10 — 3).

3.2. Maintaining statistics on injuries at the enterprise: more than 5 years — 3 points, 3-5 years — 2, less than 3 years — 1, no statistics — 0.

3.3. Accident statistics for the last 5 years: without accidents — 3 points, 1-2 cases — 2, 3-4 — 1, 5 or more — 0.

3.4. Data on injured and suffering from occupational diseases employees: without disability — 3 points; with disability (up to 30% of the total number of employees) — 2; with disability (up to 50% of the total number of employees) — 1; with disability (over 50% of the total number of employees) — 0.

3.5. Notices of control and supervisory authorities (Rostrud and Rostekhnadzor) for the last three years: not issued — 3 points, less than 3 regulations — 2, 3-6 — 1, more than 6 — 0.

3.6. The amount of administrative fines: 0 — 3 points, up to 100 thousand rubles — 2, 100-300 thousand rubles — 1, more than 300 thousand rubles — 0.

The customer should identify dangerous and harmful production factors in advance, develop occupational risk management measures, procedures for investigating accidents with the contractor's personnel [9]. This is important, given that the contractor does not know about all the risks to the health and safety of its employees on the customer's territory.

An effective interaction between the customer and the contractor involves the creation of an information card for the IS and OS of the enterprise. The document will inform the contractor about the existing and possible hazards and prepare for the work in the appropriate production conditions. The information from such a map should be reflected in the IS and OS section of the terms of reference.

**Conclusions.** The creation and publication of the rating of contractors in the field of IS and OS will allow customers working in the field of oil refining to reasonably judge the system of industrial safety of potential contractors. The result should be a reduction in the risks of accidents and injuries.

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