TECHNOSPHERE SAFETY

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Use of mobile apps for periodic knowledge tests and qualification assessment of slingers

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Introduction. The article is devoted to the issues of improving the processes of periodic knowledge testing and assessing the qualifications of slingers to improve the level of professional skills, readiness to use appropriate devices, equipment and personal protective equipment.
Problem Statement. In view of the often formal organization of regular (periodic) knowledge checks of slingers, which potentially leads to accidents at work, there is a need to apply new forms of organization and conduct of these activities.
Theoretical Part. Periodic knowledge testing involves an oral examination in the commissions of the organizations that operate cranes. As an alternative to regular knowledge checks, the independent qualification assessment at Qualification Assessment Centers is of particular importance. Taking into account the widespread digitalization of production and the widespread use of IT technologies, it is proposed to develop and apply mobile applications for periodic knowledge checks of slingers, allowing them to visualize and choose the right solutions for performing labor functions.
Conclusions. The high level of professional training of the slinger is an important component in the issue of increasing the level of safety in the operation of lifting structures, so special attention must be paid to the training of qualified personnel.

Keywords: slinger, professional training, certification, knowledge testing, information technology.

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Introduction. The profession of a slinger is in demand in many industries where lifting devices are operated, in which a hook is used as a lifting body — lifting cranes or loader cranes. These include construction, warehousing, port and railway cargo terminals, machine-building industry and others. The profession of a slinger is associated with the risk of an injury in the course of work due to the impact of hazardous and harmful production factors, such as: increased noise and vibration, increased dust and gas contamination of the air of the working area, the risk of falling of the transported cargo or its elements [1]. Despite the apparent improvement in accident and injury statistics at the facilities operating lifting devices (Fig. 1) [2], the situation cannot be called optimistic. Slingers are still at risk.

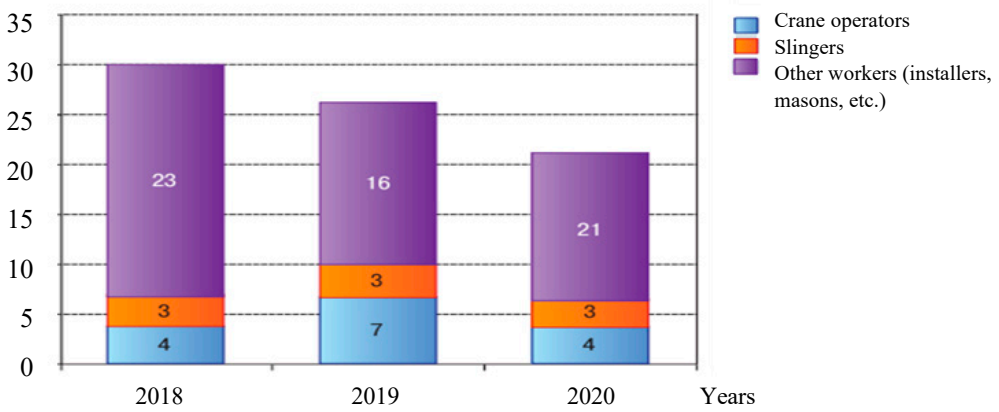

Fig. 1. Personnel who died during the operation of lifting cranes in 2018-2020 [2]

Earlier, in the works devoted to the issues of personnel safety [3, 4], the causes of injuries and accidents were considered in detail, including the role of the "human factor" and the low level of professional training of personnel [5].

Problem Statement. In order to avoid injury to slingers and improve the quality of service of lifting cranes, it is necessary to apply new approaches and methods within the framework of maintaining the level of professional knowledge of employees.

Currently, an employee who has received a professional education as a slinger is placed at the full disposal of the head of the relevant department at the enterprise, where the attitude to further maintaining the level of his professional knowledge is not always guaranteed to be high. The annual regular checks of slingers' knowledge provided for [6, 7] are often carried out formally, while the scope of professional knowledge of employees is narrowed to the level of performing certain actions, sometimes without affecting issues related to the personal protection of the slinger during the performance of these labor actions. Such an approach to conducting periodic knowledge checks potentially leads to accidents at work, the causes of which are the negligent attitude of management and employees to the use of protective equipment, special inventory devices, etc. The range of necessary knowledge for the assessment of the qualifications of slingers should not be limited only to knowledge of labor actions. The skills of identification and rejection of lifting accessories, selection and use of inventory devices, as well as the use of personal protective equipment, special clothing and shoes for specific work are also of great importance.

Theoretical Part. The problem of insufficient qualification of personnel at the facilities operating lifting cranes potentially leads to serious consequences, such as industrial injuries, including fatal ones, and entails significant material damage to the operating organization.

The experience has shown that periodic knowledge assessment assumes an oral exam, which is conducted by the commission organized by the organization itself. In rare cases, a pre-certification lecture is held. As a rule, shortcomings and mistakes made in specific works on objects are discussed. As an alternative to regular knowledge assessment, an independent assessment of qualifications in Qualification Assessment Centers (QAC) that carry out their activities in accordance with the requirements of legislation becomes more important [8].

The experience of Qualification Assessment Centers in qualification assessment of, for example, employees of the elevator industry [8, 9], shows a positive trend in the level of preparedness of personnel to perform labor functions and actions. An important role is played by the competence and independence of the qualification assessment event itself in the QAC, which allows an objective assessment of each attested person. The qualification assessment procedure involves several stages — theoretical stage and practical stage. The process of knowledge assessment is recorded on video. Then the video material is sent to the Council for Professional Qualifications for Certain Types of Professional Activities. This body provides and controls the activities of independent assessment of qualifications. Its powers include: verification, processing and recognition of the results of an independent qualification assessment; making a decision on the issuance of certificates of qualifications by the Qualification Assessment Center; sending information about the issued certificates of qualifications to the national qualifications development agency for inclusion in the register.

Currently, a slinger can pass a qualification assessment in the QAC independently or if send by an employer. The mandatory nature of passing an independent qualification assessment has not yet been defined at the legislative level. However, this problem is widely discussed in professional communities.

Regardless of forms and locations of qualification assessment or knowledge testing of slingers, these events also require the use of other forms and approaches, in particular, the use of IT technologies. IT technologies are processes, methods of searching, collecting, storing, processing, providing, distributing information and the ways of implementing such processes and methods [10].

Information technologies have become part not only of our everyday life, but have also become indispensable in production processes. Today, anyone has access to a huge amount of visual information. It is known that visual information is remembered and reproduced faster than other types. This fact can be applied in the development of mobile applications and training cases to test the knowledge of slingers.

The occupational standard "Slinger" [11] is currently under approval. This document can be used to form an understanding of the distribution of functions and requirements for the skills and knowledge of slingers in production activities. Operating organizations develop production instructions for slingers, guided by the standard instruction [12].

Thus, with all the provisions of the above documents, it is possible to consider the requirements for the performance of labor functions. For example, for the labor function "Preparatory work before starting simple work", among the necessary skills are indicated: "Use of personal protective equipment", "Compliance with occupational safety and fire safety requirements ", etc., and the necessary knowledge is the knowledge of the procedure for the use of specific personal protective equipment.

As a rule, in the process of conducting a periodic examination of the knowledge of slingers, the main attention of the qualification commission is focused on the knowledge of the principles of the correctness of slinging, hanging cargo on a hook, cargo escort and other specific labor actions. At the same time, almost no attention is paid to the knowledge, skills and abilities of choosing and using personal protective equipment and special clothing. Realizing the importance of all the slinger's competencies, including those mentioned above, it is proposed to develop practical materials in the form of training cases or mobile applications. They are planned to include situational tasks or issues with a graphic image as tasks, in which, for example, it is necessary to choose a set of workwear for a specific type of work: work performed at a distance of 30 m and closer to the outer conductor of the power line; at height; in conditions of dust or increased noise level. It is also important to include questions on the topic of "First aid". In other words, the tasks should be a visualization of control tests to test knowledge and skills. Tests can be of various levels: the first is recognition, the second is reproduction; the third is the solution of situational problems; the fourth is the solution of original non-standard problems. For slingers, it may be enough to conduct tests of the first level, and for managers — of the second and higher levels.

In order to start knowledge tests, you need to select a test (Fig. 2). After that, a question will appear in which, for example, you need to choose one correct answer from four suggested ones (Fig. 3); the correct answer will be highlighted in green, the wrong one – in red. Then you need to move on to the next question. The results are shown at the end of the test.

Fig. 2. Mobile application (test selection)

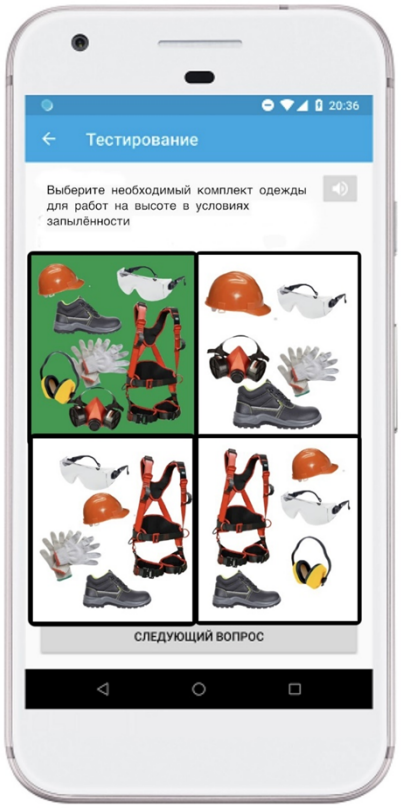

Fig. 3. Mobile application (answer to a question selection)

The use of visualized materials for periodic knowledge verification of slingers will determine the level of readiness of workers for real labor actions, and the use of information technology will make it easier to assimilate theoretical and practical information and apply it in further work. Such a procedure will further exclude a formal attitude to the examination of the slingers' knowledge, both on the part of the commission members and on the part of

the examinee, since the participation of an employee in an event where he must answer a question, make a decision in a situational task already confirms his personal participation and can guarantee the memorization of the necessary information obtained using mobile phones, applications and educational internet cases.

Conclusions. A high level of professional training of a slinger is an important part in the issue of increasing the level of safety during the operation of lifting devices. Therefore, special attention should be paid to the training of qualified personnel. Training and knowledge testing of personnel should be carried out using modern technologies, including mobile applications, educational Internet cases. This will contribute to a wider development of theoretical and practical training, which will further minimize violations of industrial safety requirements and, consequently, increase safety during the operation of lifting devices.

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E. V. Egelskaya — scientific supervision, formulation of the main concept, goals and objectives of the study, revision of the text, correction of the conclusions; V. A. Kalanchukova — analysis of the research results, preparation of the text, formulation of the conclusions.