



The Role of the Human Factor in Construction Safety

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Abstract: *The purpose of this article is to examine the role of the human component in hazardous situations, the causes of dangerous situations, and their occupational features in order to prevent injuries and accidents in building operations.*

Keywords: *construction, qualification, person, danger, production*

Date of Submission: 04-11-2021

Date of Acceptance: 07-12-2021

The increasing complexity of construction activity, as well as the greater use of contemporary equipment and technology, necessitates the development of new and inventive solutions to assure safety.

As a result, there is no way to entirely solve safety issues by enhancing construction machinery and technology, making them more reliable and safe, and developing special protective equipment to safeguard workers from hazards while on the job. Human error and its factor have been seen to grow in total accident data.

Despite the numerous precautions made to decrease construction-related injuries and accidents, these rates remain high. Another element generating accidents, according to research, is the workers' psychophysiological and other factors, which can be linked to a lack of attention to work and inadequate control over their activities (over 10 percent of accidents). Workers' psychophysiological states result in decreased work quality, decreased attention and concentration, greater carelessness, and an increased risk of injury[1]: More than half of workplace injuries and accidents are caused by people's lack of knowledge, particularly in their field of work, indiscipline, psychological and physical condition, incorrect assessment of the situation, improper organization of work processes, errors such as non-use of equipment on duty, and low demand for safety requirements and regulations by managers of manufacturing enterprises.

According to the experts of the National Association of Occupational Safety and Health Centers, the generalization of industrial accident and accident investigation materials allows to divide the direct causes of hazards in the workplace into four groups [2]:

A. Unable to do - this means that the employee does not have the knowledge necessary to perform this work, has not mastered the relevant skills, methods, directions.

B. Not willing - it means that the employee knows how to do the job well and safely, but has no desire to comply with safety requirements, i.e. there is no desire because there is no psychological attitude to comply with these requirements.

C. Doesn't work - it means that the employee is in such a physical or psychological state that he or she will tolerate dangerous behaviour regardless of his or her skills and willingness.

D. Non-provision means that an employee fails to perform a specified action because he is not provided with the necessary conditions, i.e. tools, materials, data, etc., and this applies to the organization and management of production.

The first three groups of causes (A, B, C) are the individual and personal characteristics of the employee, i.e. the human factor. The fourth group (D) is related to the organization and management of production. Obviously, the above causes that lead to a dangerous situation in production need to be addressed.

This means that in order for employees to work safely, they have developed personal qualities, i.e. the necessary professional knowledge and skills, a psychological attitude and desire to comply with safety requirements, physical and mental working capacity, sanitary-hygienic and material-technical working conditions must meet the requirements of labor protection and scientific organization of labor.

Today, there are more than 400 qualities that define a person as a person. Based on a professional study of working conditions, content and risks in industrial, transport and construction enterprises, 30 professionally important qualities were identified for assessing the professional suitability of workers, which were divided into 3 groups [3] :

- A. Professional knowledge and skills;
- B. Socio-psychological qualities;
- C. Physiological and psychophysiological qualities.

For a particular employee, each quality may have a different level of expression, such as high, low, or no professional skills at all.

The following are the factors that characterize professionally important qualities, i.e:

- a. Professional knowledge and skills - knowledge, skills and abilities to safely perform business processes; knowledge and skills to act in dangerous situations; ability to learn independently.
- b. Socio-psychological qualities - conscientiousness, responsibility, abstinence from alcohol, drugs; readiness to help and co-operate, discipline, determination, perseverance, caution, ability to assess situations in advance, independence, determination, courage; adaptability, adjustment to conditions.
- c. Physiological and psychophysiological qualities: performance, endurance; speed of psychomotor reactions; high vision, vision; colour perception, hearing acuity, voice differentiation, emotional endurance, attention span, attention distribution, working memory, long term memory, operational thinking, logical thinking.

The aforementioned human-specific professional knowledge and skills, socio-psychological, physiological and psychophysiological qualities lead to improved work quality, increased attention and concentration, reduced negligence and fewer construction accidents and injuries.

Practice and special studies show that people act differently in dangerous situations[3]. The lower part (12-15%) - experiences a wave of strength, mental energy, makes quick and clear decisions, acts boldly and purposefully. A portion of people (15-20%) - in general, they retain the ability to think and act correctly despite experiencing tension and anxiety.

However, the majority of people (up to 65%) lose the ability to take appropriate action when there is a serious risk. Some of them fall into a state of passion: they act impulsively, erratically, sometimes aggressively. Others, under the influence of fear, try to leave the inaction, the dangerous

place, instead of allowing the development of a dangerous situation. At the same time, they do not know how and where to go for salvation.

Finally, among the group under consideration are people who are always incapable of anything, fear binds their thoughts and actions, and they become helpless and helpless.

Analyses show that most accidents are caused by organizational causes, i.e. human activities, and eliminating these types of negative causes is an urgent task, i.e:

- Increasing a person's level of emotional stability plays an important role in ensuring safety in the work process, and it depends on many factors. Emotional stability is determined, on the one hand, by the characteristics of the individual's nervous system and the level of the physical state of the organism, and, on the other hand, by the peculiarities of the individual's consciousness, his intellect, willpower, and range of higher emotions. In this case, the main role in maintaining emotional balance is played by volitional qualities, which are manifested in the ability to consciously control their actions;
- Fostering safety-oriented behavior is the development of positive qualities that contribute to an employee's morale and safety. That is, the right attitude of the employee to the requirements of labor protection is the result of his attitude to work without accidents;
- Encouraging safe work means that employees are rewarded for safe work or punished for violating safety requirements. The system of incentives for safe work should include moral and material elements.

Consequently, the human factor and its physical and psychological readiness to perform its functions safely, with sufficient personal skills to determine how, when and why accidents occur at work, help predict the direct impact of human error and prevent accidents.

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