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IMPROVING WORKPLACE SAFETY USING ADVANCED INDUSTRY 4.0 TECHNOLOGIES

Authors: Marija Savković, Marica Dašić, Marko Đapan, Arso Vukićević, Ivan Mačužić, Miladin Stefanović

Taking into account the fact that improving safety and health at work is one of the main indicators of an organization's financial success, contemporary industrial systems operating on lean principles strive to achieve the highest level of occupational safety and health at work (OSH).

Industry 4.0 represents a new production paradigm that causes changes in production, work organization, the way on work activities are performed, and this is increasingly reflected in the safety and health of workers.

The paper presents the connection between workplace safety and Industry 4.0 through the analysis of the most important research papers in this field. Also, the paper presents the most significant modern advanced digital technologies of Industry 4.0 that have applications in the field of safety and health of workers (sensors and wearable technologies, exoskeletons etc.). Special attention in the paper is paid to emphasizing the positive effects and benefits of the application of these modern advanced technologies.

The main purpose of scientific research is to through critical analysis and synthesis of conclusions from scientific research papers in the OSH field and Industry 4.0 answer questions about how Industry 4.0 affects the safety and health of workers and how the application of innovative technologies Industry 4.0 can lead to improved safety and health of workers.

The main goal of the application of these modern innovative technologies is to improve workplace safety through the prevention of injuries at work, occupational diseases and deaths and to improve the general health and well-being of workers.

The application of innovative Industry 4.0 technologies improves OSH by enabling the detection and elimination or reduction of hazards that may endanger the life and health of workers. By improving working conditions, reducing occupational injuries, occupational and work-related illnesses, preconditions are created for the physical, mental and social well-being of employees and the improvement of economic indicators - efficiency and productivity.

All these innovative technologies of Industry 4.0 contribute to workplaces in contemporary industrial systems be safer, more ergonomic and more comfortable, and this will further increase the economic effects - productivity and efficiency of workers.

The combination of digital wearable technologies, smart personal protective equipment, cameras, artificial intelligence can predict the potential dangers that may occur in the workplace, and this further enables the prevention of accidents and injuries to workers.

The application of innovative Industry 4.0 technologies allows workers to perform activities in a safer and more flexible way. The application of these technologies contributes to reducing the occurrence of occupational diseases and injuries at work and improving the health of workers by reducing repetitive/monotonous work activities, reducing stress and creating a better work-private life balance, reducing the risk of occupational diseases by monitoring basic health parameters of workers (monitoring muscle and brain activity using EMG and EEG sensors placed in personal protective equipment) in real time and showing warnings to workers about the occurrence of danger or harm, facilitating the implementation of preventive measures and improving working conditions through continuous monitoring of parameters in the work environment in real time (humidity, noise, lighting, etc.) and reducing or eliminating their negative impact.

The benefits of applying the innovative technologies of Industry 4.0 are reflected in the overall improvement of the health and safety of workers. Continuous monitoring and supervision of parameters from the work environment and monitoring the health of workers in real time in combination with analytics achieves safer working conditions, eliminates accidents and deaths, reduces injuries at work and occupational diseases and creates a basis for the application of personalized preventive measures.