



NEWSLETTER

On Occupational Safety and Health & Working Environment

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Vietnam National Institute of Occupational Safety and Health - VNNIOSH



**Application of Virtual Reality Technology in
Occupational Safety and Health Training**



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The Occupational Health Center (VNNIOSH) provides health check-ups for workers at the Launching Ceremony of the Action Month on OSH 2024 (Photo: Kim Thi)

RESOLUTION 209/NQ-CP: ENSURING WORKERS WORK IN SAFE AND HYGIENIC WORKING CONDITIONS

On October 28, 2024, the Government issued Resolution No. 209/NQ-CP promulgating the Plan to implement Directive No. 31-CT/TW dated March 19, 2024 of the Secretariat of the 13th Party Central Committee on continuing to strengthen the Party's leadership for occupational safety and health in new situation.

The plan aims to clearly define the tasks and responsibilities of ministries, ministerial-level agencies, government agencies, People's Committees of provinces and centrally-run cities, and relevant agencies, especially the responsibilities of leaders, in order to propose solutions to develop action plans, organize implementation, inspect, monitor, and evaluate the implementation of Directive No. 31-CT/TW.

In addition, clearly define the main and key contents and tasks in developing master plans, projects and products, and summarize and evaluate the implementation results. Proactively coordinate to consistently, synchronously and effectively organize and implement Directive No. 31-CT/TW. Create powerful changes in the awareness and actions of all levels, sectors and the whole society regarding occupational safety and health; clearly identify that economic development must be associated with ensuring the safety of life and protecting the health of workers.

The plan sets out four key tasks and solutions: Raising awareness, consciousness, and responsibility for occupational safety and health; perfecting mechanisms, policies, and

laws; improving the effectiveness and efficiency of State management; and increasing investment resources for occupational safety and health.

Regarding raising awareness, consciousness and responsibility for occupational safety and health, the Government proposes to raise the responsibility of leaders for occupational safety and health, considering this a regular, long-term task of great significance in socio-economic development, ensuring the rights of workers to work in occupational safety and health conditions. At the same time, it is required to promote, diversify, and innovate the content and forms of propaganda and dissemination of policies, laws, and knowledge on OSH; attach importance to the application of information technology, and gradually implement digital transformation in communication and propaganda work on OSH; build and improve the quality of emulation movements on OSH, forming a culture of occupational safety; organize activities of the Action Month on OSH, coordinate with the Workers' Month in a practical and effective manner, towards the grassroots level.

Regarding the task of perfecting mechanisms, policies and laws on occupational safety and health, the Government requires relevant ministries and branches to summarize the practical implementation of OSH law. Review and complete policies and law on OSH, promptly overcome difficulties and shortcomings in practice. Review and complete a set of technical standards and regulations on OSH that are synchronous, complete and suitable to practical requirements. Strengthen the monitoring and social criticism functions of the Vietnam Fatherland Front and its member organizations on draft OSH policies directly related to the legitimate and legal rights and interests of the People, cadres, civil servants, public employees and workers, creating social consensus in the development of OSH policies and laws.

In order to improve the effectiveness and efficiency of State management on OSH, the Government requires gradual application of information technology and digital transformation in reporting, statistics, and service provision in the field of OSH; improve and enhance the

quality of human resources, OSH staff, labor inspection, and OSH inspection at all levels; receive and resolve feedback, recommendations, complaints, and denunciations from people and businesses on the implementation of OSH laws in a timely manner, in accordance with legal regulations. In addition, regularly inspect, examine and focus on controlling working conditions; study the mechanism for quality control of activities: OSH training; monitoring the working environment; periodic health check-ups, occupational disease detection; technical safety inspection of machinery, equipment, and materials with strict requirements on occupational safety. At the same time, strengthen management and improve capacity for health workers in enterprises, production and business establishments; continue to effectively implement the Program on caring for and improving workers' health, preventing occupational diseases in the period 2020 - 2030. In addition, the Government will also strengthen the handling of violations in OSH field that cause serious consequences for the health and lives of people and workers.

Regarding increasing investment resources for occupational safety and health, the Government requires promoting socialization, mobilizing and effectively using resources for OSH. Enterprises proactively ensure investment resources to improve working conditions, implement measures to prevent and minimize occupational accidents. Along with that, the Government will increase State and enterprise resources to invest in OSH in association with innovating financial mechanisms, improving the efficiency of resource use, prioritizing resource allocation to implement measures to prevent occupational accidents and diseases for areas without labor relations; integrating OSH content into socio-economic development programs and plans of sectors, localities, programs and projects related to the fields of labor, health and environment. Effectively manage and use the Occupational Accident and Disease Insurance Fund; review, propose to supplement and amend the contribution level, benefits, and subjects participating in occupational accident and disease insurance in accordance with the socio-economic development situation.



Risk of occupational safety at some shipbuilding facilities in the Northern region of Vietnam

Nguyen Hoang Phuong

National Working Environment Monitoring Station, VNNIOSH

Shipbuilding is an important industry, providing means for transporting goods and exploiting resources, contributing to improving the country's defense potential. However, statistics on occupational accidents in many countries around the world and studies on working conditions and occupational health in Vietnam have shown that shipbuilding is a heavy industry with many potential hazards that adversely affect the safety and health of workers. This article presents some high-risk hazards in shipbuilding activities at some shipbuilding facilities in the Northern region of Vietnam and proposes some control solutions to help protect human resources of the industry:

High-risk hazards in shipbuilding activities in Vietnam

The results of occupational safety and health risk assessment by Nguyen Hoang Phuong and colleagues (VNNIOSH) at 05 shipbuilding

facilities showed high and very high risks, including:

- Falling from height: Fall from a height of 2 meters or more. Workers working at heights such as scaffolding, assembly floors, forklifts, etc., are the main subjects at risk from this hazard.

- Falling/tripping/slipping: Falling from a height of less than 2 meters; tripping due to rough work areas, many objects blocking the way; slipping due to slippery, wet, oily floors; slipping when stepping on objects on the floor; slipping when stepping on a mold base; slipping down stairs... Many cases of workers tripping while moving lead to serious consequences from injuries to broken bones.

- Pitfalls: Footfalls into holes or hatches while walking on a ship. This is a danger when workers walk or work on a ship, when holes or hatches are not fenced, guarded, or marked with

warnings. Accident reports show that pitfall accidents all result in serious injuries.

- Hand/finger cut/pinched/smashed: Cut, pinched, and smash hazards occur in many situations, from crane hooks, loading materials into machines, transporting equipment and materials to installing equipment... leading to broken or crushed bones in the hand and fingers.

- Foreign objects in the eyes: This hazard mainly occurs in cutting, grinding, welding, spray painting, shot blasting/abrasive work and often leads to consequences such as burns, corneal and conjunctival lacerations. Most accidents involving foreign objects shooting into the eyes are due to workers not using protective glasses during work.

- Falling objects: This is a high-risk hazard when workers work with lifting equipment, welding machines, grinders, material bars and scaffolding. Falling objects from above can cause head injuries, broken bones in the feet and toes.

- Being crushed by heavy objects: Heavy objects pressing on body parts (except hands and fingers) or the entire body (roller pressing on legs; brace pressing on legs; door falling on body...) during operation or transportation can cause injuries leading to workers having to take time off work for medical treatment or death.

- Electric shock: This hazard arises mainly when workers work with welding machines, grinding machines and some other electrical equipment. Because electrical equipment in the shipbuilding industry is equipped with safety circuit breakers and is periodically inspected, the risk of electric shock accidents is usually only medium to low. However, among the surveyed facilities, there was an electric shock accident due to workers operating grinding machines who did not comply with safety procedures, so the risk of electric shock for welding and grinding work is assessed as high.

- Fire: This is a specific hazard of heat-generating work (welding, grinding, cutting) when working near flammable materials and work using gas, oxygen such as gas cutting, fire work.

- Accidents caused by vehicles at work: Accidents caused by transport vehicles such as forklifts, cranes, trucks, etc., including vehicles moving within the factory premises such as bicycles and motorbikes, for example being caught by crane wheels, falling off bicycles and motorbikes within the factory premises, etc.

Solutions

For workers: Research results have shown that workers in the shipbuilding industry are still subjective about the safety and health of themselves and their colleagues. Through actual surveys, there are still workers who do not fully use the personal protective equipment provided, such as not using safety helmets, noise-cancelling earplugs, not wearing safety belts or wearing safety belts but not using them when working at heights above 2 meters, not wearing safety glasses when doing fire work or grinding welding seams; not using handrails when going up and down stairs; dismantling scaffolding while there are still workers working above, etc. In this case, building self-awareness and safety habits is extremely important so that workers can protect themselves and those around them from occupational accidents and diseases.

For businesses: It is necessary to conduct annual risk assessments and evaluate the effectiveness of control solutions being implemented in reducing risk classification, with the goal of continuous improvement towards zero occupational accidents and occupational diseases. Businesses need to do a better job of collecting, investigating and storing information on occupational accident incidents, including near-misses, occupational diseases and work-related diseases, as a basis for accurately and objectively assessing occupational safety and health risks and developing focused control and mitigation solutions. In addition to technical, technology and ergonomic solutions, businesses need to strengthen compliance monitoring, raise awareness and encourage workers participation in risk assessment and mitigation; organize information and training activities to identify and prevent risks for workers so that these contents become habits and reflexes in the work process; and build a safety culture in the workplace.

Factors related to mental health of underground coal miners in Vietnam

Mai Ngoc Thanh , Nguyen Thi Hien, Nguyen Huong Tra My, Bui Thi Ngoc Minh

Occupational Health Center, VNNIOSH

Underground coal miners often face many stress factors such as harsh working conditions, cramped working postures, large workloads and time pressure. These factors can cause a number of psychophysiological diseases such as stress, anxiety, fatigue, etc., affecting the mental health of workers. However, this issue has not received due attention, most of the focus is still on physical health and occupational safety, ignoring the mental health of workers.

Mental health status of underground coal miners in Vietnam

Mental health problems can have serious consequences for workers. They can lead to reduced productivity, increased absenteeism, accidents, and strained interpersonal relationships. Neglecting mental health not only affects the health of the individual, but also hinders the efficiency and safety of the industry.

In 2022, a study by the Vietnam National Institute of Occupational Safety and Health (VNNIOSH) on 180 underground coal miners found that they were at risk of or had suffered from mental health-related illnesses. Among the most common mental health problems identified in underground coal miners were depression and anxiety disorders.

The study used Zung Self-Rating Anxiety Scale and Beck Depression Inventory which are quite commonly used today.

The proportion of underground coal miners with mental health problems (anxiety and/or depression) was 15%. The proportion of workers with anxiety disorders was 9.4%, and with depression was 11.4%, mostly at a mild level.

Factors associated with mental health among underground coal miners in Vietnam

Based on the results of the study, it was found

that some factors related to mental health of underground coal miners :

- The influence of age and working seniority: The study showed that workers in the age group of 40-49 years old had the highest rates of anxiety. Those with 6-10 years of working seniority had the highest risk of anxiety, 10.14 times higher than those with ≤ 5 years of working seniority.

- The influence of family factors, work, health behavior: Workers who were dissatisfied with their current income were 3.7 times more likely to be depressed than workers who were satisfied with their current income. Workers who were dissatisfied with their current job were 6.89 times more likely to be depressed than workers who were satisfied with their current job. Workers who used alcohol were 3.1 times more likely to be anxious and depressed than workers who did not use alcohol.

- The influence of working environment: Workers in a working environment with temperature not meeting allowed standards had a risk of anxiety and depression 2.74 times higher than those in a working environment with temperature meeting allowed standards; Workers in a working environment with noise not meeting allowed standards had a risk of anxiety and depression 4.11 times higher than those in a working environment with noise meeting allowed standards. Workers in a working environment with humidity not meeting allowed standards had a risk of anxiety and depression 2.1 times higher than those in an environment with humidity meeting allowed standards.

- The influence of physical labor burden : Workers with focal muscle burden assessment results at high burden level had anxiety and depression results 2.1 times higher than those with results at mild-moderate burden level. Workers with large muscle burden assessment

results at high burden level had anxiety and depression results 2.12 times higher than workers with results at mild-moderate burden level.

- The influence of psychological stress burden: Workers with high assessment results of attention span, task repetition time and work content had higher anxiety and depression results than workers with assessment results of these indicators at low to medium burden levels.

Proposed solutions to reduce mental health disorders of workers

Early identification and response play an important role in reducing the impact of mental health problems among underground coal miners. Some effective measures could be implemented in the workplace include:

- Research and apply quick anxiety and depression tests before workers enter the mine; conducting memory test, reflexes, drug test if necessary. Provide workers temporary break if the results are not good.

- Research and apply risk assessment of labor burden in underground coal mining industry.

- Disseminate and instruct workers on mental health issues and symptoms.

- Maintain equipment, improve technical measures to minimize harmful factors in the working environment. Carry out working environment measurement; evaluate ergonomics; perform periodic health check-ups and occupational health for workers.



Sampling the working environment at a mine. Photo: M.N. Thanh



VNNIOSH delegation at a working session with KOSHA in Ulsan city. Photo: N.A. Tuan

VNNIOSH strengthens international cooperation activities in the OSH field

Tran Bich Ha

Scientific Information and International Cooperation Department, VNNIOSH

The Vietnam National Institute of Occupational Safety and Health (VNNIOSH) actively implements cooperation activities in the last 6 months of 2024 and some key focuses for international cooperation in 2025.

2024 continues to be a year of many efforts to implement cooperation activities within the framework of the technical cooperation arrangement between VNNIOSH and the Korea Occupational Safety and Health Agency (KOSHA). In the last 6 months of 2024, VNNIOSH deployed 02 delegations to attend the joint research program and the invitational training program at KOSHA's headquarters in Ulsan City, Korea. The activities of the delegations focused on coordinating research to improve professional qualifications in the field of working environment; training and sharing experiences in implementation and management of science and technology, investment in building laboratories, digital transformation, and safety management in the field of OSH at the institutes under KOSHA and the Korea Elevator Safety Institute.

During the trip to Korea, the VNNIOSH officers had a working session with Hansung University on training high-quality human resources and seeking opportunities for cooperation in research in the field of OSH.

In the third quarter of 2024, VNNIOSH welcomed Mr. Jaewang Lee, Director of KOSHA's International Cooperation Center to visit and work at the Institute in order to review and evaluate the effectiveness of cooperation activities within the framework of the signed arrangement and discuss the prospects for cooperation between the two organizations in the next period.

KOSHA also sent a delegation of 02 experts from OSHRI to visit and exchange experience in the field of working environment at the National Working Environment Monitoring Station, a unit under VNNIOSH.

Since 2012, KOSHA and VNNIOSH have been actively promoting and diversifying cooperation activities within the framework of



VNNIOSH's leaders receives project survey team of KOICA Vietnam Office. Photo: Phi Long

signed arrangement, focusing on experience sharing, professional training, technical support and consultancy in the field of OSH. The cooperation activities implemented by both organizations are from actual needs, highly practical and directly applied to regular scientific research activities at the units.

In 2024, VNNIOSH also have received a number of international organizations to visit, work, and seek opportunities to expand cooperation in the fields of occupational safety, occupational health and working environment such as: delegation of Inje University (Korea), project survey team of the Korea International Cooperation Agency (KOICA) in Vietnam, NIOSH (Malaysia).

In 2025, VNNIOSH will continue to promote international cooperation activities in the field of OSH with the aim of learning and updating scientific and technical achievements, knowledge and experience from prestigious international partners, thereby contributing to improving capacity of scientific research staff, strengthening deeper integration into scientific research activities, innovation in the field of OSH and working environment in the region and the world.

The institute's international cooperation activities in 2025 are expected to focus on the following main contents:

- Maintain, strengthen and expand bilateral

and multilateral cooperation activities to become increasingly in-depth, stable and effective.

- Actively diversify and proactively seek cooperation opportunities, projects and joint programs with international organizations and new partners operating in OSH field in the ASEAN and Asia-Pacific region, especially countries with developed science and technology in Asia and in the world.

- Continue to promote expert exchange activities and international training with traditional partners to improve research capacity of the institute's scientific staff. Strive to build a team of highly qualified staff, keeping up with and meeting the development trends in the field of OSH in the region and the world.

- Participate in prestigious and high-quality international conferences, seminars, and scientific and technological events for researchers to attend and have the opportunity to interact and meet with leading experts, learning new trends and approaches in the field of OSH.

International cooperation activities are considered one of the factors that help create a foundation to contribute to VNNIOSH's development strategy to 2030, vision to 2045, thereby gradually contributing to the innovation of the model, content and methods of operation of the Vietnam Trade Union in the new situation.



In the context of strongly technological development, the application of Virtual Reality (VR) technology in Occupational Safety and Health (OSH) training has become an essential trend. This technology not only improves the quality of training but also brings practical benefits, helping to reduce occupational accidents and enhance safety awareness among workers.

Recognizing the importance and urgency of integrating VR technology into OHS activities, the Occupational Safety Center, VNNIOSH, has recently collaborated with K&L VINA Co., Ltd and HuLan Company (Korea) to establish a Smart Safety Training Room at 216 Nguyen Trai Street, Hanoi.

Introduction to the Smart Safety Training Room

Virtual Reality technology is an advanced technology that allows people to experience an almost real simulated environment through electronic devices. This environment can be created to replicate any space, from the real world to entirely imaginary landscapes, enabling users to explore, interact, and experience it in a highly realistic way. VR technology has been used to install the Smart Safety Training Room at the Occupational Safety Center.

The Smart Safety Training Room is a solution that applies modern technologies such as Artificial Intelligence (AI), the Internet of Things (IoT), and Big Data to effectively and accurately

monitor and manage safety factors in the workplace. This system can collect and analyze data from sensors, cameras, and mobile devices to provide early warnings and prevent potential hazards, thereby enhancing safety awareness and ensuring worker safety. Below are some functions of the system along with visual illustrations:

- Smart Surveillance Camera System: This system monitors hazardous areas and entry points which designed to scan, detect, and then alert about non-compliant safety actions in the workplace. It sends signals to the control center through speakers, sound alarms and visual alerts.

- Smart Health Monitoring System: This system monitors workers' health metrics such as heart rate and blood pressure to provide warnings regarding their health status.

- Smart Safety Experience Area: This area includes VR headsets pre-installed with virtual reality simulations of unsafe behaviors in high-altitude work, confined spaces and areas with chemicals.

The role and application of the Smart Safety Training Room

The use of VR technology in building a Smart Safety Training Room aligns well with current trends and delivers positive outcomes as follows:

- Enhanced realistic experience: Users are allowed to access and experience a virtual

space that closely resembles real environments.

- Cost and time optimization: VR technology reduces the need for physical devices and environments, resulting in significant cost and time savings.

- Safety: In the field of training and simulation, VR creates a safe environment for practicing skills without the risk of real-world hazards.

With these advantages, VR technology plays a significant and essential role in the current context. It opens a new era of digital technology applications in advancing educational and training activities, particularly in occupational safety training - an area that has long needed technological innovation to replace traditional methods. Moreover, VR technology will continue to be widely applied across many fields due to its visual and simulation capabilities, spanning from entertainment to healthcare, education, training and commerce including: entertainment and gaming; healthcare; education and training; construction engineering; retail and commerce; military engineering, etc.

Upcoming Activities with Virtual Reality Technology

To effectively and comprehensively apply VR

technology, Occupational Safety Center faces several challenges, primarily related to investment costs and the need for a highly skilled technological workforce, particularly in information technology. However, recognizing VR technology as an advancement that improves the quality and services of training, especially in the field of occupational safety, also contributes to the sustainable growth of the organization. Accordingly, some prioritized solutions are aimed at as follows:

- Approaching VR technology and developing diverse virtual reality simulation scenarios across various industries to meet training needs through research and scientific technology tasks.

- Collaborating with technology units and providers to jointly develop content. This is an advantage for the organization, as it has specialized scientists who can contribute to building scenarios and situations related to occupational safety activities.

- Enhancing dissemination and widespread communication to businesses and workers about occupational safety training through VR technology, aiming to improve quality and foster the effective use of VR technology.

OSH training cooperation on digital education and learning platforms

Ngo Thi Thuong

Digital Safety and Training Center, VNNIOSH

Training is one of the educational activities that aims to provide knowledge and practice skills for learners to help them proactively handle situations and problems encountered in practice. Occupational safety and health (OSH) training activities change awareness leading to changes in more standard behavior in OSH work which is one of the active prevention activities that requires attention and priority in the field of State management of OSH.

In the context of the strong Industrial

Revolution 4.0, raising awareness of workers on OSH needs to change its approach to suit the current situation. OSH training on the digital education and learning platform is one of the appropriate approaches, bringing many benefits to businesses and workers in comparison to traditional education:

- Improve training quality: New technologies help design diverse, rich, interactive and intuitive learning programs that in turn help learners remember and understand easily, and

bring high efficiency.

- Save time and money: Training on digital education and learning platforms helps businesses reduce costs for facilities and travel, while being flexible in terms of time, allowing learners to access information of OSH easily, anytime, anywhere.

- Increased Interactivity: Digital tools enhance interaction between instructors and students as well as between students themselves, creating a collaborative, engaging learning environment.

- Measuring training effectiveness: Big data and learning management systems allow for the storage and management of information, accurate analysis and assessment of learners' learning progress and outcomes, thereby making timely and effective adjustments.

With the goal of expanding OSH training on the digital education and learning platform, Vietnam National Institute of Occupational Safety and Health Science (VNNIOSH) has signed a cooperation agreement with the Vietnam Multimedia Corporation (VTC) in

producing digital learning materials on OSH, organizing training on the digital education and learning platform to provide quality online learning experiences, helping workers equip themselves with the best knowledge and skills to work safely. The cooperation will expand access to occupational safety knowledge for millions of workers with flexibility, easily improving the quality of resources, reducing occupational accidents and protecting the health of workers, supporting businesses to comply with the law and building a safe working environment, spreading occupational safety knowledge to all classes of workers.

The cooperation between VNNIOSH and VTC is an effective combination of deep expertise in the field of OSH and the wide accessibility of digital training. Both parties are committed to maximizing the strengths of each side to create quality, attractive digital learning materials that reach a large number of workers. At the same time, it contributes to narrowing the gap in occupational safety training between urban and rural areas.

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LABOUR PUBLISHING HOUSE

Add: 4th Floor - Area A Building No. 97 Tran Quoc Toan -
Hoan Kiem District - Hanoi

Tel: (+84) 024 38515380; Fax: (+84) 024 38515381

Email: info@nxblaodong.com.vn

Website: www.nxblaodong.com.vn

Southern Branch

85 Cach Mang Thang Tam Street, District 1, Ho Chi Minh city

Tel: (+84) 028 38390970; Fax: (+84) 028 39257205

Responsible for publishing:

Director - Editor-in-Chief

Mai Thi Thanh Hang

Editor: Phan Thi Anh Tuyet

Responsible for compilation:

Vice Director of VNNIOSH

Vu Xuan Trung

Print Editor: Xuan Dai

Affiliate partner:

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Vietnam National Institute of Occupational Safety and Health

Add: 99 Tran Quoc Toan Street,
Hoan Kiem District, Hanoi

Website: www.vnniosh.vn



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