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Viet Nam National Institute of Occupational Safety and Health - VNNIOSH

SCIENTIFIC RESEARCH ON OCCUPATIONAL SAFETY AND HEALTH: OPPORTUNITIES AND CHALLENGES IN THE NEW SITUATION

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The Vietnam National Institute of Occupational Safety and Health (VNNIOSH), directly under the Vietnam General Confederation of Labor (VGCL), is the leading national institute assigned with the task of conducting scientific research in service of state management for occupational safety and health (OSH). For many years, the institute has made positive contributions, confirming the role of the VGCL in the work of safeguarding OSH in our country. Due to the great development in science and technology, its impacts on many economic sectors as well as the environment and working conditions of many workers and laborers, new directions for scientific research in the field of OSH are also a necessity.

Implementing the Resolution of the 11th

Congress of the Vietnam Trade Union for the 2013-2018 tenure on the scientific and technological research in the field of OSH, the National Institute of Labor Protection (now known as the Vietnam National Institute of Occupational Safety and Health) has identified the key issues to focus its research, and based on which, constructed plans and implemented its research effectively.

Issues on which the Institute has focused its research efforts:

- Strengthening and supplementing researches in order to contribute to improving the effectiveness and efficiency of state management for OSH and have a hand in the development of mechanisms and policies on OSH;

- Promoting the research on applying scientific and technological solutions for ensuring OSH and environmental protection, and putting the research findings into practice;

- Paying special attention to the study of measures to prevent occupational accidents and diseases; improving safety culture in the workplace;

- Paying special attention to research on OSH for professions with high risks of occupational accidents and diseases such as high-rise buildings construction, pit mining, chemicals and new materials related occupations, etc. At the same time, adequate attention must be paid to the problems of specific groups such as: female workers, workers with disabilities, fishermen, national defense employees, etc.

In addition, the Institute has also paid attention to improving working conditions in small and medium enterprises, in craft villages; studying the effective methods for raising public awareness, educating and disseminating knowledge on OSH in order to mobilize the public to participate in the movements on OSH, bring into full play the roles of trade union organizations in OSH.

Based on the scientific and technological issues on OSH identified, assigned by the VGCL as the liaison agency for the implementation of a coordinated program on science and technology by the Ministry of Science and Technology and VGCL, VNNIOSH has brainstormed, planned and conducted 09 researches under the coordinated program; developed and organized the implementation of 07 scientific researches under the “Program on key scientific and technological focuses on OSH in the period of 2014-2020”, a program which was held by the VGCL; carried out 39 researches and projects at Ministry level. In order to set the scientific basis for proposing to the Government on the organization of mid-shift

meals for workers, the VGCL has proposed that the Ministry of Science and Technology assign the VNNIOSH to take charge of conducting the scientific and technological research at national level (DTDLCN.06-15): “Assessing the ergonomic burdens, nutritional needs and servings of food, and developing a set of criteria on nutrition and food safety for mid-shift meals of workers in chosen industries”. The outcomes of scientific and technological researches and projects on OSH conducted by VNNIOSH in the period of 2013-2018 is diverse, ranging from scientific basis for the state management of OSH to technological products and technical systems, etc.

Some outstanding outcomes, which have contributed to the task of state management are: The understanding of safety culture and a basic model of safety culture at work is the result of the project: “Research on theoretical and practical basis and development of safety culture model at work in industrial production in Vietnam”. The “Methodology for assessing, classifying labor conditions based on overall ergonomic burden VNNIOSH-2017” resulted from the research on “Investigating, evaluating and forecasting the working conditions in several sectors of industrial production up to 2020” has been handed over to Ministry of Labors – Invalids and Social Affairs to set the basis for developing the Circular on the criteria for the classification of workers under typical working conditions. Other applications such as: a list of standards and national technical regulations on OSH; drafted standards and regulations on personal protective equipment (PPE), weight limits for manually lifted loads for female workers, standards of natural lighting in industrial production, methods and procedures of analyzing environmental parameters, biological monitoring, etc.; methods to assess the safety level of technical – technological systems;

methods of overall assessment of occupational health risks, the system of criteria for evaluating and rating enterprises in implementing the law on OSH and environmental protection; project on “Developing Atlas Ergonomics of working age Vietnamese in the present time”; toolkit for evaluating and proposing solutions to control occupational accidents in construction of tall buildings, etc. are effective tools in OSH management at work and in enterprises.

Many research outcomes are technical devices and systems which are highly effective in improving working environment and conditions. For example, the natural light illumination system that guide collected sunlight to the electrical and electric equipment manufacturing workshop of ABB, the Swedish electric transformers manufacturing factory located in Ngoc Hoi, Hanoi is the result of the “Research on the application of solutions for natural light illumination in industrial buildings in order to creating favorable lighting conditions for workers and contributing to the economical use of energy and the protection of environment”. Other technical devices and systems resulted from our researches are: small-scaled cluster of clean water systems in rural and mountainous areas; H₂S treatment equipment for industrial gas emissions; modular wastewater treatment system using Moving Bed Biofilm Reactor (MBBR), spray nozzles for dust suppression applied in rock mining and processing plants; catalytic oxidation process for total oxidation of toluene at low temperature; application of a non-thermal plasma technique for organic solvents treatment in printing shops, etc.

There are many researches resulted in PPE, such as heat resistant safety helmets which are suitable to the outdoor working conditions in Vietnam; fuel, oil resistant shoe soles made from blended acrylonitrile butadiene rubber (NBR) and polypropy-

lene (PP); system for conformity assessment of dust filters of respiratory protective equipment; system for conformity assessment of filters of some safety masks and half-face masks; system for conformity assessment of personal fall protection equipment, etc.

Many researches have focused efforts on the detection of occupational diseases, assessing and forecasting the occupational hazards to workers' health, developing preventive solutions and mechanisms to take care of workers' health, such as: “Research on the current situation of formaldehyde poisoning among workers in wood processing industry, proposing to include the disease into the list of occupational diseases entitled to compensation in Vietnam”; “Research on the current situation of organic dust exposure and its relation to Hypersensitivity Pneumonitis in workers of feed manufacturing and furniture making industries”; “Dental erosion in workers exposed to acids”; “Nickel exposure and typical pathological symptoms in workers in nickel plating plant”; “Thresholds for controlling organic solvents in blood and urine of female workers in footwear industry”; “Observation of the chronic effects of benzene, toluene, xylene in workers exposed to low concentrations by testing some hematological parameters, mRNA CYP2E1 and the mutation of CYP2E1 gene”; etc.

With the adoption for the first time of the Law on OSH (entry into force on January 7, 2016), the system of laws and regulations on OSH has been further improved. This not only creates favorable conditions for state management of OSH in general, but also contributes to promoting the scientific and technological research on OSH in particular. The increasingly intensive and extensive international integration through bilateral and multilateral free trade agreements has posed various challenges for

Vietnam in the participation and full adherence to international conventions and standards on social responsibilities in ensuring OSH and workers' health, etc. We have actively taken part in international programs on decent work, safety culture and culture of prevention, etc. and this represents both opportunities and challenges for our country in the work of ensuring OSH.

In recent time, Vietnam has made dramatic economic progress, production technology has been gradually innovated and outdated technologies have been replaced, many high-tech manufacturing industries have enjoyed FDI investment projects. On one hand, the rapid development in science and technology has helped to accelerate growth in labor productivity, improve working environment; automation has unleashed labor forces, eased the burden for labor; high technology has indeed bettered the working environment for workers; however, on the other hand, the negative consequences of line production and high level of automation are the monotony and tediousness due to the repetitive manufacturing rhythm, etc., new hazards appeared more frequently (nanotechnology, new chemicals which are considered the technological secrets of business have appeared and become hard to control due as they are not publicly unknown, etc.). This has posed challenges, the challenges which Vietnam is not the only country to face, in managing and reaching scientific and technological solutions for controlling OSH.

Hazard control in the field of OSH, prevention of occupational accidents and diseases stipulated in Vietnam's Law on OSH have revealed many limitations. This not only requires the innovation and replacement of old and high risk technologies by eco-friendly technologies which use low-polluting materials and save energy; but also dictates the necessity of effective

scientific and technological solutions for OSH in order to identify and control hazards, contribute to reducing occupational accidents and diseases, and protect workers' health.

Following this trend, scientific and technological research on OSH have basically enjoyed favorable conditions with the attention of leaders at all levels. Especially, after the Law on Science and Technology and the Law on OSH entered into force, the Government adopted Decision No. 17/2017/QĐ-TTg on the organization and activities of the Vietnam National Institute of Occupational Safety and Health (previously known as the National Institute of Labor Protection) which supplements the functions, responsibilities and rights in conformation with the Laws. In the past years, the Government has invested to improve the working conditions and research facilities of the Institute (the Institute currently has 05 laboratories in Vietnam Laboratory Accreditation Scheme (VILAS) system); research capacity of the staff has been strengthened. However, the number of researchers, especially highly qualified researchers still does not meet requirements. For nearly 20 years, major national-level programs have not been assigned to the field of scientific and technological research on OSH. This has created limitations in the mobilization of research forces from all governmental agencies to join the scientific and technological research on OSH.

Nowadays, the focal issues of scientific and technological research for the coming time include: Research to propose the inclusion of diseases into the list of occupational diseases entitled to compensation, especially those related to new manufacturing industries and technologies; Research on solutions to control occupational hazards on safety and health, contributing to the reduction of occupational accidents and diseases; Implementation of

safety culture, culture of prevention in the work place, etc.

In order to effectively implement the tasks aforementioned, some solutions should receive attention from related agencies: the Ministry of Science and Technology should consider to put the scientific and technological research program on OSH into the plan on Building strategy for national scientific and technological research in the period of 2020-2015 with vision to 2030 in order to mobilize extensively and effectively the forces from all governmental agencies to participate in the scientific and technological research on OSH.

Meanwhile, the Government should focused invest in agencies and organizations with scientific and technological research on OSH in order to improve facilities, especially in laboratories and experimental facilities, and strengthen the research capability of research staff, thus raising the capacity and helping the agencies to effectively carry out researchs in important fields.

The task of training, building a staff with highly-qualified researchers and leading experts in the field of OSH must receive attention. Moreover, policies and mechanisms must ensure the appropriate benefits of workers to attract the highly-qualified researchers to join the field of scientific and technological research on OSH.

Promoting international cooperation in order to take full advantages of experiences and resources from international organizations and experts in the field of OSH in general and in scientific and technological research of OSH in particular must not be neglected.

These solutions shall help to create favorable condition, create incentives and opportunities for the scientific research on OSH to continuously amplify its strength, approaching and addressing contemporary issues, serving the national management of OSH, contributing to securing workers' safety and health and protecting the environment.

12th Congress of the Vietnam Trade Union: Asserts the position, role and responsibilities of the working class and the Trade Union

On the morning of September 24th, 2018, at the National Convention Center (Hanoi, Vietnam), the 12th Congress of the Vietnam Trade Union for the 2018-2023 tenure was officially opened with the participation of 947 delegates representing over 10 million trade union members, workers, cadres, civil servants, laborers nationwide and 7 international delegations.

The Congress took place in 3 days, from September 24 to 26, 2018. Under the theme "Renewal, democracy, solidarity and responsibility", the Congress confirmed the determination to renew the organization and operation of trade unions; focus on the task of trade unions to represent, take care of and protect the rights and interests of trade union members and workers; attend to the task of raising awareness and educating workers, and build a strong working class, contributing to national construction and defense.

In his opening remarks, Bui Van Cuong, member of the Central Committee of the Communist Party of Vietnam (CPV), President of the 12th-tenure Vietnam General Confederation of Labor (VGCL) stressed that this Congress is a major political event and a big festival for Vietnam's working class and trade unions to determine important issues related to the movements of workers, cadres, civil servants and laborers as well as the activities of trade unions for the next 5 years.

A panorama of the Congress

VGCL President Bui Van Cuong affirmed that trade unions at all levels, with a sense of responsibility, dynamism and creativity, have overcome difficulties, overhauled operational contents and methods, and designed many innovative and practical guidelines and measures to implement and basically fulfil the goals and tasks set at the 11th Congress of the Vietnam Trade Union.

Trade union activities have gradually shifted its focus on grassroots trade unions, caring for the practical benefits of trade union members and workers. Trade union organizations have constantly been growing, promoting their role as a trustworthy representative of workers and laborers, a strong supporter of the Party, and a bridge connecting the Party, the State and the labor force.

The position of trade unions in society has been improved. Trade union activities and the workers' movements have made significant contributions to enhancing the country's socio-economic development, strengthening national defense and security, building ours a clean and strong Party and a transparent and efficient political system, thus increasing the position of Vietnam in the international arena, actively contributing to the cause of national construction and defense.

"These achievements are the result of the non-stop efforts made by the working class and trade union organizations, affirming the position, role and responsibilities of the working class and trade union organizations in the course of national industrialization, modernization and international integration" – stated Bui Van Cuong.

VGCL President Bui Van Cuong also said that the 12th Congress of the Vietnam Trade Union was tasked with the responsibility of objectively and comprehensively evaluating the achievements, pointing out the shortcomings and limitations, and drawing lessons learned from the experiences during the 2013-2018 Tenure; then, on the basis of the achievements inherited from the last tenure, determining the objectives, directions, tasks and mechanisms of trade unions in the next 5 years.

VGCL President Bui Van Cuong - member of the Central Committee of the CPV, President of the 12th-tenure VGLC – delivers the opening remarks at the 12th Congress of the Vietnam Trade Union.

Over the past five years, the Vietnam Trade Union has continued to overhaul operational contents and methods, achieved fruitful results and basically accomplished major tasks and targets set by the 11th Congress of Vietnam Trade Union.

The legal and legitimate rights and interests of trade union members and laborers are protected and attended to.

Trade Union has taken an active role in formulating labor laws and policies; many guidelines and policies of the Party and the State on building working class and trade union organizations have been specified and materialized.

In the organizational system of trade unions, activities to raise awareness and educate workers and laborers have been pervasive. The patriotism emulation movements among workers, cadres, civil servants and laborers have enjoyed positive changes, making an important contribution to boosting the socio-economic development.

Mass mobilization has achieved fruitful accomplishments, attracting a large number of laborers to join and participate in trade union activities; the tasks to overhaul organizational structure and improve the quality of trade union cadres have been attended to. Inspection activities in trade unions are strengthened.

Finance management in trade unions has had important innovative changes, aiming to increase disclosure, transparency, effectiveness, and efficiency.

The Congress demonstrated the determination of Vietnam Trade Union to successfully implement the overall objectives for the five-year tenure from 2018 to 2023, namely: To increase the effectiveness in its tasks to represent, take care of, and protect the rights of trade union members and laborers, aiming at ensuring decent works and improving life standard for laborers; To generate awareness and educate workers to raise class consciousness, political prowess, patriotism, knowledge of the law, work ethics and skills, contributing to building a strong Vietnamese working class; To overhaul the organizational model, renovate the operational methods, and build a contingent of courageous, knowledgeable and professional trade union cadres; To gather and attract a large number of laborers to join the Vietnam Trade Union; To build a strong Vietnamese Trade Union; To actively participate in the cause to build ours a strong Party and a transparent and efficient political system, contributing to the national construction and defense.

In order to achieve the objectives, the Congress set out 9 groups of targets, 9 groups of tasks and mechanisms, and 3 strategic breakthroughs, including the task to implement the Program entitled “Vietnam Trade Union accompanying the Government to enhance the nation’s competitiveness and sustainably develop the country” with the aim to promote the role of workers, laborers, and Vietnam Trade Union in the cause of national construction and defense.

Putting into play the strength of democracy, the Congress elected 161 comrades to the Executive Board of the 12th-tenure Vietnam General Confederation of Labor to assume the responsibilities assigned by the working class and Vietnam’s Trade

Union. Those are virtuous, capable comrades who are dedicated to the work of Vietnam’s working class and Trade Union

In the opening session, the Executive Board of the 12th-tenure VGCL (for the 2018-2023 period) elected 22 comrades to the Presidium. Bui Van Cuong, member of the Central Committee of the CPV, was re-elected as President of the 12th-tenure VGCL. Tran Thanh Hai, Tran Van Thuat, Ngo Duy Hieu, Phan Van Anh were elected as Vice-Presidents of VGCL.

On the afternoon of September 26, 2018, the 12th Congress of Vietnam Trade Union was closed after 3 days of hard work, seriousness, responsibility and efficiency.

Provisions for Mid-shift Meal should be Included in the Revised Labor Code

The statement above was made by the Vice President of the Vietnam General Confederation of Labor, Ngo Duy Hieu, at the Conference on Nutrition and Food Safety at Mid-shift Meal for Workers in the Textile and Garment and Footwear Industries, organized by the Vietnam National Institute of Occupational Safety and Health (Vietnam General Confederation of Labor) in collaborating with the National Institute of Nutrition (Ministry of Health) on October 9th in Hanoi.

In his opening remarks, Dr. Do Tran Hai, Director General of the Vietnam

National Institute of Occupational Safety and Health, stated that: Over the past years, the trade unions have taken practical measures and actively collaborated with employers to take care of both material and spiritual lives of laborers, contributing to improving workers’ health. Aside from these achievements, the mid-shift meals of workers in many companies and enterprises still fail to meet the requirements of

Ngo Duy Hieu, Vice President of the Vietnam General Confederation of Labor, gives speech at the Conference

Photo: Dr. Do Tran Hai, Director General of the Vietnam National Institute of Occupational Safety and Health, delivers the opening remarks at the Conference

reproducing labor power; poor food quality and insanitary processing conditions have led to the risk of food poisoning. In 2016, the Vietnam General Confederation of Labor set the goal of reaching the agreement on minimum mid-shift meal allowance of 15,000 VND in collective bargaining and encouraging companies and enterprises to improve the quality of mid-shift meals. However, this issue has been neglected by some grassroots trade unions. Textile and garment and footwear industries are amongst the labor-intensive industries but nutrition for workers in those industries has not been paid due attention. Over 2 years, VNNIOSH carried out research and surveys on nutritional status and health problems of approximately 9,000 workers in 48 companies and enterprises in textile and garment and footwear sector throughout the country, and the results showed that: the general rate of anemia was 17.3%, of which 21.5% was female. The rate of anemia in footwear industry was 20.6%, higher than 16.3% in the textile and garment industry.

Speaking at the Conference, Vice President of the Vietnam General Confederation of Labor, Ngo Duy Hieu, noted that organizing the Conference on Nutrition and Food Safety at Mid-shift Meal for Workers in the Textile and Garment and Footwear Industries right after the 12th Congress of the Vietnam Trade Union is meaningful, demonstrating the determination of the Vietnam Trade Union to renew itself in order to meet the needs of integration and development. Textile and garment and footwear industries are two labor-intensive industries with hard work, therefore, mid-shift meals are of highly important. However,

the lack of criteria and regulations causes many difficulties in improving the quality of meals for workers.

“It is important to include the issue of mid-shift meals into the upcoming revised Labor Code. Mid-shift meals should be the responsibility of employer; and food quality as well as food safety must be ensured”- Hieu said.

During the Conference, participants considered and discussed the issues of: Nutritional status of workers in textile and garment and footwear industries; Results of the survey on energy consumption and ergonomic burden of workers in textile and garment and footwear industries; Status of food hygiene and safety of mid-shift meals; Nutritional status of mid-shift meals; Food hygiene and safety in mid-shift meals cooking process, etc.

The Conference also discussed the draft of the set of nutritional criteria for mid-shift meals, draft of the set of food hygiene and safety criteria for mid-shift meals, and received constructive feedbacks to improve the quality of results, set the basis for proposing to the government for consideration and promulgation regulations relating workers' mid-shift meals.

RISK ASSESSMENT OF CHEMICAL EXPOSURES

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In Vietnam, leather tanning is a polluting industry due to its usage of raw animal skins and hides and many types of chemicals in large quantity to perform the process of producing leather. Mixtures of various surplus chemicals, products transformed from them, and waste in the dissolved or dispersed form in water also produce pollutants in three major categories: solid, liquid and gas. Organic substances from unwanted parts such as fur, fat, meat, etc. in raw materials (fresh skins, salted skins) are removed along with excess chemicals (both inorganic and organic, especially chromium(III)). The decomposition of organic compounds causes a typical foul odor in manufacturing and surrounding areas. Volatile solvents and exhaust gases from boilers also characterize the environmental status of the tanning industry.

Therefore, in the production process, workers often suffer from the exposure to chemicals in the forms of solid, liquid, dust, vapor, gas, fibers, fume and fog. Solid and liquid chemicals are recogniza-

ble to workers. However, workers can only detect the presence of chemicals in the forms of dust and fog at large particle sizes and high concentration. Also, workers are unable to recognize gaseous chemicals, except for some odorous types.

Factors affecting workers' health when suffering exposure to chemicals include:

- Toxicity of chemicals
- Amount of exposure
- Time of exposure
- Reaction or interaction with other chemicals
- Workers' physical condition (e.g. health condition, age, gender, the state of being pregnant or breastfeeding)

However, in fact, these data are not readily available or easily collected. In a study to develop a Procedure for hazard identification and occupational safety and health risk assessment, VNNIOSH had applied the risk assessment matrix to identify health risks under exposure to chemicals, quantitatively, based on the toxicity of chemicals, the amount of exposure, the physical and chemical properties such as solid, liquid or gas, volatility, and the frequency of exposure.

Method of risk assessment matrix

General formula for risk identification:

$$\text{RISK} = \text{HAZARD} \times \text{EXPOSURE}$$

in which,

- Hazard: a characteristic of chemicals or waste, associated with their physicochemical properties and toxicology or ecological toxicology.

- Exposure: the way and extent to which chemicals affect the people in contact with them. The level of impact (to workers' health and/or life) depends on the concentration of chemicals/waste and the intensity of exposure to the subject at risk in a unit of time.

- High hazard (high levels of danger) leads to high risk. Similarly, high exposure (high concentrations of chemicals and exposure time) also results in high risk. Therefore, exposure to chemicals poses high risks when the chemicals are dangerous and in large quantities, the intensity and frequency of exposure is high and the duration of exposure is prolonged.

The procedure of determining the risk of exposure to chemicals follows these basic steps:

Step 1: Determining the hazardous level of chemicals

The determination of the hazardous level of chemicals is based on the toxicity, reactivity and physical properties of chemicals, specified in the Globally

Harmonized System of Classification and Labeling of Chemicals (GHS).

Step 2: Determining the exposure level to chemicals

The exposure level to chemicals is determined by combining two factors of concentration and frequency of exposure.

Determining the exposure frequency

Exposure frequency is the length of time in which workers are exposed to chemicals at work, in hour(s) per work shift or total working hours per year. The frequency of exposure is converted into a scale of 1 to 5, in which 1 is the lowest and 5 is the highest frequency of exposure.

Determining the exposure concentration

Exposure concentration is determined from measurement in the workplace (for gas-phase chemicals) or the number of chemicals in contact (for solid and liquid chemicals), taken into account the physical and chemical characteristics of that chemicals.

For gas-phase chemicals:

Exposure concentration for gas-phase chemicals is the ratio of measured values in the working environment and the permitted limit of the chemical in the workplace. It is converted into a scale of 1 to 5, in which 1 is the lowest and 5 is the highest exposure concentration.

For solid and liquid chemicals: Exposure concentration for solid and liquid chemicals is the combination of various factors including the quantity of the chemical, its volatility and dustiness, the protection level of workers, and is also converted into a scale of 1 to 5 similar to gas-phase chemicals.

Step 3: Determining the risks of chemical exposures

		Exposure levels				
		5	4	3	2	1
Hazardous levels of chemicals	5	5	5	4	3	2
	4	5	4	3	3	2
	3	4	4	3	2	2
	2	4	3	3	2	1
	1	4	3	3	2	1

Figure: Risk matrix for chemical exposure assessment

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The formula for determining the risks of chemical exposures:

$$\text{Risk} = \text{Hazard} \times \text{Exposure}$$

In the matrix above, the exposure levels and hazardous levels are arranged from left to right and top to bottom, respectively, with 5 is the highest level, following by 4, 3, 2, 1. The risk areas are achieved as in Figure 1.

Table: Classification of the risks of chemical exposures

Level	Description
5	Unacceptable risk
4	High risk
3	Medium risk
2	Acceptable risk
1	Negligible risk

Thus, based on the results of the risk matrix with a certain level of quantification, companies and enterprises may adopt management measures to reduce the risks of chemical exposures for workers at work.

