NEWSLETTER

On Occupational Safety and Health & Working Environment

JUNE 2025

Vietnam National Institute of Occupational Safety and Health - VNNIOSH

Promoting scientific research activities on OSH in the spirit of Resolution 57-NQ/TW dated December 22, 2024 of the Politburo

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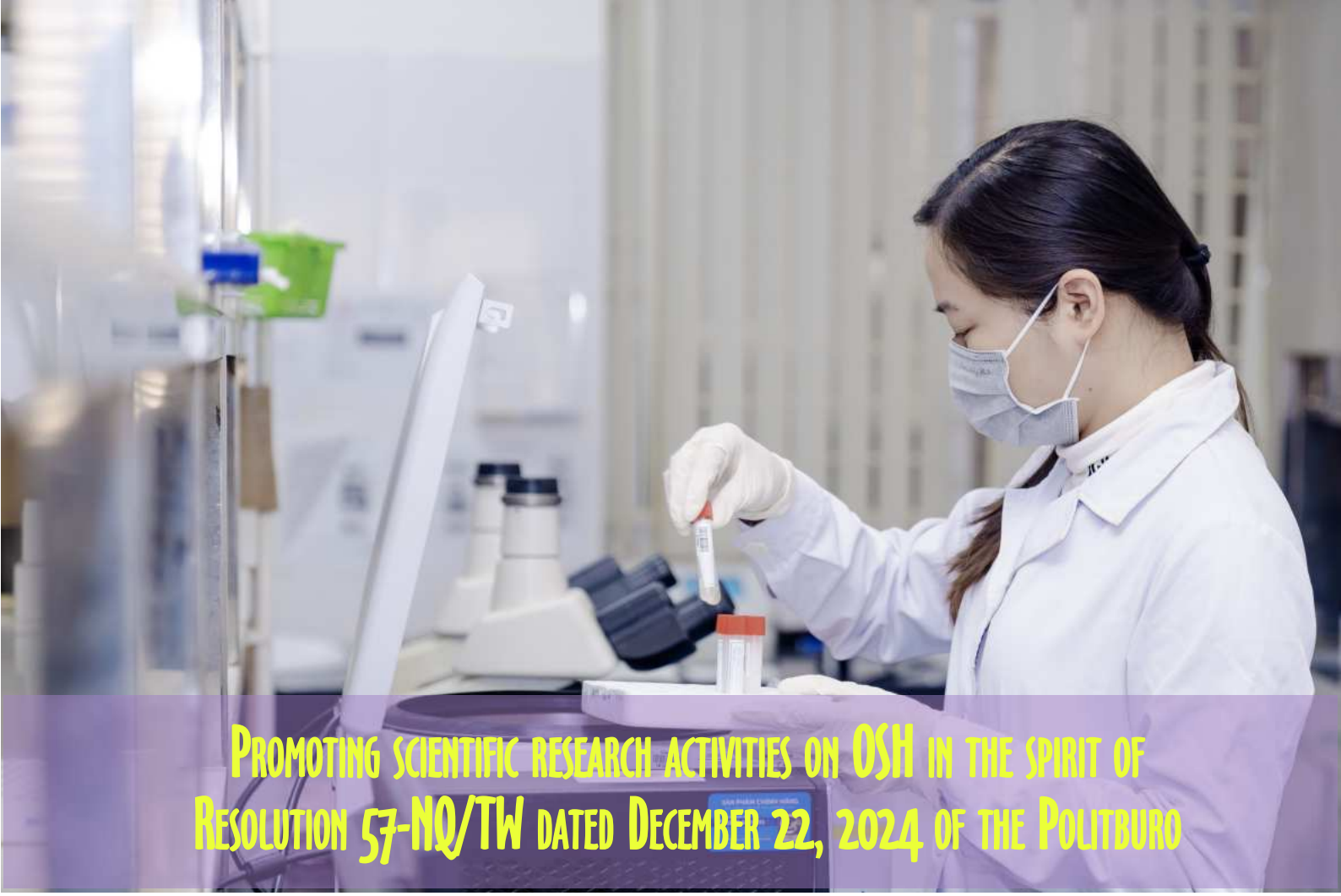

Promoting scientific research activities on OSH in the spirit of Resolution 57-NQ/TW dated December 22, 2024 of the Politburo

Vu Xuan Trung

Deputy Director General of VNNIOSH

Resolution No. 57-NQ/TW dated December 22, 2024 of the Politburo on breakthroughs in science, technology, innovation to 2030, vision to 2045 has set forth major orientations to strongly promote the comprehensive and sustainable development of Vietnam's science and technology in the new period. One of the priority areas is the science of occupational safety and health (OSH), which plays a key role in ensuring the health and safety of workers, contributing to the stability and sustainable development of the socio-economy.

The role of scientific research in the field of OSH

Scientific research on OSH not only aims to identify, assess, and control risk factors in the working environment but also serves as a foundation for proposing suitable, effective, and sustainable policies and intervention solutions. In the context of strong industrialization, modernization, digital transformation and innovation, the risk factors related to safety and occupational health are becoming increasingly diverse, complex, and unpredictable. This poses an urgent demand to enhance scientific research activities to timely adapt to, proactively prevent, and effectively respond to new risks arising in the working environment.

The challenges

Practice shows that, despite significant progress, scientific research activities on OSH in Vietnam still face several limitations. The first limitation is the lack of proactivity and long-term strategy, many research projects are still reactive, not driven by practical needs or not well-connected with national development policies and strategies. Secondly, there are limitations regarding resources and research infrastructure; OSH researchers are still limited, the facilities for in-depth research have not been adequately invested, and modern research equipment is still lacking and outdated. Thirdly, there is not a tight linkage between research and practical application, many research results have

not been effectively transferred into management and production practices, leading to a lack of clear impact on improving working conditions and the occupational health of workers.

Research orientation for innovation in the spirit of Resolution 57-NQ/TW

Resolution 57-NQ/TW affirms that science, technology and innovation are the main driving forces for rapid and sustainable socio-economic development. In the era of technology and digital transformation, increasingly numerous new dangerous and harmful factors are emerging. Therefore, scientific research orientation needs to be closely tied to production practices and forecast new risks. This includes prioritizing research on working environments in high-risk industries such as mining, chemicals, metallurgy, construction, textiles, electronics, etc., as well as vulnerable labour groups such as freelancers, women, the elderly, and workers in the informal sector.

In particular, it is important to focus on risk factors arising from changes in production technology such as technical errors from automation systems, robots, intelligent control systems; impacts from new materials (nanotechnology, batteries, heavy metals, etc.); and the effects of electromagnetic fields and non-ionizing radiation in working environments with lots of electronic equipment, IoT; or psychological impacts such as stress from remote work, constant pressure to adapt to new technologies. Innovation needs to be understood not only as technical innovation but also as the process of applying new ideas, products, and processes to improve working conditions, reduce accidents, occupational diseases, and enhance workers' health. Some prominent directions include using robots to replace dangerous jobs; comprehensive digitization of OSH work; building a safety culture within enterprises; encouraging workers to participate in suggesting initiatives to improve working conditions.

Some key areas that need to be promoted scientific research activities on OSH

To successfully achieve the objectives of Resolution No. 57-NQ/TW dated December 22, 2024 of the Politburo, the OSH sector needs to concentrate on the following key tasks:

1. Develop and implement a National Scientific Research Program on OSH: It is necessary to have a National research program with the overall goal of creating a scientific and technological ecosystem in the field of OSH, serving as a foundation for effective policy, legal, and practical frameworks. The program's content may include: (i) Research to propose the issuance of regulations, standards, and technical regulations on the use of artificial intelligence (AI), big data, etc., in the field of OSH to create a legal framework for researching and applying development solutions to manage, monitor, and ensure the safety and health of workers. (ii) Research to evaluate the impact of hazardous and harmful factors for workers arising from changes in production technology, the process of digital transformation of the economy, climate change, and aging population… on working conditions and the health of workers. (iii) Research to develop an intelligent labour environment monitoring system, an OSH management system based on AI, big data, IoT sensor devices to detect and alert risks in real-time, wearable devices to monitor personal indices, fatigue status and location to forecast, analyze risks, report occupational accidents and occupational diseases.

2. Develop specialized research centers in the field of OSH: To improve the quality of research and promote innovation in the OSH field, it is necessary to develop specialized research centers and modern laboratories that meet international standards. The State needs to have mechanisms and policies to support organizations, individuals and businesses in investing in the construction and upgrading of key research centers and laboratories focused on the working environment and occupational health. In addition, it is essential to establish a network of calibration centers to ensure the quality of monitoring the working environment, health surveillance and early detection of occupational diseases. At the same time, a system of laboratories should be developed to serve the testing, assessment, and standardization of safety equipment and PPEs; building data centers and researching the

application of automation technology and AI in the field of OSH.

3. Develop a high-quality research workforce: Human resources are the core factor in research activities. Therefore, it is necessary to establish mechanisms to attract and retain talented scientists in the field of OSH. On that basis, it is important to clearly identify the list of long-term (3-5 years) and regular science and technology tasks to proactively recruit and train high-quality researchers. At the same time, it is essential to enhance cooperation between institutes and universities specializing in OSH with research units in cutting-edge technology to leverage and supplement high-quality human resources. Additionally, connecting networks of experts and scientists both domestically and internationally, as well as strengthening research institute - university - business collaboration will contribute to improving practical relevance, application capabilities and technology transfer into practice.

4. Promote scientific cooperation and transfer research results: Domestic and international cooperation is an inevitable trend to promote research and innovation. Research institutes, universities and organizations in Vietnam need to actively organize or participate in national and international scientific conferences on OSH to exchange academic knowledge, update research trends and enhance the professional qualifications of scientific personnel. At the same time, it is necessary to promote the application of international standards such as ISO 45001 (OSH management systems), ISO 17025 (laboratory competence), ISO 15189 (medical laboratory quality), etc., to improve the international integration capacity of domestic scientific and technological organizations. Additionally, the transfer of research results to enterprises should be encouraged through specific policies. It is essential to allow research institutes and univercities to jointly invest and collaborate with businesses or allow scientists to run scientific and technological enterprises to realize research products. This will be an important driving force to bridging the gap of research - application - production.

Conclusion

Strengthening scientific research activities on OSH in the spirit of Resolution 57-NQ/TW not only contributes to enhancing the effectiveness of state management, the capacity to prevent and respond to workplace risks, but also plays an important role in protecting human resources, promoting sustainable development and international integration. In an era where knowledge, technology and innovation are vital factors, OSH also needs a strong transformation in thinking and action in scientific research.

SIMULATING AMMONIA RELEASE IN THE WORKING ENVIRONMENT USING CONTAM SOFTWARE: WHEN TECHNOLOGY HELPS TO SEE INVISIBLE RISKS

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Ammonia (NH_3) is a familiar chemical compound, widely used in many industries such as fertilizer production, food processing, refrigeration industry, chemicals, etc. Although it plays an important role in production, due to having characteristics like rapid evaporation, strong dispersion and high toxicity, ammonia is considered one of the chemicals that pose many potential risks to workers' health if not strictly managed and controlled in the workplace.

Under normal conditions, NH_3 exists as a colorless gas with a distinct, pungent odor, easily noticeable when released into the environment. However, at concentrations of only 20–50 ppm, it can irritate the eyes, nose and respiratory tract. If the concentration reaches 500 ppm or more, this gas can cause serious damage and even death with only short-term exposure. In particular, NH_3 gas is easy to react quickly with water vapor in the air, forming suspended aerosol particles, prolonging the residence time and increasing the level of danger for exposed people.

In fact, there have been many serious incidents involving ammonia. Typical examples include the NH_3 gas leak in Ho Chi Minh City in 2017, which forced the evacuation of more than a thousand residents, or the gas tanker explosion in India in 2015, which caused great loss of life and property. These accidents are clear reminders of the need to improve the capacity to prevent and respond to chemical incidents, especially in industrial production environments.

Confronting such reality, a research team from the Vietnam National Institute of Occupational Safety and Health (VNNIOSH) has simulated the dispersion of NH_3 gas using CONTAM software. The simulation results have provided important information about the path, spread level and residence time of toxic gas in the factory. This is a useful scientific basis for developing chemical incident response scenarios, contributing to protecting the safety of workers and improving the response capacity of enterprises.

Incident simulation using CONTAM: When technology helps "see the invisible"

To support enterprises in assessing the risk of NH_3 gas leakage, the research team chose CONTAM software as the main tool in the simulation model. This is a specialized software developed by the National Institute of Standards and Technology (NIST), for simulating air flow and dispersion of pollutants in closed structures such as factories, workshops, and buildings.

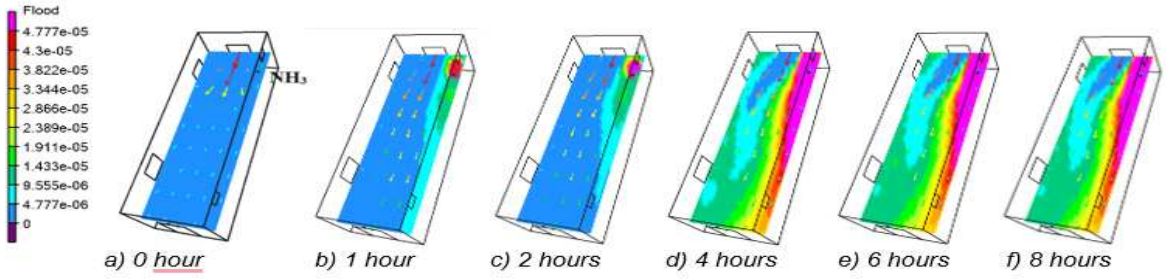
Specifically, the team has built 02 simulation scenarios:(1) Anhydrous ammonia gas leak from a valve on the pipeline; (2) NH_3 leak from a high-pressure tank.

In the above situations, the software will rely on parameters such as temperature, humidity, wind speed, ventilation level and leakage rate to calculate and display toxic gas concentrations over time at different locations in the factory. Thanks to that, enterprises can easily identify dangerous areas, exposure levels, and gas dispersion directions – which are extremely important information for building response scenarios.

Important results from simulation

The simulation results show that many factors strongly affect the speed rate and concentration of toxic gases in the air.

1. Ambient temperature: When the ambient temperature increases from 18°C to 30°C, the diffusion rate of NH_3 rises as well, causing NH_3 to escape into the environment faster and spread more widely in the air, increasing the ammonia



Example illustrating CFD+CONTAM results simulating ammonia leakage from a valve on a pipeline at a wind speed of 0.5m/s at different leakage times

concentration in the vicinity of the leakage point.

2. Humidity: When the humidity increases from 40% to 80%, the NH3 concentration in the air also rises slightly. The reason is that NH_3 easily combines with water vapor to form suspended aerosol particles, so when the humidity is high, this gas is "retained" longer at the leakage source, increasing the local concentration.

3. Wind speed: When increasing the wind speed in the factory from 0.5 m/s to 8 m/s, the NH3 concentration in the air decreases significantly - from more than 80 ppm to less than 60 ppm. This is the scientific basis for factories to redesign the ventilation system to dilute toxic gas when a leak occurs.

4. Leakage rate: At a low leak level (0.125 kg/h), the NH_3 concentration is only about 80 ppm. But if the leak increases to 1 kg/h, the gas concentration can exceed 600 ppm - the level that causes suffocation, difficulty breathing and the risk of death if exposed for a long time. Therefore, periodic control of the quality of valves, pipes, joints, etc., is extremely important.

In addition to CONTAM software, the research team also combined simulation with CFD0-Editor - an aerodynamic flow modeling tool, allowing for more intuitive 3D display. This model enables managers to visualize the extent, height and density of toxic gas coverage, which can be leveraged to improve the design of warning systems and emergency exits within a facility.

Recommendations from the research

From the simulation results, the research team proposed a number of practical recommendations to improve the effectiveness of risk management and ensure safety in the working environment.

For enterprises, applying simulation models in periodic risk assessments will help detect potential risks early, thereby planning to improve ventilation systems and install NH_3 gas warning sensors in areas with high risk of leakage. In addition, organizing incident response drills based on specific simulation scenarios will help improve the situation handling skills of safety officers and workers.

For management agencies, it is necessary to develop technical guidelines on the application of simulation software in chemical risk assessment, thereby creating a legal framework and professional standards for enterprises. In addition, organizing simulation software training courses for technical staff is necessary to improve professional capacity and effectively deploy models. In particular, supporting small enterprises in adopting appropriate models for their scale will help expand the scope of technology application and improve safety levels across the industry.

Conclusion

Ammonia is an indispensable chemical in many industries, but it is also a potential danger if a leak occurs. Simulation research on the dispersion of NH_3 gas using CONTAM software has provided clear scientific evidence, helping to see invisible risks - thereby proactively preventing instead of passively responding.

The application of simulation technology not only contributes to improving occupational safety but also creates an important step forward in modernizing the assessment and management of chemical risks in the workplace. In the future, combining CONTAM with new technologies such as AI to analyze big data from simulations, or integrating with real-time monitoring systems, promises to bring further advances in the field of occupational safety and chemical incident response.

Impacts of di-n-butyl phthalate (DBP) exposure on the health of workers in the rubber processing industry: *A warning from epidemiological research in the Central region*

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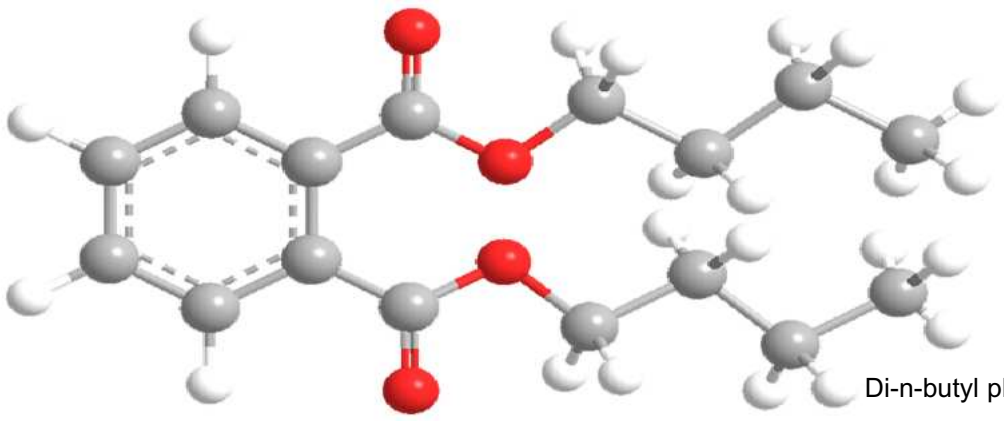
In the rubber processing industry, di-n-butyl phthalate (DBP) is a compound commonly used as a plasticizer, contributing to the flexibility of products. However, few people know that DBP is a substance that can negatively affect the health of workers if they are exposed frequently and for prolonged periods. This is one of the concerning potential hazards in manufacturing facilities in the Central region – where the rubber industry is rapidly developing.

In reality, working conditions in rubber processing factories are often characterized by high temperatures, a strong chemical odor, and arduous working conditions. Although physical safety factors have been improving, the risks from chemical exposure like DBP have not received adequate attention. Consequently, a field study conducted by the Branch of National Institute of Occupational Safety and Health in the Central Vietnam, VNNIOSH, at two rubber production facilities has provided a clearer insight into the impact of DBP on the health of workers.

DBP - The invisible hazard from daily exposure

When entering the body through respiration or skin, DBP is metabolized into phthalic acid (PA) and other metabolites. Many international studies have shown a link between DBP and endocrine disorders, decreased reproductive function, as well as chronic diseases such as obesity, diabetes and even cancer. Notably, the International Agency for Research on Cancer (IARC) has classified DBP as Group 2B - possibly carcinogenic to humans.

In Vietnam, a research group from VNNIOSH conducted a survey at two rubber processing facilities (CS1 and CS2) with the aim of assessing the level of DBP exposure through two indicators: the concentration of the substance in the air (personal exposure) and the PA content in workers' urine. At CS1, the results from 125 samples (including 100 production workers and 25 office staff) showed that the levels of DBP in the air as well as PA in urine were both below the regulatory thresholds of Vietnam and the United States. Meanwhile, at CS2, 250 samples were collected (including 200 samples from direct production areas and 50 samples from indirect areas) through two survey rounds, each with 125 samples, showing that the majority of workers in the production processes at CS2 were exposed to DBP in the working environment.



Di-n-butyl phthalate

Different production processes record varying degrees of DBP exposure. The locations with the highest levels of exposure include kneading and vulcanization, with DBP concentrations potentially exceeding 0.2 mg/m³ – many times higher than in other processes. Notably, although it does not exceed the permissible exposure limit according to Decision 3733/2002/QĐ-BYT, there are up to 52 positions at CS2 with DBP exposure exceeding the MADL limit set by the United States – which means the daily exposure level should not be exceeded to avoid health impacts. Specifically, in the kneading process, DBP exposure can reach up to 42.05 µg/day, more than 4 times the recommended limit. In the vulcanization process, exposure ranges from 21.7 to 42.05 µg/day, which is over 2 times the permissible threshold. These figures indicate that workers in the above processes are experiencing serious impacts from DBP in their working environment.

Not only stopping at analyzing the air, but the research group also collected urine samples to measure PA – the metabolite of DBP in the body. At CS2, nearly half of the samples (46% in the first round and 42% in the second round) had PA concentrations exceeding the threshold of 0.426 µmol/L, particularly concentrated among workers in the kneading and vulcanization processes. The correlation between DBP in the air and PA in urine is also quite clear, especially in the second survey round with a correlation coefficient reaching 0.73 – reflecting the extent of exposure that truly affects workers' bodies.

Health impacts: Notable signs

In addition to environmental and biological indicators, the research also assessed the relationship between DBP and some common health issues such as obesity, cardiovascular diseases and diabetes.

At CS2, 29% of production workers and 12% of office staff were recorded with obesity levels 1 and 2. The correlation coefficient between PA concentration in urine and BMI index is 0.363 - while it is weak, it indicates that DBP may contribute to the risk of abnormal weight gain. In contrast, at CS1, this relationship was not clear, mostly only showing signs of pre-obesity.

Regarding cardiovascular diseases, the study has not noted a clear link between DBP exposure and hypertension. However, the limitations of the research in terms of duration and sample size do not allow for definitive conclusions, requiring further long-term researches.

A similar situation occurs with diabetes. Although some weak correlations between urinary PA and the disease have been recorded (correlation coefficient $r \approx 0.4$), they are not strong enough to assert a causal relationship. Nevertheless, these results still raise warnings for closer monitoring of the health of workers who are frequently exposed to DBP.

Towards a safer working environment

Field research at CS1 and CS2 has shown that although some DBP exposure values do not exceed current regulatory standards, their continuous and cumulative presence in the body over the years can still be harmful to health. Processes such as kneading and vulcanization are hot spots for chemical exposure, requiring timely and coordinated interventions.

Some urgent solutions proposed including enhancing communication and occupational health education for workers; improving production processes and ventilation techniques; properly and fully using personal protective equipment and regularly monitoring the working environment as well as the biological indicators of workers.

More importantly, larger scale and long-term researches are needed to accurately determine the relationship between DBP and chronic pathologies. This is a necessary basis for proposing adjustments to occupational exposure standards and appropriate health protection policies.

Conclusion

From the practical survey of rubber processing facilities in the Central region, exposure to DBP is a significant occupational risk that cannot be overlooked. Although not all workers exceed safe levels, the high rate of exposure and abnormal health signs in specific work positions have raised alarm bells. Without early and effective intervention measures, these impacts could accumulate serious long-term consequences, not only for the workers but also for the entire rubber industry.

OCCUPATIONAL HEALTH CENTER:
20 YEARS OF ACCOMPANYING FOR THE HEALTH OF WORKERS

Nguyen Thi Hien, Vu Xuan Trung
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In the process of socio-economic development, workers are always the core force creating material wealth and spiritual values for the country. However, during their work, they often face many risk factors from the working environment such as dust, chemicals, noise, vibration, microorganisms, or prolonged psychological stress. If not well controlled, these factors can seriously affect health, even leading to occupational diseases – diseases specifically associated with work and working conditions.

Therefore, occupational health is not only a specialized field of medicine but also plays a key role in the sustainable human resource development strategy of each country. In Vietnam, around two decades ago, this area was not given the proper attention. However, in recent years, along with the development of the economy and the demand for higher quality human resources, occupational health has gradually been given more focus. ***The Occupational Health Center, under the Vietnam National Institute of Occupational Safety and Health (VNNIOSH)***, is one of the pioneering units and plays an important role in protecting the health of workers.

20 years – A journey of dedication and perseverance

Established on January 20, 2005, the Occupational Health Center (OSC) was born with the mission of caring for, protecting and enhancing the occupational health of the workforce. This is a continuation and enhancement of over 50 years of tradition in the field of occupational safety and health in Vietnam, which was laid down in the early years after the establishment of the Institute in 1971.

From the very first days of its establishment, the Center had to face numerous challenges: limited facilities and workforce, while public awareness about occupational health was still inadequate. The legal framework related to occupational health was lacking and not synchronized; the organization of health check-ups and the detection of occupational diseases at enterprises had not received due attention.

In that context, with a sense of responsibility and dedication, the team of officials from the Center has proactively brought health check-ups, consultations, and occupational health supervision to construction sites, factories, industrial zones, and remote areas across the country. This journey is not just about business trips, but also about meaningful steps, demonstrating a lasting commitment to the consistent message: ***"For the health of workers".***

Not only does the Center focus on providing

services to every location with workers, it also focuses on in-depth investment, technological innovation, and professional capacity improvement. In 2015, the Center inaugurated and put into operation a modern occupational biochemical testing laboratory - one of the first specialized laboratories in Vietnam. In 2016, a General Clinic was established in Hanoi, expanding the scope of services. Since then, the Center has continuously achieved important international certifications such as ISO 9001:2015 and ISO/IEC 15189:2012 (VILASMED 120), demonstrating efforts to standardize and professionalize its operations.

In particular, the Center is also a pioneer in establishing international standard analysis processes and implementing comprehensive digital transformation in management and service delivery. Every step taken demonstrates the commitment to bring occupational health services in Vietnam closer to the advanced standards of the region and the world.

Professional Milestones - Outstanding Achievements

Over the course of 20 years of development, the Occupational Health Center has continuously matured and grown, gradually affirming its pioneering role in the fields of research, monitoring, diagnosis and occupational health care.

In scientific research and policies, the Center has completed more than 40 in-depth research projects in the field of occupational health, many of which have been effectively applied in practice. The Center also plays an important role in proposing the addition of 3 new occupational diseases to the list of occupational diseases covered by social insurance. Notably, the development and implementation of a process to analyze 30 modern occupational disease monitoring indicators according to international standards has laid the foundation for increasingly accurate and effective diagnosis and monitoring.

In the field of occupational health examination and care, the Center has conducted regular health checks for over 70,000 workers each year at more than 350 businesses across the country, early detecting hundreds of cases of occupational diseases, contributing to reducing risks and improving the quality of life for workers. The Center performs over 180,000 tests each year, providing expertise to many clinics within the system.

In training, communication and community activities, the Center regularly organizes training courses on first aid, occupational medicine, and occupational diseases; while also actively participating in scientific conferences and seminars both domestically and internationally. Community activities such as free health check-ups for teachers in remote areas, supporting occupational disease examinations for struggling businesses, participating in COVID-19 prevention, and disaster relief... clearly demonstrate the Center's social responsibility.

In the field of cooperation and integration, under the direction of the Vietnam General Confederation of Labour and with the support of the Vietnam National Institute of Occupational Safety and Health, the Center has established relationships with many research institutes, hospitals, and organizations both domestically and internationally. This connection not only enhances professional capacity but also helps timely update new technologies and medical standards, contributing to building the Center's image as a reliable, professional, and pioneering address in the field of occupational health in Vietnam.

Future orientation – Innovation and aspiration to reach further

Two decades may not be a long journey, but the efforts and achievements made are a solid foundation for the Occupational Health Center to enter a new development phase with a broader vision and an aspiration to reach further.

In the coming time, the Center aims to strengthen comprehensive digital transformation in all activities, from internal governance, service deployment to storage and analysis of health data. At the same time, it will promote the application of artificial intelligence (AI), biotechnology, and digital medicine in the diagnosis and prevention of occupational diseases, contributing to improving accuracy, shortening processing time, and optimizing resources.

Another important direction is to build an early warning system and monitoring occupational diseases by profession and region, helping to proactively detect and prevent health risks early. The Center also intends to expand high-quality examination services at reasonable costs, while training highly skilled personnel ready to meet international integration requirements.

With a long-term goal, the Center strives to become the leading unit in research, diagnosis, and prevention of occupational diseases in Vietnam, gradually reaching out to the region, contributing to the advanced workers health care network in Asia and the world.

Connecting for health – Stepping firmly into the future

From the early days filled with challenges to the solid position today, the Occupational Health Center has demonstrated its important role in caring for workers' health. The achievements made over the past 20 years are a solid foundation for the Center to continue to develop even more strongly in the future.

With a dedicated team of staff, solid expertise, and a desire to contribute, the Occupational Health Center will continue to be a reliable companion for workers, contributing to the building of a safe and healthy working environment aimed at the sustainable development of the country.

VNNIOSH RECEIVES KOSHA DELEGATION:

Promoting cooperation in biological monitoring of occupational diseases

Binh Nguyen
Scientific Information and International Cooperation Department, VNNIOSH

From May 26-30, 2025, Vietnam National Institute of Occupational Safety and Health (VNNIOSH) received and worked with Dr. Lee Mi Young from OSHRI, Korea Occupational Safety and Health Agency (KOSHA), this is an activity within the framework of the arrangement on technical collabouration between the two sides for the period 2022-2025.

Dr. Lee Mi Young exchanging experiences on occupational disease biological monitoring

In Hanoi, the KOSHA expert worked with the Occupational Health Center, VNNIOSH. Both sides discussed and practiced in depth the testing process of some acids (BAA, MAA, EAA) and the process of building QC samples to Korean standards with indicators such as 2,5-HD, acetone, MIBK, MEK... from urine samples, sharing experiences in biological monitoring according to the latest standards of countries such as Korea, the US and Germany. Dr Lee Mi Young also guided the practice of sampling techniques, sample preservation, standard sample construction and analysis operations on GC-MS equipment. The Occupational Health Center also proposed two potential research directions: (1) assessing the level of n-hexane exposure from urine test results in occupational health examination; (2) studying and proposing to adjust the lead exposure standard to match ACGIH standards.

On May 29-30, 2025, at the Branch of VNNIOSH in the Central Vietnam in Da Nang, KOSHA expert shared experiences in organizing external quality assessment (EQA) of occupational disease biological monitoring. The content focused on methods of sampling for toxicological testing in biological samples, sampling time, influencing factors during sampling, storage conditions and analysis time. The staff of the Branch were instructed to practice evaluating EQA results, processing data and learning about the limits of biological monitoring indicators currently applied in Korea. KOSHA expert also guided the practice of analyzing some metal indicators in blood and urine using AAS, the process of analyzing organic solvent indicators on GC-MS and HPLC equipment, along with notes on chemical preparation and maintaining equipment performance, contributing to improving laboratory operational capacity.

This working and exchanging experience has helped VNNIOSH staff gain a lot of practical experience, contributing to improving professional capacity in the field of occupational disease biological monitoring. The two sides also summarized and proposed directions for technical cooperation and experience exchange in the coming time, aiming at the common goal of improving working conditions and protecting workers' health in the new context.

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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:
Vietnam National Institute of Occupational Safety and Health
99 Tran Quoc Toan Street, Hoan Kiem District, Hanoi

Print 50 sets, size 21 x 30 cm, at VIETMAX IAD., JSC
Add: Tan Trieu Commune, Thanh Tri District, Hanoi
Registration for Publication: 5069-2024/CXBIPH/04-330/LD
Decision number: 1607/QD-NXBLD dated December 18th, 2024
ISBN: 978-604-386-849-4
Printed and deposited in 2025

CONTENTS

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Website: www.vnniosh.vn

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