SUMARY REPORT OF CO-RESEARCH PROGRAM ON OCCUPATIONAL HEALTH IN TH FIELD OF AIRBONE AND BIOLOGYCAL MONITORING

28th April-15th May 2015, KOSHA

1. Introduction

The Vietnam General Confederation of Labour (VGCL) is the sole national trade union center in Vietnam. It was founded July 29, 1929 as the Red Workers' General Union in Northern Vietnam, and extended into the entire country after the collapse of South Vietnam in 1975.

VGCL's role, as shown on the Vietnamese side of its website, includes *"responsibility to implement the Party's directions and policies and to contribute to the Party's development"*. It is under the oversight of the Communist Party: *"The Party oversights the way VGCL implements the Party's directions and policies"*

All trade unions in Vietnam are required to affiliate to the VGCL, and the VGCL is one of the mass movements of the Vietnamese Fatherland Front. Dang Ngoc Tung, the VGCL president, is a member of the Communist Party of Vietnam Central Committee.

NILP under VGCL was established by the Government Council (now the Government) May 1st 1971.Being the leading National Institute among the State scientific and technological organizations signed by the Prime Minister, August 1st 1998.

Personnel: NILP has more than 200 staffs including 01 professor, 48 Doctors of Science, PhD and Master of Science and more than 100 engineers, bachelors and medical doctors.

Sections under NILP at present having 04 Scientific units

- National Working Environment Monitoring Station
- Occupational Safety Centre
- Occupational health Centre
- Centre for consulting and transferring labour protection equipment

And having Two Sub-institute:

- Sub-Institute for OSH&EP in the South (Ho Chi Minh City)
- Sub-Institute for OSH&EP in the Central areas (Danang city)

- Labour Protection Review and Safety – Health & Working Environment Review

2. Conducted Details:

+ Venue: Occupational Safety and Health research Institute (OSHRI)
  - Work Environment Research Department (WERD)
  - Occupational Health Research Department (OHRD)

+ Date:
  - Monday, 04/27/2015 - Wednesday, 11/07/2015 (WERD)
  - Thursday, 05/07/2015 – Friday, 05/15/2015 (OHRD)

+ Field:
  - Occupational health and work environmental monitoring
  - Occupational health and Biological monitoring

3. Participants details:

Full Name	Birth	Organization
Msc. Vu Duy Thanh	1980	National Working environment monitoring station (WEMOS), National Institute of Labour Protection (NILP)
Mr. Phy Maly	1971	Senior Technical officer, Capacity building and planning unit, Department of occupational Safety and Health (DOSH), MoLVT, Cambodia
Mr. Erdenechamba Natsagdorj	1992	Laboratory doctor, Ministry of Labor Occupational Health Research Center, Mongolia

4. Core Trainers:

1. Dr. Jae-Kil Jang, PhD, CIH, Senior Research Scientist, Work Environment Research Department, KOSHA
2. Mr. Hae Dong Park, Research Scientist, Professional Engineer, Work Environment Research Department, KOSHA
3. Ms. Hyunhee Park, Senior Research Scientist, Professional Engineer, Work Environment Research Department, KOSHA

4. Dr. Lee, Mi-Young, PhD, Senior Research Scientist, Occupational Health Research Department, KOSHA
5. Dr. Chulyong Park, Researcher, Occupational Health Research Department, KOSHA.

5. Coordinators:

1. Mr. Lee, Jaewang, Deputy Director of International Cooperation Center, KOSHA
2. Mr. Kim, Hyun Joon, Manager of International Cooperation Center, KOSHA

6. Training Course details:

Date	Contents	Responsible
04/27/2015	- Arrive KOSHA, 400 Jongga-jo, Jung-gu, Ulsan, Korea - Mr. Lee, Jaewang guide to visiting KOSHA and OSHRI, ICC introduce to everyone.	Mr. Lee, Jaewang Deputy Director International Cooperation Center
04/28/2015	- WERD introduction - Basic concept of Occupational Hygiene - OSH act & Work environment monitoring scheme in Korea - Exposure Assessment of Chemical substances (include: Work environment monitoring system, Sampling methods, Analysis of organic chemicals, analysis of inorganic chemicals)	Dr. Jae-KilJang Senior Research Scientist. Hyunhee, Park Senior Research Scientist. Hae Dong Park Research Scientist
04/29/2015	- Evaluation methods of chemical Hazards - Sampling method exposure organic and inorganic chemicals. - Spike organic (Toluene) sample standard input charcoal tuber. - Pre-treatment of Toluene - Analysis of organic by GC - Spike metal (Pb) sample standard in MCE face. - Pe-treatment by Microwave Digestion	Hae Dong Patk Research Scientist

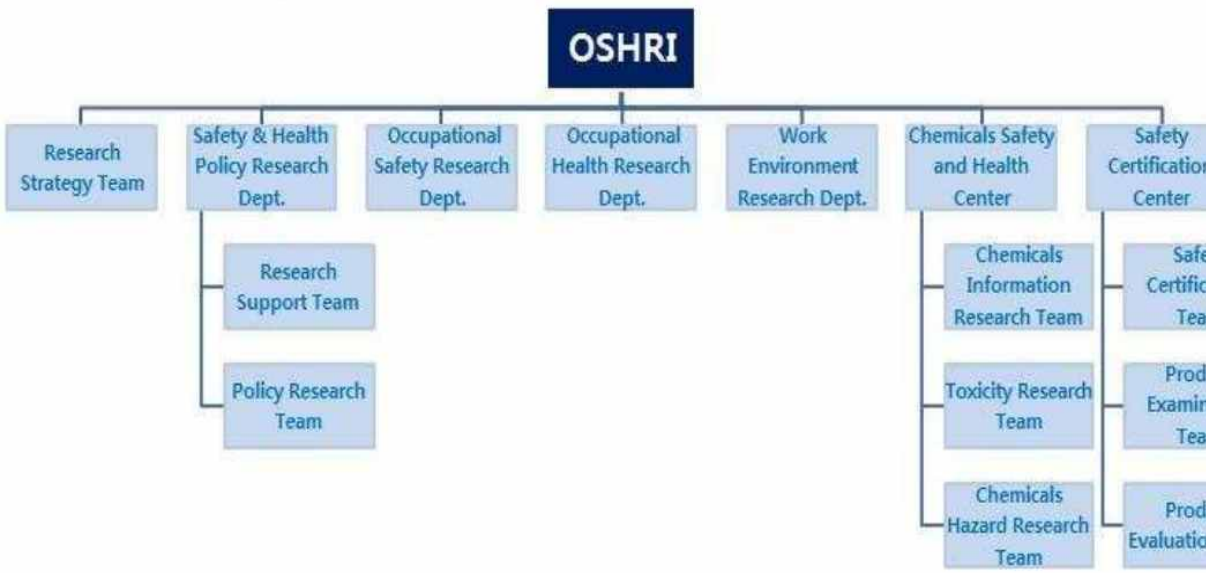
04/30/2015	- Review sampling Metal dust and organic exposure on worker at product metal factory - Analysis of inorganic metal (Pb) by AAS	Hae Dong Patk Research Scientist
05/01/2015	- Holyday; Labour day. Visiting trip to Busan City.	
05/04/2015	- Basic concept of Bio – aerosols; Assessment and control - Manual sampling method of Endotoxin in the air. + Sampling methods (by filters, 37mm, 0.8 µm, PC (polycarbonate)) + Analysis and calculate by Equipment Lonza - Sampling microorganism in the air by agar disk. - Endotoxin: Outer membrane of gram - negative bacteria (Non-culture-based methods for microorganisms)	Hyunhee, Park Senior Research Scientist.
05/06/2015	- Holyday; Children day	
05/06/2015	- Analysis of airborne in the air by incubation - Manual counted microorganism and calculate - Review Biosafety in Laboratory - Visiting equipment of Physical Hazards - Presentation of Vietnam, Cambodia, Mongolia for OSHRI.	Hyunhee, Park Senior Research Scientist. All people OSHRI
05/07/2015	- OSHRI introduction - Review of Biological monitoring in Korea - Practical guide on diagnosis of health of worker. - Review safety in Laboratory	Dr Lee, Mi-Young Senior Research Scientist, OSRD
05/08/2015	- Introduction of function and organization of OSHRI - Introduction OSH research assistance system in Korea. - History and procedures of PT program in Korean - Preparation of QA sample:	Dr Lee, Mi-Young Senior Research Scientist, OSRD
05/10/2015	- Total quality assurance system : assessment of quality of laboratory in practical aspect	Dr Lee, Mi-Young Senior Research

	- Pre-treatment of urine pool - Collection and pre-treatment of urine and blood	Scientist, OSRD
05/11/2015	- Review biological monitoring and quality assurance program - Pre-treatment of urine pool and preparation of standard solution - Introduction equipment analysis GC and GC-MS, UPLC for biological sample. - Analysis MA, HA, PAG, o,m HA of Urine by UPLC.	Dr. Lee, Mi - Young/ Senior Research Scientist Lee, Hye-jin/ Researcher
05/12/2015	- Occupational Health and Epidemiological Investigation in South KOREA. - Introduction equipment analysis ICP, ICP-MS, and AAS for biological sample. - Practical analysis Pb in Blood	Dr. Chulyong, Park Researcher Dr. Lee, Mi - Young/ Senior Research Scientist Lee, Hye-jin/ Researcher
05/13/2015	- Discussion analysis of biomarker of exposure to organic chemical : Organic solvents (BETX) in urine by headspace GC-MSD - Discussion analysis of biomarker of exposure to inorganic chemical : Lead in blood	Dr. Lee, Mi-Young/ Senior Research Scientist Lee, Hye-jin/ Researcher
05/14/2015	- Visiting Ulsan university Hospital and occupation environment health center.	Dr. Lee, Mi-Young/ Senior Research Scientist
05/15/2015	- Come back Vietnamese	

7. Contents of exchange and discussion

a. Exchange of Information about organization and role of OSHRI

* Organization:



* Role of OSHRI

+ Research and develop, dissemination of skills for accident prevention

+ Occupation safety and Health education, info and data collection, publication, distribution

+ Occupation safety and Health analysis, management, technical assistance

+ Safety certification and inspection of harm and hazard machines and tools

+ Financial assistance, installation, run of facilities for accident prevent

+ International cooperation on OHS

+ Government consigning project on OSH

b. Exchange of Information about OSRD

* Role of OSRD:

+ Research on prevention of occupation disease and workers, health promotion.

+ To operate proficiency analytical testing program for Korean occupational hygiene labs.

+ Epidemiological investigation on work-related disease, QC of hospitals for workers' medical examination, surveillance system of occupational disease.

+ To support for developing occupational health policy

+ Research and analysis biological monitoring (Ex: Urine, Blood...)

*** Main instruments of laboratory:**

Major application	Instrument
Organic compounds in urine and blood	GC-MS Agilent 7890A&5975C
	GC-MS-Hewlett Packard 8973
	LC/MS/MS PE Sciex-API 3000
	UPLC Agilent Technologies 1290 infinity
Inorganic compounds in urine and blood	IC Dionex ICS-3000
Metals in urine and blood	AAS-PerkinElmer AS-800
	AAS-Thermo scientific ICE 3000 series

c. Exchange of Information about WERD

* Role of WERD:

+ To conduct research on occupational hygiene

+ Research and analysis, monitoring working environment (include; Organic sample and inorganic sample)

+ Research on Endotoxin, and airborne bacteria and fungi in working environment.

+ Research and analysis Asbestos in the air, material, bulk.

+ To provide analysis service for field samples related to KOSHA's project and MOL's of projects

+ To conduct a role of the Korean secretary of ISO/TC 146 (Air quality)

*** Main instruments of laboratory:**

Major application	Instrument
	GC-FID

Organic compounds in air	GC-MS
	HPLC/MS
	HPLC
Inorganic acid compounds in air	IC
Metals in air	AAS
	ICP
	ICP/MS
	XRF
Silica	FTIR
	XRD
Asbestos	PCM
	PLM
	TEM
	XRD
Dust	Analytical balance
Respirable dust	Micro Balance
Endotoxin	LONZA plate reading Incubator
Airborne (bacteria, fungi)	Incubator Counted equipment

d. Main discussion:

+ Skills and experiences to treatment inorganic and organic sample for analysis

+ Skills and experiences to analysis and calculation of Toluene by GC

+ Skills and experiences to analysis and calculation of Lead (Pb) by ICP (or AAS)

+ Basic concept of Bio – aerosols: Assessment and control.

+ Experiences and research result of microorganism in Metal – working fluids handling industry and Identification

+ Skills and experiences to treatment Endotoxin sample in the air.

+ Skills and experiences to geometric means (GM) of culture Airborne bacteria, Fungi, Endotoxin and oil mist.

+ Skills and experiences to control and increase good results of proficiency test on biological monitoring

+ Assessing about laboratory safety.

+ Skills and experiences to analysis organic in biological monitoring by UPLC, GC.

+ Skills and experiences to analysis inorganic in biological monitoring by AAS.

+ Skills and experiences to analysis of Biomarker of exposure to organic chemical.

+ Skills and experiences to analysis of Biomarker of exposure to inorganic chemical.

+ General introduction of epidemiological survey

+ General introduction of statistical data management.

8. Practical experiences from co-research program

+ Practice prepare reference sample and analysis of organic compounds and metals in urine and blood sample with modern instruments. Cooperation research between Occupation Health center about environment and healthy.

+ Practice prepare reference sample and analysis of organic and inorganic acids compounds in air with modern instruments.

+ Planning to buy new equipment for my Laboratory next year.

+ Improve quality treatment and analysis microorganism in the air by culture agar.

+ Deploy new sampling method bacteria in the air by membrane.

+ Experiences analysis Endotoxin by test tubes, Pyrogen-free and by Absorbance microplate reader equipment.

+ Planning for focus gas supply system in laboratory next year.

+ Emergency system for eyes and body in laboratory

+ Chemical store system connect with ventilation

+ System against vibration for analytical balance and planning built room

balance new in the next year.

8.1. Practical Knowledge detail:

8.1.1. Airborne monitoring

Exposure assessment of chemical substances, calibration personal sampler pre and post sampling measurement with low and high flow rate regarding to kind of chemical measurements.

Pre-treatment, analysis and calculation of Toluene (GC) and lead (ICP)

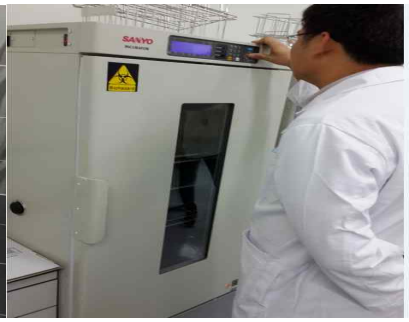
After analysis and calculate, the result indicate comparison between an actual concentration of each chemical and local/international limit standards.

8.1.2. Bio-aerosol monitoring (bacterial/fungi) and Endotoxin

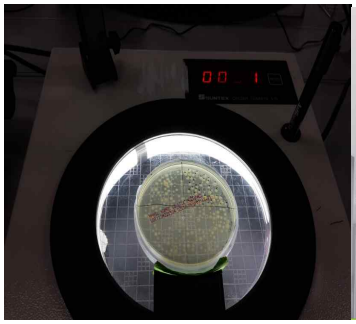
Sampling and analysis of culture-based methods for microorganism

Calibration pre-sampling, sampling of bacterial/fungi agar monitoring less time in dirty environment (1-5 minute) and a little longer in cleaning environment (10-15 minute).



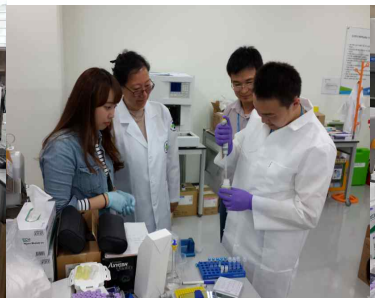
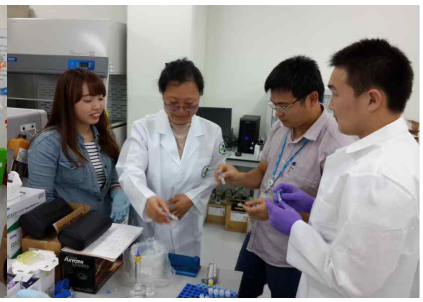


Incubation into refrigerators in various temperatures 37°C for 2day for bacteria and 25°C for 4 days for fungi and lastly counting. Endotoxin method is effective result while agar microorganism method for bacterial/fungi have been potentially contaminated that causes to high concentration comparing with standard limit values.

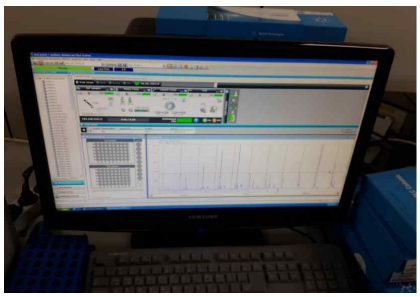



8.1.3. Biological monitoring

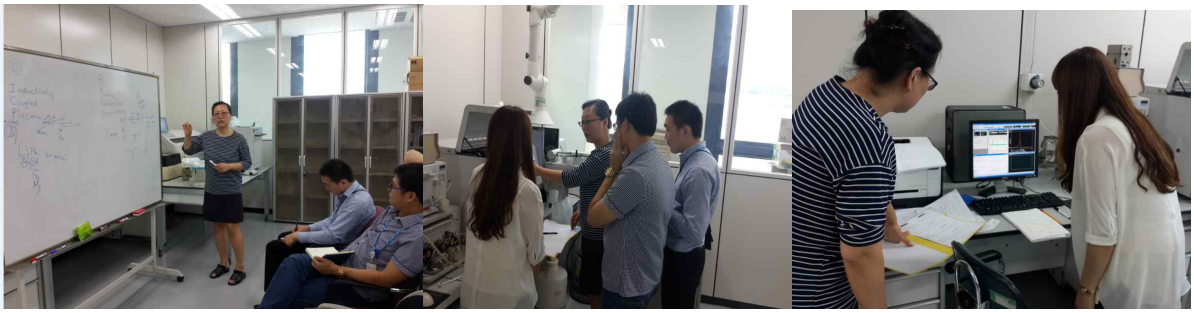
Review of biological monitoring and Proficiency Test on biological sample for biological monitoring in Korea. Also explained detail basic concept of biological analysis, and frequently used method (Chromatograph) for urine sample analysis and calculation.

Statistical process for determination of reference value and proficient range and analysis of biomarker of exposure to organic and inorganic chemical. Make urine samples analysis and calculation using by UPLC and finding out the chemicals concentration that contain in urine, including MA, HA, PGA, o-mHA, p-mHA, and m-mHA, comparing with standard limit value.

Brief basic concept chemical contained in blood, collecting blood sample, preparation blood sample analysis and calculation concentration of lead contained in blood by AAS



8.1.4. Occupational Health Epidemiology

Presented by KOSHA OH research team on statistical epidemiology and work-related to compensation institution, and make a final report from epidemiological survey on occupational Health problems related diseases for compensation scheme.

9. Conclusion

This training course program is very meaningful for me personally as well as my NILP. Through this training course program, I'm understand more than of new analysis methods, approach new methods, know more than the modern analytical equipment's.

I wish to have more training course programs like this in the future. Thank you all the principal senior Researcher and Researcher, Doctor of OSHRI having presentation very good on this training course program.

10. Suggestion about the future directions of co-research between KOSHA and NILP:

10.1. NILP must have plans to enhance NILP's ability to:

- Ensure confident results in analysis of biomarker of exposure to organics and metals in urine, blood

- Ensure confident results in analysis of organics, inorganic acid compound, airborne asbestos and metals in work environment

- Ensure confident results in analysis of microorganism, Endotoxins in the air working environment.

- Having plant to buy new equipment for analysis Endotoxin, Mycotoxin in the working environment.

10.2. NILP needs invite KOSHA experts to help about:

- Training about occupation hygiene and proficiency analytical testing program.
- Appreciating about methods and results in NILP's Laboratory
- Training about plant construct new project research short term, long term for NILP. And training methods research about occupation health & environment for Worker.
- KOSHA support certification NILP analysis results in quality assurance analysis. When compliance with the conditions NILP method according KOSHA.

10.3. Proficiency testing program of KOSHA

KOSHA have many proficiency analytical testing programs about biological monitoring and workplace environment monitoring in Korea. If KOSHA organize this program for another laboratory outside Korea, it will be useful for my institute and some laboratory other in Vietnam.

Pass through more than proficiency testing program desired KOSHA and NILP mutual recognition of the results of analysis of environmental and biological monitoring samples. Hopefully this will be done in the future. If so would be very good for my NILP Laboratory and many Korean companies in Vietnam.

10.4. Coordinating research in future between KOSHA and NILP:

Hopefully KOSHA support some projects protocol for my NILP laboratory and OSHRI in future.

- Several subject important in the future to construct of new research projects:

  + Research on sampling and analysis, calculator Nano particulates matter effect to worker. (Construct project about occupation health and occupation environment)

+ Research on sampling and analysis and Assessments, calculator Nano Airborne (bacteria pathogen, fungi pathogen, fungi generate Mycotoxin) e. (Construct project about occupation health and occupation environment)

I think, pass through this projects protocol, the researcher of NILP improve the level research and this research results with high accuracy, access to Asia level and proximity to the international level.

10.5. Exchange research between KOSHA and NILP.

KOSHA support for researcher of OSHRI to studying at NILP form 3 – 6 month, and Contrary researcher of NILP to studying at OSHRI. Effectiveness to researcher result is high quality and jointly publish research results in international journals. About field occupation environment and health.

Thank you very much!

Reported by Msc.VU DUY THANH, Vietnamese