

**Summary of report**  
**Co-research Program for occupational safety and Health**  
**28<sup>th</sup> April-15<sup>th</sup> May 2015, KOSHA**

**I-Introduction**

OSH is as play a key role of industrial sectors. Many hazards/risks have been faced in term of inappropriate measures often applied and leading to cause various accidents and also latency period that causes to occupational diseases. Indeed, mass-fainting cases (unconsciousness), Cambodia context, have frequently affected to a huge amount of workers taken places in different factories since 2011 until now. The determinant factors that has been investigated subjectively to this problem such as chemicals and poor working conditions, no properly ventilation and controlling measures taken in places haven been lacked. Team investigators have been applied through observational survey and provided many kind of suggestions, even though these were still happening. Obviously, research program like chemical, microorganism and biological monitoring are playing a useful tools in assessing this kind of problems and dealing with public significantly.

KOSHA as key partner and strong collaboration with our country in term of Technical Assistant (TA) and support in kind of building capacity to staffs through providing training related to OSH improving knowledge taken pace in local and oversea since years. Otherwise, Asbestos Development Profile has also been supported from KOSHA under collaborated with WHO, providing technical assistant through building capacity and asbestos sample analysis.

This research program courses is an important role in building capacity based on improving knowledge, practical and skills on airborne and biological monitoring among industrial sectors particularly indoor environment. Furthermore, this is to exchange experience, sharing knowledge, and discussion and find out the gap, those are contributed to further development OSH plan and support among countries.

**II- Participated in:**

This course is organizing from KOSHA, and 3 participants were participated from different countries as Cambodia, Mongolia, and Viet Nam.

**2-1).Trainees:**

Participants are joined in this course as following,

- 1). Mr. Phy Maly, MD, MPH, Senior Technical officer, Capacity building and planning unit, Department of occupational Safety and Health (DOSHS), MoLVT, Cambodia
- 2). Mr. Vu Duy Thanh, Environmental Supervision and Analysis Division, National Working Environment Monitoring Station, Vietnam.

3). Mr. Erdenechamba Natsagdorj, Laboratory doctor, Ministry of Labor Occupational Health Research Center, Mongolia.

## **2-2). Core Trainers:**

Core trainers were participated in this co-research program from KOSHA Occupational Health experts.

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, Occupational and Environmental Physician, Occupational Health Research Team, Center for Occupational Health Research, KOSHA

## **2-3). Coordinators:**

The coordinators who involved in this course are:

1).Mr. Lee, Jaewang, Deputy Director of International Cooperation Center, KOSHA

2). Mr. Kim, Hyun Joon, Manager of International Cooperation Center, KOSHA

## **III- Schedule of Training Course**

(Training course is starting from 9 AM to 6 PM, lunch break for 1H)

<b>Date</b>	<b>Topics</b>	<b>Trainers</b>
27/04/15	Afternoon, visiting KOSHA hall	Lee, Jaewang
28/04/15	Basic concept of Occupational Hygiene OSH Act and Work Environment Monitoring Scheme in Korea	Dr. Jae-Kil Jang
	Evaluation method of organic Hazards Sampling and Pre-treatment of Toluene	Mr. Hae Dong Park
29/04/15	Analysis and calculation of Toluene by GC	Mr. Hae Dong Park
30/04/15	Evaluation method of Metal Sampling and Pre-treatment of lead Analysis and Calculation of lead by ICP	Mr. Hae Dong Park
01- 3/05/15	Visiting trip to Busan City	Dr. Lee, Mi-Yung

4/05/15	Basic concept of Bio-aerosols, Assessment and control Experience and research results of microorganism evaluation Sampling and analysis of culture-based methods for microorganism	Ms. Hyun Hee Park
5/05/15	Children 'day	
6/05/15	Sampling and analysis of Endotoxin Country presentation	Ms. Hyun Hee Park
7/05/15	Review of biological monitoring in Korea	Dr. Lee, Mi-Yung
8/05/15	Practical Guide on diagnosis of Health of workers	Dr. Lee, Mi-Yung
11/05/15	Review on Proficiency Test on biological sample for biological monitoring	Dr. Lee, Mi-Yung
12/05/15	Statistical process for determination of reference value and proficient range	Dr. Lee, Mi-Yung
13/05/15	Total quality assurance system: assessment of lab quality Analysis of biomarker of exposure to organic chemical	Dr. Lee, Mi-Yung
14/05/15	General introduction of epidemiological survey	Dr.Chulyong-Park
	Analysis of biomarker of exposure to inorganic chemical	Dr. Lee, Mi-Yung
15/05/15	Course evaluation and closing	Lee, Jaewang

#### IV-Methodology:

This course was provide technical knowledge on airborne and biological monitoring through lecture generally and specific topics relatedness, discussion and practical technic. For example, Toluene environmental monitoring. First, let trainees to know sampler calibration, pre and post measuring. Second, make sampling, and lastly, pre-treatment, analysis and calculation of concentration comparing with standard limit values.

#### V- Outputs:

Over 3 weeks of research practical training course on airborne, microorganism and biological monitoring. The main topics included are achieved and those are included basic concepts that are related occupational hygiene, Bio-aerosols, and OSH Act in Korea as well as the quality of Lab control program (QA). All of us could be able to knowledgeable, understandable and applicable in these areas.

#### 5-1). Knowledge

- Basic concept of Occupational Hygiene
- OSH Act and Work Environment Monitoring Scheme in Korea
- Evaluation method of organic hazards and lead
- Sampling and pre-treatment, analysis and calculation of Toluene by GC
- Sampling and pre-treatment, analysis and calculation of Lead by ICP

- Basic concept of Bio-aerosols, Assessment and management control
- Experience and research results of microorganism evaluation
- Sampling and analysis of culture-based methods for microorganism
- Review of biological monitoring in Korea
- Proficiency Test on biological sample for biological monitoring
- Statistical process for determination of reference value and proficient range
- Analysis of biomarker of exposure to organic and inorganic chemical
- General introduction of epidemiological survey

## 5-2). Practical Knowledge:

### 5-2-1). Airborne monitoring

Explained basis concept and practice on 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.



All participants who conducted pre-treatment, analysis and calculation of Toluene (GC) and lead (ICP)



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

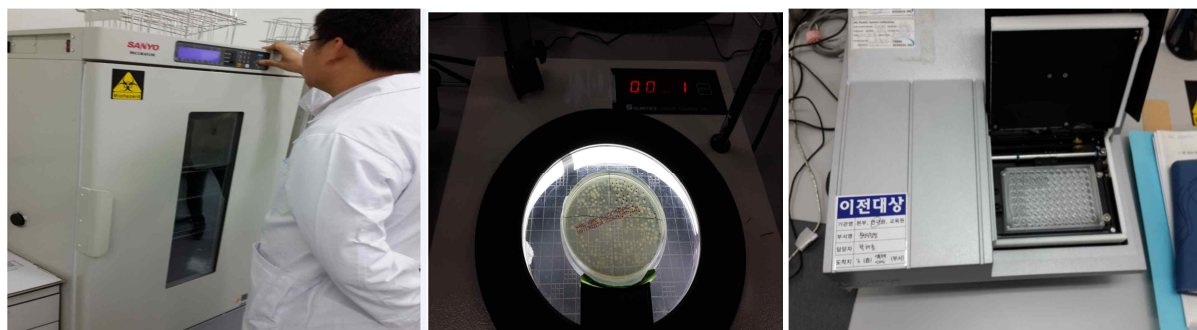
### 5-2-2). Bio-aerosol monitoring (bacterial/fungi)

### 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).

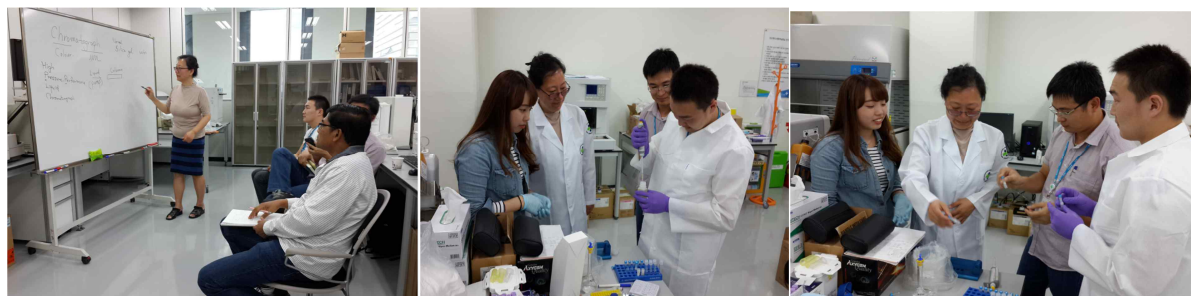


Incubation into refrigerators in various temperatures 37 CC for 2day for bacteria and 25 cc for 4 days for fungi and lastly counting. Endotoxin method is effective result while agar microorganism method for bacterial/fungi have been potentially contaminated that causes to high concentration comparing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



### 5-2-3). Biological monitoring

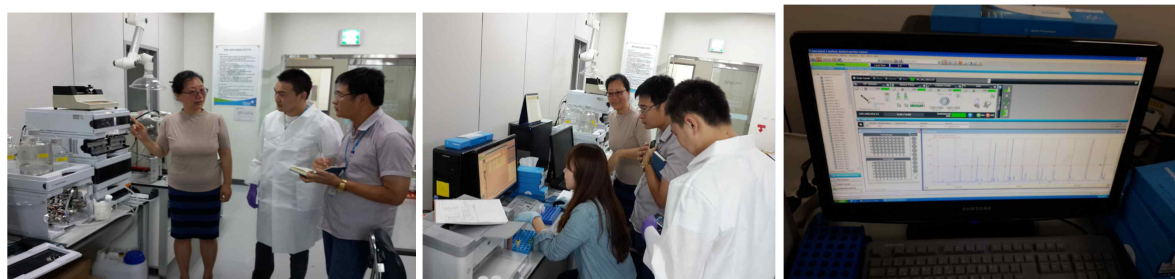
Review of biological monitoring and Proficiency Test on biological sample for biological monitoring in Korea. Also explained detail basic concept of biological analysis, and frequently used method (Chromatograph) for urine sample analysis and calculation.



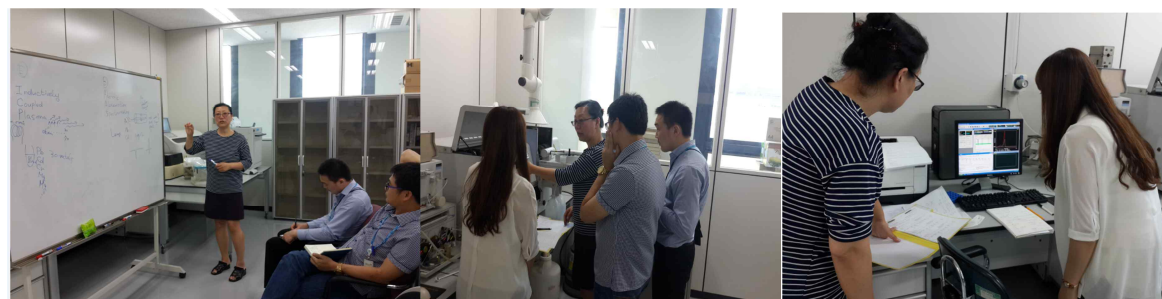
Statistical process for determination of reference value and proficient range and analysis of biomarker of exposure to organic and inorganic chemical. Make urine samples analysis and



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



#### 5-2-4). 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.



#### VI- Problems encountered

The course entirely designed was well organized and is under supporting from different fields of experts, competencies and expertise in the team of research program. Those are focusing on providing knowledge and practical skills in each kind of measurements, particularly discussing and sharing experiences on what the differences among countries. Even though, the problems could be found due to the participants who were variety of field works and experiences, for

example, some are exposed to one or two among the research program and other have never experienced before. Otherwise, health background and laboratory management knowledge are as part of further efficiency and effectiveness in the field of OSH research program.

The KOSHA website provides many recent information about the research and projects fully in Korean, but the English website did not show updated information which was in Korean website. This information is very important for other countries to use, but presently, not enough applications for foreign researchers.

## **VII-Conclusion**

This course has been reached with fairly well organization. This is under supporting, facilitating and coordination from various KOSHA experts and highly capable. Although, the time is not enough over three weeks but the results could be highly appreciated. We got plenty of knowledge and experiences from the research program. Last but not least, we also share all of these knowledge to other important colleagues particularly our management team for further improvement in our working places.

In addition, the research program of KOSH has been more innovative and creative through plenty of supplies, equipment and facilities related research activities as well as useful quality of human resources in dealing with all types of hazards/risks, such as physical, chemical, biological, ergonomic and stress at works. Therefore, KOHSA research program is as play of key role in providing Technical Assistant (TA) to other countries accordingly.

However, Cambodia country, it is not neither research programme nor quality of human resources and equipment, particular facility relatedness until now. The mass-fainting problems, as public health issues, are almost occurring from factories workers since 2011, we have investigated and the result found is still subjective related to this problems. This research program course is useful applied for finding out a good evidences for dealing with statistical significances and public significance in this country.

## **VIII-Recommendations and future plan**

After this course, we will be sharing to these significant research knowledge that we have got with management team of DOSH and develop a future plan for this program.

Regarding to the current issues in Cambodia of such work-related mass-fainting among factory workers and it is still lacking of quality of human resources, on behalf of our DOSH, we would like to KOSHA for building a few more staffs related to different fields of research program, such as airborne, bio-aerosols and biological monitoring for further improvement of OSH status in our organization. Currently, in case of dealing with work-related mass-fainting, we would like to recommend to KOSHA for other support.

With the detailed example of KOSHA research and regulation as well as projects for workers welfares, it was clear that Projects for Cambodian workers' health development is urgent. As there is no detailed plan for research or projects about occupational health in Cambodia, the cooperation program will be a good start for this innovation for Cambodian occupational health.

- 1) Epidemiological survey for shoe industry: As the primary projects, mutual cooperation for research projects is possible. As the visit to any factories in Cambodia is relatively easier than in Korea, we can get very meaningful data of the relationship between airborne chemical and their biological marker. The result can be submitted as the work of cooperation research between each organization and country, as well as can be necessary data for Cambodian policy renovation.
- 2) QC programs: KOSHA runs 5 different QC programs in environmental and occupational area (Asbestos program).
- 3) Establishment of laboratories for occupational health
  - Instrument
  - Facilities
  - Faculty training

KOSHA laboratory is a good model for any new laboratories in occupational health. Mutual contact and sharing information about necessities will be essential for this project.

- 4) Guideline for occupational health

As KOSHA already set up practical detailed guidelines, the papers and reports as well as many guidelines in KOSHA homepage(in KOREAN) will be very good references for establishing and set up systematic regulations and guide in Cambodia. The translated results of the Korean guidelines (especially workers special health examination guideline vol. 1-3) will be very compact and essential article which can be directly applied in practice.
- 5) Support by sending Korean expert to Cambodia
  - As asbestos is not banned in Cambodia and being used still, even though the scholars know the toxicity, the prevalence is still problem. We had good support by KOSHA already in Asbestos by inviting expert already, but the practical training at site from the expert is also necessary for practice. For example, as collecting and treatment of Asbestos sample, analyzing is new area for any staff in Cambodia, we need direct Instruction from the expert.
  - For environment and biological monitoring, Cambodia need to start the monitoring from now on. In this respect, the advice and information about setting up laboratories and training of new staffs from expert is another need. In near future, with the cooperation with KOSHA, the occupational health in Cambodia can improve with the domestic need and support altogether.



Reported by Dr. PHY Maly, Cambodia