An Exposure Assessment System & Recent Issues in Korea

Seung-Hyun Park
KOSHA

Exposure Assessment System

- All employers shall evaluate worker's exposure concentration for hazardous factors every 6 months and conduct proper improvement measure as the results of exposure monitoring
  - 188 Chemical substances
  - 2 Physical agents (Noise, Heat)
  - 698 OELs for Chemical substances

Exposure Assessment System

- Generally most employers entrust exposure monitoring for their workplace to exposure monitoring institutes
- About 150 exposure monitoring Institutes
- Some large-sized companies have their own exposure monitoring services

Quality Control of Exposure Monitoring Results

- Anyone who is conducting an exposure monitoring by OSH law shall participate quality control program and must pass all the test according to the program
  - 2 times a year (every 6 months)
- KOSHA is managing the program under the authority of OSH law

Recent issues in Korea

Necessity of System Improvement

- Some cases of occupational diseases have occurred due to the absence of exposure assessment or underestimation of worker's exposure concentrations.
- There have been continuous social requests for more efficient system of exposure assessment.

Cases of underestimation of worker's exposure concentration

Chemicals	OEL	Results having at workplaces	Results of Epidemiological survey
DMF	10 ppm	ND~3.4	10.5~12.8
n-Hexane	50 ppm	12.5~59.7	75~204
TDI	5 ppb	No evaluation	0.13~1.2

Reliability Assessment of Exposure Monitoring Results

- The reliability assessment regulation for exposure monitoring conducted by employers (including entrust) was included in OSH Law in 2007
- As a part of activities for improvement of the awareness of employers on importance of exposure monitoring
- KOSHA has been conducting the reliability assessment since 2006

Cases of Reliability Assessment

Hazard Factor	Process	OEL	Results of Exposure Monitoring	
			Employer	KOSHA
Sb_2O_3	Mixing	0.5 ㎎/㎥	trace	0.35~0.37
Co	Granule	0.05 ㎎/㎥	0.0005	0.02~0.33
Noise	Press	90dB	89.0~89.9	93.4~96.3
Toluene	Coating	100ppm	50.8~69.7	120.7~277.1
DMF	Mixing	10 ppm	1.42~3.87	12.84~29.50
Mn	Welding	1 ㎎/㎥	0.01~0.04	2.24~4.18

About 10 % of workplaces have these kinds of problems
Small-sized workplaces are more than 10%

Cause ?

- This is related to working amount the day when monitoring is conducted.
- Some employers reduce working amount or drop special work where workers are exposed at high concentration
- Because they don't like including in surveillance system of the ministry of labor due to their poor working environment
- Even they don't like visit of KOSHA staffs for consulting

Cause ?

- Missing of the exposure monitoring for workers being exposed at the higher concentration led to these problems
- The problems was due to the deficit of awareness of employers about a real meaning of the exposure monitoring
- Now the awareness for exposure monitoring are changing after a two-year activity of KOSHA

Review & Change of OEL

- OELs different from ACGIH TLVs have been reviewed for 3 years from 2005 to 2007.
- OELs of 84 chemical substances have already been amended base on 2005~2006 researches
- OEL of Silica was changed from 0.1 mg/m3 to 0.05 mg/m3. Toluene was changed from 100 ppm to 50 ppm

Review & Change of OEL

- OELs of about 40 chemical substances will be amended according to results of the review
  - MWFs (newly added in OSH law)
  - Grain dust, Flour dust
  - There was no OEL values
  - Trichloroethylene
  - STEL value will be changed from 200 ppm to 100 ppm

Recent Research activities

- Exposure monitoring method for MWFs was developed according to MWFs' inclusion to OSH Law
- Recent NIOSH have newly developed NMAM for MWFs
  - REL: 0.5 mg/m3 as total particulate
  - There are no ACGIH TLV for MWFs

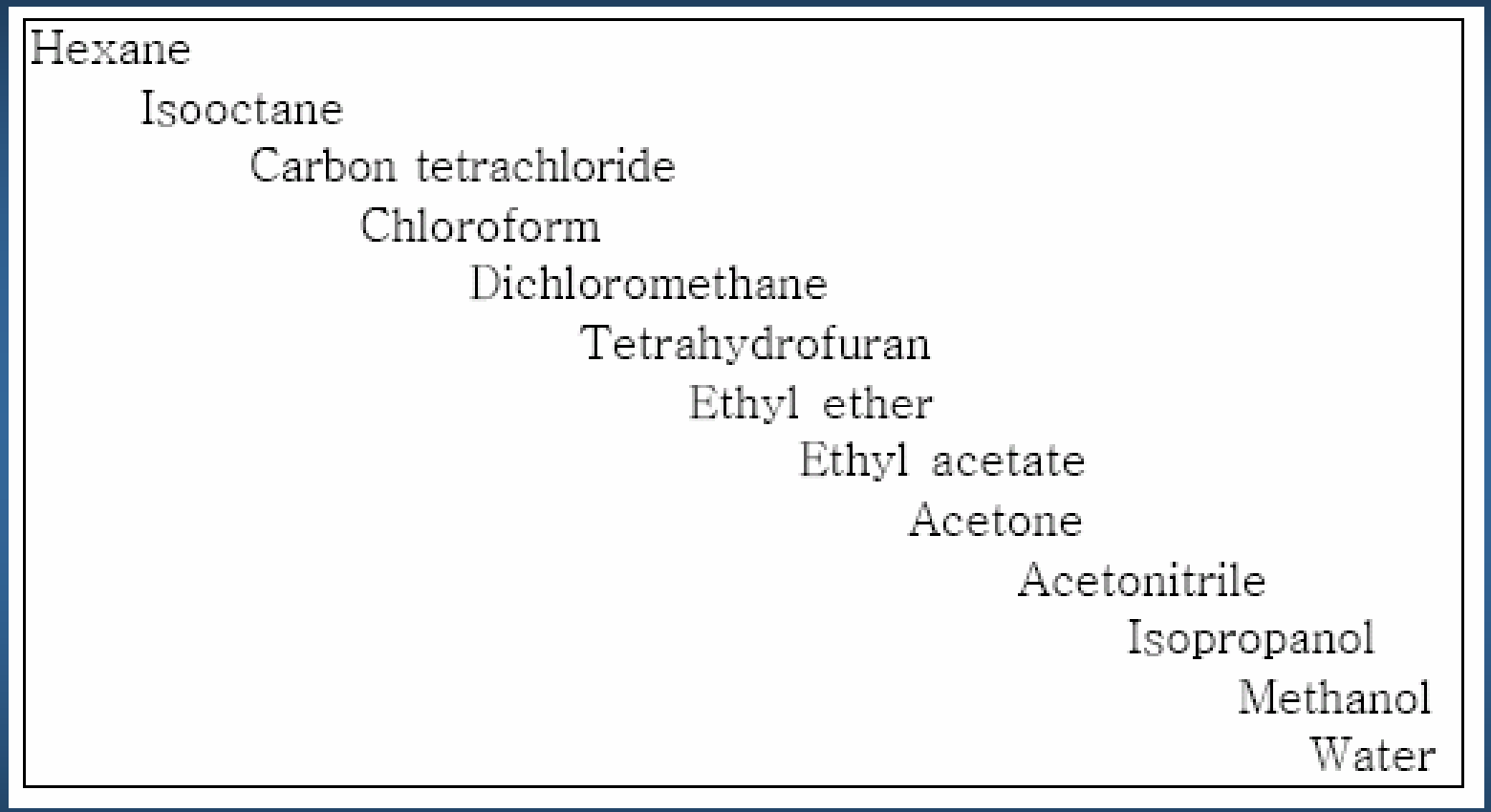
Analytical Method

- NIOSH Method (Issued March 2003)
- Gravimetric using Solvent extraction after sampling by PTFE filter
- Ternary solvent:
  - Dichloromethane, methanol, toluene
- Binary Solvent
  - Methanol, water

Analytical Method

- KOSHA Method
- Gravimetric using Solvent extraction
- Differences from NIOSH is to use only Ternary solvent
  - Tetrahydrofuran:toluene:methanol,1:1:1
- We use THF instead of MC for improvement of solubility of soluble MWFs

Polarity of Solvents



Ternary blend of KOSHA consists of polar, non-polar and intermediate solvents

Recent Research activities

- Method Evaluation
  - LOD: 0.05 ㎎/sample
  - LOQ: 0.15 ㎎/sample
  - Analytical precision: about 2 %
- This method is sufficient to evaluate compliance to NIOSH REL(0.5 ㎎/㎥).

Thank you !

See you again in Korea
June 29 ~ July 2, 2008