

# Abstract

## Statistical Analysis of Domestic Work Environment Monitoring Big Data

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### 1. Objective

The aims of this study is to analyze domestic work environment monitoring database that has been accumulate for 13 years, from 2002 to 2014. Variables for this assessment includes monitoring years, measurement materials(agent), administrative districts, business sectors, and the size of organizations.

### 2. Methods

This study was conducted by as following methodologies:

(1) Among hazardous materials that should be monitored periodically at work environments, 107 were selected for statistically analysis for this study, which includes 61 monitoring agents that had abundant measurement numbers.

(2) Microsoft spreadsheet program(Excel) could successfully extract monitoringdata from the database system. Each agent allocated to one Excel file with 13 worksheets for year measurement data separately. In the context of a worksheet, one row represented a single measurement

value(8-hr TWA) that arranged with administrative district, business sector, and the size of organizations along the column.

(3) Extreme measurement values that exceeded 3 to 5 times of occupational exposure limits set by the Korea Ministry of Employment and Labor(KMOELOEL) and that were 1,000 to 10,000 times lower than KOEL were filtered by ordering data for each year worksheet.

(4) Arithmetic means and standard deviations were calculated for each measurement agent by considering years, districts, business sectors, and organization sizes.

### **3. Results**

(1) Most abundantly measured agent was iron oxide and fume followed by manganese and its inorganic salts, toluene, titanium dioxide, isopropyl alcohol, xylene, acetone, copper(fume), sodium hydroxide, and methylethyl ketone by descending order.

(2) Average concentration levels for 107 monitoring agents recorded lower than about 5 to 10% of KMOEL-OEL. As year passed, agents which had been changed KOEL showed decreasing trend in mean values.

(3) Some administrative districts including Taebaek, Yangsan, Tongyoung, Jinju, and Eujeongbu held slight higher mean values for certain measurement agents.

(4) Also some business sectors including coalmine etc. and business sizes showed a little elevated mean values for certain measurement agents.

#### **4. Conclusion**

As mean values, domestic work environment monitoring data for 107 measurement agents showed less than 5 to 10% of KMOEL-OEL. Some business sectors and administrative districts held higher exposure levels compare with other sectors or districts for certain agents. Management options including engineering controls might be polished for the sectors and/or districts.

**Key words** : work environment monitoring, big data, arithmetic mean, standard deviation, monitoring agent