

A Study on Status Laboratory Safety and Improvement According to the Safety Consciousness Survey of University Students in Korea

Young-ra Kang, Tae-gu Kim* and Keun-Won Lee¹

Department of Occupational Health & Safety Engineering, INJE University, Gimhae 621-749, Korea

¹Korea Occupational Safety & Health Agency, doejeon 305-380, Korea

(Received February 5, 2006; Accepted June 10, 2006)

Abstract : In laboratories, researchers frequently work using new methods with new tools and materials. So the workers in laboratories are exposed to risk from dangerous articles all the time. In the case of university laboratories, testing is done by the individual at night. Because of that, the risks in university laboratories are higher than in other places. In addition, students and managers in universities generally have little concern for laboratory safety. So students are sometimes injured or killed in laboratory accidents. In this study, 1,000 university students answered questions about university laboratory safety. Their answers have been analyzed to determine the state of actual conditions and to formulate countermeasures. The results indicate that we need to change the safety awareness of the universities and the students. Adequate safety training and safe practice must be implemented by each university to decrease accidents. Development of systematic safety training program suited to the specific conditions of the individual laboratory and formulation of specific counter plans should accidents occur are required.

Key words : accidents, countermeasure, risk survey, university laboratory safety

1. Introduction

In laboratories, researchers conduct experiments under extreme chemical, electrical and mechanical conditions. There are many chemical substances and sources. In addition, there are many kinds of dangers such as fire, breakdown of machinery and smoking in the lab caused by coexistence of dangerous tools, experimental equipment and researchers. Although researchers' experiments are repeated infrequently, the experiments are done as routine but they are done by new methods with new tools and materials. [1] Workers in laboratories are exposed to some risk from dangerous articles all the time. Especially, in the case of university laboratories, most tests are conducted by individuals at night. Laboratories usually have limited facilities. Because of that, the risks in university laboratories are higher than others. Explosions occurred in Seoul University Engineering laboratory and in KAIST Aeronautics and Space laboratory recently[2]. These are significant reminders of the importance of laboratory safety in universities. In the case of domestic universities, accidents that happen

are kept secrets for the sake of the universities' reputation. Moreover, the universities do not open to the public the condition of their laboratory safety except under special conditions like a serious accident or a detailed safety diagnosis. Therefore, statistical data about these situations is lacking. Then an analysis and a prediction of change in accidents are difficult.[5]

In this study, 1,000 university students answered questions about university laboratory safety. We analyzed the answers to determine the grasp by students of the actual conditions and of their consideration of countermeasures.

2. Method

In this study, 1,000 university students (male:551, female:315, no respond: 134) answered questions about university laboratory safety, for which the answers were then analyzed. The highest rate of respondents were located in Seoul, Gyeonggi-Do and In-cheon with 66.1%. This reflect the actual situation of most universities being concentrated in the metropolitan area. The age range of respondents is 18~30 and 4th year students

*Corresponding author: tgkim@inje.ac.kr

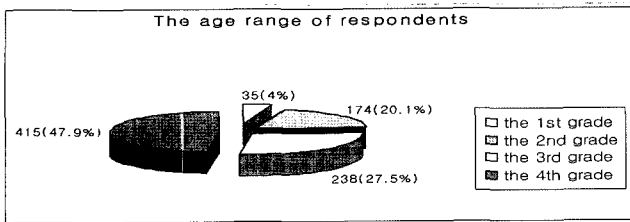


Fig. 1. The age range of respondents.

account for 47.9% of all. University laboratory use in experiments is related to the student's major. That is why the 4th year students account for roughly half of all respondents (Fig. 1).

3. Result

The 78.6% response of "hardly ever" or "never" to

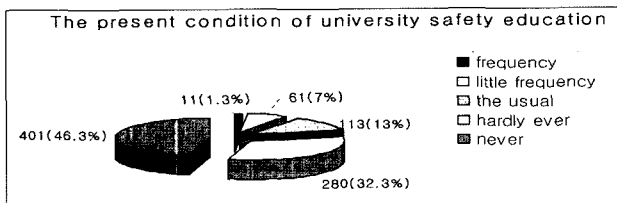


Fig. 2. The present condition of university safety education

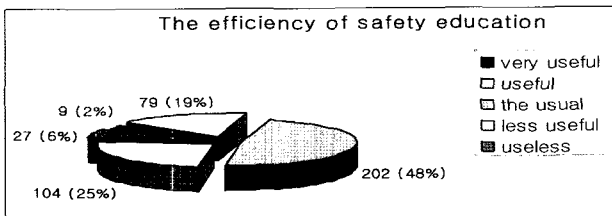


Fig. 3. The efficiency of safety education

the question "Operation of University Safety Education" shows that university safety education was not well done (fig. 2).

Only 21% of those 421 respondents (around 50% of all respondents) said "The University safety education is useful for students". It means there is little link between the University safety education and the good safety and health (fig. 3).

We also made up a question "The frequency of using a computer to search for safety and health data" to know students' concern about safety and health. The 71.7% the response of "never" or "hardly ever" indicates that students are not interested (fig. 4).

In this study, the results which use a 5 level scale for safety operations at each university, show that most response said "little" or "low" and "the usual". The results show that universities generally work below an acceptable safety standard. This means students don't have correct safety knowledge and they may have an increased risk in university laboratories because of this inferior knowledge. It suggests the importance of having correct safety knowledge (Table 1).

We asked the questions - "Did you have any experience of accident in laboratory?". The answer "1-3 times"

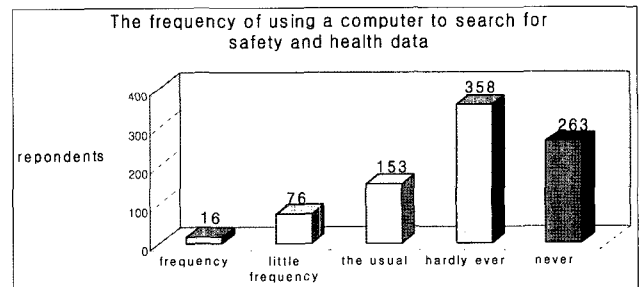


Fig. 4. The frequency of using a computer to search for safety and health data

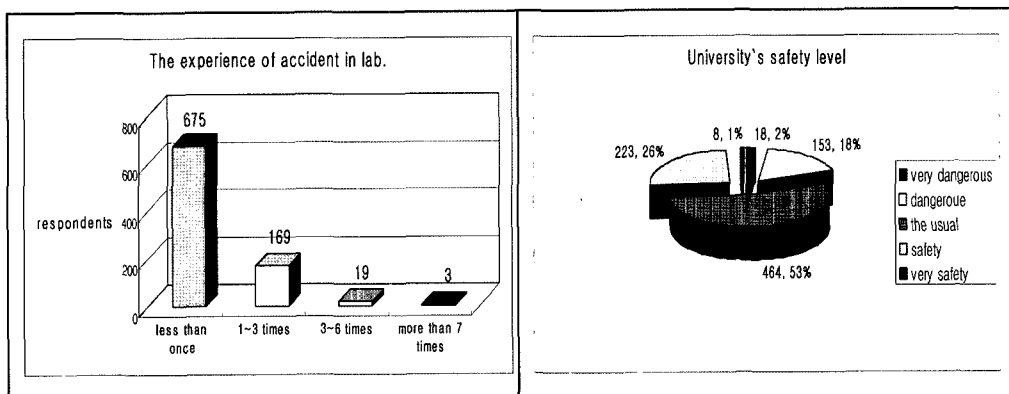


Fig. 5. The experience of accident (left) and University's safety level

Table 1. The investigation of university's safety operation

The president is interested in the university's safety and health program.	[Scale: Most low to Most high]					2.50
The president join in the operation of the university's safety and health program.	[Scale: Most low to Most high]					2.35
The student council is interested in the university's safety and health program.	[Scale: Most low to Most high]					2.53
The student council join in the operation of the university's safety and health program.	[Scale: Most low to Most high]					2.42
The professors is interested in the university's safety and health program.	[Scale: Most low to Most high]					2.59
The professors join in the operation of the university's safety and health program.	[Scale: Most low to Most high]					2.38
If any accident happened at the university, they take immediate action after identifying the reason.	[Scale: Most low to Most high]					2.80
The university's safety manager has Done good job.	[Scale: Most low to Most high]					2.56
The safety manager or managerial officer has the right of authority.	[Scale: Most low to Most high]					2.85

accounts for 19.5% of all answers and "more than 3 times" is 2.5%. In spite of the highly dangerous situation, the response to the question "University's risk level" is "safe" or "the usual" in 80.2% of all responses. It is apparent that students don't recognize the risks.

Also respondents replied that "Ventilation and physical surroundings are not suitable" (Fig. 5).

We also analyzed the previous questions by classifying them into 3 groups - "the respondent specific", "the university specific" and "the laboratory specific". The answer to the question about "Surroundings if laboratory is not exposed by dangerous materials (radiations, drugs and anesthetic gas etc.) is "Yes" for 75.6% of the

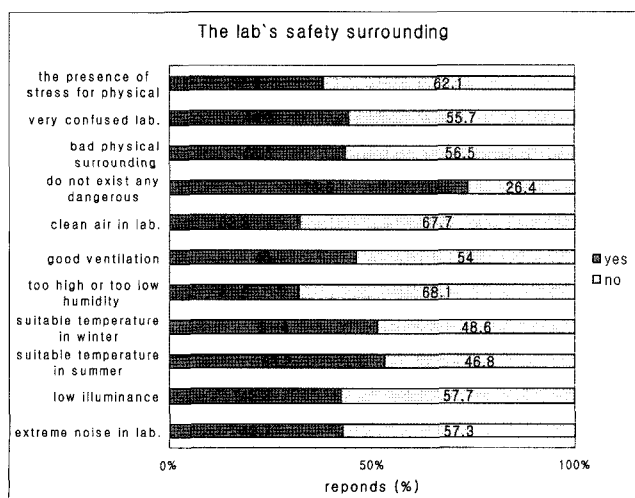


Fig. 6. The laboratory's safety surrounding

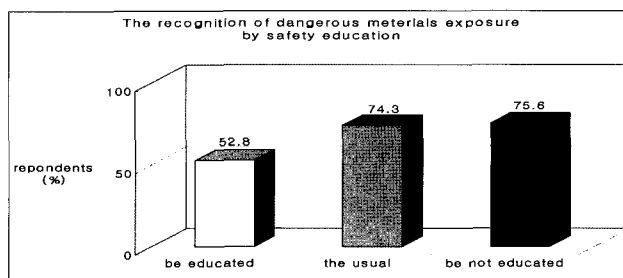


Fig. 7. The respondents' recognition of dangerous materials exposure by safety education (the rate of respondents saying "not exposed to dangerous materials")

responses when the respondent was not educated about safety (Fig. 6, Fig. 7). That is higher than the result of 52.8% when the respondents were educated. We judged that the respondents who were not educated didn't have the right information about dangerous materials so they were wrong in their judgment. In addition, the positive response "Safety" to the question "Condition of university laboratory safety" is more than the negative response "Danger" in almost every area such as noise and ventilation. It demonstrate that anyone can be exposed to the dangerous situations in a laboratory if they don't realize the risk. Students cannot be aware of the risk around them with safety insensitivity.

4. Conclusions

This study shows that students were not educated on safety by universities. Problems with the current safety education are identified. Most respondents did not realize risks because they did not have the requisite knowledge on safety and health. It means that the safety insensitivity has spread to universities. The safety risks in university laboratories occur due to insufficient safety training by universities and the lack of safety awareness by universities and students.

Therefore we need to change safety awareness of universities and students, through practice and education of adequate safety measures by universities to decrease accidents at university laboratories. Development of systematic safety education catered to specific conditions of the individual laboratory and the formulation of procedure when students have an accident is required.

References

- [1] Jeon-sik Kim, "An efficiency study of safety supervision in a government- related research institution" A master's thesis, Kyoung hee University, 1985

- [2] A Study on Status Laboratory Safety in Seoul University, Institute of Environmental Protection and Safety, 2003
- [3] The Almanac of Science and Technology, Ministry of Science and Technology, 2003.
- [4] The Research Activity Investigation of Science and Technology in 2003”, Ministry of Science and Technology, 2003
- [5] “Counter plans for laboratory safety”, Monthly Non-disaster, 174(11), pp. 106-112, 2003
- [6] Life Safety Code, NFPA101, 1991
- [7] Guidelines on the laboratory safety, Korea Occupational Safety and Health Agency, 1999