Vol. 11 No. 3 THE HONG KONG UNIVERSITY OF SCIENCE AND TECHNOLOGY SEP 2002

SAFETY AND ENVIRONMENTAL PROTECTION OFFICE

Safetywise

Fire Safety Ambassador at HKUST

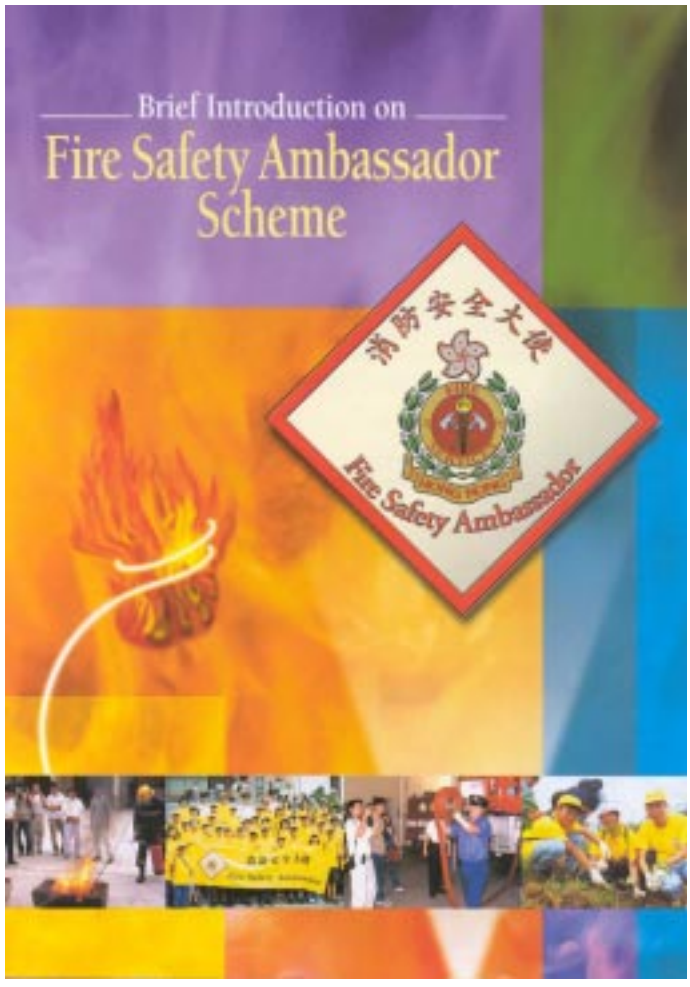
In order to educate the public on fire safety matters, the Fire Services Department (FSD) has launched a Fire Safety Ambassador Scheme since 1997. Participants of the scheme are provided with basic fire protection training to enrich their fire safety knowledge. Participants will become "Fire Safety Ambassador Trainer" or "Fire Safety Ambassador", if they successfully complete the respective training course and pass the written test.

This year, SEPO organized these two courses for staff of EMO, SAO, CSO and SEPO in June and July. A total of 13 staff members were appointed as "Fire Safety Ambassador Trainers" and 24 staff members were appointed as "Fire Safety Ambassadors". They will help to promote fire safety in their departments/offices and will also help the FSD by executing the following civic duties:

(a) disseminate fire protection messages to the general public;

(b) promote fire safety awareness among citizens; and

(c) help abate fire hazards and report them to the Fire Services Department.



As fire prevention is an important element of UST's safety program, SEPO will continue to support the Fire Safety Ambassador Scheme and will organize these courses to our staff members in the near future. Interested parties should contact Mr C. M. Li at extension 6485.

You can now see Safetywise on line at http://www.ab.ust.hk/sepo/sftywise.htm

Plan Your Operations... Know the Hazards... Implement Safety Measures...

Accident analyses often show that one of the major root causes of accidents is the lack of proper safety awareness and training. Consider the following scenario:

- A laboratory technician poured a hazardous chemical into a waste container and few seconds later, the container started releasing smoke and exploded, damaging nearby equipment and contaminating the facility. Investigation revealed that the person involved had not attended any chemical safety or hazardous waste management courses. Although he was aware that the material he was working with couldn't be poured down the drain, he was not familiar with the incompatibility nature of the chemicals in question, which led to the mishap.

Unlike established industrial operations, such scenarios are commonplace to many academic institutions where operations are frequently "non-routine" and new processes are often attempted in an effort to explore new frontiers. Furthermore, many researches employ a multidisciplinary approach in that it is not uncommon to find personnel, trained in one discipline, but one engaged in work procedures of a different field which had not been a part of his/her previous academic training. Similarly, when new findings are reported, PIs elsewhere often attempt to repeat what was done with the goal of applying the new findings in their own research efforts. In many such cases, the involved personnel do not have the training nor experience to handle the work. This is a recurrent script for accidents…

Careful planning is the first step in ensuring safety. Several units at UST have adopted the "Hazard Control Plan" approach to address safety concerns of new

operations. Personnel engaging in new operations which involve the use of hazardous physical, chemical or biological materials or dangerous operations must first compile a safety work plan to identify all such agents and operations and specify what controls are necessary.

These safety controls include engineering measures

such as exhaust ventilation and isolation devices, and administration procedures such as attending applicable safety training courses, designation of suitable work areas, etc. Personal protective equipment such as specific types of gloves and respirators may also be needed. After all the groundwork has been done, close supervision by qualified personnel must be employed, especially during the initial stages of the work.

A university environment is like a rendezvous of people with different background, culture and prior work practices. In this regard, safety culture and practices can vary greatly as well. Nevertheless, in order to ensure safety of an institution as a whole, all members must learn and adhere to the same safety practice to protect themselves and others. Let's hope all of us will be "safety-wiser" after experiencing our safety culture and actively implementing our safety practices!

HOW TO CONTACT SEPO

	Ext.	E-mail
SEPO General Enquiry	**7229/6509**	**SAFETY**
Environmental Issues, Recycling	***Director*** **Dr. Joseph Kwan** **6451**	**JOEKWAN**
Fire Safety, Electrical Safety, Ergonomics, Accident Reporting, Safety Training	***Engineer (Safety)*** **Mr. T.S.Li** **6511**	**TSLI**
Ionizing Radiation Safety, Non-ionizing Radiation Safety	***Health Physicist*** **Dr. Joseph Kwan** **6451**	**JOEKWAN**
Biosafety, Chemical Safety, Laser Safety, Medical Surveillance, Regulatory Affairs, Safety Publications,	***Senior Engineer*** **Dr. Samuel Yu** **6547**	**SAMYU**
Indoor Air Quality, Hazardous Waste Management, Analytical Services	***Assistant Engineer*** **Mr. Pak Ip** **6538**	**SEPOPCIP**
Construction Safety, Contractor Safety, Food Hygiene, Machine Shop Safety	***Health & Safety Officer*** **Mr. C M Li** **6485**	**CMLSEA**
Environmental Health & Safety Team, Field Services, Compliance Monitoring	***Team Leader*** **Mr. Percy To** **6507**	**PERCYTMT**

SEPO homepage: http://www.ab.ust.hk/sepo

Please feel free to call any of us or send us an e-mail if you have specific safety or environmental related questions.

Safetywise

is published by the Safety and Environmental Protection Office and printed by the Publishing Technology Centre.

The Hong Kong University of Science & Technology.

Printed on 100% post-consumer recycled paper.

Comments from staff and students are welcome.

Improving Dispersion of Laboratory Emission by Virtual Stacks

Many of the laboratories at HKUST have local exhaust ventilation provisions, such as fume hoods, canopy hoods, equipment exhausts, or other forms of air extraction devices. The extracted air goes up to the rooftop of the Laboratory Block and is emitted through exhaust stacks. The exhaust stacks on top of the Laboratory Block were all designed in accordance with recognized standards to provide for adequate dispersion of the air emission. In fact, a mathematical modeling and a wind tunnel study using a miniaturized model of the campus were conducted before our campus was built. However, actual air dispersion is much more difficult to predict because of the complex three-dimensional outline of a building, and the chaotic nature of wind on a localized scale.

From 1998 to 1999, a study has been conducted on campus to investigate the actual dispersion of laboratory emission, and its potential impacts to rooftop workers and the general public. A non-reactive gas not commonly found in the atmosphere was released in one of the laboratory fume hoods, and air samples were taken on the rooftop of the Laboratory Block and various downwind locations on the ground, and submitted to a laboratory for analysis. This kind of tracer gas study was repeated several times over the year under different weather conditions. Smoke release studies were also performed a few times for visualization of the dispersion conditions under different meteorological conditions.

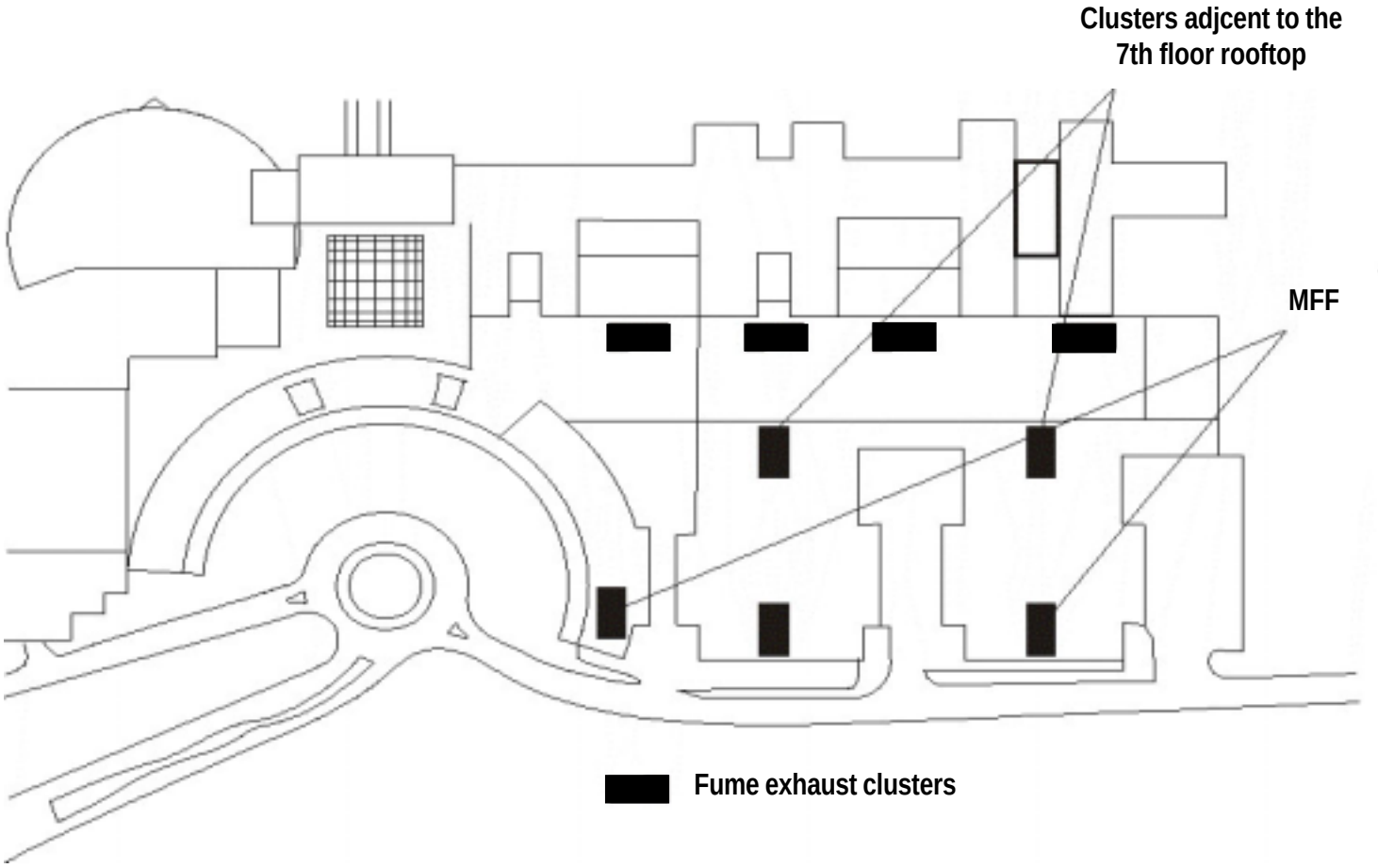
Results indicated that the dilution factor between concentration at the source and measurements on the rooftop of the Laboratory Block is usually 10,000 times or more under favorable weather conditions. Considering the normal chemical use patterns and the allowable exposure limits of common laboratory chemicals, the dispersion of laboratory emission can be considered satisfactory. The impact to the rest of the campus is negligible. However, there are times when the weather conditions are not so favorable, i.e. when the wind speed is low, and the atmosphere is stable, the chemical concentration on the rooftop may accumulate to a level that requires protection for people working up there. Besides, if there is an accidental release of chemicals, the concentration on the rooftop can be even higher.

In view of these findings, several interim measures have already been implemented for protection of rooftop workers. These include scheduling regular maintenance work to avoid certain time of the year when the weather

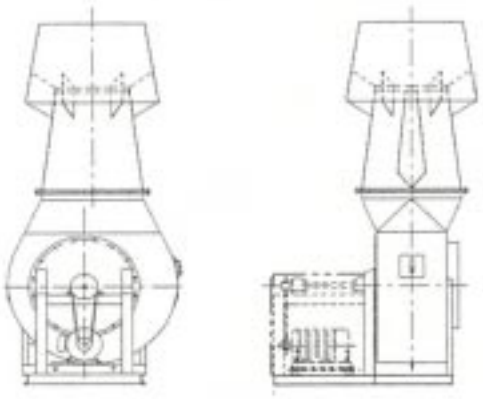
conditions are unfavorable, and the use of personal protective equipment, mainly respirators. In addition, a set of rooftop audiovisual alarms was installed, so that when the laboratory Emergency Ventilation system is activated, which usually means there is an accidental chemical release, rooftop workers can evacuate at the same time.

In the long run, an improvement of the laboratory emission is necessary to further reduce the risk of occupational exposure to rooftop workers. In 2000, the University was successful in securing a special funding from the UGC to improve the exhaust ventilation and emission dispersion for our “high impact” laboratories. These laboratories either use more hazardous gases, such as Microelectronic Fabrication Facility Phases I and II, or are connected to stack clusters that have relatively high impact on particular rooftop areas.

The improvement work essentially involves replacing the existing exhaust fans, which have been in service for 10 years, with a different type of fans, sometimes called “Virtual Stacks”. These new fans utilize a unique design to create an air stream to push the laboratory emission to tens of meters higher than before, without using a physical stack. The enhanced air stream of these virtual stacks is achieved partially by pooling air flows currently going to separate conventional exhaust fans, and by drawing extra air from the rooftop. The increased



plume rise allows much better dispersion, and is expected to significantly reduce the rooftop chemical concentration. On the other hand, the short stack height allows us to retain the aesthetic outlook of the Laboratory Block.



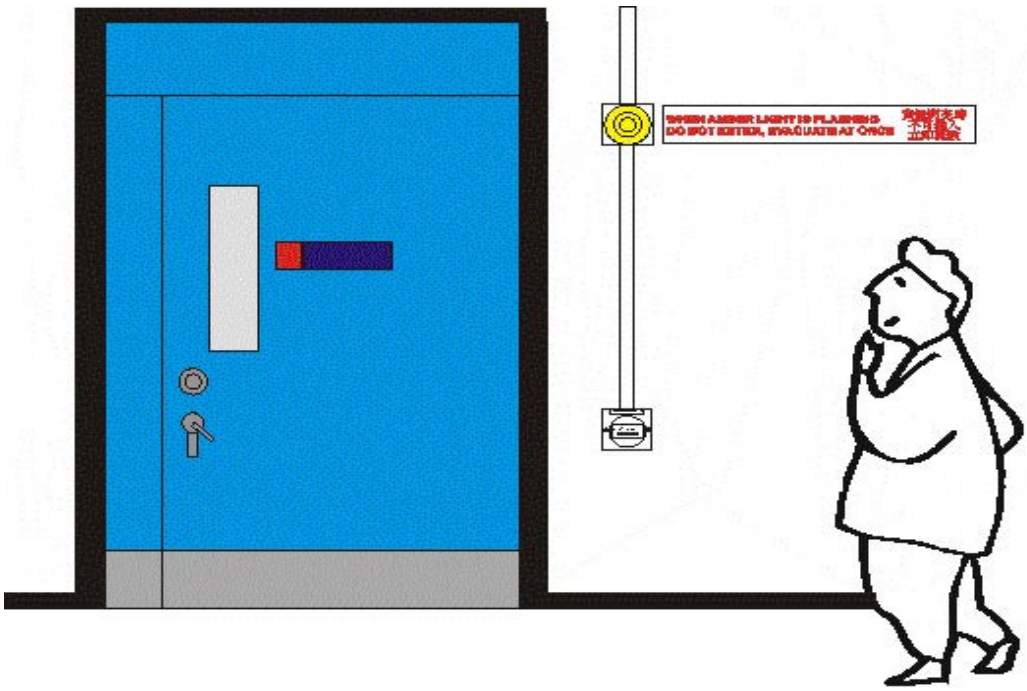
The first shipment of the Virtual Stacks has already arrived. The current schedule is to install them throughout the rest of this year, up to March 2003. During this period, fume hoods and other local exhaust ventilation systems in some of the laboratories will be interrupted for a few days for disconnecting them from the old fans and reconnecting to the new ones. All possible preparation work will be done beforehand to minimize the interruption to laboratory users. EMO/Laboratory Services will coordinate the improvement work schedule, similar to the regular exhaust fan maintenance shut-down. We hope all affected laboratory users will understand the importance of this work, and will bear with the short-term inconvenience in the coming future.

Laboratory Visitors' Safety

HKUST's achievements over the years have left a lasting impression. As the striving for excellence intensifies, growing interests in research activities on campus from all over the world are expected. With the increasing number of visitors trying to witness or capture the essences of some of the research activities in one form or another, their safety and well being become a concern. In addition, operational staff from administrative offices may visit the laboratories regularly. Both the visitors and the operational staff must be protected.

Recently an accident occurred in a laboratory on campus where a photographer was injured by the UV light generated from an experimental setup. With so much attention being focused on how to take the best shot of the setup, the photographer was inadvertently exposed to the UV light sources. The accident could have been prevented if proper control measures such as covering the setup with transparent polycarbonate, using suitable surrogates instead of the UV light and wearing proper protective equipment were adopted. Fortunately, the injury was not a serious one but it raised the question of how visitors' safety on campus should be managed, especially in laboratories where there are potentially hazardous agents.

For administrative offices like EMO that need to have frequent access to laboratories, some of them have established written procedures for their staff to carry out duties in the laboratories. A typical guideline would involve notifying the users, seeking for users' advice on the hazards associated with the work or equipment inside the laboratories prior to the commencement of work and, together with SEPO, performing a risk assessment for the work. Each of the laboratories has a hazard placard on the door and workers are advised to read it before entering the laboratory. In any case, workers are always welcome to seek SEPO's advice. Similar approaches can be adopted as the guidelines for any visit or activities inside a laboratory involving anyone who is not familiar with the area. The personnel in charge of a laboratory should take care of the safety of their visitors, make sure they understand the potential hazards involved and are well protected while they are in the laboratory. With such complements, we will be able to ensure that visit to our laboratory is productive and safe.



Legislation Update:

Occupational Safety And Health (Display Screen Equipment) Regulation

A new set of Regulation called Occupational Safety and Health (Display Screen Equipment) Regulation was enacted in April this year. There will be a one-year grace period before this Regulation becomes fully effective (i.e. April 2003).

How Will The University Be Affected By This Regulation?

This Regulation aims at protecting the safety and health of employees who use display screen equipment at work for "prolonged periods of time almost every day."

A "display screen equipment (DSE)" refers to any display screen which shows letters, numbers, characters or graphics, regardless of the display process involved. The most common type of DSE that can be found in our office and laboratory environments is the computer monitor. However, the definition does not include portable computers with attached keyboards.

According to the Code of Practice published under the Regulation, the definition of "prolonged periods of time" means:

- Operation of display screen equipment continuously for at least 4 hours during a day or cumulatively for at least 6 hours during a day; almost every day, and
- Breaks not exceeding 10 minutes in an hour away from the display screen equipment shall not be regarded as breaking the continuity of use of the display screen equipment.

If any employee in a workplace is required to work with a display screen equipment (e.g. a computer) at a workstation for "prolonged periods of time almost every day", the person responsible for the workplace (office, laboratory, workshop etc.) is required to:

- Ensure that the workstation is suitable having regard to the safety and health of the employee.
- Perform a risk assessment (according to a checklist) of the workstation in the workplace when the workstation is first used by the employee.
- Take steps to reduce any risks identified in the risk assessment.
- Make available to the employee a copy of the relevant record of assessment.
- Ensure that the employee is provided with necessary safety and health training in the use of the workstation.

SEPO is developing a program and will work with the DSOs to ensure compliance with this regulation. In the meantime, for more information about this regulation and related issues, please visit the following website:

http://www.ab.ust.hk/sepo/dse/Default.htm