inFIRE Conference 2014, Sun Yat-sen University, Guangzhou

Day 1 - Tuesday, May 6

Introduce the meeting

Presenter: Royal P. Mortenson, The Illinois Fire Service Institute (IFSI)

New Fire Suppression System for Large Halls

Presenter: Professor W.K Chow, Hong Kong, research center for fire engineering, Department of building services engineering, The Hong Kong Polytechnic University

Introduction

Many large halls such as airport terminals have been constructed in major cities of China. Fire safety problems in these large halls identified before include the extended travel distance and no full coverage by sprinkler or smoke exhaust system. There are also concerns about the cabin design used in retail areas. In this talk, the open cabin design will be introduced. Two new fire suppression systems, namely water gun and sidewall long-throw sprinkler at height, for better control in large halls will be discussed.

Many new large buildings are being built everywhere in China, which brings new challenges. There was a fire in Hong Kong's new airport even before it was opened. New major problems includes that there is farther from the fire source and with the great new buildings. It is always crowded with people. There is a lack of built-in sprinklers or fire alarm systems. The cabin design used gives many major fire problems. Open cabin makes it even more dangerous. They have not thought of environment for fire fighters in the design. Large halls are not sufficiently protected by sprinklers or fire alarms. There are four levels of fire codes in Hong Kong.

In Hong Kong, there is now a new passive building fire code and one active.

Cabin design

This construction causes amounts of combustible items collected in one place. It is a special design developed for example for new airports or railway stations. It is a mistake to think that a fire only

takes place in an enclosed area, it appears that the fire spreads. Professor Chow's conclusion is that there must be an end with such a design, it simply does not prevent fire. In addition to the smoke exhaust system there is also a need of sprinklers and drenches systems. Traditional sprinkler systems may have some problems to extinguish fires. It works to control or suppress the fire but not to extinguish it.

Water gun

There have been experiments carried out with water gun instead of sprinklers for 10 years. It is mounted on the wall, looks like a small cannon and sprays water as from a fire hose on the fire.

Sidewalls long throw sprinklers for tall buildings.
It may be a good alternative to traditional sprinklers and other fire prevention measures. They are built into the walls in some places in Hong Kong.
Professor Chow concludes by saying that he began his research 20-30 years ago and have had good help of the library on campus, using them even for interlibrary loan, no problem.

Meeting the Fire Service Challenges of the 21 st Century through training, education, research and information.

Presenter: Royal P. Mortenson, The Illinois Fire Service Institute (IFSI)

IFSI Director Royal P. Mortenson will provide an overview on how the Illinois Fire Service Institute at the University of Illinois-Champaign/Urbana is meeting the challenges and needs of first responders in the 21st century through realistic training & education based on state and nationally certified courses, cutting edge life safety research and customer oriented information/data resource management and support.

Their mission is to provide the best training, which will be standard based, safe, effectful and meaning building.

They guarantee institution hands-on training with tactics and procedures. 74% of the fire fighters in the state of Illinois are volunteer fire fighters and among other training their wild land fire training at IFSI. 400 fire fighters trained wild land fire training there last year. There are courses in agriculture rescue. IFSI also support Chicago Fire department training. In Special rescue skills training you will find trench rescue, high line, structural collapse and rope rescue. They have 28 acres of rescue city, Collapse structures, three burn buildings and trench rescue shipping containers with the tops cut off. There are five fire investigation rooms and a six story burn building. They have a street simulation area and an auto extrication area. They have Hazardous material training, approved nationally by FEMA.

Some facts:

65 500 first responders were trained at IFSI last year in 1080 different courses.

15 274 class hours.

945 Illinois fire departments and 123 other response organizations took part.

2 835 students in officer training courses.

They are developing focused decision making leadership through table top exercises.

The IFSI offers training where the students live and work. Most of the training is at the different departments. More than 74% of the training is at different sites except for the collapse training. The students are fully covered by insurance during training and response. Some of the departments in Illinois are as small as 12 people. Illinois is divided in seven regions when it comes to training.

The IFSI 5-step training model.

1. Individual self-study
2. Classroom lecture & simulation
3. Instructor –led walk-throughs
4. Full-scale and full speed, Live fire training/exercise
5. Validation

Mostly Homeland Security and Firefighting training divided into Program areas. IFSI offered On-line courses to 1 789 students and 29 different courses last year. In the future it will be blended training, both on-line and on-site in the same program.

IFSI carries out Life safety research from bottom to top driven by direct connection to the benefit for the fire fighter.

Some high light research last year: Rope systems, slip injuries, self-contained breathing apparatus.

There is a Learning resource, research and learning center with a Library, International conference center, Fire Fighting life safety research labs and State-of-the-art incident management training facility.

There is no funding from the University but the University carries out some services to the IFSI.

International programs:

Hong Kong FD

Chinese librarians summer programs

Chinese institutions

21st Century Fire services challenges

Doing more with less.

Pressure to cut budgets.

Continuing demand for volunteer firefighters.

New construction means less time to work with a fire. Time is down from 30 minutes to 7 minutes on new buildings before the building collapse.

Aging population.

More diverse non-English speaking population.

Use of Prevention Technology such as Residential sprinklers. There is a discussion going on between builders and others about the cost for the sprinkler systems.

Educating the public & engaging the public as initial responders

Answers to questions from the auditorium

Incident management system training, ICS, is carried out. It is computer based and scenario based. The training is incident driven but it has to be better. IFSI would like to connect the research better with the training.

They do training where the security issues are emphasized. They need to know how to identify risks through knowledge to understand their environment.

A career paid department requires specific fire fighters that are put through specific training processes. In volunteer departments there are very little regulations, they manage by volunteer training programs and good judgment. IFSI have had students that have paid out of their own pocket to attend training programs. Director Mortenson´s advice for training is to do it as realistic as possible.

The ICS training is the most class room based training at the moment, usually seven instructors and forty students. It is very instructor intensive. The relationship between the IFSI and the University: IFSI is the law based training academy for fighters in Illinois. It is much more sufficient to carry out the training through the University, than through the government. The funding is from FEMA and through the Fire marshal. There are 45 full time employees and 400 part time instructors.

Firefighting tactics to building fires

Presenter: Leung Kwun Hong, Deputy Chief Fire Officer, Hong Kong Fire Services

For all fore-front fire fighters, protecting life and property in case of fire and calamity is their prime responsibilities. In order to discharge their duties effectively and efficiently, it is crucial to learn the fire safety engineering knowledge and apply them in in the firefighting operations. Subsequent to a fire occurred at a herb tea shop in Hong Kong, a working group in the Hong Kong Fire Services Department was formed to conduct a study on the firefighting tactics to building fires. Several tests on simulated fire, smoke generation and water consumption had been carried out. Some basic fire engineering concepts, such as the composition of combustible gases, indication from smoke, the hazards by inappropriate application of conducting timely Fire Dynamic Risk Assessments at incidents, etc, were also reviewed. Relevant information, findings and recommendations of the study will be shared in the conference.

As a firefighter you have to understand smoke and heat to understand firefighting tactics. Smoke and heat will hamper firefighting. Reading smoke is important, the colour means different things. Make a risk assessment before action, choose strategy. There are also tenability limits to considerate. An improper act may endanger the whole operation. Smoke and water will also affect the situation. In Hong Kong the firefighting statistics is going down.

A fire call to an elderly home on 1/F and shops on the street level. The fire starts in a shop. Large quantity of smoke and heat is generated. Smoke is no longer floating and falls to floor level. They made computer studies and real fire tests at FSTS. They used Water Jet, Pulse spray application, Compressed air foam system, High pressure fog applicator for the tests. They used Fire behavior training from UK 2001Fl which emphasizes how to understand flashover and back draught. We need to know the fire to protect lives.

Risk assessment is essential together with personal protection clothing. Compressed air foam system - CAFS - is used too.

Using Water jet, 5 300 liter water used but 1 700 more volume of steam is produced. It makes poor visibility and heat. Pulse spray application doesn't produce so much steam.

The place of libraries in the development of decision support systems

Presenter: Mats Bornström, Librarian, Swedish Civil Contingencies Agency, Sweden

RIB Decision Support System is a source of information for everyone (who knows Swedish) working in the field of Civil Contingencies, ie, all the firefighters, police, transport, medical personnel and coast guard officials for the municipality. RIB linking databases together provide comprehensive information about how an accident can be managed, how prevention can be planned, risks involved when the accident occurs and where resources are. WIS is a web-based information system developed to facilitate information sharing between actors in the Swedish emergency management system. The system has primarily been designed to be used in the event of an emergency, but can also be used as a knowledge bank for preventative work and as a support in practice and training. The government library at the Swedish Civil Contingencies Agency can assist with literature that is searchable via the library catalog. We also have access to magazines, videos and other media, primarily in emergencies and crises. In this presentation we will find out what a government library, a decision support system and a web-based information system have in common.

Why do we do that? Research to inform fire safety

Presenter: Emma Roache, Librarian, New Zealand Fire Service

Emma represents the New Zealand fire service. There has been a National fire service since 1975 and today there are altogether 8 000 volunteers and 800 career fire fighters in New Zealand. She is stationed in the capital Wellington and provides service to all NZ fire fighters.

1991: A fire service employee who worked with local young kids wanted to provide service to help young people who were involved in juvenile fire setting. 1993 he launched a pilot program with the purpose of helping teenagers who were setting fires. The IFP program went nationwide and today all five regions have coordinators working with juvenile fire setters. It is unique since it started locally. 700 kids every year come in contact with the program. 57% of the young people taking part in the program continued with other crimes; however the arson rate is down to 6%. The study is unique with its depth and following up and it sets fire settings in context with anti-social behavior.

0,5 million NZ dollars every year are used for fire research projects in New Zealand operated by this fund. The fund has been operated for 16 years and there may be some need for the fund to be revitalized. The library is trying to put together a 2-page summary of every research report to make them more accessible.

To explore behavior and understanding of home fires:

Research International

Project Kindle NZFS Commission Research Report Number 110

Project Re-kindled

Project Kindle NZFS Commission Research Report Number 117

They had a TV ad-campaign for smoke alarms which was very successful.

Visit www.fire.org.nz to reach the 140 different reports that has been produced during this 16 years.

You can also visit www.iafss.org and their Fire Research Engine to find the reports.

Emergency Management Case Studies Database Construction and Practice in Jinan University

Presenter: Li Bin, Jinan University Library

Emergency Management is an emerging subject, banded together with social practice. It needs a large number of cases and data to research. However, nowadays resources about Emergency Management are finite, such as books and database. After a survey about the typical institutions in Emergency Management Studies in the world, we cannot find any large-scale special website or database for cases of emergency management abroad. Therefore, it is very urgent to establish a mature scientific emergency program in China. In April 2009, JINAN University established the first Emergency 2011 the database got recognized by CALIS. The Illinois Fire Service Institute (IFSI) has visited the library. The database was also spotted by the Elsevier foundation. You can also read about it on the IFSI website. It contains reports from different types of accidents. It includes the type of media and so forth. There are reports of mining disasters for example, including country and region.

The database (SODCEM) is searchable with keywords with the hit list ranked thereafter. The database is open for students and teachers from JINAN University. Up to now, the SODCEM collects more than 400 cases, 3000 pictures, medias, books and journals of emergency management abroad including five rough categories and 32 refined categories.

Measuring the importance of crowd evacuation network component

Presenter: Ma Jian, National United Engineering Laboratory of Integrated and Intelligent Transportation, School of Transportation and Logistics, Southwest Jiaotong University, Chengdu, China

High crowd density, is there an intelligent crowd management and planning strategy? How can we measure which way that has the best traffic flow? Nash equilibrium: No pedestrian can unilaterally change routes to improve his perceived travel times. He discusses the disaster at the Love Parade Festival in Duisburg 2010 where 19 people were crushed to death in the overcrowded entrance. He applies the proposed model to analyze the disaster. Results indicate that the presented method could well measure the flow of a crowd.