***Meeting Minutes***
***InFIRE Conference 2005***
***Thursday June 16***

***James M. Shannon, President and Chief Executive Officer, NFPA:*** Arrived at NFPA to morning coffee & pastries. Introduction - Libraries are changing more recently than ever have in the past. The Library at NFPA may be the first stop for a fire researcher.

***Rita Fahy, Manager, Fire Data Bases and Systems, NFPA:*** Databases and systems related to human behavior in fires. Research comes internationally Australia, Canada and events in the USA.

- There is data on a decision to start to evacuate and travel times
- Little data on evacuee decision making
- Evacuation studies
- NRCC – Data on drills in apartment buildings, offices, apartment fires
- Victoria Australia – post fire interviews and reaction to smoke alarms
- Ulster Northern Ireland – Drills and experiments focus mobility impairments

***Human Behaviors in Fires***

- Lab experiments indicate travel time increase for different types of surfaces for mobile challenged
- Videotaped observations utilized
- Interviews – post fire for evacuees
- Security cameras – pick up precise observations

***Example 1: Fire alarm goes off in a supermarket***

- New arrival will tend wander a little, may start to shop and then leave
- 1 ½ hours into shopping – shoppers will tend to exit after ignoring for a short time
- In line at cash register will tend to stay or refuse to leave

***Example 2: Fire alarm goes off at a restaurant***

- Ate but have not paid bill will tend to leave quickly
- Just got food – may refuse to leave

So Evacuation Studies suggest that familiarity – how well do you know the space? People form bonds – leisure centers – parents find kids, your role in the situation – in line at cash register, new arrival has an affect. Hotel guests tend to determine how the firefighter is behaving? Also, age and mobility play a large role. Occupancy characteristics by time of day and venue - hockey game or figure skating or show in the same arena will have different evacuation times.

***Evacuation time:***

- Based on notification, reaction time, pre-evacuation time and travel time (path, distance and speed).

***Action categories:***

- Investigate, seek information, alert others, and seek refuge.

***Case studies:***

- Apartment Buildings – can have different evacuation times based on alarm level of quality

3 minutes – good alarm
9 minutes – bad alarm
Winter – will take a long time to evacuate

***Word Trade Center (WTC) 2001***

- People above impact floors could not escape
- Media accounts helped evacuation
- Appendix in NIST Report – Project 7 1B Draft recommendations out later this month
- CDC – study on deaths, below impacts 75-77 deaths
- CDC – study on code changes
- UK study began in 2004

WTC Occupancy – 5000 to 7000 people there. ¼ of all due to Elections and ½ school day
Tower #1 – no upper floor survivors
Tower #2 – six above 78$^{th}$ floor survive

***Tower #1***

- 1 hour 42 minutes to evacuate
- Crowding floor 30

***Tower #2***

- 1 hour 12 minutes
- Crowding floor 50

***Initial cues*** – fire alarm, building shook, flames, jet fuel smell assisted evacuation decision.

***1993 Event***

- Car bomb, emergency communication, backup electricity knocked out
- Blackout in stairwells
- Evacuation took hours – darkness
- Stairwell dead end, stairs had different number of treads
- People counted and shouted up number of stairs and turns
- Cross-over shafts at floors 41$^{st}$, 48$^{th}$, 76$^{th}$

***1993 cues ambiguous – transformer explosion was thought the cause***

- Stairwells smoky and dark
- Evacuation time was 6 hours in 1993, and 1hour 42 minutes on 9/11

***Due to 1993 Event on 9/11:***

- Safety in high-rise buildings perception changed
- Photo luminescent paint and signs helped out on stair treads, handrails – calming effect

***Night Club Fire – Great White Band – February – Warwick, Rhode Island***

- TV reporter videotaping
- Video tape evidence – no panic
- All evacuees interviewed by police

***Video shows***

- Commitment – show special effects looked cool at first did not know it was not intended
- Slow recognition of initial cues
- Orderly evacuation
- Preference for familiar exit

***Nightclub – NFPA Code Changes***

- Sprinkler new clubs
- Sprinkler occupancy greater than 100
- Restrictions with occupancy greater than 250
- Use of Crowd Managers

***Panic – myth or reality?***

- Panic kills is the basic assumption of human behavior in fires but there is no panic it exists only in the news stories and catchy headlines
- Voice messages have a calming effect
- PEOPLE DON'T PANIC
- LaSalle Hotel in 1946 had an orderly evacuation while it was burning to the ground

***Observations on human behavior***

- Little reaction to smoke
- Fear of flame but not smoke
- Need for second or third cues
- Varying reactions to fire wardens

***Need to study***

- Effects of population characteristics
- Physical limitations
- Aging population

***Behavior modification***

- Pre-movement time
- Decision to evacuate or not
- Information before a fire
- Follow-up after fire
- Information during fire
- Alarm audibility
- Voice message audibility
- Elevator use

***Evacuation videotapes***

- Security tapes time and again indicate – there is no panic.

***Fire Protection Research Foundation, recent research – NFPA***

***Kathleen H. Almand, P.E.***
***Executive Director, The Fire Protection Research Foundation***
***NFPA***

- Since October 2004
- National Research Foundation
- 1982 – support NFPA Mission
    - Hold symposium – detect and alarm
        - No peer review, no proceedings
    - Research agenda setting
    - Projects – literature, major fire testing
- Research programs
    - NFPA library – web site soon
- Resource to technical committees
    - No funding or resources
- Research process
    - Technical Advisory Committee
    - Research/testing
    - Publish report – public only
- Fire Detection Alarm Research Council
    - Mission
    - Activities
- Developing Research
    - Human behavior studies
    - Roadway tunnels
    - Ceilings
    - Visual Signaling
    - Smoke and heat alarms
- Fire Suppression
    - Database test reports – Tyco
    - Hazmats
    - NFPA 2001 studies enclosure loads
        - Need sprinkler testing reports on loading

***Emerging Issues***

- New materials and systems
    - Security
    - Alternative vehicles
    - Aging population
- Roadway tunnel Fires NRCC
    - Boston – detection went off after fire department arrived
    - Project plan to determine what, how, why
- Sponsors to come

***Hydrogen Economy***

- New Vehicles
- 1/25/04 – Talked about research needs for X
    - Assemble information stationary fuel cell; refueling stations
    - Model for separation
    - 12 stations in California already
    - Cell phones use stationary fuel cells

***Sue Marsh – Charles S. Morgan Library - digitizing old NFPA codes***

- Contractor - Input Solutions – Gaithersburg, MD
- Formulas and graphs – OCR can change character
- ROP's and ROC's will be done next

***Robert Duval, New England Regional Manager/Sr. Fire Investigator, NFPA***
***NFPA Fire Investigations Unit***

***Notification***
Wire services, word of mouth, network, relations with response 24 hours for domestic
***Criteria***
Fatalities, large losses, request, significant fire, codes issue.
***Resources***
Investigator, engineer, staff, analysis, library
***Report***
Client report review, not expert witness – no origin/cause determination, electronic format, summary presented by alerts, Internet, presentations
***Teamwork***
State and local authorities, ATF, fire academies, arson investigative team
***Fire Investigation Examples***

- Florida tornados 2/98
- Bulk retail/store Tempe AZ 3/98
- Propane explosion, Albert City FL 4/9/98
- Grain elevator, Haysville KS 6/8/98
- Cruise ship, Miami, FL 7/98
- Bus, MS, 8/98
- Dance Hall, Gothenberg, Sweden, 10/98
- High Rise, NYC 12/98