

CFAA TECHNICAL SEMINAR

2011



Fire Investigation Case Studies

Canadian Fire Alarm Association (CFAA)

D. GOODYEAR FIRE CONSULTING

THE BUILDING

- Rooming and boarding house
- Combustible construction
- Three stories above ground and basement
- Basement - Electrical room & storage
- Ground floor - Variety store
- 2nd & 3rd floors - Rooms rented
- Limited exit paths



THE FIRE

- Christmas Eve
- Some occupants socializing
- Deliberate ignition
- Quickly compromised escape route
- **THE FIRE SYSTEM DID NOT WORK**



THE RESULT

- 10 FATALITIES
- Fire department hampered by overhead wires
- Criminal trial
- Inquest



FIRE INVESTIGATION REVEALED

- Fire alarm AC power was turned OFF
- Fire alarm battery fuse was removed
- No records of fire alarm testing or repairs
- No restricted access to the fire alarm panel



LESSONS LEARNED

- The causes and location of fires are unpredictable
- Fire alarm systems **MUST** be operable at all times
- Fire alarm systems **MUST** be thoroughly tested
- A logbook of fire alarm system testing and repairs must be kept
- Restricted access to the fire alarm panel is important



THE BUILDING

- High rise apartment building
- Non-combustible construction
- 30 stories above ground and basement parking garage
- Part of a large complex



THE FIRE

- Originated in apartment 509
- Area of origin: the living room sofa
- Tenant attempted extinguishment
- Tenant did not close the apartment door
- The fire progressed rapidly to the corridor



THE RESULT

- 6 FATALITIES
- Fire damage in the corridor on the fire floor
- Smoke contamination of the stairs
- Fire department hampered by scissor stairs
- The FIRE SYSTEM FAILED during the fire



FIRE INVESTIGATION REVEALED

- Many fire safety issues:
 - Smoke spread, door closers, smoke hatches in stairwells
- Fire safety system failures:
 - Emergency lighting, exit lighting, stairwell lighting
- Improper fire alarm testing and repairs
- Failure of the fire alarm system



FIRE INVESTIGATION REVEALED

- Failure of the fire alarm system:
 - Annunciation failure
 - Signalling failure (Bells)
 - Emergency voice communication failure
 - Fire fighter telephone system failure
- ALL FIRE ALARM FAILURES
 - OCCUR WITHIN THE FIRST FEW MINUTES



LESSONS LEARNED

- Fire alarm system testing and repairs
 - *must be done correctly*
- Fire alarm systems **MUST** be operable at all times *including during a fire*
- Fire alarm systems **SURVIVABILITY** is important
 - *must perform under real fire conditions*



Seniors Apartment

THE BUILDING

- High rise apartment building
- Non-combustible construction
- Well maintained
- Occupants - senior citizens
- Supervised voice communication in each suite



Seniors Apartment

THE FIRE

- Suite where the occupants had just left
- Area of origin: at the closet outside the bedroom
- No fatalities or injuries
- Suite was destroyed
- Fire was contained to the suite and was detected
- The FIRE SIGNALS DID NOT WORK on the fire floor



Seniors Apartment

FIRE INVESTIGATION REVEALED

- The fire alarm signalling in the suite was destroyed before the fire was detected
- The failure of fire alarm signalling wiring in the suite prevented signalling on the entire fire floor



LESSONS LEARNED

- Fire separations can perform well
- Fire in a compartment may cause wiring to be destroyed before fire is detected
- Issues such as fire alarm system isolators or separate circuits are important



THE BUILDING

- High rise apartment building
- Non-combustible construction
- 22 stories above ground and basement parking garage
- Near rectangular in shape
 - Elevators near centre and separate stairs at ends of building
- Annunciator & CACF
- There had been a number of false alarms



THE FIRE

- Originated in apartment on the 9th floor
- Area of origin: the living room sofa
- Occupants left without activating the fire alarm
- Occupants left without closing the suite door
- The fire progressed rapidly to the corridor



250 Davenport

THE FIRE

- The superintendent proceeded to the annunciator
- Used the elevator to investigate a possible false alarm
- Was nearly overcome by hot gasses and smoke
- Four occupants entered another elevator



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THE RESULT

- 4 FATALITIES
- Occupants died when the elevator stopped at the fire floor



FIRE INVESTIGATION REVEALED

- The fire alarm system was activated
- 7:11 Initial alarm on 9th floor
- 7:13 Fire alarm system detected smoke in the north stairs
- 7:18 Alarm annunciation from all floors 9 to 25
- 7:20 Smoke detectors operate in south stairs
- Failure of the elevator door closing override

- *Superintendent may have gone to the elevator between 7:11 and 7:13*



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FIRE INVESTIGATION REVEALED

- NO FAILURE of the fire alarm system
- False alarms resulted in deviation from the Fire Safety Plan
- Occupants ignored the fire alarm system



LESSONS LEARNED

- Critical events can occur within the first few minutes
- Fire alarm system automatic functions are effective
- The Fire Safety Plan is important
- Fire safety testing
 - *must be done correctly*



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THE BUILDING

- High rise apartment building
- Non-combustible construction
- 22 stories above ground and basement parking garage
- “Y” shape structure
 - Elevators near centre and separate stairs at end of corridors
- Upscale building with full-time security
- Video security in corridors and in elevators
- Manual elevator recall



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THE FIRE

- Originated in apartment
- Area of origin: the bedroom
- Cause: ignition of the bed by flame
- Occupant activated the fire alarm
- Occupant left and propped open the suite door
- Fire progressed rapidly to the corridor



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THE FIRE

- Female occupant on upper floor was disabled
- Husband was visiting niece in same building on a lower floor when the fire alarm sounded
- Husband used the elevator to return to wife
- Security used keys to place elevators on recall
- Elevator stopped at fire floor
- Husband died in elevator



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THE RESULT

- ONE FATALITY
- Tests of elevator controls revealed the controls would activate from by-products of fire



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FIRE INVESTIGATION REVEALED

- The fire alarm system was activated
- The security guard was not slow in recalling elevators
- The occupant in the elevator did not push the button for the fire floor
- Tests of elevator controls revealed the controls would activate from by-products of fire



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LESSONS LEARNED

- Fire can progress to life endangering size within minutes
- Fire alarm systems are useful in the automatic operation of life safety functions
- Ancillary functions must be properly installed and tested



2660 Southvale

THE BUILDING

- Low rise commercial building
- Non-combustible construction
- 3 stories
- Rectangular in shape
- Many different tenant spaces
- Sprinklered with a fire alarm system
- Contained a FIRE SIGNAL RECEIVING CENTRE
- Video security in corridor near the station



2660 Southvale

THE FIRE

- Occurred at approximately 11 PM
- Located on third floor
- Building was mostly unoccupied
- Three people on duty in the monitoring station



2660 Southvale

THE RESULT

THE FIRE RECEIVING CENTRE

- Monitors thousands of accounts
- Had to evacuate almost immediately
- Reacted quickly and had a contingency plan
- Alternate stations were able to handle the communications
- After fire - station personnel unable to access station even though not damaged



2660 Southvale

FIRE INVESTIGATION REVEALED

- Originated in small unit (7 feet 2 inches by 9 feet)
- Fire progressed rapidly to the corridor
- Delayed detection due to sprinkler system problem
- Monitoring station quickly abandoned



LESSONS LEARNED

- Fire can progress to life endangering size within minutes
- Delayed activation of fire alarm systems are problematic
- Critical functions or operations may be at risk due to other tenants
- Contingency plan necessary for critical functions or operations



SUMMARY: LESSONS LEARNED

- The incredible speed of fire
- The destructive power of fire
- The unpredictable nature of occupants
- The vulnerability of elevators
- The survivability of fire alarm systems
- The value of a Fire Safety Plan
- The value of contingency plans
- The value of thorough testing
- Ethics in the Fire Safety Business



QUESTIONNAIRE



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