LINE OF DUTY
DEATH REPORT
VISUAL EXTENSION

F2018-03 PA

Career Lieutenant Killed in Building Collapse While Fighting Row House Fire - Pennsylvania

Summary

- On January 6, 2018, a 42-year-old career Lieutenant was killed in a structural collapse while fighting a fire in an 1800's era row house
- Firefighters arrived to find a two-story row house heavily involved in fire
- Crews faced limited street access, excessive clutter in the building, extreme cold, multiple inoperable fire hydrants, and a frozen handline
- First arriving crews, operating only off tank water, were able to locate and remove a civilian victim from the first floor and initially knock down the fire on the first floor
- Interruptions in water supply hampered firefighting efforts and forced a change in strategy from offensive to defensive until a reliable supply was established and offensive operations re-started

Summary

- Crews re-entered the structure to continue to extinguish the fire
- 5 firefighters entered the first-floor and 3 firefighters went to the second-floor to attack the fire
- There was a shift in the second-floor and it collapsed into the first-floor, forcing escape through the A- and C-sides
- The Lieutenant was pinned down by the second-floor joists and was unable to escape
- Rescue crews worked continuously for approximately 60-minutes in extremely dangerous conditions to extricate the Lieutenant
- Cause of death was determined to be positional asphyxia with superheated gas and smoke inhalation

Contributing Factors

- Extreme cold weather, water supply (6 inoperable hydrants)
- Inherent building characteristics and unique row house variation
- Structural overloading, excessive clutter and deteriorated building conditions
- Risk assessment that included a structural condition evaluation after strategy change (fire severity on primary building materials and extension within the ceiling spaces)

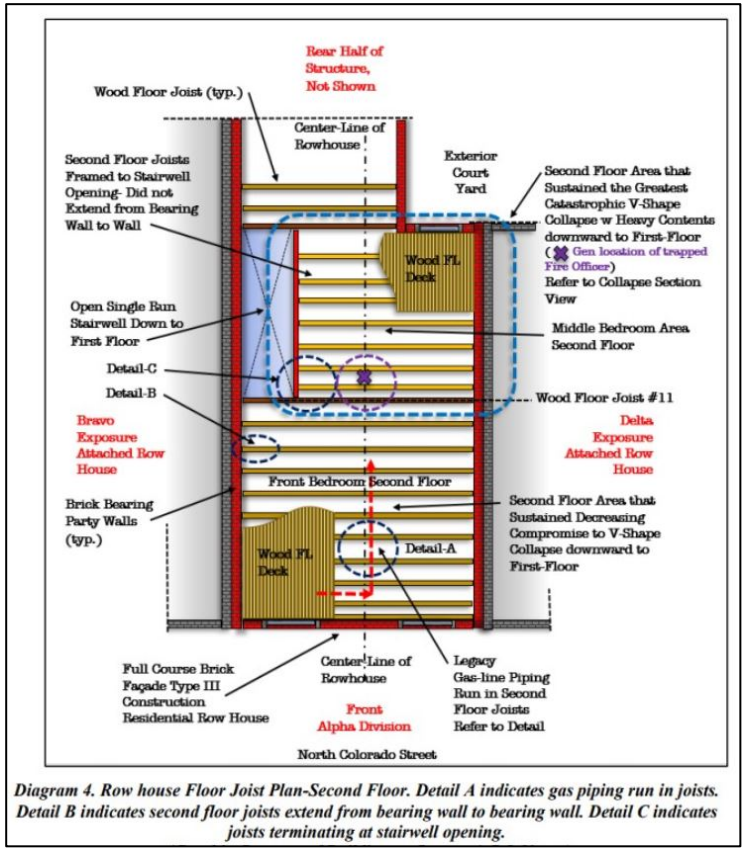

Diagram 4. Row house Floor Joist Plan-Second Floor. Detail A indicates gas piping run in joists. Detail B indicates second floor joists extend from bearing wall to bearing wall. Detail C indicates joists terminating at stairwell opening.

Graphic Courtesy of buildingsonfire.com\C.J. Naum

Key Recommendation

- Fire Departments and Authorities Having Jurisdiction should consider increasing emergency response capabilities during extreme weather

Photo by FD, NIOSH Report 2018-03PA

Key Recommendation

- Fire Departments should consider defensive operations when a dependable, continuous water supply is lost or not available and the building's primary building materials may have been subject to severe fire conditions

Photo by FD, NIOSH Report 2018-03PA

Key Recommendation

- Fire Departments should ensure that firefighters are trained to understand the influence of inherent building performance characteristics, unique row house variation (modifications and construction) on structural collapse, and consider defensive operations when dilapidated/excessive clutter conditions are encountered

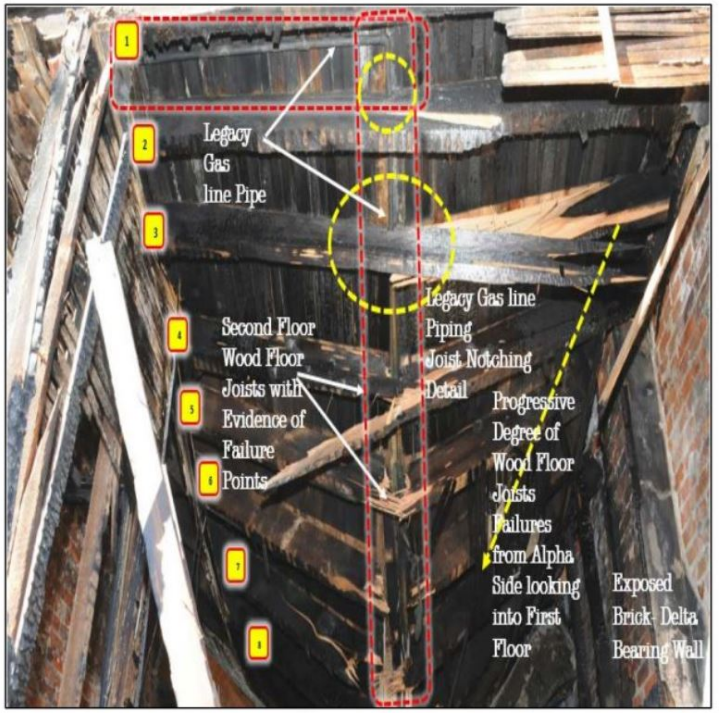

Diagram 11. Joists numbered from side Alpha toward side Charlie detailing the joist breaking points along the notched cut out for the gas pipe installation.

Photo by FD; Analysis diagram courtesy of Buildingsonfire.com\C.J. Naum

Key Recommendation

- Fire Departments should ensure that Incident Commanders establish a stationary/expandable command post, which includes the use of a tactical worksheet and effective fireground communications

Photo by NIOSH

Key Recommendation

- Fire Departments should consider the capacity and capability of the dispatch process to ensure response accountability and prevention of a single source failure in the response matrix

Incident Conditions	Time	Response & Fireground Operations
Command called Engine-45 officer and advised of the fire conditions on second floor and he (Engine-45) had Engine-50 coming in behind him and needed them to make the second floor.	0905	Engine-45 officer acknowledged and told command of trouble making stairs due to the debris inside.
Command told division Charlie that he had Engine-13 stretching a line to him.	0905	
Engine-45 officer called Engine-45 DPOP. Engine-34 officer told Engine-34 DPOP to send water.	0906	Engine-50 DPOP told Engine-50 officer that he had a bad hydrant. Battalion Chief-8 aid gave progress report of "all hands in-service, heavy fire, first and second floors" and confirmed the incident address with dispatch.
FCC provided information to Battalion Chief-8 aide and command regarding information that someone in the building (exposure Delta) cannot get out of their property.	0907	Battalion Chief-8 aide acknowledged, and Command acknowledged and said that he would send someone in.
Command told all companies operating-exit the building they were going to switch to a defensive attack.	0907	**Command repeated this defensive command twice.**
All hands response dispatched: Deputy Chief-2, Incident Safety Officer, Emergency Service-1, and 3, Fire Marshal-13, and 15, Medic-36.	0907	Deputy Chief-2 responded at 0943 and arrived at 1002. Note: Deputy Chief-2 response and arrival were delayed due to a communication issue.

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Key Recommendation

- Fire Departments should ensure that fire officers and firefighters are trained in and practice situational awareness and personal safety

Compromise and Collapse Time & Benchmarks*

Fire | Heat | Smoke Propagation | Impingement | Severity | Growth	Predictability of Building Compartment | Assembly | System | Perimeter Wall-PW | Floor-FL | Roof-RF	Benchmark	Operational Risk Profile	
Duration (Minutes) Not Definitive & Variable Based	Compromise and Collapse Projections & Prediction	Engagement Time | Progress | Effects	Severity Risk	Operational Probability
0m -15m	Anticipate	10m	Normal	Occasional M
15m-23m	Expect	15m	Marginal	Likely H
23m-30m	Impending	20m	Critical	Likely E
30m +	Precipitated	25m	Catastrophic	Frequent E

*Suggested Timeare highly expressive and are greatly influenced by a large number of fire ground variables that include but are not limited to exposed time, building design, features, fire dynamics, personnel capabilities, deployment, resources, training and other industry recognized parameters. No liability is assumed or implied in the use or application of these suggested parameters and the user assumes all liability. Buildingonfire.com • Fireground.leadership.com ©2005-2018 Chris Naum, PE

Appendix 2 Diagram 13. Compromise and Collapse Time & Benchmarks. Provided with Permission from the Command Institute, Center for Fireground Leadership. Fireground Operations Training Series on Type III & IV Buildings. Graphic Courtesy of C.J. Naum

Photo by FD, NIOSH Report 2018-03PA

Key Recommendation

- Fire Departments should consider increased staffing and/or capacity of specialized rescue companies in dense urban areas or targeted areas to assist in highly technical rescue capabilities and prevent a single source failure in response

Photo 3. Red pin and horizontal arrow point to incident structure, vertical white arrows indicate the narrow access to side A due to narrow roadway and on street parking and very limited access to the utility alley on side C.

Photo courtesy of Google Earth

Key Recommendation

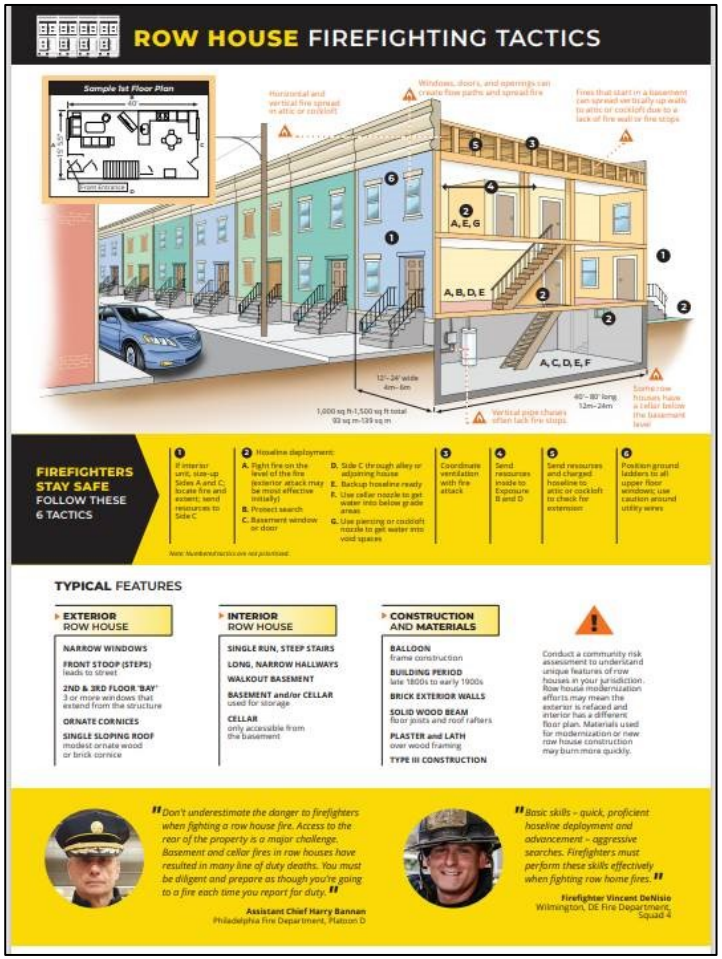
- Fire Departments, water and utility departments, and authorities having jurisdiction should consider increased fire hydrant maintenance programs and identify and replace “problematic” type fire hydrants

Photo by ©bmcent1/Getty Images

NIOSH Fact Sheet

Additional information on row house firefighting considerations and tactics can be found at DHHS (NIOSH) Publication Number 2020-18:

[Row House Firefighting Tactics Poster]



CONTACT US

Fire Fighter Fatality Investigation and Prevention Program

Surveillance and Field Investigations Branch

Division of Safety Research

NIOSH 1000 Frederick Lane, MS 1808

Morgantown, West Virginia 26505-2888

FFFIPP Webpage

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