

One meridian plaza highrise fire of 1991 case study

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Introduction

On the evening of February 23, 1991, the Philadelphia Fire Department received a call reporting a fire on the 22nd floor of the One Meridian Plaza. The fire department responded immediately but were faced with various challenges that made the fire unmanageable. The fire lasted for nineteen hours and spread to eight floors above the 22nd floor in the 38 story building. Firefighters were able to contain the fire when it spread to the 30th floor. The incident led to three casualties, all firefighters from the local Philadelphia Fire Department, and injuries to 24 others. For this task, we are supposed to review and analyze an incident, which in this case is the One Meridian Plaza highrise fire. The following discussion covers the summary of a case study about the incident followed by a critical analysis of the case that both applies and relates to concepts and practices in emergency incident management.

Building Construction

One Meridian Plaza, also known as the Meridian Bank Building, houses commercial offices in South Penn Square. Construction of the building finished in 1973, and it is located in a busy area in downtown Philadelphia alongside other high rise and mid-rise buildings. It is located in an approximately 22, 400 sq. ft. property with the building occupying 17, 000 sq. ft. The building has 38 floors - 3 underground, 36 above ground, 2 mechanical floors, and 2 rooftop helipads. Based on the Philadelphia Department of Licenses and Inspections' assessment of the building's construction, it is classified as BOCA Type 1B construction, which in common

terminology means that One Meridian Plaza is “ Fire Resistive and Non-combustible”. Assessment in general is based on the quality of building columns, beams, floors, ceilings, space separations, stairways, among others. The building was constructed using structural steel and all of which underwent fireproofing.

Fire Protection Systems

One Meridian Plaza adhered to standards and regulations in fire protection during its early years. In 1973, the Philadelphia Building Code merely required buildings to utilize local fire alarm systems and smoke detectors. Occupants were also required to make space for hose stations. The building had dry standpipes while its three underground levels had automatic sprinklers. One Meridian made changes based on improvements in building codes over the years. Changes in the building’s fire protection system over the years included the installation of visible signs at exits and stairwells, and smoke detectors, as well as the acquisition of various permits. A review of city records, however, reveal absence of files to prove that One Meridian Plaza accomplished necessary paperwork and that the building was assessed following changes in local code.

One Meridian’s elevators had security features in case of fire. Elevators serviced different floors. Elevator Bank A only goes up from the ground floor to the 11th floor while Elevator Bank B services floors 12 to 21. Elevator Bank B also has a freight elevator that moves between the 22nd and 38th floor. Elevator Bank C services the 21st to the 29th floor and Elevator Bank D services the 29th to the 37th floor. When the alarm goes off, the elevators

automatically go down to the lobby. Other protection systems in the building include standpipes, sprinkler systems, and alarm systems. Nevertheless, further inspection after the fire revealed that all parts were inadequate and did not cover all areas necessary to ensure effective fire protection.

Automatic sprinkler systems, for instance, were only installed in select floors. The absence of which in the upper floors above the 22nd floor contributed to the rapid spread. If these floors had the same automatic sprinkler system installed in the 30th floor, then the firefighters could have contained the fire immediately. Standpipes through which water supply passes through were also absent in the some part of the building.

Fire protection practices often includes measures for every structure's heating, ventilation, and air conditioning (HVAC) system. Ideally, HVAC systems must be equipped with fire dampers. The purpose of which is to prevent the spread of fire in the air ducts. Nevertheless, due to the absence of fire dampers in One Meridian's HVAC system, fire spread significantly in these areas. Post-incident assessment also led to several revelations that highlighted negligence on the part of One Meridian's owners to maintain the structure's fire protection system. Separation of rooms in each floor and between the floor and ceiling proved to be weak as a result of assessment. Separation between these parts of the building should have been installed with vertical and horizontal penetrations that would have prevented the spread of fire from one room to another and from the 22nd floor to the upper floors. The penetrations should also have protected electrical wirings into exposures. The absence of penetrations in the building proved that poor construction led to the immediate horizontal and vertical spread of fire.

Fire Attack

On the day of the fire, the smoke detector on the unoccupied 22nd floor of One Meridian Plaza came off at 8: 23 PM. The smoke detector is located near the return air shaft, northeast of the building. An engineer and two security guards were manning the building on that day. One of the guards was in the lobby while the other was on the 30th floor doing his rounds. When the alarm went off, the engineer went up using the elevator to investigate, during which the alarm company called the front desk about it. The security guard assured the alarm company that it was being investigated. Despite the alarm, the alarm company did not alert the fire department. After reaching the 22nd floor, the engineer saw heavy smoke that blocked his vision and disabling him from pressing the elevator buttons to go down. The engineer used his radio to inform the guard in the lobby. The security guard recalled the elevator and immediately called the alarm company to confirm the incident. The other guard heard the engineer's report on the radio and used the stairwell to go down. The Philadelphia Fire Department received two calls via 911 and the alarm company at about the same time - 8: 27. A passerby called 911 after seeing fire in the building using a payphone while the alarm company called the fire department to report. After further investigation on the matter, the authorities discovered that the cause of fire is a spillage of linseed oil on the 22nd floor of the structure, from rages left by a contractor that worked on that floor that day.

Fire Spread

Aside from delayed response due to series of issues, from the late report to the fire department and the impediments that the firefighters faced, such as the locked stairwell entrance and exits, and the power failure, among others. Nevertheless, the main reason why the fire spread and reached eight other floors in the building is because of the weak exterior windows, which made the vertical spread of fire possible. Other parts of the structures damaged easily when exposed to fire, such as the assemblies putting the floor and ceiling together and the shaft enclosures.

Response

After receiving the calls, the Philadelphia Fire Department deployed “ four-engine and two ladder companies with two battalion chiefs” (p. 8). Engine 43 arrived at 8: 31 PM. One of the battalion chiefs called in another alarm at 8: 33 PM and proceeded to remain in the lobby while the other battalion chief headed his team to the 11th floor using the low-rise elevators. From there, the team used the stairs up to the 22nd floor. Meanwhile, the heat that built up in the 22nd floor caused a power failure. The building had an emergency generator, but it did not work at that time. Records show that four weeks before the incident, One Meridian tested the generator. Problems were detected but the faulty parts of the generator were replaced immediately. After the replacement of the part, another test was conducted but without the load, which caused problems during the first test. The generator worked properly but no other tests were subsequently made with the previous load conditions. The power failure significantly affected the initial response.

Without the lighting, the firefighters had to carry all suppression equipment until the 20th floor. The heavy equipment and the distance from the 11th floor until the 20th floor delayed fire response. Entrance and exits in the stairwell also impeded response. Since the low-level elevators went up to the 11th floor, the firefighters used the stairwell. Nevertheless, the stairways doors remain locked, a security feature that prevented entry and exits in specific floors. To continue their flight up to the upper floors, the firefighters had to break the doors down, which also took time. The firefighters sought to control the fire but when they spent eleven hours doing so, they left the building due to the possibility of the building collapsing because of the extent of the damage. The inadequate water supply contributed to delays in response. Throughout the entire operation, firefighters had to make several adjustments due to the limited and intermittent water supply. Not until the fire reached the 30th floor were the firefighters able to control the fire with the help of the automatic sprinklers activated on the floor. The firefighters were only able to declare the fire as “ under control” during this time, which was on the next day, 19 hours after the fire started.

Casualties

Three firefighters died in the fire. All of them, who are from the Engine Company 11, were in the 28th floor. Twenty four other firefighters were injured.

Analysis of the Incident

The One Meridian Plaza incident is a momentous event not only because of the magnitude of the damage and casualty but also because it brought

about important issues pertaining to building construction and the distribution of function, responsibility, and accountability when it comes to fire protection. Essentially, the incident raised the important issue about the roles and responsibilities of private institutions, especially of highrise structures, in establishing spaces that are fire proof. Moreover, the case proved that firefighters are incapable of handling fires in highrise structures. We should note that one of the problems that arose during the fire response was the distance from the ground floor and the 11th floor where the low level elevator stops to the upper floors including the 22nd floor. From the 11th floor, the firefighters had to carry their suppression equipment up to the higher floors. Although the first battalion that arrived and proceeded to the 22nd floor had a support team, the distance yet again from the lobby where the second battalion primarily stayed to the position of the initial response team made it difficult for both groups to help one another.

Aside from the distance and the effort it took for the firefighters to reach the 22nd floor, the lighting problem and the weak water pressure, both contributed to the slow response from the firefighters that responded to the incident. Since the fire rapidly spread even before the firefighters came, it reached parts of the building and destroyed the electrical wiring system. Due to the power failure, the firefighters had to use their own emergency light. Upon reaching the 22nd floor, the firefighters could not contain the fire due to weak water pressure preventing or limiting water source from reaching the floor. Due to the incapacity of firefighters to deal with the incident, the fire spread eight floors. The firefighters were only able to contain the fire when it reached the floor that had adequate sprinkler systems involved. The

previous developments in the incident proves the importance of structure design and implementation. Had One Meridian Plaza took precaution and installed complete fire protection systems on all floors of the structure, and assessed facilities to make sure that these would work during a disaster (e. g. working water pressure valves and hose outlets), the firefighters would have contained the fire immediately. The fire weakened when it reached the level with sprinklers but if the other floors had adequate sprinkler systems, then the fire would not have spread to eight floors.

In the case of the One Meridian Plaza highrise fire, management should have played an important role, especially in guiding emergency prevention, or specifically fire prevention system. Firefighters can only do so much that is why they need the help they can get from other people. Furthermore, the responsibility and accountability mostly lay on the owner of the building and perhaps its applications as they should have looked into the structure's fire prevention and protection system regularly. Not all floors have automatic sprinkler systems, which is why the fire spread to eight floors until it reached a floor with automatic sprinklers. Moreover, the water pressure valves did not work efficiently because they were not properly positioned at the time of the fire. What these problems highlight is the importance of structure design and maintenance that not only follows local codes but also considers improvement and full coverage for fire protection and prevention. Delays in the response could also be attributed to man-made error, specifically by the security staff and the alarm company. The engineer chose to investigate first while the alarm company waited for confirmation from the security staff before calling the fire department.

Overall, incident command was a strong point during the fire. After receiving the call, the Philadelphia Fire Department immediately deployed large teams to handle the situation. While teams sought to reach the upper floors, the remaining members of the team communicated with custodians of the building to view building plans. Problems only arose when several impediments prevented firefighters from proceeding to the upper levels immediately to control the fire. Therefore, lessons learned from the One Meridian Plaza incident were directed towards improvement in building structures and the installation and regular maintenance of fire protection systems, which are the responsibilities of highrise owners. Moreover, the incident also contributed to changes in tactics and equipment used by firefighters, specifically the equipment they connect to standpipes. Subsequent regulations addressed this issue to prevent the problems that the firefighters experienced while using the building's standpipes that suppressed water pressure.

References

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