# TerranearPMC Safety Share

## Week of October 30, 2017 – The Grenfell Tower Fire

In the early morning hours one day this past June, a 24-story apartment building in London caught fire resulting in the deaths of an estimated 80 people with another 70 persons severely injured. Persons were so badly burned, that as of late September, a number of the victims still could not be identified.

The apartment building was known as the Grenfell Tower. The fire is reported to have begun on the fourth floor and, according to the most recent information, the blaze started due to an electrical fault in a Hotpoint refrigerator (a fairly new appliance, manufactured between 2006 and 2009). Residence could see the fire in the apartment kitchen (apparently the door was opened) and immediately began knocking on doors to alert others in the building. Fire fighters arrived within six minutes and shortly thereafter, extinguished the fire. When the crew was leaving the building, firefighters outside spotted flames rising up the exterior of the building – and spreading rapidly.

Grenfell Tower was a 24-storey building that was designed in 1967. Like many towers in the UK, Grenfell had a single central staircase. Unlike many other countries, UK regulations do not require a second. Having only one staircase hampered residences for safe evacuation. In 2016, the building underwent major renovations that included the installation of aluminum composite rain screen cladding to improve the appearance of the building. *Cladding* is a protective or insulating layer fixed to the outside of a building. The materials used were aluminum sheets that were fused- bonded to both sides of a polyethylene core.

The fire on the exterior moved upward and to the other side, re-entering the building. Fire crews with self-contained breathing apparatus (SCBA) searched for people trapped in the building – some were able to be carried out. Fire fighters reported thick smoke and zero visibility above the fourth floor. After three hours, the original teams of firefighters were replaced by new crews.

Some residents said no fire alarms was sounded and were only alerted to the fire due to people screaming for help or knocking on doors. However, one resident said they were alerted to the fire by the sound of an alarm and the sight of smoke. Others reported that they survived by ignoring the "stay put" advice given by city council notices, which is a directive instructing residents to remain in their flat in case of fire (in the US, this type of response is referred to as “shelter-in-place”). The emergency services originally repeated the "stay put" advice to residents while the fire was spreading. This instruction was later reversed, but by then it was more difficult to exit the building.

Research by the British news network, BBC, brought up a number of issues that appear to have contributed to the events' devastation. First off, the water pressure from the city supply was insufficient to meet the demands necessary for firefighting equipment to extinguish the fire. This required a call to the local utility company, Thames Water, to increase the pressure. Also, a high ladder did not arrive for 32 minutes, by which time the fire was out of control. Members of the local Fire Brigades Union insisted that this piece of equipment was essential. Prior to the Grenfell Tower fire, it has been estimated that about 70% of fire brigades would have automatically sent a high ladder to tower fires. Since this tragedy, London's official procedure has been changed to ensure a high ladder unit is part of the initial response for fires involving tall structures. Other types of equipment necessary for proper firefighting included the appropriate type of SCBAs as firefighters said their units lacked sufficient extended duration. In addition, it was stated that they had difficulty getting vital radio messages due to overuse of their communication system as many messages were being transmitted over the same channel. At the same time, vital messages were hampered due to the signal's inability to penetrate layers of concrete.

Another factor that caused the fire to spread was that Grenfell Tower did not have a fire sprinkler system. However one city official cited that if a gas riser was leaking or if the cladding was at fault, sprinklers would have had little effect. Meanwhile, an advisor to the Fire Brigades Union said sprinklers would have successfully suppressed the fire, if indeed, the fire was initiated in a kitchen,

Let's review some of the causes and contributing factors that influenced the devastation of this event.

First – it appears the refrigerator may have been susceptible to an electrical short. While this theory is currently under investigation, it appears that the time line of events supports that the fire started with this occurrence. If the investigation bears out that this is the root cause of the fire, the manufacturer will probably will held responsible as inadequate testing was not performed to ensure electrical safety of their product. In addition, with regards to an automatic fire suppression system (i.e. sprinkler system) not being installed, it is true that this type of system would not have been expected to extinguish a fire on the outside cladding; however, these devices are designed to extinguish a fire during an initial, incipient stage, which seems to be the case if, indeed, the electrical fault of the refrigerator was the cause of the fire.

Another important point was the refurbished cladding, as it was not fire-rated or even fire-resistant and therefore, appears to have been a major contributor for the fire to spread rapidly throughout the building.  Also the thermal insulation – polyethylene is known to release toxic gases (carbon monoxide) as a combustion product, which can cause chemical asphyxiation to those exposed.

Next, there was poor emergency preparedness on the part of the city and city's fire department due to a lack of appropriate equipment. This includes, a high ladder (for access to strategic location for extinguishing the fire), and not having adequate breathing apparatus for firefighters. In addition the city water supply lacked the proper pressure for firefighting capabilities. With inadequate water pressure, firefighters were not be able to deliver water to the upper building floors.

Then, according to city regulations, only one staircase was required for multi-story residences, thus not providing alternative routes of escape. This was clearly a poorly designed structure; however, the building was built in the 1960's when many of our current philosophies for disaster preparedness were not developed. Yet, the community instruction for residence to "shelter-in-place" was an incorrect assessment which was reversed, only when it was too late for many of the occupants to evacuate. One more aspect that cannot be overlooked; that is, the overlapping radio communications, which negatively impacted the emergency responders to provide information to the scene incident commander (and vice versa). Today, it is current practice for emergency responders to first ensure channels are open prior to breaking into an existing conversation. If it was necessary to break into an existing conversation, specific protocol should have been established.

While all the facts for the Grenfell Tower disaster are still in the process of finalization, once again, as seems to be the case with such tragedies, a break-down in mitigating steps and preventative measures were overlooked, or even sadly, never initialized.

**Adults are obsolete children -** Dr. Seuss