

# City Talk



The Garley Building fire in 1996.

## FIRE SERVICES HELP TO KEEP US SAFE

This year, we have seen many a building catch fire. The Shuri Temple in Okinawa and the spire of Notre Dame are sad examples of how valuable historic pieces can be destroyed.

Looking back, there have also been huge building fires resulting in loss of lives, such as the Glenfell Tower in London and, here in Hong Kong, the Garley Building in Nathan Road and the Amoyan Industrial Center in Ngau Tau Kok.

Let me try to explain how fire occurs. When objects containing carbon get to high temperatures, they burn as carbon molecules react with oxygen to generate heat energy, sustaining the combustion process.

Some may believe all matter burns at high temperatures, but I hasten to point out metal and earth only melt.

Metals melt at temperatures higher than that of wood fires, and at even high temperatures, earth or rock become lava, as in a volcanic eruption.

The fires we see only involve burning of compounds of carbon, wood and plastics.

So much for the chemical theory of fire, but the point I like to stress is the need for oxygen, or air that contains about a quarter of its contents as oxygen, to sustain a fire.

To put out fires, the most effective way is to cut off the oxygen supply and reduce the temperature. Water is the best agent for doing this, but for petroleum fire, or for objects that need preservation, carbon dioxide or other gases may be used, as water may allow oil or petroleum to spread, causing more damage.

To fight fires, it is important that we do not feed fresh air into the building. Hot air rises and cold air, with its oxygen content, is brought in to support combustion.

Garley Building burned so intensely as the empty lift shafts (the lift cars were removed for renovations at the time) acted like a chimney, drawing fresh air from below. The unfortunate use of helicopters to try to douse the fire inadvertently helped to fan the fire.

For Glenfell Tower, the cladding outside the building was of aluminium sheets with a "sandwich" polyethylene



### Nuts and bolts

Edmund Leung

filling. This material not only supplied carbon for burning, but the space between the building and the cladding formed a chimney effect to channel air to fan the fire.

Likewise, the shape of the tall and narrow tower of Notre Dame allowed fresh air to be drawn into the building to help it burn furiously, as the tall and narrow form of that building created drafts, enhancing the burning process.

Whenever a building fire occurs, occupants must evacuate quickly. That no one died in the fires of the historic buildings was only because they were closed for renovations and no one was in.

Casualties in the other cases were mainly due to occupants failing to leave the site in time, including firemen. Most of these casualties resulted from suffocation. Suffocation can occur in minutes but burning will take a lot longer before it can cause death.

Thanks to the Fire Services Department, in most of our commercial buildings, where a lot of people may gather, the installation of water sprinklers is mandatory. This, together with the stringent requirements of limiting the amount of inflammable materials allowed in buildings, helps to prevent any fire propagating.

With modern fire engineering practice, limiting large atriums into manageable compartments, forming smoke traps in ceilings, together with many other safety features, ensure that all commercial buildings can provide safe occupation. Finally, we seldom use wood or other combustible materials in our building structures.

We should be grateful for the good work of our Fire Services Department, protecting our lives and our valuable properties effectively by preventing and fighting fires in our congested city.

**Veteran engineer Edmund Leung Kwong-ho casts an expert eye over Hong Kong's iconic infrastructure**