Issue 010 - Smoke Travel Between Tenancies
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Fire Research & Investigation Unit

Heads Up

BACKGROUND

A deliberately lit fire in an Auckland retail business resulted in a multi-million dollar loss to other tenancies sharing the building. Smoke damage had serious consequences to neighbouring businesses even though they received no actual flame damage.

The building was a two story structure of approximately 1600m². It had concrete walls and concrete supporting structural elements that divided 2 tenancies on the ground floor and 3 tenancies on the first floor. It appeared that the building was built as two separate fire cells (ground and first floor levels) and divided into tenancies with light non fire rated internal walls. The building had a glass frontage the full height of both levels.

There was no separation in the ceiling area between tenancies due to this area being used to circulate air as an active part of a plenum air-conditioning system. A plenum system uses the ceiling space to commute air flow rather than ducting.

The building was fitted with hose reels and an unmonitored alarm with call points and heat detection.

INCIDENT DETAILS

At around 12.50am one morning the Fire Service received a 111 call to a fire in the retail emporium that occupied one of the building tenancies. Witnesses reported seeing youths running away from the scene and a later investigation identified multiple seats of fire in the emporium and determined that the fire had been deliberately lit.

The first Fire Service appliance arrived just over 5 minutes after being alerted and extinguished the fire using a combination of hose reels and a foam branch.

Fire damage was limited to the ground floor retail business that represented the room of fire origin, however smoke spread to other tenancies in the building.

The worst effected was the other ground floor tenancy which was a Medical Centre with expensive electronic equipment.

Emporium involved in fire occupied ground floor along with Medical Centre.

FURTHER INFORMATION

Records indicate that this building was built and consented prior to 1986, it is acknowledged that the building requirements and standards were quite different to the present day at that time.

While it could be questioned if it completely met the standards even when it was constructed, what is important to note was that its use at the time of the fire was not inline with that for which it had been consented.

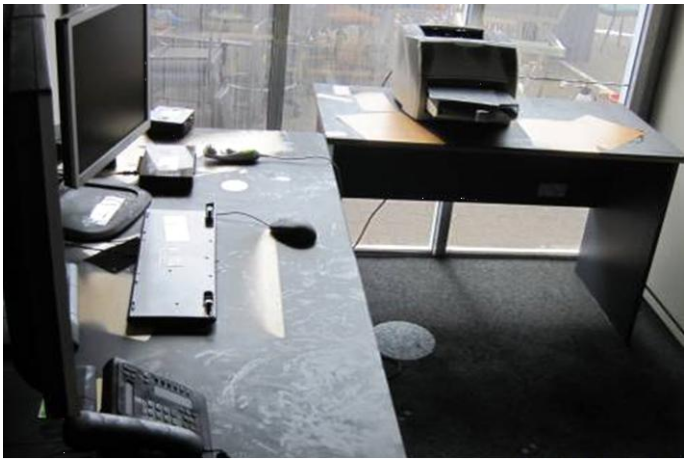
Had the change of use of this building been handled and notified correctly it is possible that it would have had to be upgraded to a level of passive and active fire protection consistent with modern day standards.

While there was the potential for flame spread beyond the tenancy of origin in this fire, that was avoided due to early detection by a passer by and intervention by the Fire Service.

Smoke travel was not however controlled and this alone did considerable damage in the neighbouring tenancy making this a high loss multi-million dollar fire.

While there was some smoke travel through air conditioning extraction grills and other small openings, the main avenue of smoke travel was through fluorescent light units. These units had two slots open directly between the ceiling void and tenancy spaces for ventilation purposes during normal use. As there was no separation between tenancies in the ceiling space smoke was able to travel freely from one to the other.

Due to the temperature differences, 200-300°C for the smoke layer and only 4°C to 6°C in the neighbouring tenancy, as the smoke entered the cold atmosphere it immediately lost its buoyancy and travelled down vertically leaving thick deposits on all horizontal surfaces. This resulted in extensive damage to critical health monitoring and screening equipment in the Medical Centre.



Example of smoke damage in neighbouring tenancy.

Fluorescent light units and other openings allowing smoke travel.

LESSONS LEARNED/RECOMMENDATIONS

The fire detailed in this document provides robust evidence to support the following recommendations:

- Procedures for seeking consent for change of use of buildings should be followed as this may trigger the requirement to upgrade buildings to meet modern day building standards.
- While not mandatory, regular reviews and recommendations of specific improvements due to age, lack of protection systems, or obsolete technology in buildings will help reduce fire risk and avoid potential significant business interruption.
- Owners and insurers should be made aware of the possible implications of not having suitable construction to limit smoke and fire spread between tenancies.
- Legislative change should be considered making it a requirement that there should be protection against smoke and fire spread between tenancies within a building.

INFORMATION SOURCE

Post Incident Analysis Report & Fire Investigation Report - F0741178