Issue 14 - Building Paper Underlay in Warehouse Buildings

Released 3 April 2012

Fire Research & Investigation Unit

Heads Up

BACKGROUND

A deliberately lit fire was started against the external wall of a large warehouse which quickly spread to the internal surface linings of the building travelling up the wall and across the ceiling. Flaming pieces of building paper began to drop down onto stock below starting multiple fires within the building.

The multiple fires grew quickly and had the potential to overwhelm the sprinkler system.

The post fire investigation examined why the fire spread so quickly when it involved building products that should have been fire retardant.

Above: the rapid fire spread was promoted by flammable surface linings

INCIDENT DETAILS

For buildings of this nature, the Compliance Document for the NZ Building Code (C/AS1) requires that '*underlay to exterior cladding or roofing when exposed to view in occupied spaces*' is to be fire retardant[1] (not supporting a flame). For a sprinklered building this applies to ceiling linings only.

These underlays typically have a silver foil surface on one side and a white light reflecting surface on the other side. Once installed, building lining papers are not easily distinguishable between those that are fire retardant and those that freely support fire as they are not required to be marked or labelled. It is likely that builders and compliance officers would be unable to determine by visual inspection whether a product is flammable or if it meets the Flammability Index (FI) requirements of C/AS1 Table 6.2.

Above: visual comparison of products with a C/AS1 compliant product on the right hand side of each photo.

[1] C/AS1table 6.2 Flammability index ≤ 5 when tested to part 2 of NZS 1530 part 2.

Tests of surface linings

Samples of the lining material were taken from the fire scene for further examination and were found to promote the spread of flame when tested in a manner similar to part of the test required by C/AS1: NZS 1530.2:1993 – Methods for fire tests on building materials, components and structures.

	5 Secs	52 Secs	67 Secs
Sample of Product Installed			
	10 Secs	**14 Secs**	**18 Secs**
Compliant Product Sample			

<u>Test 1 - product sample taken from building</u>

The sample (535 x 75 mm) was subjected to a small ignition source and the speed of flame spread was measured in seconds.

Flame quickly spread the full length of the sample. Flaming material can be seen on the final photo falling from the sample as occurred in the building fire.

<u>Test 2 -sample of C/AS1 compliant material</u>

A compliant material (having a FI value < 5) was subject to the same test as above and briefly ignited with a small flame (<100 mm) before self-extinguishing within 18 seconds. The material stayed intact.

LESSONS LEARNED/RECOMMENDATIONS

The installation of incorrect interior surface linings can, in the event of a fire, cause significant financial loss to building owners and business interruption for occupants.

Advice to manufacturers/suppliers - it would be helpful to builders and certifiers if product identification could be discretely marked (e.g. on leading edges) for easy identification of the product.

Advice to builders and compliance officers - ensure the product being used for linings is fire retardant as specified in the building consent documents.

Advice to building owners - to avoid potential loss and to protect business continuity, owners should ensure their building's interior surface linings meet the requirements of the Building Code. A simple indicative test can be to remove a small strip sample of surface lining (e.g. 500 mm x 50 mm) to a safe place and apply a small flame while the sample is held vertically. A product that meets the current code requirements (has a FI value less than 5) should not allow a flame to spread more than 100 mm upwards from the bottom edge within 160 seconds.

INFORMATION SOURCES

C/AS1, New Zealand Fire Service Post Incident Analysis Report & Fire Investigation Report - F1088022