



Fire-stopping mortar failure causes fatal fall

INCIDENT

A fire alarm technician died from head injuries after falling 10 metres when a section of a floor he was walking on collapsed under him. The section of floor that collapsed was made from a fire-stopping mortar.

CIRCUMSTANCES

The technician was working in a plant room on the second level of a multi-storey commercial building under construction.

A space had been boxed out in the floor of the plant room when the slab was poured to accommodate the HVAC (Heating, Ventilation and Air Conditioning) ducting between the floors. The HVAC design was changed and as a result a 1m x 0.5m section was not filled with ducting as planned. Access to the plant room was mainly across this space in the floor, and drawings for the plant room showed this gap was fire-proofed and covered by a metal walkway.

Fire-stopping mortar had been previously poured into the gap and it was isolated by barriers and unsecured covers. These were removed to allow HVAC risers to be installed, and from then on the gap in the floor was no longer isolated.

At times, loose planks were placed over it by contractors working in the plant room, but on other occasions, including the day of the incident, the mortar was uncovered and was walked over by a number of contractors.

In the dimly-lit conditions of the plant room, the mortar looked like standard concrete flooring. The permanent metal walkway referred to in the plant room drawings was never installed.

Immediately before the incident, a ladder was set up on the mortar by another contractor and used to access the top of the ducts. The technician moved the ladder, then stepped onto the mortar. It failed to hold him and he fell 10 metres to the concrete floor below. He died at the scene.

INVESTIGATION

The investigation found that the mortar was neither reinforced nor mechanically keyed into the surrounding floor slab. The mortar did not meet the load-bearing requirements for flooring set out in the *New Zealand Building Code*, and the mortar also had a high moisture content, which meant it was not performing to its specified strength.

The investigation also found that the designers, contractors, installers and principals on the site had differing views about the expected structural performance

of the mortar and the ongoing need to prevent any load being put on it.

The Department's investigation also found that fire mortar has been widely used in the building industry for fire-stopping holes in floors, but has not been routinely isolated when installed.

GUIDANCE

When a product is used to fill a hole in a floor that is large enough to present a risk of harm to people, the product must meet the loads detailed in the *New Zealand Building Code*. Expert advice should be sought to determine this. Any statements about the structural performance of a product should be verifiable. Information from suppliers should reference AS/NZS 1170.1:2002 *Structural design actions – Permanent, imposed and other actions*.

The design for the installation of a product in these circumstances should be reviewed by a competent person such as a chartered professional engineer. The installation should be monitored and tested in accordance with the product's specifications.

If a product installed to fill a gap in a floor does not meet the Building Code's load bearing requirements, it should be permanently isolated. The need for isolating a part of the floor must be clearly communicated between designers, contractors and principals and the methods of isolation coordinated between all parties.

Any isolating covers should be fixed so they cannot be removed without ensuring other controls to prevent access are in place during their removal. It is recommended that permanent isolation is put in place at the earliest practicable stage.

These fire mortar products are typically, but not exclusively, found around hydraulic risers and HVAC ducting in floor penetrations in other New Zealand buildings.

Building managers and owners should seek expert advice to assess whether any mortar currently being used is suitable for load bearing. It must be isolated if there is any doubt, because the product may have the appearance of a concrete floor.

Special care needs to be taken during demolition or renovations of buildings as areas where the product is installed may have been permanently "walled in" at construction and will only be exposed to workers when those walls are removed.

It is important to remember that this product is part of the passive fire control system in a building and that the integrity of that system needs to be maintained for fire safety.



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The New Zealand Building Code can be accessed from the Department of Building and Housing's website:

www.building.dbh.govt.nz/blc-building-code-and-review

Standards can be purchased from Standards New Zealand's website: www.standards.co.nz

WHICH INDUSTRIES/SECTORS OR MATTERS WILL THIS INFORMATION BE RELEVANT TO?

Construction companies, HVAC, mechanical services and fire protection installers, demolition contractors, property managers, building managers and building owners.

Note: This material has been prepared using the best information available to the Department of Labour at the time of publication. Information may change over time and it may be necessary for you to obtain an update. This material is also only intended to provide general advice and does not constitute legal advice. You should make your own judgement about action you may need to take to ensure you have complied with your workplace health and safety obligations under the law.

