MINZ
Mould Inspections NZ

ASSESSOR REPORT

Client name:	Tel:
Site address:	Email:
Date:	Job Ref:

This was a non-invasive inspection undertaken on 09/11/17. The objective was to assess the mould infested timber and underlay in the roof void in an attempt to identify the source.

The property is approximately two years old. The specification consists of timber frames and trusses over a concrete floor slab. The wall cladding consists of a brick exterior with a drained cavity and roof cladding of corrugated steel.

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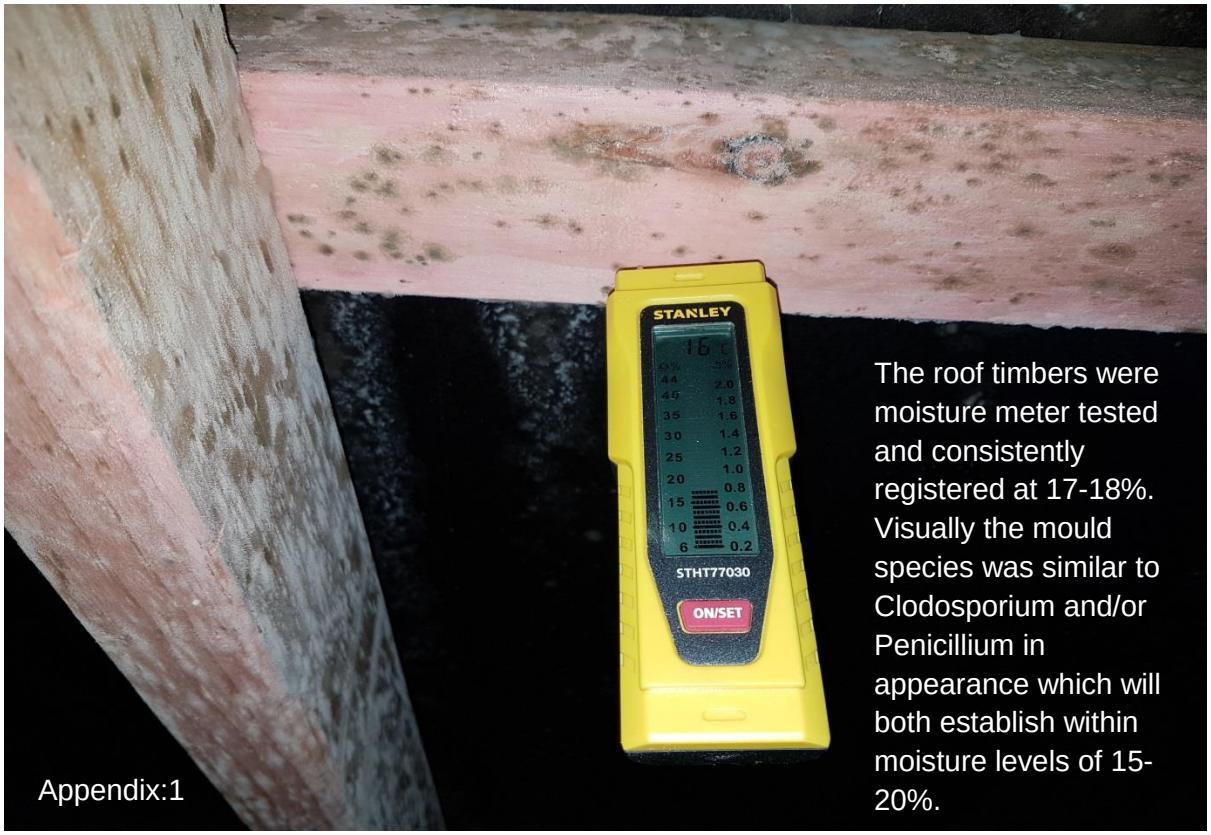

The roof timbers were moisture meter tested and consistently registered at 17-18%. Visually the mould species was similar to Clodosporium and/or Penicillium in appearance which will both establish within moisture levels of 15-20%.

Appendix:1

Appendix:2

It was noted that the insulation was in regular contact with the roofing paper/membrane. This can lead to mould growth when subject to condensation during colder months

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Appendix:3

In an unventilated roof void, moisture becomes trapped between the roof purlins and the roofing paper/membrane. This image clearly illustrated the contact of the membrane to the underside of the cladding trough resulting in mould growth.

Appendix:4

The roof apex showed a marginally higher humidity/ moisture reading due to being the highest point. This humidity/ moisture becomes trapped in a roof void without eaves or ridge ventilation.

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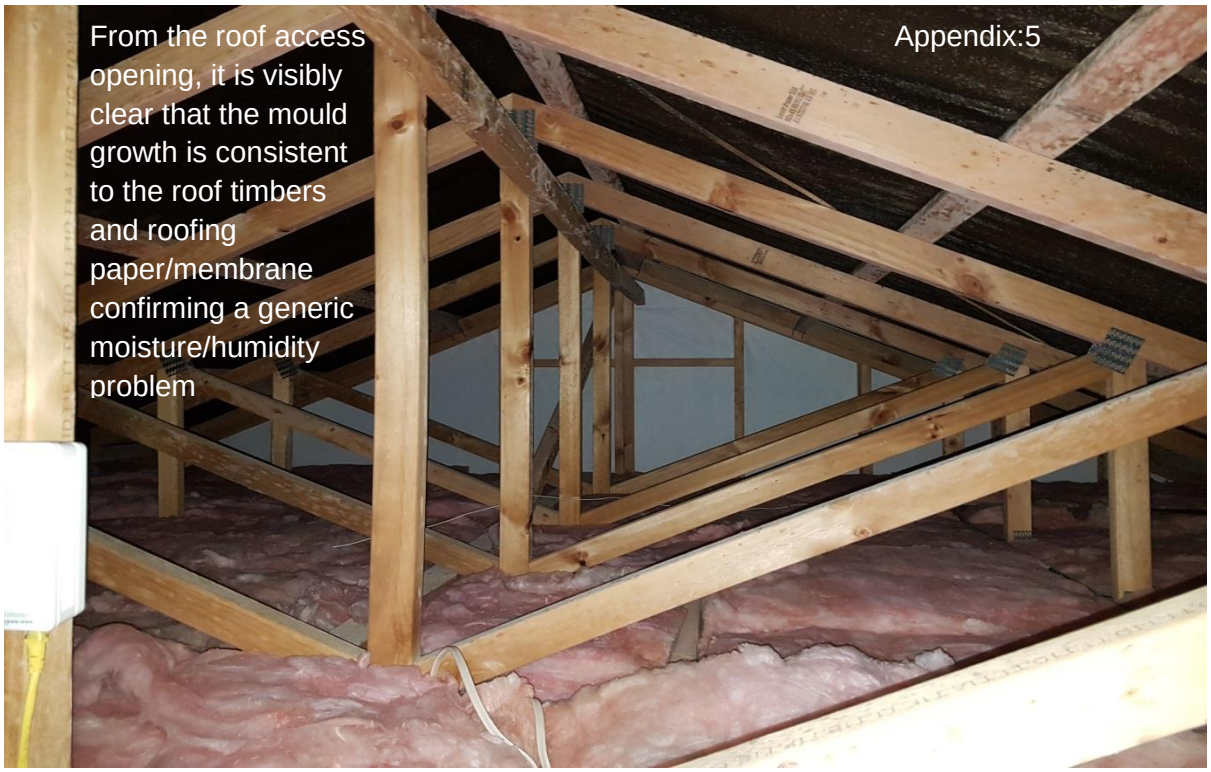

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Mould Species - Cladosporium and Penicillium will establish in similar circumstances to this on timber with a moisture reading of 15-20% which explains the abundant growth.

*"**Superficial fungi: Penicillium** species are common environmental isolates and are often found on damp building materials. These fungi may contribute to high spore levels in the air resulting in allergenic reactions in sensitive people, and many of the species may cause infections in immunocompromised individuals.*

***Cladosporium** species are common air-borne contaminants particularly in outdoor air. They are commonly found on outdoor claddings, particularly timber and will also grow superficially on indoor surfaces that have a moisture level between 15 and 20%, often in response to slightly elevated moisture levels such as condensation.*
The main effect of the fungus is disfigurement of the surface that the fungus is growing on. Mycotoxin production is generally not associated with this species but the ability to sporulate heavily and have buoyant easily dispersed spores makes this an important fungal airway allergen."

Summary - This is an alarmingly common problem within 'Cold roof' designs in NZ and we receive reports of mould in similar specification properties on a weekly basis. All mould related works are dealt with total confidentiality so we cannot provide names but we can safely state that there many major 'Group Housing' companies who are experiencing similar/identical generic problems.

The NZ Code of Practice was changed back in December 2014 to permit ventilation to roof voids. However, due to the change being optional instead of mandatory, it has been intentionally overlooked by most, predominantly for cost reasons. The reality is that this property will cost more to decontaminate the mould than it would have to install continuous and calculated roof ventilation.

An average 180m2 house similar to this will incorporate around 1000 litres of water within the concrete floor slab. There will be an additional 250 litres of paint along with the wet trades (tiling and Gib-stopping). In the case of a winter build, you can also presume that the frames will become saturated prior to being wrapped up. Once sealed, the combined moisture/humidity in an unventilated roof void will become trapped with no escape. Depending on the season, it can take 4-6 months for the slab to totally dry out. Meanwhile the new tenants have moved in creating additional moisture/humidity from everyday living which all rises into the 'weathertight' roof void. This moisture/humidity is created by heating, washing appliances, tumble driers, showers, baths, cooking, exercising and simply breathing.

With highly elevated moisture/humidity trapped within the roof void, condensation will occur during cooler temperatures. Condensation will appear on the underside of the roofing membrane and a) soak into the roof timber structure causing mould growth and b) run down the roof until it makes contact with the insulation at eaves level. This moisture can then filter through the insulation and settle on the ceiling Gib below. Because there is no vapour membrane requirement in NZ at ceiling level (Unlike Canada, USA, UK and most of Europe), mould can form around the perimeter of the property and filter into the living environment through the ceiling.

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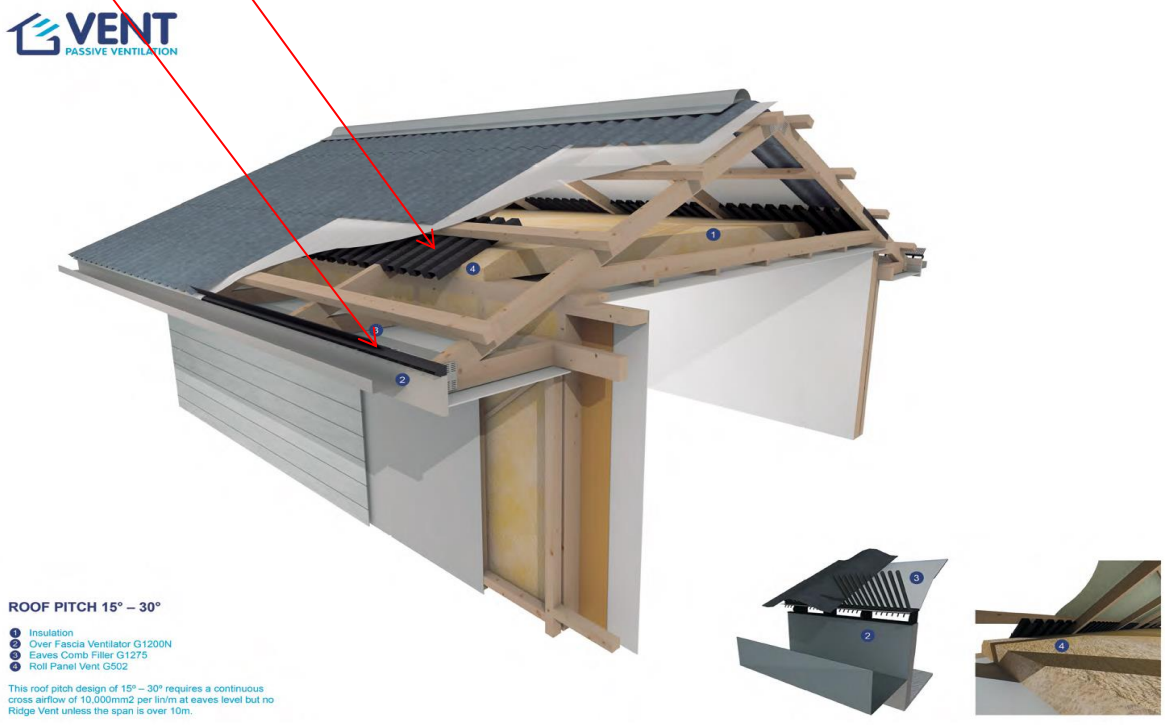
As per Appendix:2, it was noted that the building regulation requirement of a continuous 25mm gap between the insulation and underside of the roofing membrane has not been observed. There is continuous contact making a clear pathway for condensation to soak into the insulation as described above. This is a common error which is largely overlooked by building inspectors. This is largely due to a pre-line inspection being observed from below the ceiling/roof insulation where the contact is not visible. Additionally, the installation is signed-off by the installer making it of no liable concern to the local authority.

What can we do about this generic and national problem? There are products available on the market which are both affordable and easy to install. They are designed specifically to resolve the problems described above so it is just a case of incorporating them into the standard roof design. There are products which can provide a calculated and continuous airflow to every roof design which is recommended worldwide. These products are not visible once installed and will prevent ingress of nesting insects (bees and wasps). They are also incorporated outside the thermal envelope meaning there is no associated heat loss.

Below is a similar 'Cold roof' scenario to 116 Kennedy Rd. A roof pitch of 15-30 degrees only requires 2 ventilation products, a G1200N 'Over Fascia Vent' and a G502 Roll Rafter Tray.

- **G502 'Roll Rafter Tray'** – This is required to ensure a) there is a moisture barrier between the insulation and underside of the roofing membrane and b) it also provides unrestricted airflow into the roof void past the insulation at eaves which is commonly blocked as in this case.

- **1200N 'Over Fascia Vent'** – This product runs along the top of the fascia and allows a continuous airflow of 10,000mm2/m2 (10mm) around the perimeter of the roof.



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The total product RRP is only $905.00 +gst for this property with approximately 1hr labour time for fixing. Compared to a total build cost of $250-$300k, it is a barely noticeable investment considering the scale of the problem it is eliminating, not only to the structural integrity of the building but the associated health issues too.

The answers and products are out there and we should be ventilating all roofs as do the rest of the civilised world where roof condensation & associated mould has been under control since the nineties.

Tim Dorrington

Technical Manager

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