INFORMATION SHEET

DURABILITY

NZ WOOD
For a better world

HAZARDS: INSECTS, FUNGAL DECAY, OTHER FUNGI, BACTERIA, CHEMICAL AND PHYSICAL HAZARDS

BIOLOGICAL HAZARDS

Insects

Wood boring insects (and to a lesser extent, termites) are a potential hazard to dry wood in New Zealand buildings. *Anobium punctatum* (Furniture beetle) has been identified as the principal hazard to interior finishing timbers and framing.

When radiata pine was accepted as timber framing in the mid 1950's, the preservative treatment was exclusively to combat the potential risk of wood borer.

From the 1990's untreated machined stress grade high temperature dried radiata pine was also accepted as an alternative, since it had been shown that machine gauged, high temperature kiln dried radiata pine was much less susceptible to borer attack than rough sawn, air dried framing. It was also accepted that the susceptibility of untreated radiata pine to Anobium attack had been somewhat overstated in the past.

More recently and as a consequence of the 'leaky building crisis', timber framing is now more likely to have had a preservative treatment to reduce the risk of decay if leaks in the building envelope occur, although untreated framing is still acceptable for some limited applications and building designs such as single storey brick veneer houses with a wall cavity and build with eaves.

Fungal decay

Until recently, fungal decay of timber building components in New Zealand was not considered to be a significant biological hazard. It was mainly confined to occasional incidences of dry rot (*Serpula lacrymans* - the true dry rot fungus), or decay of poorly maintained exterior cladding, or decay of native timbers used in poorly ventilated sub-floor situations. Since the "leaky building crisis", decay has become the main perceived biological hazard for framing although the timber is required in-service to have a moisture content of < 20% which is too low for the fungal decay.

Two broad types of decay are relevant to timber in buildings, brown rots and white rots. The main distinction is that brown-rotted wood is usually various shades of orange or orange brown to dark brown and the dried decayed wood has extensive cuboidal cracks.

White rots produce a white/cream fibrous decay and are less common in softwoods than hardwoods. Brown rots are a threat when the wood moisture content exceeds 25-30 % for lengthy periods of time.

White rots prefer a somewhat higher moisture content. True dry rot (the term is often misused) is relatively rare, but the fungus has the ability, once established, to attack wood with moisture contents below 25%. It thrives in alkaline conditions, e.g. when wood is in close proximity to cement-based products (concrete blocks, mortar etc).

When conditions are particularly wet – wood moisture contents in excess of 60% - soft rot decay may occur. This type of decay appears initially as a gradual erosion of the wood from the outside, characterised by grey/black discolouration, particularly of the late wood (the dense rings) in softwood timber. When the decay becomes advanced, the wood substance becomes quite brittle and the dried wood surface develops fine cuboidal cracks.

Other fungi

Mould fungi frequently colonise the surface of damp wood, whether preservative treated or not. White, pink, orange, green and black moulds may be encountered, the colour being that of the mycelium and spores which the fungus produces. Although they have negligible effect on wood strength, several moulds pose a serious health hazard when in a closed or poorly ventilated envrionment.

Timber treatment will not relieve this potential risk and it is critical that building design and construction provide for adequate ventilation where moisture may be encountered. Perhaps the most serious is *Stachybotrys ata*, which can produce highly toxic spores. It preferentially grows on damp wood fibre products (building paper, fibre-cement building components), rather than solid wood.

Sapstain is not a health or strength issue but it is often present when timber has not been seasoned or dried properly. It occurs as blue-black discolorations which may penetrate deeply into the wood. Like moulds, this group of fungi have negligible effect on wood strength, although under appropriate, wet conditions, some can develop as soft rot.

Bacteria

In the last 20 years there have been different types of bacterial degrade patterns documented. As with soft rot, this type of degrade tends to be associated with timber with a high moisture content that is in ground contact or even immersed in water, e.g. water cooling tower slats.

CHEMICAL HAZARDS

Most timber species exposed to strong acids and alkalis will be detrimentally affected. A notable exception is redwood *(Sequoia sempervirens)*. Strong acids and alkalis result in separation of wood fibres or changes to the wood structure with an effect similar to chemical pulping.

The contact of some preservative treated wood with iron fastenings such as screw spikes with CCA-treated railway sleepers (cross-ties) are an example of chemical degradation. This is referred to as ‘iron rot’.

Some timber species may also be discoloured by reaction between naturally occurring timber tannins and metals, e.g. uncoated nails.

PHYSICAL HAZARDS

Some timbers, such as pine species, of low to medium density are ‘soft’ and are susceptible to physical abrasion which will wear away timber surfaces. Species that are more dense are better suited to applications such as flooring where weighty objects or the heels of shoes will not leave imprints on the timber surface.

Exposure of timber surfaces to sunlight (UV rays) can lead to bleaching, yellowing and roughness of timber surfaces. The UV rays alter the cell structure in the surface wood cells. Western red cedar is commonly used as a cladding material and over time will grey and develop surface checking.

Prolonged wetting and drying cycles (swelling and shrinkage) of wood will also lead to deformation of wood which is seen as warping (twist and bow), splitting and cracking (checking) of timber. Different timber species or products may be more resistant to moisture and therefore appear to be more dimensionally stable.

The failure of paint coatings or films may also allow moisture ingress into wood and open wood joints as timber takes up moisture and swells. The maintenance and renewal of paint coatings is important and can significantly affect the overall long-term performance of a wood product in service.