

# PROTECTION OF WOOD

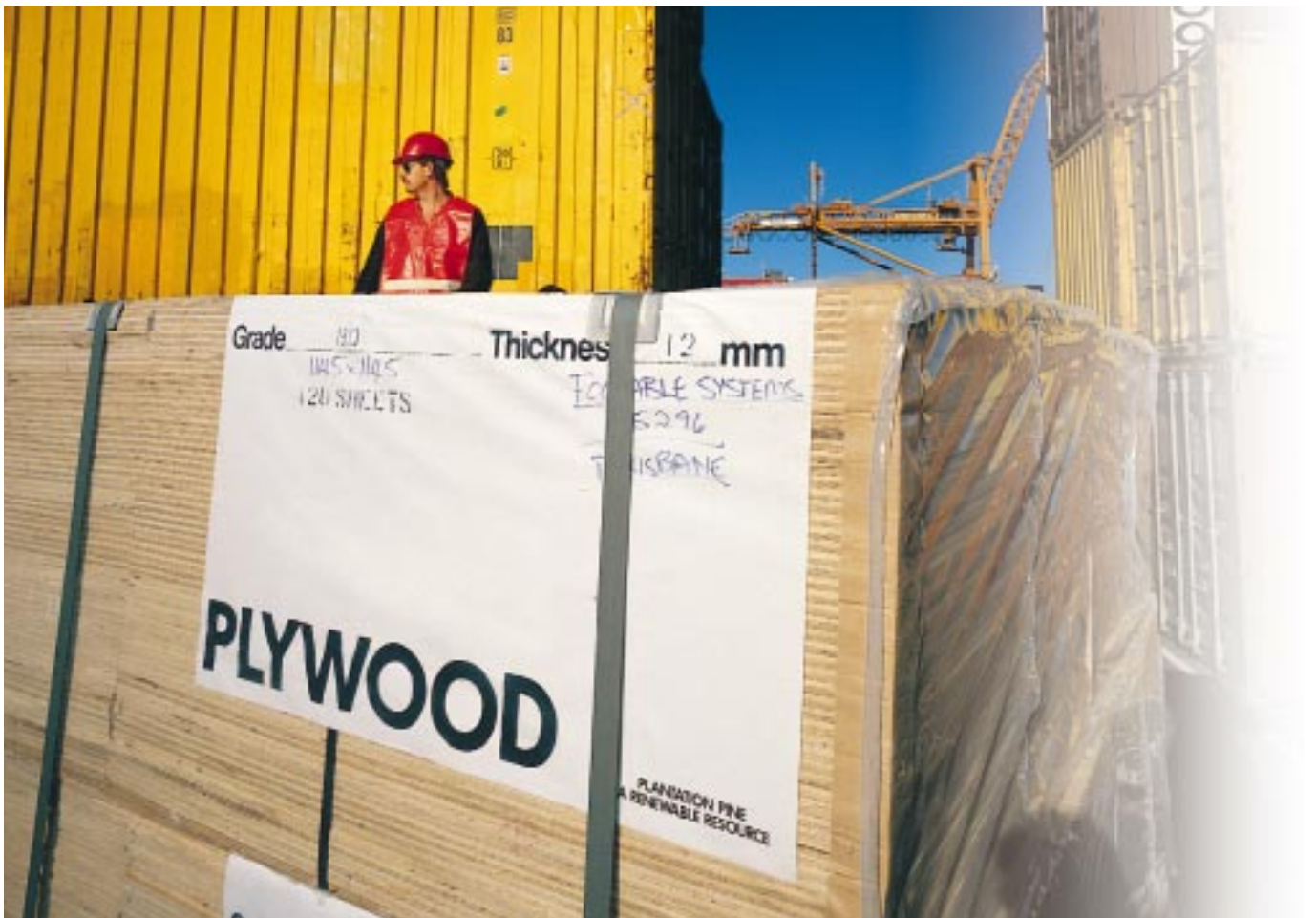
Freshly cut sapwood is particularly vulnerable to attack as its high moisture content (60% to 200%) and available supply of simple nutrients provide an excellent substrate for fungal growth. Wood species vary in susceptibility to fungal attack; New Zealand pine is less susceptible than rubberwood, but more susceptible than Douglas fir.

Chemical or physical control regimes can be used to prevent attack. Chemical control (commonly known as “anti-sapstain treatment”) involves application of fungicides to the surface of wood. There are two methods of physical control: kiln drying sawn lumber or ponding logs to keep moisture content above a level at which fungi can develop (the same effect can be achieved by sprinkling water on to logs). Kiln drying

has the significant advantage that once wood is dry, (provided correct handling practice is observed to prevent re-wetting,) sapstain and other fungal attack is permanently prevented. Ponding logs is a temporary control measure since sapstain will occur if wood is allowed to dry out. Antisapstain fungicides only provide temporary protection.

The choice of treatment depends primarily on market requirements. If a guarantee of sapstain-free wood is demanded, and strict control of the time it takes to get the lumber to the customer cannot be achieved, then kiln drying is the only satisfactory method of control. Chemical control can be very reliable if lumber is delivered to the customer within an appropriate time frame. The maximum period that sapstain can be prevented

*Plastic wrapping to protect dry plywood or lumber*



depends on a number of factors, such as climate and handling practices, and individual cases may require expert advice at the time. In general for sawn lumber the maximum period that protection can be achieved is 4 months and for logs it is 3 months.

Effective control of sapstain depends not only on correct handling after treatment but on rapid processing before treatment. When conditions for establishment of sapstain are optimal it is necessary to process the logs within 1-3 days. It is critical that anti-sapstain chemical is applied as soon as a fresh log is debarked or when lumber is cut from logs. There is no point in treating wood which is already infected as that will not prevent further fungal growth.

## FUNGAL DEGRADE ORGANISMS

Whilst sapstain is usually the most commonly recognised type of attack there are other types of fungal degrade that it is necessary to control.

- **Sapstain** develops after wind-borne or insect-borne spores have germinated on the wood surface. The developing fungus in the form of fine threads penetrates the entire sapwood. When these threads are in large numbers, they give a blue-black coloration to the wood, most often seen as wedge-shaped bands on the cross-cut ends of logs and sawn lumber. Sapstain has very little effect on strength properties.

*Sapstain, mould, and decay*

*fungi can cause serious*

*financial losses in forest-*

*based industries.*

*This large and diverse*

*group of fungi can infect*

*freshly felled logs and*

*sawn lumber which,*

*unless protected, often*

*have to be downgraded.*



## PROTECTION OF LOGS

If logs are to be protected against fungal degrade, they should be peeled and treated against fungal degrade within 1-3 days of the trees being felled. Even with careful anti-sapstain application and log handling, protection is not long-term – generally not more than 3 months. Therefore, it is important to get logs to the sawmill, and to process them, as promptly as possible. This is particularly true for imported logs, which will have been in transit for some time. Further storage should be avoided since any delays could cause a loss of wood quality. After 6 months from felling it is unlikely that any unblemished lumber will be produced.

# PROTECTION OF WOOD

**Mould** fungi also penetrate wood but with colourless fungal threads. Masses of coloured spores are produced on the wood surface without discolouring the wood itself. Blue, green, pink, yellow, and black are common colours. The spores can often just be brushed or planed off.

- **Decay** fungi can be difficult to recognise, but usually appear on sawn lumber as white strand-like or fan-shaped structures. In early stages, decayed wood is often discoloured orange-brown. As decay proceeds there is substantial loss of wood strength and drying becomes increasingly difficult.



## PROTECTION OF SAWN LUMBER

### Kiln Drying

If lumber is kiln dried and handled to prevent re-wetting, it can be stored indefinitely without risk of fungal attack. When sapstain-free lumber is demanded and delivery to the customer within 4 months of felling cannot be guaranteed, kiln drying is the only satisfactory method of processing.

### Antisapstain treatment

Sawn lumber must be cut from uninfected logs if anti-sapstain treatment is to be successful. Because machined lumber is less absorbent than sawn lumber, concentrations of anti-sapstain treatments must be higher for machined lumber than for sawn lumber.

Most anti-sapstain formulations are used as suspensions or emulsions rather than true solutions. As such, they are prone to settling at the bottom of dip tanks, absorption on to sawdust if this is present in excessive amounts, or on to other contaminating material in baths. It is, therefore, essential that baths be regularly agitated, kept free of extraneous materials, and have excessive sawdust removed at frequent intervals.

Protection time will be reduced during warm, wet, or humid conditions. Under such circumstances, the chemical concentrations should be increased two-fold in order to achieve acceptable protection.

### Application Methods

- **Sorting-chain dipping**  
Sawn lumber passes through a bath containing the chemical immediately before sorting. The advantage of this procedure is that boards pass through the bath singly, so even coverage of chemical on each board is readily achieved.
- **Tank dipping**  
Sawn lumber is first sorted into packets and the complete packet is immersed in the chemical. The main advantage is that there is no handling of wet boards.
- **Spraying**  
In the past, spraying systems have not been commonly used because of difficulties in maintaining even coverage of the chemical over the target, settling of suspensions in piping, and clogging due to accumulation of sawdust in piping.  
New systems with low volume spray applications have been designed to overcome these problems.