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The role of glycerol in addressing surface checking

Summary

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by

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EXECUTIVE SUMMARY

Objective

The objective of this project was to investigate the impact of glycerol application, during the early stages of drying, on reducing the incidence of surface checks in Australian hardwood timbers.

Key Results

The project showed that for four out of the five species investigated, surfacing checking was reduced by well over 10% by the application of glycerol in the early stages of drying. The glycerol had generally penetrated into the timber to a depth of between 1-3 mm at the end of drying and conditioning. This outer glycerol penetrated layer of timber will most likely be machined off during final dimensioning

The glycerol application appeared to alter both the shrinkage properties, and the surface hygroscopic properties of the treated boards. The changes to shrinkage and hygroscopic properties will affect both timber processing and behaviour in-service. The reduction in shrinkage would lead to reduced losses of timber through over-cutting green wood to produce a desired finished size, and in-use, boards will take up and lose moisture more readily.

Surface checks that developed in the glycerol treated timber appeared to be narrow and shallow with widths of approximately 1 mm and depths of 3 mm. Surface checks in untreated timber were generally longer (50 - 100 mm) and deeper (approximately 20 mm). The shallower surface checks on the glycerol treated boards may well be machined off during final dimensioning of products. Post steaming the timber was machined to a given thickness and a reassessment of surface checking indicated that the effect of the glycerol treatment was only evident in messmate. The low check levels observed in the tested boards were most likely due to the gentle drying conditions used in this trial.

Grading boards to AS2796 did not indicate a marked reduction in surface checking of glycerol treated material among the species as surface checking was the grade limiting defect in only one board out of 140. However in messmate, the average aggregate check length reduction from 280 to 50 mm and 580 to 260 mm from inner (pith) and outer (sap) faces respectively was significant. For the same species, the total average number of clear pieces greater than 30 cm on the best face was 14% higher for the treated material; for all the boards, the glycerol treatment produced a greater number of 30 cm long pieces. Some improvements were also obtained in treated boards of spotted gum, but the differences were not statistically significant.

A single coating of green wood with glycerol may lead to some reduction of surface checking that could benefit producers lacking highly controlled processing facilities particularly during the summer months.

The effective application of glycerol in the timber drying process could conservatively add between $5 million and $28 million worth of value per annum to the Australian hardwood timber industry. It is not possible to produce more accurate figures, at this time, as the impact surface checking on product value has not been quantified.

Application of results

This project has only shown the **potential** of glycerol, an innocuous chemical, to reduce surface checking in Australian hardwood timbers. For the first time south-east Australian hardwood processors can backsaw messmate with some confidence, as glycerol has been shown to be effective in reducing surface checking, the main source of downgrade for backsawn boards.

Further Work

Effective, commercial application of glycerol prior to drying Australian hardwood timber requires more extensive work:

- It is suggested that this work be undertaken using a single species (messmate) to determine the best practical outcome;
- A system to apply pure glycerol industrially needs to be developed;
- Alternatively the efficacy of diluted glycerol in reducing surface checking should be investigated. A system to apply diluted glycerol with its reduced viscosity is likely to be much more readily available;
- The efficacy of a 'one-off' application of glycerol for reducing surface checking of backsawn species should be more thoroughly investigated under harsh drying conditions. This was an unexpected result from the project but the ease of application by dipping is commercially attractive;
- More sophisticated profit-functions should be developed to calculate costs and gains in product value from different drying options and glycerol treatments.