

FLNRO Process Specification for CCA Treatment of Coastal Douglas-fir Wood

An evaluation of results - Brian Chow, Chief Engineer, MEng., PEng

The ministry specification for preservative treatment of Douglas-fir was developed upon a realization that simply referencing the Canadian Standards Association (CSA 080) standard for Wood Preservation was inadequate to address timber treatment requirements for bridge timbers. Upon review, it was evident that suppliers had not been adhering to conforming to CSA 080 and there were no checks in place to ensure conformance for treated wood.

Standards for ministry timber treatment options were reviewed and it was determined to establish a standard specifying Chromated Copper Arsenate (CCA) for bridge timbers. This decision hinged on the efficacy as well as the broad availability of treatment facilities and environmental acceptability of the product for non-residential uses province wide.

Douglas-fir is the species of choice for bridge applications due to its superior structural characteristics. Douglas-fir is specified in ministry standards for cross-ties for timber deck bridges. However, experts advised that Douglas-fir does not treat well with Chromated Copper Arsenate (CCA), and that the specified penetration to meet CSA 080 is extremely difficult if not impossible to achieve.

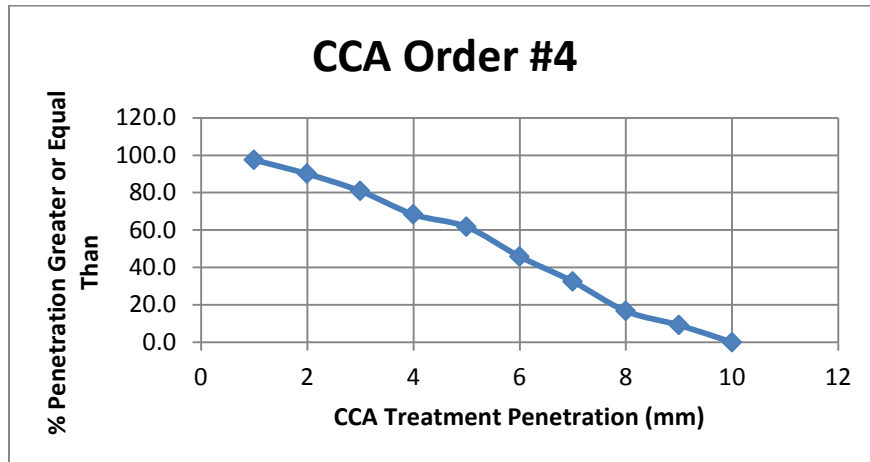
Experts in the timber treatment industry were engaged, including individuals associated with authoring CSA 080, to assist in developing the ministry wood treatment standard. Although they did not initially support the concept, they greatly assisted in development of a ministry process based specification. In particular, Paul Morris, of FP Innovations, was instrumental in assisting in developing the specification. It was believed that such a process based specification would be better than what was currently available - conformance to CSA 080 which was clearly not achievable. The intent was to implement such a standard and then monitor the results. Key results monitored are: retention and penetration: retention refers to the amount of preservative retained in the wood and the penetration refers to the depth of penetration of the preservative treatment into the wood.

The ministry *Process Specification for CCA Treatment of Coastal Douglas-fir Wood* was developed in the context of CSA 080 and modelled upon what would be done in treating wood to best meet the requirements of CSA 080. This included the requirement for the Douglas-fir to be "Coastal" in origin. The literature denotes a genetic difference between Coastal and Interior Douglas-fir and a substantial difference in treatability. Consequently only coastal Douglas-fir is specified for industrial applications within the US and Canada where preservative Douglas-fir wood is required.

The ministry process based specification required testing of the treated material by a person qualified to do so. These results were to be provided to the ministry as a requirement specified in the purchase orders for treated wood.

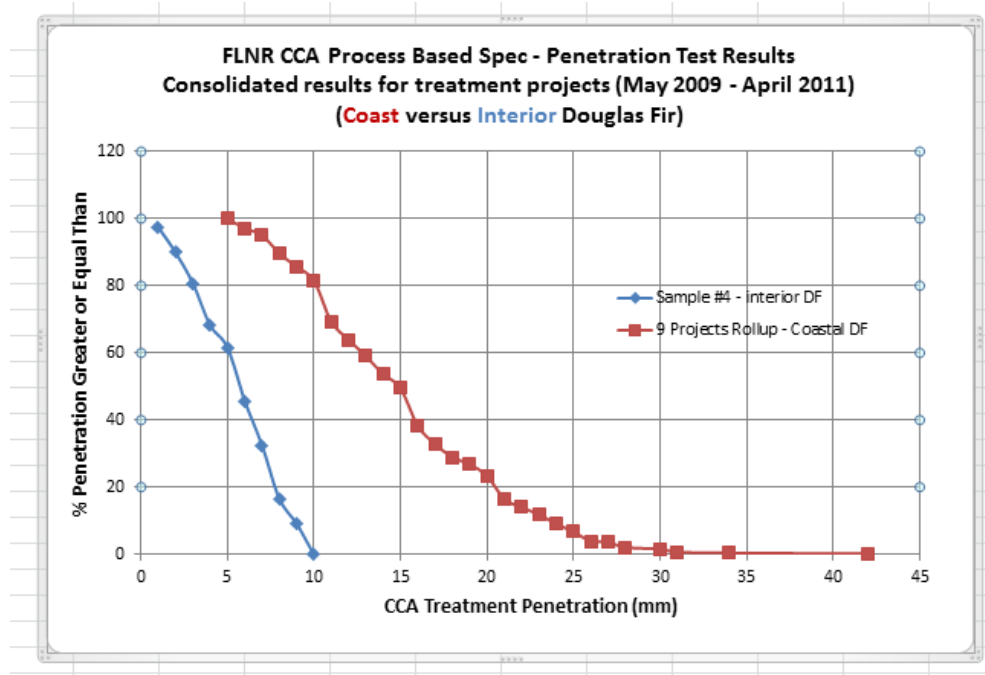
In the fall of 2011, the results from May 2009 through April 2011 were collated and reviewed. 10 separate treated timber orders were reviewed. The review consisted of evaluating all of the test results for penetration of the preservative into the wood.

In review of the data, one order clearly stood out for poor penetration results (100% less than 10mm; 3 mm penetration for 80% greater than), being much lower than any of the other remaining data sets, and was extracted as an outlier from the evaluation data set. The only documentation received indicates that the wood used was interior Coastal Douglas-fir (not Coastal Douglas-fir). The poor results would be consistent with Interior Douglas-fir being supplied.



The data for all of the remaining orders (9) were collated into a single data set of (428 measurements) and the frequency of depth of penetration plotted against depth of penetration. This was done to compare against requirements of CSA 080 which specifies a required percentage of penetration exceedance.

The results show that 80% of samples achieved a penetration result of 10mm or greater and 60% achieved over 13mm. The least amount of penetration achieved was 5mm.



By way of comparison, CSA 080 specifies the following requirements for Douglas-fir:

- Products <114mm thick (lumber) – penetration of 80% required to be 10mm or better
- Products ≥114mm thick (timbers) – penetration of 80% required to be 13mm or better

Conclusion

Although the ministry *Process Specification for CCA Treatment of Coastal Douglas-fir Wood* is not resulting in strict conformance with attaining the requirements specified in CSA 080, the results have been very good even surprising the “experts”.