




Development of decay in preservative treated plywood

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INTRODUCTION

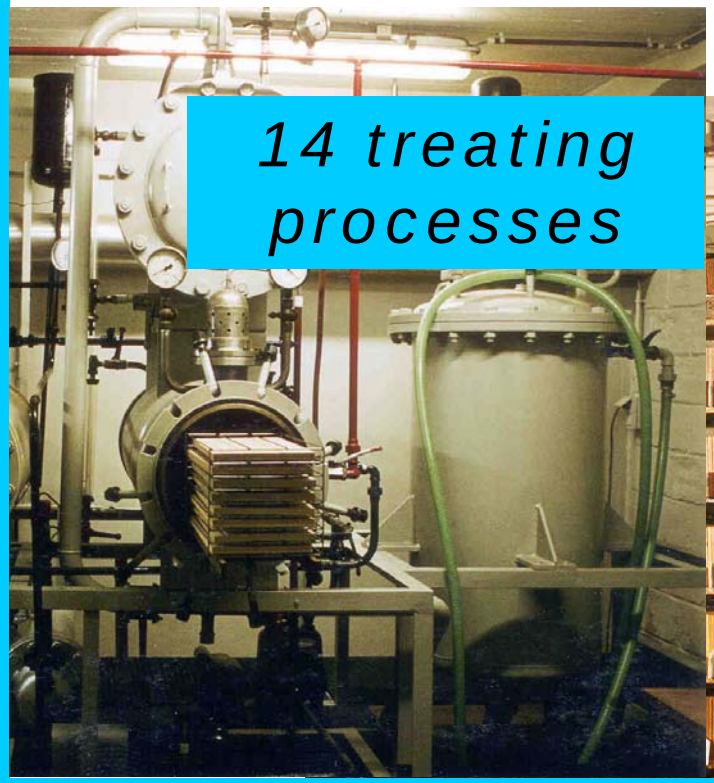
- *Poplar is a non-durable wood species*
- *Poplar plywood can decay when exposed under semi-continuous wet conditions*
- *No risk strategy:*

  preservative treatment

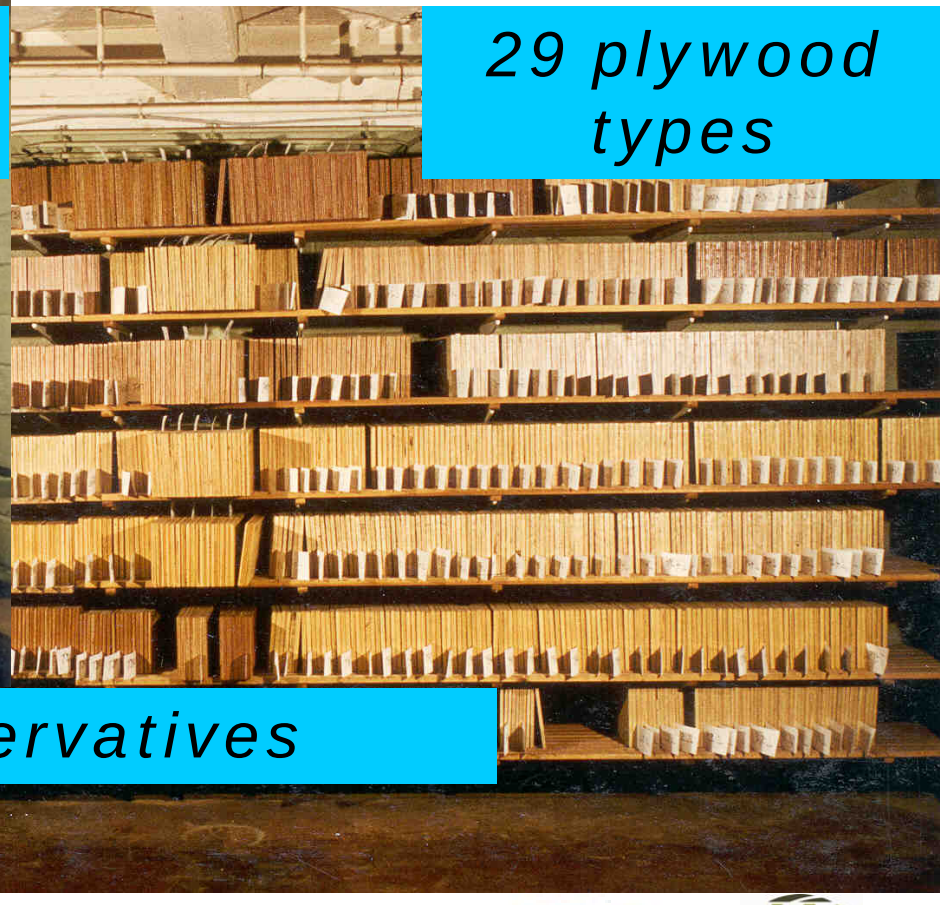





INTRODUCTION



14 treating processes



29 plywood types

21 wood preservatives






PLYWOOD

Denomination	Glue	Total thickness (mm)	Veneer thickness (mm)
Poplar 1	UF	12	0.9/3.9/2.4
Poplar 2	UMF	12	2.7/1.8/3.0
Poplar 3	UMF	15	3.0/3.0/3.0






FUNGAL TESTING

ENV 12038 Standard test method early version






FUNGAL DECAY

Plywood	**ML %** ***Coriolus***	**ML %** ***Poria***	**ML %** ***Lentinus***
Poplar 1	30.0	46.2	28.9
Poplar 2	29.9	24.5	33.3
Poplar 3	26.5	39.1	25.1






PRESERVATIVES

Salts	Quats	Waterborne organic	Oilborne organic
CCA	AAC1	Aza / Li	XAl/Li
CCB	AAC2		AAC/Pe
CCF			






TREATING PROCESSES

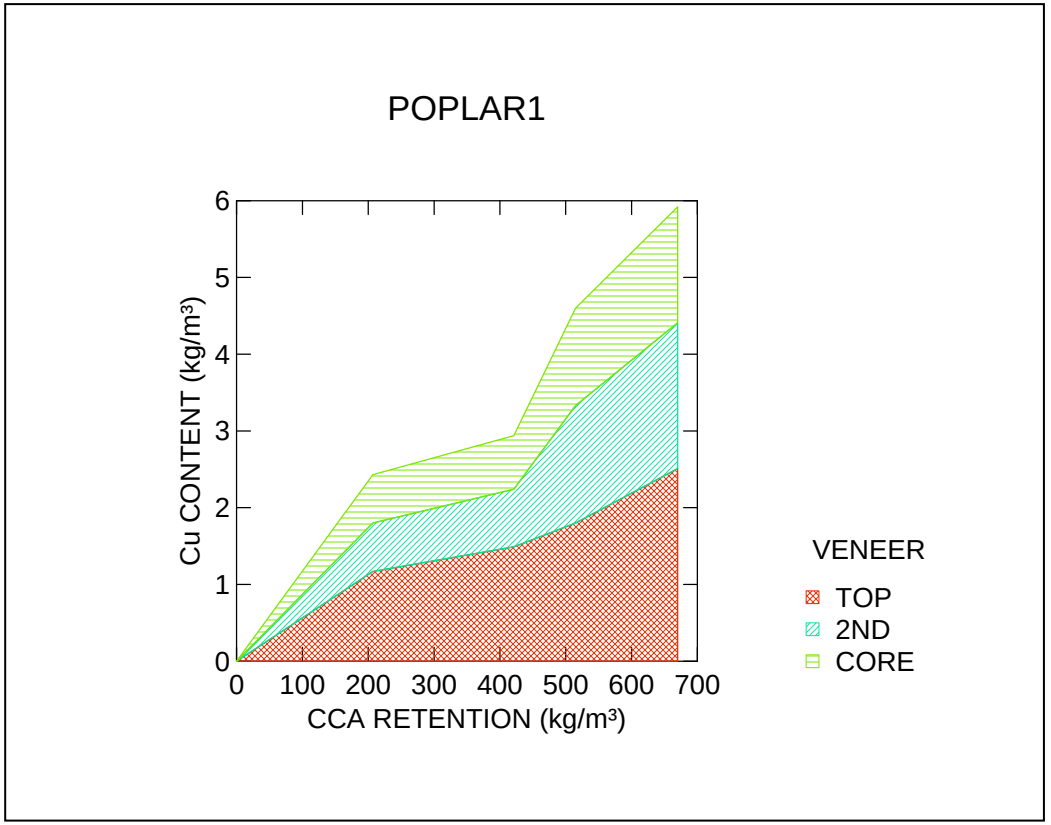
Vacuumpressure or soaking treatments for waterborne preservatives

Dipping or dip-vacuum treatments for oilborne preservatives





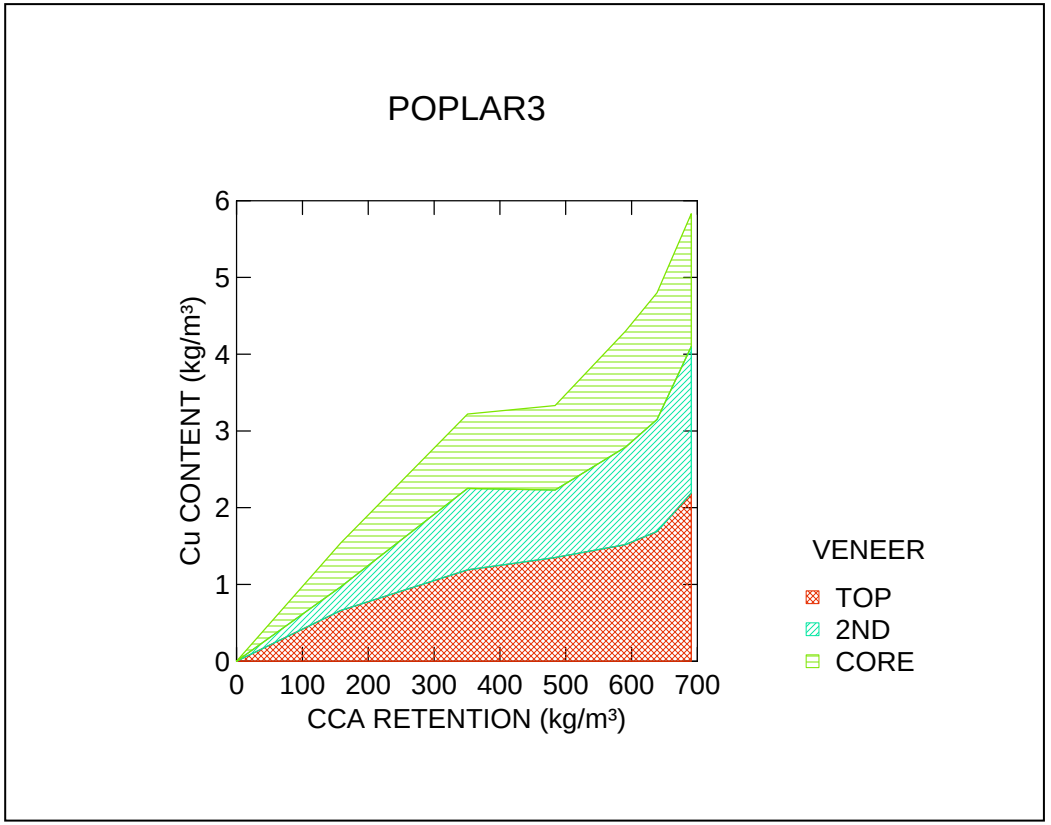

Cu content of CCA treated POPLAR1 plywood








Cu content of CCA treated POPLAR3 plywood



ASYMMETRIC TRANSITION FUNCTIONS

(1) the Weibull cumulative function

$$Y = a\,[1 - \exp(-((X + c\,(\ln 2)^{1/d} - b) / c)^d)]$$

(2) the asymmetric sigmoid function

$$Y = a / [1 + \exp(-(X - c \ln (2^{1/d} - 1) - b) / c)]^d$$

(3) the logistic dose response (LDR) function.

$$Y = a / (1 + (X/b)^c)$$

(4) growth relationship, model of Richards

$$Y = a\,.\,(1 - (1 + b\,.\,\exp(-c.\,X)^{-1/d})$$

all with

Y = mass loss (%)

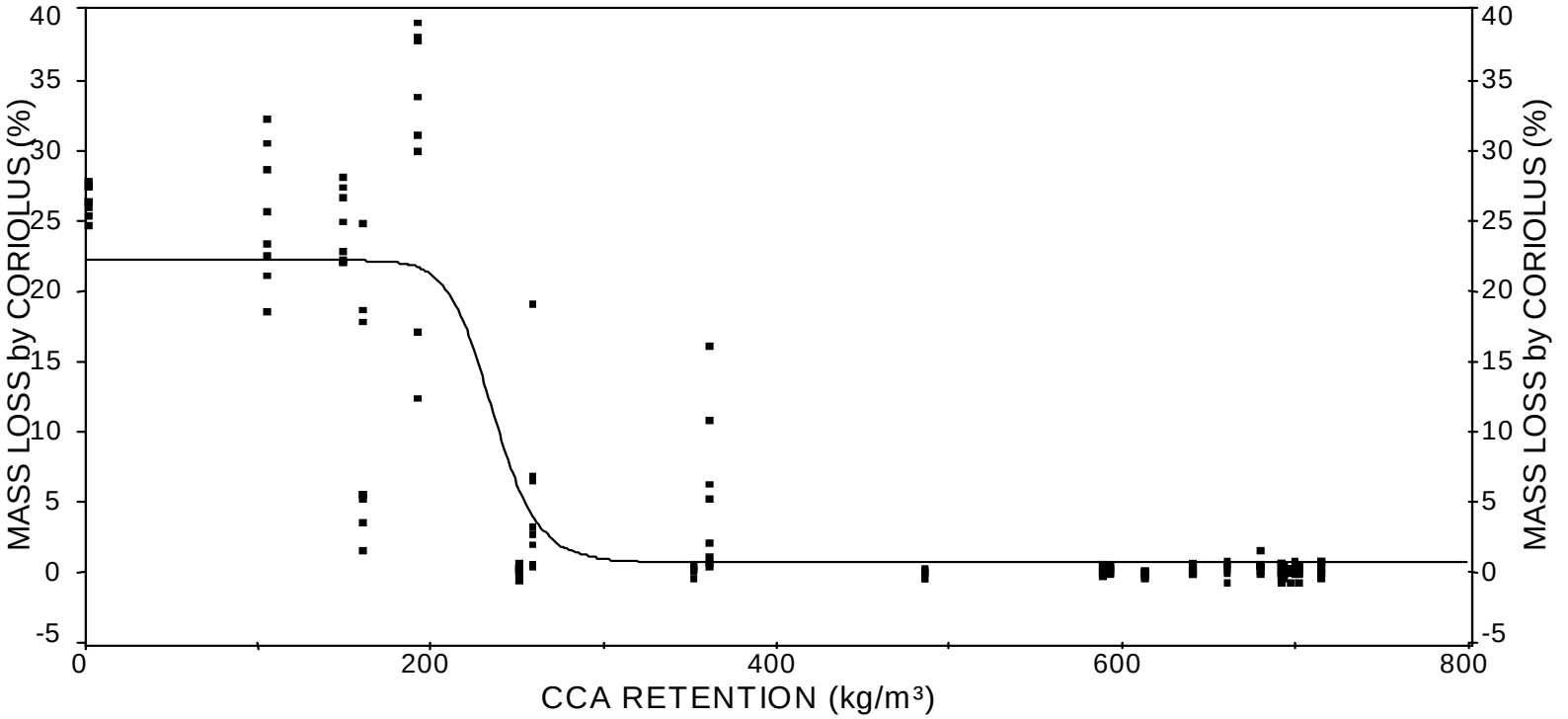
X = preservative retention (kg/m³)






DECAY BY CORIOLUS

LOGIST DOSE RESP



'PRACTICAL' Toxic Threshold Values for CCA – POPLAR plywood

(1) Coriolus versicolor

retention of 240 kg/m³ or salt **8** kg/m³

(2) Poria placenta

retention of 400 kg/m³ or salt **13** kg/m³

(3) Lentinus cyathiformis

retention of 220 kg/m³ or salt **7** kg/m³

These are derived from 5 % mass loss levels and can be implemented as such….

CONCLUSIONS

To achieve full biological protection of poplar plywood a high loading of preservative is required.

Deriving 'practical' toxic threshold values for a wood preservative should be recommended as better option than deriving values based on standard Basidiomycete testing of solid timber (EN 113,…)






CONCLUSIONS

Poplar plywood possesses very good starting properties to produce durable (treated) plywood of low density






THANK YOU FOR YOUR ATTENTION