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Soft rot Determines Service
life of L-Joints with low
Borate Loading

**P.I. Morris, J. Wang and J.K.
Ingram**

Background

- Borates approved in NZ outdoors painted
- Borates used for windows in UK in 70s
- No experience or data in N America
- AWPA L-joint test standardised in 1987
 - Based on EN standard
- Forintek L-joint test set up in 1990

Methods

- L-joints cut from diffusion treated Hem-fir
- Analysed at 0.2% BAE
- Painted with standard alkyd paint
- Exposed in Vancouver 10 years
- Sheffer index = 45 (moderate decay hazard)
- Primary challenge - *Gleophyllum* species

L-Joint Test Site



Gleophyllum sepiarium



L-Joint Inspection



Inspection using Old AWPA Rating Scheme

- 10 Sound
- 9 Signs of slight surface decay
- 7 Small zones of obvious decay
- 4 Extensive decay
- 0 Rejected due to decay

The L-joint Test is designed to be Accelerated

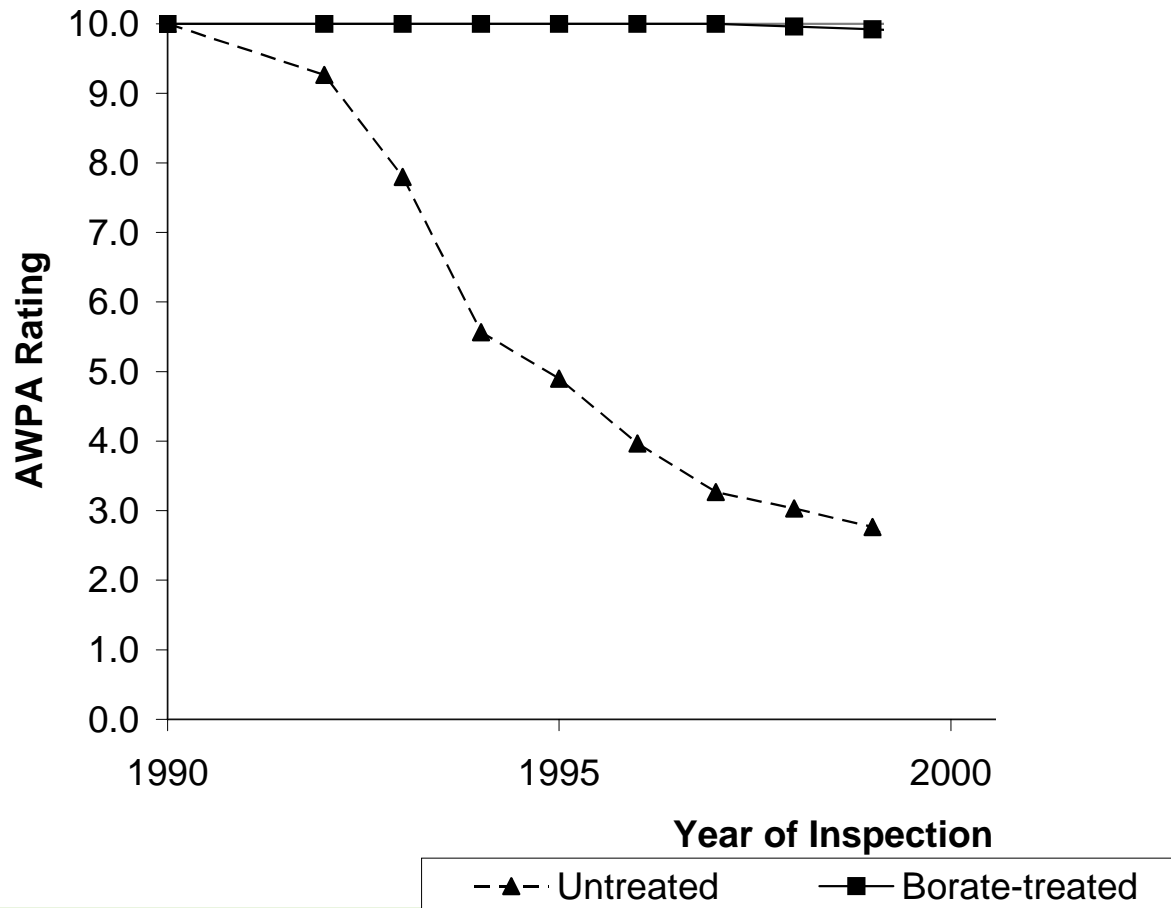
L-joint

- Fully exposed
- Flat surface
- Inclined at 10°
- Paint seal broken

Window

- Some protection
- Sloped surface
- Horizontal
- Paint seal initially intact

Performance Against Decay to 2000



Results Reported to IRG in 2000

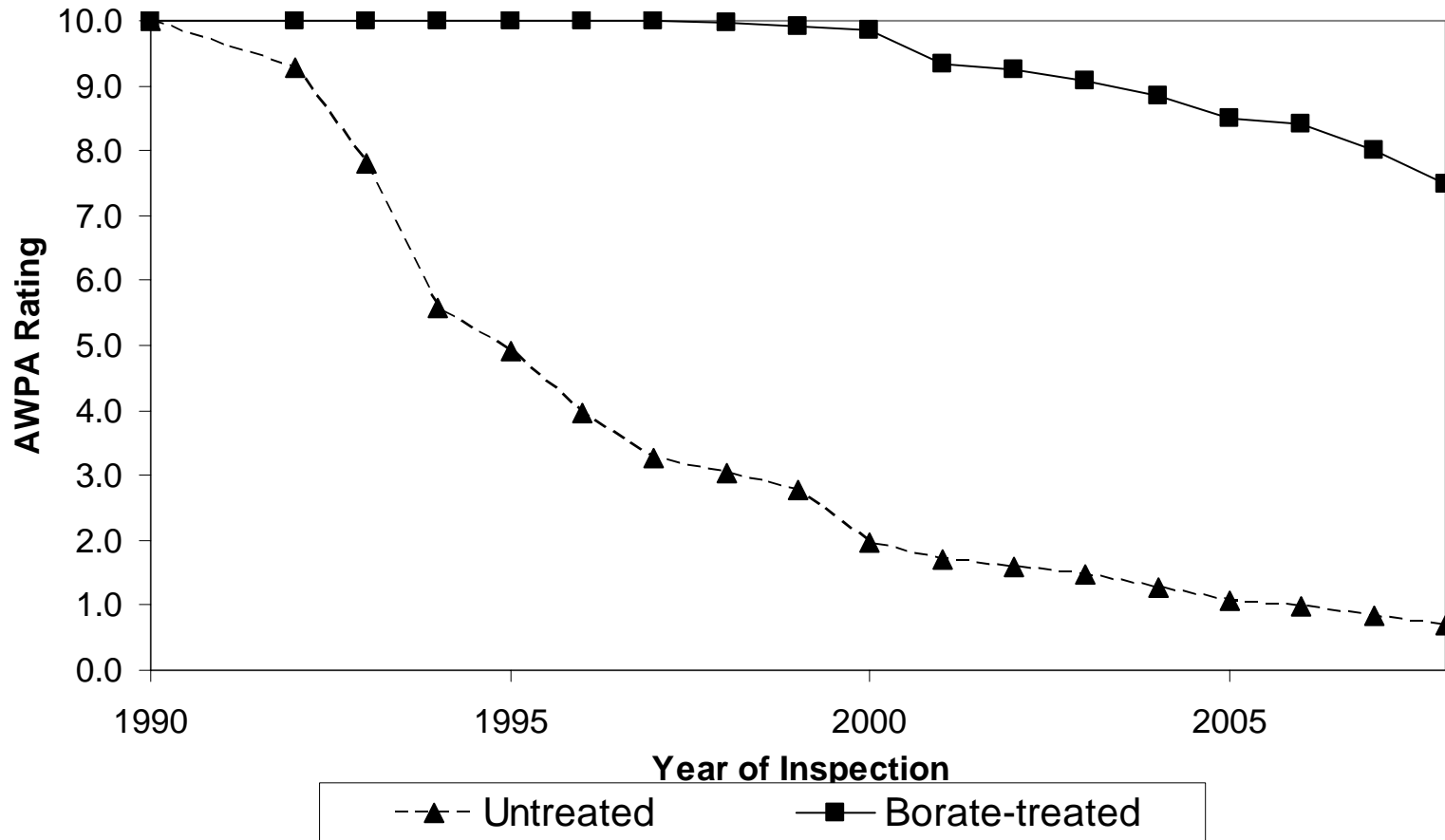
5 years

- No detectable borate in joint zones

9 years

- Untreated: 13% sound, 21% decay, 66% failed
- Treated: 91% sound, 8% rated 9, 0% failed

Performance Against Decay to 2008 (May 18th)



Status of Borate Treated Material at Year 17

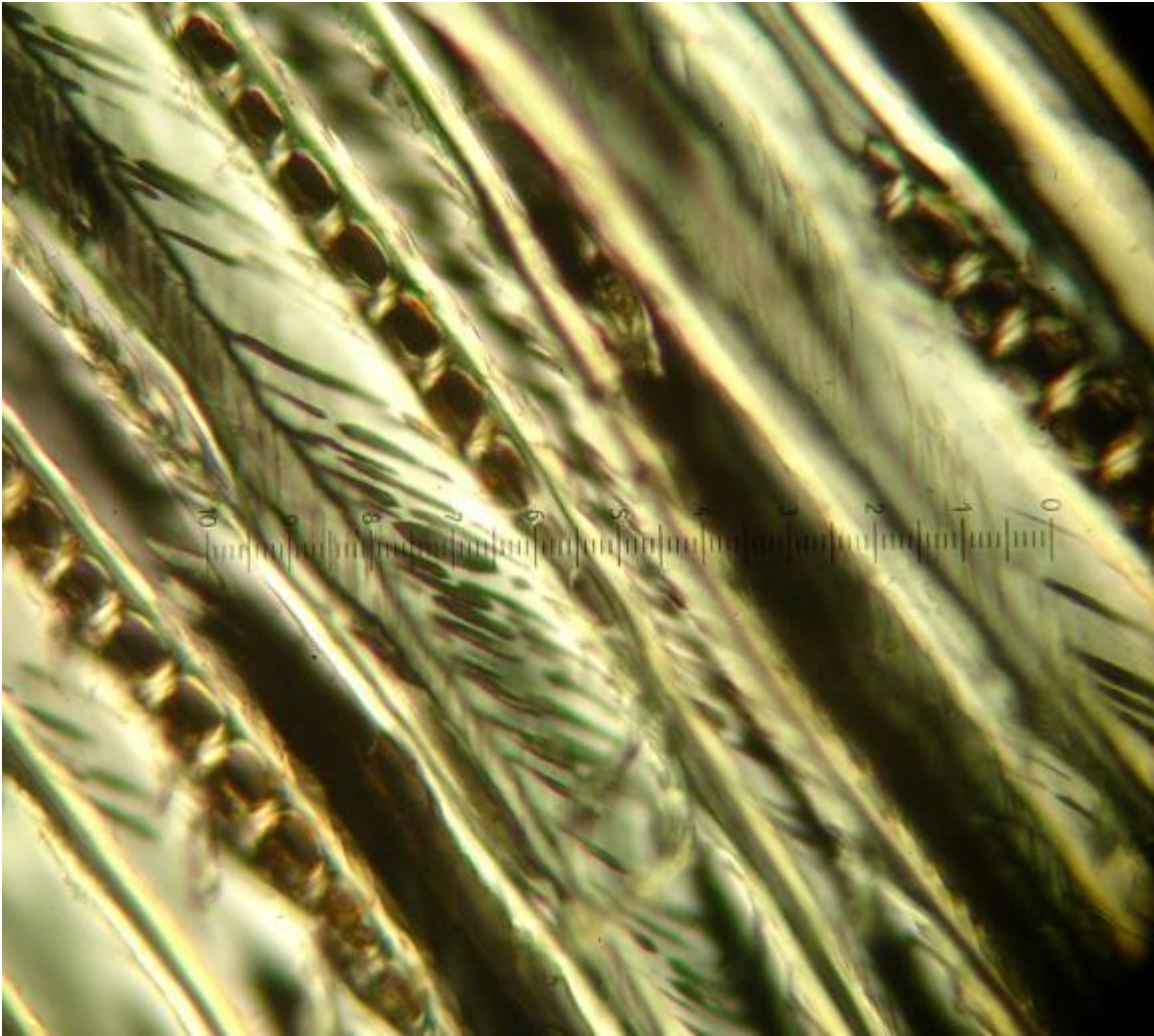
- Rate of decay very slow
- Pick test suggested soft rot
- Samples microscopically examined

Decay Types Noted at 17 years

	Basidiomycete	Soft rot
Untreated	18*	3
Borate Treated	2	21

* Failed due to decay visually assessed as brown-rot or white rot
May also have had undetected soft rot

Soft Rot in L-joints after 17 Years



Soft rot in Window Joinery

- Janice Carey isolated soft-rot fungi from L-joints
- Soft rot damage not often reported in windows
- Conditions not ideal for soft rot
 - Softwood less susceptible to soft rot
 - Low moisture content
 - Low nutrient status
 - Spores in air?
- May be able to occupy niche but decay slowly

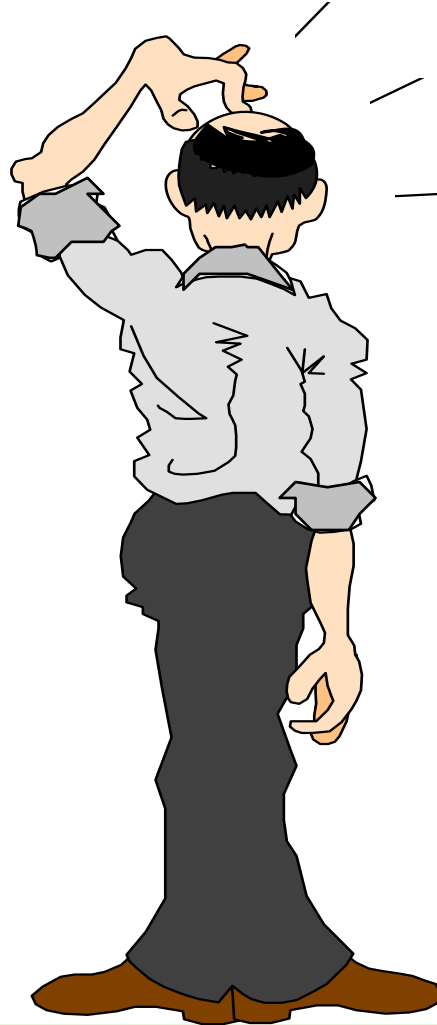
Two possibilities

- Low initial borate loading
 - Stops basidiomycetes
 - Soft rots colonize
 - Unable to decay fast
 - Borate lost
 - Soft rots exclude basidio's
- Low initial borate loading
 - Stops basidiomycetes
 - Soft rots colonize
 - Unable to decay fast
 - Borate below detection limit
 - Borate excludes basidio's

Conclusion

- Soft rot colonization favoured by a low loading of borate contributed to excluding basidiomycete from treated L-joints.

Any Questions?



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