



OVERHEAD LINE DESIGNERS FORUM · 2026

Radiata Pine *Utility Poles*

Manufacturing Criteria for Long-Term Pole Performance

AARON MULLINS · GOLDPINE ELECTROPOLES



Tailwind.

Bringing wood back into the conversation.

01

Climate targets

02

**Sustainable
procurement**

03

Scope 3 reporting

CARBON

Embodied carbon

Measured, full lifecycle, independent.

NET CARBON FOOTPRINT PER POLE

-181 to -1,409
kg CO₂-e per pole

SPECIFIC TO

Goldpine Electropoles

not industry average

METHODOLOGY

ISO 14064-1:2018

full lifecycle accounting

ASSESSED BY

DETA Consulting, 2021

conservative assumptions

Full lifecycle covers resource, production, treatment chemistry, transport, in-service, end-of-life.

Historical performance issues

Five failure modes that drove networks away from wood.

01	02	03	04	05
Many producers	Incomplete pre-treatment conditioning	Incomplete preservative fixation	Inadequate pre-installation seasoning	strength verification

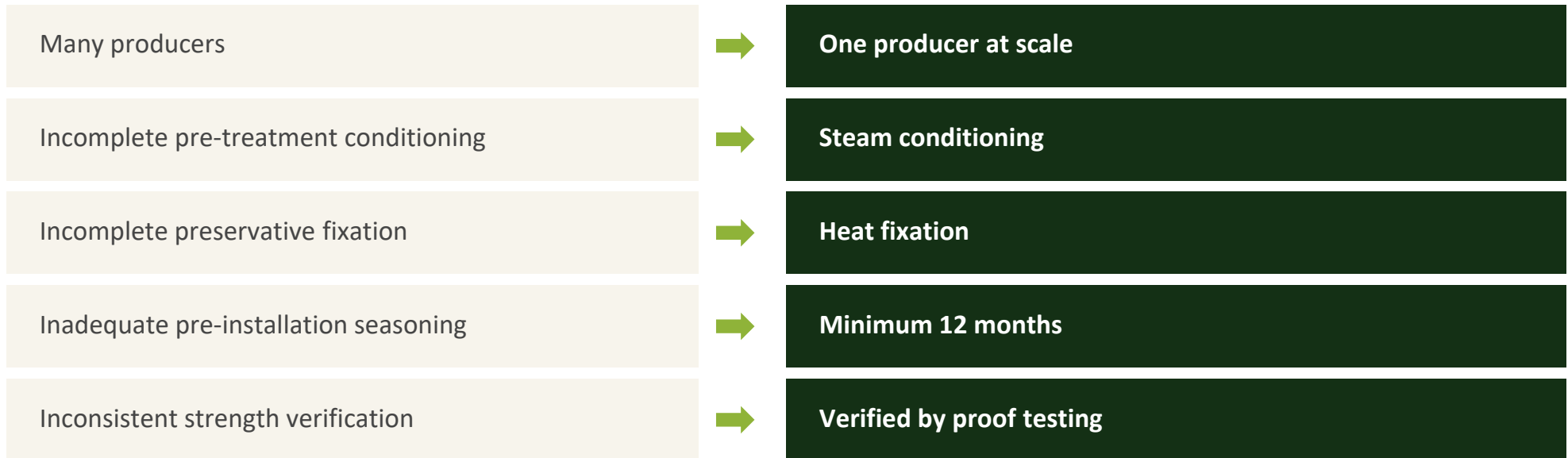
MODERN PRODUCTION

Conditions for reliable performance.

Five requirements the material can't do without — each addressing one historical issue.

HISTORICAL ISSUE

REQUIRED CONTROL

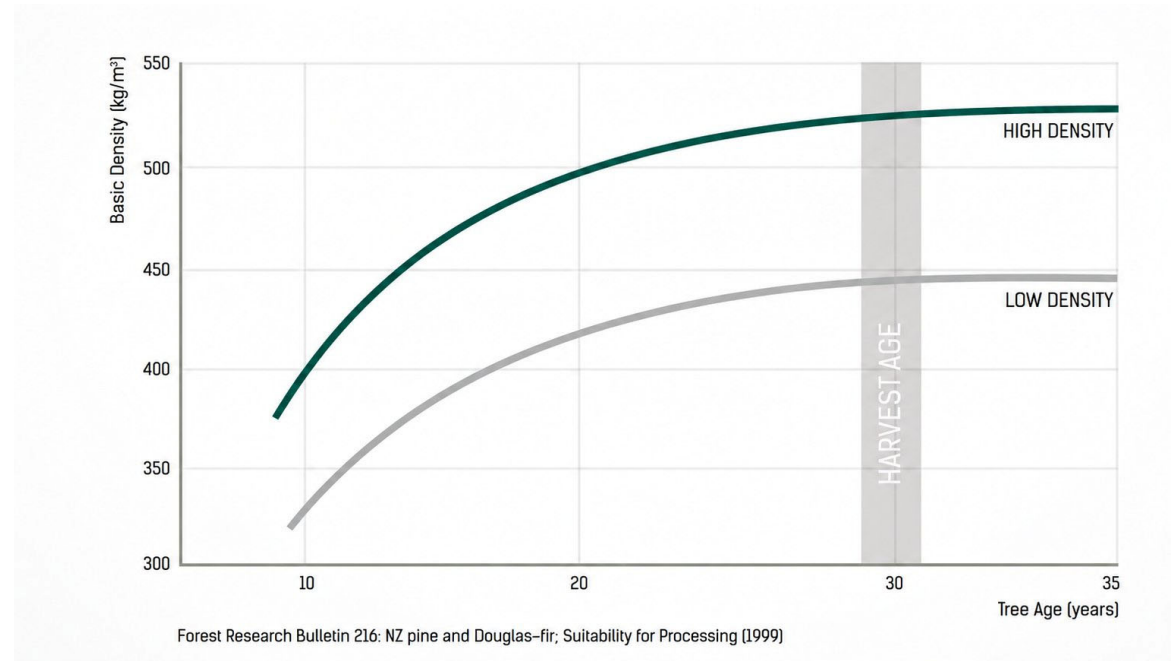


RESOURCE

Resource.

Three things radiata pine has to be — before any production step begins.

- 1 Grown in the right region
- 2 Harvested at the right age
- 3 Selected in the right form



CONDITIONING

Steam conditioning replaces air drying.

Three problems with air drying. Steam conditioning addresses all three.

AIR DRYING

Moisture unverifiable



Cycle runs to a recorded endpoint

Resin blocks the pathways



Resin is mobilised and removed

Cell pathways close



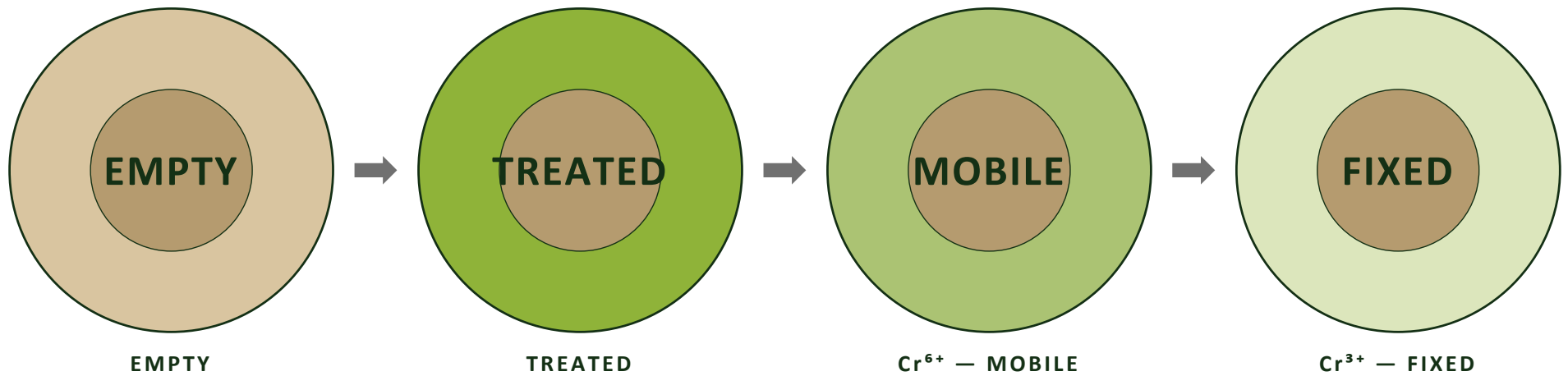
Cell pathways stay open

NZFRI testing on radiata pine: air drying produced penetration failures in 37% of pieces. · NZ Journal of Forestry Science: moisture content 21–33% after 24 weeks of air drying.

FIXATION

Preservative fixation.

How preservative goes from mobile to permanently locked into the wood.



EMPTY
Untreated radiata pine. Outer wood is ready to accept preservative; inner heartwood is naturally durable and does not need treatment.

TREATED
Pressure cycle drives CCA solution into the outer wood. Preservative present throughout the treated zone.

MOBILE
 Cr^{6+} — MOBILE
Immediately after treatment, chromium is hexavalent. Soluble. Mobile. Leachable if released for service at this point.

FIXED
 Cr^{3+} — FIXED
Heat completes the reduction. Chromium is trivalent, insoluble, bonded into the wood structure. Fixation complete.

Cycle time and temperature recorded per charge. Verified against AS/NZS 1605 — no fixation, no release for despatch.

SEASONING

Pre-installation seasoning.

What happens after treatment — and why it can't be skipped.

CONTROLLED SEASONING

12
months

minimum between treatment and despatch

GOLDPINE PRODUCTION STANDARD



Twelve months in the yard is what turns a chemically-treated pole into a dimensionally stable one.

VERIFICATION

What proof testing does.

Three things proof testing achieves — under NZS 3605 methodology.

- 1 Verifies strength**
- 2 Rated load is the minimum**
- 3 Increases reliability**

Walford (1999): proof testing demonstrated to be a legitimate procedure under NZS 3603.

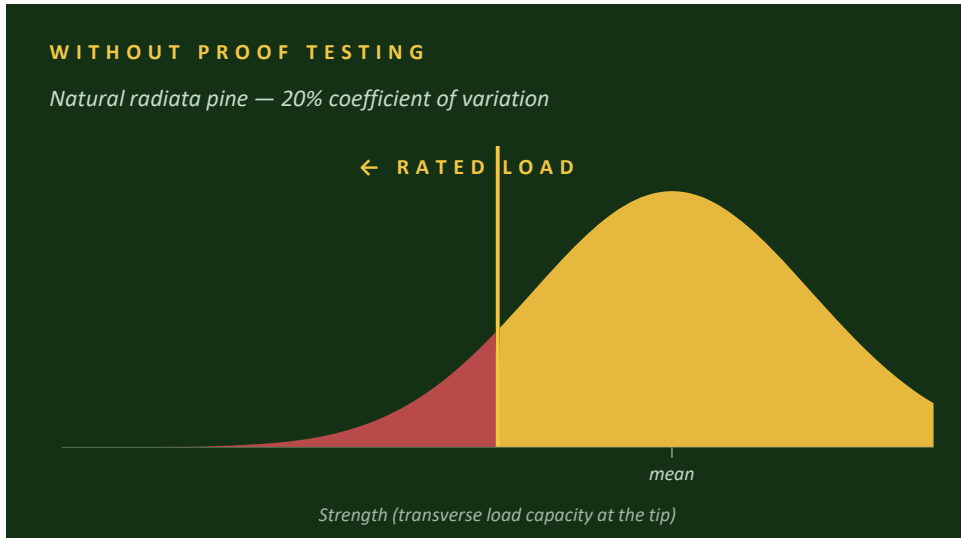
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VERIFICATION

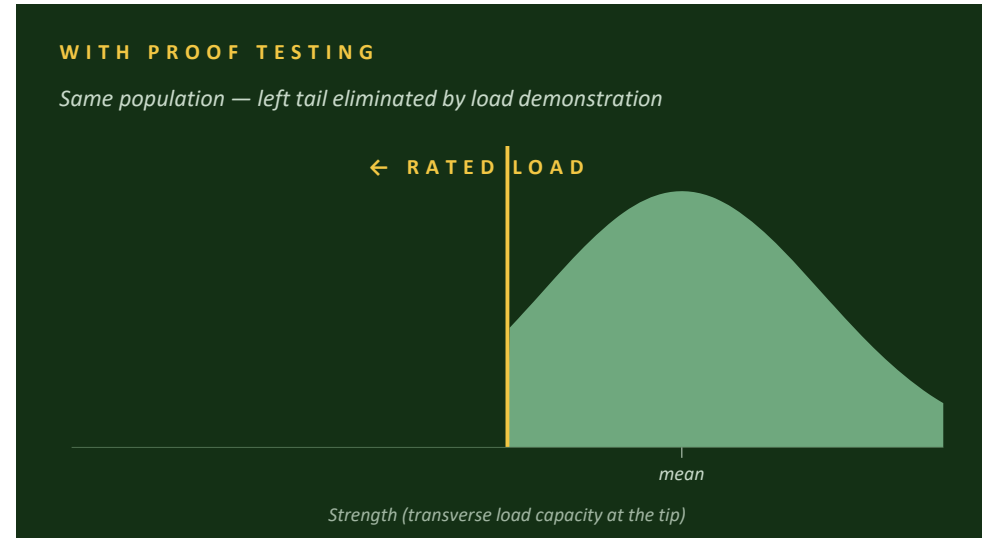
A property worth knowing.

What proof testing does to the strength distribution.



THE RED TAIL

In an untested population, the natural variability of wood means some poles fall below the rated load. These are the poles a network never wants in service — but without verification they're indistinguishable from the rest.



THE VARIABILITY THAT REMAINS

Every pole has demonstrated the rated load before despatch. The variability that remains isn't variability AROUND the rating — it's variability ABOVE it. The left tail is gone.

TRACEABILITY

Production record

Every field captured per pole. Retained and auditable.

Pole ID	Type	Initial Scan	Fab. Date	Test Date	Test ID	Len	Class/Dia	SED	GLD	LED	Customer Spec	Hazard	Treat Yr	Species	Steam #	Treat #	Moisture
H0605	Utility	188395	12/02/2025	8/10/2024	101	9.0m	B	263	308	313	Chorus	H5	2024	P. radiata	S025446	T046253	
H1303	Utility	193772	19/05/2025	26/03/2025	247	9.0m	B	272	306	319	Chorus	H5	2024	P. radiata	S025446	T046861	
H1287	Utility	193498	16/05/2025	26/03/2025	206	9.0m	B	265	315	320	Private Service	H5	2024	P. radiata	S025446	T046946	
H1290	Utility	194265	16/05/2025	26/03/2025	225	9.0m	B	267	309	307	Private Service	H5	2024	P. radiata	S025445	T046936	36.1%
H1305	Utility	194271	19/05/2025	26/03/2025	217	9.0m	B	260	307	313	Chorus	H5	2024	P. radiata	S025446	T046936	
H1286	Utility	193812	16/05/2025	26/03/2025	210	9.0m	B	262	318	315	Private Service	H5	2024	P. radiata	S025440	T046936	
H1285	Utility	193939	16/05/2025	26/03/2025	205	9.0m	B	263	307	313	Private Service	H5	2024	P. radiata	S025440	T046936	
H1289	Utility	194036	16/05/2025	26/03/2025	202	9.0m	B	247	298	308	Private Service	H5	2024	P. radiata	S025440	T046841	36.3%

Records held against every pole — species, class, hazard, treatment batch, steam batch, moisture content. Traceable forest to installation.

TRACEABILITY

Testing record — proof results

Visual grading and proof load result against each pole.

Pole ID	Log Lot	Initial Scan	Test Date	Test ID	Type	Length	Class/Dia	Visual	Proof Load	Result
Y1010	EL0123B	171079	7/02/2024	79	Utility	11.0 m	A	Pass	73.4 kN	Pass Std
Y1009	EL0123B	171173	7/02/2024	99	Utility	11.0 m	A	Pass	74.3 kN	Pass Std
Y1008	EL0123B	171094	7/02/2024	95	Utility	11.0 m	A	Pass	74.1 kN	Pass Std
Y1007	EL0123B	171033	7/02/2024	92	Utility	11.0 m	A	Pass	73.4 kN	Pass Std
Y1006	EL0123B	171063	7/02/2024	78	Utility	11.0 m	A	Pass	75.3 kN	Pass Std
Y1005	EL0123B	171272	7/02/2024	93	Utility	11.0 m	A	Pass	73.9 kN	Pass Std
Y1004	EL0123B	171022	7/02/2024	91	Utility	11.0 m	A	Pass	73.6 kN	Pass Std
Y1003	EL0123B	171080	7/02/2024	101	Utility	11.0 m	A	Pass	73.4 kN	Pass Std
Y1002	EL0123B	171022	7/02/2024	80	Utility	11.0 m	A	Pass	73.6 kN	Pass Std

Every proof test recorded against the unique pole ID. Results held permanently — retrievable years after installation.

The five controls.

Manufacturing Criteria for Long-Term Pole Performance

- **Resource** *right region, right age, right form*
- **Conditioning** *steam conditioning — moisture out, pathways open*
- **Fixation** *heat fixation*
- **Seasoning** *minimum 12 months, dimensional stability*
- **Verification** *proof tested, per NZS 3605*