






NETWORK DESIGN AND MAINTENANCE: POLES

Powercor distributes electricity through a network comprising over 88,300 kilometres of wires supported by more than 570,000 poles and associated infrastructure. Around 86% of the network uses overhead lines and the remaining 14% are underground cables.

The poles are made from wood, concrete or steel. In general, the design of our poles is based on Australian Standards and a range of factors including the environment in which they will be located.

Characteristics of the Powercor network

	364,866	WOOD POLES
	128,419	CONCRETE POLES
	78,515	STEEL POLES
	75,554km	OVERHEAD LINES
	12,810km	UNDERGROUND LINES

Timber power poles

Given that two thirds of our poles are made of wood, and about half of our network is located in hazardous bushfire risk areas, the integrity of our poles is especially important.

We source poles made from 17 different types of natural timber within Australia. Hardwood poles are favoured because of their natural strength. The wood poles we use on our network are predominantly class one and two durability hardwood such as Blackbutt and Spotted Gum.

The majority of our poles are made from a natural material and can vary in their appearance. Timber will commonly have naturally occurring features like textures, splits in the timber and holes.

While outwardly a pole may appear old or weathered, these aesthetic qualities do not necessarily impact on the pole's overall strength.

BENEFITS OF USING HARDWOOD POLES

- Readily available - through sustainable harvests
- Anti-corrosive - so will not rust or be affected by salt air or heavy industrial environments
- Ease of handling - for transport and installation compared to concrete or steel
- Non-toxicity - which makes it safe for the environment
- Cost effectiveness - taking into consideration the whole life cycle for the product

Inspection methods

Powercor has a robust and extensive inspection regime in line with strict regulations and audited by Energy Safe Victoria. These standards were extensively reviewed as part of the 2009 Victorian Bushfire Royal Commission (VBRC) and the subsequent Grimes Review.

Powercor's inspection regime exceeds the frequency required by regulatory standards. Inspections determine when poles need to be repaired or replaced. Every year, poles are inspected by fully trained and qualified inspectors as part of a regular cycle and vary depending on whether the poles are located within a Hazardous Bushfire Risk Area (HBRA) or Low Bushfire Risk Area (LBRA).

Above and below ground inspection methods are used to determine the conditions of wooden poles including the amount of sound wood, presence of rot or termites, size and number of splits in the timber, height and diameter measurements.

Data from inspections is used to calculate each pole's residual strength and hence its safety factor. Based on this, the serviceability of the pole is assigned one of three classifications.

A new wood pole's residual strength is well above its rated strength (2.5 times) and will typically reduce with age. We do not allow poles to deteriorate below their rated strength as they would not be considered strong enough to support infrastructure or withstand environmental factors such as high winds.

In March 2019 and as part of a continuous improvement program, Powercor made three changes to its inspection policies:

1. Poles previously referred to by the industry as 'Limited Life' were redefined to 'Added Controls – Serviceable'. This reflects the pole is still sound but moves to a more frequent inspection cycle.
2. Poles classified as 'Added Controls - Serviceable' which were previously inspected every 2.5 years, will be inspected annually prior to the summer season and bushfire declarations.
3. The safety factor for poles classified as 'Unserviceable' has become more conservative. It has been lifted from a maximum safety factor of 1.25 to 1.40. This increases the amount of sound wood required by 5mm (or 15%) and will result in a greater number of poles replaced annually.

**EVERY YEAR, POLES ARE
INSPECTED BY FULLY TRAINED
AND QUALIFIED INSPECTORS
AS PART OF A REGULAR CYCLE**

Pole inspection technology

Some of the inspection methods involve drilling holes into the pole to test for internal defects like fungus or rot.

In 2016, Powercor evaluated three alternative inspection technologies that do not have any impact on the pole itself. As a result, our inspectors have used a technology called Woodscan since 2017 to complement our timber pole assessments.

The Woodscan process uses 12 contact points around the pole to generate 66 scans across each section checked. An ultrasonic scanner measures pulses travelling between the points to detect if there are any defects inside the pole.

We selected Woodscan following comprehensive technical tests. Only Woodscan performed as promised.

Pole classification and inspection policy

PREVIOUS APPROACH

PROCESS IMPROVEMENT
AS OF MARCH 30 2019

CLASSIFICATION	DESCRIPTION	ACTIONS ARISING	SAFETY FACTOR (TIMES RATED STRENGTH)	CLASSIFICATION	ACTIONS ARISING	SAFETY FACTOR (TIMES RATED STRENGTH)
<u>Serviceable</u>	New pole or pole with a high level of strength	<ul style="list-style-type: none"> Maintain regular inspection cycle 	≥ 1.875	<u>Serviceable</u>	<ul style="list-style-type: none"> Maintain regular inspection cycle 	≥ 1.875
<u>Limited Life</u>	Pole which is still strong but may need to be monitored more frequently	<ul style="list-style-type: none"> White cross to signify classification Single band Increase the regular cycle of 5 yearly above ground and ground line inspections to every 2.5 years 	< 1.875 and ≥ 1.25	<u>Added Controls - Serviceable</u>	<ul style="list-style-type: none"> Install label, with words 'Added Controls - Serviceable' Increase the regular cycle from 2.5 yearly above ground and ground line inspections to conduct prior to 1 November annually 	< 1.875 and ≥ 1.40
<u>Unserviceable</u>	Pole which is still within an acceptable safety range but is coming to the end of its useful life	<ul style="list-style-type: none"> White cross to signify classification Double band Use Woodscan technology to verify the result Consider if staking or replacing the pole is appropriate Determine priority for action: <ul style="list-style-type: none"> - Priority 1: Repair within 24 hours - Priority 2: Repair within 32 weeks 	< 1.25	<u>Unserviceable</u>	<ul style="list-style-type: none"> White cross (with double band) to signify classification Use Woodscan technology to verify the result Consider if staking or replacing the pole is appropriate Determine priority for action: <ul style="list-style-type: none"> - Priority 1: Repair within 24 hours - Priority 2: Repair within 32 weeks 	< 1.40

(Note: Changes as of 30 March 2019 in bold)

Qualified asset inspectors

Our asset inspection program is contracted to a specialist company, Electrix.

Electrix asset inspectors are Certificate II qualified as required by Energy Safe Victoria (ESV) and work in accordance with our Asset Inspection Manual. We conduct annual audits of Electrix inspectors in the field to ensure inspections are in line with our instructions and safety standards are maintained. Powercor keeps records of all inspection reports.

While Electrix personnel conduct the inspections, any maintenance, repair or replacement work arising is conducted by Powercor field teams.

About Powercor

Powercor distributes electricity to around 810,000 customers – or more than 1.75 million Victorians - across the western suburbs of Melbourne and through central and western Victoria. The network supports 2,900 commercial and industrial business, 104,000 small businesses, 70 per cent of the state's agricultural production and 25 per cent of Victoria's GDP.

Teams based in depots across the region are focused on staying on top of things to deliver reliable, safe and affordable electricity to households and businesses by operating, managing and maintaining all network assets and metering services. From a safety viewpoint, of course, we are particularly vigilant with bushfire risks.

Benchmarking by the Australian Energy Regulator rates Powercor as the lowest cost rural network for residential and small business customers across Australia. It is also the most efficient and the highest utilised network in the National Electricity Market.



**POWERCOR DISTRIBUTES
ELECTRICITY TO MORE THAN
1.75 MILLION VICTORIANS**