

Distribution Lines Refurbishment Guideline - REPEX



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1 Introduction

Planned refurbishment programs are used to support routine inspection activities to deliver long term sustainable levels of asset replacement. The objective of the planned refurbishment programs is to remove the highest risk assets from the network first whilst delivering efficient programs that address multiple risks in a logical bundle of work wherever possible. These programs have been established to manage network risk, budget, and resource availability through the prioritisation of asset replacement.

The purpose of this document is to provide guidelines for Network Management teams to scope the replacement of overhead conductor, equipment, and components under the Asset Replacement Expenditure (Repex) Program as well as provide guidelines for Line Designers.

The scope of the planned refurbishment programs should be developed in accordance with the criteria established by the Asset Maintenance Group (AM) and published in Asset Management Plans. The guidance for asset replacement in this document should only be applied at an individual site level after it has been established that the site meets the criteria defined in the Asset Management Plan.

2 Principles

- 2.1 The requirement to perform targeted Conductor Replacement is the main driver in the establishment of the Repex program. Part of this strategy, it is also recommended to replace if the targeted conductor types such as small copper installed on LV neutral phases in urban locations with high density of PV connected to the grid. Replacement of other equipment and components, as defined in Section 3 is opportunistic and incidental to the Conductor Replacement.
- 2.2 The intent is to balance the expected life of the conductor and pole with the expected life of the attached hardware/equipment to minimise the number of return visits required to an individual pole site to perform maintenance activities over its lifetime. It is not intended to increase the scope of planned refurbishment projects through the addition of additional sites/works.
- 2.3 When replacing the span carrying the strategic conductor, consider replacing the pole based on if the treated pole ≥ 55 years old, untreated pole ≥ 65 years old and age of nail ≥ 15 years.

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- 2.4 When replacing a pole or crossarm, all bolts and pins through poles or crossarms shall be replaced.
- 2.5 When replacing a pole or stay assembly, the following must be considered:
- If the pole is being replaced and is within 5km of the coast, replace the stay cable and stay rod
 - If the pole is being replaced and is on an agricultural property with irrigation used for seasonal cropping, replace the stay cable, and stay rod.
 - If the pole is being replaced and the stay rod is a legacy eye-bolt or turnbuckle, replace the stay rod
 - If the pole is being replaced and the pole is >25 years old, replace the stay cable and stay rod
 - If visual inspection indicates severe deterioration in accordance with the LDCM, replace the stay wire and stay rod accordingly
 - All double wrapped stay wires must be replaced
- 2.6 Serviceable distribution transformers < than 45 years must be re-used when replacing transformer poles.
- 2.7 When replacing a pole or crossarm and the site is within 0.5km of the marine coast, all associated steel hardware (e.g. shackle straps, 'U' brackets, bolts, pins) should be replaced with stainless steel variant based on design requirement prescribed for coastal environment (refer to Technical Operational Update - T1648 issued 30 September 2020), unless in "as good as new" condition. Link to Operational Update – T1648:
- [Operational Update – T1648](#)
- 2.8 In areas greater than 0.5km from the marine coast, the associated steel hardware, other than bolts and pins, can be reused if it is in sound condition and expected to last the remaining life of the installation.
- 2.9 Wherever practicable, construction should comply with current design and construction standards.
- 2.10 All redundant hardware shall be removed and discarded.

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- 2.11 Timing and alignment to other programs, such as P2 defect rectification and Clearance to Structure/Ground, should be considered where efficient to do so.
- 2.12 Closed defects from the most recent inspection should be considered to confirm assets or hardware that may have already been replaced.

3 Component Replacement Guidelines

The following Asset Types should be considered for opportunistic and incidental replacement in accordance with the specific criteria detailed.

Asset Type	Replacement Criteria
Pole	<p>Design requirement / or</p> <p>Consider replacing the pole in the span if:</p> <ul style="list-style-type: none"> • Treated pole \geq 55 years old • Untreated pole $>$ 65 years old • Age of the nail \geq 15 years old • Pole is being replaced and is within 5km of the coast, replace the stay cable and stay rod • Pole is being replaced and is on an agricultural property with irrigation used for seasonal cropping, replace the stay cable and stay rod • Pole is being replaced and the stay rod is a legacy eye-bolt or turnbuckle, replace the stay rod • Pole is being replaced and the pole is $>$25 years old, replace the stay cable and stay rod • Visual inspection indicates severe deterioration in accordance with the LDCM, replace the stay wire and stay rod accordingly
Crossarm	Design requirement
Ladder racks	Condition based

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Asset Type	Replacement Criteria
Connectors	All legacy connectors shall be removed and discarded including claw clamps and split bolts.
Insulators	Re-use if in sound condition
Customer Services	<ul style="list-style-type: none"> • Design Requirement OR • Problematic Type <ul style="list-style-type: none"> ○ Colour Coded (flat and twisted) ○ Neutral Screened ○ Bare Open Wire ○ 6mm Copper ○ Unsupported connection at the supply end (excl Insulation Piercing Connectors) ○ Mitti branded XLPE
Targeted or Non-targeted LV Conductor (during targeted HV conductor Scoping)	<ul style="list-style-type: none"> • Design Requirement OR • Single or twisted 7/064 CU on LV & HV Networks or 7/080 CU on Neutral phase must be replaced in urban areas with high PV penetration
Switches (i.e. ABS, LBS, sectionalisers)	<ul style="list-style-type: none"> • ABB U Series, R Series, S Series • Age > 45 years OR • Condition based (e.g., oil leaks, gas leaks, severe corrosion)
Switchgear (i.e. reclosers)	<ul style="list-style-type: none"> • Age > 45 years OR • Condition based (e.g., oil leaks, gas leaks, severe corrosion)

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Asset Type	Replacement Criteria
Distribution transformers	<ul style="list-style-type: none">• Age > 45 years; OR• Condition based (e.g.e.g., oil leaks, severe corrosion)• Re-use serviceable transformers when replacing transformer poles• Porcelain surge/lightning diverters on LV/HV side of transformers must be replaced
Cable terminations	<ul style="list-style-type: none">• Cast iron potheads (HV and LV replaced in EGX as a program)• In EE issued as a P2 defect
Stay wires & rods	<ul style="list-style-type: none">• Age > 25 years; OR• Double wrap stay wires• Within 5km of the coast, replace the stay cable and stay rod• Agricultural property with irrigation used for seasonal cropping, replace the stay cable and stay rod based on condition• Legacy eye-bolt or turnbuckle, replace the stay rod• Severe deterioration in accordance with the LDCM, replace the stay wire and stay rod accordingly

Once work has been completed, asset data must be updated in corporate systems to ensure accuracy for future analysis and work scoping activities.

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Appendix A

Equipment Reference Photos

A.1 Stays

A1.1 Double Wrapped Stays

Are to be replaced



A1.2 Single Wrapped Stays or current standard eye-bolt stays (right)

Do not require replacement



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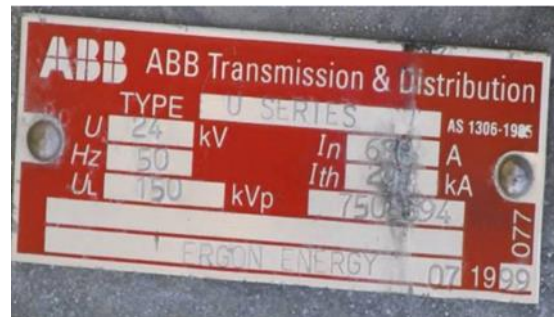


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A.2 Air Break Switches

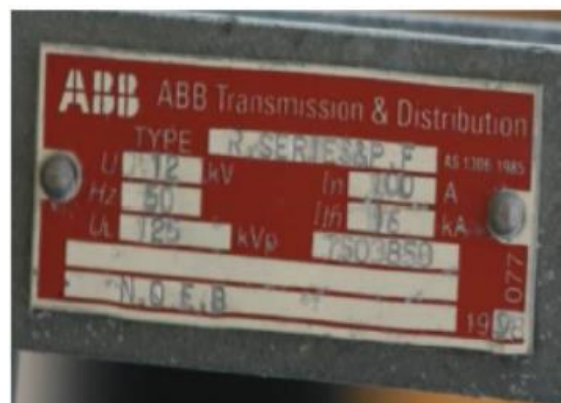
A2.1 ABB U Series

To be replaced



A2.2 ABB R Series

To be replaced



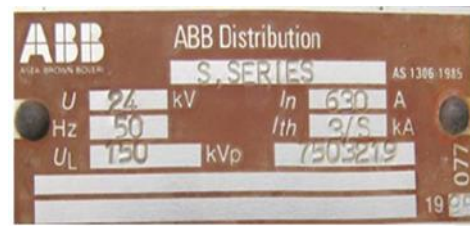
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A2.3 ABB S Series

To be replaced



Note: Differences between AEM and ABB U series ABS can be difficult to determine from groundline. The best method to differentiate is to identify the material of the bracket.



Figure 9 - ABB "U" Series Powder coated aluminium bracket



Figure 10 - AEM Stainless Steel bracket

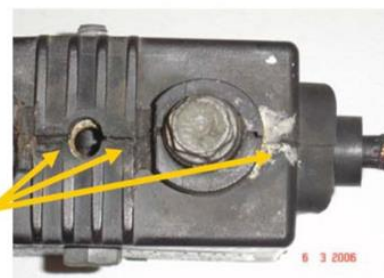
A.3 LV Fuses

A3.1 Sciame Fuses PF100



Possible 415V between these two brackets

Fuseholder base splitting



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A3.2 Mitti branded XLPE

A.3.2.1 Identification of Mitti XLPE Service Cable

Mitti XLPE Service cable can be identified by the markings on the cable. There are 3 main types of service cable that were supplied and installed from 2004 to 2006:

- Pirelli service cable - identified by small, lowercase blue font.
- Mitti service cable - identified by small, uppercase white font.
- Midlands service cable - identified by large, uppercase white font.

As shown in figures 1 and 2, the font on Mitti and Midlands service cable is similar but there is an obvious size difference. Employees should take as much care as possible to ensure that the cable is identified correctly as this information may be used for a future work program.



Figure 1: XLPE Service Cable photograph showing identification markings



Figure 2: XLPE Service Cable drawing showing identification markings