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The Powerlines People

Standard Designs & Composite Crossarms

Mitch Graham

Topics

- Why did Unison go Composite?
- The Journey of Change
- Design Decisions for Standardisation
- Standard Arms & Components
- Experiences so far

Why did Unison go Composite?

Wood Arms - Issues

Splits

Bowing and twisting

Decay

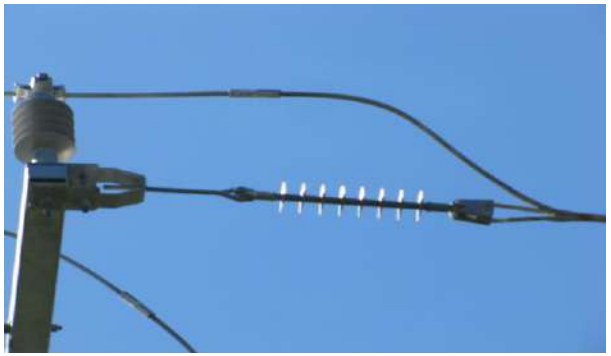
Burning

Why did Unison go Composite?

Steel Arms - Issues

Animal Flashover

Bird Flashover



Bird 33kV Flashover

Corrosion

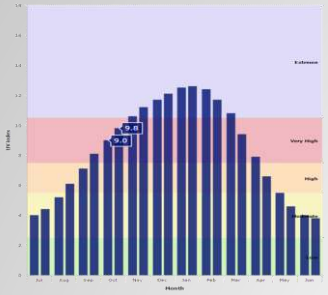
A Journey of Change

- Market Research
- Material Comparison

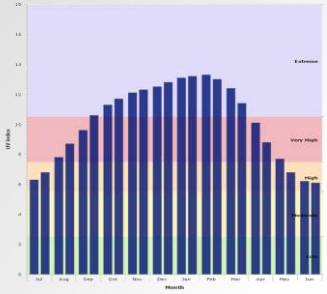
	Galvanised Steel	Hardwood	Composite
Known strength	✓	✗	✓
Resistant to Known Failure Modes			
Rust	✗	✓	✓
Decay (rot)	✓	✗	✓
Splitting	✓	✗	✓
Burns readily	✓	✗	✓
Easily modified	✗	✓	✗
Cost	✗	✓	✓
Weight	✗	✗	✓
Insulation properties	✗	✓ limited	✓

Potential Issues – UV and Longevity

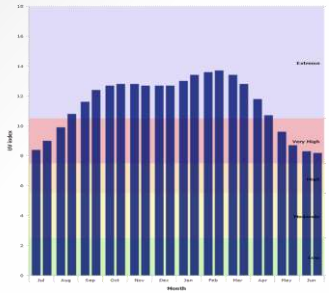
Australasian Users of Wagner's composite arms local UV levels. Crossarm numbers from 2017



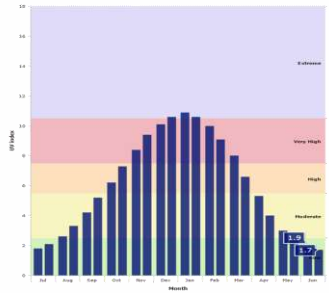
energex 208,879



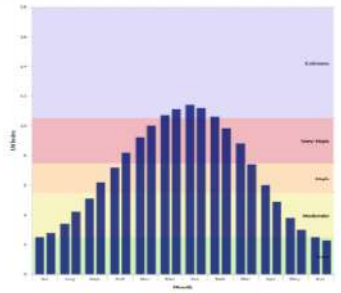
ERGON ENERGY 15,247



PowerWater 9,535

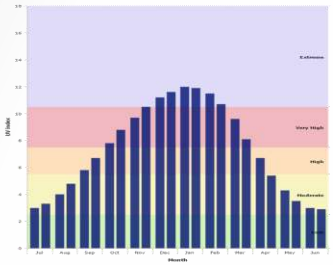


essential energy 284,377

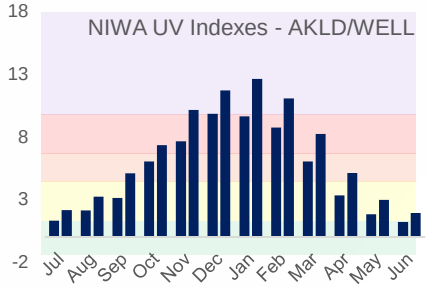


ActewAGL 8,113

Ausgrid 533



westernpower 38,811



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Blooming issues in coastal areas with 1st version of coating, coating revised in 2010 and no subsequent issues

A Journey of Change

- Industry Research and Interviews

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Please complete the following composite cross arm questionnaire:

1. How long have you been using Wagner's composite arms for on your network? ……yrs
2. Are they approved or under a trial? Approved/ under trial
3. Do you use any other make of composite arms on your network? Yes/No
   If 'Yes' what brand(s)?
   -
   -
4. What pole materials are used on your network?

	Yes	No
Wood		
Steel		
Concrete		
Composite		

- Product trial
  - High Corrosion Sulphur Environment
  - Terminating 2 circuits

Design Decisions - Scope

In Scope

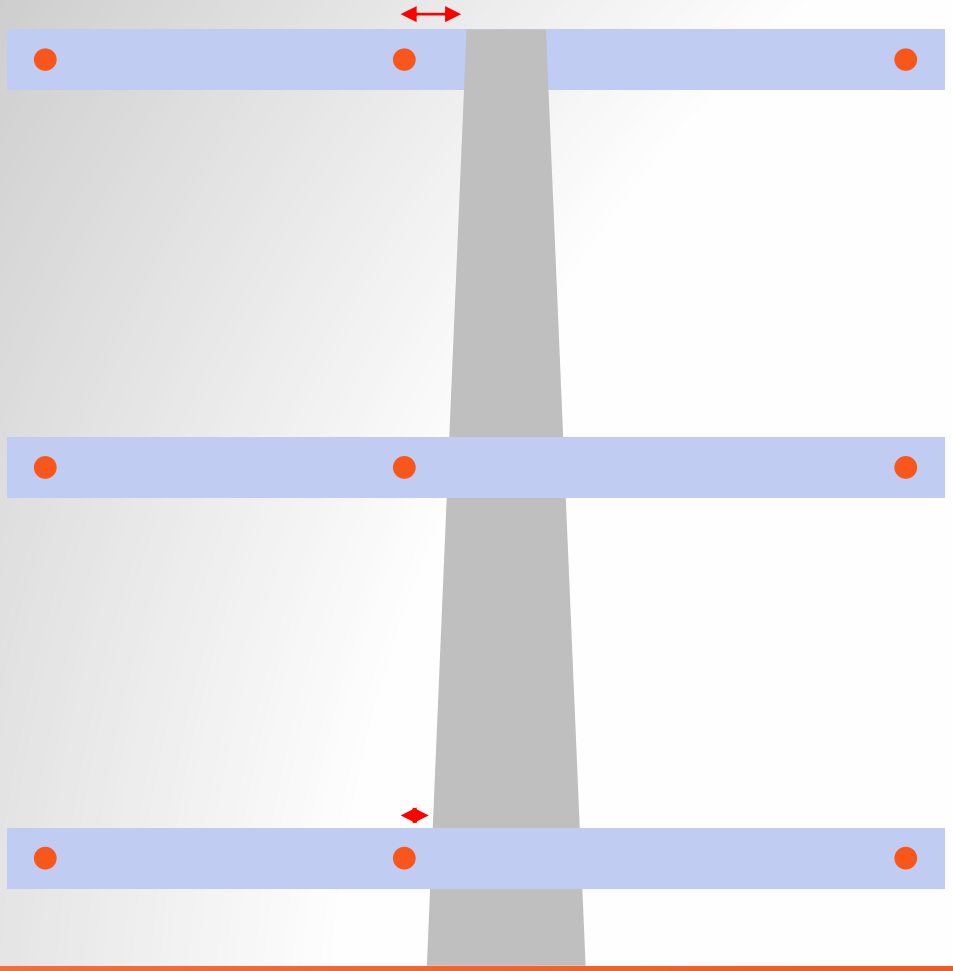
- 11kV arms
- 33kV arms
- Arm Braces
- Attachments:
  - ABS
  - Drop out fuses

Out of Scope

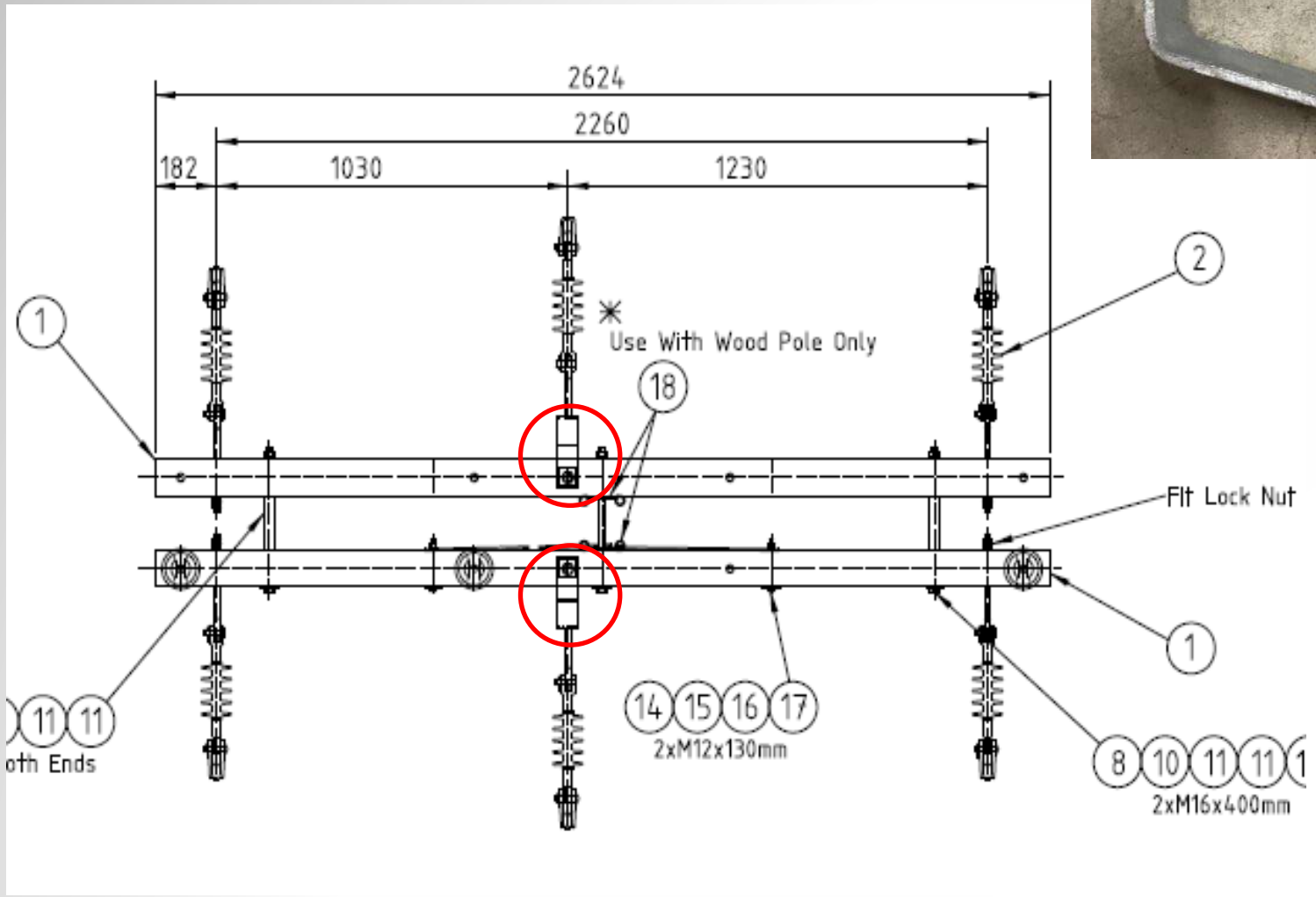
- LV arms
- Mounting:
  - Recloser/RCS
  - Regulators

Design Decisions

How far out to put the centre phase strain?



Clevis

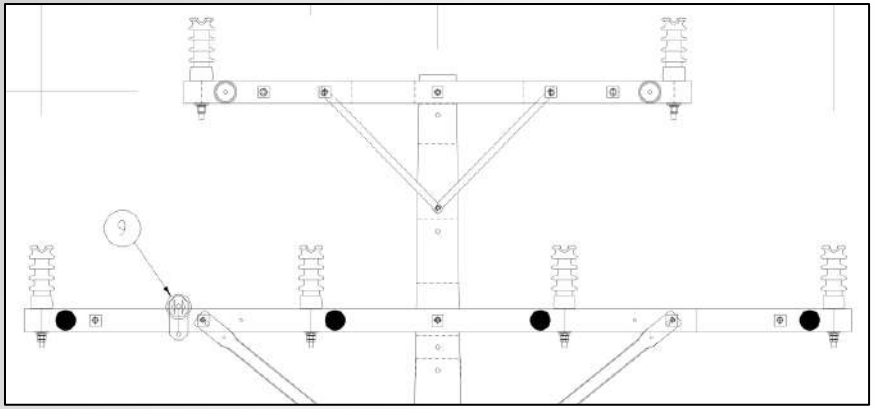

2624
2260
182
1030
1230
Use With Wood Pole Only
18
1
2
Fit Lock Nut
1
11
11
oth Ends
14
15
16
17
2xM12x130mm
8
10
11
11
2xM16x400mm

Standard Arms

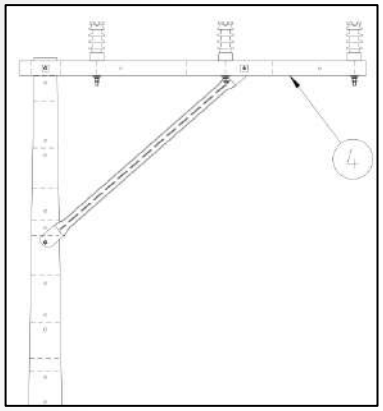
Standard Lengths

2.2m, 2.6m, 3.2m, 4.1m

Double Delta Arm



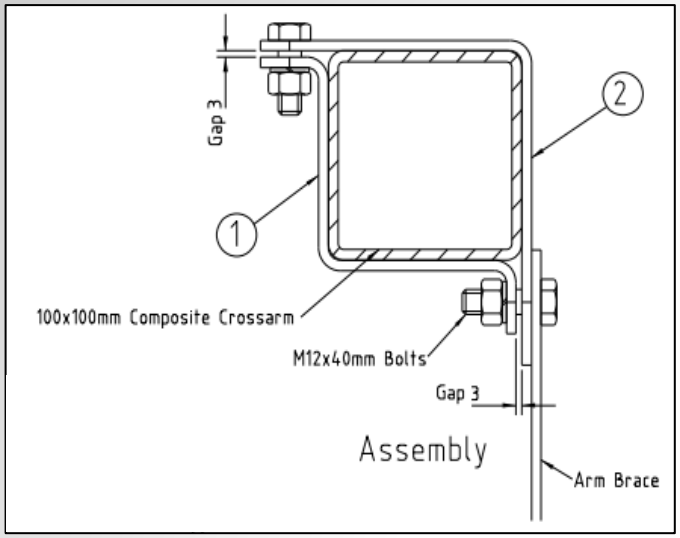
Offset Arm

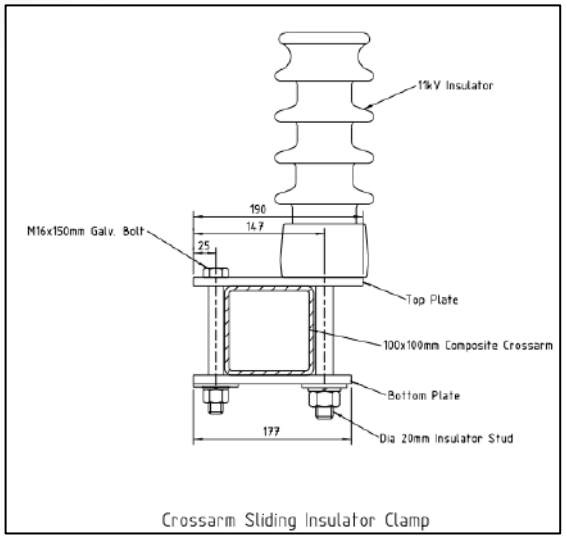


Composite Standard Arms

Length (m)	Configuration	Dimensions (mm)
2.2	Both	100x100
2.4	Offset & ABS takeoff	100x100
2.6	Both	100x100
3.2	Both	100x100
3.6	Dual Circuit	100x100
4.1	Both	100x100

Components & Handling





SOP-84 Handling Composite Crossarms

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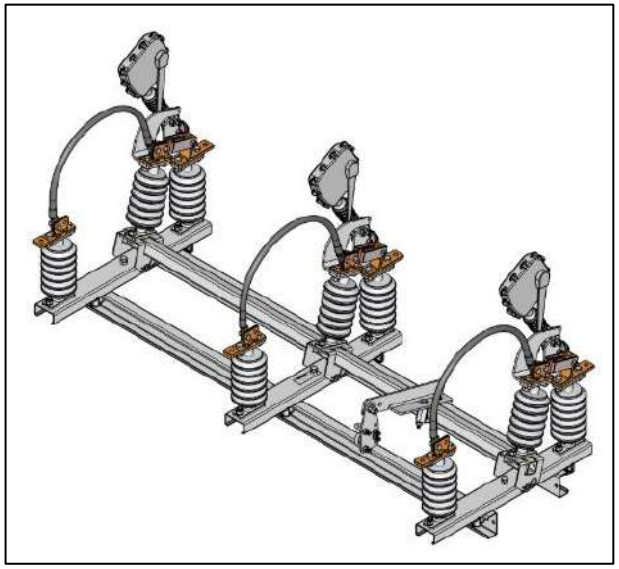
Preventing damage to composite crossarms

The table below summarises what to do to prevent damage to composite crossarms.

	What to do
Transporting	When transporting crossarms: • do not store crossarms on racks unless the racks have been covered with some form of non-scratch material such as cloth, rubber mats or cardboard, and • tie down to prevent movement. 

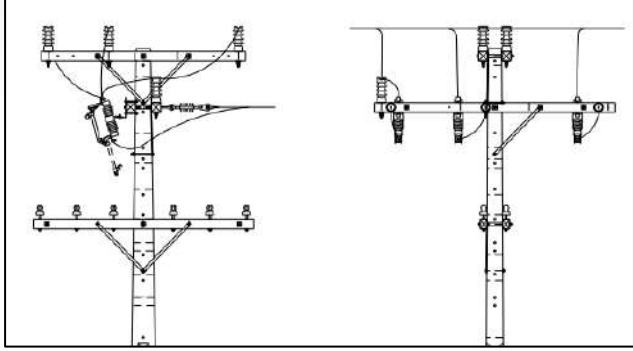
Transporting Composite Crossarms

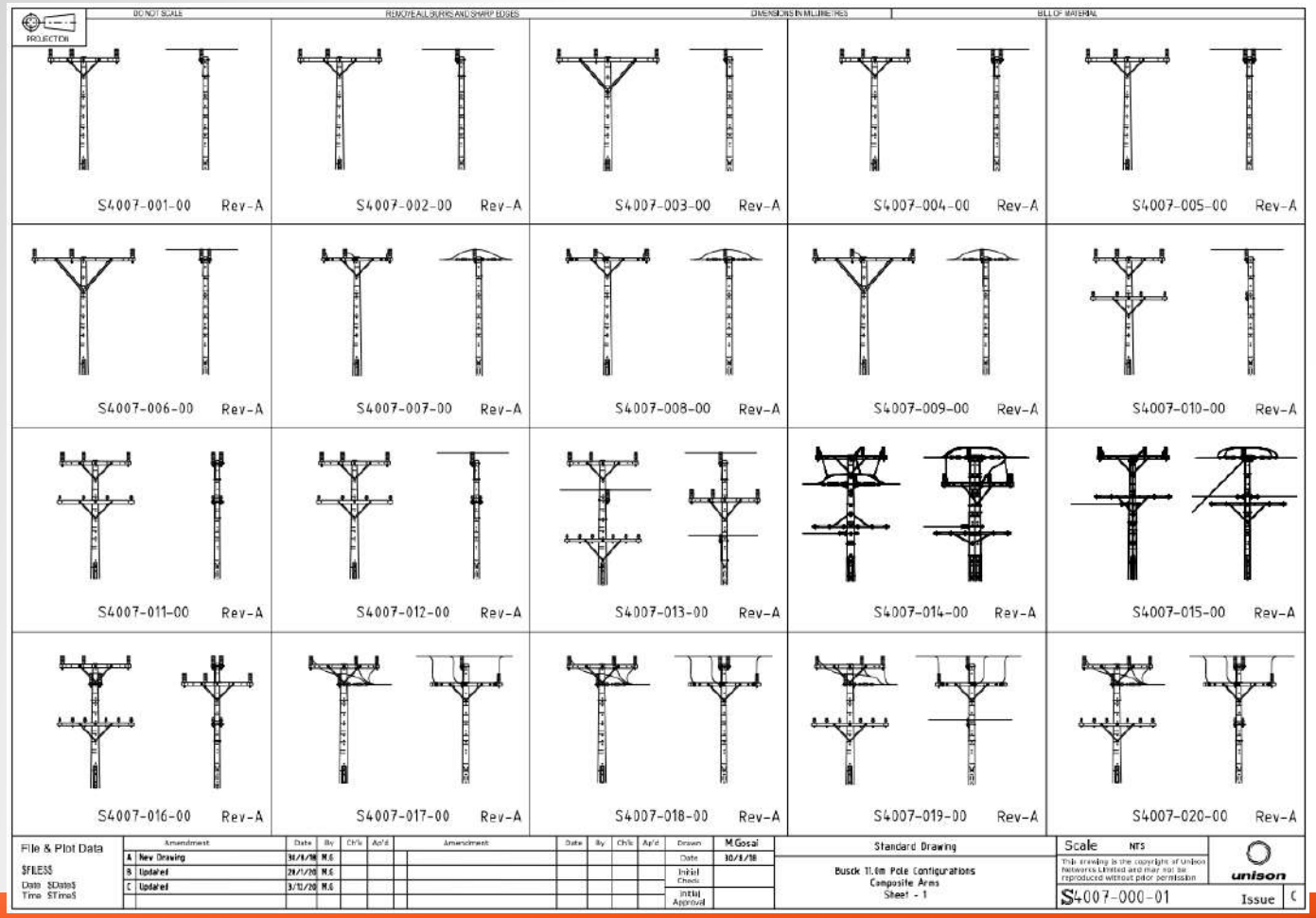


Standard Drawings

Identify standard components

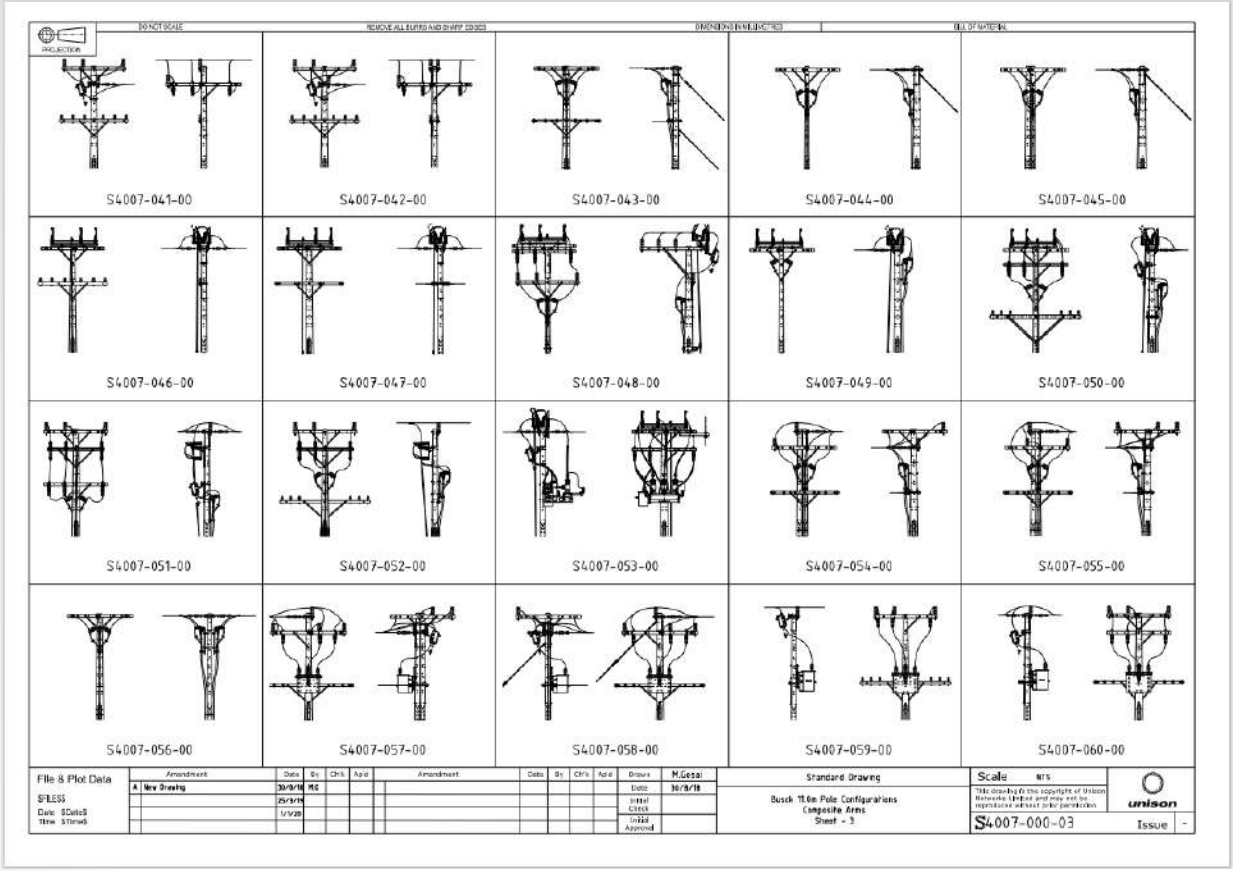
Develop standard arm assemblies





Industry Standardisation

- The Lines Company are using our designs. Currently working with PowerCo and Vector to standardise our arms
- Full suite of Busck pole drawing and happy to share



Failure Hierarchy

Experiences

- Less build variability with standard drawings and no drilling
- More care required when lining up H Structures
- “Lighter – much nicer on my back”
- Some minor damage from handling
- Small number of 125x125mm arms needed for strength

Stakeholder Feedback

- Designers – Designing with a known strength
- Control Room – Improving reliability from reduced animal trippings
- Field Crews – Lighter and simple to use
- Stores – 33% fewer arm types = less stock
- Asset Management – consistent quality and long life expected

Any Questions?

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Industry Standardisation – Get in touch if you are interested, full suite of Busck pole drawing available