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1 Introduction

This chapter provides guidance for the use and installation of stays on overhead line structures. Guidance is also included on the use of wooden struts. The line design specifications listed in the reference documents near the end of this chapter shall be read to determine the stay requirements for newly installed poles.

The suitability of the various stay installation procedures for any given stay depends on location and terrain conditions. The supervisor shall decide which installation procedure is appropriate for each stay. All the procedures and techniques outlined in this chapter are fully covered in CP430 Part 1.

Prior to any work being carried out, all working party personnel shall be fully acquainted with the procedures to be adopted in order to ensure the safety of the public and livestock, especially when installing stays adjacent to public highways, footpaths, sites of special scientific interest, waterways, other areas of special interest, etc. Reference shall be made to the relevant sections of the Distribution Safety Rules prior to work being started.

General handling of materials (including stay wire and associated components) is covered in Chapter 02.

General arrangements for current design standards are included in the appropriate documents listed at the end of this chapter.

2 Scope

This chapter contains information relating to the types, general arrangements, installation and protection of stays, used for new build, refurbishment and maintenance, from LV up to and including 132kV. Drawings of approved stay arrangements with lists of materials are included, together with selection criteria.

3 General

The dimensions for an installed stay fitted with a mandatory anti-climbing device are shown in Drawing I-420-1.07-001. The dimensions comply with all statutory requirements, and the requirements of Electricity North West. For background information, refer to the following documents:

- Electricity Safety, Quality and Continuity Regulations (ESQCR), Regulation 20 for statutory requirements for the presence and minimum height of a stay insulator (all stays shall meet this statutory requirement by 31/01/2013):

“Fitting of insulators to stay wires

20. Every stay wire which forms part of, or is attached to, any support carrying an overhead line incorporating bare phase conductors (except where the support is a lattice steel structure or other structure entirely of metal and connected to earth) shall be fitted with an insulator no part of which shall be less than 3 metres above ground or above the normal height of any such line attached to that support.”

- ENA TS 43-91.

In order to select an appropriate stay arrangement and stay anchoring system for a particular pole, refer to the guidance given in this chapter and the relevant design and construction specification, e.g. ES40003 (for 11/6.6 and 33kV bare-wire overhead-lines).

Uplift calculations are based on installation in sand of density 1595kg/m³ which is considered to be representative of average worst ground conditions, with a minimum angle between stay and pole of 30 degrees. If very wet soft ground conditions are encountered, special foundations shall be considered; in such cases the 'H' pole bracing block may be used.

Existing installations shall be treated as follows:

- Where work is to be carried out on an existing support which carries a stay arrangement (including anchor) and that arrangement is shown to be either
 - (a) non-compliant with ESQCR or
 - (b) the stay is at the end of its working life.

then the inadequate stay components shall be replaced in accordance with this chapter and CP421. Where the stay is shown to be fit for further continued service, no action shall be taken unless the structure is to be changed, in which case a stay arrangement to this chapter shall be installed. | April 23

Where a new line is to be erected, or an existing line is to be rebuilt, the requirements of this chapter shall apply in full.

4 Stay Components

Each stay arrangement comprises an assembly of individual components based on high tensile steel wire, helical fittings, stay plates or straps, insulators and anchoring systems. Stay components shall comply with ENA TS 43-91 and the Electricity North West specifications quoted in the lists of materials for the drawings included at the end of this chapter. Note that the heavy duty stay plate is not included in ENA TS 43-91.

4.1 Pole Top Make-Offs

Only the pole top make-offs detailed in the stay arrangement drawings shall be used.

The manufacturers' instructions and application diagrams shall be used for the attachment of the pole top make-offs.

Pole top make-offs are specified in ES400H2.

4.2 Stay Plates and Straps

Stay plates may be used in place of pole top make-offs as stated below.

Heavy duty stay plates may be used on LV, 6.6/11kV and 33kV lines. For specific information on the permissible use of stay plates, refer to the appropriate design and construction specification (eg ES40003 for 11/6.6 and 33 kV bare-wire overhead-lines). The specified minimum failure load of stays attached to a heavy duty stay plate shall not exceed 145kN.

Light duty stay plates may be used on LV lines only. The safe working load of a stay attached to a light duty stay plate shall not exceed 28kN.

When fitting stay plates to wood poles it is important to ensure that the stay plate is fixed beneath the head (but never on the threads) of a M20 bolt; not under the nut. A square curved washer shall be fitted between the pole and the nut.

Stay straps shall be used on 132kV Trident lines.

Stay plates and straps are specified in ES400S11.

4.3 Helical Fittings

Only the helical fittings detailed in the stay arrangement drawings shall be used.

The manufacturers' instructions and application diagrams shall be used for the attachment of the helical fittings.

Helical fittings are specified in ES400H2.

4.4 Stay Insulators

All stays (with the exception of 132kV Trident) shall have insulators fitted as shown in Drawing I-420-1.07-002 and positioned as shown in Drawing I-420-1.07-001. The position of the insulator in the 132kV Trident stay arrangement is fixed by the other components (refer to Drawings I-420-1.07-014 and -015).

There are three types of insulator:

- Type 1 for use on LV and 11kV.
- Type 2 for use on 33kV. One Type 2 insulator shall be installed on 33kV earthed structures (refer to Drawing I-420-1.07-012) and two Type 2 insulators shall be installed on 33kV unearthed structures as shown in Drawing I-420-1.07-013.
- A stay insulator for 132kV Trident lines.

Only the stay insulators specified in the stay arrangement drawings shall be used, and only for the purposes stated above.

The height of the stay insulator shall be such that no part of the insulator shall be less than 3m above ground level, as required by ESQCR.

For lines up to 33kV, stay insulators shall be positioned at a minimum 1.8m along the stay from the pole/crossarm, except where, on supports containing auxiliary equipment, it is envisaged that a broken stay or broken jumper could result in contact between live metal and the stay wire below the insulator. In such cases the insulator shall be installed at an appropriately greater distance from the pole/crossarm, but not below a position which would maintain a minimum of 3.0m above ground level where the stay could swing if broken.

Stay insulators are specified in ES400I4.

4.5 Stay Wires

Only 1150 grade 7/4.00mm stay stranded wire shall be used on Electricity North West’s network for all new build and any replacement stays during refurbishment and maintenance.

Stay wire is specified on ES400S3.

4.6 Stay Anchoring Systems

There are four permissible stay anchoring systems approved for use, as shown in Drawings I-420-1.07-003 to -006. The selection of an appropriate anchoring system depends on a number of factors. The advantages and disadvantages of these systems are summarised in [Table 1](#) below.

Table 1: Advantages and Disadvantages of Stay Anchoring Systems

ANCHORING SYSTEM	ADVANTAGES (+) / DISADVANTAGES (-)
A. Auger stay rod	+ Less land damage and faster installation than system C. - Vehicle availability. - Vehicle access.
B. Load locking stay anchor	+ Less land damage and faster installation than system C. - Only suitable for light work. Effective area of anchor is less than that of the equivalent wooden block, thus increasing the chance of pull-out. - Can only be used in undisturbed ground.
C. Excavated stay rod with wooden holding block	- Increased land damage and slower to install than systems A and B. + Does not have the disadvantages of systems A and B.
D. Rock anchor	+ This is the only system that can be used in rock. Not for use elsewhere.

All stay anchoring systems used on the Network shall meet the requirements of ES400A3.

4.6.1 Auger Stay Rod System

The auger system consists of a galvanized high tensile steel threaded anchor rod, a screw base with either single or twin helices welded to a square stub and a galvanized forged steel stay eye nut.

Drawing I-420-1.07-003 shows the stay rod assembly to be used in conjunction with the hydraulic drive motor for the auger system.

The manually installed screw-in stay anchor to ENA TS 43-91, Drawing 439105, is no longer approved for use on Electricity North West’s overhead line network.

4.6.2 Load Locking Stay Anchor System

The anchoring system, shown in Drawing I-420-1.07-004, consists of an anchor connected to a wire tendon. The anchor is rotated underground and locked in position (as shown on the drawing) by a load locking jack which applies an upward force via the tendon.

The main disadvantage of this system is that the effective area of the anchor is less than that of an equivalent wooden block. The risk of pull-out is therefore greater, making load locking and proof-testing of the anchor essential. This system shall only be used for light work. See Section **Error! Reference source not found.** of this chapter for the limits of use.

Where traditional load locking anchors are used as light duty stays, one of the following requirements shall be met:

- If a single anchor is to be used, a 3m tendon shall be fitted.

The 3m tendon can be identified by a red band around the eye. Suitable installation equipment and a suitable load locking unit shall also be used.
- Alternatively, two traditional load locking anchors (with 2m tendons) may be installed provided they are a minimum of 2m apart if splayed, or 1m apart if installed in tandem. (Splayed is preferred to tandem.)

Only load locking stay anchor systems that have adequate earthing (ie electrical connection between the tendon and the stay wire via flying lead) shall be used.

4.6.3 Excavated Stay Rod with Wooden Holding Block

This type of anchor is shown in Drawing I-420-1.07-005. Only adjustable Type 2 stay rods to ENA TS 43-91 shall be used on Electricity North West's network for new build, refurbishment and maintenance. Stay rods shall be adjustable and in accordance with ENA TS 43-91 Drawing 439101 Type 2 for 7/4.00mm stay wire.

Each rod shall be installed with a Type 2 wooden stay block to ENA TS 43-91.

Note that the use of concrete stay blocks is no longer allowed within Electricity North West.

Wooden stay blocks are specified in ES400W2.

4.6.4 Rock Anchor

The rock anchor system, as shown in Drawing I-420-1.07-006, is suitable for use in solid rock. Rock anchors expand and wedge against solid walls of rock. Once a rock anchor is expanded, the harder the pull on the rod, the tighter it wedges.

There are two grades of rock anchors that can be used dependent on the type of work. Each grade is available in two lengths. These are:

- Heavy (25mm / 1") 1346mm / 53" or 1828mm / 72" length.
- Light (19mm / 3/4") 762mm / 30" or 1524mm / 60" length.

5 Selection of Stay Arrangements

5.1 Introduction

The purpose of this section is to provide the reader with enough information to select an appropriate stay arrangement for any wood pole structure. First, the type of stay arrangement to be used shall be selected using the information in Section **Error! Reference source not found.**, then the most suitable anchoring system from those available for that arrangement can be selected using the information contained within this chapter as guidance.

Stay plates may be used in place of pole top make-offs in certain circumstances – refer to Section **Error! Reference source not found.** above.

5.2 Stay Types

The following stay types are approved for use on Electricity North West's network, but only for the purposes specified.

5.2.1 Light Duty Stay

For use on LV overhead line structures and light duty 6.6/11kV overhead line structures, ie BS1320, ENA TS 43-10 and any historical light duty company specific derivations.

A light duty stay is a stay that has either a light duty stay plate or a load locking stay anchor system. This stay is rated for 65kN MFL with an SWL of 26kN applying a 2.5 factor of safety. See Drawings I-420-1.07-007 to -009 for components.

This type of stay is the equivalent of a Group 2 stay as per ENA TS 43-30.

5.2.2 Heavy Duty Stay

For use on LV, 6.6/11kV and 33kV overhead line structures.

This stay is rated for 101kN MFL with an SWL of 40.4kN applying a 2.5 factor of safety. See Drawings I-420-1.07-010 to -013 for components.

5.2.3 132kV Trident

For use on 132kV Trident overhead line structures.

This stay is rated for 101kN MFL with an SWL of 40.4kN applying a 2.5 factor of safety. See Drawings I-420-1.07-014 and I-420-1.07-015 for components.

5.2.4 Flying Stay

For use as defined in [Section 5.3](#) below.

This stay type is rated for a horizontal SWL as per [Table 2](#) due to the eyebolt. The flying stay pole and stays attached shall then be designed as a normal stay based on the horizontal load.

See Drawing I-420-1.07-016 for details.

Table 2: Safe Working Load of Flying Stay

ANGLE BETWEEN DIRECTION OF FLYING STAY WIRE AND AXI SOF BOLT		SAFE WORKING LOAD	
Degrees	kN	kgf	
0	38	3918	
5	30	3115	
10	25	2602	
15	22	2248	
20	19	1993	
25	17	1802	
30	16	1656	
35	15	1543	
40	14	1454	
50	13	1332	
>50	12	1239	

5.2.5 Struts

For use on LV and light duty 6.6/11kV overhead line structures.

Struts shall only be used for LV or like for like replacements on light duty 6.6/11kV poles where a stay cannot be fitted. Struts on HV poles shall be fitted with an anti-climbing device in line with guidance for HV H-poles in Chapter 10.

See Drawing I-420-1.07-017 for details and [Section 5.3](#) for usage.

5.3 Stay Arrangements

Stays can be installed using any of the following arrangements:

- Single Stay – a single stay holding directly against the line of the resultant load.
- Splayed Stays – 2 stays with their stay anchors equally splayed apart from their centreline, which is directly against the line of the resultant load.

- Tandem Stays – 2 stays with their anchors spaced sufficiently apart on the line of the resultant load.
- Flying Stay – consists of a stay wire spanning between the overhead line pole to a specific flying stay pole which then has a single stay holding directly against the line of the resultant load. These are used where there is not enough room for a stay anchor, eg next to a road. The statutory overhead line clearances across roads and other ground shall be maintained for these stay arrangements.

- Windstays – consist of two stays, one on each side of the pole perpendicular to the line and attached a minimum 1.5m below the top crossarm. They are attached to intermediate or section poles to provide additional stability to lines in very poor ground conditions and/or subject to high winds, eg lines routed through marshy ground or up on high level ground.
- Strut – a strut is used if a stay cannot be located on the outside of an angle pole. The strut is a specifically fabricated wooden pole fixed to the overhead line pole on the inside angle in the line of the resultant force as shown in Drawing I-420-1.07-017.

6 Installation Requirements

6.1 Pole/Stay Setting

Much of the stability of an overhead line depends upon the effectiveness of the stays. Correct stay spread, using a preferred stay slope angle of 45°, is essential to avoid over-stressing either the stay components or the pole. Stay setting and stay spread details are given in Drawings I-420-1.07-018 and I-420-1.07-019 respectively.

When making off the stay assembly, consideration shall be given to any settlement of the pole which will take place when the conductors are pulled up to tension.

The amount of pole movement will depend upon the natural ground conditions and the care with which the stay hole has been backfilled and consolidated. It is difficult to be precise, but as a guide, each assembly shall be adjusted so that the pole is set back into the stay between one half and one full pole diameter.

6.2 Multiple Stays

Strut loading on H poles shall be apportioned as follows:

- | | | |
|------------------------------|---|------|
| • Stays on outer leg only | - | 100% |
| • Stayed equally on each leg | - | 50% |
| • Two stays on inner leg | - | 60% |
| • and one stay on outer leg | - | 40% |

Where double stays are required, the splayed form is preferable; splayed stays provide the most stable arrangement. Refer to Drawing I-420-1.07-020.

On HV lines, splayed stays shall always be splayed with a minimum of 2m undisturbed ground between stay anchoring assemblies, as shown in the arrangement in Drawing I-420-1.07-020. Tandem stays (minimum 1m apart as shown in Drawing I-420-1.07-020) may be used where necessary, but splayed stays are preferable.

On HV lines, for example, where more than one stay is required on an H-pole angle structure, the use of triple stays is preferred. Triple stays comprise two splayed stays set at the approved angle to the pole, and a third stay placed to bisect the two and enter the ground at least 1 m behind them, when viewed from the pole. The arrangement is shown in Drawing I-420-1.07-020.

Where 2 stays are installed on an H-pole angle structure, they shall both be fitted to the outer leg.

On LV lines only, tandem stays may be placed in the same stay hole, providing it is possible to undercut sufficiently for each stay block to bear against undisturbed ground.

6.3 Auger Stay Rod System

The auger system uses a hydraulically-operated vehicle-mounted drive-motor. A square drive tube can be fitted with screw base plates of differing sizes dependent upon the type of ground in which the stay rod is to be mounted. This system has been extensively tested and is used successfully around the world in ground conditions considered to be worse than those experienced in the UK. The system is not suitable for 'one off' installations where the vehicle may have to travel a relatively long distance to perform a few minutes' work, and where site access and manoeuvrability may be a problem for the vehicle.

Drawing I-420-1.07-003 shows the stay rod assembly to be used in conjunction with the hydraulic drive motor for the auger system.

Because different types of ground provide different holding abilities for the stay rod anchorage points, the following factors shall be considered prior to installation of the auger:

- The type of ground in which the stay rod is to be installed.
- The screw base diameter to be used. (Generally, the larger the screw base diameter, the greater the holding capacity of the stay rod will be.)
- In very poor ground conditions the use of a twin helix screw base shall be considered.
- The auger shall withstand proof loading to 5 tonnes.

The holding capacity of an augered stay is related to the torque reading on the hydraulic drive motor. The required reading shall be 6.1kNm (4500lbf ft) on the torque gauge to provide a minimum holding capacity of 133kN (30000lbf).

6.4 Load Locking Stay Anchor System

The strength of this system is dependent upon the earth anchor being driven into undisturbed ground; this shall be considered prior to installation.

The load locking system is installed by connecting to special drive rods which are driven into the ground at the required angle by the use of either a pneumatic or hydraulic hammer. (The drive rods are recovered after each installation.) The earth anchor shall be driven to such a depth that the thimble eye on the end of the tendon is just visible above ground level.

A tendon, which is attached to the anchor, is used to load lock the anchor by means of a portable load locking jack which applies an upward force to attach the stay to the tendon. The anchor shall withstand proof loading to 3.5 tonnes which provides a holding capacity of 2.8 tonnes. Drawing I-420-1.07-004 shows the earth anchor installation and load locking procedure.

6.5 Excavated Stay Rod with Wooden Holding Block

6.5.1 Stay Hole Excavation

Drawing I-420-1.07-005 shows a typical excavation. The depth of the hole will depend upon the angle of the stay to the pole, but for general guidance, LV stays shall be set at a depth of 1.6m to 1.8m, and 1.75m to 2.0m for HV stays.

On reinstatement, a suitable cement based compound shall be added to the excavated material.

6.5.2 Stay Hole Temporary Shuttering

All stay hole excavations shall be shuttered in accordance with Drawing I-420-1.07-005: temporary shuttering shall be provided for any excavation in danger of collapse in accordance with CP430 Part 1. Further information is given in Chapter 03 of this CP (CP420 Part 1).

6.6 Rock Anchor

The rock anchor system is suitable for use in solid rock. Installation is quick and simple (refer to Drawing I-420-1.07-006). A hole is drilled using a power drill. The anchor, with attached rod, is dropped into the hole. The rod is turned by a bar to expand the anchor against the sides of the hole. Once expanded, the harder the pull on the rod the tighter the anchor wedges. The rock anchor shall withstand proof loading to 5 tonnes.

The site selected shall have minimum overgrowth, and shall be solid rock, not boulder.

The length of the anchor shall be determined by the type of rock:

- Hard rock (granite etc) – short.
- Limestone/sandstone – longer.

If the rock face is exposed and solid, a short anchor shall be used.

If the rock surface is shale, shattered or subterranean, a longer anchor shall be used.

There are two rock drill sizes that can be used dependent on the type of rock anchor to be installed. These are:

- Heavy (60mm / 2 ³/₈").
- Light (48mm / 1 ⁷/₈").

The angle of the hole shall be the same as the angle of the stay, such that rod and stay wire will be in line.

If break through is achieved before the hole is deep enough, choose another site.

6.7 Out of Balance Stays

At transposition poles it will generally be necessary to install an additional stay to counteract the out of balance loads. Consideration shall be given to ground clearance, clashing and overtensioning issues. Out of balance stays shall be installed in the correct location as specified by the designer.

6.8 Bonding of Stays

All stays supporting HV lines, with the exception of Windstays that are 1.5m or greater from the top crossarm, shall be bonded at the top to the steelwork.

The method of bonding stays is to take the centre “king” wire from a preformed pole top make-off or the separate bonding wire from the heavy duty stay plate, and connect it to a convenient bolt on the HV steelwork.

A stay attached to a stay strap need not be bonded separately if it is fitted to a bolt in contact with the steelwork.

7 Stay Protection

7.1 Protection Against Corrosion

The inclusion of a stay insulator is primarily a safety requirement, but it also prevents circulating currents which might otherwise promote accelerated corrosion of the stay rod.

In ground with high acid content, such as peat and refuse disposal areas, it may be necessary to protect against corrosion. This may be achieved by application of a suitable tape or heat shrinkable tubing. Note that it is mandatory for the stay rod to make electrical contact with the general mass of earth, therefore, application of tape or heat shrinkable tubing shall be limited to where corrosion is likely to take place, ie the first 600mm from ground level of installation of the rod.

7.2 Protection Against Interference

A barbed wire anti-climbing device shall be fitted to all stays in accordance with Drawing I-420-1.07-001.

All stay wires shall be wrapped with barbed wire from a vertical distance of 2.15m above the datum line extending 1.5m along the stay, except when the stay insulator may also lie within this section of stay wire. In these circumstances the barbed wire shall be applied above and below the insulator in such a position that it cannot short out the insulator. The ends of the barbed wire shall be securely fastened down using plastic securing ties (cable ties).

A livestock guard shall be considered where there is evidence of livestock interference. This generally takes the form of a wooden structure erected around the stay rod, usually 1m high, to prevent livestock rubbing against the stay wire and rod and causing the line to clash (See Drawing I-420-1.07-21 for examples). A livestock guard shall only be erected with the landowner’s permission.

8 Outrigger Brackets

Stay outrigger brackets, as shown in Drawing I-420-1.07-022, shall only be used on a like for like replacement where adequate stay spread cannot be achieved for a standard stay arrangement. An outrigger bracket is not suitable for heavy loads due to the tendency of the pole to bend.

9 Stay Marking

In certain locations it may be beneficial to increase the visibility of a stay. Examples of such locations are:

- A public highway or footpath.
- A hedge, or other vegetation, that is likely to be maintained (eg trimmed).

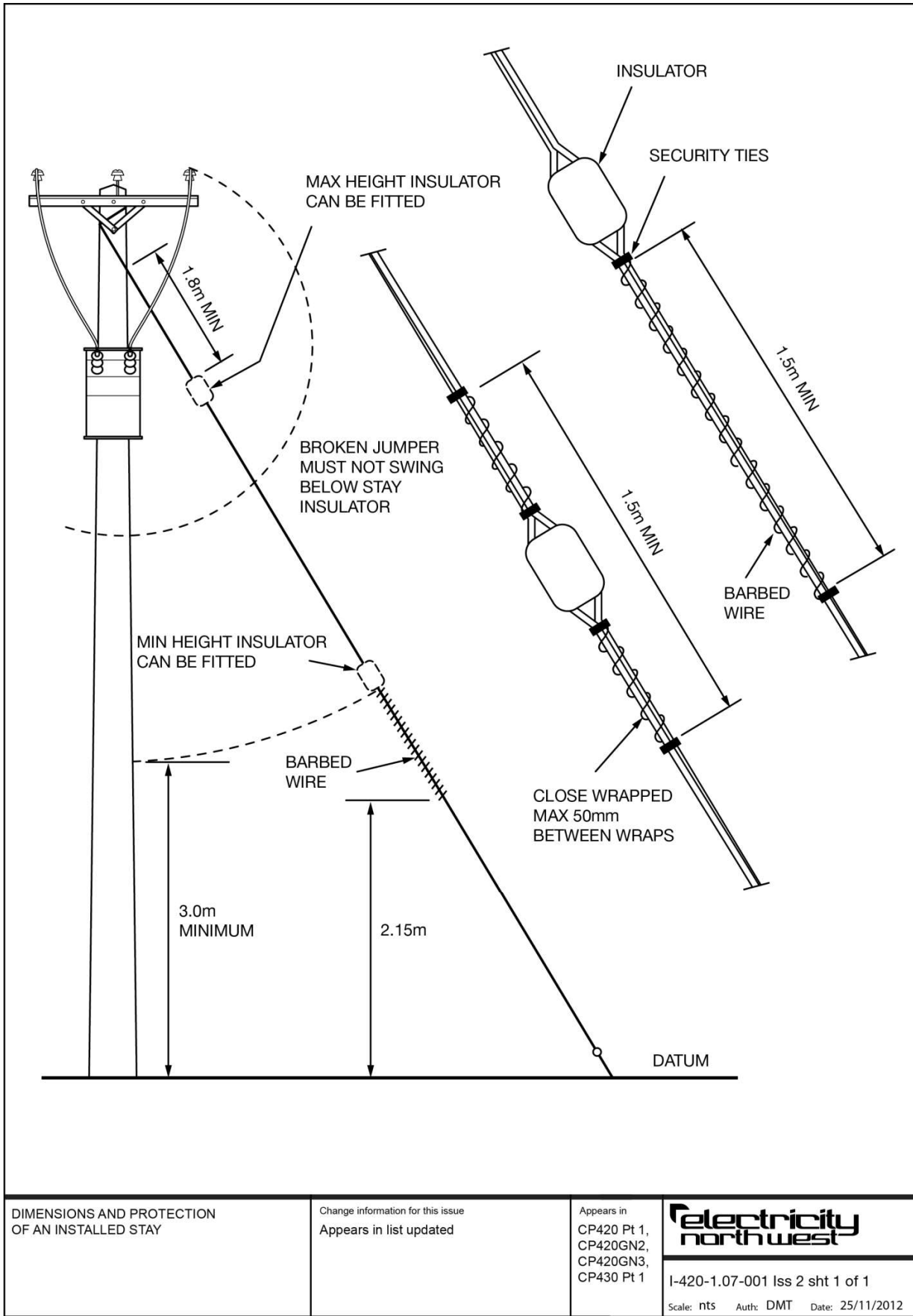
In these situations, a yellow stay marker shall be fitted over the stay to highlight its position.

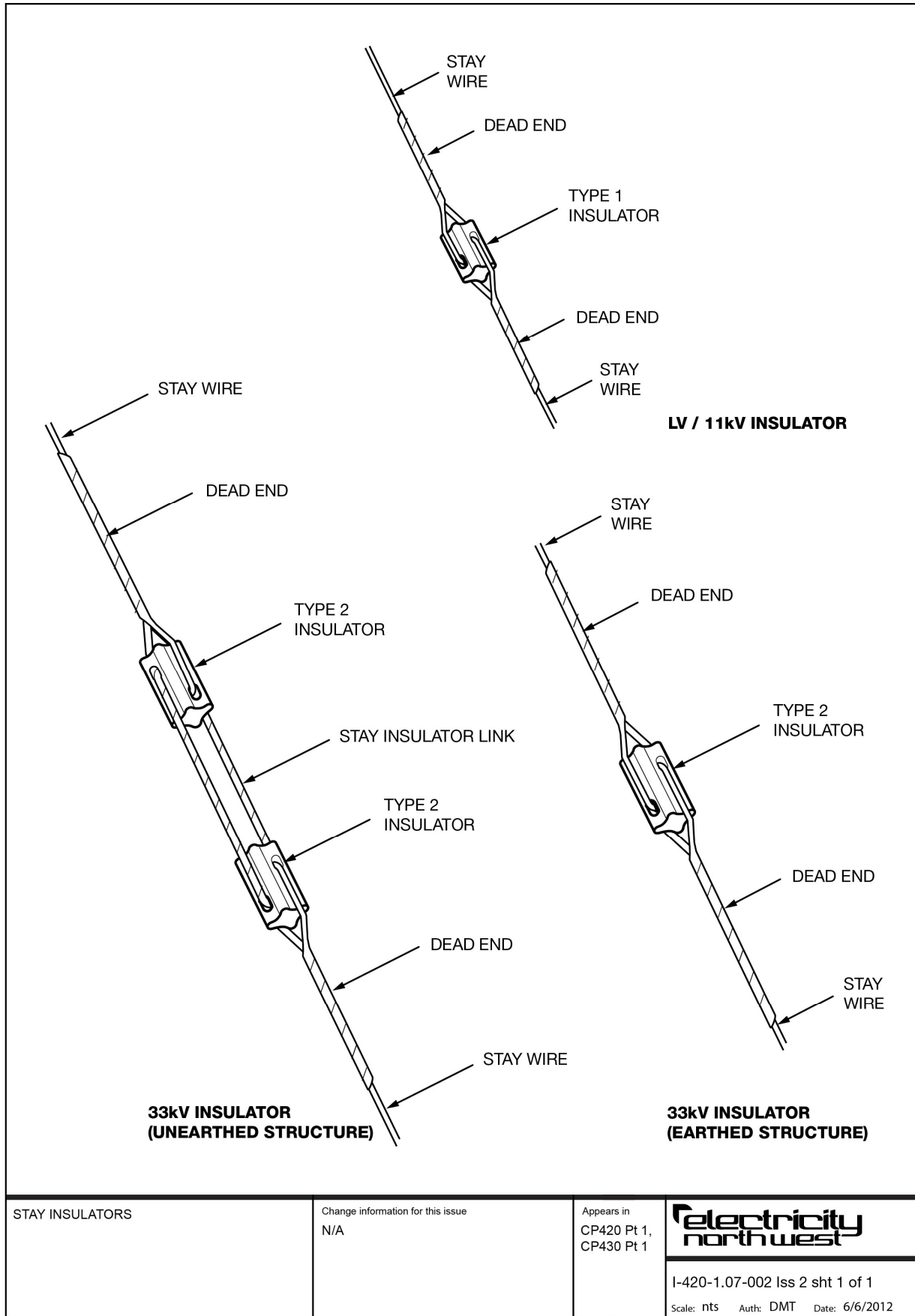
10 Documents Referenced

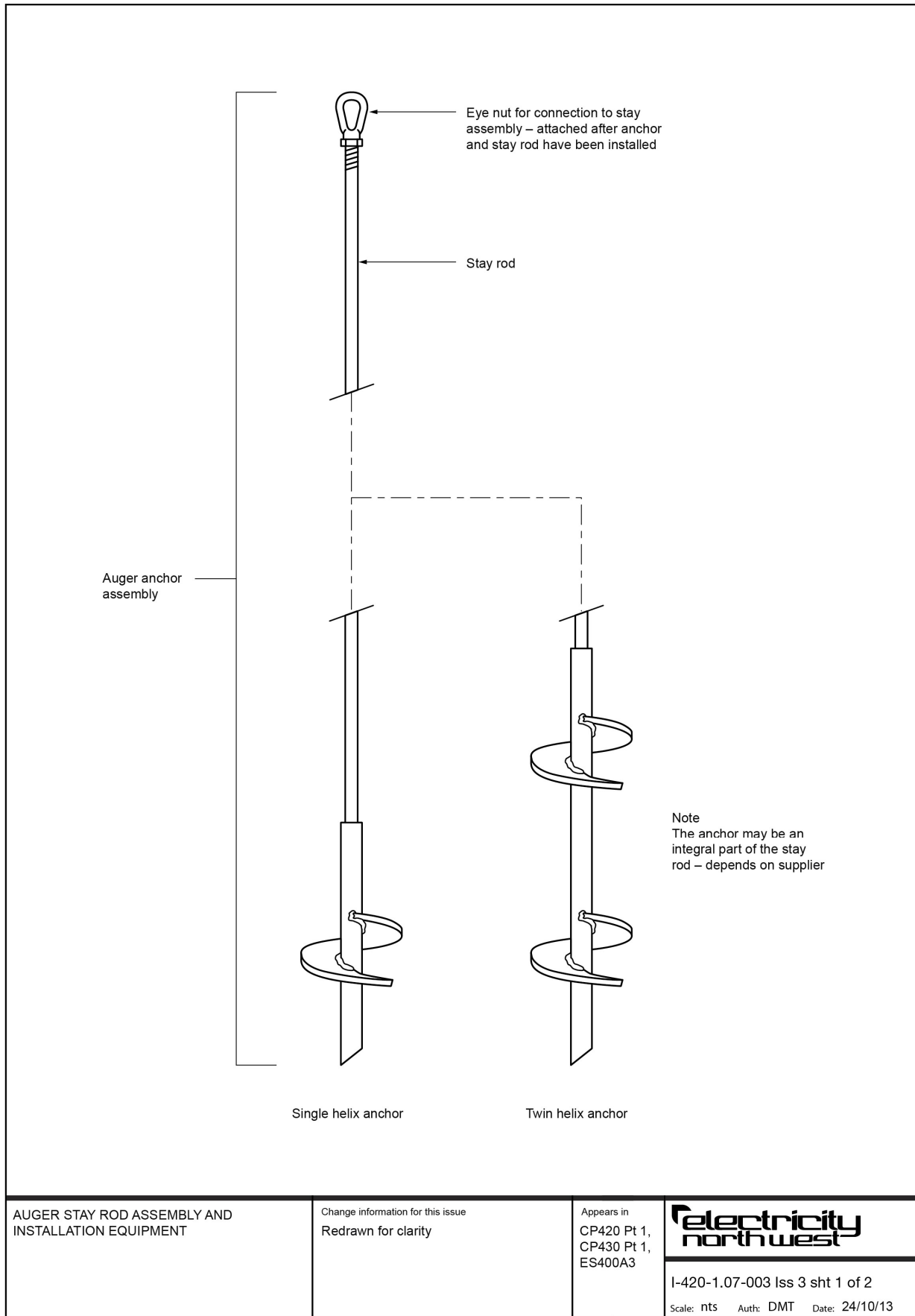
DOCUMENTS REFERENCED	
Electricity Safety, Quality and Continuity Regulations	
BS 1320	High-voltage overhead lines on wood poles for line voltages up to and including 11 kV, with conductors not exceeding 0.05 sq in
ENA TS 43-10	11kV Single Circuit Overhead Lines of Light Construction of Wood Poles (Withdrawn)
ENA TS 43-91	Stay strands and stay fittings for overhead lines
ENA TS 43-30	Low voltage overhead lines on wood poles
CP430 Part 1	Overhead Line - Linesman's Manual - Wood Pole
ES400A3	Mechanical Stay Anchors for Wood Pole Overhead Lines
ES400F1	Fasteners and Washers for Wood Pole Overhead Lines
ES400H2	Supply and Delivery of Helical Fittings
ES400I4	Overhead Line Insulators
ES400O3	Bare-Wire Overhead-Lines on Wood Poles for 11/6.6 and 33kV
ES400S3	Galvanized Steel Stay Strand
ES400S11	Overhead Line Steelwork
ES400W2	Wood Poles
ES400W4	Barbed Wire

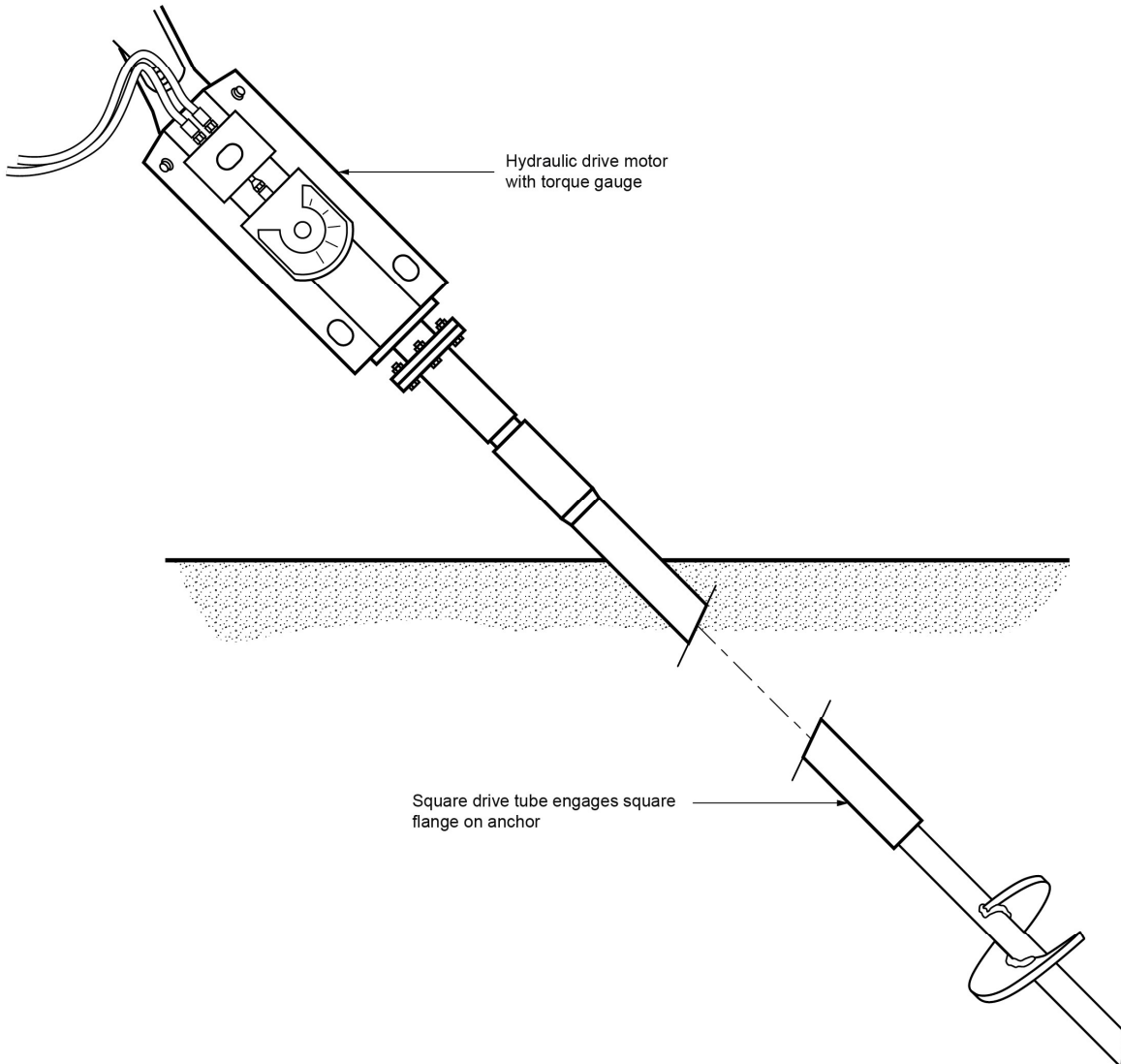
11 Keywords

Stay.









AUGER STAY ROD ASSEMBLY AND
INSTALLATION EQUIPMENT

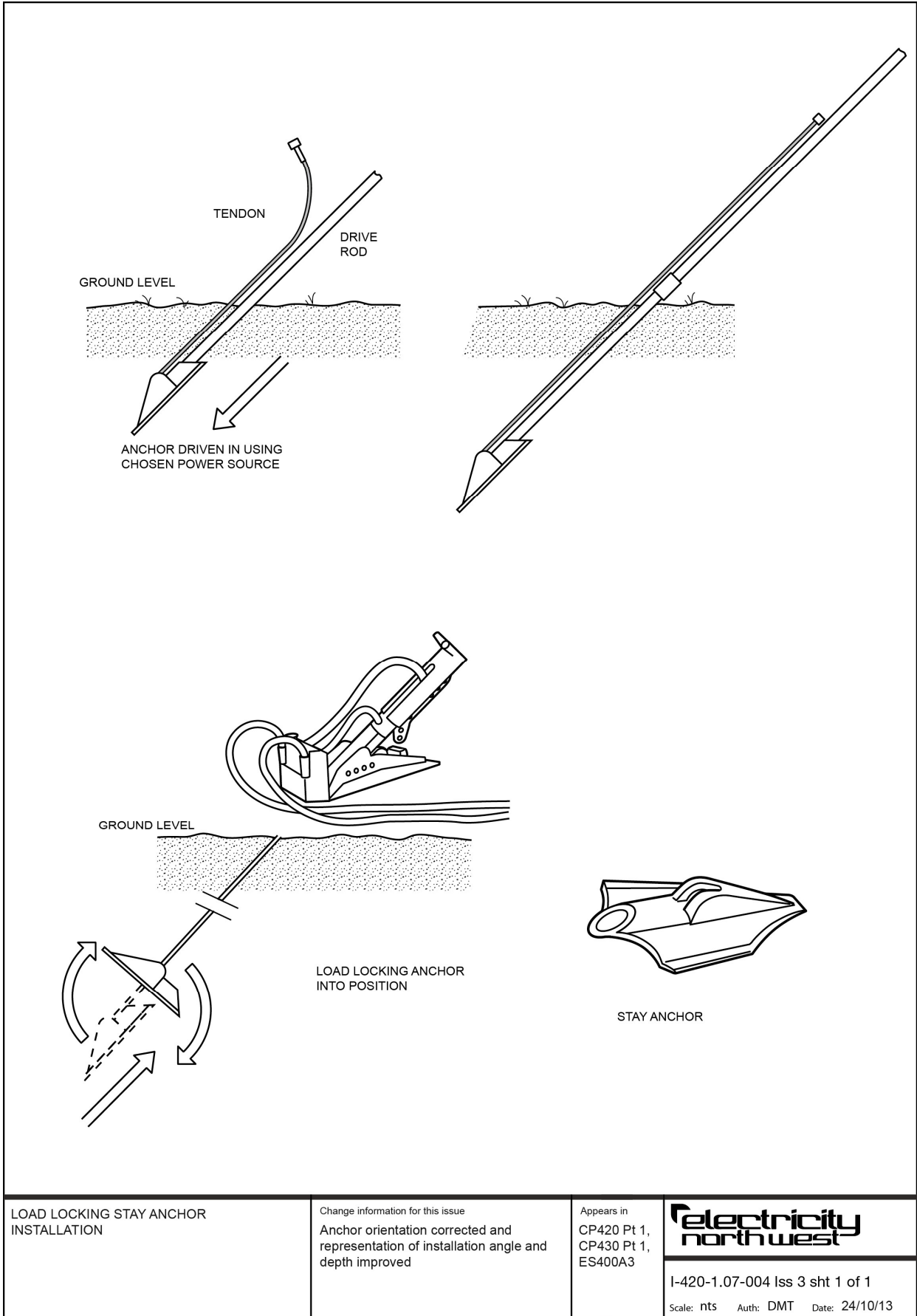
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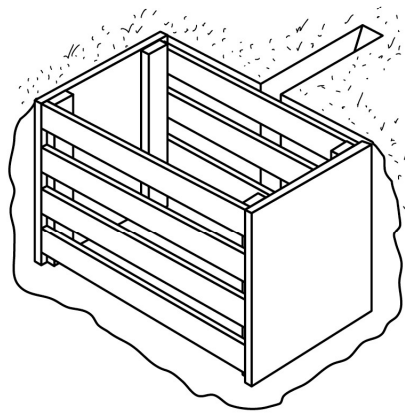
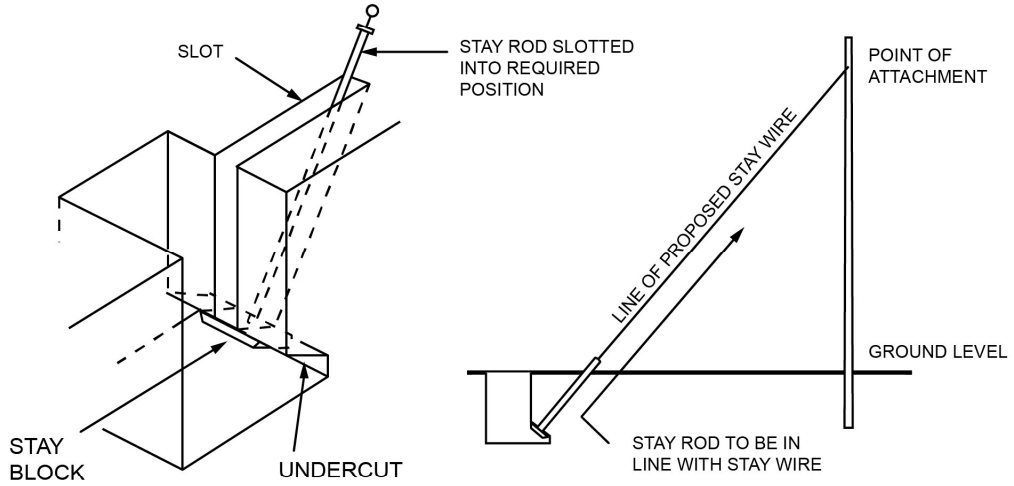
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CP420 Pt 1,
CP430 Pt 1,
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I-420-1.07-003 Iss 3 sht 2 of 2

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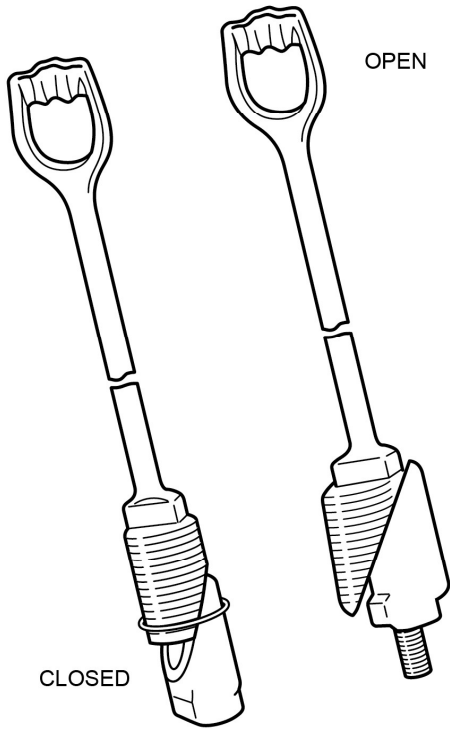


SHUTTERING FOR STAY HOLES

TYPICAL STAY-HOLE EXCAVATION

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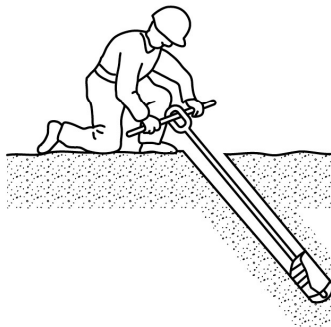
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CP430 Pt 1



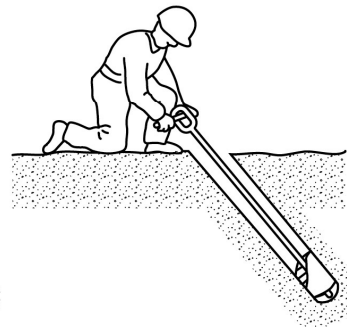
ROD DIA mm	ROD LENGTH mm	DRILL SIZE
19	762	1 7/8" 48mm
19	1524	
25	1346	2 3/8" 60mm
25	1828	



DRILL HOLE
ENSURE CORRECT
DIAMETER AND
DEPTH



PUSH ANCHOR INTO HOLE
ENSURE IT GOES FULLY
HOME



TURN ROD TO EXPAND
USING 1220mm
STRAIGHT BAR

EXPANDING ROCK ANCHOR

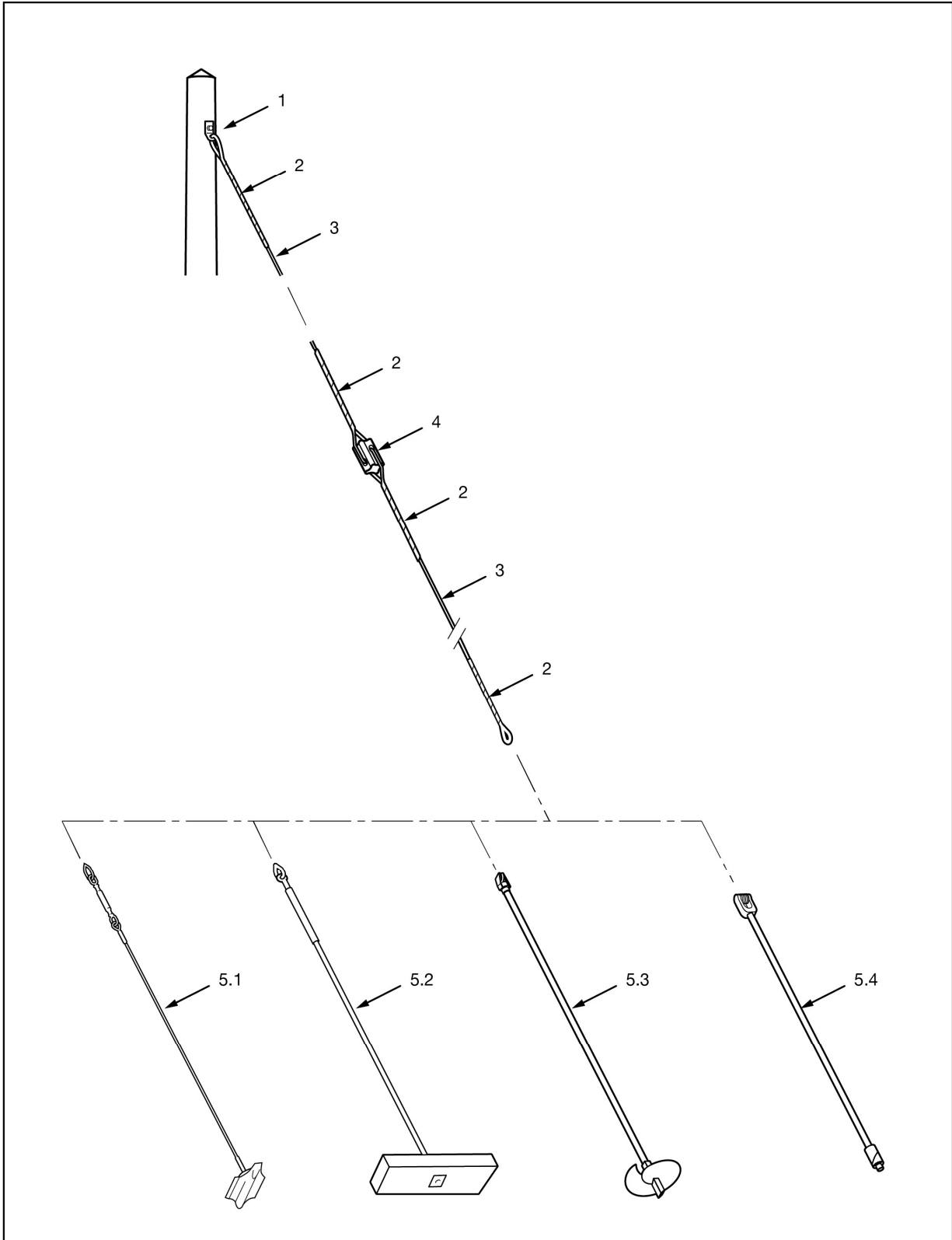
Change information for this issue
Drawing included in ES400A3

Appears in
CP420 Pt 1,
CP430 Pt 1,
ES400A3

**Electricity
north west**

I-420-1.07-006 Iss 2 sht 1 of 1

Scale: nts Auth: DMT Date: 04/10/12



<p>LIGHT DUTY STAY FOR LV USE ONLY</p>	<p>Change information for this issue Numbering amended</p>	<p>Appears in CP420 Pt 1, CP430 Pt 1</p>	<p>Electricity north west</p> <p>I-420-1.07-007 Iss 2 sht 1 of 1 Scale: nts Auth: DMT Date: 5/5/2015</p>
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LIGHT DUTY STAY FOR LV USE ONLY
MATERIALS FOR DRAWING I-420-1.07-007-11-1

ITEM	ALT. ITEM *	DESCRIPTION	ES REF	CC NO	QTY
1	-	Steelwork, stay plate, light duty	ES400S11	129194	1
		Bolt, M20, length 260mm, thread length 150mm, galvanized, c/w hex full nut	ES400F1	107697	1
		Washer, square, curved, 60x60x6mm, 22mm hole, galvanized	ES400F1	139203	1
2	-	Stay wire fitting, helical dead end, 7/4.00mm	ES400H2	121053	4
3	-	Stay strand, 7/4.0mm, 1150 grade	ES400S3	014397 [†]	15m
4	-	Insulator, stay, LV and 11kV, type 1, 110kN MFL	ES400I4	126470	1
5	5.1	(i) Anchor, stay, load lock, 2m tendon	ES400A3	121444	1
		(ii) Anchor, stay, load lock, 3m tendon	ES400A3	121445	1
	5.2	Anchor, stay rod, type 2	ES400A3	130435	1
		Wood block, foundation/stay, 1300mm	ES400W2	106569	1
	5.3 **	(i) Anchor, stay, auger, 8", single helix	ES400A3	123692	1
		(ii) Anchor, stay, auger, 10", single helix	ES400A3	123706	1
		(iii) Anchor, stay, auger, 10", twin helix	ES400A3	123722	1
		(iv) Anchor, stay, auger, 12", single helix	ES400A3	123714	1
	5.4 ***	(i) Anchor, stay, rock, ¾" dia, 30" length, 1¾" bolt	ES400A3	121517	1
		(ii) Anchor, stay, rock, ¾" dia, 60" length, 1¾" bolt	ES400A3	121525	1
		(iii) Anchor, stay, rock, 1" dia, 53" length, 2¼" bolt	ES400A3	121533	1
		(iv) Anchor, stay, rock, 1" dia, 72" length, 2¼" bolt	ES400A3	121541	1
6 (NI)	-	Barbed wire ****	ES400W4	197408 [†]	2m
7 (NI)	-	Tie, security, length 200mm, width 4.8mm, plastic ****	ES400F1	299758 [†]	4
8 (NI)	-	Staples, wire	ES400F1	133019	6

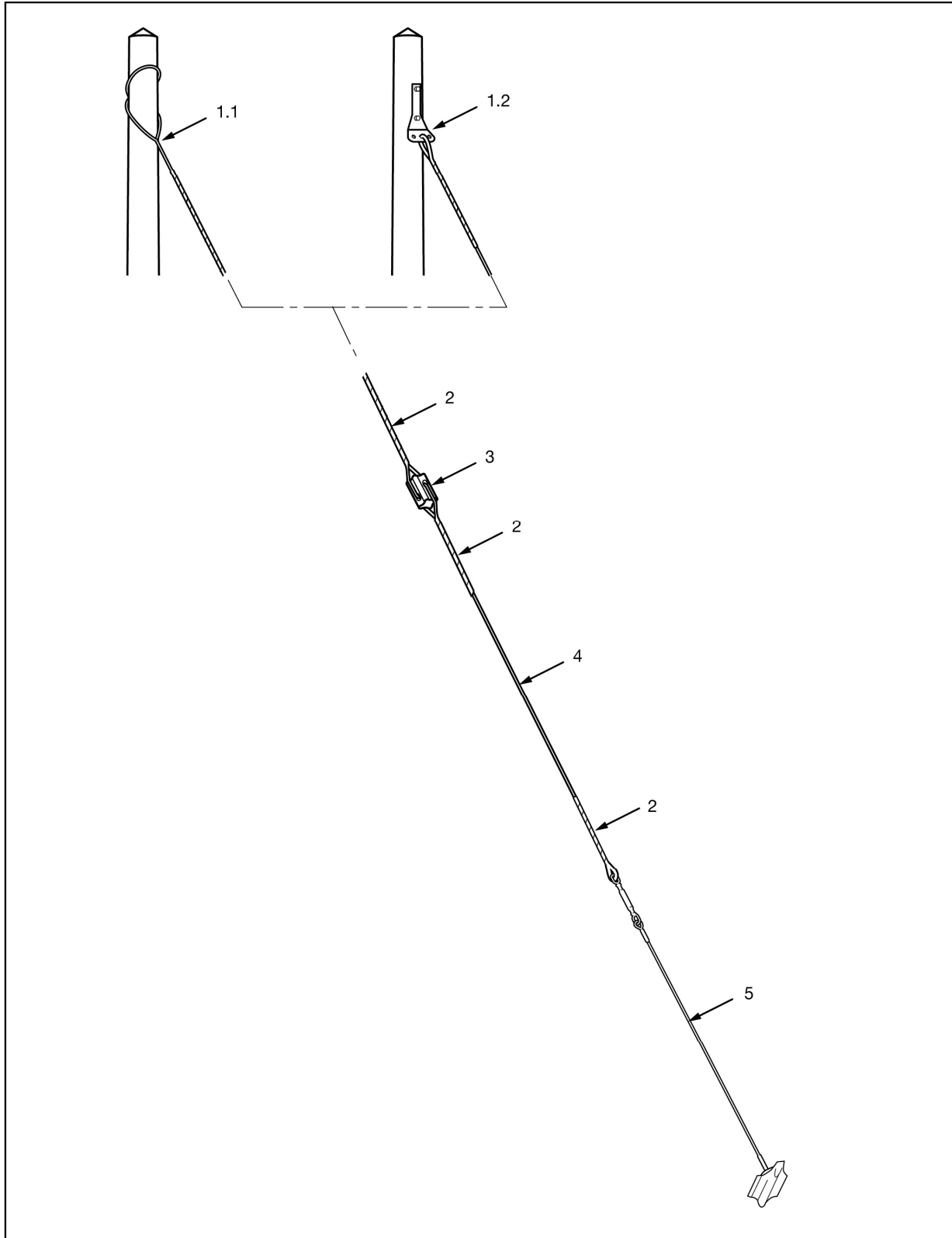
* Where alternative items are listed, select as appropriate.

** Choose either (i), (ii) or (iii) from item 5.2 dependent on ground conditions.

*** Choose either (i), (ii), (iii) or (iv) from item 5.3 dependent on type and condition of rock.

**** Not illustrated (NI) items shall be fitted in accordance with Drawing I-420-1.07-001.

[†] It is not necessary to order these items for every stay assembly: these CC numbers cover multiple items or coiled lengths.



<p>LIGHT DUTY STAY FOR LV & 11kV USE ONLY (NO AUXILIARY EQUIPMENT)</p>	<p>Change information for this issue N/A</p>	<p>Appears in CP420 Pt 1, CP430 Pt 1</p>	<p>electricity north west</p> <p>I-420-1.07-008 Iss 1 sht 1 of 1</p> <p>Scale: nts Auth: DMT Date: 6/6/2012</p>
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LIGHT DUTY STAY FOR LV & 11KV USE ONLY (NO AUXILIARY EQUIPMENT)

MATERIALS FOR DRAWING I-420-1.07-008-11-1

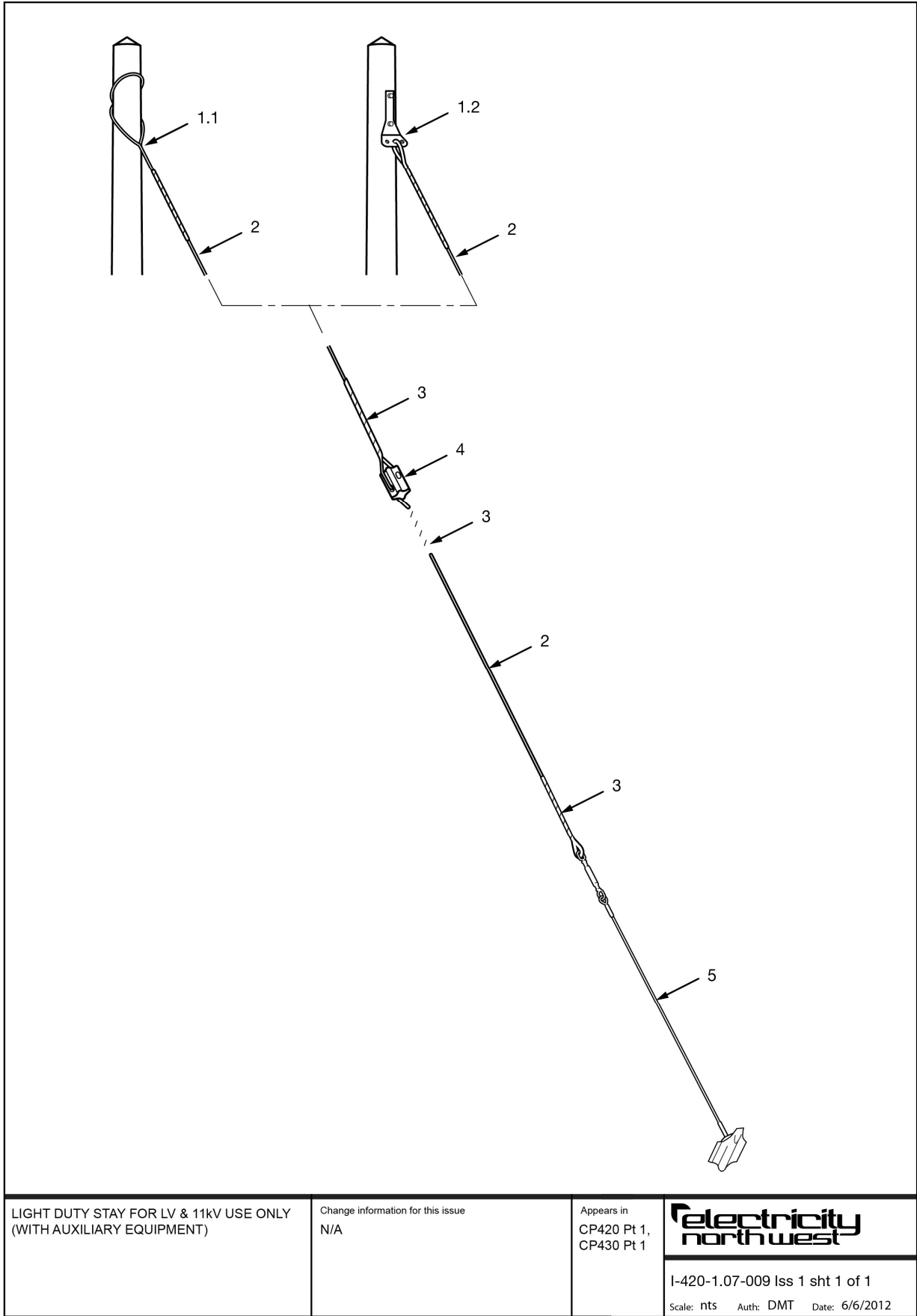
ITEM	ALT. ITEM *	DESCRIPTION	ES REF	CC NO	QTY
1	1.1	Stay wire fitting, pole top make off, 7/4.00mm	ES400H2	121045	1
	1.2	Steelwork, stay plate, heavy duty	ES400S11	260840	1
		Bolt, M20, length 260mm, thread length 150mm, galvanized, c/w hex full nut	ES400F1	107697	2
		Washer, square, curved, 60x60x6mm, 22mm hole, galvanized	ES400F1	139203	2
		Stay wire fitting, helical dead end, 7/4.00mm	ES400H2	121053	1
2	-	Stay wire fitting, helical dead end, 7/4.00mm	ES400H2	121053	3
3	-	Insulator, stay, LV and 11kV, type 1, 110kN MFL	ES400I4	126470	1
4	-	Stay strand, 7/4.0mm, 1150 grade	ES400S3	014397 [†]	15m
5	-	Anchor, stay, load lock, 3m tendon ^{††}	ES400A3	121445	1
6 (NI)	-	Barbed wire **	ES400W4	197408 [†]	2m
7 (NI)	-	Tie, security, length 200mm, width 4.8mm, plastic **	ES400F1	299758 [†]	4
8 (NI)	-	Staples, wire	ES400F1	133019	6

* Where alternative items are listed, select as appropriate.

** Not illustrated (NI) items shall be fitted in accordance with Drawing I-420-1.07-001.

[†] It is not necessary to order these items for every stay assembly: these CC numbers cover multiple items or coiled lengths.

^{††} Alternatively, two CC 121444s (anchor, stay, load lock, 2m tendon) can be used as stated in text.



LIGHT DUTY STAY FOR LV & 11KV USE ONLY (WITH AUXILIARY EQUIPMENT)

MATERIALS FOR DRAWING I-420-1.07-009-11-1

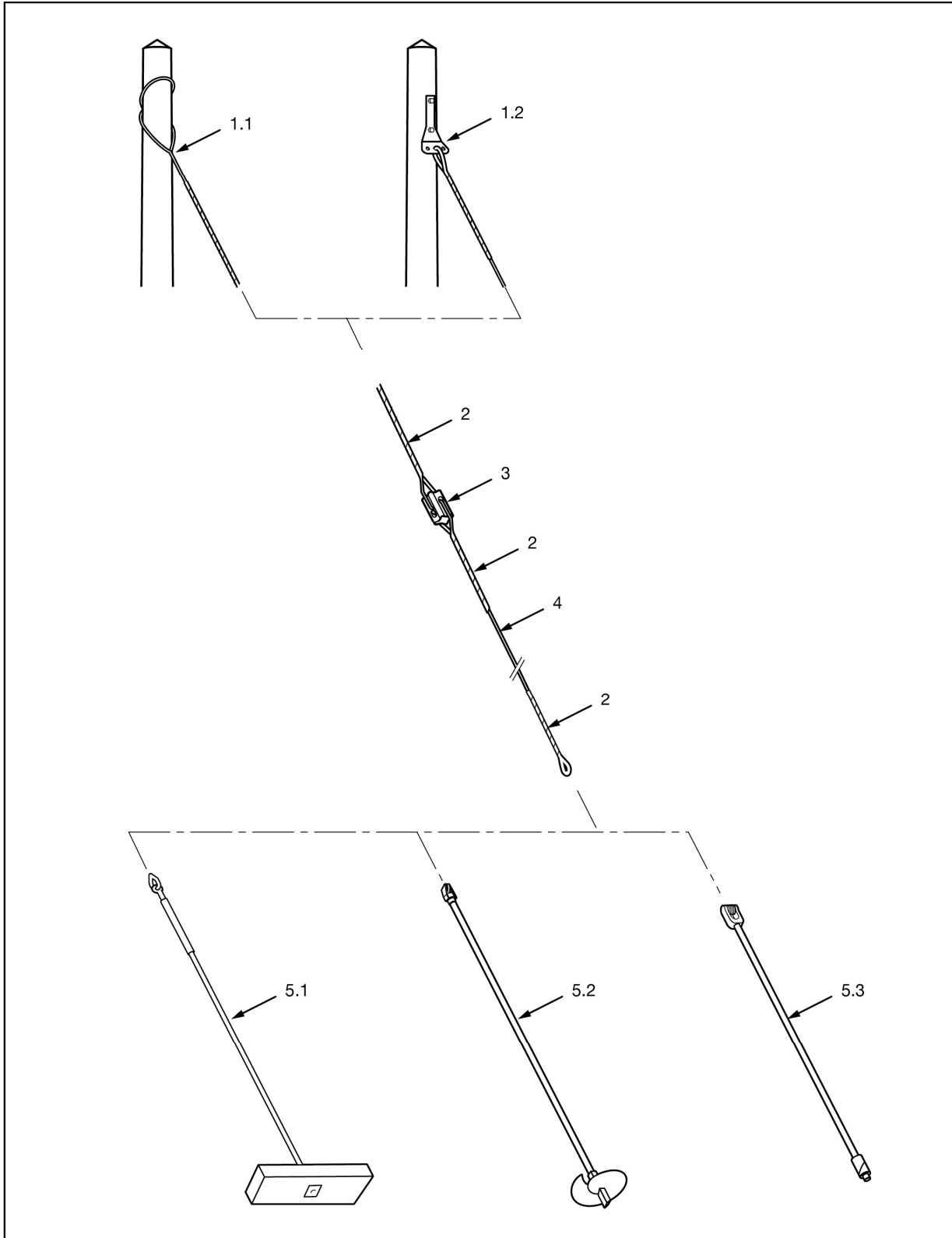
ITEM	ALT. ITEM *	DESCRIPTION	ES REF	CC NO	QTY
1	1.1	Stay wire fitting, pole top make off, 7/4.00mm	ES400H2	121045	1
		Stay wire fitting, helical splice	ES400H2	132896	1
	1.2	Steelwork, stay plate, heavy duty	ES400S11	260840	1
		Bolt, M20, length 260mm, thread length 150mm, galvanized, c/w hex full nut	ES400F1	107697	2
		Washer, square, curved, 60x60x6mm, 22mm hole, galvanized	ES400F1	139203	2
		Stay wire fitting, helical dead end, 7/4.00mm	ES400H2	121053	1
2	-	Stay strand, 7/4.0mm, 1150 grade	ES400S3	014397 [†]	15m
3	-	Stay wire fitting, helical dead end, 7/4.00mm	ES400H2	121053	3
4	-	Insulator, stay, LV and 11kV, type 1, 110kN MFL	ES400I4	126470	1
5	-	Anchor, stay, load lock, 3m tendon ^{††}	ES400A3	121445	1
6 (NI)	-	Barbed wire **	ES400W4	197408 [†]	2m
7 (NI)	-	Tie, security, length 200mm, width 4.8mm, plastic **	ES400F1	299758 [†]	4
8 (NI)	-	Staples, wire	ES400F1	133019	6

* Where alternative items are listed, select as appropriate.

** Not illustrated (NI) items shall be fitted in accordance with Drawing I-420-1.07-001.

[†] It is not necessary to order these items for every stay assembly: these CC numbers cover multiple items or coiled lengths.

^{††} Alternatively, two CC 121444s (anchor, stay, load lock, 2m tendon) can be used as stated in text.



HEAVY DUTY STAY FOR LV & 11kV USE ONLY
(NO AUXILIARY EQUIPMENT)

Change information for this issue
N/A

Appears in
CP420 Pt 1,
CP430 Pt 1

**Electricity
north west**

I-420-1.07-010 Iss 1 sht 1 of 1

Scale: nts Auth: DMT Date: 6/6/2012

HEAVY DUTY STAY FOR LV & 11KV USE ONLY (NO AUXILIARY EQUIPMENT)

MATERIALS FOR DRAWING I-420-1.07-010-11-1

ITEM	ALT. ITEM *	DESCRIPTION	ES REF	CC NO	QTY
1	1.1	Stay wire fitting, pole top make off, 7/4.00mm	ES400H2	121045	1
	1.2	Steelwork, stay plate, heavy duty	ES400S11	260840	1
		Bolt, M20, length 260mm, thread length 150mm, galvanized, c/w hex full nut	ES400F1	107697	2
		Washer, square, curved, 60x60x6mm, 22mm hole, galvanized	ES400F1	139203	2
		Stay wire fitting, helical dead end, 7/4.00mm	ES400H2	121053	1
2	-	Stay wire fitting, helical dead end, 7/4.00mm	ES400H2	121053	3
3	-	Insulator, stay, LV and 11kV, type 1, 110kN MFL	ES400I4	126470	1
4	-	Stay strand, 7/4.0mm, 1150 grade	ES400S3	014397 [†]	15m
5	5.1	Anchor, stay rod, type 2	ES400A3	130435	1
		Wood block, foundation/stay, 1300mm	ES400W2	106569	1
	5.2 **	(i) Anchor, stay, auger, 8", single helix	ES400A3	123692	1
		(ii) Anchor, stay, auger, 10", single helix	ES400A3	123706	1
		(iii) Anchor, stay, auger, 10", twin helix	ES400A3	123722	1
		(iv) Anchor, stay, auger, 12", single helix	ES400A3	123714	1
	5.3 ***	(i) Anchor, stay, rock, ¾" dia, 30" length, 1¾" bolt	ES400A3	121517	1
		(ii) Anchor, stay, rock, ¾" dia, 60" length, 1¾" bolt	ES400A3	121525	1
		(iii) Anchor, stay, rock, 1" dia, 53" length, 2¼" bolt	ES400A3	121533	1
		(iv) Anchor, stay, rock, 1" dia, 72" length, 2¼" bolt	ES400A3	121541	1
6 (NI)	-	Barbed wire ****	ES400W4	197408 [†]	2m
7 (NI)	-	Tie, security, length 200mm, width 4.8mm, plastic ****	ES400F1	299758 [†]	4
8 (NI)	-	Staples, wire	ES400F1	133019	6

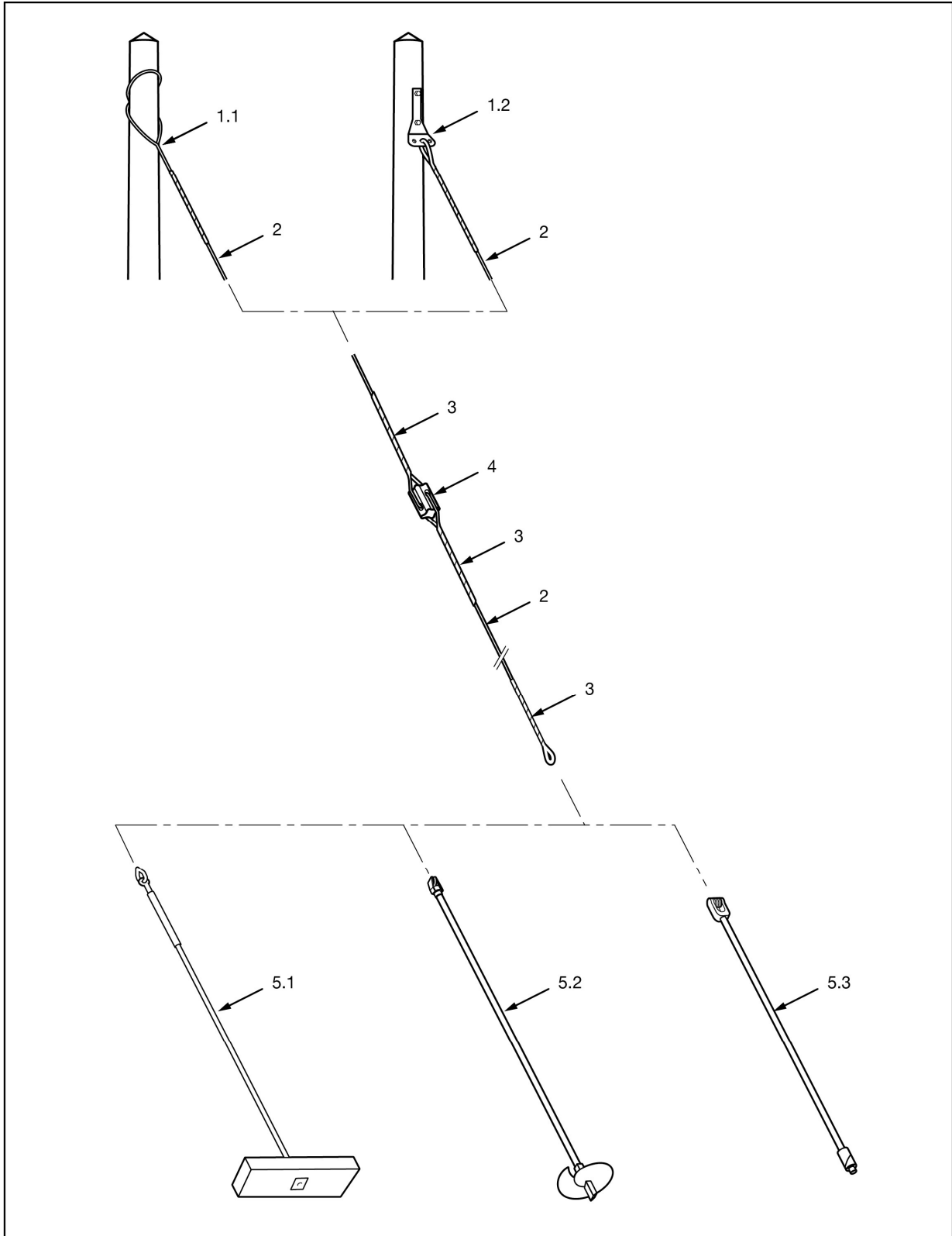
* Where alternative items are listed, select as appropriate.

** Choose either (i), (ii) or (iii) from item 5.2 dependent on ground conditions.

*** Choose either (i), (ii), (iii) or (iv) from item 5.3 dependent on type and condition of rock.

**** Not illustrated (NI) items shall be fitted in accordance with Drawing I-420-1.07-001.

[†] It is not necessary to order these items for every stay assembly: these CC numbers cover multiple items or coiled lengths.



HEAVY DUTY STAY FOR LV & 11kV USE ONLY
(WITH AUXILIARY EQUIPMENT)

Change information for this issue
N/A

Appears in
CP420 Pt 1,
CP430 Pt 1

**Electricity
north west**

I-420-1.07-011 Iss 1 sht 1 of 1

Scale: nts Auth: DMT Date: 6/6/2012

HEAVY DUTY STAY FOR LV & 11KV USE ONLY (WITH AUXILIARY EQUIPMENT)

MATERIALS FOR DRAWING I-420-1.07-011-11-1

ITEM	ALT. ITEM *	DESCRIPTION	ES REF	CC NO	QTY
1	1.1	Stay wire fitting, pole top make off, 7/4.00mm	ES400H2	121045	1
		Stay wire fitting, helical splice	ES400H2	132896	1
	1.2	Steelwork, stay plate, heavy duty	ES400S11	260840	1
		Bolt, M20, length 260mm, thread length 150mm, galvanized, c/w hex full nut	ES400F1	107697	2
		Washer, square, curved, 60x60x6mm, 22mm hole, galvanized	ES400F1	139203	2
		Stay wire fitting, helical dead end, 7/4.00mm	ES400H2	121053	1
2	-	Stay strand, 7/4.0mm, 1150 grade	ES400S3	014397 [†]	15m
3	-	Stay wire fitting, helical dead end, 7/4.00mm	ES400H2	121053	3
4	-	Insulator, stay, LV and 11kV, type 1, 110kN MFL	ES400I4	126470	1
5	5.1	Anchor, stay rod, type 2	ES400A3	130435	1
		Wood block, foundation/stay, 1300mm	ES400W2	106569	1
	5.2 **	(i) Anchor, stay, auger, 8", single helix	ES400A3	123692	1
		(ii) Anchor, stay, auger, 10", single helix	ES400A3	123706	1
		(iii) Anchor, stay, auger, 10", twin helix	ES400A3	123722	1
		(iv) Anchor, stay, auger, 12", single helix	ES400A3	123714	1
	5.3 ***	(i) Anchor, stay, rock, ¾" dia, 30" length, 1¾" bolt	ES400A3	121517	1
		(ii) Anchor, stay, rock, ¾" dia, 60" length, 1¾" bolt	ES400A3	121525	1
		(iii) Anchor, stay, rock, 1" dia, 53" length, 2¼" bolt	ES400A3	121533	1
		(iv) Anchor, stay, rock, 1" dia, 72" length, 2¼" bolt	ES400A3	121541	1
6 (NI)	-	Barbed wire ****	ES400W4	197408 [†]	2m
7 (NI)	-	Tie, security, length 200mm, width 4.8mm, plastic ****	ES400F1	299758 [†]	4
8 (NI)	-	Staples, wire	ES400F1	133019	6

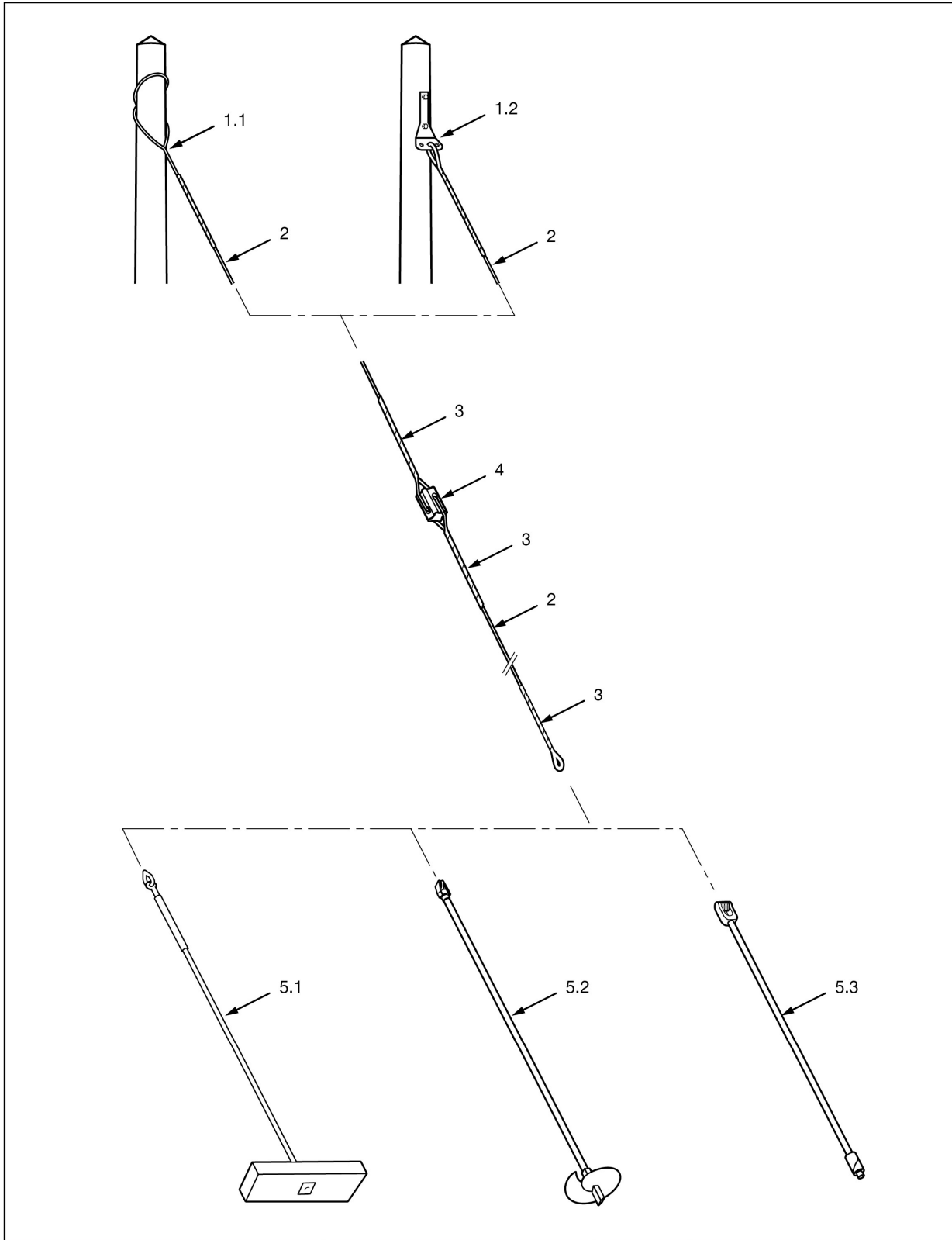
* Where alternative items are listed, select as appropriate.

** Choose either (i), (ii) or (iii) from item 5.2 dependent on ground conditions.

*** Choose either (i), (ii), (iii) or (iv) from item 5.3 dependent on type and condition of rock.

**** Not illustrated (NI) items shall be fitted in accordance with Drawing I-420-1.07-001.

[†] It is not necessary to order these items for every stay assembly: these CC numbers cover multiple items or coiled lengths.



HEAVY DUTY STAY FOR 33KV
EARTHED STRUCTURE

Change information for this issue
N/A

Appears in
CP420 Pt 1,
CP430 Pt 1



I-420-1.07-012 Iss 1 sht 1 of 1

Scale: nts Auth: DMT Date: 6/6/2012

HEAVY DUTY STAY FOR 33KV EARTHED STRUCTURE
MATERIALS FOR DRAWING I-420-1.07-012-11-1

ITEM	ALT. ITEM *	DESCRIPTION	ES REF	CC NO	QTY
1	1.1	Stay wire fitting, pole top make off, 7/4.00mm	ES400H2	121045	1
		Stay wire fitting, helical splice	ES400H2	132896	1
	1.2	Steelwork, stay plate, heavy duty	ES400S11	260840	1
		Bolt, M20, length 260mm, thread length 150mm, galvanized, c/w hex full nut	ES400F1	107697	2
		Washer, square, curved, 60x60x6mm, 22mm hole, galvanized	ES400F1	139203	2
		Stay wire fitting, helical dead end, 7/4.00mm	ES400H2	121053	1
2	-	Stay strand, 7/4.0mm, 1150 grade	ES400S3	014397 [†]	15m
3	-	Stay wire fitting, helical dead end, 7/4.00mm	ES400H2	121053	3
4	-	Insulator, stay, 33kV, type 2, 110kN MFL	ES400I4	126489	1
5	5.1	Anchor, stay rod, type 2	ES400A3	130435	1
		Wood block, foundation/stay, 1300mm	ES400W2	106569	1
	5.2 **	(i) Anchor, stay, auger, 8", single helix	ES400A3	123692	1
		(ii) Anchor, stay, auger, 10", single helix	ES400A3	123706	1
		(iii) Anchor, stay, auger, 10", twin helix	ES400A3	123722	1
		(iv) Anchor, stay, auger, 12", single helix	ES400A3	123714	1
	5.3 ***	(i) Anchor, stay, rock, ¾" dia, 30" length, 1¾" bolt	ES400A3	121517	1
		(ii) Anchor, stay, rock, ¾" dia, 60" length, 1¾" bolt	ES400A3	121525	1
		(iii) Anchor, stay, rock, 1" dia, 53" length, 2¼" bolt	ES400A3	121533	1
		(iv) Anchor, stay, rock, 1" dia, 72" length, 2¼" bolt	ES400A3	121541	1
6 (NI)	-	Barbed wire ****	ES400W4	197408 [†]	2m
7 (NI)	-	Tie, security, length 200mm, width 4.8mm, plastic ****	ES400F1	299758 [†]	4
8 (NI)	-	Staples, wire	ES400F1	133019	6

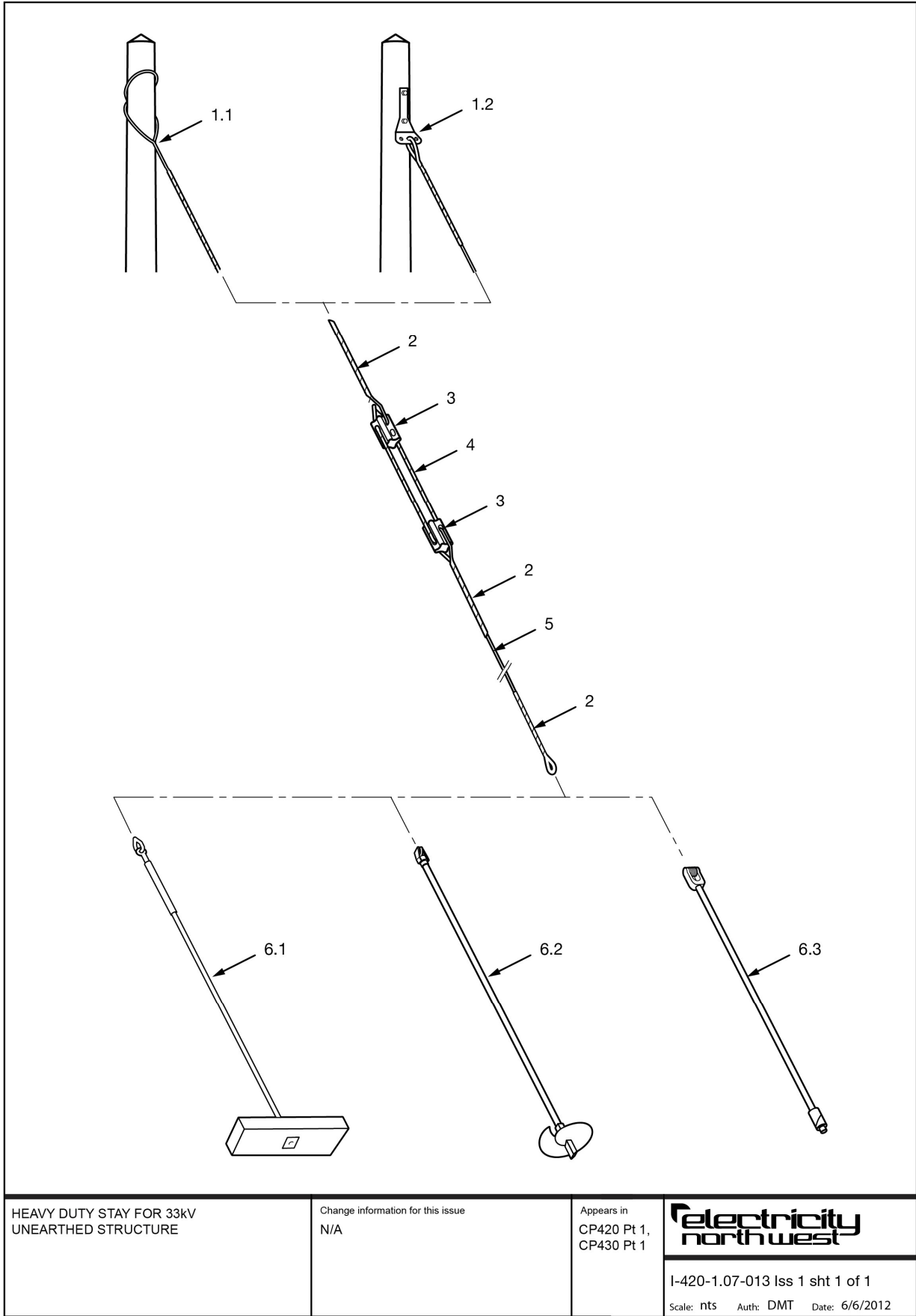
* Where alternative items are listed, select as appropriate.

** Choose either (i), (ii) or (iii) from item 5.2 dependent on ground conditions.

*** Choose either (i), (ii), (iii) or (iv) from item 5.3 dependent on type and condition of rock.

**** Not illustrated (NI) items shall be fitted in accordance with Drawing I-420-1.07-001.

[†] It is not necessary to order these items for every stay assembly: these CC numbers cover multiple items or coiled lengths.



HEAVY DUTY STAY FOR 33KV UNEARTHED STRUCTURE
MATERIALS FOR DRAWING I-420-1.07-013-11-1

ITEM	ALT. ITEM *	DESCRIPTION	ES REF	CC NO	QTY
1	1.1	Stay wire fitting, helical pole top make off, 7/400mm	ES400H2	121045	1
	1.2	Steelwork, stay plate, heavy duty	ES400S11	260840	1
		Bolt, M20, length 260mm, thread length 150mm, galvanized, c/w hex full nut	ES400F1	107697	2
		Washer, square, curved, 60x60x6mm, 22mm hole, galvanized	ES400F1	139203	2
		Stay wire fitting, helical dead end, 7/4.00mm	ES400H2	121053	1
2	-	Stay wire fitting, helical dead end, 7/4.00mm	ES400H2	121053	1
3	-	Insulator, stay, 33kV, type 2, 110kN MFL	ES400I4	126489	2
4	-	Stay wire fitting, helical insulator link assembly	ES400H2	127221	1
5	-	Stay strand, 7/4.0mm, 1150 grade	ES400S3	014397 [†]	15m
6	6.1	Anchor, stay rod, type 2	ES400A3	130435	1
		Wood block, foundation/stay, 1300mm	ES400W2	106569	1
	6.2 **	(i) Anchor, stay, auger, 8", single helix	ES400A3	123692	1
		(ii) Anchor, stay, auger, 10", single helix	ES400A3	123706	1
		(iii) Anchor, stay, auger, 10", twin helix	ES400A3	123722	1
		(iv) Anchor, stay, auger, 12", single helix	ES400A3	123714	1
	6.3 ***	(i) Anchor, stay, rock, ¾" dia, 30" length, 1¾" bolt	ES400A3	121517	1
		(ii) Anchor, stay, rock, ¾" dia, 60" length, 1¾" bolt	ES400A3	121525	1
		(iii) Anchor, stay, rock, 1" dia, 53" length, 2¼" bolt	ES400A3	121533	1
		(iv) Anchor, stay, rock, 1" dia, 72" length, 2¼" bolt	ES400A3	121541	1
7 (NI)	-	Barbed wire ****	ES400W4	197408 [†]	2m
8 (NI)	-	Tie, security, length 200mm, width 4.8mm, plastic ****	ES400F1	299758 [†]	4
9 (NI)	-	Staples, wire	ES400F1	133019	6

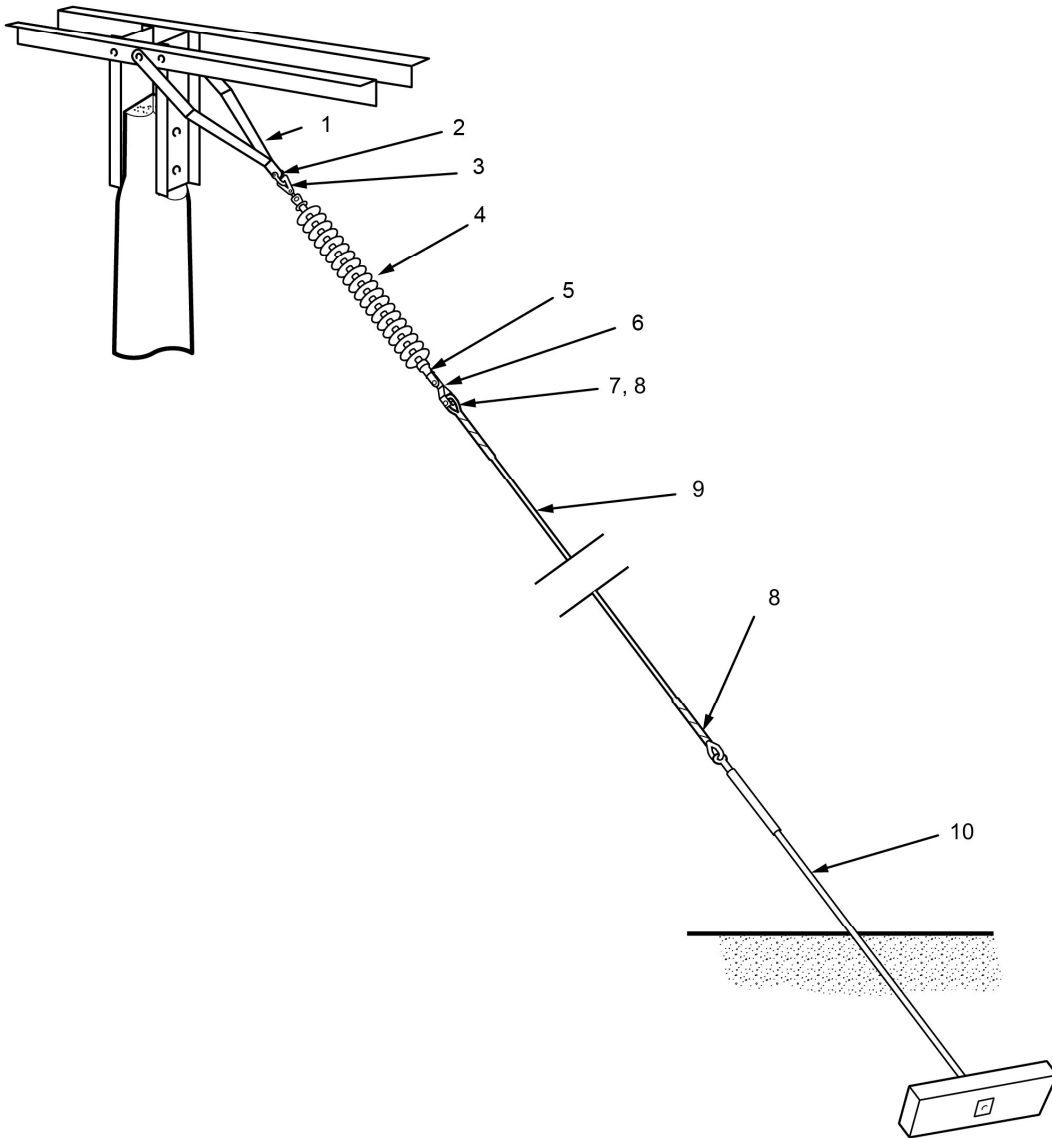
* Where alternative items are listed, select as appropriate.

** Choose either (i), (ii) or (iii) from item 6.2 dependent on ground conditions.

*** Choose either (i), (ii), (iii) or (iv) from item 6.3 dependent on type and condition of rock.

**** Not illustrated (NI) items shall be fitted in accordance with Drawing I-420-1.07-001.

[†] It is not necessary to order these items for every stay assembly: these CC numbers cover multiple items or coiled lengths.



132kV TRIDENT STAY (SINGLE STAY)

Change information for this issue
N/A

Appears in
CP420 Pt 1,
CP430 Pt 1

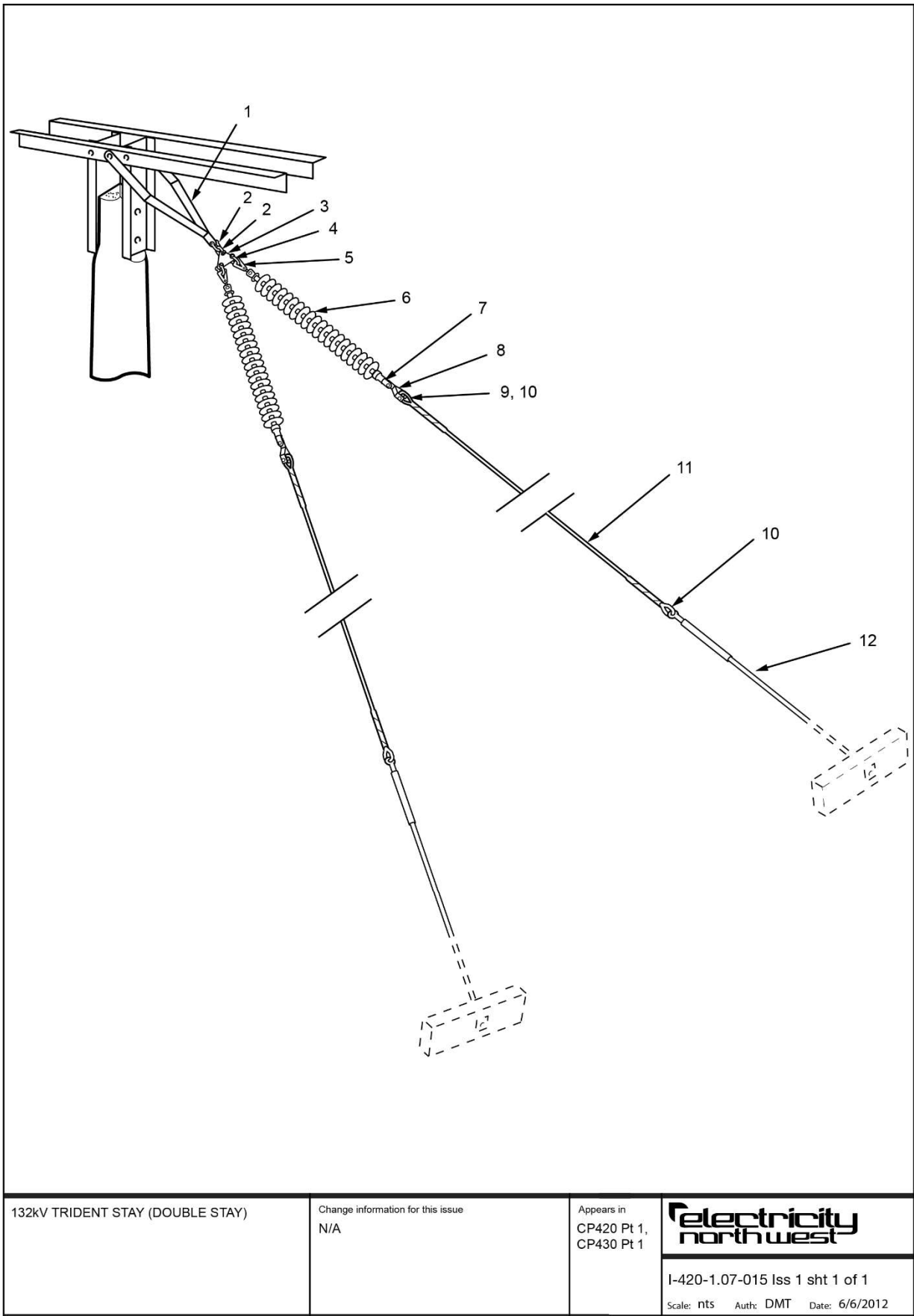
132KV TRIDENT STAY (SINGLE STAY)
MATERIALS FOR DRAWING I-420-1.07-014-11-1

ITEM	ALT. ITEM *	DESCRIPTION	ES REF	CC NO	QTY
1	-	Steelwork, stay strap, heavy duty	ES400S11	122835	2
		Bolt, M24, length 60mm, thread length 36mm, galvanized, c/w hex full nut & Washer, round, flat, 26mm hole, outer dia 44mm, thickness 4mm, galvanized (for fixing stay strap to crossarm)	ES400F1	107791	2
			ES400F1	993019	2
		Bolt, M20, length 45mm, thread length 45mm, galvanized, c/w hex full nut	ES400F1	107573	1
		Washer, round, flat, 22mm hole, outer dia 37mm, thickness 3mm, galvanized	ES400F1	993018	1
2	-	Steelwork, shackle, stay, 28/29	ES400S11	122830	1
3	-	Steelwork, ball ended eyelink, stay, 28/30	ES400S11	122827	1
4	-	Insulator, stay, 132kV wood pole line, 125kN MFL	ES400I4	125215	1
5	-	Steelwork, socket clevis, 28/31	ES400S11	109594	1
6	-	Steelwork, cranked links, 28/87	ES400S11	109593	1
7	-	Steelwork, thimble, open-ended, stay	ES400S11	132241	1
8	-	Stay wire fitting, helical dead end, 7/4.00mm	ES400H2	121053	2
9	-	Stay strand, 7/4.0mm, 1150 grade	ES400S3	014397 [†]	15m
10	-	Anchor, stay rod, type 2	ES400A3	130435	1
		Wood block, foundation/stay, 1300mm	ES400W2	106569	1
11 (NI)	-	Barbed wire **	ES400W4	197408 [†]	2m
12 (NI)	-	Tie, security, length 200mm, width 4.8mm, plastic **	ES400F1	299758 [†]	4
13 (NI)	-	Staples, wire	ES400F1	133019	6

* Where alternative items are listed, select as appropriate.

** Not illustrated (NI) items shall be fitted in accordance with Drawing I-420-1.07-001.

[†] It is not necessary to order these items for every stay assembly: these CC numbers cover multiple items or coiled lengths.



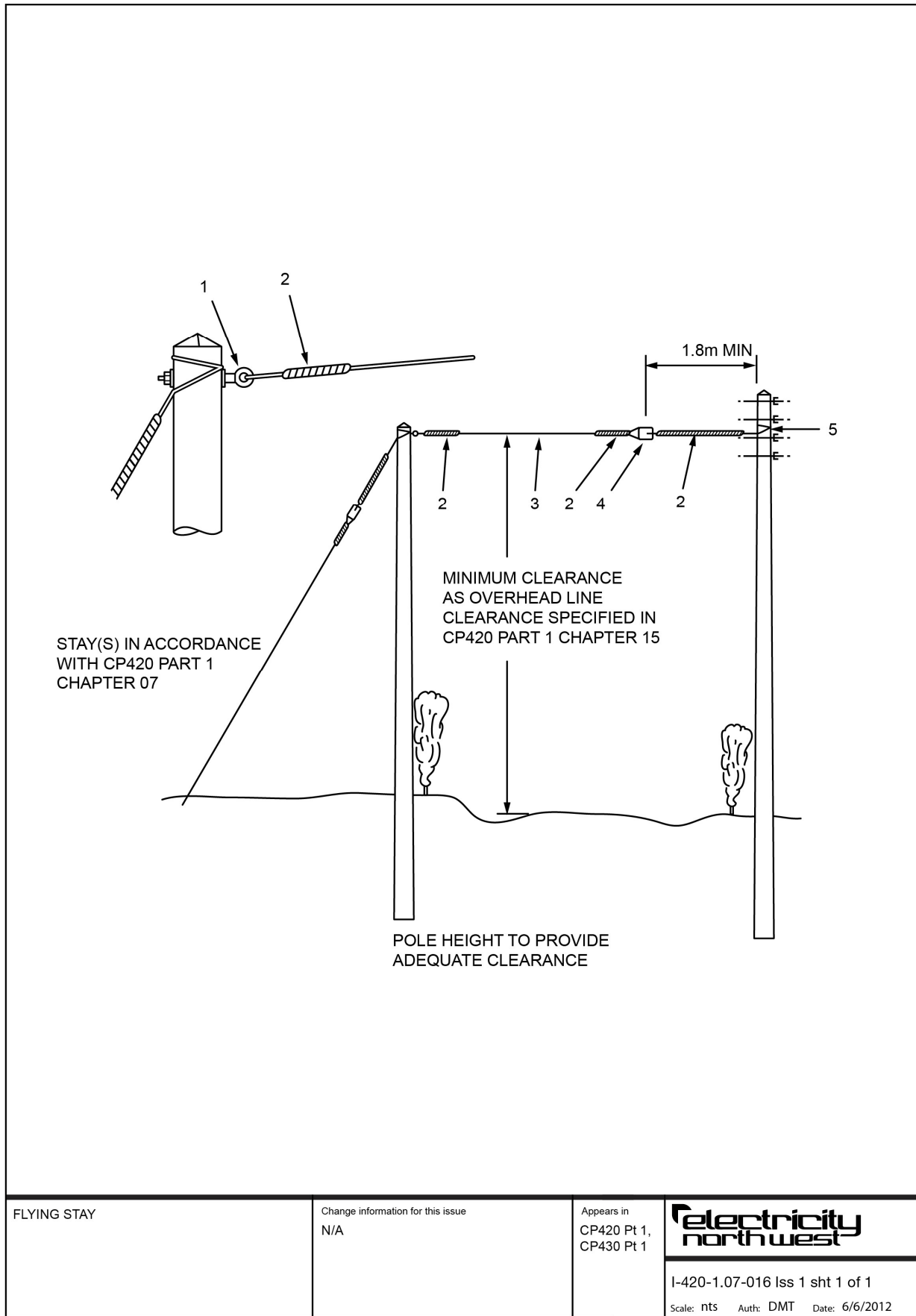
**132KV TRIDENT STAY (DOUBLE STAY)
MATERIALS FOR DRAWING I-420-1.07-015-11-1**

ITEM	ALT. ITEM *	DESCRIPTION	ES REF	CC NO	QTY
1	-	Steelwork, stay strap, heavy duty	ES400S11	122835	2
		Bolt, M24, length 60mm, thread length 36mm, galvanized, c/w hex full nut & Washer, round, flat, 26mm hole, outer dia 44mm, thickness 4mm, galvanized (for fixing stay strap to crossarm)	ES400F1	107791	2
			ES400F1	993019	2
		Bolt, M20, length 45mm, thread length 45mm, galvanized, c/w hex full nut	ES400F1	107573	1
		Washer, round, flat, 22mm hole, outer dia 37mm, thickness 3mm, galvanized	ES400F1	993018	1
2	2.1	Steelwork, shackle, stay, 42/29	ES400S11	122831	2
	2.2	Steelwork, shackle, stay, 42/29A	ES400S11	122832	2
3	-	Steelwork, yoke plate, stay, 42/42	ES400S11	122836	1
4	-	Steelwork, shackle, stay, 28/29	ES400S11	122830	2
5	-	Steelwork, ball ended eyelink, stay, 28/30	ES400S11	122827	2
6	-	Insulator, stay, 132kV wood pole line, 125kN MFL	ES400I4	125215	2
7	-	Steelwork, socket clevis, 28/31	ES400S11	109594	2
8	-	Steelwork, cranked links, 28/87	ES400S11	109593	2
9	-	Steelwork, thimble, open-ended, stay	ES400S11	132241	2
10	-	Stay wire fitting, helical dead end, 7/4.00mm	ES400H2	121053	4
11	-	Stay strand, 7/4.0mm, 1150 grade	ES400S3	014397 [†]	2 x 15m
12	-	Anchor, stay rod, type 2	ES400A3	130435	2
		Wood block, foundation/stay, 1300mm	ES400W2	106569	2
13 (NI)	-	Barbed wire **	ES400W4	197408 [†]	2 x 2m
14 (NI)	-	Tie, security, length 200mm, width 4.8mm, plastic **	ES400F1	299758 [†]	8
15 (NI)	-	Staples, wire	ES400F1	133019	12

* Where alternative items are listed, select as appropriate.

** Not illustrated (NI) items shall be fitted in accordance with Drawing I-420-1.07-001.

[†] It is not necessary to order these items for every stay assembly: these CC numbers cover multiple items or coiled lengths.



FLYING STAY

Change information for this issue
N/A

Appears in
CP420 Pt 1,
CP430 Pt 1

**FLYING STAY
MATERIALS FOR DRAWING I-420-1.07-016-11-1**

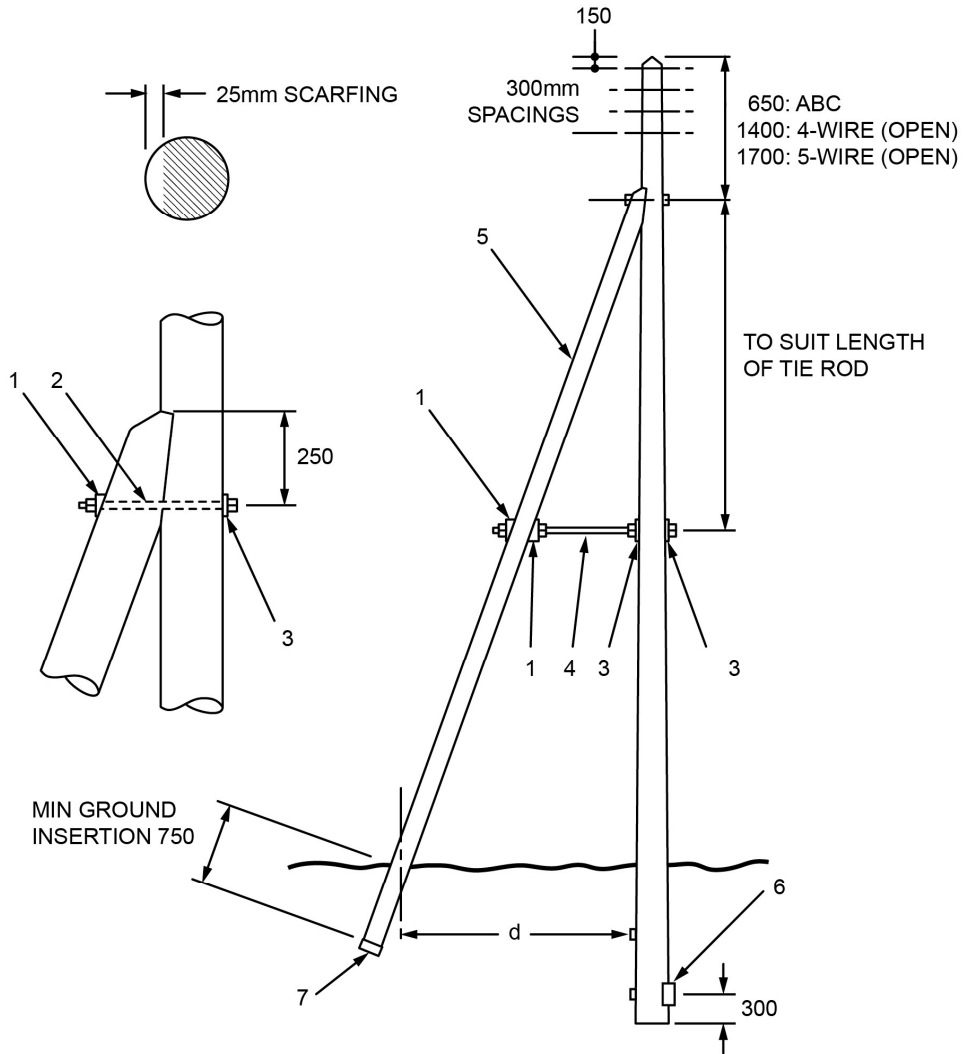
ITEM	ALT. ITEM *	DESCRIPTION	ES REF	CC NO	QTY
1	-	Bolt, eye, M20	ES400F1	**	1
		Washer, square, curved, 60x60x6mm, 22mm hole, galvanized	ES400F1	139203	2
2	-	Stay wire fitting, helical dead end, 7/4.00mm	ES400H2	121053	3
3	-	Stay strand, 7/4.0mm, 1150 grade	ES400S3	014397	AR [†]
4	-	Insulator, stay	ES400I4	***	1
5	-	Stay wire fitting, pole top make off, 7/4.00mm	ES400H2	121045	1

* Where alternative items are listed, select as appropriate.

** Select to fit pole top from ES400F1.

*** Type 1 for LV/11kV or Type 2 for 33kV.

AR[†] As required.



STAY STRUT

Change information for this issue
N/A

Appears in
CP420 Pt 1,
CP430 Pt 1

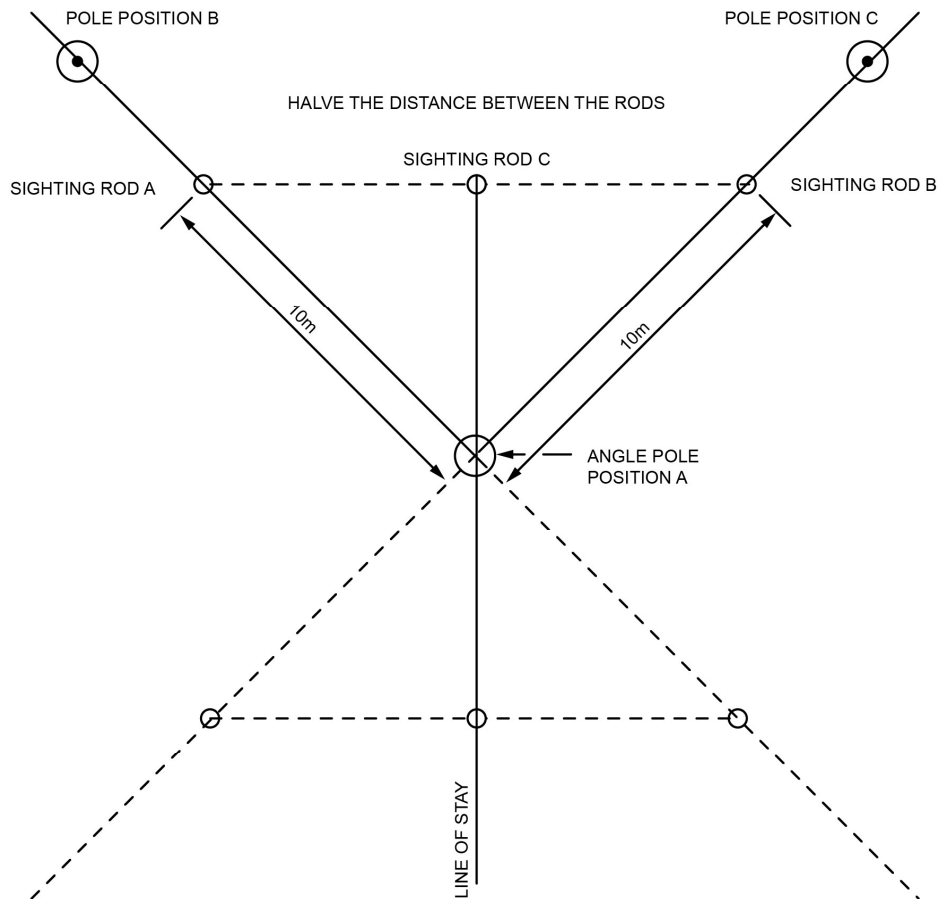


I-420-1.07-017 Iss 1 sht 1 of 1

Scale: nts Auth: DMT Date: 6/6/2012

Stay Strut Materials for Drawing I-420-1.07-017-11-1									
Item	Alt. Item *	Description	ES Ref	CC No	Qty				
1	-	Washer, tapered, square, curved (ENA TS 439607)	ES400F1	139352	3				
2	-	Bolt, M20, length 450mm, thread length 150mm, galvanized, c/w hex full nut	ES400F1	107751	1				
3	-	Washer, square, curved, 60x60x6mm, 22mm hole, galvanized	ES400F1	139203	3				
4	-	Bolt, tie rod, M20, length 2100mm, thread lengths 750mm and 350mm, galvanized, c/w four hex full nuts	ES400F1	130118	1				
5	-	Strut **	ES400W2	**	1				
6	-	Wood block	ES400W2	***	1				
7	-	Wood block	ES400W2	***	1				
* Where alternative items are listed, select as appropriate.									
** Refer to strut and wood pole data below.									
*** Select as appropriate from ES400W2.									
Strut and Wood Pole Data									
Struts shall comply with ES400W2. Struts shall be selected according to the size information below. (Consider site conditions and take care when selecting kicking and compression blocks.)									
LV Conductor (type and size)	Line Deviation (Degrees)	Minimum Pole Size †			Minimum Strut Size			Strut CC	Dist d (m)
		Length (m)	Dia (mm) Pole Top	Dia (mm) 1.5m from Butt end	Length (m)	Dia (mm) Pole Top	Dia (mm) 1.5m from Butt end		
Cu, 4x16mm ² Cu, 4x32mm ² Al, 4x25mm ² Al, 4x50mm ²	Up to 15	8.5	150	205	7.0	150	205	106260	2.2
		9.0	150	205	7.5	150	205	106264	
		9.5	150	210	8.0	150	210	106268	
		10.0	150	210	8.5	150	210	106272	
	15 to 30	8.5	165	230	7.0	165	230	106262	2.3
		9.0	165	235	7.5	165	235	106266	
		9.5	165	240	8.0	165	240	106270	
		10.0	165	245	8.5	165	245	106274	
Cu, 4x70mm ² Al, 4x100mm ² ABC, 4x95mm ²	Up to 15	8.5	160	225	7.0	160	225	106261	2.4
		9.0	160	230	7.5	160	230	106265	
		9.5	160	235	8.0	160	235	106269	
		10.0	160	240	8.5	160	240	106273	
	15 to 30	8.5	175	240	7.0	175	240	106263	2.5
		9.0	175	245	7.5	175	245	106267	
		9.5	175	250	8.0	175	250	106271	
		10.0	175	255	8.5	175	255	106275	

† Note that half-metre pole sizes are included for reference only; they are not available for new build.



STAY SETTING
BISECTING THE ANGLE

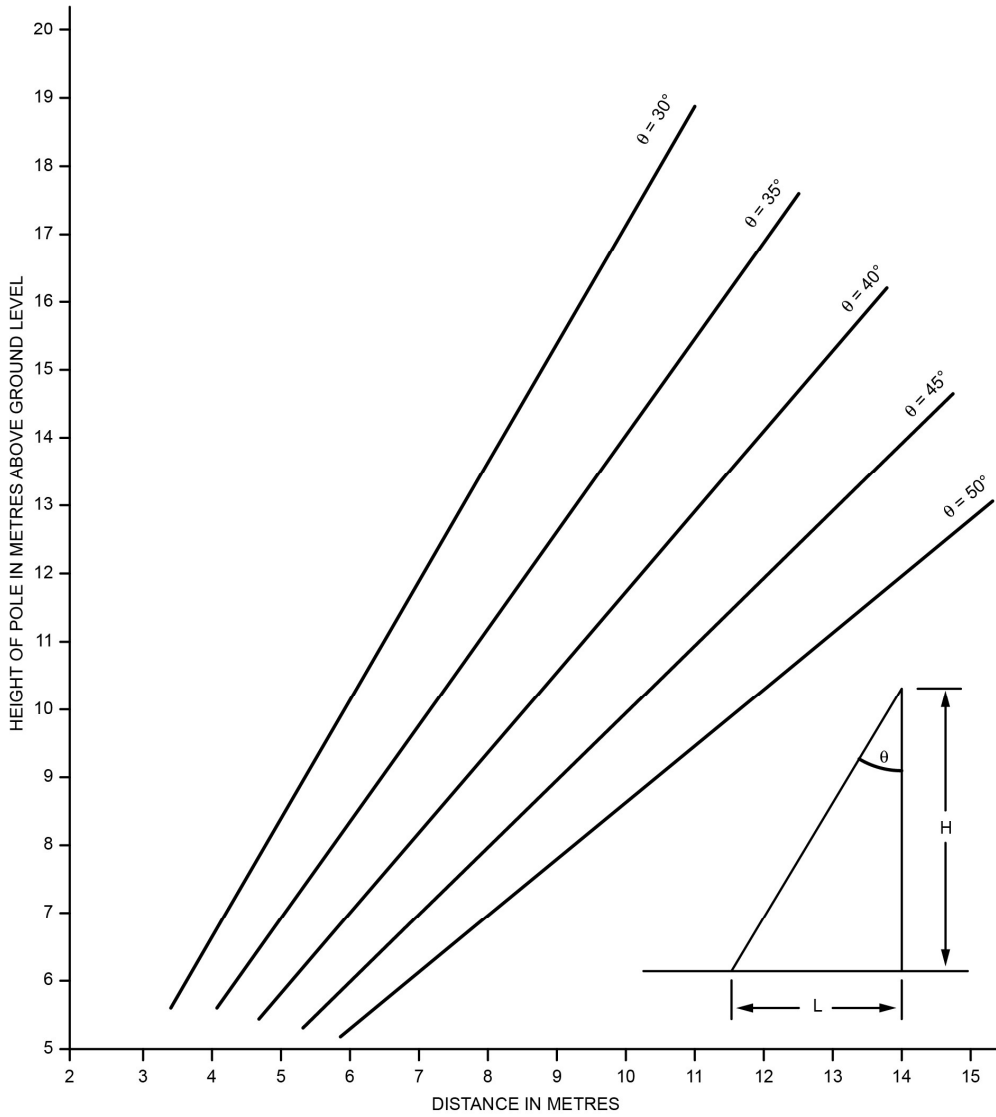
Change information for this issue
N/A

Appears in
CP420 Pt 1,
CP430 Pt 1



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Scale: nts Auth: DMT Date: 6/6/2012



GRAPH OF STAY SPREAD

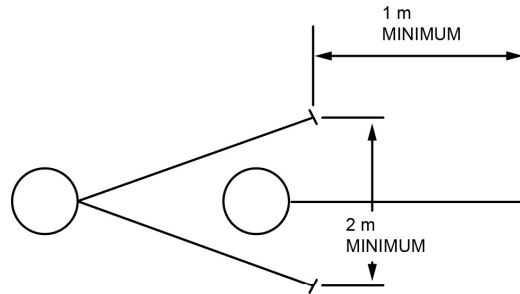
Change information for this issue
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Appears in
CP420 Pt 1,
CP430 Pt 1

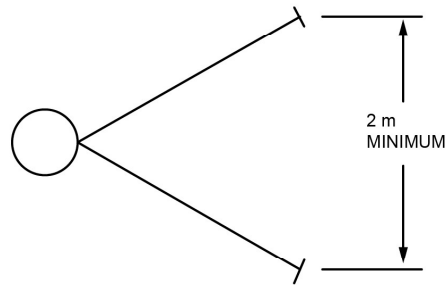


I-420-1.07-019 Iss 1 sht 1 of 1

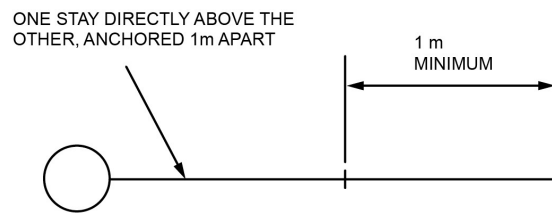
Scale: nts Auth: DMT Date: 6/6/2012



TRIPLE STAYS



SPLAYED STAYS



TANDEM STAYS

MULTIPLE STAYS

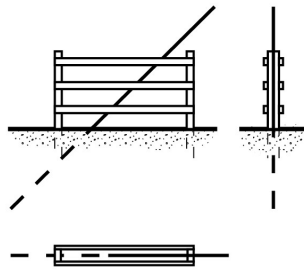
Change information for this issue
N/A

Appears in
CP420 Pt 1,
CP430 Pt 1

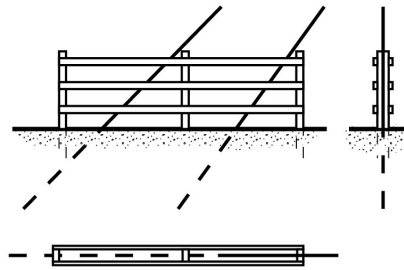


I-420-1.07-020 Iss 1 sht 1 of 1

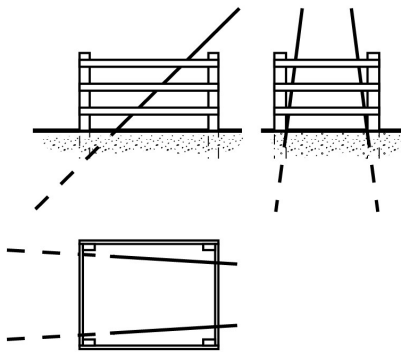
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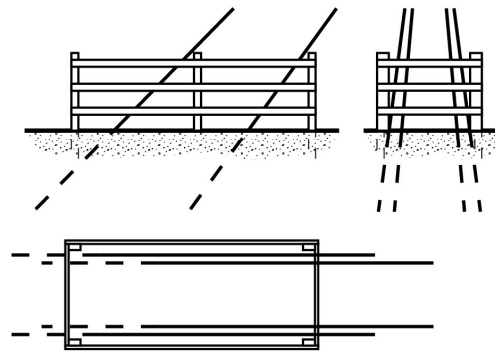
SINGLE STAY – 1 KIT



IN LINE STAYS – 2 KITS



SPLAYED STAYS – 2 KITS



4 STAYS IN BOX – 3 KITS

WOODEN RAILS OR BARBED WIRE CAN BE USED
DEPENDING UPON AGREEMENT WITH LANDOWNER

STAY FENCING IS NOT TO BE INSTALLED WITHOUT
LANDOWNER'S CONSENT

EXAMPLES OF PROTECTIVE FENCING
FOR STAYS

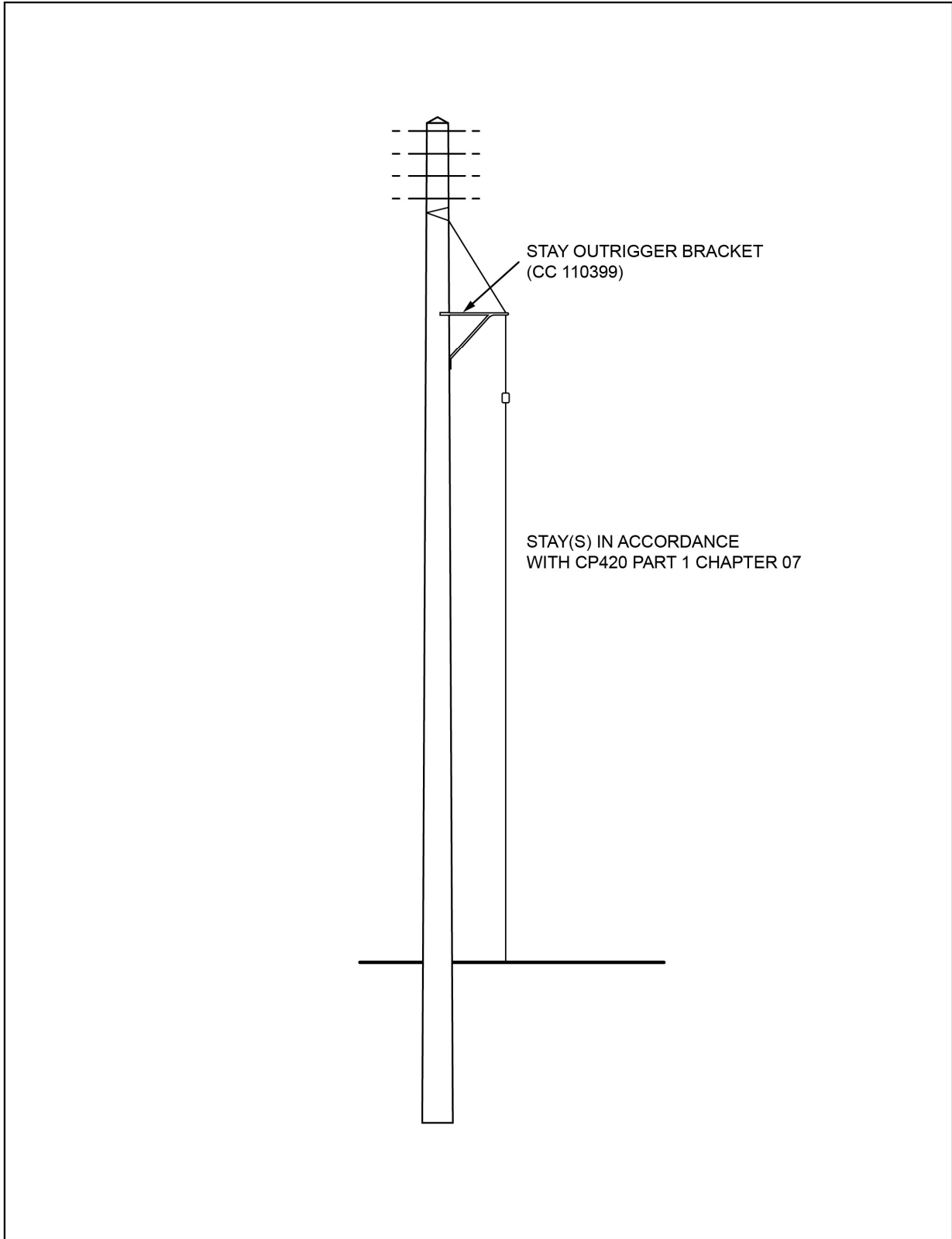
Change information for this issue
N/A

Appears in
CP420 Pt 1,
CP430 Pt 1

**electricity
north west**

I-420-1.07-021 Iss 1 sht 1 of 1

Scale: NTS Auth: DMT Date: 6/6/2012



STAY OUTRIGGER BRACKET
(CC 110399)

STAY(S) IN ACCORDANCE
WITH CP420 PART 1 CHAPTER 07

<p>OUTRIGGER STAY</p>	<p>Change information for this issue N/A</p>	<p>Appears in CP420 Pt 1, CP430 Pt 1</p>	<p>electricity north west</p> <hr/> <p>I-420-1.07-022 Iss 1 sht 1 of 1 Scale: nts Auth: DMT Date: 6/6/2012</p>
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