



# **VESI GUIDELINE FOR INSPECTION OF HV LIVE WORK SUPPORT EQUIPMENT**

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## **1. BACKGROUND**

The insulating qualities and mechanical strength of High Voltage (HV) Live work Strain Stick assemblies are essential for safe live work maintenance.

This guideline is to establish a basis for mechanical inspection and testing of HV Live work equipment.

## **2. SCOPE**

The guideline will be applicable to the VESI network operators and service providers. This guideline provides information and recommendations with regard to assessment of the structural integrity of HV Live work equipment.

This guideline will apply to both proprietary and company manufactured equipment.

Use of equipment must be as per manufacturer instruction or recommendations.

This guideline does not apply to other lifting and straining equipment that is covered by existing Australian regulatory codes and standards e.g. slings and shackles.

## **3. PURPOSE**

This guideline provides a VESI framework appropriate to Network operator/employees and their service providers for managing the structural integrity of HV Live working equipment.

This guideline will;

- Establish the minimum inspection and maintenance requirements for HV Live working equipment.
- Provide guidance for inspection of HV Live work equipment.
- Provide companies and their employees with information and knowledge to undertake inspection and maintenance of HV Live work equipment.

## **4. REFERENCES**

- A.S 5804 High Voltage Live Work
- A.B Chance product catalogue
- Hastings product catalogue
- Nobles Rigging Handbook

## 5. DEFINITIONS

- **Acceptance Test / Inspection;** contractual test or inspection to prove to the customer that the device meets certain conditions of its specification.
- **Approved;** appropriate organisation endorsement in writing for a specific function.
- **Authorised Person;** a person with technical knowledge or sufficient experience who has been approved, or has the delegated authority to act on behalf of the Network Operator, to perform the duty concerned.
- **Competent;** means having the skills, knowledge and attributes a person needs to complete a task.
- **Electrical apparatus;** means any electrical equipment, including overhead lines and underground cables, the conductors of which are live or can be made live.
- **Electricity network;** transmission and distribution systems consisting of electrical apparatus which are used to convey or control the conveyance of electricity between generators' points of connection and customers' points of connection.
- **Employee;** a worker engaged by an employer (whether under a contract of employment or apprenticeship) and includes a contractor or subcontractor, and a person employed by a contractor or subcontractor, who carries out work for an employer.
- **High voltage or 'HV';** means a nominal voltage exceeding 1000V ac or exceeding 1500V dc.
- **Insulated;** separated from adjoining conducting material by a non-conducting substance which provides adequate resistance to the passage of current, or to disruptive discharges through or over the surface of the substance at the operating voltage, and to mitigate the danger of shock or injurious leakage of current.
- **Insulated Plant, Tools and Equipment;** plant, tools and equipment specifically designed, approved, tested and maintained for use on or near live electrical apparatus. They shall be used only on or near electrical apparatus, which is energised at a voltage equal to or less than the voltage rating marked on the plant, tool or equipment.
- **Live;** energised or subject to hazardous induced or capacitive voltages.
- **Network Operator;** the owner, controller or operator of an electricity network.
- **Non-Conducting Material;** a material, which is known to have insulating properties, but is not electrically tested. It is not to be intentionally placed across phase to phase or phase to earth air gaps.
- **Periodic test / inspection;** a test or inspection conducted at regular intervals to confirm the ongoing serviceability of the item.
- **Procedure;** documentation of a systematic series of actions (or activities) directed to achieve a desired result.
- **Routine test;** a test to which an item is subjected, during or after manufacture, to ascertain whether it complies with specifications. This is generally performed in the factory.
- **Safe;** means not posing an unacceptable risk to life, health or property.
- **Service Provider;** is a person/organisation who undertakes a designated task on or near an electricity network.
- **Shall;** is to be interpreted as 'mandatory'.
- **Should;** is to be interpreted as 'advisory or discretionary'.
- **Testing Authority;** is an organisation that has been assessed (usually by a third party or independent industry based organisation) to ensure they can deliver testing and inspection services to an acceptable industry standard.
- **Type test;** is a test to establish or confirm the required properties of a design. A manufacturer would usually use this test in the development of the item. Normally only one item of a contract would be required to be type tested. Often this item would be damaged or stressed beyond its normal usage and therefore would not be suitable for use.
- **Voltage;** means a difference of electrical potential normally existing between conductors or between conductors and earth.

## 6. CONDUCTOR SUPPORT EQUIPMENT

### 6.1. Overview

Proper care, inspection and maintenance of live work load support equipment will not only result in longer equipment life, but will ensure greater safety for the live worker.





All live work equipment SHALL be inspected before use, inspected and maintained at regular intervals in accordance with the manufacturer's instructions, relevant standards and guidelines.

## 7. SAFE WORKING LOADS (SWL)

- Safe working load (SWL) is the load that a lifting rig is rated to lift.
- An example is a 3 tonne sling choked around a load has its rated working load limit reduced because it is choked. The Safe Working Load (SWL) may now be 2.4 tonne.
- The safe working load will be dependent upon how a lifting device is used and loaded. A lifting rig may be made up from a number of lifting devices and consequently the Safe Working Load is then calculated based on the assembly and how the load is applied.

## 8. WORKING LOAD LIMIT (WLL)

- The working load limit is the load that a lifting device is rated to lift in line.
- An example is a 3 tonne (WLL) sling is rated to lift a 3 tonne load when the load is supported from each end of the sling (vertical).

Vertical	Choke	Basket	60°
			
WLL = 3,000 Kg	SWL = 2,400 Kg	SWL = 6,000 Kg	SWL = 5,100 Kg

## 9. GENERAL

### 9.1. Competency, training and inspection frequency

- Field inspection to be completed daily and completed by approved live linesmen
- It is recommended that periodic inspection be under taken every 12 months .

### 9.2. Defining what has to be inspected and what is not included

- All load bearing live work equipment
- Universal sticks
- Pole clamps and pole clevis
- Brackets
- Gins/jibs
- Blocks and tackles
- Chains and tighteners
- Hydraulic equipment
- Strap Hoist

### 9.3. Excluded Items

- Blankets and covers (electrical)
- Drills
- Crimpers
- Hoists (chain)
- Electrical equipment

## **10. SAFETY FACTOR**

A safety factor is the material ultimate strength divided by the load the item is designed to support.

An example is if a 1 tonne rated sling would start to break when a load of 5 tonne is applied, the factor of safety is 5.

### **10.1. Safety factor – Design**

When an item is designed to support loads a safety factor is considered. Determining the most efficient safety factor will be dependent upon on the material used, the type of load, application, the working environment and the consequence of failure. An example would be designing a rig to support a human would require a high safety factor because the consequence of the rig failing might be death. A safety factor of 10 might be selected.

Proprietary items (from a manufacturer) have generally a safety factor of 2:1

Items manufactured by a utility would generally have a safety factor greater than 2:1 depending on the material used, the type of load, application, the working environment and the consequence of failure.

Any items manufactured by a utility would have a fully engineered process which shall include load analysis, type testing (e.g. proof loading, destruction testing), and have an SWL.

### **10.2. Proof Loading**

Proof loading is done in the manufacturing process and is not generally done as a routine maintenance/inspection activity. Proof loading could involve tension, compression and bending/flexing.

The test load applied to equipment should be in a controlled environment. Proof loading is done to enable inspection of equipment under load. The Proof load is typically higher than expected regular working load (e.g. up to the WLL or as recommended by the manufacturer). The aim is to prove capacity in a working environment. Proof loading should not go beyond the elastic limit of the material being tested. This testing shall be carried out at a NATA approved test facility.

## **11. ROPE**

### **11.1. General**

This section only addresses rope used directly with HV Live work.

Ropes shall be given the same respect and care as any other insulated tool used in high voltage live work. Ropes used for HV Live work shall not be used for any other purpose.

All rope used in HV Live work shall be manufactured from polypropylene, or a material having electrical and mechanical properties, not inferior to polypropylene.

Polypropylene has an excellent dielectric strength, very good mechanical strength, is light weight and has a resistance to water absorption.

The rope shall be treated by pigmentation or some other means to minimise the effects of ultra violet light. This guideline only deals with the mechanical inspection of rope used in HV Live work. AS 5804.1 2010; details HV Live Work for electrical testing procedures for rope.

## **11.2. Inspection**

### **1. External wear**

The rope should be examined for external wear as follows:

- Examine the outside of the rope. Ordinary usage may cause “fluffing” of the outer yarns. Ropes in this condition should be removed from service.
- Note for any signs of abrasion, contusions, nicks, cut or wear in the rope results in a serious loss of strength the rope shall be removed from service.
- Look for kinks. A rope must never be put under tension in an attempt to remove a kink. This causes permanent damage to the rope and a substantial loss of strength. A kink under tension cause internal fibre damage and could render the rope unusable.
- Inspect for any reduction in diameter or excessive elongation of the lay. Any significant narrowing of the rope has been caused by overload and that section of the rope shall be removed from service.
- Examine the rope for signs of discolouration, softening or powdering of the fibres. This has been caused by contamination with corrosive substances. The extent of the damage will govern the future of the rope.
- Inspect for signs of heating or fusion. Other than contact with sources of direct heat, the heat will be generated through friction. This cause loss of strength and will result in that section of the rope being condemned.

### **2. Internal wear**

Three strand hawser laid and eight strand plaited ropes should be examined for internal wear as follows:

- For laid ropes, open up the rope by twisting the strands, taking care not to kink them. For plaited ropes, bunch up the rope to expose the interior.
- Check to make sure that the interior of the rope is bright and clean, as it was when new.
- Note any signs of broken yarns, excessively loose strands and yarns, or an accumulation of grit or powder like dust. These defects indicate excessive internal wear as the rope is flexed back and forth in use. Grit and dirt aggravate this problem. These should be removed by washing the rope in clean water and hanging the rope to dry.

## **11.3. Damaged ropes**

Ropes which are damaged, or suspected of being damaged, shall be treated as follows:

- If there is any doubt that the rope has been damaged, the rope should be removed from service.
- Polypropylene ropes will not be subject to mechanical testing. The condition of the rope shall be judged by inspection only. Ropes not passing inspection shall be removed from service.

## **12.INSPECTION CRITERIA**

**Live work equipment must be withdrawn from service for further inspection, testing, repair or replacement if:**

- The equipment service date has expired; or
- The equipment appears to be defective; e.g.- A mechanically stressed tool showing such evidence as damaged, bent, worn or cracked components

**The equipment must be examined for any indications mechanical overstressing such as;**

- fibre delaminating;
- end fitting bond deterioration;
- cracks;
- major dents; and
- deformation

**Wear or damage associated with –**

- threads and trunnions;
- pin damage, pins missing, pin holes elongating;
- castings;
- clamps; and
- yokes
- Any live work stick or associated support equipment that is known to have been overloaded must immediately be withdrawn, tagged out of service and quarantined.

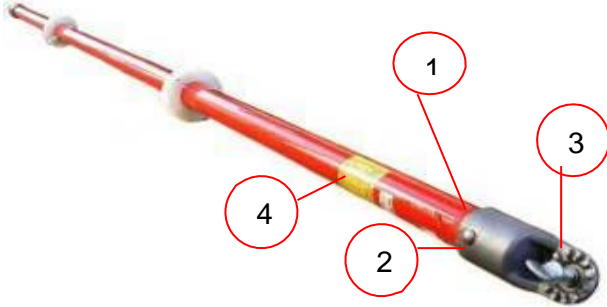
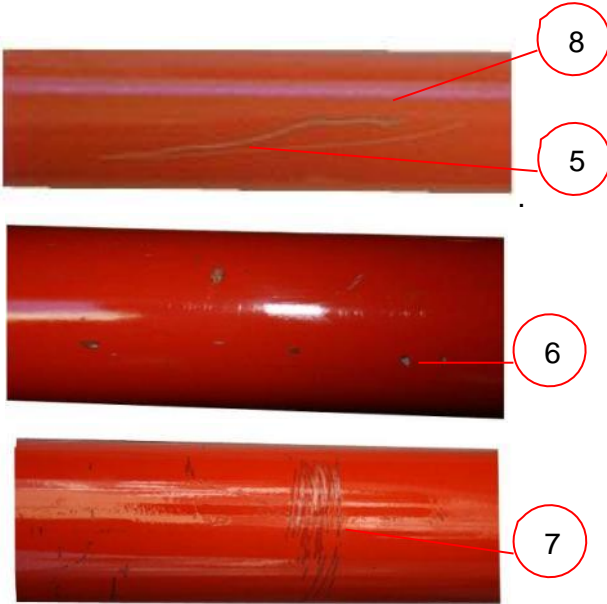
## **13.STORAGE AND TRANSPORT**

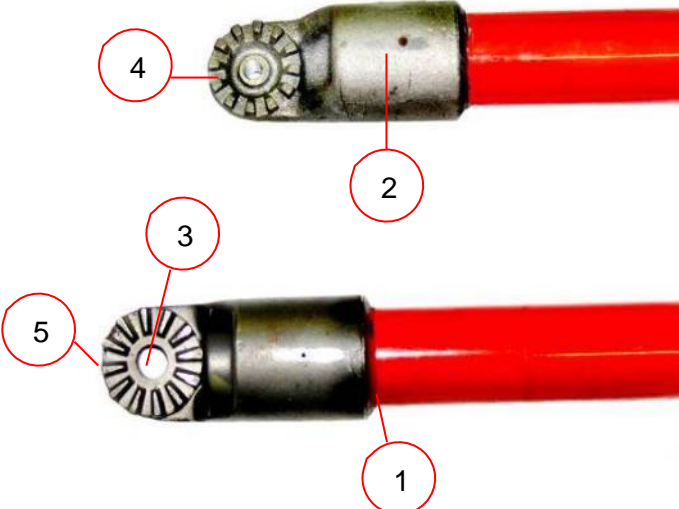
Adequate facilities must be provided to protect HV Live Work mechanical support equipment.

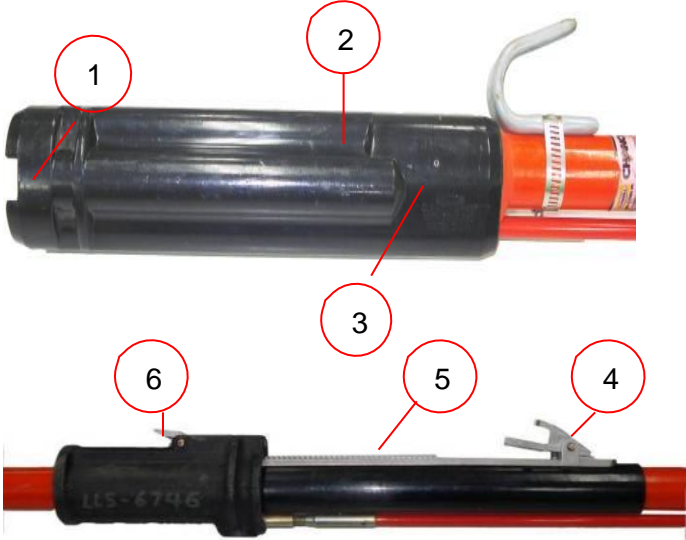
- Damage during transport and in storage;
- Equipment stored in containers or racks on vehicles;
- Racks are to be well padded and constructed so the equipment is held firmly in place during transport;
- Where necessary, to ensure safe transport and storage, the equipment should be dismantled.



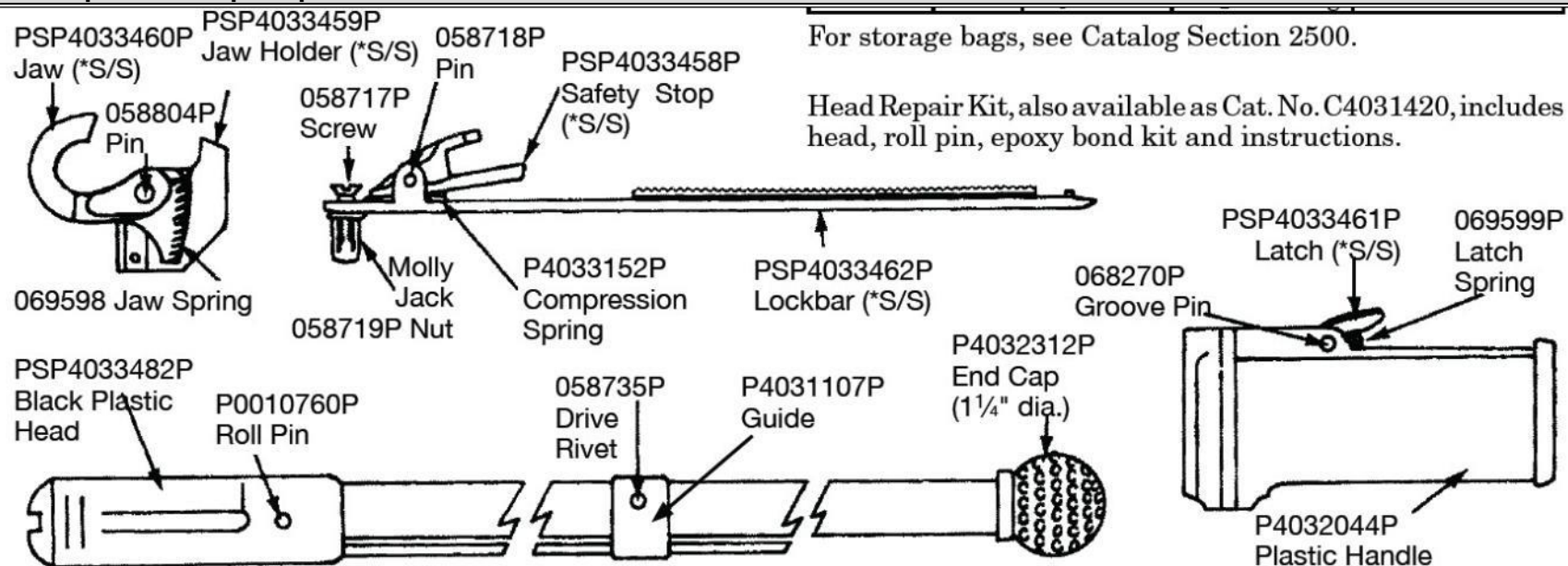
## 14.DISTRIBUTION EQUIPMENT

Item 1:Universal Hand Sticks	Inspection	Maintenance
	<ol style="list-style-type: none"> <li>1. Check epoxy seal between head and stick is in place to stops water ingress.</li> <li>2. Bent rivets for signs that ferrules have been pulled away from their original position and damaged the stick.</li> <li>3. Inspect thumb screw and spline for excessive wear and other visible damage.</li> <li>4. Check Electrical Test Date Stamp.</li> </ol>	<ul style="list-style-type: none"> <li>• Clean Fibreglass Pole with Live Work Stick Cleaner and water repellent wipe.</li> </ul>
	<ol style="list-style-type: none"> <li>5. Gouges.</li> <li>6. Deep Chips.</li> <li>7. Scratches.</li> <li>8. Inspect sticks for any loss of gloss.</li> </ol>	<ul style="list-style-type: none"> <li>• Insulated Sticks shall be visually inspected prior to use for signs of overstressing, this type of damage is evidenced by distorted or cracked parts.</li> <li>• If any deep chips, gouges or scratches are found, the stick shall be removed and sent away for repair and testing.</li> <li>• An approved person shall perform all insulated stick repairs.</li> <li>• Insulated Sticks shall be visually inspected and wiped clean with a silicone impregnated cloth before use.</li> <li>• If the Live Work Stick has any grease dirt or contaminants, wipe thoroughly with Live Work Stick Cleaner, then a coating of silicone applied to the entire stick with a water repellent wipe e.g. silicone impregnated cloth.</li> </ul>

Item 2: Universal Fittings	Inspection	Maintenance
	<ol style="list-style-type: none"> <li>1. Check epoxy seal between head and stick is in place to stops water ingress.</li> <li>2. Bent rivets for signs that ferrules have been pulled away from their original position and damaged the stick.</li> <li>3. Inspect thumb screw and spline for excessive wear and other visible damage.</li> <li>4. Spline Anchorage.</li> <li>5. Sunrise Fitting.</li> </ol> <p><b>NOTE:</b> Universal fittings enable tools to be set at various angles up to 90°.</p>	<ul style="list-style-type: none"> <li>• Lubricate thread with manufacturers approved lubricant.</li> <li>• Repair or replace insulated stick as per item 1.</li> </ul>

Item 3: Grip-All (Shotgun)	Inspection	Maintenance
 <p>The image shows two views of a Grip-All shotgun. The top view shows the side of the shotgun with callouts 1, 2, and 3. Callout 1 points to the jaw spring, 2 points to the insulated stick, and 3 points to the roll pin. The bottom view shows the front of the shotgun with callouts 4, 5, and 6. Callout 4 points to the safety stop and compression spring, 5 points to the locking bar, and 6 points to the groove pin &amp; latch spring.</p>	<ol style="list-style-type: none"> <li>1. Jaw spring in place. Jaw opens and closes correctly.</li> <li>2. Insulated stick in good condition as per item 1.</li> <li>3. Roll pin in place.</li> <li>4. Safety stop and compression spring working correctly.</li> <li>5. Locking bar in place.</li> <li>6. Groove pin &amp; latch spring in place.</li> </ol>	<ul style="list-style-type: none"> <li>• Inspect and replace parts when necessary as per item 4.</li> <li>• Lubricate all bearing surfaces, sliding and threaded with manufacturers approved lubricant.</li> <li>• Repair or replace insulated stick as per item 1.</li> </ul>

#### Item 4: Description of Grip-All parts

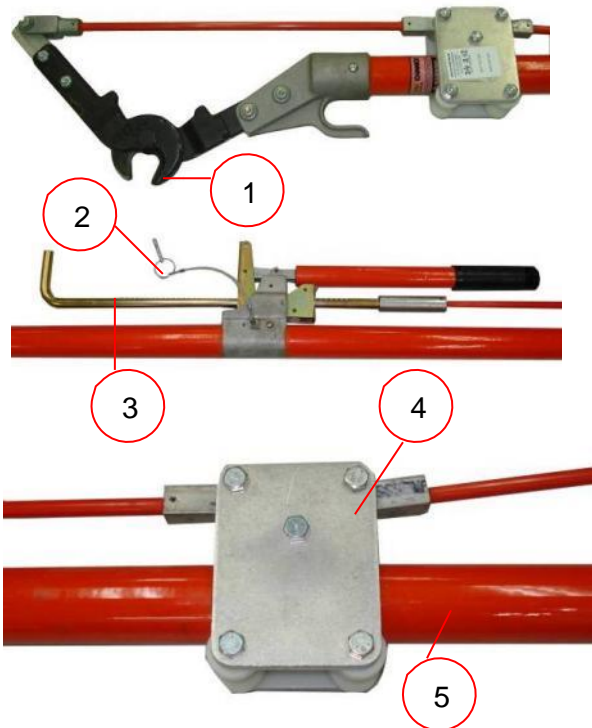


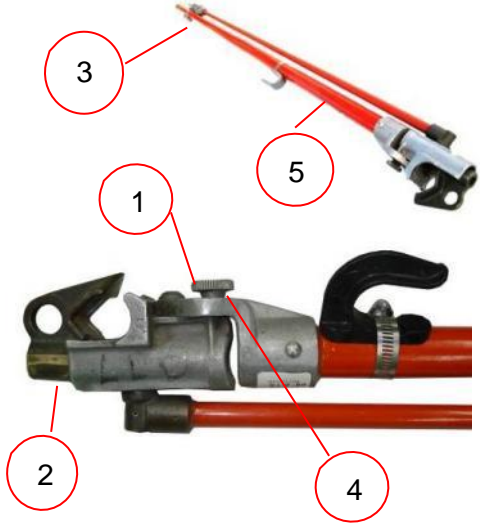
For storage bags, see Catalog Section 2500.

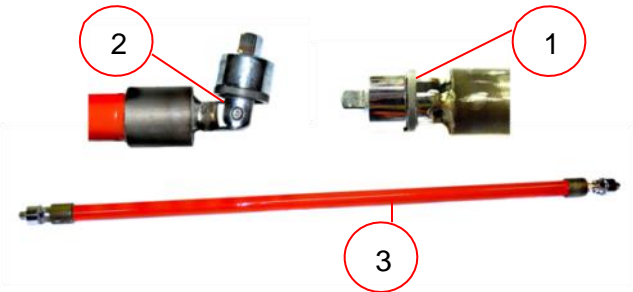
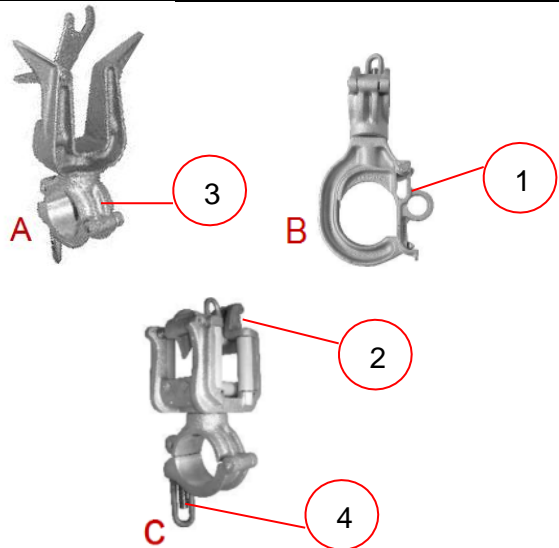
Head Repair Kit, also available as Cat. No. C4031420, includes head, roll pin, epoxy bond kit and instructions.

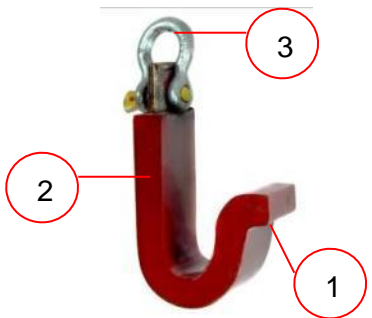
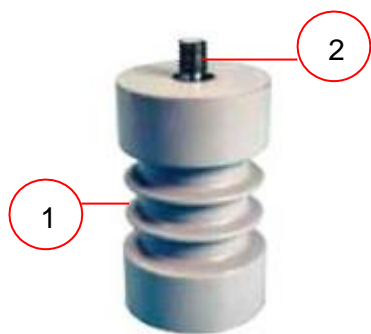
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**HUBBELL**  
Power Systems

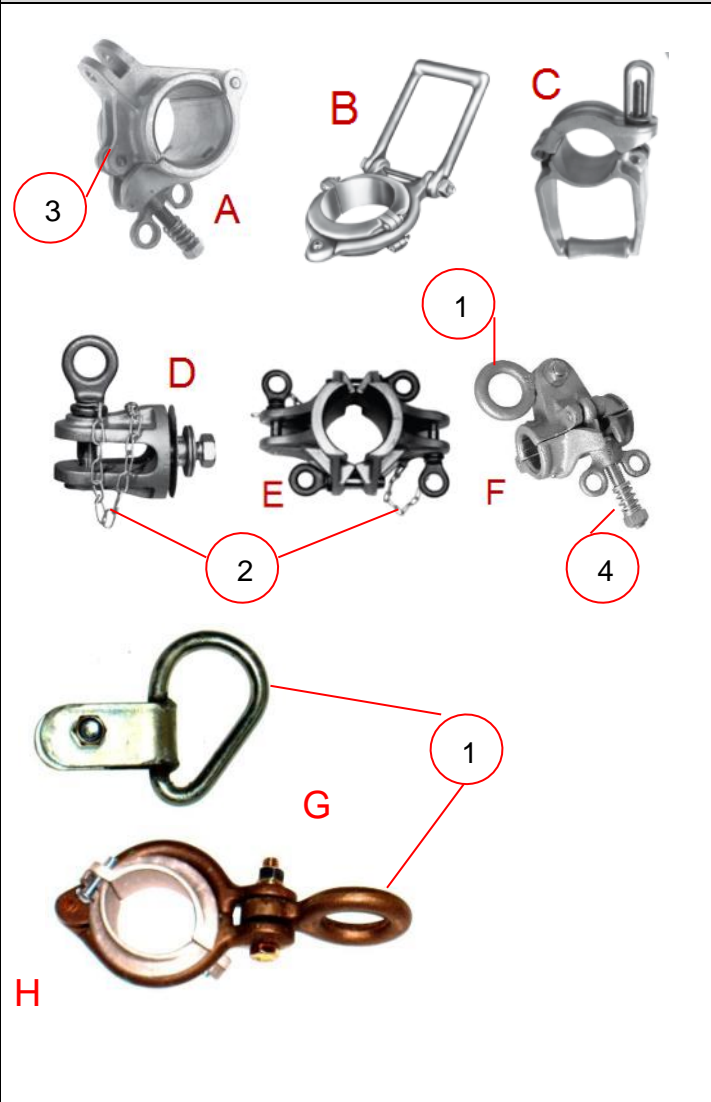
Item 5: Cutter	Inspection	Maintenance
	<ol style="list-style-type: none"> <li>1. Jaws open and close correctly, no metal pitting, burrs nicks on blades.</li> <li>2. Handle locking pin attached.</li> <li>3. Operating lever and ratchet works correctly.</li> <li>4. Roller mechanism runs smoothly on insulated stick.</li> <li>5. Insulated stick in good condition as per item 1.</li> </ol>	<ul style="list-style-type: none"> <li>• Repair/replace cutter heads when necessary.</li> <li>• Repair or replace insulated stick as per item 1.</li> <li>• Lubricate all bearing surfaces, sliding and threaded with manufacturers approved lubricant.</li> </ul>

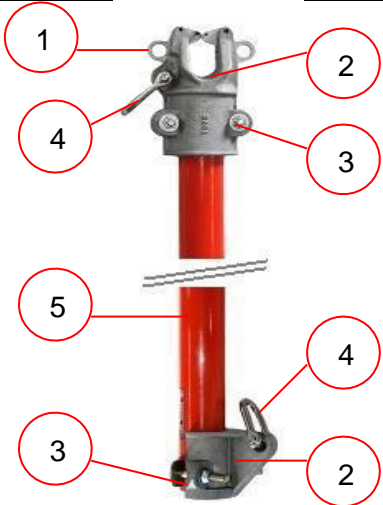
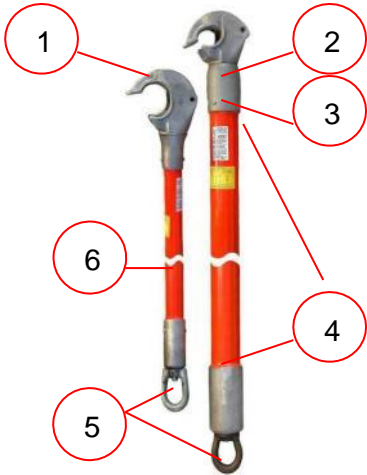
Item 6: Wire Holder	Inspection	Maintenance
	<ol style="list-style-type: none"> <li>1. Knurled screw on swivel head locks securely.</li> <li>2. Jaw slide operates smoothly.</li> <li>3. Control lever and locking screw secures correctly.</li> <li>4. Knurled nut turns freely.</li> <li>5. Insulated stick in good condition as per item 1.</li> </ol>	<ul style="list-style-type: none"> <li>• Repair or replace insulated stick as per item 1.</li> <li>• Lubricate all bearing surfaces, sliding and threaded with manufacturers approved lubricant.</li> </ul>

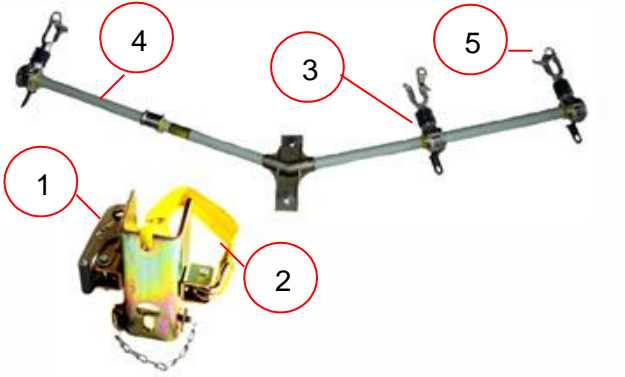
Item 7: Ratchet	Inspection	Maintenance
	<ol style="list-style-type: none"> <li>1. Ratchet fixed ends spins freely.</li> <li>2. Ratchet swivel end turns freely.</li> <li>3. Insulated stick in good condition as per item1.</li> </ol>	<ul style="list-style-type: none"> <li>• Repair or replace insulated stick as per item 1.</li> <li>• Lubricate ratchets with manufacturers approved lubricant.</li> </ul>
Insulated Support Sticks and Attachments		
Item 8: Temporary Conductor Support Attachments	Inspection	Maintenance
	<ol style="list-style-type: none"> <li>1. Safety catches working correctly.</li> <li>2. Spring release levers working correctly.</li> <li>3. Alloy frame cracking / overstressing.</li> <li>4. Threads not damaged running freely.</li> </ol> <p> <b>A.</b> Fork type wire holder (Top Support).  <b>B.</b> C clamp wire holder (Suspended Support).  <b>C.</b> Roller wire holder. </p>	<ul style="list-style-type: none"> <li>• Clean threads with wire brush.</li> <li>• Lubricate all threads with manufacturers approved lubricant.</li> <li>• <b>Fork Type Wire Holder (A)</b> Is fitted in an upright position above the temporary conductor support.</li> <li>• <b>C-Type Wire Holder (B)</b> Is suspended under the temporary conductor support equipment to allow the conductor to be supported.</li> <li>• <b>Roller Wire Holder (C)</b>  Is fitted in an upright position above the temporary conductor support allowing conductor movement.</li> </ul>

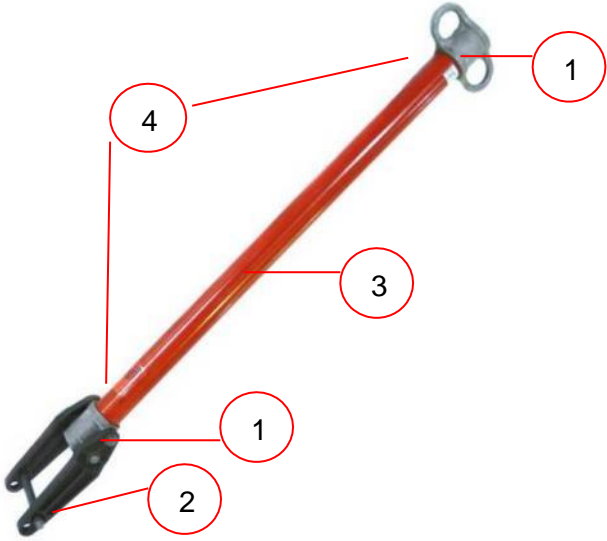
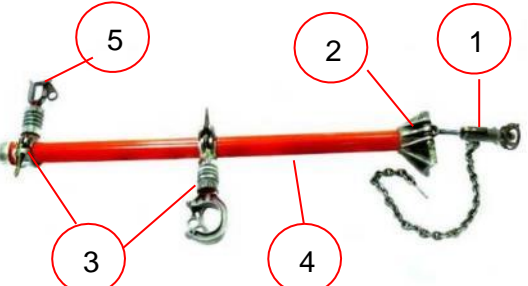
Item 9: Conductor Support Hook (CN)	Inspection	Maintenance
	<ol style="list-style-type: none"> <li>1. CN hook not overstressed.</li> <li>2. Fractures and Cracks.</li> <li>3. D shackle for Cracks and (SWL).</li> </ol> <p><b>NOTE:</b> A conductor support hook is used to support conductors in conjunction with an approved rig. Hook not to be used as insulation.</p>	<ul style="list-style-type: none"> <li>• No maintenance required.</li> </ul>
Item 10: Auxiliary Arm Insulator	Inspection	Maintenance
	<ol style="list-style-type: none"> <li>1. Insulator cleans from chips.</li> <li>2. Thread not damaged.</li> </ol> <p><b>NOTE:</b> Used to provide extra insulation when using an auxiliary arm and mast, or temporary support bracket where the phase to phase voltage is greater than 15kV - For all 22kV applications.</p>	<ul style="list-style-type: none"> <li>• Repair or replace insulated stick as per item 1.</li> <li>• Lubricate all threads with manufacturers approved lubricant.</li> <li>• Insulator</li> <li>• Is used to insulate the wire holder from the insulated support stick.</li> </ul>

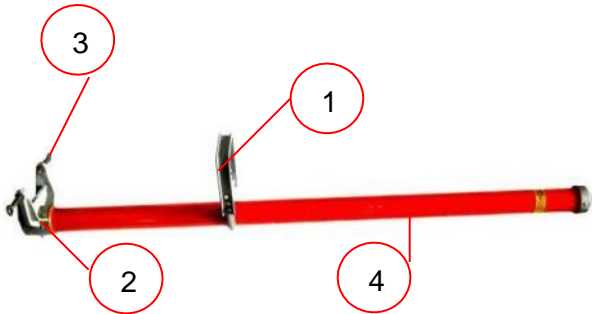
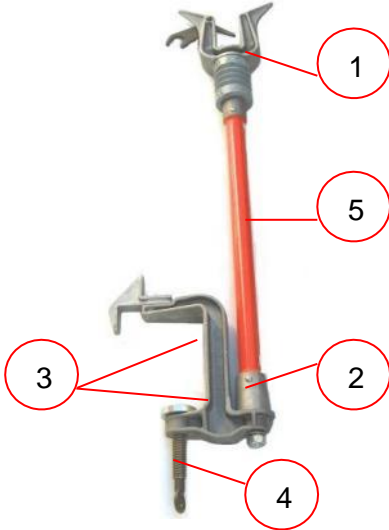


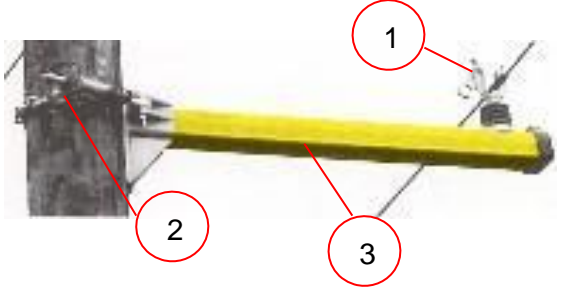
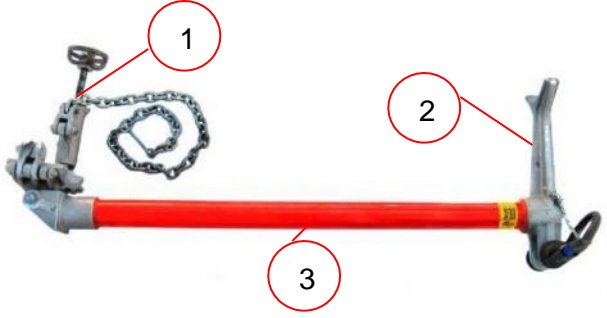
Item 11: Assorted Metal Attachments	Inspection	Maintenance
	<ol style="list-style-type: none"> <li>1. Elongating Eyelets.</li> <li>2. Safety Chains Attached.</li> <li>3. Alloy frame cracking / overstressing.</li> <li>4. Threads not damaged running freely.</li> </ol> <p>A. Pole Clamp.</p> <p>B. Wire Tong Swivel.</p> <p>C. Wire Tong Stirrup.</p> <p>D. Saddle Clevis.</p> <p>E. Pole Clevis.</p> <p>F. Block Clamp.</p> <p>G. Wire Tong Butt Swivel Ring Adaptor.</p> <p>H. Wire Tong Band.</p>	<ul style="list-style-type: none"> <li>• Clean threads with wire brush.</li> <li>• Lubricate threads with manufacturers approved lubricant.</li> </ul>

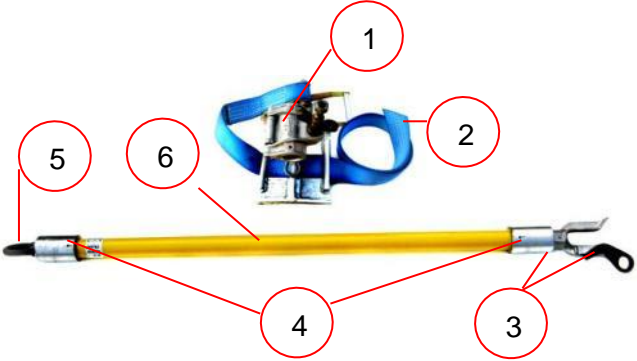
Load Support Equipment		
Item 12: 63/75mm Support Sticks	Inspection	Maintenance
	<ol style="list-style-type: none"> <li>1. Spring clips working.</li> <li>2. Alloy frame cracking / overstepping.</li> <li>3. Bolts bent over stressed.</li> <li>4. Inspect D shackle for wear and cracks and free moving.</li> <li>5. Insulated stick in good condition as per item 1.</li> </ol>	<ul style="list-style-type: none"> <li>• Repair or replace insulated stick as per item 1.</li> </ul>
Item 13: 38/63mm Wire Tongs	Inspection	Maintenance
	<ol style="list-style-type: none"> <li>1. Head turning freely open and close.</li> <li>2. Alloy frame cracking / overstepping.</li> <li>3. Bent ferules/rivets, holes elongating.</li> <li>4. Cracking of Epoxy Resin.</li> <li>5. Butt swivel ring turning freely.</li> <li>6. Insulated stick in good condition as per item1.</li> </ol>	<ul style="list-style-type: none"> <li>• Repair or replace insulated stick as per item 1.</li> <li>• Lubricate threads with manufacturers approved lubricant.</li> </ul>

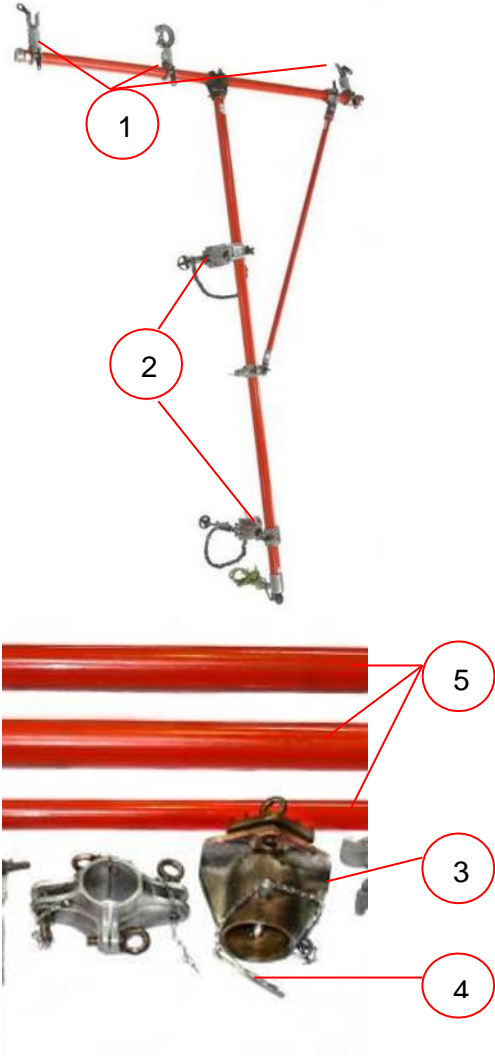
Item 14: Hastings Temporary Crossarm V-Arm	Inspection	Maintenance
 <p>The diagram shows a V-shaped crossarm assembly. Callout 1 points to the yellow ratchet assembly at the bottom left. Callout 2 points to the yellow webbing strap attached to the ratchet. Callout 3 points to the central metal bracket where the two arms meet. Callout 4 points to the left insulated stick. Callout 5 points to the right insulated stick. Both sticks have safety catches at their ends.</p>	<ol style="list-style-type: none"> <li>1. Ratchet assembly clean working smoothly</li> <li>2. Webbing strap inspected for tears, deterioration or stitching release.</li> <li>3. Insulator clean free from chips, thread not damaged.</li> <li>4. Insulated stick in good condition as per I.</li> <li>5. Safety catches working correctly.</li> </ol>	<ul style="list-style-type: none"> <li>• Repair or replace insulated stick as per item 1.</li> <li>• Support attachments as per item 8</li> <li>• Insulators as per item 10</li> </ul>

Item 15: Gin Pole	Inspection	Maintenance
 <p>The diagram shows a red insulated stick (3) with a metal hook at the top (1) and a metal bracket at the bottom (2). A red line (4) points to the stick itself.</p>	<ol style="list-style-type: none"> <li>1. Alloy frame cracking / overstressing.</li> <li>2. Ball bearing in pin working correctly.</li> <li>3. Insulated stick in good condition as per item1.</li> <li>4. Cracking of Epoxy Resin</li> </ol>	<ul style="list-style-type: none"> <li>• Repair or replace insulated stick as per item 1.</li> </ul>
Item 16: Temporary Conductor Support Pole Mounted	Inspection	Maintenance
 <p>The diagram shows a red insulated stick (4) with a metal hook at the top (1) and a metal bracket at the bottom (2). A red line (3) points to the stick itself. A red line (5) points to the metal hook at the top. A red line (4) points to the metal bracket at the bottom.</p>	<ol style="list-style-type: none"> <li>1. Chain Tightener free running thread, stopper guide pin not bent/damaged, spring load clip working.</li> <li>2. Alloy frame cracking / overstressing.</li> <li>3. Temporary conductor support attachment and insulator.</li> <li>4. Insulated stick in good condition as per item1.</li> <li>5. Safety catches working correctly.</li> </ol>	<ul style="list-style-type: none"> <li>• Repair or replace insulated stick as per item 1.</li> <li>• Support attachments as per item 8</li> <li>• Insulators as per item 10</li> <li>• Maintain Chain Tightener as per Item 29.</li> </ul>

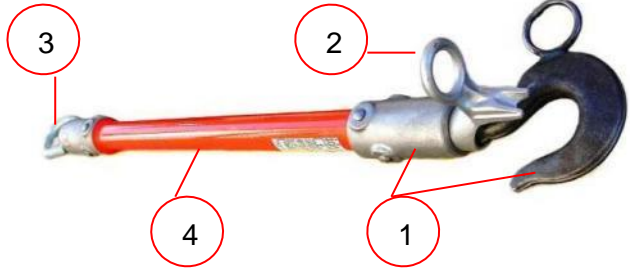
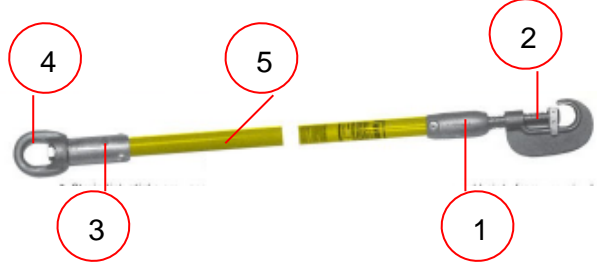
Item 17: Extension Cross arm	Inspection	Maintenance
	<ol style="list-style-type: none"> <li>1. Bangle not bent.</li> <li>2. Alloy frame cracking / overstressing.</li> <li>3. Securing screws free running.</li> <li>4. Insulated stick in good condition as per item1.</li> </ol>	<ul style="list-style-type: none"> <li>• Repair or replace insulated stick as per item 1.</li> <li>• Clean threads with wire brush.</li> <li>• Lubricate threads with manufacturers approved lubricant.</li> <li>• An insulator must be inserted between each wire holder and the fiberglass arm.</li> </ul>
Item 18: Temporary Conductor Support, Crossarm Mounted	Inspection	Maintenance
	<ol style="list-style-type: none"> <li>1. Temporary conductor support attachments and insulator.</li> <li>2. Bent ferules/rivets, holes elongating.</li> <li>3. Alloy frame cracking / overstressing.</li> <li>4. Screw and thread running freely.</li> <li>5. Insulated stick in good condition as per item1.</li> </ol>	<ul style="list-style-type: none"> <li>• Repair or replace insulated stick as per item 1.</li> <li>• Support attachments as per item 8</li> <li>• Insulators as per item 10</li> <li>• Clean threads with wire brush.</li> <li>• Lubricate threads with manufacturers approved lubricant.</li> </ul>

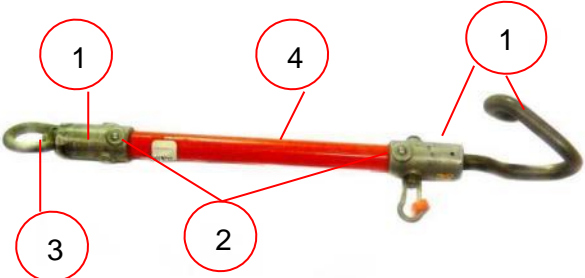
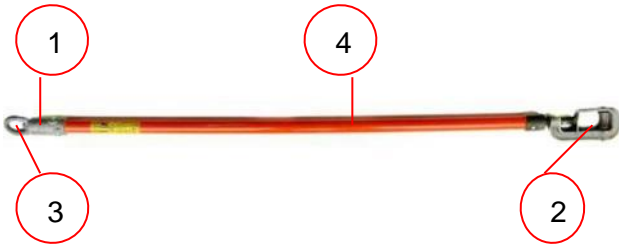
Item 19: Temporary Conductor Support, Crossarm Mounted	Inspection	Maintenance
	<ol style="list-style-type: none"> <li>1. Temporary conductor support attachments and insulator.</li> <li>2. Chain Tightener free running thread, stopper guide pin not bent/damaged, spring load clip working.</li> <li>3. Insulated stick in good condition as per item 1.</li> </ol>	<ul style="list-style-type: none"> <li>• Repair or replace insulated stick as per item 1.</li> <li>• Support attachments as per item 8</li> <li>• Insulators as per item 10</li> <li>• Maintain Chain Tightener as per item 29.</li> </ul>
Item 20: Lever Lift Wire Tong Support	Inspection	Maintenance
	<ol style="list-style-type: none"> <li>1. Chain Tightener free running thread, stopper guide pin not bent/damaged, spring load clip working.</li> <li>2. Alloy frame cracking / overstressing. Bent ferules/rivets, holes elongating.</li> <li>3. Insulated stick in good condition as per item 1.</li> </ol>	<ul style="list-style-type: none"> <li>• Repair or replace insulated stick as per item 1.</li> <li>• Maintain Chain Tightener as per Item 29.</li> </ul>

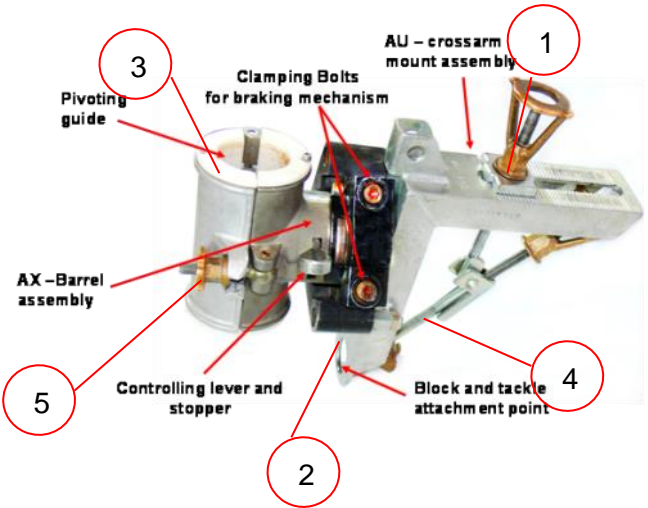
Item 21: Adjustable Pole Mounted Conductor Support	Inspection	Maintenance
 <p>The diagram shows a yellow insulated stick with a blue webbing strap and a metal ratchet assembly. Numbered callouts point to specific components: 1 points to the ratchet assembly, 2 points to the webbing strap, 3 points to the safety latch, 4 points to the alloy frame, 5 points to the swivel ring, and 6 points to the insulated stick.</p>	<ol style="list-style-type: none"> <li>1. Ratchet assembly clean working smoothly.</li> <li>2. Webbing strap inspected for tears, deterioration or stitching release.</li> <li>3. Alloy frame cracking / overstressing and fork safety latch working correctly.</li> <li>4. Bent ferules/rivets, holes elongating.</li> <li>5. Swivel ring turning freely.</li> <li>6. Insulated stick in good condition as per item1.</li> </ol>	<ul style="list-style-type: none"> <li>• Repair or replace insulated stick as per item 1.</li> <li>• Replace webbing strap if tears, deterioration or stitching release is evident.</li> </ul>

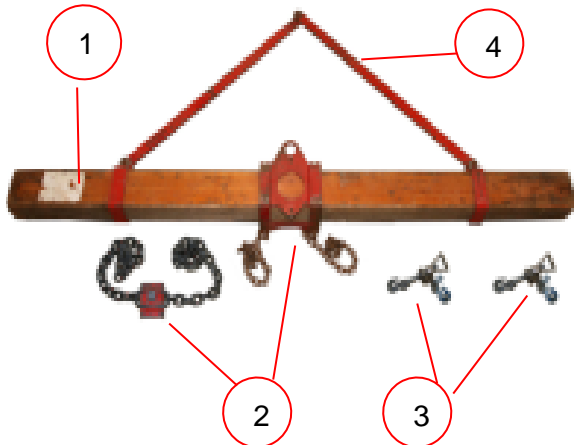
Item 22: Auxiliary Crossarm Assembly	Inspection	Maintenance
 <p>The diagram illustrates the Auxiliary Crossarm Assembly. Callout 1 points to the temporary conductor support attachments and insulator at the top. Callout 2 points to the chain tightener mechanism. Callout 3 points to the brass T-bar bracket. Callout 4 points to the alloy arm brace bracket. Callout 5 points to the insulated stick components shown in a separate view below the main assembly.</p>	<ol style="list-style-type: none"> <li>1. Temporary conductor support attachments and insulator.</li> <li>2. Chain Tightener free running thread, stopper guide pin not bent/damaged, spring load clip working.</li> <li>3. Brass T-Bar bracket &amp; alloy arm brace bracket inspected for signs of cracking / overstressing.</li> <li>4. Locking pins and safety pins attached.</li> <li>5. Insulated stick in good condition as per item 1.</li> </ol>	<ul style="list-style-type: none"> <li>• Repair or replace insulated stick as per item 1.</li> <li>• Support attachments as per item 8</li> <li>• Insulators as per item 10</li> <li>• Maintain Chain Tightener, brass T-bar bracket and alloy arm brace bracket as per Item 29.</li> <li>• Base of the brace/s must be located below the top saddle.</li> </ul>

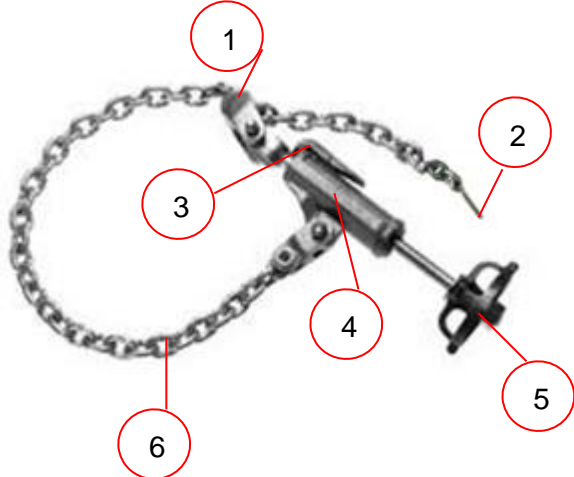
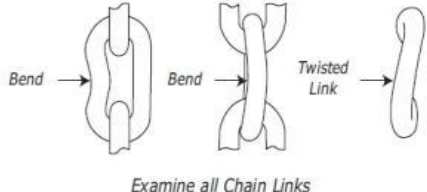
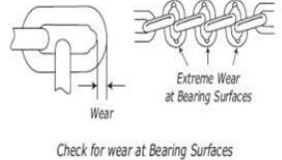



Link Sticks		
Item 23: Link Stick (Hoist)	Inspection	Maintenance
	<ol style="list-style-type: none"> <li>1. Alloy frame and steel hook free from cracking / overstressing.</li> <li>2. Safety catch working correctly, bent ferules/rivets, holes elongating.</li> <li>3. Swivel ring turning freely.</li> <li>4. Insulated stick in good condition as per item 1.</li> </ol>	<ul style="list-style-type: none"> <li>• Repair or replace insulated stick as per item 1.</li> <li>• Lubricate all threads with manufacturers approved lubricant.</li> </ul>
Item 24: Strain Stick	Inspection	Maintenance
	<ol style="list-style-type: none"> <li>1. Alloy frame cracking / overstressing.</li> <li>2. Gate free running working smoothly.</li> <li>3. Bent ferules/rivets, holes elongating.</li> <li>4. Swivel ring turning freely.</li> <li>5. Insulated stick in good order as per item 1.</li> </ol>	<ul style="list-style-type: none"> <li>• Repair or replace insulated stick as per item 1.</li> <li>• Lubricate all threads with manufacturers approved lubricant.</li> </ul>

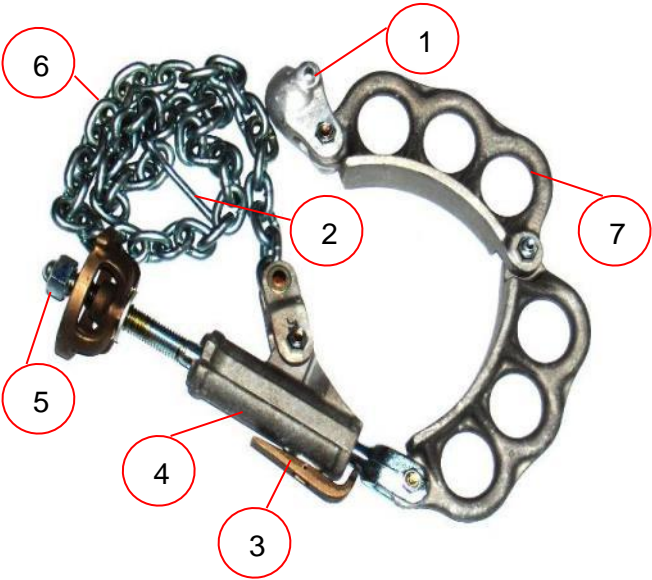
Item 25: Link Stick (Spiral)	Inspection	Maintenance
 <p>The diagram shows a red insulated link stick with a spiral hook at one end. Numbered callouts are: 1 (Alloy frame at the hook), 2 (Insulated stick body), 3 (Swivel ring at the hook), and 4 (Bent ferules/rivets on the stick body).</p>	<ol style="list-style-type: none"> <li>1. Alloy frame and spiral hook free from cracking / overstressing.</li> <li>2. Bent ferules/rivets, holes elongating.</li> <li>3. Swivel ring turning freely.</li> <li>4. Insulated stick in good condition as per item1.</li> </ol>	<ul style="list-style-type: none"> <li>• Repair or replace insulated stick as per item 1.</li> <li>• Lubricate all threads with manufacturers approved lubricant.</li> </ul>
Item 26: Link Stick (Roller)	Inspection	Maintenance
 <p>The diagram shows a red insulated link stick with a roller gate at one end. Numbered callouts are: 1 (Alloy frame at the roller gate), 2 (Roller gate mechanism), 3 (Swivel ring at the roller gate), and 4 (Insulated stick body).</p>	<ol style="list-style-type: none"> <li>1. Alloy frame cracking / overstressing. Bent ferules/rivets, holes elongating.</li> <li>2. Roller gate free running working smoothly.</li> <li>3. Swivel ring turning freely.</li> <li>4. Insulated stick in good condition as per item1.</li> </ol>	<ul style="list-style-type: none"> <li>• Repair or replace insulated stick as per item 1.</li> <li>• Lubricate all threads with manufacturers approved lubricant.</li> </ul>

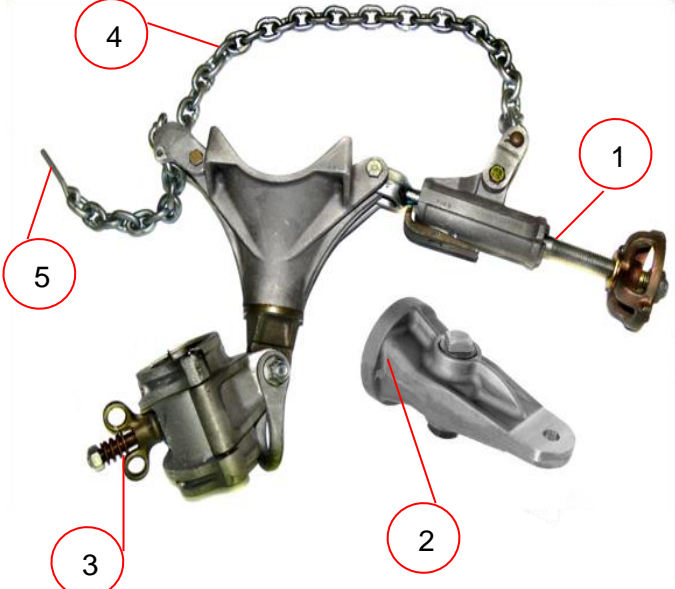
Item 27: Cross arm mounted Support Bracket	Inspection	Maintenance
 <p>The diagram shows a mechanical assembly with the following labeled parts:</p> <ul style="list-style-type: none"> <li><b>1</b>: AU – crossarm mount assembly</li> <li><b>2</b>: Clamping Bolts for braking mechanism</li> <li><b>3</b>: Pivoting guide</li> <li><b>4</b>: Block and tackle attachment point</li> <li><b>5</b>: AX – Barrel assembly</li> <li>Controlling lever and stopper</li> </ul>	<ol style="list-style-type: none"> <li>1. No thread damage, nuts running freely.</li> <li>2. Bracket examined for signs of cracking excessive wear and other visual damage.</li> <li>3. Check barrel liner is fixed and in good condition.</li> <li>4. Check clamping bolts thread.</li> <li>5. Check barrel safety catch is operational.</li> </ol>	<ul style="list-style-type: none"> <li>• Clean thread with wire brush.</li> <li>• Lubricate all bearing surfaces, sliding and threaded with manufacturers approved lubricant.</li> <li>• Replace barrel liners if cracked or damaged.</li> </ul>

Item 28: Temporary Cross arm Assembly	Inspection	Maintenance
 <p>The diagram shows a temporary cross arm assembly. It consists of a horizontal wooden cross arm (1) with a central metal bracket (2). Two red straps (4) are attached to the ends of the cross arm, forming a triangular shape. Below the cross arm, there are two sets of chain tighteners (3) with hooks and stopper guide pins.</p>	<ol style="list-style-type: none"> <li>1. Crossarm Inspected for cracks, splits, splinters, delaminating and any visual signs of damage.</li> <li>2. Bracket examined for signs of cracking excessive wear and other visual damage.</li> <li>3. Chain Tightener free running thread, stopper guide pin not bent/damaged, Hook not bent. Chain Tightener as per item 29</li> <li>4. Inspect crossarm braces for wear or damage.</li> </ol>	<ul style="list-style-type: none"> <li>• Clean thread with wire brush</li> <li>• Chain Tightener free running thread, stopper guide pin not bent/damaged, spring load clip working.</li> <li>• If crossarm is damaged, remove Temporary Crossarm immediate.</li> </ul>

Chains and Tighteners		
Item 29: Chain Extension	Inspection	Maintenance
	<p><b>Chain shortening hook</b></p> <ol style="list-style-type: none"> <li>Fractures and cracks, attachment pin, excessive wear.</li> </ol> <p><b>Tightener</b></p> <ol style="list-style-type: none"> <li>Safety pin attached.</li> <li>Spring loaded clip working.</li> <li>Alloy frame cracking / overstressing.</li> <li>Stopper/guide pin not bent/damaged wing nut and thread free running.</li> </ol> <p><b>Chain</b></p> <ol style="list-style-type: none"> <li>Elongation/distorting of links, burrs fractures and cracks &amp; rust.Excessive wear</li> </ol>  <p><b>Excessive Wear</b></p> 	<p><b>Tightener</b></p> <ul style="list-style-type: none"> <li>Clean thread with wire brush.</li> <li>Lubricate all bearing surfaces, sliding and threaded with manufacturers approved lubricant.</li> <li>No maintenance required on other parts.</li> <li>Damaged parts shall be replaced by approved suppliers.</li> </ul>

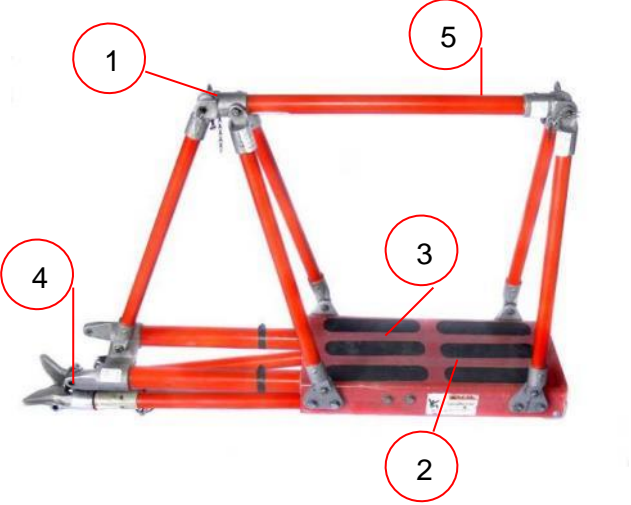
Item 30: Chain (DK Type)	Inspection	Maintenance
 <p>The diagram shows a DK Type Chain with the following inspection points:</p> <ul style="list-style-type: none"> <li>1. Fractures and cracks excessive wear, attachment pin.</li> <li>2. Safety pin attached.</li> <li>3. Spring loaded clip working.</li> <li>4. Alloy frame cracking / overstressing.</li> <li>5. Stopper/guide pin not bent/damaged wing nut and thread free running.</li> <li>6. Elongation/twisting of links, burrs Fractures and cracks &amp; Rust Inspection Tag in place.</li> <li>7. Elongating Eyelets.</li> </ul>	<p>A DK chain is attached to the pole and used as an anchor point for all hand or tackle ropes.</p> <ol style="list-style-type: none"> <li>Fractures and cracks excessive wear, attachment pin.</li> <li>Safety pin attached.</li> <li>Spring loaded clip working.</li> <li>Alloy frame cracking / overstressing.</li> <li>Stopper/guide pin not bent/damaged wing nut and thread free running.</li> <li>Elongation/twisting of links, burrs Fractures and cracks &amp; Rust Inspection Tag in place.</li> <li>Elongating Eyelets.</li> </ol>	<ul style="list-style-type: none"> <li>Clean thread with wire brush.</li> <li>Lubricate all bearing surfaces, sliding and threaded with manufacturers approved lubricant.</li> <li>No maintenance required on other parts.</li> <li>Damaged parts shall be replaced by approved suppliers.</li> <li>Maintain Chain Tightener as per Item 29.</li> </ul>

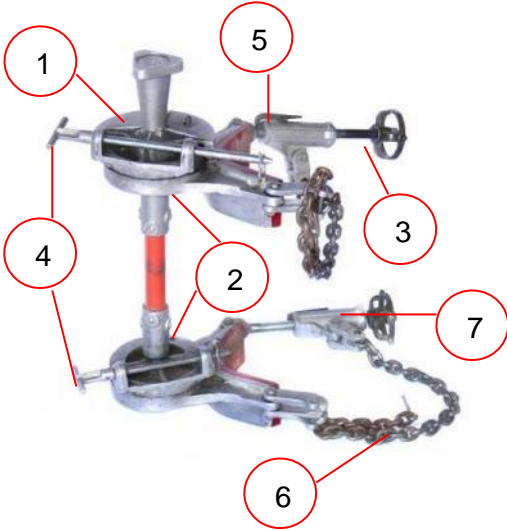
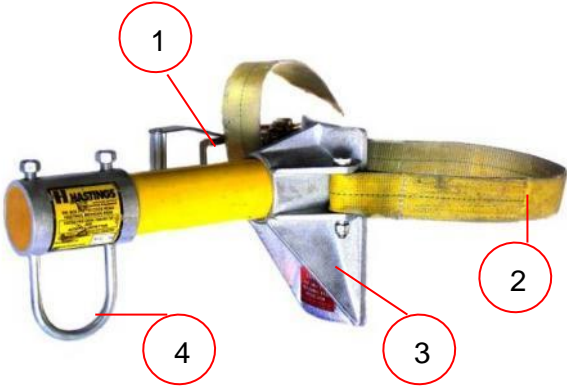
Item 31: Rope-Snubbing-Bracket	Inspection	Maintenance
 <p>The diagram shows a metal snubbing bracket with a circular frame containing seven eyelets. A chain is attached to the top of the frame. A spring-loaded clip is attached to the bottom of the frame. A stopper/guide pin is attached to the side of the frame. A wing nut and thread are attached to the bottom of the frame. A tag is attached to the bottom of the frame. A chain tightener is attached to the bottom of the frame.</p>	<p>A snubbing bracket is attached to the pole and is used as an anchor point for all hand or tackle ropes.</p> <ol style="list-style-type: none"> <li>1. Fractures and cracks, excessive wear, attachment pin</li> <li>2. Safety pin attached</li> <li>3. Spring loaded clip working</li> <li>4. Alloy frame cracking / overstressing</li> <li>5. Stopper/guide pin not bent/damaged wing nut and thread free running</li> <li>6. Elongation/twisting of links, burrs Fractures and cracks &amp; Rust Inspection Tag in place</li> <li>7. Elongating Eyelets</li> </ol>	<ul style="list-style-type: none"> <li>• Clean thread with wire brush.</li> <li>• Lubricate all bearing surfaces, sliding and threaded with manufacturers approved lubricant.</li> <li>• No maintenance required on other parts.</li> <li>• Damaged parts shall be replaced by approved suppliers.</li> <li>• Maintain Chain Tightener as per Item 29.</li> </ul>



Item 32: Wire Tong Saddle (38/63mm)	Inspection	Maintenance
 <p>The diagram shows a wire tong saddle assembly. Callout 1 points to the wing nut on the right side. Callout 2 points to the barrel component at the bottom. Callout 3 points to the spring mechanism on the left. Callout 4 points to the chain at the top. Callout 5 points to a safety pin on the left side.</p>	<ol style="list-style-type: none"> <li>1. Chain Tightener as per Item 22.</li> <li>2. Alloy frame cracking / overstressing.</li> <li>3. Wing nut, spring and barrel in good condition and working correctly, inspect slides in barrel for nicks/burrs.</li> <li>4. Elongation/twisting of links, burrs Fractures and cracks &amp; Rust Inspection Tag in place</li> <li>5. Safety pin attached.</li> </ol>	<ul style="list-style-type: none"> <li>• Maintain Chain Tightener as per Item 29.</li> <li>• Replace barrel or internal slides if damaged.</li> </ul>

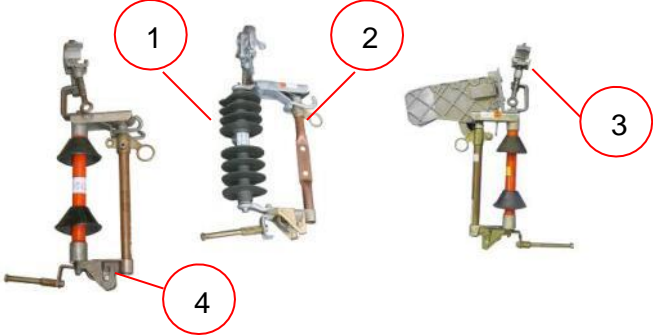
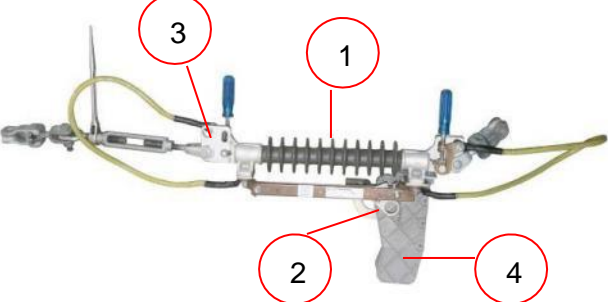


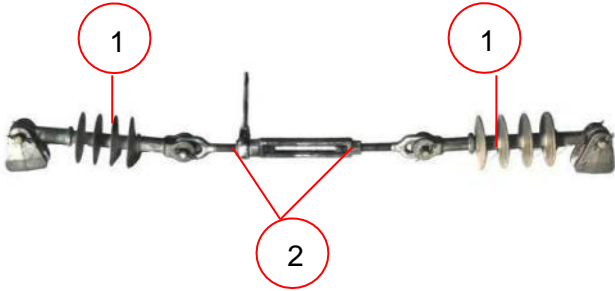
## Insulated Pole Platform and Attachments


Item 33: Insulated Pole Platform	Inspection	Maintenance
 <p>The diagram shows a red insulated pole platform. Callout 1 points to the top joint of the frame. Callout 2 points to the platform tread. Callout 3 points to the platform tread. Callout 4 points to the safety chain attachment. Callout 5 points to the insulated stick.</p>	<ol style="list-style-type: none"> <li>1. Alloy frame cracking / overstressing.</li> <li>2. Excessive wear of non slip grips.</li> <li>3. Platform tread clean and if necessary, refurbished.</li> <li>4. Safety Chains Attached.</li> <li>5. Insulated stick in good condition as per item1.</li> </ol>	<ul style="list-style-type: none"> <li>• Repair or replace insulated stick as per item 1.</li> <li>• Replace or repair non slip grips.</li> <li>.</li> </ul>

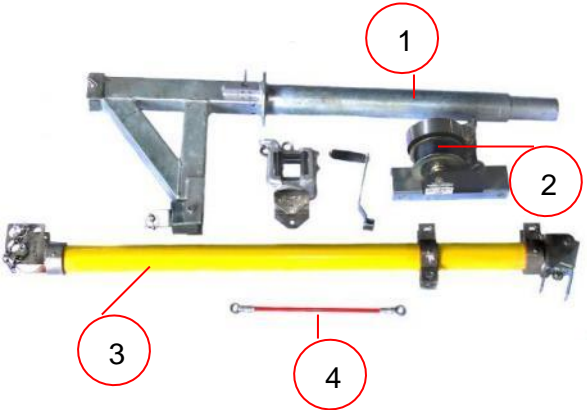
Item 34: Insulated Pole Platform Pivot Base	Inspection	Maintenance
	<ol style="list-style-type: none"> <li>1. Alloy frames cracking / overstressing.</li> <li>2. Pivot mounts clean and lubricated.</li> <li>3. Chain Tighteners free running threads, stopper guide pin not bent/damaged, spring load clip working.</li> <li>4. Safety pin attached.</li> <li>5. Spring loaded clip working.</li> <li>6. Elongation/twisting of links, burrs fractures and cracks &amp; rust inspection Tag in place.</li> <li>7. Chain Tightener as per Item 30.</li> </ol>	<ul style="list-style-type: none"> <li>• Maintain Chain Tightener as per Item 29.</li> <li>• Repair or replace insulated stick as per item 1.</li> <li>• Lubricate all bearing surfaces, sliding and threaded with manufacturers approved lubricant.</li> </ul>
Item 35: Insulated Fall Restraint Anchor Point	Inspection	Maintenance
	<ol style="list-style-type: none"> <li>1. Ratchet assembly clean working smoothly.</li> <li>2. Webbing strap inspected for tears, deterioration or stitching release.</li> <li>3. Alloy frame cracking / overstressing.</li> <li>4. U bolt, thread and nuts good condition.</li> </ol>	<ul style="list-style-type: none"> <li>• Repair or replace insulated stick as per item 1.</li> <li>• Replace webbing strap if tears, deterioration or stitching release is evident.</li> </ul>

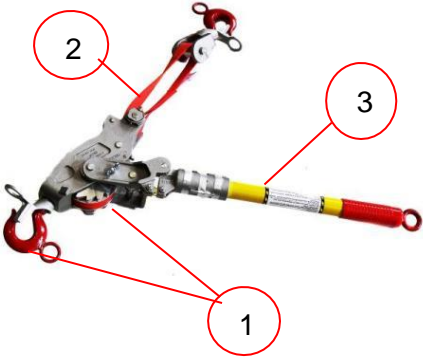
Insulating / Live Work Rope		
Item 36: Insulating Rope 14mm	Inspection	Maintenance
	<p>Insulating rope is designed, tested and used where the rope comes in contact with energised electrical apparatus.</p> <ol style="list-style-type: none"> <li>1. Ensure that correct splicing has been achieved in the insulating rope.</li> <li>2. Insulating rope is in good condition free from cuts, abrasions excessive wear.</li> </ol>	<ul style="list-style-type: none"> <li>• Replace rope if it becomes soiled or shows excessive wear.</li> <li>• Tested in accordance to relative standard and manufacturers recommendations.</li> <li>• Stored in a sealed container with a moisture depleting medium.</li> <li>• Wiped rope with a silicone cloth over entire length.</li> </ul>
Item 37: Live Work Rope	Inspection	Maintenance
	<p>Live work rope is used as head ropes, side ropes, operating ropes, tackles, and spreader ropes etc.</p> <ol style="list-style-type: none"> <li>1. Insulating rope is in good condition free from cuts, abrasions excessive wear and contaminants.</li> </ol> <p><b>NOTE:</b> Live work rope must not make direct contact with energised electrical apparatus.</p>	<ul style="list-style-type: none"> <li>• Replace rope if it becomes soiled or shows excessive wear.</li> <li>• SWL - Diameter squared, answer in Kg.</li> <li>• SWL - For an accurate determination of the ropes safe working load, a rope specification table - as supplied by rope manufacturers should be consulted.</li> </ul>
<p><b>Splicing</b>  When splicing wax impregnated ropes the correct splicing procedure for this rope is critical to ensure it does not fail. Therefore when splicing them, eight tucks are required. Commence splicing the rope with four full tucks, followed by two other tucks using 2/3 of the rope yarn. Finally two more tucks using 1/3 of the rope yarn. This splice makes a much stronger and smoother splice.</p>		

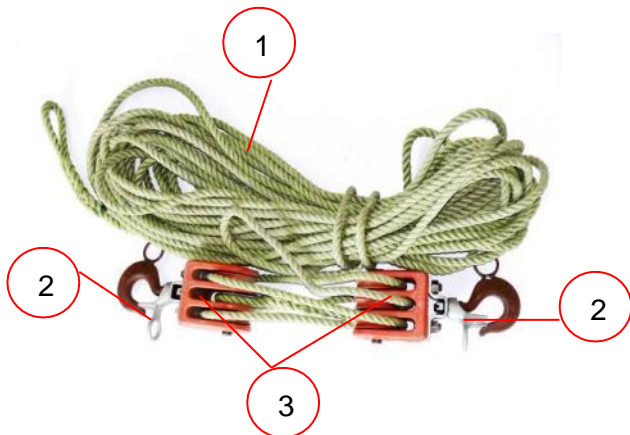
Switching Devices		
Item 38: Temporary Cut Out Tools	Inspection	Maintenance
	<ol style="list-style-type: none"> <li>1. Signs of insulation damage to insulator sheath.</li> <li>2. Check operation and closely inspect mechanical components for wear and visual signs of damage.</li> <li>3. Check connections and for wear and damage.</li> <li>4. Check fuse carrier opens and closes correctly.</li> </ol>	<ul style="list-style-type: none"> <li>• Verify serviceability by checking E.D.O operation.</li> <li>• Inspect for any sign of mechanical damage.</li> <li>• All repairs shall be performed by an approved person.</li> </ul>
Item 39: MSI Units with Arc Shute Interrupter	Inspection	Maintenance
 <p>This photo is a representation of this type of tool there are a number of different styles and types of this tool in the work place.</p>	<ol style="list-style-type: none"> <li>1. Signs of insulation damage to insulator sheath.</li> <li>2. Check operation and closely inspect mechanical components for wear and visual signs of damage.</li> <li>3. Check connections and for wear and damage.</li> <li>4. Check Arc Chute Interrupter for damage.</li> </ol>	<ul style="list-style-type: none"> <li>• Clean thread with wire brush.</li> <li>• Lubricate threads with manufacturers approved lubricant.</li> <li>• Replace insulators if any sign of sheath damage.</li> <li>• All repairs shall be performed by an approved person.</li> </ul>

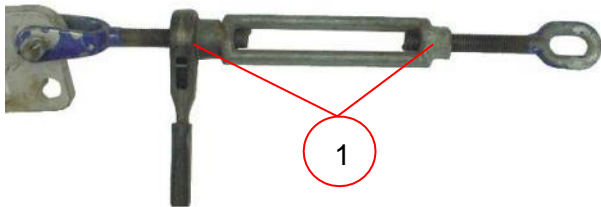
Item 40: Temporary In-Line Shackle	Inspection	Maintenance
	<ol style="list-style-type: none"> <li>1. Signs of insulation damage to insulator sheath.</li> <li>2. Check operation and closely inspect mechanical components for wear and visual signs of damage.</li> </ol>	<ul style="list-style-type: none"> <li>• Clean thread with wire brush.</li> <li>• Lubricate threads with manufacturers approved lubricant.</li> <li>• Replace insulators if any sign of sheath damage.</li> </ul>


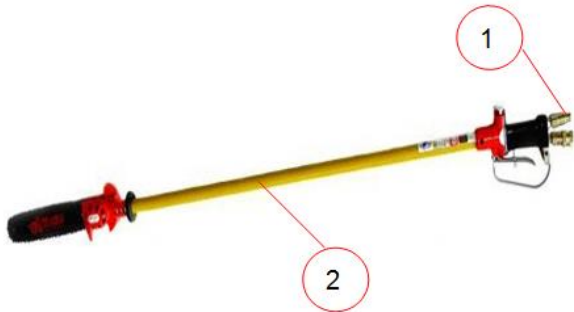
Lifting Jibs for EWP		
Item 41: EWP Basket Mounted Lifting Jib	Inspection	Maintenance
	<p><b>SWL</b> – 100kg/150kg as marked by the manufacturer.</p> <ol style="list-style-type: none"> <li>1. Visually inspect the jib assembly for signs of damage and wear.</li> <li>2. Roller moves freely no sign of chips or cracking.</li> </ol>	<ul style="list-style-type: none"> <li>• Remove boom from service if any visual signs of damage to mechanical components, metal fittings.</li> </ul>

Item 42: EWP Insulated Basket Mounted Lifting Jib	Inspection	Maintenance
 <p>The diagram shows the components of the lifting jib. Callout 1 points to the metal jib arm. Callout 2 points to the mechanical assembly at the end of the jib. Callout 3 points to the yellow insulated boom. Callout 4 points to the Epoxirod stick.</p>	<ol style="list-style-type: none"> <li>1. Visually inspect jib for damage to all mechanical components and distortion of metal fittings which support the insulated boom.</li> <li>2. Nylon web strap extended and thoroughly inspected for any tears, deterioration or stitching release.</li> <li>3. No distortion of insulated boom.</li> <li>4. Inspect Epoxirod stick as per item 1.</li> </ol>	<ul style="list-style-type: none"> <li>• Repair or replace insulated stick as per item 1.</li> <li>• Remove boom from service if any visual signs of damage to mechanical components, metal fittings or insulated boom.</li> </ul>

Tensioning Devices and Accessories		
Item 43: Strap Hoist	Inspection	Maintenance
 <p>The diagram shows the components of the strap hoist. Callout 1 points to the metal hook. Callout 2 points to the red nylon web strap. Callout 3 points to the insulated stick.</p>	<ol style="list-style-type: none"> <li>1. Visually inspect Strap Hoist for damage to all mechanical components and distortion of metal fittings including latches and latch springs.</li> <li>2. Nylon web strap extended and thoroughly inspected for any tears, deterioration or stitching release.</li> <li>3. Insulated stick in good condition as per item 1.</li> </ol>	<ul style="list-style-type: none"> <li>• Repair or replace insulated stick as per item 1.</li> <li>• Remove strap hoist from service if any visual signs of damage to mechanical components, metal fittings, web strap.</li> </ul>

Item 44: 12mm Rope Blocks	Inspection	Maintenance
	<ol style="list-style-type: none"> <li>1. Only 12mm polypropylene rope to be sheaved through blocks.</li> <li>2. Inspect hooks and safety catches are in good working condition.</li> <li>3. Main body and sheaves inspected for wear and free running condition.</li> </ol>	<ul style="list-style-type: none"> <li>• Replace rope if it becomes soiled or shows excessive wear.</li> </ul>

Item 45: Turnbuckle	Inspection	Maintenance
	<p><b>Turnbuckle</b> used in conjunction with the In Span Isolator.</p> <ol style="list-style-type: none"> <li>1. Check operation and closely inspect mechanical components for wear and visual signs of damage.</li> </ol>	<ul style="list-style-type: none"> <li>• Clean thread with wire brush.</li> <li>• Lubricate threads with manufacturers approved lubricant.</li> <li>• Replace insulators if any sign of sheath damage.</li> </ul>

INSULATED HYDRAULIC EQUIPMENT		
Item 46: Insulated Hydraulic Hose	Inspection	Maintenance
	<p>Tested Insulated hydraulic hoses are used to supply hydraulic oil from a EWP to hydraulic tools.</p> <p>Tools attached to the Insulated hoses may be applied directly to the high voltage.</p> <ol style="list-style-type: none"> <li>1. Visually inspect for defects of the hose (deep cuts, scratches, abrasions, kinks of hose.)</li> <li>2. Visually inspect for defects of the female/male hydraulic fittings.</li> </ol>	<ul style="list-style-type: none"> <li>• Clean hose with approved cleaning fluid.\</li> <li>• Rinse with clean water.</li> <li>• Wiped down with a clean dry cloth.</li> <li>• Wiped down with silicone impregnated cloth.</li> </ul>
Item 47: Insulated Long Reach Chainsaw	Inspection	Maintenance
	<p>The insulated long reach chainsaw has a foam filled handle with a chainsaw attachment which is used for cutting vegetation.</p> <ol style="list-style-type: none"> <li>1. Visually inspect for defects of the female/male hydraulic fittings.</li> <li>2. Insulated stick in good condition as per item 1.</li> </ol> <p><b>NOTE:</b> The hydraulic pole saw or insulated extension must not be directly applied to live high voltage.</p>	<ul style="list-style-type: none"> <li>• Repair/replace cutter head when necessary.</li> <li>• Repair or replace insulated stick as per item 1.</li> </ul>