Pole Erection

PURPOSE

The purpose of this method statement is to document the safe systems of work for the erection and replacement of overhead line wood poles.

SCOPE

This method statement covers the erection and replacement of wood poles using mechanical techniques. The document also covers the precautions to be taken when working in the vicinity of live existing overhead lines. Reference should also be made to the method statement covering excavation for pole and stay holes.

RESPONSIBILITIES

Staff are responsible for:

- Ensuring that they have an adequate understanding of Electricity Network Solutions (ENS) policies, procedures and associated Risk Assessments and Method Statements and their application.
- Undertaking works in a safe and efficient manner.
- Completing a personal and site risk assessment on arrival at the work site and whenever location or conditions change.
- Their own personal safety and that of their colleagues.
- Checking the safe condition of tools and equipment on a daily basis.
- Ensuring that safety exclusion zones are adhered to.
- Ensuring that Personal Protective Equipment (PPE) is worn at all times on site.

STAFF COMPETANCY

ENS shall assess all staff engaged on this activity as competent to do so. Machine Operators shall possess relevant in date certification. Additionally staff shall possess Distribution Network Operator (DNO) authorisation for the work, particularly for live line pole erection. Where persons are undergoing training they shall be supervised, the level of supervision will depend upon their current experience and ability.

PREPARATION

The following will be completed before site work commences:

- A work pack will be issued containing details of work location and access restrictions, plans of utility equipment in the vicinity of the works, details of hazards identified at the planning stage and details of any electrical permits that may be required.
- Assimilate the work pack contents, note known hazards and locate utility pipes and cables.
- Consideration will be give to safe means of access to and egress from the site within the confines of landowner permissions.
- The need for specialist equipment (eg tracked vehicles) will be considered. Combined pole and steelwork weights will be checked to ensure that they are within the SWL of erection machines.
- Risk Assessments will be prepared on a pole by pole basis, using ENS published generic assessments as a guide.

GENERAL CONSIDERATIONS

In addition to the precautions noted in the method statement and associated risk assessments the following should also be noted:

- **When poles are erected, anti climbing guards and danger notices shall be applied prior to leaving site, to ensure the public are protected against unauthorised access and in order to fulfil our legal obligations.**

- For pole replacement the new pole shall be erected as close as practical to the old, taking care to avoid damage to conductors and fittings. The old pole shall be lashed to the new.
- Making dead, isolating, earthing and where necessary the removal of any adjacent electrical apparatus under the control of approved safety documentation.
- Work on/over or within pole falling distance of railway property shall not be carried out without Network Rail consent.
- BT lines should be protected from possible damage.
- Permission will be required for work near navigable waterways.
- Consider measures to prevent poles falling towards obstacles such as play areas and buildings.

WORK SEQUENCE

Erection under dead conditions.

1. On arrival at the work location vehicles will be parked off public roads where possible. If it is necessary to park on public roads, all vehicles are to parked safely and positioned to give the team some protection against traffic flow.

2. Position road signs in accordance with Chapter 8 of New Roads and Street works Act.

3. Ensure correct PPE is being worn, **including reflective jackets.**

4. Check work location is correct and prepare joint team risk assessment.

5. Receive Permit to Work, if necessary, and apply local/drain earths to establish safe zone of work. Ensure team fully understands work zone limitations and work method to be adopted.

6. Scan work area for pipes and cables. Dig trial holes, if necessary, to make absolute identification.

7. Bring excavator to site. The team leader will check the inspection certificate of the machine, the operators training certificate, the SWL of the machine and the operation of any check valves and pole handling equipment (eg Roach or Strimech

8. Excavate pole hole in accordance with ENS Method Statement for Pole and Stay Hole excavation (MS 04)

9. Dress the pole and ensure combined pole and fittings weight is within capacity of the excavator.(See table below)

TYPICAL TIMBER POLE WEIGHTS USED FOR OVERHEAD LINE CONSTRUCTION								
LENGTH (M)	**GRADE**	**MASS (Kg)**	**LENGTH (M)**	**GRADE Standard**	**MASS (Kg)**	**LENGTH (M)**	**GRADE Standard +**	**MASS (Kg**
8.5	Medium	210	8.5	Stout	294	8.5	Stout +20mm O/A	346
9.0	Medium	223	9.0	Stout	327	9	Stout +20mm O/A	384
9.5	Medium	240	9.5	Stout	354	9.5	Stout +20mm O/A	414
10.0	Medium	254	10	Stout	381	10.0	Stout +20mm O/A	446
10.5	Medium	276	10.5	Stout	410	10.5	Stout +20mm O/A	479
11.0	Medium	300	11.0	Stout	410	11.0	Stout +20mm O/A	513
11.5	Medium	326	11.5	Stout	472	11.5	Stout +20mm O/A	548
12.0	Medium	351	12.0	Stout	504	12.0	Stout +20mm O/A	584
13.0	Medium	407	13.0	Stout	594	13.0	Stout +20mm O/A	684
14.0	Medium	461	14.0	Stout	684	14.0	Stout +20mm O/A	784
15.0	Medium	545	15.0	Stout	783	15.0	Stout +20mm O/A	893
16.0	Medium	622	16.0	Stout	901	16.0	Stout +20mm O/A	1023
17.0	Medium	707	17.0	Stout	998	17.0	Stout +20mm O/A	1130

18.0	Medium	802	18.0	Stout	1124	18.0	Stout +20mm O/A	1267
20.0	Medium	970	20.0	Stout	1380	20.0	Stout +20mm O/A	1545
			22.0	Stout	1640	22.0	Stout +20mm O/A	1827
CAUTION THESE WEIGHTS ARE FOR GUIDANCE POLE WEIGHTS CAN VARY								

Roach pole handling attachment fitted to JCB 3c4x		
Working load limit of pole handling attachment fitted in place of front loading bucket	1200 Kg	Note the WLL of the pole attachment may exceed the SWL capacity of the JCB 3c4x front bucket arms and hydraulics.
JCB 3c4x front loading bucket SWL	1000 Kg	The safe working load includes an allowance for the weight of the bucket, when the bucket is detached the tare of the bucket and the tare of the pole handler will have to be considered to establish the maximum SWL of the machine.
The SWL of the JCB front arms must not exceed their rated capacity, (refer to the rating plate or SWL marked on the arms). The pole handling attachment may, or may not be heavier than the standard JCB bucket, any weight penalty or benefit must be considered when lifting poles in any configuration.		

10. Make final check of planting depth and pole location and orientation against plan.

11. The excavator operator will grip the pole with the handling attachment at a suitable position for planting (See Figure 1). Alternatively a tracked machine, with suitable marked SWL, may be used where ground conditions are less favourable. The pole will be secured to the excavator by a suitable chain sling, which in turn will be attached to the excavator lifting eye with an appropriate shackle (See Figure 2). Vehicles equipped with suitably rated hydraulic cranes may also be used for lifting operations.

12. The work area will be cleared of all persons not directly associated with the task, and those persons involved with the pole planting will temporarily withdraw to a safe distance.

13. The machine will raise the pole and traverse to the point of planting, the nominated banksman will then approach the pole in full sight of and with the agreement of the machine operator, to direct the final placing.(See figure 3)

14. Brace the pole as required and ensure correct plumb, backfill in accordance with ENS Method Statement for Pole and Stay Hole Excavation (MS 05).

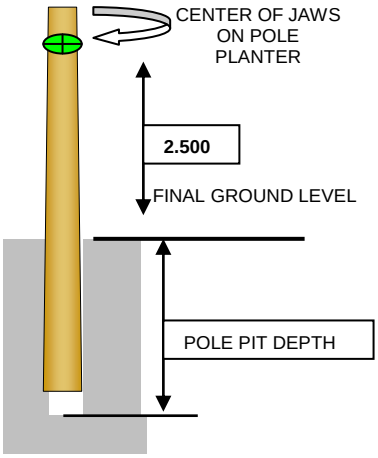
15. Complete reinstatement and ensure site is in a safe and tidy condition, **in particular remove excess soil from around pole base.**

16. Ensure stability of pole before climbing, especially where soil structure is fluid, or where other works, for example underground cable jointing, are being carried out at the pole base.

FIGURE 1

GUIDE TO POLE HANDLING POSITION FOR PLANTING USING JCB MOUNTED POLE HANDLER - STRYMECH OR ROACH ATTACHMENT, OR POSITION OF ARTICULATED POLE GRAB OR SLING IF USING A TRACKED EXCAVATOR OR HIAB CRANE.

POLE SIZE (M)	POLE PIT DEPTH	CLAMP POSITION – POLE BUTT TO CENTER OF JAWS
< to 10.500	1.500	4.400
11.00 to 14.00	1.800	4.700
15.00 to 17.00	2.100	5.000



The center of gravity when lifting and handling wood poles is: 40% of the total length when measured from the ***butt.***

Figure 2

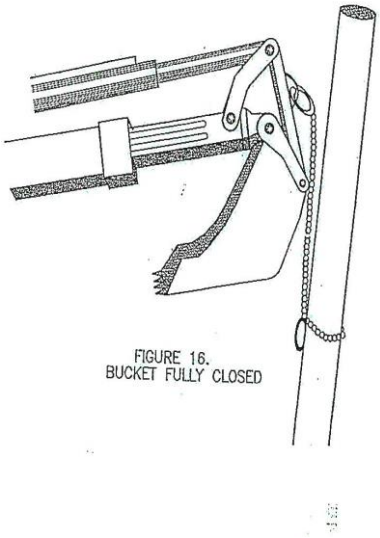
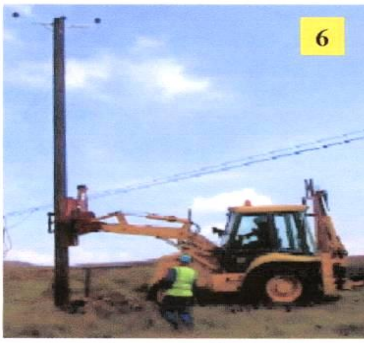


FIGURE 3

POLE PLANTING -- JCB 4CX FITTED WITH ROACH POLE PLANTER

SEQUENCE

1. Pick up pole from 'dump'
2. Rotate into transport position
3. Pole in transport position will rest on cab 'v' frame
4. Approach pole pit
5. Raise pole for planting
6. Signaller directs JCB driver to plant the pole
7. Pole planted and held by the JCB whilst backfilling takes place
8. Pole plumbed during backfilling - JCB will withdraw when backfilling and compaction has been completed



POLE ERECTION IN THE VICINITY OF LIVE LINES

1. Ensure that adequate notice is given of the intention to live line erect, in accordance with the client's procedures.

2. Proceed to pole hole excavation stage as previously described.

3. Select machine with suitable height restrictor and confirmation of earth continuity test.

4. Connect machine to earth. (See Figure A for wheeled and Figure B for tracked excavators.)

5. Engage height restrictor and prove operation at a safe distance from live line.

6. Establish line to ground clearance where the machine is to be positioned.

7. Clear work area of staff not directly involved with the task.

8. All persons directly involved are to be in sight of the machine operator, with one nominated to act as banksman.

9. Establish 10 metre exclusion zone to keep members of the public or livestock away from the work zone, using temporary fencing if required.

10. The pole **will not** be dressed prior to erection, and pole top shrouding will be fitted in accordance with the client's specification.

11. All members of the team will withdraw to safe position, but will remain vigilant and monitor line clearances at all times.

12. The banksman will direct the operator to approach the planting position. The machine will travel parallel to the overhead line. The machine will then raise the pole slowly and traverse as required under the direction of the banksman, who will ensure that the pole does not clash with the live overhead line. Final positioning will be carried out by articulation of the pole planting attachment.

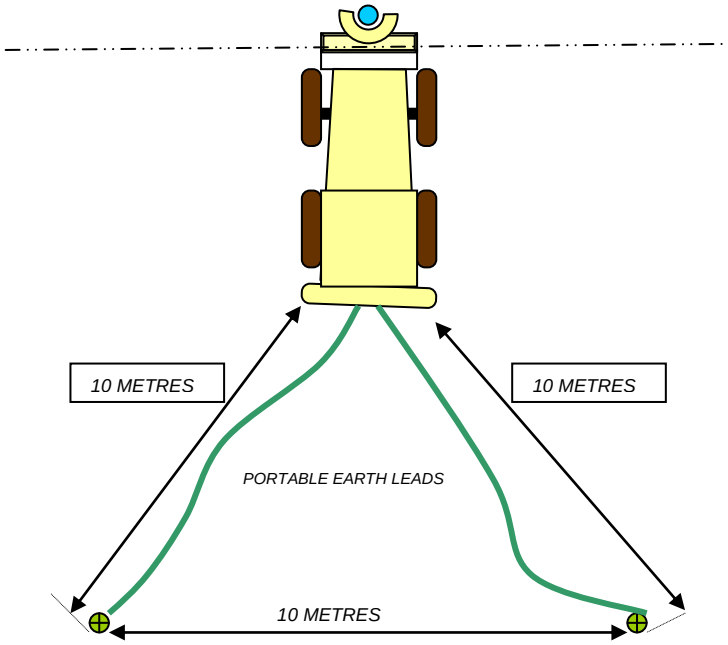
13. The pole will be braced and supported as required.(By necessity the pole will not be plumb and will be placed between two live phase wires. A check will be made to ensure that the shrouding is not in contact with a live wire.)

14. Alternatively a tracked machine, fitted with pole planting device, may used in the following way. The tracked excavator with height restrictor engaged will approach the overhead live overhead-lines under the direction of the authorised person. Under direction, the excavator will track towards the pole planting position with the pole planter and dipper arm at 90 degrees to the overhead-line. The excavator tracks and the pole fitted with an approved pole top shroud retained in the pole planter attachment will be parallel to the existing overhead lines. The tracked excavator will be earthed down using portable earths of a sufficient length to permit the tracking movement of the machine (See figure B). With the pole lying horizontal close to the ground the banksman will direct the machine driver to unfurl the pole under and parallel with the live overhead-lines. Under the direction the banksman person the pole butt will be guided into the excavation, until the butt is in position, maintaining live line clearances, (with the main boom movement restricted) the pole will then be raised under the direction of the banksman person using the dipper arm and the pole planting attachment. The excavator driver operating the pole planter attachment will at the same time track the machine at a snails pace, parallel with the line until the pole is approaching vertical. The pole will be finally positioned by the articulation of the pole planter attachment. The excavation will be backfilled and the site cleared and tidied as previously described.

FIGURE A

POLE PLANTING USING EXCAVATOR TRACKED OR WHEELED EQUIPPED WITH A POLE PLANTING ATTACHMENT

ALL PERSONS
MUST BE FORWARD OF THIS LINE, IN SIGHT OF THE JCB OPERATOR AT APPROPRIATE SAFE DISTANCE WHILST POLE ERECTION IS IN PROGRESS



EARTH SPIKES DRIVEN TO A MINIMUM DEPTH OF 1 METRE AFTER CHECKING THE AREA FOR THE PRESENCE OF UNDERGROUND SERVICES

DANGER – NO PERSON IS PERMITTED WITHIN THE OPERATIONAL ARC OF THE POLE WHILST GRIPPED BY THE POLE PLANTING ATTACHMENT

ONLY APPROACH THE JCB OPERATOR WHEN YOU HAVE CAUGHT HIS EYE AND **HE** BECKONS YOU TO APPROACH.

Fig A

GENERAL ARRANGEMENT OF PORTABLE EARTH'S WHERE EXCAVATORS ARE REQUIRED TO BE EARTHED DOWN WHEN USED IN PROXIMITY TO LIVE LINES.

- All persons associated with live line work including the excavator operator must be authorised and trained in appropriate procedures for excavating close to live overhead lines.
- Excavators must be fitted with fully operational dipper arm height restriction control which must be engaged and locked in place whenever approaching within 6 metres of live overhead lines.
- Persons present at excavations will comply with the instructions from the nominated banksman.
- All persons on site will so far as is practicable remain in the JCB operator's field of vision. Generally being outside the operating arc of the pole planter/handler and the potential fall zone of any pole should it come become detached from the pole planter grab.

FIGURE B

POLE PLANTING USING TRACKED EXCAVATOR EQUIPPED WITH A POLE PLANTING ATTACHMENT

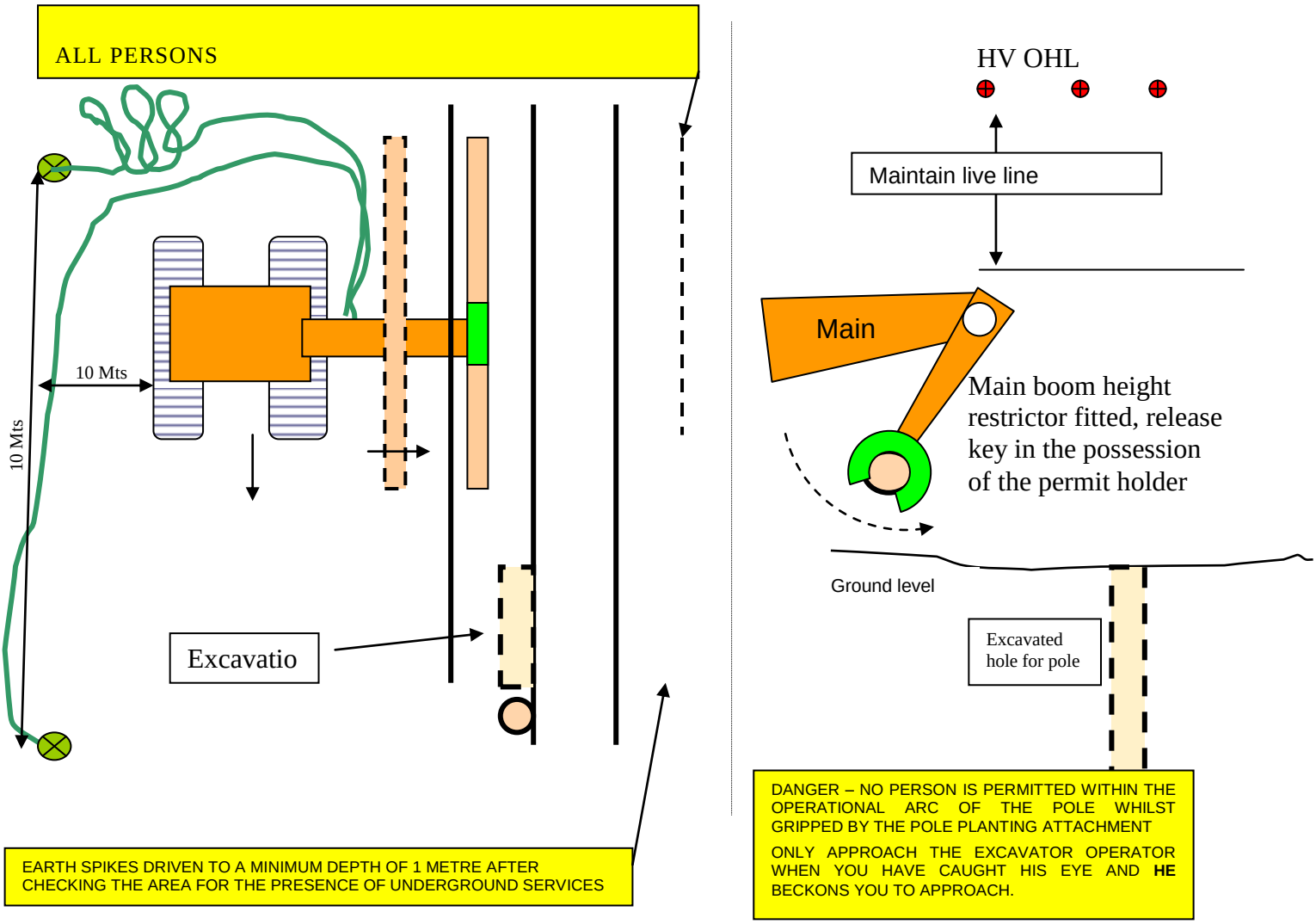


Fig B

GENERAL ARRANGEMENT OF PORTABLE EARTH'S WHERE EXCAVATORS ARE REQUIRED TO BE EARTHED DOWN WHEN USED IN PROXIMITY TO LIVE LINES.

- All persons associated with live line work including the excavator operator must be authorised and trained in appropriate procedures for excavating close to live overhead lines.
- Tracked excavators must be fitted with fully operational main boom arm height restriction control which must be engaged and locked in place whenever approaching within 6 metres of live overhead lines.

REVISION HISTORY

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