Foreword
This Guide designates the practices that should be followed by the member firms of the Infrastructure Health & Safety Association (IHSA) when handling poles. This Guide is not designed as a training manual, but contains information, best practices and general recommendations deemed appropriate to perform a job in a responsible and safe manner.

The contents of this Safe Practice Guide, including all advice, recommendations and procedures, are provided as a service by the Infrastructure Health & Safety Association. No representation of any kind is made to any persons whatsoever with regard to the accuracy, completeness or sufficiency of the information contained herein. Any and all use of or reliance on this Safe Practice Guide and the information contained herein is solely and entirely at the user's risk. The user also acknowledges that the safe practices described herein may not satisfy all requirements of Ontario law.

The Infrastructure Health & Safety Association wishes to express its appreciation to those who assisted in the preparation of this Guide.
# TABLE OF CONTENTS

Foreword ........................................................................................................ 1

## SECTION I

### GENERAL

100 Safe Execution of Work ......................................................... 6
101 Competent Supervisors ....................................................... 6
102 Competent Workers ............................................................. 6
103 Job Planning ......................................................................... 6
104 Work Methods ...................................................................... 7
105 Teamwork ............................................................................ 7

## SECTION II

### PUBLIC RELATIONS

200 Customer Premises ............................................................. 10
201 Working on Customer Premises ........................................ 10

## SECTION III

### HYDRAULIC EQUIPMENT

300 Hydraulics ........................................................................... 12
301 Digger/Derrick Trucks .................................................... 12
302 Truck Parking Devices ..................................................... 12
303 Winch Lines ......................................................................... 13
304 Pole Trailer Permits ........................................................... 18
305 Pole Trailer Requirements ................................................ 19

## SECTION IV

### POLE HANDLING

400 Pole Handling Requirements ........................................... 24
<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>401</td>
<td>Loading Requirements for Poles</td>
<td>24</td>
</tr>
<tr>
<td>402</td>
<td>Hand Signals</td>
<td>24</td>
</tr>
<tr>
<td>403</td>
<td>Pole Data Charts</td>
<td>24</td>
</tr>
<tr>
<td>404</td>
<td>Pole Bunks (Storage)</td>
<td>29</td>
</tr>
<tr>
<td>405</td>
<td>Vehicle Set Up</td>
<td>29</td>
</tr>
<tr>
<td>406</td>
<td>Control of Poles</td>
<td>31</td>
</tr>
<tr>
<td>407</td>
<td>Capacity Chart for RBDs</td>
<td>34</td>
</tr>
<tr>
<td>408</td>
<td>Load Binders and Tie Downs</td>
<td>34</td>
</tr>
<tr>
<td>409</td>
<td>Safety in Load Security During Transport</td>
<td>36</td>
</tr>
<tr>
<td></td>
<td><strong>SECTION V</strong></td>
<td></td>
</tr>
<tr>
<td>500</td>
<td>Pole Installation Requirements</td>
<td>38</td>
</tr>
<tr>
<td>501</td>
<td>Digger/Derrick Trucks</td>
<td>38</td>
</tr>
<tr>
<td>502</td>
<td>Directional Controls</td>
<td>42</td>
</tr>
<tr>
<td>503</td>
<td>Digger Operations</td>
<td>43</td>
</tr>
<tr>
<td>504</td>
<td>Auger Care and Use</td>
<td>44</td>
</tr>
<tr>
<td>505</td>
<td>Operator's Platform</td>
<td>48</td>
</tr>
<tr>
<td>506</td>
<td>Safe Limits of Approach</td>
<td>48</td>
</tr>
<tr>
<td>507</td>
<td>Truck Grounds</td>
<td>49</td>
</tr>
<tr>
<td>508</td>
<td>Utility Work Protection Code</td>
<td>49</td>
</tr>
<tr>
<td>509</td>
<td>Conductor and Pole Guards</td>
<td>49</td>
</tr>
<tr>
<td>510</td>
<td>Use of Rubber Gloves</td>
<td>50</td>
</tr>
<tr>
<td>511</td>
<td>Hand Signals</td>
<td>50</td>
</tr>
<tr>
<td>512</td>
<td>Pole Installations</td>
<td>50</td>
</tr>
<tr>
<td>513</td>
<td>Pole Setting Requirements (Piking Method)</td>
<td>59</td>
</tr>
<tr>
<td>514</td>
<td>Securing Poles</td>
<td>65</td>
</tr>
<tr>
<td>515</td>
<td>Back Fill</td>
<td>65</td>
</tr>
<tr>
<td>516</td>
<td>Pole Cribbing</td>
<td>66</td>
</tr>
<tr>
<td>517</td>
<td>Installation of Pole Mounts on Rock</td>
<td>68</td>
</tr>
</tbody>
</table>
SECTION VI
POLE REMOVAL

600 Pole Removal .................................................. 74
601 Vehicle Set Up ............................................... 74
602 Trailer and Permit Requirements ................. 74
603 Hold-Off Protection
     (Utility Work Protection Code) ....................... 74
604 Protective Equipment ................................. 74
605 Truck Grounds .............................................. 74
606 Personal Protective Equipment ..................... 75
607 Pole Jacks .................................................. 75
608 Removal Procedure of Wood, Concrete
     and Steel Poles ........................................... 77
609 Loading Poles .............................................. 78
610 Restoration .............................................. 80
611 General Completion at Work Site ............... 80

REFERENCES
- IHSA's Crane Operator's Handbook
- EUSR Electrical Utility Safety Rules
- IHSA Safe Practice Guides Ropes & Rigging
  Temporary Grounding Techniques and Utility Work
  Protection Code
- Highway Traffic Act of Ontario
- IHSA's Powerline Technician Training Manuals
- Ontario Traffic Manual Temporary Conditions, Book 7
- OHSA Regulation 6/91
- Ontario Hydro Line Trade Handbook
SECTION I
GENERAL

100 SAFE EXECUTION OF WORK
101 COMPETENT SUPERVISOR
102 COMPETENT WORKERS
102 JOB PLANNING
103 WORK METHODS
104 TEAMWORK
SECTION I
GENERAL

100 SAFE EXECUTION OF WORK
The safe execution of work requires:
- competent workers
- job planning
- work methods
- teamwork
- proper equipment maintained in good condition

101 COMPETENT SUPERVISORS
A person who has met the competent person criteria as described in the Occupational Health and Safety Act, and has charge of a workplace or authority over a worker.

102 COMPETENT WORKERS
Workers involved with pole handling procedures must have been previously instructed in, or be under instruction in, the proper methods of handling poles.

103 JOB PLANNING
As in all phases of line work, job planning is very important if work is to be performed safely and efficiently. A job plan must be worked out and agreed upon by all workers involved. It must identify all known hazards, the associated barrier(s) needed to eliminate or control such hazards and indentify each worker's responsibilities in the performance of the task which has been documented.
104  WORKMETHODS
Due to various types of installation and changing circumstances, work methods adopted and equipment used may vary from one location to another. Always follow a specific set of procedures to ensure a safe work environment. When handling or setting poles, consider the following:

1. Work area protection, including a written/documented traffic protection plan
2. Underground plant locations
4. Cover-up protection
5. First aid
6. Emergency rescue procedures
7. Temporary grounding devices
8. Use of rubber gloves
9. Personal protective equipment
10. Other approved work methods or procedures that may be required

This Safe Practice Guide does not provide detailed solutions to individual problems regarding the installation and removal of poles. Each member firm is responsible for finding their own solutions, based on the general guidelines found in this Guide.

105  TEAMWORK
1. The best teams are usually made up of people who know how to work well together.

2. Effective communication between the worker and the supervisor is essential while work is being done. Only when these two requirements are met can a job be carried out safely and efficiently.
SECTION II
PUBLIC RELATIONS

200 CUSTOMER PREMISES
201 WORKING ON CUSTOMER PREMISES
SECTION II
PUBLIC RELATIONS

200 CUSTOMER PREMISES
If you are required to enter a customer’s property for any reason (i.e. back lot construction, pole line right-of-way), consider the following:

1. Remember that a customer’s premises is private property. Treat it with respect.
2. Inform the customer of your presence and try to follow any special requests they may have.
3. Never use a customer’s tools or equipment.
4. Observe and follow any warning or instructional signs.

201 WORKING ON CUSTOMER PREMISES
1. When work has been completed, remove all waste materials, such as excess soil or old poles, and leave the area in a tidy condition. Arrange for further cleanup and sodding, if necessary.
2. Report any abnormal conditions, such as damage to a customer’s property, to your immediate supervisor.
3. Any gates, chains or cables should be returned to their original state when leaving private property.
SECTION III
HYDRAULIC EQUIPMENT

300 HYDRAULIC EQUIPMENT
301 DIGGER DERRICK TRUCKS
302 TRUCK PARKING DEVICES
303 WINCH LINES
304 POLE TRAILER PERMITS
305 POLE TRAILER REQUIREMENTS
SECTION III
HYDRAULIC EQUIPMENT

300 HYDRAULICS
Hydraulic equipment is a great asset to the line construction industry. Through its development, hydraulic equipment has eliminated many dangerous and strenuous jobs formerly faced by workers alone. Using hydraulic equipment is safer and less costly because improved job methods take less time and use fewer people. However, this is true only as long as the hydraulic equipment is used and maintained correctly. If it is abused or used improperly, safety goes down and costs go up.

When using new or unfamiliar equipment, read the owner’s manual and get instructions on how to use the equipment safely and properly. This will help give a better understanding of the equipment and the terminology related to it, and result in a safer, more productive operation.

301 DIGGER DERRICK TRUCKS
It is essential that hoisting devices be designed and maintained in accordance with current legislation for mobile cranes and that the operator hold a valid certificate issued or approved by the Ministry of Training, Colleges and Universities (MTCU) for the appropriate rating of the crane. Refer to the section “Digger Derrick Trucks,” in the IHSA Safe Practice Guide Hydraulics.

302 TRUCK PARKING DEVICES
Hydraulic parking devices hold a vehicle stationary when auxiliary equipment is operating. They should not
be used when a vehicle is parked and left unattended. Always use MICO locking devices in conjunction with a vehicle’s regular parking brake. To ensure maximum safety, do not leave a vehicle with only a MICO brake to hold it. Set the parking brake and use wheel chocks and outriggers as required. Check within five to ten minutes after the MICO lock has been applied to determine if pressure is still being held.

If the MICO lock is applied while the vehicle’s engine is running, be sure that the locked up pressure is maintained at the same level after the engine is shut off. The cooling of the engine and its related components may cause the pressure to drop to unsafe limits.

NOTE: 1. MICO brakes should not be left engaged for an extended period (overnight) because they could drain the battery.

2. If vehicles are equipped with air brakes, refer to the Air Brake Manual, available from the Ontario Ministry of Transportation.

303 WINCH LINES
1. Some digger derrick units are equipped with a 12.7 mm (1/2 in.) diameter wire rope winch line with a working load limit (WLL) of 2,041 kg (4,500 lbs.). For further information, refer to the IHSA Safe Practice Guide Ropes, Rigging And Slinging Hardware.

2. Synthetic Ropes
Double braided polyester rope is actually two ropes in one, constructed of a braided polyester outer cover and a braided polyester inner core.
Orienting all fibres parallel to the rope axis reduces abrasion and stretch and allows the line to run smoothly on and off winch drums and over sheaves.

Safety factors will vary according to the practices and policies of different utilities. OHSA regulations specify a safety factor of five to one. Thus, the load applied must not exceed the manufacturers' declared working load limit (WLL). A synthetic rope used for hoisting should be clearly marked to identify the following:

(i) the manufacturer
(ii) the type of material
(iii) the diameter
(iv) the rated capacity in kilograms and pounds
(v) the designed safety factor
(vi) the month and year of manufacture

Synthetic ropes are sometimes advertised as having high dielectric properties. Remember that the dielectric strength applies only to new, clean rope. Factors like dirt, grease, moisture and other conductive contaminants reduce the rope’s dielectric quality.

Don’t expose winch lines to sharp edges such as metal burrs on winch drums, sheaves, shackles, wire rope slings, etc. This is of the utmost importance for synthetic rope.

Before installing synthetic winch lines on drums designed and used for wire rope, inspect the drum for burrs or other defects that could damage the synthetic material.

There are many ways of attaching a winch line to a winch drum: using a wedge or plug and set screw in the main body of the drum, or a “U” bolt through the side of the flange and other methods varying with
the type of equipment used.
Whatever method you choose, be sure no sharp edges will cut the rope line when it is under load. This end of the rope should be tightly whipped with a strong twine.
Most suppliers of synthetic winch lines install a spliced eye* on each end, which permits the line to be reversed (rotated end to end) and extends the life of the product. IHSA recommends every winch line be reversed a minimum of every six months to vary high stress and wear points.

*NOTE: All splices should be lock-stitched.

NOTE: The winch drum end connection is not designed to carry load, so always keep at least four wraps on the drum. Do not attach the end of the line to the drum by using the core only. (See Figure #1).

![Figure #1](image)

**Winding Rope on a Winch Drum**
The first layer (wrap) around the winch drum should be put on tightly. Initial winding tension should be approximately 22.7 kg (50 lbs.). This will prevent subsequent wraps from slipping down between the turns when tension is applied.
The outer jacket on some polyester rope has a
relatively high degree of resistance to abrasion and fusing. However, synthetics are subject to fusing if exposed to enough friction and heat. Therefore, avoid such practices as undue slipping on a capstan winch or poles and other objects.

Don’t use the winch line itself as a choker to pick up a pole or other objects. The clevis attached on the end of the winch line can cut into the rope. Use a sling as a choker. (See Figure #2).

To assure maximum efficiency and safety, the boom sheave diameter should be no less than eight times the rope diameter. The sheave groove diameter should be no less than 10% greater than the rope diameter and the groove should be rounded, not “V”
shaped. (See Figure #3).

Splicing is by far the strongest and most efficient means of attachment. Knots should not be tied in a winch line because they can reduce the strength of any rope by as much as 50%. Also, avoid sharp bends in the line where possible, as this will greatly reduce strength.

**NOTE:** Splicing manuals are available from manufacturers.

Shock loading produces a drastically different set of physical properties and can best be described as a very sudden change in tension, from a state of relaxation or low load to one of high load. This could result in accelerated wear, fatigue or breakage.

A typical shock load occurs when an object is lifted vertically by a winch line with a sudden jerk, or when the load is suddenly dropped. For example, 2,268 kg. (5,000 lbs.) under shock loading conditions may be the equivalent of 13,608 kg (30,000 lbs.). The increase in load may be more than the maximum load rating of the winch line, creating the potential for failure.

**NOTE:** Shock loading a drop of 0.3 m (1 ft.) increases weight by five times.

Another reason to avoid shock loading is that synthetic fibres have a “memory”. That is, they function similarly to wire rope in that they retain the effects of being shock loaded.

Proper loading procedures will prolong the life of the rope and reduce premature downgrading. If there is reason to believe that a winch line has been shock loaded above its working load limit, it should be logged. If there have been a number of shock loads, the winch line should be rotated and inspected. If shock loading has occurred, inspect and replace, where necessary.
Synthetic Rope Winches

<table>
<thead>
<tr>
<th>Size</th>
<th>Average Tensile Load (New Rope)</th>
<th>Work Load Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>16 mm</td>
<td>5,896.80 kg (13,000 lbs.)</td>
<td>1,179.36 kg (2,600 lbs.)</td>
</tr>
<tr>
<td>19 mm</td>
<td>7,257.60 kg (16,000 lbs.)</td>
<td>1,451.62 kg (3,200 lbs.)</td>
</tr>
<tr>
<td>22 mm</td>
<td>10,886.40 kg (24,000 lbs.)</td>
<td>2,177.28 kg (4,800 lbs.)</td>
</tr>
<tr>
<td>26 mm</td>
<td>12,882.25 kg (28,400 lbs.)</td>
<td>2,575.45 kg (5,680 lbs.)</td>
</tr>
<tr>
<td>32 mm</td>
<td>19,776.96 kg (43,600 lbs.)</td>
<td>3,955.39 kg (8,720 lbs.)</td>
</tr>
</tbody>
</table>

NOTE: Wire rope or synthetic rope winches can be used provided they do not exceed their safe working load limit (WLL).

304 POLE TRAILER PERMITS

NOTE: The dimensions referred to in this section are governed by Ontario Regulations, Highway Traffic Act.

In most cases, member firms obtain an annual permit allowing a maximum load length of 24.5 m (80 ft.) including truck and trailer load. No permit is required if the load is under 23 m (75 ft.).

A 4.5 m (15 ft.) overhang from the centre of the dual axles is allowed on this permit. A special permit is available for an additional 1.5 m (5 ft.) of overhang for emergency use.
If the total length exceeds 21 m (69 ft.) a red flag is required to be placed at each corner of the truck and trailer combination and a “LONG LOAD” sign and a red flag are required at the rear of the load.

**Notes on Permits**

(a) The original permit must be carried in the vehicle.
(b) They are only valid during daylight hours.
(c) They are not valid on holidays or weekends.
(d) Loads must carry a flag on the overhang of the pole if the overhang is 1.5 m (5 ft.).
(e) Contact the Ontario Provincial Police if moving an overlength load when permit is not valid.
(f) Check with municipalities for additional regulations.
(g) Ensure that pole trailers are equipped with proper brakes, running lights, safety chains (which should be crossed) and approved flag. A red light or warning sign should be attached to the extended end of the pole. (See Figure #4 and Figure #14).
(h) Length of loads in excess of the above should be marked with four flags and a sign bearing the words “LONG LOAD” in black letters at least 20 cm (8 in.) high on a yellow background.

**NOTE:** The driver should be aware of the turning radius of the pole trailer if it enters the opposing traffic lane and the swing arc of the end of the poles.

**305 POLE TRAILER REQUIREMENTS**

In accordance with current MTO Regulations, all trailers should be equipped with reflective markings.

The following are limitations for normal loads on trucks or trailers under the Highway Traffic Act:
**WIDTH** – No vehicle, including load or contents, should have a width greater than 2.6 m (8.5 ft.).

**HEIGHT** – No vehicle, including load or contents, should have a height greater than 4.1 m (13.5 ft.).

No combination of vehicle and trailer is permitted to exceed a length of 23 m (75.5 ft.) while on a highway without a special permit (Refer to Section 304, Permits, of this guide).

**WEIGHT** – Maximum allowable axle unit weights for vehicles and trailers.

No vehicle or combination of vehicles, unless exempted under the regulations, shall be operated on a Class A highway where the axle unit weight on an axle unit, whether or not part of any axle group, exceeds the following:

(a) for a single axle with single tires:
   9,000 kg (19,840 lbs.)

(b) for a single axle with dual tires:
   10,000 kg (22,050 lbs.)

(c) for dual axle, that weight shown in column 2 opposite the corresponding axle spacing shown in column 1 of the table MAXIMUM ALLOWABLE WEIGHT FOR DUAL AXLE; or the maximum allowable axle weight for a dual axle shall not exceed 18,000 kg (39,680 lbs.) unless the axle is equipped with dual tires

**NOTE:** Trailers having a gross weight more than 1,320 kg (3,000 lbs.) must be equipped with working brakes.
### MAXIMUM ALLOWABLE WEIGHT FOR DUAL AXLE

<table>
<thead>
<tr>
<th>Column 1 Axle Spacing</th>
<th>Column 2 Maximum Allowable Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0 to less than 1.2 m (3.3 to less than 4 ft.)</td>
<td>15,400 kg (34,000 lbs.)</td>
</tr>
<tr>
<td>1.2 to less than 1.6 m (5 to less than 5.3 ft.)</td>
<td>18,000 kg (39,642 lbs.)</td>
</tr>
<tr>
<td>1.6 to less than 1.7 m (5.3 to less than 5.6 ft.)</td>
<td>18,300 kg (40,300 lbs.)</td>
</tr>
<tr>
<td>1.7 to less than 1.8 m (5.6 to less than 6 ft.)</td>
<td>18,700 kg (41,225 lbs.)</td>
</tr>
<tr>
<td>1.8 m or more (6 ft. or more)</td>
<td>19,100 kg (42,100 lbs.)</td>
</tr>
</tbody>
</table>
13.7 m (45 ft) is the maximum pole length allowed without permit.

1 m (3 ft)

Minimum of 4 tie downs

Two feet

Two feet

1.5 m (5 ft) overhang requires red flag and "long load" sign during the day and red light at night.

> 4.6 m (15 ft)

Maximum overhang

Figure #4
SECTION IV
POLE HANDLING

400 POLE HANDLING REQUIREMENTS
401 LOADING REQUIREMENTS FOR POLES
402 HAND SIGNALS
403 POLE DATA CHARTS
404 POLE BUNKS (STORAGE)
405 VEHICLE SET UP
406 CONTROL OF POLES
407 CAPACITY CHARTS FOR RBDs
408 LOAD BINDERS AND TIE DOWNS
409 SAFETY IN LOAD SECURITY DURING TRANSPORT
SECTION IV
POLE HANDLING

400 POLE HANDLING REQUIREMENTS
Safe and efficient pole handling requires that workers be competent and safety conscious, that equipment be maintained in good condition and that jobs be planned in advance by those involved.

401 LOADING REQUIREMENTS FOR POLES
During loading and unloading operations:
(a) the wheels of the transporting vehicle should be braked securely or, where conditions demand, wheel chocks shall be used; and
(b) employee should not stand between the pole bunk and the transporting equipment.

NOTE: Refer to section 304, Pole Trailer Permits, Section 305, Pole Trailer Requirements, and Section 609, Loading Poles.

402 HAND SIGNALS
The Hand Signals for Hoisting Operations chart on the next page shows the proper hand signals to use for hoisting operations.

403 POLE DATA CHARTS
Workers must know both the lifting capacity of their hoisting equipment and the weight of the load to be lifted. A load capacity chart is located near the operator's platform of all radial boom derrick trucks. See Pole Data Charts for wood, concrete and steel poles.
HAND SIGNALS FOR HOISTING OPERATIONS

STOP
Both arms outstretched at the sides horizontally, fingers outstretched.

HOIST (WINCH UP)
With forearm vertical, forefinger pointing up, move hand in small horizontal circles.

LOWER (WINCH DOWN)
With arm extended downward, forefinger pointed down, move hand in small horizontal circles.

USE MAIN HOIST
Tap first on head; then use regular signals.

USE WHIPLINE (AUXILIARY HOIST)
Tap elbow with one hand; then use regular signals.

RAISE BOOM
Arm extended, fingers closed, thumb pointing upward.

LOWER BOOM
Arm extended, fingers closed, thumb pointed downward.

MOVE SLOWLY
Use one hand to give a motion signal and place the other hand motionless in front of it.

RAISE THE BOOM & LOWER THE LOAD
Arm extended, fingers closed, thumb pointing upward, other arm bent slightly with forefinger pointing down and rotate hand in horizontal circles.

LOWER THE BOOM & RAISE THE LOAD
Arm extended, fingers closed, thumb pointing downward, other arm with forearm vertical, forefinger pointing upward and rotate hand in horizontal circles.

SWING
Arm extended, point with finger in direction of swing of boom.

EXTEND BOOM (TELESCOPING BOOMS)
Both fists in front of body with thumbs pointing outward.

RETRACT BOOM (TELESCOPING BOOMS)
Both fists in front of body with thumbs pointing toward each other.

TRAVEL
Arm extended forward, hand open and slightly raised, make pushing motion in direction of travel.

HOIST SLOWLY TO CLEAR FOULED LINE
Hands crossed in front above shoulders, fingers relaxed.

DOG EVERYTHING (STOP)
Clasp hands in front of body.
## POLE DATA CHART

### WOODEN POLES

<table>
<thead>
<tr>
<th>Length m (ft.)</th>
<th>Type of wood</th>
<th>Pole Weight Classification kg. (lb.)</th>
<th>Depth of setting m (ft.)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>9.14 (30)</td>
<td>Cedar</td>
<td>308 (680)</td>
<td>265 (585)</td>
</tr>
<tr>
<td></td>
<td>Pine</td>
<td>377 (833)</td>
<td>320 (707)</td>
</tr>
<tr>
<td>10.70 (35)</td>
<td>Cedar</td>
<td>362 (800)</td>
<td>308 (680)</td>
</tr>
<tr>
<td></td>
<td>Pine</td>
<td>469 (1,036)</td>
<td>405 (895)</td>
</tr>
<tr>
<td>12.20 (40)</td>
<td>Cedar</td>
<td>471 (1,040)</td>
<td>399 (880)</td>
</tr>
<tr>
<td></td>
<td>Pine</td>
<td>570 (1,258)</td>
<td>493 (1,088)</td>
</tr>
<tr>
<td>13.71 (45)</td>
<td>Cedar</td>
<td>562 (1,240)</td>
<td>471 (1,040)</td>
</tr>
<tr>
<td></td>
<td>Pine</td>
<td>671 (1,480)</td>
<td>580 (1,280)</td>
</tr>
<tr>
<td>15.24 (50)</td>
<td>Cedar</td>
<td>653 (1,440)</td>
<td>562 (1,240)</td>
</tr>
<tr>
<td></td>
<td>Pine</td>
<td>771 (1,700)</td>
<td>675 (1,490)</td>
</tr>
<tr>
<td>16.80 (55)</td>
<td>Cedar</td>
<td>725 (1,600)</td>
<td>635 (1,400)</td>
</tr>
<tr>
<td></td>
<td>Pine</td>
<td>898 (1,980)</td>
<td>771 (1,700)</td>
</tr>
<tr>
<td>18.30 (60)</td>
<td>Cedar</td>
<td>798 (1,760)</td>
<td>725 (1,600)</td>
</tr>
<tr>
<td></td>
<td>Pine</td>
<td>1,034 (2,280)</td>
<td>879 (1,940)</td>
</tr>
<tr>
<td>19.80 (65)</td>
<td>Cedar</td>
<td>907 (2,000)</td>
<td>834 (1,840)</td>
</tr>
<tr>
<td>21.30 (70)</td>
<td>Cedar</td>
<td>1,088 (2,400)</td>
<td></td>
</tr>
</tbody>
</table>
## POLE DATA CHART

### CONCRETE POLES

<table>
<thead>
<tr>
<th>Length m (ft.)</th>
<th>Pole Weight Classification kg. (lb.)</th>
<th>Depth of setting m (ft.)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>C</td>
<td>D</td>
</tr>
<tr>
<td>9.15 (30)</td>
<td>783 (1,723)</td>
<td>783 (1,723)</td>
</tr>
<tr>
<td>10.70 (35)</td>
<td>990 (2,178)</td>
<td>990 (2,178)</td>
</tr>
<tr>
<td>12.20 (40)</td>
<td>1,202 (2,644)</td>
<td>1,202 (2,644)</td>
</tr>
<tr>
<td>13.71 (45)</td>
<td>-</td>
<td>1,433 (3,153)</td>
</tr>
<tr>
<td>15.24 (50)</td>
<td>1,681 (3,698)</td>
<td>1,681 (3,698)</td>
</tr>
<tr>
<td>16.80 (55)</td>
<td>1,967 (4,327)</td>
<td>1,967 (4,327)</td>
</tr>
<tr>
<td>18.3 (60)</td>
<td></td>
<td>2,253 (4,457)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Length m (ft.)</td>
<td>Pole Weight Classification kg. (lb.)</td>
<td>Depth of setting m (ft.)</td>
</tr>
<tr>
<td>---------------</td>
<td>--------------------------------------</td>
<td>-------------------------</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>9.15 (30)</td>
<td>152 (335)</td>
<td></td>
</tr>
<tr>
<td>10.70 (35)</td>
<td></td>
<td>187.8 (414)</td>
</tr>
<tr>
<td>12.20 (40)</td>
<td>325.7 (718)</td>
<td>307.1 (677)</td>
</tr>
<tr>
<td>13.71 (45)</td>
<td>382.4 (843)</td>
<td>361 (796)</td>
</tr>
<tr>
<td>15.24 (50)</td>
<td>442.7 (976)</td>
<td>418.7 (923)</td>
</tr>
<tr>
<td>16.80 (55)</td>
<td>528.4 (1,165)</td>
<td>499.4 (1,101)</td>
</tr>
<tr>
<td>18.30 (60)</td>
<td>594.2 (1,310)</td>
<td>562 (1,239)</td>
</tr>
<tr>
<td>19.80 (65)</td>
<td>670.4 (1,478)</td>
<td>635 (1,400)</td>
</tr>
<tr>
<td>21.30 (70)</td>
<td>743.5 (1,639)</td>
<td>704.4 (1,553)</td>
</tr>
</tbody>
</table>
404  POLE BUNKS (STORAGE)
Special care should be taken when working on a pole bunk. Make sure that poles are properly stored on bunkers (an example is shown in Figure #5) to eliminate any possibility of shifting while being loaded or unloaded.

Figure #5

Pole Handling and Transportation
1. Only approved methods, tools and equipment should be employed during pole handling operations.
2. Employees and equipment should be positioned to minimize danger of injury or damage should control of a pole or poles be lost.
3. Employees should not ride on piles of poles, trailers or dollies.
4. The transportation of poles should be completed in accordance with existing traffic legislation.

405  VEHICLE SET UP
Setting Up the Truck at the Job Site
Before using a piece of equipment, the operator should be familiar with the manufacturer's operator's
manual. Consult the manual for limitations of the machine and proper use of the equipment's stabilizers.

1. Upon arriving at the job site, turn on emergency lighting as required (four-way flashers, rotating beacon, etc.).

2. Set out traffic control devices in accordance with local by-laws and the Ontario Traffic Manual Book 7 Temporary Conditions and current legislation regarding a written/documentated traffic protection plan.

3. Check the job site for the best location for the truck, then position it accordingly.

4. Set the parking brake and/or lock.

5. Engage Power Take Off (PTO). In cold weather, refer to Section 103 of IHSA's Safe Practice Guide, Hydraulics.

6. Position wheel chocks.

7. If the unit is so equipped, extend outriggers after placing pads, as shown in Figure #6. On uneven ground, level the pads before the outriggers are extended. If the work location is not level, extend the low side outrigger first to level the truck, then extend the high side to obtain a firm contact with the pad. If firm contact cannot be made, the
outrigger pads should be cribbed until firm contact is achieved.

**NOTE:** For maximum stability, extend the outriggers as recommended by the manufacturer's operation manual. The outriggers shall rest on blocking able to support the maximum load to be lifted without settling into the ground.

8. Conduct a documented tailboard talk.


10. Ground the vehicle in accordance with Section 3, Rule 300 of the IHSA Safe Practice Guide Temporary Grounding & Bonding Techniques. (See Figure #7). The radial boom derrick should be
operated from the operator's platform at all times.

406 CONTROL OF POLES

General
1. Poles being loaded or unloaded should be tended, preferably with tag lines, while suspended from a load line.
2. When loading/unloading poles with hoisting equipment, inspect the work area to ensure clearance from energized conductors and equipment is maintained.
3. Devices used for attaching load lines to poles (such as clevises and pole lifting tongs) must be of an approved type and be in good working condition.

Pole Lifting Tongs
There are several types of pole lifting tongs used in the utility industry. They vary in size and method of attachment. **Use only approved lifting tongs with the Working Load Limit (WLL) stamped on them.**

Three types are shown in Figure #8. The type top left employs the chain link lifting attachment. The type shown top right has the clevis on one side of the tong extension. The bottom image is of a safety pole tong.

**NOTE:** Ensure the device is...
properly seated before raising the pole. Winch lines must never be choked.

To minimize winch line damage, and when lifting concrete/steel/wood poles, use the appropriate sling, either wire or synthetic rope as shown in Figure #9.

**Pole Guides**

Some units may be equipped with pole guides at the boom tip, as shown in Figure #10. The pole guides can be tipped hydraulically forward or backward to maintain the guiding arms (tongs) perpendicular to the pole. The guides open hydraulically to allow the pole to be nestled in the boom tip. They can be closed around the pole to keep it in position. The pole guides (tongs) are intended to be used as guides only and should not be clamped tightly around the pole. The winch line and boom should do the lifting while the boom tip should
take most of the pressure.
When not in use, the pole guides should be tilted to the
stored position. The winch line should be clear of the
pole guides when making a lift.

407 CAPACITY CHART FOR RADIAL BOOM
DERRICKS
As mentioned in Section 403, all radial boom derricks
have the manufacturer's capacity chart attached near
the operator's platform. Refer to it before lifting a load.

408 LOAD
BINDERS AND TIE
DOWNS
Load binders are
used to tighten
chains or other
strapping when
securing loads on
trucks or other
vehicles. See
Figure #11. They
are proof-loaded
and their capacity
is usually marked
on them. The size of the largest chain on which they
may be applied is usually stamped on the hook.
Load binders shall not be used for hoisting. Hook
points should be used for holding or binding the
chains used for securing loads.
Take care when installing this type of load binder
because improper installation could cause it to snap
back violently.
Don’t use a pipe extension on the handle to close the load. It may overload the chain or destroy the load binder. Handles must be tied down during travel as per OHSA Regulations (Security of Loads).

Portable Load Binders
1. CABLE TYPE: This unit is simple and compact, as shown in Figure #12. The pawl and ratchet arrangement may be tightened or slackened without danger of losing the load. The drum holds 5.5 m. (18 ft.) of 8 mm (5/16 in.) cable. It is installed using a steel bar to tighten the load.

Inspect the cable and pawl and ratchet assembly regularly for any signs of wear. Replace if necessary.

2. WEB TYPE: This type of binder (shown in Figure #13) is available in two different load ratings: 2,268 kg (5,000 lbs.) and 4,536 kg (10,000 lbs.). It has a hand-operated ratchet for tightening the strap around the load. To operate, pass the free end through the opening in the spindle and pull the slack through the spindle. By operating the handle, the webbing is tightened around the load. Because of the flat nylon webbing, it can be used to bind a wide variety of loads. For example, the web type binder can be used to fasten a
broken wood pole to a new one by placing a piece of crossarm or wood block between the poles.

**NOTE 1:** Use only an approved ratchet type hoist (chain, wire rope or web), that is designed and rated for the load to be carried, to secure loads to a trailer for transportation.

**NOTE 2:** Load binders under tension should be released under control to prevent injury and/or equipment damage.

A load on a pole trailer requires at least four tiedowns: two securing the load to the forward bolster and two securing the load to the rear bolster.

A long load sign with a red flag is required for daytime travel. At night, a red light is required on the end of the pole. See Figure #14.

**409 SAFETY IN LOAD SECURING DURING TRANSPORT**

For minimum recommended specifications, refer to the current Ontario Regulations of the Highway Traffic Act (Security of Load).
SECTION V
POLE INSTALLATION

500 POLE INSTALLATION REQUIREMENTS
501 DIGGER DERRICK TRUCKS
502 DIRECTIONAL CONTROLS
503 DIGGER OPERATIONS
504 AUGER CARE AND USE
505 OPERATOR'S PLATFORM
506 SAFE LIMITS OF APPROACH
507 TRUCK GROUNDS
508 UTILITY WORK PROTECTION CODE
509 CONDUCTOR AND POLE GUARDS
510 USE OF RUBBER GLOVES
511 HAND SIGNALS
512 POLE INSTALLATION
513 POLE SETTING REQUIREMENTS (PIKING METHOD)
514 SECURING POLES
515 BACK FILL
SECTION V
POLE INSTALLATION

500 POLE INSTALLATION REQUIREMENTS
Installing poles properly requires job planning, safe and competent workers, and well maintained equipment.

501 RADIAL BOOM DERRICK TRUCKS
1. Follow manufacturer's recommendations when operating a radial boom derrick truck. Read the operator's manual.

2. Cranes or radial boom derricks used near energized conductors for purposes other than live line techniques should be operated in accordance with safe limits of approach guidelines (refer to Section 506).

3. The use of cables and metal booms to raise poles, near high voltage conductors, should be done using proper live line techniques.
   (a) The conductor must be covered with approved cover-up of the appropriate voltage rating. Approved pole guards are required on the pole. To make room to bring the pole through, it may be necessary to use an aerial device to support one of the phases or spread out the conductor support arms.

   Rig the cable and the boom below the covered conductor a sufficient distance, to prevent the possibility of making electrical contact with the boom, cable or conductive load being raised.

   (b) The vehicle should be adequately grounded and the operator must operate the controls from the vehicle operator's platform.
The members of the crew handling the load must be wearing rubber gloves and/or using other protective devices, such as guide ropes or pole cant hooks with wood/fibreglass handles.

4. Do not subject a boom to a load in excess of its load lifting capacity. A load capacity chart should be placed on the vehicle where the operator can see it when operating the equipment. The operator should learn the safe loading capacity of the unit under various loads, terrain and boom positions. (See Figure #15).

5. Adhere to boom load chart. If necessary, reposition the unit after digging so the boom may be used at an elevation where the lifting capacity is increased.

6. Never pass any part of a boom's load over a worker.

7. Avoid jerky or erratic operation by using the hand throttle to control speed.
8. Use top governed RPM for digging.
9. Where a worker may be endangered by the rotation or uncontrolled motion of load being hoisted, use one or more guide ropes to prevent rotation or other uncontrolled motion.
10. Use the boom – not the load line – for the initial lift.
11. When using the boom tip winch for pulling, such as snaking a pole, keep the boom in line with the pull. Position the radial boom in line with the load to prevent side strains. (See Figure #16).
12. Avoid side pulls with a load line. Point the boom toward the load if possible. If not, move the load by rotating the boom. (See Figure #17).
13. Lower the load with the winch line, not the boom.
15. Keep heavy loads (poles) close to the ground.
16. Do not allow any winch cable to build up on one side of the drum. This could cause shock load on the cable if it drops.
17. Do not allow a load to drop suddenly. Shock loads are many times greater than the lifted load.

Figure #16
18. The recommended method for pulling poles is to use a pole puller in conjunction with the boom. (Refer to Section 607, Pole Jacks.)

19. Do not rotate a load downhill.

20. Do not move the vehicle with a load suspended on the boom.

21. Stow the auger and boom in the "Rest" position before moving. All stages should be fully retracted.

22. Remove the fibreglass bucket and store the top controls on the end of the boom before handling poles with a boom.

23. Inspect the stow cable before use and replace when defective.

24. The shear pin used to hold the auger on the kelly bar is used for up and down motion only. Inspect the bolt. If it is worn or bent, replace it with one of equal strength.
25. A power anchor can exert more pulling force than the heaviest load. It is important to follow the anchor with the boom, because the anchor could pull the boom down. Never lift the outrigger off its pad by using excessive downward pressure on the boom.

26. Do not tamper with the pressure relief valve. It could damage the hydraulic system.

27. When the operator's view of the radial boom derrick is obstructed, a signal person should assist the operator.

28. Never choke a winch line.

29. Do not unhook or unsling a load until it has been placed in a secure rest position, and there is no danger of tipping, collapsing or rolling of the load.

30. A winch line used over a fibreglass extension negates any dielectric qualities the boom would have when being used as an aerial device.

502 DIRECTIONAL CONTROLS
Simultaneous use of all operational functions can be achieved with proper control. When one or more boom controls are engaged at the same time, the components that move with the least power will take most of the hydraulic oil output. This control should be metered (partly open) so that part of the oil flow is available to drive those components which take more power to move.

For example, the extension boom moves with less power than the lift cylinder, so the extension boom's control valve should be properly metered to activate the lift cylinder at the same time. (See Figure #18).
503  DIGGER OPERATION
Before lowering or storing the auger, be sure that all personnel are in the clear, the storage cable is in good condition and the boom is elevated high enough so that the auger will clear the truck body.

To Lower Auger
Disengage the safety storage pin, if so equipped, and move the digger handle to "Reverse" to relieve the storage mechanism of digger weight. Trip the auger storage release and lower the auger until it is in the vertical position and the storage cable swings clear. Lower the boom to a position where the auger would strike the ground if the cable broke (this practice may not be possible on all vehicles). Return the auger storage release to "Lock" for automatic storage of the digger. In the vertical position, the digger will automatically travel out with the extension boom.
To Store Digger
Retract the extension boom completely and place the loop of wind-up storage cable over the pin or auger stem and push the digger control to "Reverse" until the auger rolls up into the storage pocket. To lower the auger into its storage position, return the digger control to "Neutral" and the auger will settle into it's stored position, where the digger is independant of the extension boom.

If the auger is rotated after it reaches the top of the bracket, the storage cable could break. If this happens, the auger will automatically drop into the storage pocket until a new cable is installed. A new storage rope can be wound onto the auger in the stored position.

504 AUGER CARE AND USE

1. Augers are designed to dig straight holes. Wherever possible, keep the boom lined up with the auger as it digs a hole to prevent bending the auger or kelly bar. Keep the auger vertical by metering the boom extension and boom rotation controls. (See Figure #19).
2. Power digging in ordinary earth can be done at any speed in the range of the digger. However, in shale, granite; etc. the best digging is done with slow auger speed and steady pressure.

3. Never drive the auger in reverse with boom pressure on it.

4. Do not feed the auger into the earth too quickly. Remove drilled material from the hole frequently. It may become difficult to raise the auger if it has been allowed to drill too deeply at a single pass.

5. When starting to dig on inclines, angle the auger so that it is perpendicular to the incline. (See Figure #20). Turn the auger several revolutions before starting a gradual return of the digger to the vertical position. An alternative is to level the digging area with a shovel before setting the auger. (See Figure #21.)

6. Soil can be spun off by allowing the auger to rotate at maximum speed or by rapidly reversing the digger control. (See Figure #22.)

**NOTE:** Never shake the auger by operating the controls back and forth.
7. Carbide auger teeth are essential when digging in frost or hard pan. For digging in these ground conditions, IHSA recommends using slow speed and maximum downward pressure.

If digging is particularly severe, move the extension boom in and out to help when concentrating the downward pressure on one side and then the other.

8. Worn points and teeth do not dig, they just rub. Most auger teeth are interchangeable. The outer teeth travel further and are subject to more wear than the inner teeth. It is therefore possible to get longest life from your auger's teeth by rotating them.

NOTE: Be sure that the sides of the outer teeth cut a hole that provides clearances for the auger. Loss of this clearance will result in excessive auger binding and wear. Replace worn teeth.

9. If you strike a rock that you can't auger through, bite into it and raise the auger. This should roll the rock from its bed so that you can pick it up the next time. This may have to be repeated several times.

If the proper pole depth can't be obtained, consider using other means (i.e. pole cribs).
Most wooden poles used by IHSA member firms have been "branded" with the class and length of the pole, as shown in Figure #23. The brand should appear about 3 to 3.6 m (10 to 12 ft.) from the butt end of the pole. If no brand is on the pole, a date nail should be driven in at the 3 to 3.6 m (10 to 12 ft.) range as a depth indicator. (See Figure #24).

![Figure #23](image1)

![Figure #24](image2)

Most concrete and steel poles will have a metal tag or plate (with the applicable length and class data) installed at a similar distance from the pole butt.

**NOTE:** IHSA recommends that all member firms establish a standard pole setting depth for all classes of poles.

10. Be careful when exerting downward pressure when digging an anchor hole or installing a power anchor. Keep the auger or power anchor turning to help prevent bending when applying pressure at an angle.

11. Make sure the boom is fully retracted and the auger shaft is at the shortest possible length before trying to remove or store the auger.
12. When digging anchor holes or installing power anchors, be sure to maintain the correct angle by adjusting the extension or rotating the boom to prevent excessive strain on the derrick. (See Figure #25).

![Figure #25](image)

505 OPERATOR'S PLATFORM

Everyone except the worker operating the controls of the hoisting device, must be kept clear of line vehicles during pole setting operations.

If an inadvertent electrical contact occurs, the operator will be unharmed if he/she is either on the operator's platform, sitting on the operator's seat or standing on a mat electrically connected to the unit and is not simultaneously touching an object that is in contact with the earth or another potential.

506 SAFE LIMITS OF APPROACH

Cranes or digger/derricks used near energized conductors for purposes other than live line techniques should be operated in accordance with the Safe Limits of Approach, as set out in the Electrical Utility Safety Rules (EUSR).
507 TRUCK GROUNDS
While setting poles within 3 m (10 ft.) of overhead conductors energized above 750 volts, the hoisting device must be grounded – preferably to the system neutral.

508 UTILITY WORK PROTECTION CODE
Whenever poles are being set or removed in proximity to existing energized electrical apparatus, the person in charge of the work shall obtain hold-off protection on the line(s) in question before pole setting or removal operations begin.

509 CONDUCTOR AND POLE GUARDS
Before setting poles that could make inadvertent contact with energized conductors or apparatus, cover the conductors or apparatus with rubber or fibre guards of the appropriate voltage rating. Only fibre pole guards that have passed a dielectric test at the appropriate voltage rating within the last year and have been visually inspected and cleaned prior to use shall be used to cover poles. (See Figure #26).
NOTE: Take special precautions on voltages between 35 and 50 kV.

510 USE OF RUBBER GLOVES
When handling poles or winch lines while installing or removing poles in proximity to energized line apparatus, crew members shall wear rubber gloves of the appropriate voltage rating. Refer to the most recent EUSR.

511 HAND SIGNALS
Refer to Section 402.

512 POLE INSTALLATION
Only competent personnel familiar with all sections of this safe practice guide should attempt to install poles. Hardware, material and equipment may be installed on the pole before it is set, provided it is securely fastened and does not create a hazardous condition.

When installing pole into an existing circuit, positioning the hoisting device is particularly important when raising long poles. IHSA suggests you move the truck closer to the hole to gain extra boom height when raising long poles.

Attach the winch line to the pole slightly above the balance point. Make sure the clevis is connected properly. (See Figure #27).

Rotate the pole with a cant hook until the clevis is positioned to correctly orient the pole when standing in the hole.

NOTE: Prior to raising multi-section steel poles that have been assembled on the ground, ensure that all joints are secured by
through-bolts, or by chains or bars connected to the pole sections above and below the joints.

![Diagram showing通过-bolts, or by chains or bars connected to the pole sections above and below the joints.](image)

*Figure #27*

To raise the pole, lower the boom while taking up the slack in the winch line until the head of the boom is close to the pole. This reduces the amount of swing when the pole clears the ground and still permits the pole to turn into the boom head when raised into position.

While a worker controls the butt, lift the pole to a vertical position by raising the boom. Secure the pole in the boom head by tightening the winch cable. Do not overtighten.

While the second worker continues to guide the butt, lower the pole into the centre of the hole. This should be done by lowering and/or retracting the boom, not by lowering the winch. If the boom is equipped with pole guides, the operator will secure the pole with the guides and lower the pole with the winch line with assistance from the second person, as stated earlier.

Straighten the pole by moving the boom in the required direction. If it is necessary to adjust the turn, slacken the winch just slightly, make the turn, then retighten the
winch. Sight in the pole from two locations. From a location at 90 degrees to the line, check for vertical and for correct turn. Face the poles so that adjacent poles face in opposite directions (face to face) (back to back). On corners and dead ends, poles should face the anchor.

Fill the hole around the pole with good dry material. Tamp continuously while backfilling either with hydraulic or hand tampers.

Slack the winch cable and move the boom head away from the pole. The cable should drop down the pole by itself but may need to be pulled with a switch stick to bring it within reach.

**Installation of Wood Poles in Live Line:**

1. Establish work area protection for traffic and pedestrian control.
2. Obtain the appropriate hold-off protection (where applicable).
3. Conduct and document a tailboard talk with the appropriate personnel.
4. Establish proper vehicle stability and verify its lifting load capacity.
5. Install the truck ground to the system neutral.
6. Install sufficient rubber/fibre cover-up on the appropriate secondary and primary conductors. (Movement of the pole and boom from start to finish must be addressed.) Any second point of contact must be covered.
7. Relocate the primary conductor for better clearance, using a bucket truck and either approved temporary conductor supports or a jib on the aerial device.
8. Install the appropriate pole guard on the pole to be installed.

9. Ensure employees who will control the pole butt wear the required rubber gloves and, where necessary, use an approved, insulated pole wrench (cant hook).

10. Appoint a designated observer (spotter) to assist in the installation procedure.

11. Lift the pole using the proper work procedure. Refer to Section 512.

12. When lowering the pole into place, use a second worker to guide the pole butt into the centre of the hole. Do so by lowering or retracting the boom, not by lowering the winch line. (Lowering with the winch line may only be done if the unit is equipped with pole guides and they are in place to secure the pole.)

13. Realign the new pole and sight in from two locations, usually at right angles to each other.

14. Backfill around the pole with good, dry material. Tamp continuously while backfilling with an hydraulic or hand tamper.

15. Remove the winch cable from the pole and store the boom.

16. Complete the remaining job procedures and restore the work site to its original condition.

Installation of Concrete Poles in Live Line:

1. Establish work area protection for traffic and pedestrian control, including a documented traffic protection plan.

2. Obtain the appropriate hold-off protection (where applicable).
3. Conduct and document a tailboard talk with the appropriate personnel.

4. Establish proper vehicle stability and verify its lifting capacity.
   **NOTE:** In situations where the radial boom derrick doesn't have the necessary lifting capacity, the appropriate size mobile crane must be used. Installation procedures, along with hand signals, should be communicated to the crane operator prior to the lift.

5. Install the truck ground to the system neutral.

6. Install sufficient rubber/fibre coverup on the appropriate secondary and primary conductors. Movement of the pole and boom from start to finish must be addressed. Any second point of contact must be covered.

7. Relocate the primary conductor for better clearance, using a bucket truck and either approved temporary conductor supports or a jib on the aerial device.

8. Install the appropriate pole guards on the pole to be installed.

9. Ensure employees who will control the pole butt wear the required rubber gloves and, where necessary, use an approved, insulated pole wrench.

10. Appoint a designated observer (spotter) to assist in the installation procedure.

11. Lift the pole using the proper work procedure.

12. When lowering the concrete pole into place, use a second worker to guide the pole butt into the centre of the hole. Do so by lowering or retracting the boom, not by lowering the winch line. (Lowering with the winch line may only be done if the unit is
equipped with pole guides and they are in place to secure the pole.)

13. Realign the new pole and sight in from two locations.

14. Backfill around the pole with good, dry material.
   Tamp continuously while backfilling with an hydraulic or hand tamper.

15. Remove the winch cable from the pole and store the boom.

16. Complete the remaining job procedures and restore the work site to its original condition.

Installation of Steel Poles in Live Line:

NOTE: Refer to manufacturers' recommended installation procedures.

1. Establish work area protection for traffic and pedestrian control, including a documented traffic protection plan.

2. Obtain the appropriate hold-off protection (where applicable).

3. Conduct and document a tailboard talk with the appropriate personnel.

4. Establish proper vehicle stability and verify its lifting capacity.
   
   NOTE: In situations where the radial boom derrick doesn't have the necessary lifting capacity, the appropriate size mobile crane must be used. Installation procedures, along with hand signals, should be communicated to the crane operator prior to the lift.

5. Install the truck ground to the system neutral.

6. Install sufficient rubber/fibre coverup on the appropriate secondary and primary conductors.
Movement of the pole and boom from start to finish must be addressed. Any second point of contact should be covered.

7. Relocate the primary conductor for better clearance using a bucket truck and either approved temporary conductor supports or a jib on the aerial device.

8. Steel poles may be assembled either
   (a) on the ground prior to the lift
   (b) by lifting the top section and installing it onto the base/ground section, which has been previously anchored in the ground

Ground assembly requires the installer to:
   (a) Lift and support the top of the bottom section using a block of wood.
   (b) Mark the friction point on the bottom section to allow between 53 and 68 cm (21 to 27 ins.) to overlap the top section when fitted into the bottom section (check the manufacturer’s specifications).
   (c) Using the lifting boom, raise and balance the top section.
   (d) Swing this section into position to align the welds on both sections.
   (e) Wrap two nylon slings around each section, situated so they are roughly 180 degrees apart, and connect the sections together with a ratchet hoist.
   (f) Rachet the two sections together until the required measurement is achieved.

If you decide to lift the top section and install it onto the base/ground section, refer to the measurement steps as stated above.

Boom operators should maintain boom down pressure to ensure the sections are joined properly.
NOTE: For vertical and semi strain construction, the threaded insert (rivnut) on the bottom section must be in line with the overhead line.

For tangent construction, it should be across from the overhead line.

9. Install the appropriate pole guards on the pole to be installed.

10. Ensure employees who will control the pole butt wear the appropriate rubber gloves and use the approved, insulated pole wrench.

11. Appoint a designated observer (spotter) to assist in the installation procedure.

12. Lift the pole using the proper work procedure.

13. When lowering the steel pole into place, use a second worker to guide the pole butt into the centre of the hole. Do so by lowering or retracting the boom, not by lowering the winch line. Lowering with the winch line may only be done if the unit is equipped with pole guides and they are in place to secure the pole.

14. Realign the new pole and sight in from two locations.

15. Backfill around the pole with good, dry material. Tamp continuously while backfilling with an hydraulic or hand tamper.

16. Remove the winch cable from the pole and store the boom.

17. Complete the remaining job procedures and restore the work site to its original condition.

Tamper Operation
The engine and pump speed will vary from unit to unit. However, the pounds per square inch (PSI) reading on
the gauge should not exceed 1,200 RPM.

To start the tamper motor, the lines should be connected to the auxiliary tool outlets. After the tamper is operating properly, one line should be connected to the free flow return. On some units, a free flow return line has not been provided. In this case, move the valve handle to the lock tamper position for continued operation.

**NOTE:** The operator must remain at the controls while the boom is supporting the pole.

**Recommended Procedures for Using a Tamper**

After the pole is set, it is recommended that one crew member shovel in dirt and another begin tamping from the bottom of the hole upward. (See Figure #28)
This procedure ensures that the hole is uniformly tamped, leaving a minimum amount of excess material.

If the tamper is leaned in the direction of travel, it will tend to "walk" itself around the pole. Refer to The Electricity Distributors Association standards for proper pole setting requirements.

513 POLE SETTING REQUIREMENT (PIKING METHOD FOR WOOD POLES ONLY)

Although it is not used extensively today, the pike pole method remains a viable way to raise poles. It gets its name from the so-called pike poles used after the pole is lifted beyond a convenient distance by hand.

The size of the crew depends on the length and the weight of the pole to be raised. The average number of workers required to complete the job safely is shown in the following table.

<table>
<thead>
<tr>
<th>POLE LENGTH M (FT.)</th>
<th>NUMBER OF WORKERS</th>
<th>NUMBER OF PIKES</th>
<th>WORKERS ON RAISING HORSE</th>
<th>WORKERS AT BUTT</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.6 (25)</td>
<td>5</td>
<td>3</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>9.1 (30)</td>
<td>6</td>
<td>4</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>10.6 (35)</td>
<td>7</td>
<td>5</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>12.2 (40)</td>
<td>8</td>
<td>6</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>13.7 (45)</td>
<td>10</td>
<td>8</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>15.2 (50)</td>
<td>10</td>
<td>8</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

When there are not enough workers to erect poles safely by the piking method, a properly guyed gin pole may be used and the pole raised with suitable block and tackle.
The size of the crew is not absolutely fixed. It should be noted that one crew member handles the raising horse, one is stationed at the butt of the pole with cant hooks and the rest of the crew handle the pike poles. The supervisor should oversee the operation from near the butt of the pole.

**Position for Raising**

Choose a location for raising the pole, taking into account the following conditions:
- the top will not contact trees, overhead wires, etc. while being raised
- the operation will be clear of road traffic
- personnel using pike poles will have as level ground as possible, being clear of ditches, fences and other obstructions
- where raising poles on a hillside, consider raising the pole down the hill

**NOTE:** Observe safety precautions for working on public roads and highways.

A pole piking crew will require the following:

**TOOLS:** pole carriers, cant hooks, insulated pole wrenches, axe, hammer, digging bars, raised horse with points or teeth in the collar on which the pole rests, tag lines, pike poles 4.2 m (14 ft.) long with sharp points (more for longer poles).

**MATERIAL:** 7.6 cm (3 in.) nails, dating nails, small pieces of wood about 5 X 2.5 X 61 cm (2 X 1 X 24 in.), through bolt.

Drive a dating nail (see Figure #29) approximately 3 m (10 ft.) from the...
butt end of a wooden pole that will be toward the road where the pole is set. It can be used to see if the pole is deep enough in the hole. It may also be used at a later date to tell if the pole depth has changed due to road construction or other grading operations.

The first step in raising a pole by the piking method is to place one or two steel digging bars against the side of the hole (opposite to the raising position of the hole, as shown in Figure #30) and drive them well into the bottom. Lay the butt end of the pole over the hole against the bar(s). The bar(s) will hold the butt in position and protect the walls of the hole from caving in as the pole is raised.

In the second step, shown in Figure #31, raise the upper end of the pole and place it on the pole support.
(Pole supports are made in various forms, two of which are shown in Figure #32.)

![Figure #32](image)

*Figure #32*

![Figure #33](image)

*Figure #33*

The main duty of the worker at the butt is to keep the pole from rolling. This is done by means of a cant hook, shown in Figure #33.

In the third step, shown in Figure #34, the workers stand side by side on both sides at the top end of the pole.

![Figure #34](image)

*Figure #34*
They then push toward each other and up by using their arms, with the person stationed on the raising horse catching the pole’s weight between lifts. In this manner, the workers move along the pole until it is high enough to permit the use of pikes.

The fourth step, as shown in Figure #35, is to punch the pikes into the pole and prepare to raise it. As the pole is raised, the person stationed on the raising horse carries it forward, always ready to support the pole if needed. The raising continues until one of the piker’s pikes is too high to be effective if raised any further. When that happens, that person calls out “high pike”. This is the signal for the pikers to switch positions. The person stationed on the lowest pike will bring it down first, because it does not have to be lowered through the rest of the pikes, but has a clear path. The other pikers follow in order until all the pikes are lowered.

NOTE: Although they are not shown in Figures #35 and #36, at least three other workers should use guide ropes (tag lines) to direct the pole during the lift. These ropes should be left in
place and secured to the ground with anchors, to stabilize the pole before any worker is allowed to climb it.

The pole is raised in this manner until it drops into the hole. Figure #36 shows the pole almost raised and ready to slide into the hole. This shows each person’s duty in the crew. The five pikers raise the pole, the person stationed on the raising horse keeps it snugly under the pole at all times and the person stationed at the pole’s butt guides the bottom of the pole and keeps the pole from rolling.

![Figure #36](image-url)
Notice that the pikers are not all directly underneath the pole. At least one should be well out on each side to guide the pole as well as to help lift it.

Also worth noting is the manner in which the workers are holding their pike pole after the pole is partly raised – in the palm of one hand with the other hand underneath, both arms extended downward. When pike poles are held in this manner, the workers are in a comfortable position, and if the weight of the pole should be suddenly thrown onto their pike, they are in good position for grounding the pike pole or moving into the clear. If the pole is very tall, workers can support the pike pole on their shoulders, as shown in Figure #36. The pike still rests in the palm of the piker’s hand. In this way, the piker can exert a strong push on the pike.

If the pole to be raised is a large heavy one, and the crew is small, it is a good idea to “trench” the hole, that is, to cut a ditch back from the hole. The pole is then placed in the trench. This allows the pole to begin to slide into the hole earlier than if the pole lay flush on the ground. Furthermore, it allows the weight of the lower end of the pole to balance a portion of the weight of the pole above the point of the trench on which the pole is resting.

514 SECURING POLES
Newly installed poles may be used to secure broken or rotted poles. When poles are installed in proximity to energized conductors, use the approved cover-up.

515 BACK FILL
When back filling newly installed poles, use a material that will compact sufficiently to suit the ground condi-
tions. Refer to Electricity Distributors Association standards for pole setting requirements.

516 POLE CRIBBING

When setting poles in Type 3 and Type 4 soil, cribbing may be required to support the pole. Where the hole can be dug to normal setting depth and the butt is set in clay or solid earth, the pole may be backfilled with field stone or gravel to ground level, then cribbed above ground, using a steel culvert filled with stone or gravel. (See Figure #37)

NOTE: The height of the crib will vary with the pole height and the depth of penetration of the butt in the ground, but the minimum crib height is 0.6 m (2 ft.). Refer to Table #1.

Figure #37

Setting A: with butt of pole resting on or penetrating
### TABULATION OF CRIB Heights

<table>
<thead>
<tr>
<th>Pole Height: metres (feet)</th>
<th>SETTING A: butt of pole resting on or penetrating solid earth at normal setting depth</th>
<th>SETTING B: butt of pole not reaching solid earth at normal setting depth</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Depth Of Penetration:</strong> metres (feet)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0-0.3 (0-1) 0.6 (2) 0.9 (3) 1.2 (4) 1.5 (5) 1.8 (6)</td>
<td></td>
</tr>
<tr>
<td>Pole Height (metres):</td>
<td><strong>Height of Crib:</strong> metres (feet)</td>
<td></td>
</tr>
<tr>
<td>10 (30)</td>
<td>0.9 (3) 0.6 (2) 0.6 (2)</td>
<td>0.9 (3)</td>
</tr>
<tr>
<td>10.6 (35)</td>
<td>1 (3.5) 0.7 (2.5) 0.6 (2)</td>
<td>1 (3.5)</td>
</tr>
<tr>
<td>12.1 (40)</td>
<td>1.2 (4) 0.9 (3) 0.6 (2) 0.6 (2) **    ** 1.2 (4)</td>
<td></td>
</tr>
<tr>
<td>13.7 (45)</td>
<td>1.2 (4) 0.9 (3) 0.6 (2) 0.6 (2) **    ** 1.2 (4)</td>
<td></td>
</tr>
<tr>
<td>15.0 (50)</td>
<td>1.3 (4.5) 1 (3.5) 0.7 (2.5) 0.6 (2) 0.6 (2) **    ** 1.3 (4.5)</td>
<td></td>
</tr>
<tr>
<td>16.7 (55)</td>
<td>1.5 (5) 1.2 (4) 0.9 (3) 0.6 (2) 0.6 (2) **    ** 1.5 (5)</td>
<td></td>
</tr>
<tr>
<td>18.2 (60)</td>
<td>1.6 (5.5) 1.3 (4.5) 1 (3.5) 0.7 (2.5) 0.6 (2) **    ** 1.6 (5.5)</td>
<td></td>
</tr>
<tr>
<td>19.8 (65)</td>
<td>1.6 (5.5) 1.3 (4.5) 1 (3.5) 0.7 (2.5) 0.6 (2) **    ** 1.6 (5.5)</td>
<td></td>
</tr>
<tr>
<td>21.3 (70)</td>
<td>1.8 (6) 1.5 (5) 1.2 (4) 0.9 (3) 0.6 (2) **    ** 1.8 (6)</td>
<td></td>
</tr>
<tr>
<td>22.8 (75)</td>
<td>1.8 (6) 1.5 (5) 1.2 (4) 0.9 (3) 0.6 (2) **    ** 1.8 (6)</td>
<td></td>
</tr>
<tr>
<td>24.3 (70)</td>
<td>2 (6.5) 1.6 (5.5) 1.3 (4.5) 1 (3.5) 0.7 (2.5) 0.6 (2) 2 (6.5)</td>
<td></td>
</tr>
</tbody>
</table>

* IN THE IMMEDIATE AREA OF THE POLE, REMOVE SWAMP AND MUSKEG BETWEEN SOLID EARTH LEVEL AND GRADE AND REPLACE WITH STONE.

Table #1
Where poles are not in poor soil conditions and the butt of the pole does not reach solid earth, use a normal setting depth, then build a crib using 10 cm x 10 cm (4 in. x 4 in.) timbers of either cedar or pressure-treated hardwood to support the pole. Backfill the hole with field stone or gravel and crib the pole above the ground. (See Figure #38)

517 INSTALLATION OF POLE MOUNTS ON ROCK

When blasting in difficult conditions, pole mounts may be required to support the pole. Pole mounts are rated only for Class 2 wooden poles up to 21.3 m (70 ft.) long. For information on pole mounts for steel poles, contact the manufacturer.
Installation Procedure
Select the required pole mount using the information in Table #2.

1. Determine the location of the first hole on rock.

2. Place a template onto the butt of the pole, with the locking arms in position. (See Figure #39)

3. Place the template on the rock and drill the first hole using the proper-sized bit. Drill holes two and three, again using the template as a guide. (See Figure #40). Drill holes as vertical as possible.

4. Place an anchor in each hole, with the nut on the top end of the anchor rod on all three legs.

5. Install six stud bolts but leave the nuts loose.

6. Tighten the nut of the anchor rod to firmly expand the expansion shell. If the rock is very poor, use an alternate location or method. Grout the hole where the surface of the rock is on a slope or where the drill holes may be prone to weathering.

7. Install the pole and hold it in a vertical position. tighten all six stud bolts and remove the boom truck when all bolts are tight. (See Figure #41)

8. Install all lag bolts to complete the installation. (See Figure #42)
NOTE: A pole mounted identification sign should be installed 3 m (10 ft.) above the ground line on all rock-mounted poles, on the face of the pole that is normally approached for climbing. A date nail should be installed 4 m (13 ft.) from the butt of the pole. This nail will also indicate the depth of the rock mount. Poles supported by rock mounts should not be climbed without first temporarily supporting the pole with rope guys or a radial boom derrick.
## SELECTION OF POLE MOUNTS

<table>
<thead>
<tr>
<th>pole length m (ft.)</th>
<th>pole class</th>
<th>max. transverse working load applied 0.60 m (2 ft.) below top of pole kg (lbs.)</th>
<th>max. working ground line movement joules (ft. lbs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 (30)</td>
<td>4</td>
<td>435 (960)</td>
<td>36,336 (26,800)</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>471 (1,040)</td>
<td>39,218 (29,000)</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>508 (1,120)</td>
<td>42,301 (31,200)</td>
</tr>
<tr>
<td>10.6 (35)</td>
<td>6</td>
<td>340 (750)</td>
<td>33,217 (24,500)</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>367 (810)</td>
<td>36,336 (26,800)</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>399 (880)</td>
<td>39,218 (29,000)</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>430 (950)</td>
<td>42,301 (31,200)</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>499 (1,100)</td>
<td>45,420 (33,500)</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>626 (1,380)</td>
<td>60,334 (44,500)</td>
</tr>
<tr>
<td>12.1 (40)</td>
<td>5</td>
<td>340 (705)</td>
<td>36,336 (26,800)</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>347 (765)</td>
<td>39,218 (29,000)</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>371 (820)</td>
<td>42,301 (31,200)</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>530 (1,170)</td>
<td>60,334 (44,500)</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>567 (1,250)</td>
<td>64,401 (47,500)</td>
</tr>
<tr>
<td>(45)</td>
<td>5</td>
<td>306 (675)</td>
<td>39,218 (29,000)</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>329 (725)</td>
<td>42,301 (31,200)</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>471 (1,040)</td>
<td>60,334 (44,500)</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>499 (1,100)</td>
<td>64,401 (47,500)</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>585 (1,290)</td>
<td>68,469 (50,500)</td>
</tr>
<tr>
<td>(50)</td>
<td>4</td>
<td>295 (650)</td>
<td>42,301 (31,200)</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>456 (1,000)</td>
<td>64,401 (47,500)</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>476 (1,050)</td>
<td>68,469 (50,500)</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>499 (1,100)</td>
<td>72,401 (53,400)</td>
</tr>
<tr>
<td>(55)</td>
<td>4</td>
<td>381 (840)</td>
<td>60,334 (44,500)</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>408 (900)</td>
<td>64,401 (47,500)</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>431 (950)</td>
<td>68,469 (50,500)</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>456 (1,000)</td>
<td>72,401 (53,400)</td>
</tr>
<tr>
<td>(60)</td>
<td>3</td>
<td>395 (870)</td>
<td>68,469 (50,500)</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>417 (920)</td>
<td>72,401 (53,400)</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>440 (970)</td>
<td>76,468 (56,400)</td>
</tr>
<tr>
<td>(65)</td>
<td>3</td>
<td>363 (800)</td>
<td>68,469 (50,500)</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>385 (850)</td>
<td>72,401 (53,400)</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>408 (900)</td>
<td>76,468 (56,400)</td>
</tr>
<tr>
<td>(70)</td>
<td>2</td>
<td>376 (830)</td>
<td>76,468 (56,400)</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

*Table #2*
SECTION VI
POLE REMOVAL

600 POLE REMOVAL
601 VEHICLE SET UP
602 TRAILER AND PERMIT REQUIREMENTS
603 HOLD-OFF PROTECTION
604 PROTECTIVE EQUIPMENT
605 TRUCK GROUNDS
606 PERSONAL PROTECTIVE EQUIPMENT
607 POLE JACKS
608 REMOVAL PROCEDURE OF WOOD, CONCRETE AND STEEL POLES
609 LOADING POLES
610 RESTORATION
611 GENERAL COMPLETION AT WORK SITE
SECTION VI
POLE REMOVAL

600 POLE REMOVAL
Pole removal requires competent and safe workers, equipment maintained in good condition and job planning.

601 VEHICLE SET UP
Refer to Section 405, Vehicle Set Up.

602 TRAILERS AND PERMIT REQUIREMENTS
Refer to Section 304, Pole Trailer Permits and Section 305, Pole Trailer Requirements.

603 HOLD-OFF PROTECTION
IHSA recommends that the person in charge of the work obtain hold-off protection on any line(s) that may be contacted inadvertently during the removal of a pole, before any work begins.

604 PROTECTIVE EQUIPMENT
Use appropriate protective equipment when removing poles in proximity to energized apparatus. Refer to Section 509, Conductor and Pole Guards.

605 TRUCK GROUNDS
When removing poles in proximity to overhead conductors [within 3 m (10 ft.)] the hoisting device must be grounded – preferably to the system neutral. Refer to Figure #26.
606 PERSONAL PROTECTIVE EQUIPMENT
When handling poles or winch lines during removal of poles in proximity to energized line apparatus, crew members shall wear the appropriate rubber gloves and recommended personal protective equipment.

607 POLE JACKS
When removing poles, IHSA recommends using a pole jack in conjunction with the boom.

First, place the base plate on firm, level ground. If the ground is soft, use an object such as an outrigger foot pad to increase the ground load area. Now place the pole puller as close to and parallel with the pole as possible.

Place the large link over the forks at the top of the pole puller and wrap the chain once around the pole and chain plate. Keeping it snug, fit a link into the vertical slot at the top of the pole puller. The pole puller is now securely attached to the pole. (See Figure #43).

Connect the hose fittings to the pole puller and the auxiliary tool outlets. Attach the derrick winch line to the pole and position the boom tip flanges to guide the pole. The pole puller is now ready for operation.

Open the auxiliary tool handle slowly, to "set" the chain or chain plate into the pole and to compress the ground below the base plate. Now operate the pole puller at the appropriate speed.

Figure #43
After the pole puller has been cycled once and the pole has broken free of the hole, lift the pole out of the hole using the boom – not the winch line.

If the pole does not lift out easily, recycle the pole puller after repositioning the chain with the pole puller in its retracted position.

If a pole jack is not available, attach the boom to the pole to be removed and try to lift with the main boom lift cylinder.

**NOTE:** If a radial boom in good condition cannot lift a load hydraulically, it has reached its design capacity at that elevation or radius.

If the main boom lift cylinder will not raise the pole, the operator can dig beside the pole to be removed. The main boom will bypass at about 340 kg (750 lbs.) side pull, thus not damaging the pole to be removed or the boom rotation when setting up the vehicle to remove the pole with a pole jack.

Refer to date nail and pole stamp/ID tag to determine the depth of the pole below ground level. For example, if the pole depth is 1.8 m (6 ft.), set the boom and winch as shown in Figure #44.

**Figure #44**
Attach an approved sling and the winch line above the balance point.

When the operator raises the pole with the jack, the winch line should be taken up at the same time, so as not to damage the boom. When the pole breaks free of the ground, a rope line can be attached to the pole butt to control the pole.

608 REMOVAL PROCEDURE OF WOOD, CONCRETE AND STEEL POLES

1. Establish work area protection for traffic and pedestrian control, including a documented traffic protection plan.
2. Obtain the appropriate hold-off protection (where applicable).
3. Conduct and document a tailboard talk.
4. Establish proper vehicle stability and lifting load capacity.
5. Install the truck grounds to the system neutral (aerial or down ground).
6. Install sufficient rubber/fibre cover-up on the secondary and primary conductor. (Consider the movement of the pole and boom from start to finish.)
7. Relocate the conductor for better clearance, using a bucket truck and either approved temporary conductor supports or a jib on the aerial device.
8. Install the appropriate pole guard on the pole to be removed.
9. Any personnel who handle the pole at any time must wear the appropriate gloves.
10. Install the appropriately-rated sling for removing the pole.
11. Install the hydraulic pole puller on the pole.
12. Appoint a designated observer during the pole removal.
13. Using care and control, remove the pole.
14. Lower the pole to the ground.
15. Load and secure the pole onto the pole trailer.
16. Stow the boom onto the RBD.
17. Restore the work area to its original condition and transport the pole to the pole yard.

609  LOADING POLES
If a pole cannot be loaded on balance, reposition the truck. (See Figure #45).

*Figure #45*
After the pole has been removed and is ready to be loaded onto a pole trailer, certain requirements must be met. Refer to Section 401, Loading Requirements for Poles, Section 304, Pole Trailer Permits and Section 305, Pole Trailer Requirements.

1. Poles should be picked up on balance for loading.
2. Use approved pole tongs or nylon slings. Refer to Section 406, Control of Poles.
3. Workers should stay out of the danger zones, as shown in Figure #46.

![Figure #46](image)

5. When more than one pole is loaded onto a pole trailer or pole bunks, or to stabilize a pole to remove a winch line, nylon sling or pole tongs, use a cant hook.

6. Concrete or steel poles should be set on pole blocks to control them while the nylon sling or winch line is removed.
610 RESTORATION
Once the pole has been removed, fill the hole. Refer to Section 512, Pole Installation, Tamper Operation and Section 515, Back Fill.

1. When work has been completed, remove all waste materials, such as excess soil or old poles, and leave the area tidy. Arrange for further cleanup and sodding, if necessary.

2. Report any abnormal conditions, such as damage to a customer's property, to your immediate supervisor.

3. Any gates, chains or cables should be returned to their original state when leaving private property.

611 GENERAL COMPLETION AT WORK SITE
Once the pole has been removed and loaded and the hole has been back filled:

1. Remove cover-up, if required.

2. Surrender hold-off, if required.

3. Remove grounds, if required.

4. Restore power, if required.

5. Check the area before leaving for tools and equipment to ensure the work area is left clean and safe.
Available Safe Practice Guides

- Bare Hand Live Line Techniques
- Conductor Stringing
- Entry and Work in a Confined Space
- Excavating with Hydrovacs in the Vicinity of Underground Electrical Plant
- High Voltage Rubber Techniques up to 36 kV
- Hydraulics
- Ladder Safety
- Line Clearing Operations
- Live Line Tool Techniques
- Low Voltage Applications
- Pole Handling
- Ropes, Rigging and Slinging Hardware
- Temporary Grounding and Bonding Techniques
- Underground Electrical Systems