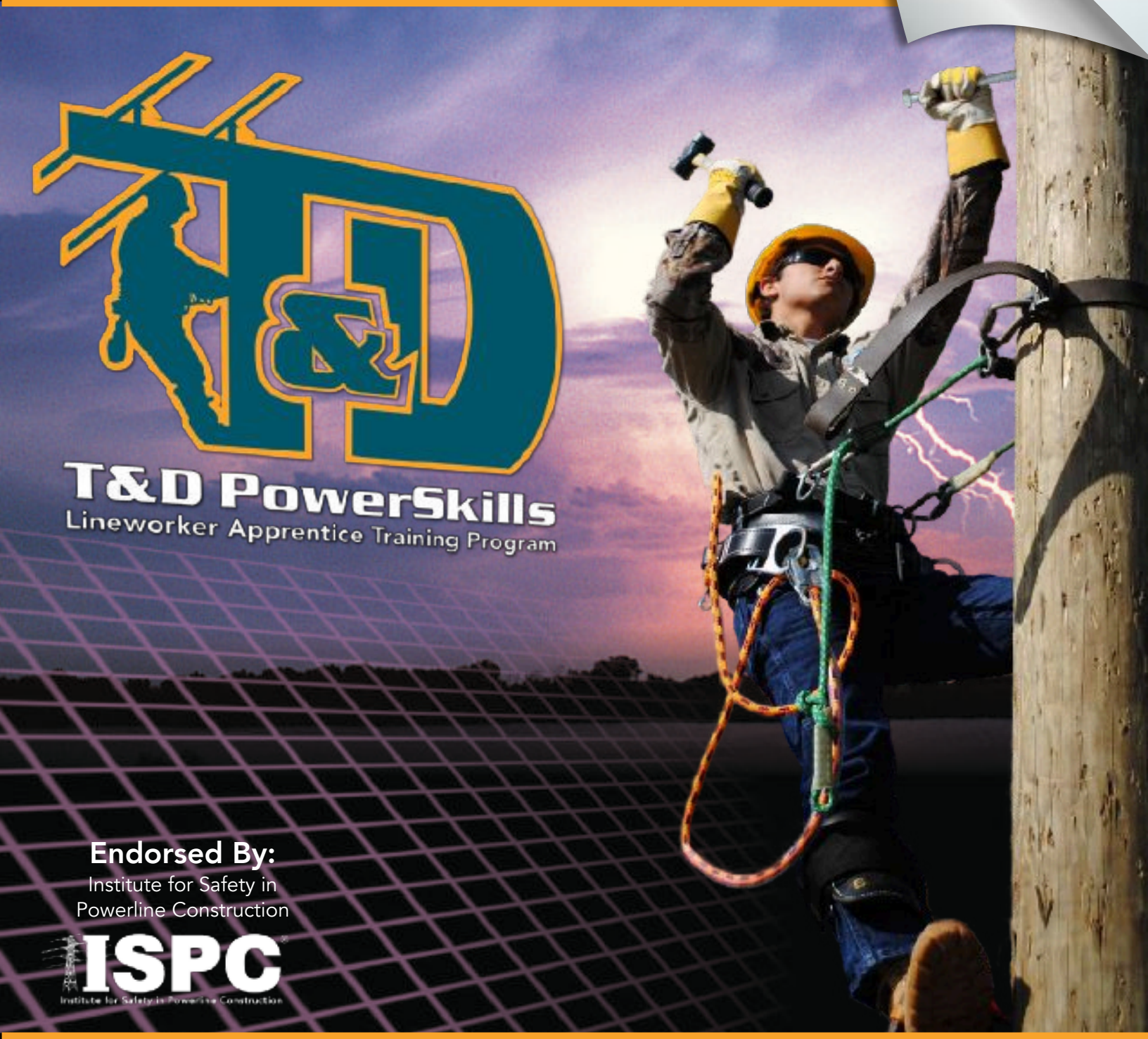
Maintenance Basics

Hydraulic Derricks

Includes:
OSHA Regulations Snapshots
& Field Performance Review



T&D POWER® SKILLS

Lineworker Apprentice Training Program

HYDRAULIC DERRICKS

3504 Parliament Ct.

Alexandria, LA 71303

866-880-1380

http://www.tdpowerskills.com

Revised on Friday, April 3, 2020

GENERAL GUIDELINES

The Safety in Transmission and Distribution Maintenance training unit is composed of a video and associated Student Manual. The DVD contains one Course. The Course is divided into Lessons, where each Lesson consists of a number of Topics. The number of Lessons and Topics will vary with each course.

RECOMMENDED SEQUENCE OF INSTRUCTION

1. After the instructor's introductory remarks, read the segment objectives found in the block at the beginning of the first segment.
2. Briefly discuss the segment objectives with the instructor and other class members.
3. View the first segment of the video.
4. Read the text segment that corresponds to the first segment of the video.
5. Answer the questions at the end of the text segment. Check your answers with the correct answers provided by the instructor.
6. Participate in a class discussion of the material just covered. Ask any questions you might have concerning the material in the video and the text, and note any additional information given by the instructor.
7. Before proceeding, be sure you understand the concepts presented in this segment.
8. Work through all segments in this manner.
9. A Final Test covering all the material will be administered by the instructor upon completion of the unit.
10. Additional instruction and testing may be provided, at the instructor's discretion.

This T&D PowerSkills training workbook is designed to be used in conjunction with the associated training DVD/video.

OSHA Regulations Snapshot

OSHA Regulations, primarily in 1926.Subpart V, 1910.269 and 1910.268 will be used in conjunction with this training unit. Where applicable, regulations will be highlighted and placed in a box like this.

Regulations are used that are in force at the time of the workbook printing. Instructors and students are expected to review the current OSHA Regulations to familiarize the student with the safety requirements expected by USDOL OSHA, specifically as they relate to the topic being discussed. This information is an important part of this training unit.

FIELD PERFORMANCE REQUIREMENTS

Name: _____ Employee #: _____ Complete ❑ Incomplete ❑

Section: **MAINTENANCE BASICS**

UNIT: **Hydraulic Derricks**

VG	=	Very Good
ACC	=	Acceptable
NI	=	Needs Improvement
NA	=	Not able to Complete on this Crew

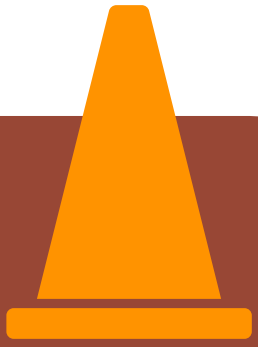
REQUIREMENTS	SUPERVISOR SIGN-OFF			
	VG	ACC	NI	NA
SEGMENT 1 - DIGGER DERRICKS				
1.1 Can identify and describe the major working parts of a typical digger derrick	❑	❑	❑	❑
1.2 Can identify and describe the function of the controls of a typical digger derrick	❑	❑	❑	❑
1.3 Can describe the personnel and equipment safety considerations when operating a digger derrick	❑	❑	❑	❑
1.4 Can read a 'lift capacity chart' and 'boom angle indicator'	❑	❑	❑	❑
SEGMENT 2 - DIGGER DERRICK OPERATION				
2.1 Can describe the factors to be considered when positioning a digger derrick truck at a job site	❑	❑	❑	❑
2.2 Can demonstrate how a digger derrick is safely set up, in preparation for digging a hole	❑	❑	❑	❑
2.3 Can demonstrate how to use a digger derrick to safely install a utility pole	❑	❑	❑	❑
SEGMENT 3 - MINI-DERRICKS				
3.1 Can describe appropriate situations for using a mini-derrick	❑	❑	❑	❑
APPENDIX				
Can conduct a DOT approved pre-trip inspection on a truck and trailer	❑	❑	❑	❑

_____ _____ _____

Apprentice's Signature Supervisor's Signature Date

NOTES:

OSHA Regulations Snapshot



1910.269 (a) (2)
Training.
(i) All employees performing work covered by this section shall be trained as follows:
(i)(A) Each employee shall be trained in and familiar with, the safety-related work practices, safety procedures, and other safety requirements in this section that pertain to their respective job assignments. (i)(B) Each employee shall also be trained in and familiar with any other safety practices, including applicable emergency procedures (such as pole top and manhole rescue), that are not specifically addressed by this section but that are related to his or her work and are necessary for his or her safety.
(i)(C) The degree of training shall be determined by the risk to the employee for the hazard involved.
(ii) Each qualified employee shall also be trained and competent in
(ii)(A) The skills and techniques necessary to distinguish exposed live parts from other parts of electric equipment,
(ii)(B) The skills and techniques necessary to determine the nominal voltage of exposed live parts,
(ii)(C) The minimum approach distances specified in this section corresponding to the voltages to which the qualified employee will be exposed, and the skills and techniques necessary to maintain those distances,
(ii)(D) The proper use of special precautionary techniques, personal protective equipment, insulating and shielding materials, and insulated tools for working on or near exposed energized parts of electric equipment, and
(ii)(E) The recognition of electrical hazards to which the employee may be exposed and the skills and techniques necessary to control or avoid these hazards.
Note to paragraph (a)(2)(ii) For the purposes of this section, a person must have the training required by paragraph (a)(2)(ii) of this section to be considered a qualified person.

SEGMENT 1: DIGGER DERRICKS

Many tools use hydraulic power to make a job that is difficult to do by hand easier. Some of the more common jobs on electrical systems involve lifting or digging. This training program covers one type of tool that has been designed to make lifting and digging jobs easier: hydraulic derricks. The major working parts, controls, and safe operating practices are described. Each piece of equipment is also shown performing a typical job.

Hydraulic derricks and digging equipment can vary in design and capabilities, depending on the manufacturer. The pieces of equipment used as examples in this unit are typical of those used in the field. However, for safety reasons, it is important to become familiar with the specific piece of equipment to be used before operating it on the job.

OSHA Regulations Snapshot

§1926.959(a)
General requirements.

1926.959(a)(1)
Other applicable requirements. Mechanical equipment shall be operated in accordance with applicable requirements in this part, including Subparts N, O, and CC of this part, except that § 1926.600(a)(6) does not apply to operations performed by qualified employees.

1926.959(a)(2)
Inspection before use. The critical safety components of mechanical elevating and rotating equipment shall receive a thorough visual inspection before use on each shift.
Note to paragraph (a)(2): Critical safety components of mechanical elevating and rotating equipment are components for which failure would result in free fall or free rotation of the boom.

1926.959(a)(3)
Operator. The operator of an electric line truck may not leave his or her position at the controls while a load is suspended, unless the employer can demonstrate that no employee (including the operator) is endangered.

A digger derrick is a truck-mounted, hydraulically operated piece of equipment designed to do two basic jobs: (1) lift heavy loads and (2) dig with an auger. This section covers the major working parts and controls of digger derricks.

OBJECTIVES

- Identify the major working parts of a typical digger derrick.
- Identify the controls of a digger derrick.
- List factors to be considered when operating a digger derrick.

1.1 MAJOR WORKING PARTS OF A DIGGER DERRICK

Because the two functions of a digger derrick, lifting and digging, are distinct from one another, the major parts of the digger derrick involved in performing each function are discussed separately.

1.2 THE DERRICK

FPR: Can identify and describe the major working parts of a typical digger derrick

The derrick is the part of a digger derrick that does the lifting. The derrick consists of a pedestal/turntable assembly, which is referred to in this program as the pedestal, and an extendable boom.

The pedestal is mounted on the truck body. The pedestal supports the boom and houses the motor that rotates the boom.

Digger derricks are often classified according to where on the truck body the pedestal is mounted. A digger derrick with the pedestal mounted at the back of the truck and the boom stored over the truck cab is known as a rear mount. A rear mounted digger derrick is illustrated in Figure 1–1. The digger derrick used as an example in this program is a rear mount.

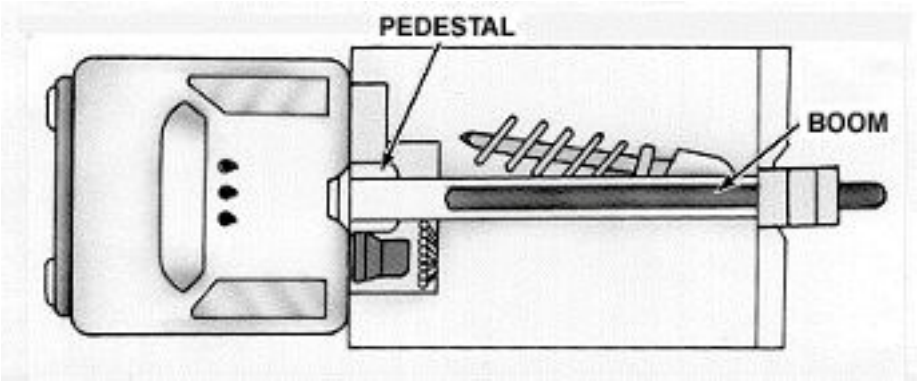
Figure 1-1

Rear mounted digger derrick

A digger derrick with the pedestal mounted directly behind the truck cab and the boom stored over the back of the truck is known as a center mount. A center mount digger derrick is illustrated in Figure 1–2.

Figure 1-2

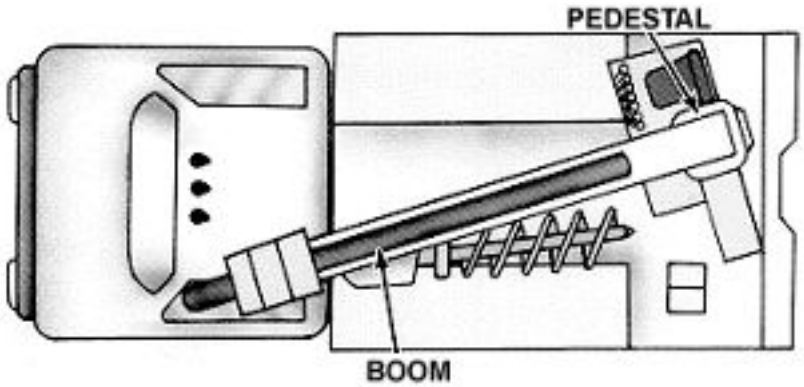
Center mount digger derrick



A digger derrick with the pedestal mounted at the rear of the truck, similar to a rear mount but off-center over one corner of the truck, is known as a corner mount. A corner mount digger derrick is illustrated in Figure 1–3.

Figure 1-3

Corner mount digger derrick



The extendable boom is attached to the pedestal. The boom is typically made in several sections, which allow it to be extended or retracted. The boom can also be raised, lowered, and swung around in a circle. This flexibility allows the tip of the boom to be positioned anywhere within a wide area around the truck.

Pole grabbers (Figure 1–4) are often mounted at the tip of the boom. Pole grabbers are hydraulically operated jaws, which can be used to guide a pole and stabilize it in position as it is being set. Pole grabbers can be opened and closed, and, on some trucks, tilted up and down.

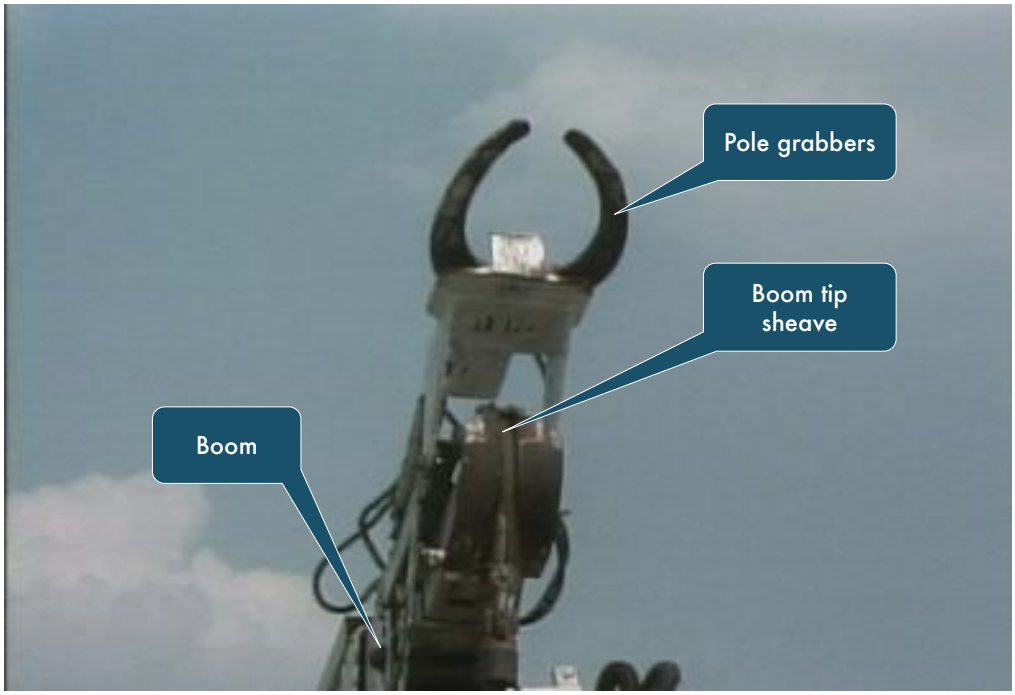


Figure 1-4

Pole grabbers

Also located on the derrick is a winch, which is a powered reel device used with a winch line for lifting. The winch can be mounted on the pedestal, or it can be mounted at the tip of the boom. If the winch is pedestal-mounted, a boom tip sheave is used at the tip of the boom to guide the winch line.

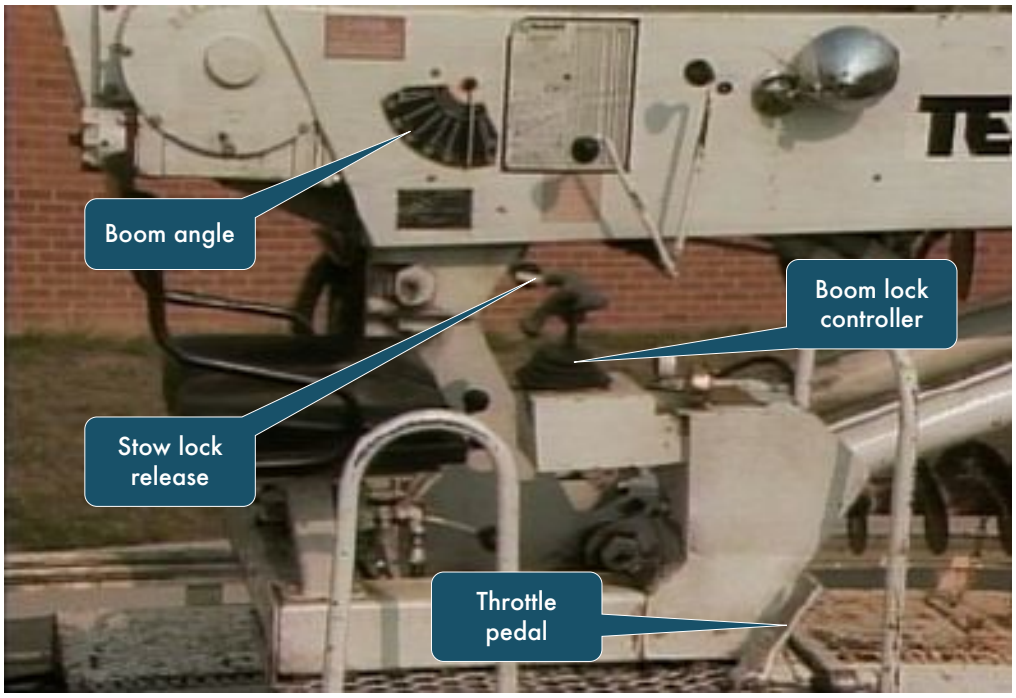
1.3 CONTROLS OF A DIGGER DERRICK

FPR: Can identify and describe the function of the controls of a typical digger derrick

The controls of a digger derrick (Figure 1–5) are mounted on the pedestal. The truck used as an example in this program has several control levers and one multi-purpose boom control. Pushing a lever in one direction performs one function, and pulling the lever in the opposite direction performs the opposite of that function. The multi-purpose boom control can be moved in several different directions to move the boom up or down, extend or retract the boom, or rotate the pedestal to the left or right. The farther any control is moved from the central, or neutral, position, the faster the function it controls is performed.

Figure 1-5

Digger derrick controls



A throttle pedal, located on the pedestal, controls the speed of the truck's engine, which powers the hydraulic system. When the speed of the engine is increased, the power to the hydraulic system is increased.

A dump valve is located within reach of the operator. If one of the controls sticks, the operator can use the dump valve to temporarily stop hydraulic action. When the problem causing the stuck control is corrected, the operator returns the dump valve to its original position to restore hydraulic power.

Outrigger controls are located at the back of the truck used as an example in this program. They control the operation of the outriggers, which are a pair of hydraulically operated arms that can be extended out from the sides of the truck to the ground to help stabilize the entire unit. The outriggers on both sides of the truck should be lowered onto outrigger pads, or cribbing blocks, to stabilize and level the truck while in view of the operator. Please note that it is an industry best practice to always use outrigger pads under the outriggers.

OSHA Regulations Snapshot

1926.959(b)(1) Outriggers
Extend outriggers. Mobile equipment, if provided with outriggers, shall be operated with the outriggers extended and firmly set, except as provided in paragraph (b)(3) of this section.

1926.959(b)(2)
Clear view. Outriggers may not be extended or retracted outside of the clear view of the operator unless all employees are outside the range of possible equipment motion.

1926.959(b)(3)
Operation without outriggers. If the work area or the terrain precludes the use of outriggers, the equipment may be operated only within its maximum load ratings specified by the equipment manufacturer for the particular configuration of the equipment without outriggers.

1.4 THE DIGGER

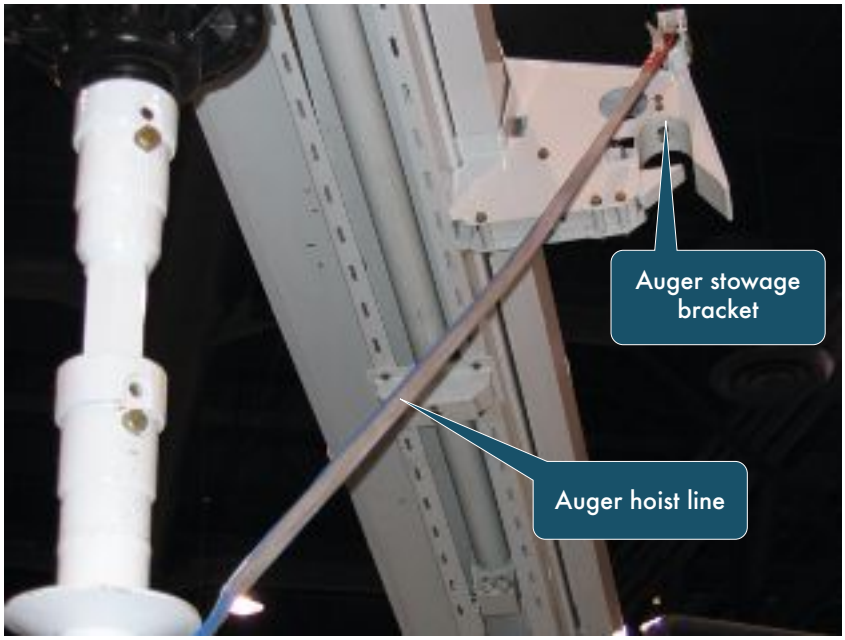
The digger is the part of a digger derrick that does the actual digging. The digger mechanism is a hydraulically operated motor that drives the auger. It is attached to the boom by the digger hanger bracket.

The auger, which resembles a large drill bit, is the hole-boring tool of the digger. The auger is connected to the shaft of the digger mechanism by a large pin. Augers are made in various sizes for different types of jobs. One auger may be used for utility pole installation, for example, and another for anchor installation. Augers are changed by removing the pin and slipping the auger off the shaft of the digger mechanism.

When the auger is not in use, the entire digger assembly is stowed on the auger stowage bracket. A stow lock release hydraulically locks and releases the stow lock pin, allowing the auger to be held in place on the auger stowage bracket or lowered for use. The auger hoist line is attached to a hook on the upper end of the auger. When the auger is rotated slowly, it winds up into its stowed position. The digger is held in place on the stowage bracket by a hydraulically operated stow lock pin. Figure 1–6 shows an auger in the process of being stowed on the stowage bracket. Some digger derricks also have a mechanical pin, which is manually inserted to further safeguard the assembly.

Figure 1-6

Auger stowage bracket



1.5 FACTORS TO CONSIDER WHEN OPERATING A DIGGER DERRICK

FPR: Can describe the personnel and equipment safety considerations when operating a digger derrick

Digger derricks are designed to perform certain lifting and digging jobs faster and more efficiently than they could be done by hand. However, to ensure that a digger derrick is set up to provide maximum safety and convenience for those working at the job site, several factors must be considered. Some specific considerations associated with lifting and digging are described in the following sections.

1.5.1 LIFTING WITH A DIGGER DERRICK

FPR: Can read a 'lift capacity chart' and 'boom angle indicator'

The maximum lift capacity of a digger derrick is the total weight that the derrick is capable of lifting safely under ideal conditions. The actual lift capacity depends on three factors: (1) the stability of the truck and the surface it is on; (2) the structural strength of the derrick; and (3) the power of the hydraulic system.

OSHA Regulations Snapshot

1910.269
Electric power generation, transmission, and distribution
a) General.
(1) Application.
(i) This section covers the operation and maintenance of electric power generation, control, transformation, transmission, and distribution lines and equipment. These provisions apply to:
[A] Power generation, transmission, and distribution installations, including related equipment for the purpose of communication or metering, which are accessible only to qualified employees.

1926.950 subpart "V"
General requirements
(a) Application. The occupational safety and health standards contained in this Subpart V shall apply to the construction of electric transmission and distribution lines and equipment.

A digger derrick may not be able to lift its maximum lift capacity with the boom in some positions. The ability of a digger derrick to lift an object that is within its maximum lift capacity depends on two interrelated factors: (1) the hook radius, and (2) the sheave height. As shown in Figure 1–7, the hook radius is the distance from the center of the pedestal to the boom tip sheave, measured in a line parallel to the ground. The hook radius can change when the boom is extended, retracted, raised, or lowered.

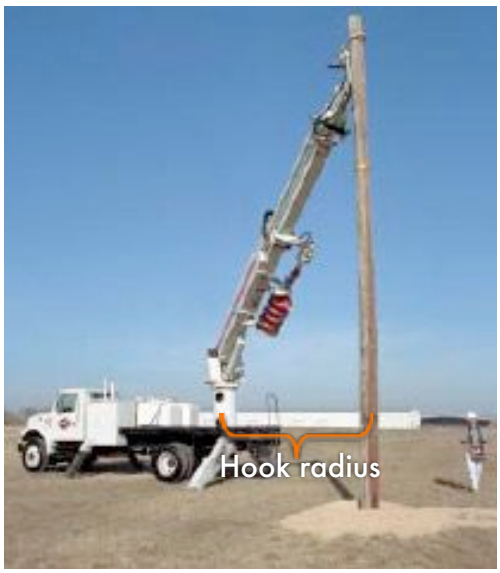


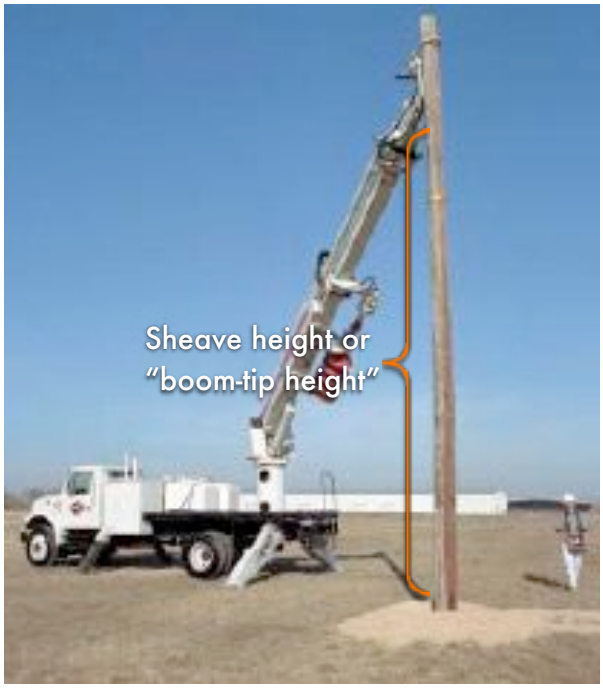
Figure 1-7

Hook radius

The sheave height (Figure 1–8) is the distance from the boom tip sheave straight down to the ground. As with the hook radius, the sheave height can change when the boom is extended, retracted, raised, or lowered.

Figure 1-8

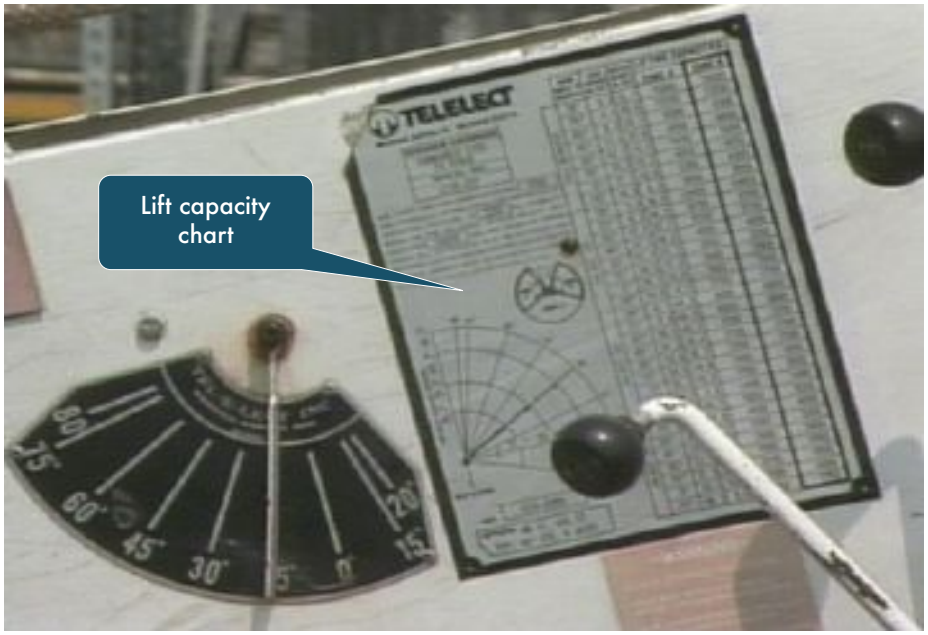
Sheave or "boom-tip" height



If the sheave (boom-tip) height does not change, increasing the hook radius decreases the lifting ability of the derrick. However, if the hook radius does not change, increasing the sheave height can increase the derrick's lifting ability. To help operators keep these considerations in mind, most digger derricks have a lift capacity chart (Figure 1–9) near the controls. The chart indicates the lift capacity of the derrick with the boom in various positions.

Figure 1-9

Lift capacity chart



A boom angle indicator (Figure 1–10) is often mounted on the side of the boom. The boom angle indicator is a free-swinging device that indicates the angle to which the boom has been raised.

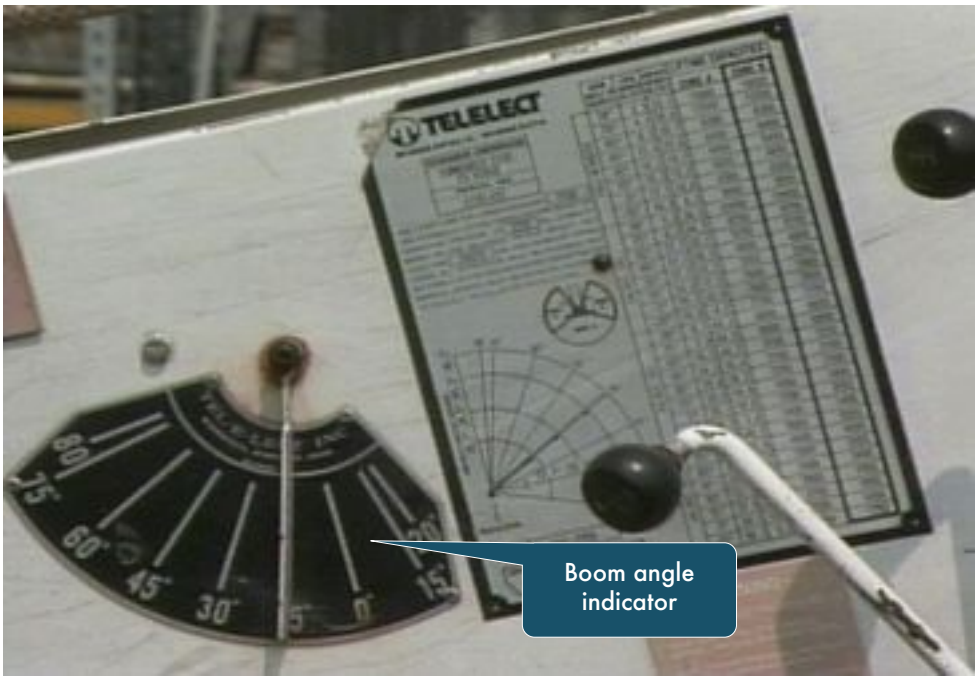


Figure 1-10

Boom angle indicator

Most companies have established safety policies regarding the lifting of loads with a digger derrick. It is important to follow these policies and to be aware of a specific truck's limitations whenever a digger derrick is used for lifting.

1.5.2 DIGGING WITH A DIGGER DERRICK

The way a digger is operated is different for different types of ground surfaces. In soft ground, for example, a light downward pressure from the boom and a fast digging speed are used. Rocky ground generally requires heavier pressure and a slower digging speed. Regardless of the type of ground, the auger should not be allowed to catch in the ground and pull the boom down. This condition is known as corkscrewing. If corkscrewing occurs, reversing the digger rotation and moving the boom up will free the auger.

To avoid serious injury, personnel should never be allowed in the digger path when the digger mechanism is being lowered or stowed. Personnel should also stay out from under the boom. As with any digging operation, underground utilities should always be located according to company procedures before breaking ground with a digger derrick.

Figure 1-11

Personnel too close to boom during operation

SECTION QUIZ

1-1. **Circle the correct answer to complete the sentence.**
A digger derrick with the pedestal at the back of the truck and the boom stored over the truck cab is known as a _____.

a) rear mount
b) side mount
c) front mount
d) corner mount

1-2. **Circle the correct answer to complete the sentence.**
The hole-boring tool of a digger derrick is called a(n) _____.

a) bore-holer
b) digger borer
c) auger
d) steager

1-3. **Circle the correct answer to complete the sentence.**
The dump valve is used to _____.

a) dump the valve if it gets stuck
b) temporarily stop the hydraulic system
c) store the auger
d) raise the outriggers

1-4. **Circle the correct answer to complete the sentence.**
The term hook radius refers to the distance from _____.

a) pedestal to front bumper
b) rear of truck to boom sheave height
c) the ground to the boom tip sheave
d) pedestal to boom tip sheave

1-5. **Circle the correct answer to complete the sentence.**
The term sheave height refers to the distance from _____.

a) boom tip height to earth
b) boom tip height to the back of the truck
c) boom tip height to the pedestal
d) boom tip height to the operator

1-6. **Circle the correct answer.**
Which of the following are factors in the actual lift capacity of a digger derrick?

a) The stability of the truck and the surface it is on
b) The structural strength of the derrick
c) The power of the hydraulic system.
d) All the above
e) Only b and c

SEGMENT 2: DIGGER DERRICK OPERATION

This section introduces some of the factors that should be considered in positioning and using a digger derrick at a job site. The use of a digger derrick is described in terms of general procedures for digging a hole and setting a utility pole. Always, the first order of business before taking the digger truck out for the day is to do a thorough pre-trip inspection. The Appendix of this manual describes the steps to be taken to inspect the typical digger truck. Second, note the location of underground utilities in the area you will be working. See page 41 for the Uniform Color Codes for marking underground utilities.

OBJECTIVES

- List factors to be considered when positioning a digger derrick at a job site.
- Describe how a digger derrick is used to dig a hole.
- Describe how a digger derrick is used to install a utility pole.

OSHA Regulations Snapshot

1926.651

(a) Surface encumbrances. All surface encumbrances that are located so as to create a hazard to employees shall be removed or supported, as necessary to safeguard employees.

(b) Underground installations.

1. The estimated location of utility installations, such as sewer, telephone, fuel, electric, water lines, or any other underground installations that reasonably may be expected to be encountered during excavation work, shall be determined prior to opening an excavation.
2. Utility companies or owners shall be contacted within established or customary local response times, advised of the proposed work, and asked to establish the location of the utility underground installations prior to the start of actual excavation. When utility companies or owners cannot respond to a request to locate underground utility installations within 24 hours (unless a longer period is required by state or local law), or cannot establish the exact location of these installations the employer may proceed, provided the employer does so with caution, and provided detection equipmen5 or other acceptable means to locate utility installations are used.
3. When excavation operations approach the estimated location of underground installations, the exact location of the installations shall be determined by safe and acceptable means.
4. While the excavation is open, underground installations shall be protected, supported or removed as necessary to safeguard employees.

2.1 POSITIONING THE TRUCK

CAUTION! Ensure that the boom has clearance between energized lines and equipment prior to moving the boom out of the cradle and placing it in position. LOOK UP.

FPR: Can describe the factors to be considered when positioning a digger derrick truck at a job site

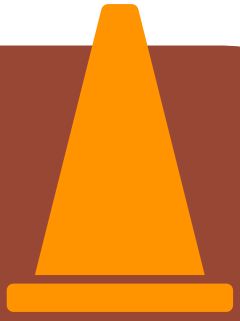
The first step in using a digger derrick on the job is to plan the job. Planning the job includes positioning the truck properly at the work area. Uneven surfaces can limit the lifting ability of the derrick, so the truck should be parked on as level a surface as possible. The truck should also be positioned so that the hole can be dug off the back of the truck. In this position, the operator has the greatest visibility. The truck should be positioned so that it does not have to be moved during the job unless the weight or length of the pole makes repositioning necessary.

Most companies have specific operating procedures designed to ensure the safety of the people working around heavy equipment. For example, when work areas are located near public roads, traffic may have to be diverted around equipment or personnel. In such cases, the work area should be clearly marked and properly coned off before work begins.

NOTE: In accordance with the M.U.T.C.D. (Manual of Uniform Traffic Control Devices) or state and local traffic control standards.

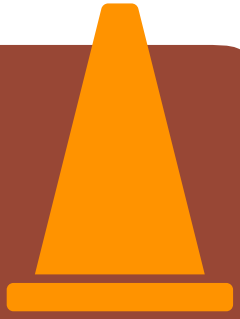
With the truck positioned properly and the work area marked and coned off, the next step is to engage the power take-off, which transfers power from the truck's engine to the derrick and the digger. Then, the outriggers are lowered to stabilize and level the truck. Many companies' policies require that the outriggers be lowered onto wooden or metal blocks known as cribbing blocks. These blocks protect the work surface from damage and distribute the pressure of the outrigger over a wider area.

OSHA Regulations Snapshot



1926.201 (a) Flaggers.
Signaling by flaggers and the use of flaggers, including warning garments worn by flaggers shall conform to Part VI of the Manual on Uniform Traffic Control Devices, (1988 Edition, Revision 3 or the Millennium Edition), which are incorporated by reference in §1926.6.

OSHA Regulations Snapshot



1926.959(d)(3)
Extra precautions. If, during operation of the mechanical equipment, that equipment could become energized, the operation also shall comply with at least one of paragraphs (d)(3)(i) through (d)(3)(iii) of this section.
(i) The energized lines or equipment exposed to contact shall be covered with insulating protective material that will withstand the type of contact that could be made during the operation.
(ii) The mechanical equipment shall be insulated for the voltage involved. The mechanical equipment shall be positioned so that its uninsulated portions cannot approach the energized lines or equipment any closer than the minimum approach distances, established by the employer under § 1926.960(c)(1)(i).
(iii) Each employee shall be protected from hazards that could arise from mechanical equipment contact with energized lines or equipment. The measures used shall ensure that employees will not be exposed to hazardous differences in electric potential. Unless the employer can demonstrate that the methods in use protect each employee from the hazards that could arise if the mechanical equipment contacts the energized line or equipment, the measures used shall include all of the following techniques:

1926.959(d)(3)(iii)(A)
Using the best available ground to minimize the time the lines or electric equipment remain energized,

1926.959(d)(3)(iii)(B)
Bonding mechanical equipment together to minimize potential differences,

1926.959(d)(3)(iii)(C)
Providing ground mats to extend areas of equipotential, and

1926.959(d)(3)(iii)(D)
Employing insulating protective equipment or barricades to guard against any remaining hazardous electrical potential differences.

Note to paragraph (d)(3)(iii): Appendix C to this subpart contains information on hazardous step and touch potentials and on methods of protecting employees from hazards resulting from such potentials.

2.2 DIGGING THE HOLE

FPR: Can demonstrate how a digger derrick is safely set up, in preparation for digging a hole

Before any actual digging is done, the controls of the digger derrick should be tested to make sure that they are operating correctly. The first step in beginning a dig is to lower the auger.

NOTE: The auger stow line should be examined for damage prior to placing the weight of the average auger on it.

A typical procedure for lowering the auger is as follows:

1. Raise the boom to about a 45 degree angle.
2. Rotate the pedestal until the boom extends over the side of the truck so that the auger will clear the truck body as it is lowered.
3. If the winch is mounted on the pedestal, make sure that the winch line has enough slack so that it will not be a restriction when the boom is extended. (This is not a concern if the winch is mounted on the boom tip.)
4. Make sure that the boom is fully retracted so that the digger will engage properly with the extendable section of the boom when it is lowered.
5. Remove the manual locking pin from the auger stowage bracket, if applicable.
6. After making sure that all ground personnel are out of the way, rotate the digger counterclockwise just enough to take the strain off the digger stow lock.
7. Open the stow lock.
8. Slowly rotate the digger clockwise to lower the auger by unwinding it on its hoist line.
9. Slip the auger hoist rope off the auger hook.

After the auger has been lowered, the boom controls are used to position the auger over the location of the hole. Generally, a crew member on the ground guides the digger derrick operator, using hand signals that their company has established. When the auger is positioned over the hole, the person on the ground checks to make sure that the auger is straight up and down.

To dig the hole, the digger is rotated clockwise while a slight down-pressure is applied by the boom. Typically, the hole is dug down a few feet, and then the auger is raised to be cleaned. The auger can either be cleaned with a shovel or rotated counterclockwise to spin the dirt off. Figure 2–1 shows men on the ground cleaning the auger, **after the operator has disengaged the mechanism, allowing personnel to safely approach.**

Figure 2-1

Cleaning the auger

The hole is typically dug in increments of a few feet at a time until the necessary depth has been reached. As the hole gets deeper, it may be necessary to extend the boom slightly in order to keep the auger straight up and down.

Although specific company policy may vary, there is a general rule of thumb regarding the depth of a hole used for a utility pole. In general, the hole should be 10 percent of the length of the pole, plus 2 feet. Thus, for example, a pole 40 feet long would require a hole 4 feet (which is 10% of 40) plus 2 feet deep, or a total of 6 feet deep.

After the hole has been dug to the required depth, the auger is stowed. This is typically done according to the following steps:

1. Rotate the boom so that it extends over the side of the truck.
2. Make sure that the boom is fully retracted.
3. Hook the auger hoist rope to the auger hook.

4. Slowly rotate the digger counterclockwise to wind the auger up on the hoist rope. It may be necessary to raise the boom slightly to keep the rope in place as it winds up.
5. When the digger is in position on the stowage bracket, lock it in place with the stow lock.
6. Replace the manual locking pin into the auger stowage bracket, if applicable.

2.3 SETTING THE POLE

FPR: Can demonstrate how to use a digger derrick to safely install a utility pole

When the hole has been dug, and the auger stowed, the next step is to set the pole in the ground. Often, when a pole is delivered to the work site, it is laid on the ground near the location of the hole. It may happen, however, that the crew setting the pole must first remove it from the pole trailer. To avoid possible damage to the pole, this should be done according to the following steps:

1. Position the boom so that the winch line is aligned with the pole.
2. Attach tongs (or other holding device) to the pole about 5 or 6 feet from the butt (large) end of the pole. (In this demonstration, tongs are used.) Attach the winch line to the tongs.
3. Raise the winch line to lift the pole 2 or 3 feet off the trailer.
4. Swing the boom towards the hole, being careful not to take the pole completely off the trailer, so that the pole does not accidentally fall to the ground.
5. Slowly lower the butt end of the pole to the ground by lowering the winch line. (The top end of the pole should still be on the trailer.)

Setting the pole requires lifting it at or near its balance point. If the procedure begins with the pole on the trailer, the lifting can be done with the pole part-way off the trailer (the butt end on the ground and the top on the trailer). If the pole was delivered to the site in advance and left on the ground, it may be some distance from the location of the hole. In this case, the pole must be moved closer to the hole before it can be lifted properly by the derrick.

This is accomplished by attaching the tongs to the pole a few feet from the end nearer the hole, and then dragging the pole along the ground with the winch line (Figure 2–2).

Figure 2-2

Dragging the pole

Dragging the pole is best done by pointing the boom straight at the pole, and winching in until the pole is close enough to the hole. This method exerts the least amount of side, or skid load on the boom. However, if the position of the pole makes it necessary to handle a skid load, the pedestal rotation motor should be used to move the load first, before the winch is used.

When the pole is close enough to the hole to be lifted safely, the tongs are set at the balance point. Often, the balance point of the pole will have already been marked. If not, it can be approximated by lifting the pole a foot or so off the ground with the tongs at a likely point (usually just below half-way). If the pole does not balance, it should be set down, and the tongs moved. This process is repeated until the balance point is found. With experience, it is often possible to approximate the balance point by sight alone.

Once the balance point is found and marked, the pole can be set according to the following steps:

1. Lift the pole at the balance point using the winch line.
2. Rotate the boom until the balance point of the pole is over the hole.
3. Position the steel choker just above the balance point, as shown in Figure 2–3.
   NOTE: This makes the pole slightly bottom heavy.

Figure 2-3

Steel choker positioned on pole

4. Lower the pole to the ground; remove the winch line from the tongs; and attach the winch line to the choker. Then, remove the tongs from the pole.
5. Open the pole grabber jaws.
6. Slowly raise the pole with the winch line, and maneuver the pole to a vertical position. When the pole is vertical, the bottom of the pole should be directly over the hole. The pole grabbers are used to stabilize and maintain control of the pole.
7. Slowly lower the winch line, and guide the butt end of the pole into the hole. Figure 2–4 shows the pole being lowered into the hole.

Figure 2-4

Lowering the pole into the hole

8. After making sure the pole is straight up and down, replace the dirt and tamp it down.
9. Remove the choker and detach the winch line.

2.4 FACTORS TO CONSIDER WHEN OPERATING A DIGGER DERRICK

Most companies have established procedures designed to ensure the safety of the people working around digger derricks. It is important to be thoroughly familiar with these safety procedures before operating a digger derrick. In addition, whenever digging is done, it is important to follow local procedures for locating underground utility lines before beginning to dig.

SECTION QUIZ

2-1. **Circle the correct answer to complete the sentence.**
Before starting a job that involves the use of a digger derrick, the first step taken by the crew should be to _____.

a) wax the insulated boom
b) start digging the hole with a shovel
c) plan the entire job
d) contact the dispatcher

2-2. **True or False.** A digger derrick should be positioned so that the hole can be dug off of the back of the truck.

2-3. **True or False.** The boom on a digger derrick should be fully extended before the auger is lowered.

2-4. **Circle the correct answer to complete the sentence.**
Setting a pole requires lifting it at or near its _____.

a) butt
b) top
c) center
d) balance point

2-5. **Circle the correct answer.**
Which of the following is NOT part of the procedure for setting a pole?

a) Attaching the winch line to a choker
b) Winding the auger up on the hoist rope
c) Maneuvering the top of the pole into the pole grabbers
d) Lifting the pole with the tongs
e) Approximating the balance point

SEGMENT 3: MINI DERRICKS

OBJECTIVES

- Define the term "distribution system" as it relates to this training unit.
- List the basic components that make up a distribution system.
- Explain the basic difference between primary distribution voltage and secondary distribution voltage.

3.1 OVERVIEW

FPR: Can describe appropriate situations for using a mini-derrick

A digger derrick may also be mounted on a smaller, portable machine that can maneuver into sites inaccessible to truck-mounted digger derricks is called a mini-derrick. This is sometimes referred to as an 'easement derrick' or a 'back-yard machine.' These machines can be used to haul equipment, dig holes, set poles, and, in some cases, support a bucket for personnel aerial lift. They are small, may be tracked or on wheels and some units may have features that include a remote control device. Figure 3–1 illustrates a Mini-Derrick being driven through a back yard fence gate using a cabled remote control device to guide it.

Figure 3-1

Mini derrick being maneuvered through a fence gate

In cases where it may be necessary to dig a hole and set a pole in an area that is inaccessible to a truck mounted digger derrick or other truck-mounted digging equipment, a smaller mini-derrick may be used.

The mini derrick has a diesel engine on one end and a boom and digger mechanism on the other end. The auger is stowed in a locked position during transport and unloading. The engine is used to power the unit so that it can be moved to the location of the work and is also used to power the hydraulic system that operates the unit's boom and digging mechanism. The mini derrick is transported to the job site in a special hauling trailer. Figure 3–2 illustrates a worker unloading the mini derrick at the job site.

Figure 3-2

EZ hauler being unloaded from hauling trailer

3.2 TRANSPORTING MATERIALS TO THE JOB SITE

At worksites where the job involves setting or replacing a pole in a constrained environment, the pole itself may need to be transported some distance from the street where the pole trailer is parked. The mini derrick may be able to assist in moving the pole from the trailer to the site of installation.

Figure 3–3 shows an example of how the mini derrick can help move the pole to the installation point. In this case, the crew is transporting a pole to be installed at a new commercial site in a remote area. The mini derrick is maneuvered alongside the pole, and the outriggers on one side are lowered. The pole is rigged to the outriggers, and then lift the pole for transport. Additionally, the mini derrick has a storage area for transporting heavy pole-top equipment. As can be seen in Figure 3–3, a pole-top transformer and a wooden pole have been set on the unit to be hauled to the site.

Figure 3-3

Mini derrick transporting pole and equipment

The amount of space available to maneuver, especially through fence gates, will determine what the mini derrick can haul to the job site. In any case, these machines can be a tremendous labor-saver for crews doing rear-lot work or other digging operations in very tight situations. Hand digging and hand setting of poles can often be avoided. Productivity increases dramatically for crews equipped with this type of equipment.

3.3 DIGGING WITH THE MINI-DERRICK

In the video example, the crew unloaded the pole at the job site and was moved into position by the operator. The hydraulic outriggers were extended to provide stability for the unit during digging operations. Figure 3–4 shows the unit outriggers being extended to the ground on pads. Although the job site illustrated in this video does not feature overhead lines, it's important to note that when operating in an energized environment the mini derrick should be grounded per your company's policies prior to operating the equipment near energized lines. The rubber tracks and the rubber pads are not approved insulating devices. No one should approach the unit during operation without wearing rubber gloves rated for the maximum voltage present.

Figure 3-4

Unit hydraulic outriggers being extended

OSHA Regulations Snapshot

1910.269(p)(2)

(ii) Outriggers may not be extended or retracted outside of the clear view of the operator unless all employees are outside the range of possible equipment motion.

(iii) If the work area or the terrain precludes the use of outriggers, the equipment may be operated only within its maximum load ratings specified by the equipment manufacturer for the particular configuration of the equipment without outriggers.

The mini derrick's digging unit operates in a manner similar to that of a truck-mounted digger derrick. Once the unit is in position and stabilized, the workers unlatch the auger and lower it from its locked and stowed position on the boom. Figure 3–5 illustrates this process.

Figure 3-5

Auger being lowered into digging position

OSHA Regulations Snapshot

1910.269(q)
Overhead lines and live-line barehand work. This paragraph provides additional requirements for work performed on or near overhead lines and equipment and for live-line barehand work.

1910.269(q)(1)
General.

(i) Before allowing employees to subject elevated structures, such as poles or towers, to such stresses as climbing or the installation or removal of equipment may impose, the employer shall ascertain that the structures are capable of sustaining the additional or unbalanced stresses. If the pole or other structure cannot withstand the expected loads, the employer shall brace or otherwise support the pole or structure so as to prevent failure. **Note to paragraph (q)(1)(i):** Appendix D to this section contains test methods that employers can use in ascertaining whether a wood pole is capable of sustaining the forces imposed by an employee climbing the pole. This paragraph also requires the employer to ascertain that the pole can sustain all other forces imposed by the work employees will perform.

(ii) When a pole is set, moved, or removed near an exposed energized overhead conductor, the pole may not contact the conductor.

(iii) When a pole is set, moved, or removed near an exposed energized overhead conductor, the employer shall ensure that each employee wears electrical protective equipment or uses insulated devices when handling the pole and that no employee contacts the pole with uninsulated parts of his or her body.

The particular unit being demonstrated has a remote control feature that allows the operator to stand away from the machine to observe and direct the drilling operation closely. Figure 3–6 shows the digging operation underway and provides a close-up view of the remote control device.

Figure 3-6

Digging operation using cabled remote control

3.4 LIFTING WITH THE MINI-DERRICK

Once the digging operation has completed, the crew stows the auger back on the boom. After framing the pole on the ground, a hoist line is attached above the balance point of the pole in order to lift it into position. As the pole is raised, it maneuvers into a vertical position and is captured by the pole grabbers at the tip of the boom. This process is similar to the truck-mounted digger derrick, but operating it by remote control allows the operator to adjust his perspective to suit the changing conditions of the job.

Once the pole is in place and the dirt is backfilled around it, the transformer is ready to be lifted. The workers rig the transformer for hoisting by attaching a sling to the transformer. The sling is dropped around the lifting lugs of the transformer and secured in place.

A lineworker positions himself in an aerial bucket at the area where the transformer will be mounted. He knocks the mounting bolts into the pole to prevent the transformer from snagging on them as it is raised. The lineworker should then position the bucket so that he can guide the transformer into place over the mounting bolts.

Figure 3-7

Worker maneuvering the transformer lifted by the mini derrick

When the transformer reaches the top of the pole, above the mounting bolts, the lineworker signals to the mini-derrick operator to hold the transformer in place. The lineworker then knocks the bolts through the pole so that they project on the transformer side and gives the signal to lower the transformer. The mini-derrick operator lets out on the winch line to lower the transformer. As it is lowered, the lineworker guides it by hand until it settles over the bolts. The bolts are then fully tightened to ensure that the transformer is securely mounted on the pole.

As with any other digging operation, all safety precautions and PPE that apply to truck-mounted digger operations need to be applied when setting up and digging with the mini-derrick.

SECTION QUIZ

3-1. **Circle the correct answer to complete the following sentence.**
Mini-Derricks are often small enough to move through _____.

a) residential subdivisions
b) substation fences
c) customers' fence gates
d) tiny work spaces

3-2. **True or False.** A Mini-Derrick is too small to require the use of outriggers.

3-3. **True or False.** The auger on a Mini-Derrick should be fully stowed and locked during transport, loading and unloading.

3-4. **Circle the correct answer to complete the following sentence.**
Setting a pole, near energized conductors, using the Mini-Derrick requires that the equipment be properly _____ using your company's approved procedures.

a) grounded
b) insulated
c) balanced
d) qualified

3-5. **True or False.** Rubber gloves, for the maximum voltage present, must be used when operating a Mini-Derrick near energized conductors.

This page intentionally left blank.

APPENDIX A: GLOSSARY

This glossary contains terms pertinent to the study of hydraulic derricks. The meanings of the terms are given in that context.

Auger The hole-digging tool of a digger derrick; resembles a large drill bit.

Boom tip sheave A pulley located at the tip of the boom of many digger derricks; used for guiding the winch line.

Centermount digger derrick A digger derrick with the pedestal mounted directly behind the truck cab and the boom stored over the rear of the truck.

Corkscrewing A condition that occurs when the auger of a digger derrick catches in the ground while digging, pulling the boom down.

Cornermount digger derrick A digger derrick with the pedestal mounted at the rear of the truck, off-center over one corner of the truck.

Cribbing blocks Wooden or metal blocks placed under outriggers to protect work surfaces from damage, and to distribute the pressure of the outriggers over a wider area.

Derrick The part of a digger derrick that does the lifting; consists of a pedestal/turntable assembly and an extendable boom.

Digger The part of a digger derrick that does the digging; consists of the digger mechanism and the auger.

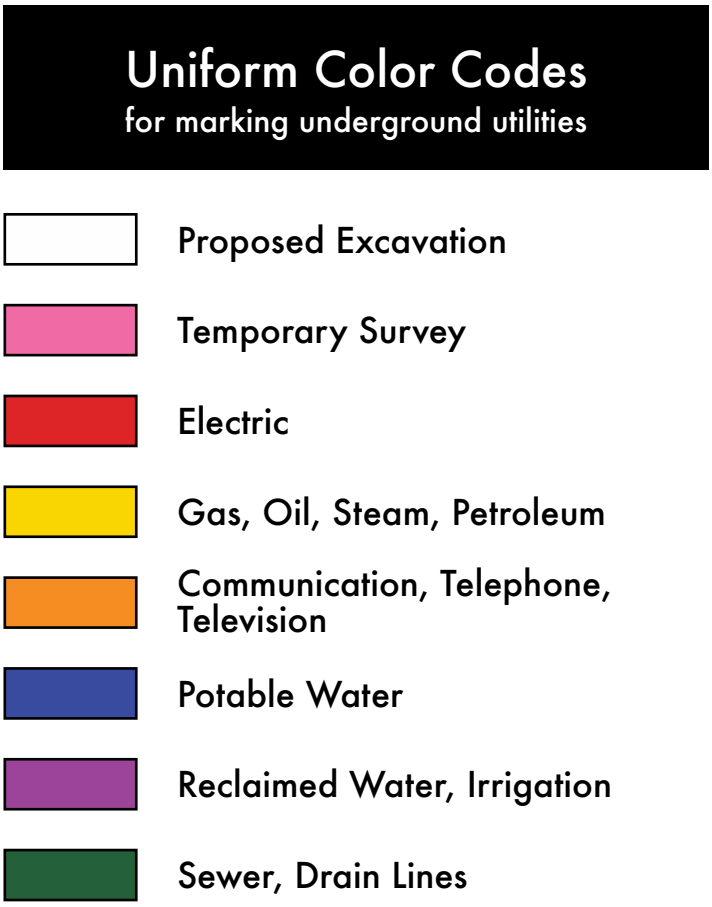
Digger mechanism A hydraulically operated motor that drives the auger of a digger derrick.

Dump valve A control on a digger derrick that can temporarily stop hydraulic action; used if one of the hydraulic controls malfunctions.

Hook radius The distance from the center of the pedestal of a digger derrick to the boom tip sheave, measured in a line parallel to the ground.

Outriggers	Hydraulically operated arms that extend from a truck's body to the ground to help stabilize the entire unit and spread the weight of the unit over a wider area.
Pedestal/turntable assembly	The component of a derrick that is mounted on the truck body, supports the boom, and houses the motor that rotates the boom; often called the pedestal.
Pole grabbers	A pair of hydraulically operated jaws often mounted at the tip of the boom of a digger derrick; used for guiding a pole and holding it in position as it is being set.
Rear mount digger derrick	A digger derrick with the pedestal mounted at the rear of the truck and the boom stored over the truck cab.
Sheave height	The distance from the boom tip sheave of a digger derrick straight down to the ground.
Winch	A powered reel device mounted on a digger derrick, used with a winch line for lifting; can be mounted on the pedestal or at the tip of the boom.

APPENDIX B: UNIFORM COLOR CODE FOR MARKING UNDERGROUND UTILITIES



This page intentionally left blank.

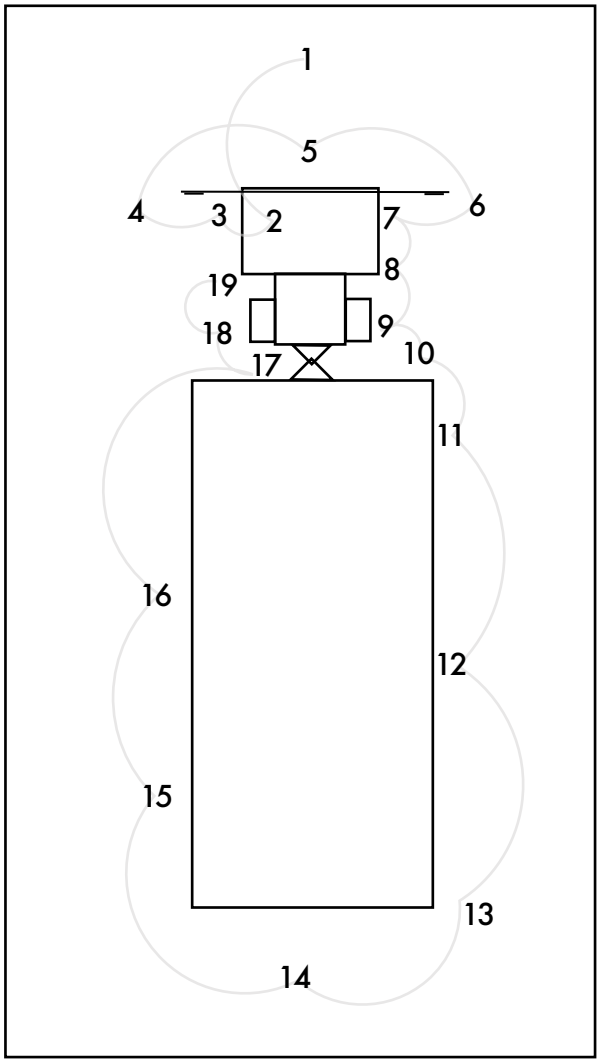
APPENDIX C: PRE-TRIP INSPECTION TRAINING

PRE-TRIP INSPECTION TRAINING

ISPC®
Institute for Safety in Powerline Construction

DIGGER TRUCKS

No professional pilot would ever consider operating an aircraft no matter how familiar they are with it, without first running through a preflight check. Likewise, no professional truck driver would subject the public, themselves, or their vehicle to the hazards of the road without first running through a pre-trip inspection.



The fact is statistically, you are subject to a far greater likelihood of accidents than airplane pilots and therefore have an even greater need of caution. To suffer or cause injury and death because of an equipment fault that wasn't checked before the trip would be a stupidity no true professional would stand for in the operation of a CMV.

The simple pre-trip inspection eliminates a wide area of accident potential and leaves you free from worry about whether or not your rig is safe.

The fact that a pre-trip inspection is required by the Bureau of Motor Carrier Safety should be the least important reason in your mind for this inspection. Your own life is on the line.

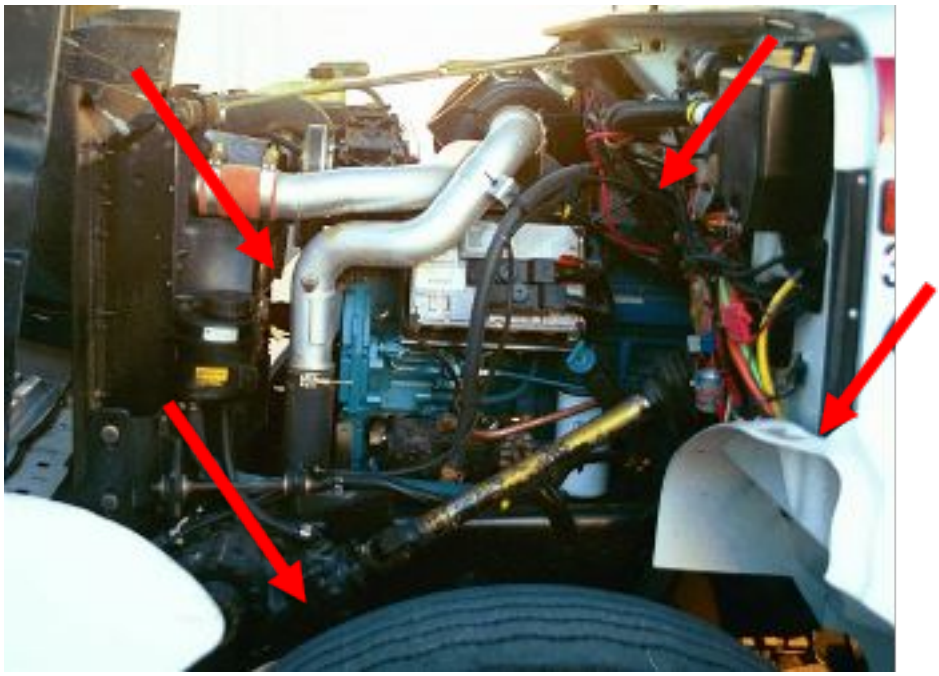
In addition to preventing accidents, the pre-trip inspection is also designed to minimize road hassles for you. By making a thorough check before heading out, you can be assured of more trouble free miles and fewer road calls.

Unit approach: It is impossible to cover every type of unit from COE to convention or trailer types in this presentation; thus, the focus should be on the method or procedures and not the type of unit. The procedure, itself, should come as natural to you as waking up in the morning and if done properly, one trip around the unit should be sufficient.

As you approach the vehicle, look for evidence of leaks under the unit, if it's sitting level or lopsided.

Check the running lights, they should be amber. Also check the condition of the windshield, wipers and grill for obstructions.

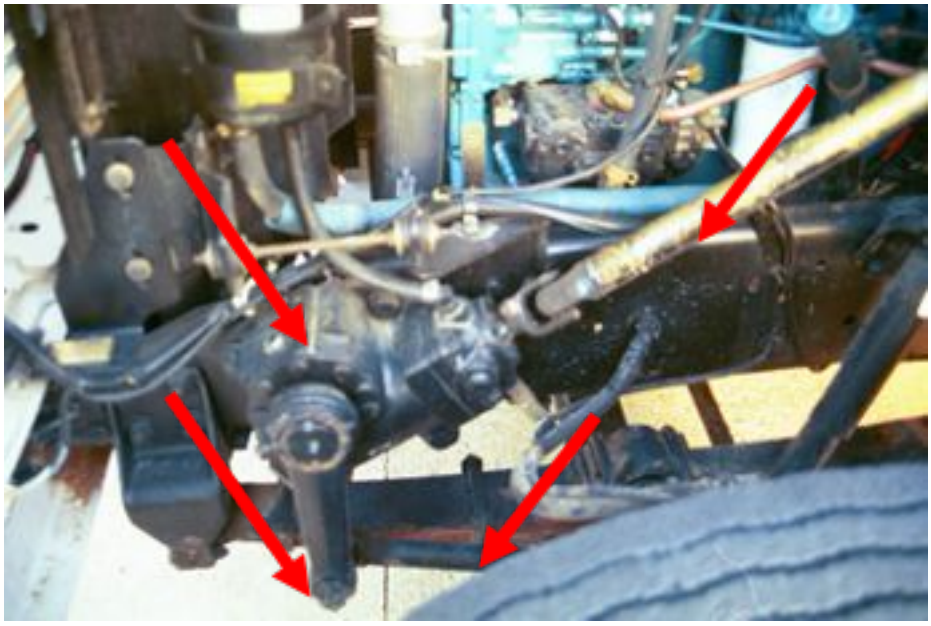
Engine - left side: Next is to check under the hood. Inspect the engine for any loose wires, frayed belts, worn connections.



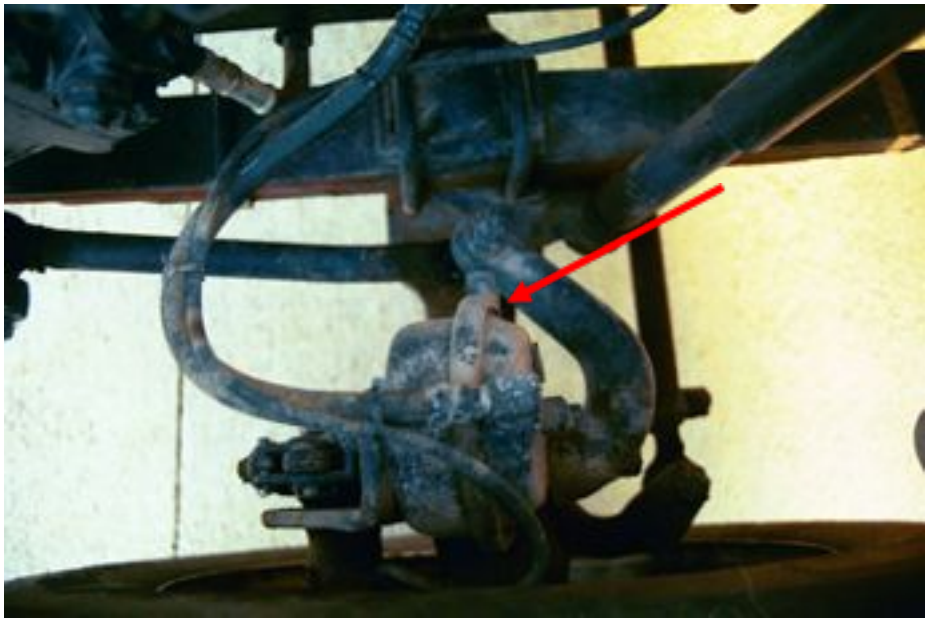
Engine - fluids and belts: Be sure to check all of your fluid levels and for any leaks.

Ensure power steering fluid level is adequate and there is no evidence of leaks.

Steering gear box: Inspect the steering gear box for any looseness in the drag links or mounting bolts. If any looseness is found, the unit should stay put until the condition is corrected.



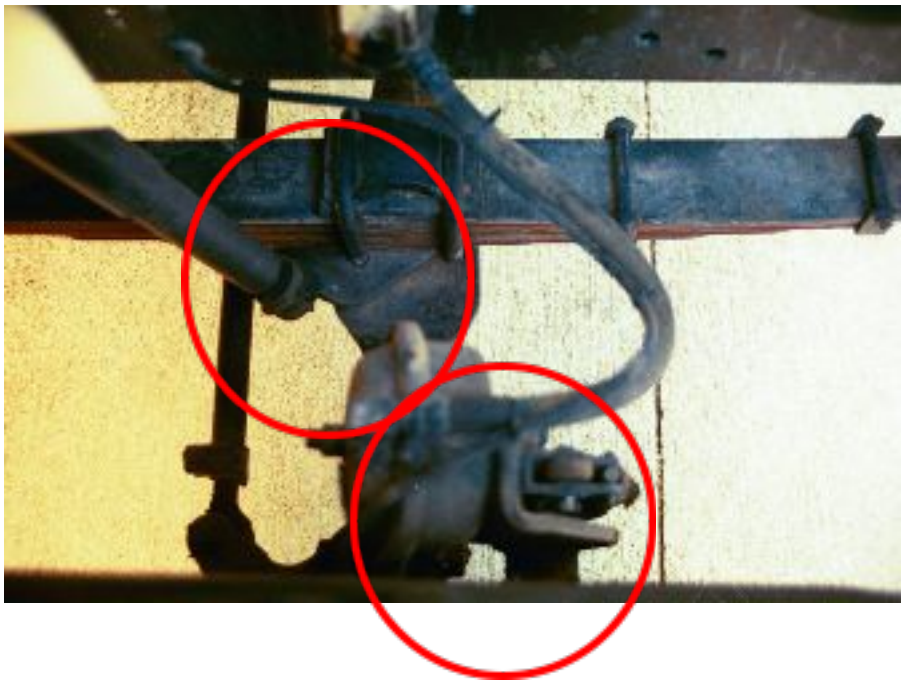
Left steer axle brake: While the hood is open, check the condition of the brake chamber, mounting and fittings. Also, check this side of the leaf springs and U bolts.



Left steer axle brake and tire: Next check the condition on the backside of the tire for cuts or bugles. Check the brake assembly for loose mounting or cracks. Also, check the condition and lining thickness to see that the shoes are properly within the limit and that the pins and springs are in place.

Engine - right side: Now step over to the right side to check the fluid levels, wiring, and for leaks as you did on the driver side.

Right steer axle brake: As you did on the left side, check the condition of the brake chamber, mounting and fittings. Also, check this side of the leaf springs and U bolts.



Right steer axle brake and tire: Here again, check the condition on the backside of the tire for cuts or bugles. Check the brake assembly for loose mounting or cracks and lining thickness.

Cab - clutch, brake, and fuel: After closing the hood and climbing in the unit to start it up, look underneath your pedals for debris or trash. Ensure the area is clear of any obstructions.

Instrument panel: Upon entering the cab, you want to check all the lights. Turn them all on, headlights, high and low beams. Four way flasher, cab clearance and identification lights, and all running lights on the towed unit. Check your steering lash and pedals. Next ensure your gages are at the proper running point. Now you're ready to start your walk around.

Parking brake: Check your climate controls and ensure your parking brake is set.

LEFT SIDE OF POWER UNIT

Left mirror system: As you step out of the unit, check the left hand mirror for the condition of the glass, cracks, cleanliness and the bracket tightness.

DOT requires at least 50 square inches of unobstructed view in the flat mirror, ensure that antennas or other items do not obscure your view.

Also, be sure to adjust your mirror system using the mirror check station.

Battery box and air tank: Check the battery box and step mounting. Inspect the air tank for solid mounting and drain the tank. Watch for excessive amounts of water or oil discharge. Large amounts of water or oil indicate a need for service. Listen for air leaks.

Left side - full view: Step back from the cab for an overview of the condition, checking for any damage or leaks. Check the hand-holds, window, reflectors, air and exhaust systems and overall appearance of the unit.

Left steer tire: Next, inspect the steer tire for cuts and bruises as well as excessive wear. Also check for evidence of loose or missing lug bolts. And be sure to gauge inflation too, by whatever system is recommended. If covered by a cap, remove the cover and check for the proper oil level in the front axle oil hub. If you notice any leaks have a mechanic check the seal.

FRONT OF VEHICLE (UNDERCARRIAGE)

As you make your way around the front, take a look underneath the unit to inspect the undercarriage. From here you can see the inside of the spring leaves and inside of the steer tires that you may not have seen when the hood was open. Inspect the axle, look for cracks and loose U-bolts.

RIGHT SIDE OF POWER UNIT

Right mirror system: As you did on the left side, check the right hand mirror for the condition of the glass for cracks, cleanliness and the bracket tightness. DOT requires at least 50 square inches of unobstructed view in the flat mirror, ensure that antennas or other items do not obscure your view. Also, be sure to adjust your mirror system using the mirror check station.

Right steer system: As you did on the left side, inspect the steer tire for cuts and bruises as well as excessive wear. Also check for evidence of loose or missing lug bolts and be sure to gauge inflation. Remove the cover and check for the proper oil level in the front axle oil hub.

Right fuel tank: As you make your way along the right side, check the brackets and fuel filter cap gasket on the fuel tank. If any problems are found, have them repaired immediately. This is the time to measure the actual fuel level because gauges can be wrong.

Right side - full view: Step back from the cab for an overview of the condition, checking for any damage or leaks. Check the hand-holds, window, air and exhaust systems, reflectors and overall appearance of the unit.

Bed of truck: Ensure that all supplies and tools are properly secured.

Right drive: The outside of the drives are next, check for any unusual wear or cuts as well as proper inflation. Remember this includes the inside of the tires between the duals. Inspect the wheels, looking for loose or missing lugs, cracked rims or leaking oil seals.

REAR OF VEHICLE

Right view of drive axle brakes: While in front of drive axle look underneath to inspect the inside of the tires on the right side, along with the brake chamber condition and mounting. Also, inspect the drive shaft and front of the housing for any leaks.

Rear view: Finishing up at the drives, check the back side of the frame assembly. Looking across to the left to inspect the inside of the tire and brake assembly. Also, check your lights and mud flaps.

Right drive - brakes and inside: Look underneath to check the condition of your dive tires, looking between the duals for any debris. This is also the time to check the condition of your leaf springs and U-bolt connectors.

Left drive: The outside of the drives are next, check for any unusual wear or cuts as well as proper inflation. Remember this includes the inside of the tires between the duals. Inspect the wheels, looking for loose or missing lugs, cracked rims or leaking oil seals.

Left view of driver axle brakes: While in front of drive axle look underneath to inspect the inside of the tires on the right side, along with the brake chamber condition and mounting. Also, inspect the drive shaft and front of the housing for any leaks.

EMERGENCY EQUIPMENT REPLACEMENT AND EMERGENCY EQUIPMENT

Emergency and Replacement equipment are next and deserve special attention. A "BC" rated fire extinguisher is sufficient. The extinguisher should be properly mounted and that the pressure gauge indicated a full charge. Ensure that you have an adequate supply of spare bulbs and fuses.

Emergency Equipment: Triangle reflectors should be used on all equipment built after 1/1/74. At a minimum you need three DOT approved reflectors. And last, ensure that you have an accident report kit and camera.

Final test of brakes, inside unit - brake check:

Okay, you're ready to climb back into the cab. Measure the free play of clutch travel, one inch of free play is allowed. Now start the engine and let it idle until all gauges are operating properly.

While the engine is warming up, measure the steering wheel for excessive free play. If any more than 30˚ or about 5" is noted, this should be corrected.

Now check the gauges one by one for all functions. Operate the heater, defroster and A/C in all functions. Note the fan operation and air temperature.

Check the operation of the windshield wipers and test the washer function at this time. Each unit is required to have an electric horn, test its operation.

Now hold the foot brake pedal down and watch the air pressure gauge. Air loss should not exceed 3 pounds per minute for a single vehicle.

Pump the air down with the foot brake and check to make sure the low air warning light and buzzer operate when the air pressure is not more than 50% below maximum.

YOUR SAFETY

Another important item that you should not forget to check is your safety belt. Safety belts on both seats should be inspected for security and adjustability. Air suspension seats should be equipped with belts anchored from the floor to the seat and from the seat to the driver. In addition, if your unit is equipped with a rear seating area, check the seat belts in this area as well.

And last but not least, don't forget to check your paperwork. Make sure that you have the proper permits for the load; that your log book is up-to-date and that you have signed off on your pre-trip inspection document.

Remember by following through with a thorough and conscientious inspection; you're note only complying with the law but minimizing the possibility of a road failure. And most importantly, you are greatly reducing the danger of the accident that could have been prevented. This pre-trip inspection is one good habit that should start before you ever get out on the road.

Institute for Safety in Powerline Construction

PRE-TRIP INSPECTION TRAINING:

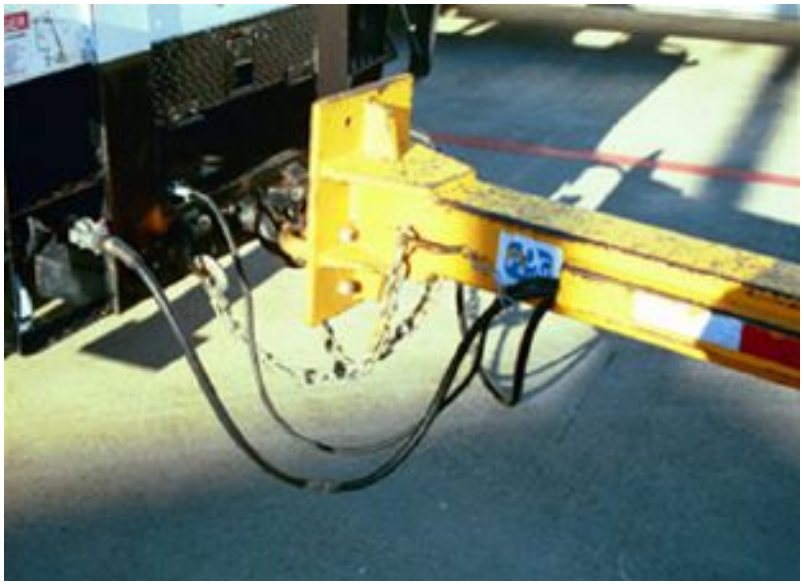
POLE TRAILERS

Pintle Hook: Prior to hooking up the trailer, inspect the condition of the hook and latching mechanism. Note any looseness, cracks and excessive wear - no part should be worn by more than 20%. Also, check your D rings to ensure that they are securely attached.

Service and emergency glad hand: Inspect the condition of your glad hands for secure mounting and leaks around the seal. Also, inspect the condition of the grommets.

Draw bar eye: As you are placing the draw bar on the pintle, inspect the condition of the eye for any cracks and excessive wear. Here again, no more than 20% is allowed on any portion of the eye. Pay special attention to the front of the eye for wear at the point where it rubs both sides of the hook.

Assembled unit: Next is to hook up your air lines, light cord, and safety chains. Ensure that your lines are not dragging or will be pinched by tailer movement. Also, make sure you cross over your safety chains to form an X pattern.



Front cradle and landing gear: As you make your way down the right side of the trailer, inspect the landing gear. Check the condition of the landing gear and crank. Make sure they are both free of defects and will move freely.

First cradle: Next, step back to position 2 to inspect your first tie-down assembly. Ensure that the posts are secured with a retaining pin and the strap is free of defects.

Center frame: As you make your way down the frame, check for cracks and alignment. Ensure that the frame isn't twisted or bowed. Also, ensure that your reflective tape is in place.

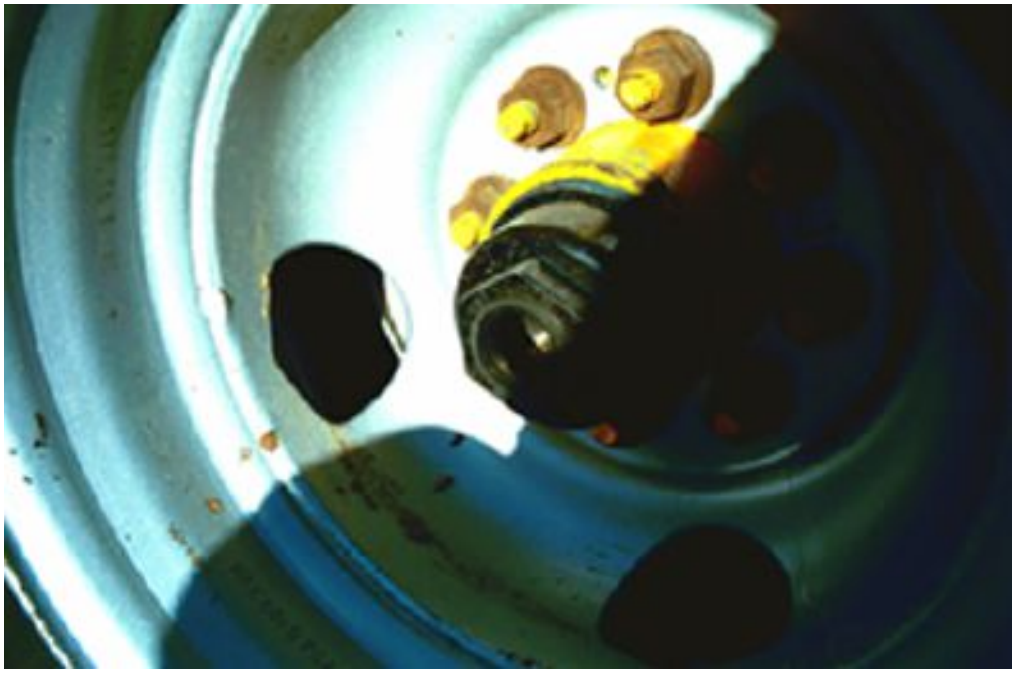
Center cradle: As you approach the A frame, inspect the trailer box and make sure that the cover is capable of locking closed. Also, inspect the condition of position 3 load bars and strap. Here again, ensuring that the posts are secured by pins.

Left undercarriage view: As you make your way down the right side, look underneath to inspect the left trailer brakes assembly, springs, U bolt connectors, and condition of tires.

Top view brake drums: Check the condition of the brake chambers and air lines, noting any cracks, looseness, and air leaks. Also, ensure the lines are below the top edge of the trailer frame so they will snag or rub on the poles as they are being loaded.

Right tires: Inspect the tires for any cuts and abrasions. Check for proper inflation using a tire gauge. Inspect for missing, cracked, or loose lugs. Inspect the rim for any cracks and bends. Also, check between the duals for any debris.

Oil hub: Pull the axle cap off the check for the proper oil level in the hub and for any leaks in the seal.



Right front and rear axle brake: As you did on the top view, check the condition of the brake assembly and lines.

Trailer rear: As you step around the the rear, inspect the corner marker light, then start inspecting the conditions of your lights, reflective tape, mud flaps, DOT bumper, and license plate. Also, inspect the load securement system at the last position.

Left rear of trailer-ABS: As you move around to the left side, check your marker and ABS lights.

Left front and rear axle brake: As you did on the right side of the trailer, inspect your left trailer brake assemblies.

Left side tires: The next step is to inspect the left trailer tires. Check for proper inflation using a tire gauge. Inspect for missing, cracked, or loose lugs. Inspect the rim for any cracks and bends. Also, check for the proper oil level in the hub and for any leaks in the seal.

Right undercarriage view: As you make your way forward, look underneath to inspect the condition of the tires, between the duals, brake assembly, slide lock, low hanging wires, and overall condition of the frame.

Left view center cradle: Inspect the load position number 2, ensuring the post is secured with a clevis pin and the strap and hook assembly is free of defects and excessive wear.

Center frame left view and wires: Next, inspect the condition of air and electrical lines. The lines should slide freely in the center of the frame without snagging. Excess should be coiled neatly and secured with a tie strap to the frame, ensuring they will not drag. Also, inspect the center pin. It should be completely through the frame and secured with a clevis pin on the end.

Landing gear left view: Inspect the left landing gear by checking for cracks along the frame. The handle assembly and foot should move freely and be free of defects.

ELECTRIC BRAKES

Breakaway battery: For units equipped with electric brakes, ensure that the breakaway batter is in working condition and the protective cover is in place.

Breakaway release: Another important part of the electric brake system is the breakaway release. Make sure the release cord and pin are in working order.

Electric brake assembly: Electric brakes will have a single wire entering the wheel shroud. Ensure the wire is in good condition without any breaks in the insulation. Also, check the condition of the brake shroud, ensuring it protects the brake assembly.

YOUR SAFETY

Do not forget to check the latest DOT rules for both the federal and state regulations in which you plan to use the trailer. In most states, when hauling wooden poles, it is required that a light bar and other indicators be attached to the end of the poles to alert drivers of additional hazards when following.

And last but not least, don't forget to check your paperwork. Make sure you have the proper permits for the load, that your log book is up-to-date, and that you have signed off on your pre-trip.

Remember, by following through with a thorough and conscientious inspection, you're not only complying with the law, but minimizing the possibility of a road failure. And most importantly, you're greatly reducing the danger of an accident that could be prevented. This pre-trip inspection is a good habit that should start before you ever get out on the road.