



Terex Utilities	
PRODUCT ADVISORY	PA716

DATE: 1/5/23

REVISED:

TO: Owners, Users, Dealers, and Installers

MODELS AFFECTED: Aerials and Digger Derricks

SUBJECT: Conductor Lifting

Issue:

Digger Derricks and Aerial Devices are only tools to aid the user in accomplishing a task. Digger Derricks and Aerial Devices are powerful machines that will aid properly trained personnel to perform elevated work on or near energized power lines or energized components. Equipment manufacturers can provide users with instructions on how to operate the equipment. It is the responsibility of the employer or user to properly train personnel to safely accomplish tasks assigned with the equipment provided. Users and Operators must consider the following issues when lifting live or grounded conductors.

Action:

Conductor Lifting

Aerial Devices or Digger Derricks with material handling capabilities can be used to lift a conductor(s) and move it out of the way for other work when properly equipped.

The following must be considered, but not limited to, when using aerials and diggers to lift conductors:

- Determine if the line is energized or grounded.
- Know the weight of the conductor being lifted and how the weight will change as the conductor is moved.
- Remain within the material handling capacity shown on the load chart.
- Do not lift conductors with the platform or boom.
- Can the conductor contact other lines or structures?
- Able to maneuver the line to the desired position safely without exceeding the lift capacity of all components used to lift including the conductor holder.
- Do not attempt to lift conductors from angle or corner pole configurations.
- Always maintain control of the conductor.
- The lifting method must not damage the line.
- Operators can only work or be exposed to one electrical potential at a time.

- When working on live lines the system protection should be switched to single shot (non-reclosing) in case of a fault.
- Unless the aerial device is built, maintained, and inspected as a Category A unit and used according to Live-Line Bare Hand work practices the conductor must not energize the boom tip through the jib boom or load line.
- See the OSHA Regulations for the required clear insulation length required for hot line tools.

Jibs

Jib booms cannot be considered as insulating:

- They are used to lift loads and subject to shock loading which can cause cracks susceptible to contamination.
- They are not stored in a weather tight area when transporting and not in use.
- The jib booms are not manufactured, tested, or rated to provide insulation even though they are made from non-conductive material.
- If winch line remains across the fiberglass section it is not insulating.

Winch Line

The winch or load line cannot be considered as insulating.

- Use an insulating link rated for the voltage to lift lines with the winch if line is energized.
- Use an insulating link if lifting a different potential than with conductor lifter.

Weight

The weight of the conductor depends on the size, material, and configuration of the conductor supports. Where the insulators are located, and elevation changes along the length of the line to adjacent supports will determine the weight of the line being lifted at any point along the line. You must work with a knowledgeable person capable of determining the weight for the specific line configuration or use a load cell or scale to determine the actual weight before lifting to stay within the lifting capacity of the Aerial Device or Digger Derrick load chart capacity. If the booms will be moved into different positions, ensure the conductor weight will not exceed the capacity in all boom configurations or jib extensions made during the move. The conductor holder must also be rated to lift the size and weight of the conductor. Many conductor holders have capacity limits to prevent damage to the conductor and prevent overloading the rollers or latch mechanisms. Insulating conductor lifters may also have capacity and attitude limits.

Grounded Conductors

Neutral, grounds and static lines are considered current carrying conductors and must be treated as such. The only conductor you can consider grounded is one that is tested and properly grounded following OSHA, NESC, and your company grounding practice. Any conductor that is not properly verified as grounded must be considered energized. It can be energized by inductance from nearby energized lines, inadvertent contact with an energized line, or unknown sources if not properly grounded. The line may also be

energized by incorrectly connected auxiliary generators connected to the system by electric customers.

Selecting the Lifter Attachment

The use of a conductor lifting attachment must be considered if the line is energized or not grounded:

- De-energized conductors can be lifted without an insulating section if no other potentials are in the area.
- If energized, the conductor lifter must utilize an approved section of hot line tool with the proper clear insulation distance required for the voltage.

If the energized conductor lifting attachment is not rated for the voltage, the conductor must be insulated from the conductor holder with line covering that is rated for the voltage. The line coverup or line hose must be approved by the line hose manufacturer for the load and use; not just brush or inadvertent contact.

Do not depend on the fiberglass jib or synthetic winch load line to provide insulation, they must be considered conductive. They are not tested, rated, or maintained to provide insulation and can be contaminated, contain hidden damage from use, or be wet. Only hot line tools or insulating covers (line hose or blankets) rated for the voltage, stored, inspected, and cleaned before each use can be considered to provide the insulation to prevent energizing the entire boom tip.

Fiberglass jibs are not considered to provide insulation because of their use as material lifting devices. They may have unseen internal cracks from use, and contamination from being stored and transported on the unit. To be considered a live line tool for electrical protection they must not be transported on the aerial or digger derrick unless in storage compartments, they must not be subject to shock loads or used for lifting material other than the conductors and must be cleaned and inspected before use.



Do not allow live lines to contact boom tip including hook, sheave, platform support structure, jib or load line. It will energize the entire boom tip including the controls.

Clear Insulation Distance Required

To provide the safe clearance distance and not energize the boom tip, insulating hot line tools must be used to separate the conductor from the boom tip. Jibs and winch lines are not hot line tools. The following information is from OSHA regulations. The insulation distance between the energized conductor and the boom tip when lifting must be at least the distance required in OSHA. The user is required to determine and/or calculate the clear insulating distance required. The method of calculating is shown in 1910.269 Appendix B and is based on the altitude and the overvoltage of the particular system being worked. The entire boom tip must be considered as conductive even if made with plastic or fiberglass components, so the following applies:

OSHA Regulations:

1910.269(I)(3)(iii) The employer shall ensure that no employee approaches or takes any conductive object closer to exposed energized parts than the employer's established minimum approach distance, unless:

1910.269(I)(3)(iii)(A) The employee is insulated from the energized part (rubber insulating gloves or rubber insulating gloves and sleeves worn in accordance with paragraph (I)(4) of this section constitutes insulation of the employee from the energized part upon which the employee is working provided that the employee has control of the part in a manner sufficient to prevent exposure to uninsulated portions of the employee's body), or

1910.269(I)(3)(iii)(B) The energized part is insulated from the employee and from any other conductive object at a different potential, or

1910.269(I)(3)(iii)(C) The employee is insulated from any other exposed conductive object in accordance with the requirements for live-line bare hand work in paragraph (q)(3) of this section.



The entire boom tip past the band of arrows on the boom, including the jib and winch line, must be considered conductive. If the boom tip is in contact with an energized line the entire boom tip must be considered energized. If in contact with a grounded line the entire boom tip must be considered grounded.

Only Category A aerial devices can provide primary protection when following Bare Hand work procedures. This includes the very important step of testing the boom insulation daily before use; at a voltage equal to or higher than that which will be worked. For all other insulated aerial devices and digger derricks the insulation provided is secondary to the primary protection provided by gloves and sleeves, line cover-up, live line tools, and Minimum Approach Distance (MAD) for the voltage. Following is a partial table of MAD from OSHA 1910.269 -- Electric power generation, transmission, and distribution. Information is also available in OSHA 1926. Subpart V. After March 2015 the user must calculate the clearance distance required; based on their system so the values shown below may be different depending on altitude and overvoltage on the particular system being worked.

Voltage range phase to phase (kV)	Phase-to-ground exposure		Phase-to-phase exposure	
	meters	feet	meters	feet
0.050 to 0.300 ²	Avoid contact		Avoid contact	
0.301 to 0.750 ²	0.33	1.09	0.33	1.09
0.751 to 5.0	0.63	2.07	0.63	2.07
5.1 to 15.0	0.65	2.14	0.68	2.24
15.1 to 36.0	0.77	2.53	0.89	2.92
36.1 to 46.0	0.84	2.76	0.98	3.22
46.1 to 72.5	1.00	3.29	1.20	3.94

¹ Employers may use the minimum approach distances in this table provided the worksite is at an elevation 900 meters (3,000 feet) or less. If employees will be working at elevations greater than 900 meters (3,000 feet) above mean sea level, the employer shall determine minimum approach distances by multiplying the distances in this table by the correction factor in Table R-5 corresponding to the altitude of the work.

² For single-phase systems, use voltage-to-ground.

Note: The clear live-line tool distance must equal or exceed the values for the indicated voltage ranges.

Single Conductor Lifting

Single conductor lifting attachments are available for lifting grounded and non-energized conductors. It fits directly in the end of the sheave on some models or replaces the jib sheave on others. It is for use on structures with no energized sources. This conductor lifting device can be used to lift energized conductors only if the conductor is insulated from the lifting attachment with line covering suitable for the voltage and rated for more than brush contact.

Insulating single conductor lifters are available that will attach to the jib with an insulating section between the jib and the conductor holder. It can lift or support one conductor. It will have an insulating section of hot stick fiberglass of orange or yellow color. It will provide insulation to prevent energizing the boom tip only up to the rating of the lifter based on the clear insulating distance. It must be treated as a hot stick and cleaned before use and stored in a compartment for travel.

Single Conductor Lifting with the Load Line

Single conductors can also be lifted by use of the winch line provided an insulating link rated for the weight and voltage is used between the winch line and the conductor.

Because an aerial can be used only to work one potential at a time, conductors must be insulated from the boom tip and each other with coverup, hot line tools, insulating conductor lifters, or insulating links rated for the voltage.

Multiple Phase Line Lifters

Multiple phase line lifters are used for lifting conductors during cross arm or pole change out. Several conductors will be lifted at one time. The multiphase line lifter must provide the proper insulation and distance between each conductor holder to prevent a phase-to-phase arc, or flash, in addition to the insulation to prevent energizing the boom tip. The line lifter can be used with winch line or hydraulic jib extension options, if equipped, to move the line out of the work area. All insulating components of the conductor lifter must be treated as hot sticks.

To Operate the Line Lifter

- Determine the position of the vehicle relative to the line to accomplish the work safely. Properly set up and stabilize the vehicle.
- For corner or angle poles, use the appropriate hot line tools supporting the line by the pole itself. Do not attempt to lift the lines with an aerial or digger derrick because of the horizontal side load it will induce on the boom.
- Inspect, clean, and assemble the conductor lifter and the line covers or blanket on the ground before use. If using a multi-conductor line lifter, position holders and jib attachment to proper separation distance to ensure insulation between phases and boom tip.

- Cover all lines in the work area before approaching lines. You must maintain clearance distance from all conductors or items at a different potential until they are covered with insulating hose sleeves or blankets rated for the voltage.
- **Always wear your PPE; gloves and sleeves**
- Attach the line lifter to the aerial or digger securely.
- Position the Aerial Device near the conductor to be lifted.
- Ensure the weight of the conductor to be lifted does not exceed the capacity of the conductor holder, line lifter, jib boom or aerial device load chart.



Be aware of sag and sway of the aerial device and conductor and allow sufficient clearance as the load is applied or removed.

- Close the conductor holder latch over the line with a hot stick to retain and control the line and to maintain MAD. (Consider your company's policy for rescue)
- Raise the conductor slowly and carefully, being aware of other objects that could be contacted. Raise the conductor clear for the work intended.
- When work is complete, lower the line into position and secure. Always maintain control of lines.



Always maintain control of lines and conductors.

Terex and local industry standards (CSA and ANSI) require the purchaser of a Terex unit report to Terex the model and serial number of each machine sold, as well as the name, address, and telephone number of the new owner, within 60 days of the sale.

Use the Owner Update Form in the manual to update the owner status of any of your machines. Terex also asks the seller to provide the new owner information so if you require additional copies of the Owner Update Form or have any questions, please contact TEREX Utilities Warranty Department at 1-844-837-3948 or utilities.warranty@terex.com.

To register your Terex Utilities aerial device or digger derrick, click or navigate to the following link: <https://www.terex.com/utilities/en/support/product-registration>