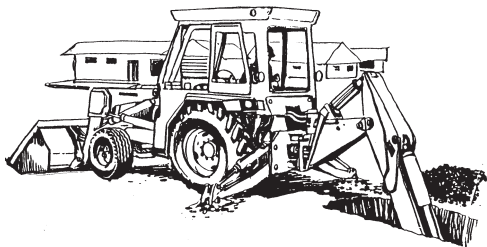


ELECTRICAL SAFETY

FOR CONTRACTORS



This brochure has been prepared to provide a basic understanding of the potential hazards involved when working near energized underground or overhead power lines, and the need to use extreme caution when in the vicinity of the HOT lines. It doesn't provide all the required safe work rules and should not be used for employee training purposes. Because it also contains emergency information in case an accident occurs, we suggest that you read it carefully and keep it handy for a quick reference.

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Electricity Demands Respect

Electricity can shock, burn, or kill if not handled properly. It always seeks all paths to ground. If you, or any other type of conductive material (metal, wood, trees, machinery/equipment, tools, etc.), get too close to or touch the power lines, you may provide this immediate path to ground through your body. This will result in severe injury or death.

Before Starting to Work Let Us Help You

Be observant. If you have work to do near power lines or power **facilities always consider them to be energized or HOT**. Call Snohomish County PUD. We want to help review safe working conditions for you at your site.

If needed for your safety, we may decide to turn off electricity or take other measures. Because it takes time to do this work, plan your job ahead and let us know. For example, if it is feasible to take lines out of service, advance notice is required. There may be a charge for work performed by the PUD.

If you need more information or have safety concerns, call the PUD at 425-783-8272 (outside your local calling area in Washington State at 1-877-783-1001, ext. 8272).

Basic Rules for Electrical Safety

Work at a safe distance from all power lines and facilities. Ten feet is considered a minimum clearance for objects, tools and people when working near overhead lines of 0 to 50,000 volts. Never assume power installations are insulated. (For minimum clearance on voltages above 50,000 volts, see WAC 296-155-428.)

Cranes, derricks and hoists used in construction have additional clearance requirements; see WAC 296-155-53408.

Plan your work ahead. If your equipment will be operating in the vicinity of a power facility, check to make sure there is no possibility of accidentally striking a line or digging into an underground cable.

Don't get close to or touch electrical equipment. NEVER attempt to move or raise electric lines or equipment. If you need help to make power lines safe, or need to report damage or hazards, call the PUD. Also call the PUD, if you have any doubts or questions about the safety of the work area.

Common Dangers for Contractors

Digging trenches or excavating in areas where there may be underground utility installations is dangerous and expensive. Call the Utilities Underground Location Center at 811 or 1-800-424-5555. The law requires the Location Center be contacted at least two (2) business days prior to starting excavation. It is a free service!

Equipment near lines may accidentally come in contact with the line, injuring the worker. Use extreme caution when carrying ladders, scaffolding poles, piping, or high-rise metal tools near power lines.

Heavy or large equipment may accidentally be driven directly into lines. Take care when operating cranes, front-end loaders, backhoes, concrete pump trucks, or farm equipment such as augers.

Be aware of obstructed views. Equipment with a boom or part that may contact the power line when extended can be hazardous when trees or other objects obscure a worker's view of lines. When accidental contact is possible, make sure workers not operating the equipment are not in contact with the equipment and touching ground at the same time.

Underground Safety

If your job requires excavation, to meet the requirements of the law, simply call this number **at least two business days prior to starting such excavation:**

**Utility Underground Location Center
811 or 1-800-424-5555**

Digging into utility cables is dangerous and expensive. RCW 19.122.040, RCW 19.122.070, WAC 296.155.655(2) and WISHA rules require “before opening an excavation or trench, underground utilities such as sewer, telephone, fuel, electric, water line, or other installations shall be located.” When excavation operations approach the location of underground installations, the exact location of the installations shall be determined by safe and acceptable means. If electric lines are found, the appropriate utility companies shall be notified and a qualified person from the utility shall make positive identification and take the necessary steps to protect lines from the work area.

An excavator who damages underground facilities and failed to contact the Utilities Underground Locating Center or Snohomish County PUD, as required, could be held responsible for triple the damage cost.

What State Law Says

For your safety, review the Washington Administrative Codes for Construction Workers (WAC 296-155) Part I (Electrical), and Part N (Excavations, Trenching and Shoring). It also requires that a minimum of ten feet be maintained from energized overhead high voltage electrical conductors (for voltages of up to 50,000 volts) with additional distance required for higher voltages (example: 12 feet 2 inches for 115,000 volts). For minimum clearances for cranes and derricks see WAC 296-155-Part L. For exact distances and other requirements of the law when working near power lines, refer to the appropriate sections in WAC 296-155.



If an Accident Does Happen, Don't Panic!

There are a number of basic steps to follow in case of an electrical accident:

- ▶▶ Do not touch the injured or any lines or equipment in contact with the injured. Even if it appears that the accident caused the line or equipment to be de-energized, use caution. Call 911 and report the accident immediately. ALWAYS assume the power lines are HOT. Modern electric lines usually relay back into service and become energized several times within a matter of seconds following an accident, or its possible under certain conditions the system may not see the problem and may not de-energize the line or equipment at all.
- ▶▶ **Prevent others from approaching the victim and any electrically energized vehicles, objects, or structures.**

▶▶ **If the electricity to a construction site accident is controlled by a construction site circuit breaker under site control, open it if it can be done safely.** A serious electrical injury will cause muscles to contract, making it difficult or impossible for a victim to pull free from an electric source, which is still energized. Cutting off the power will usually free the victim if the right breaker was opened.

DO NOT ATTEMPT TO DE-ENERGIZE HIGH-VOLTAGE POWER LINES. CALL THE PUD IMMEDIATELY!

▶▶ **Send for help.** For life-threatening situations involving power lines, call 911. To report lines down on the ground, call the PUD at 425-783-1001 (toll-free at 1-877-783-1001).

▶▶ **If a vehicle is involved** and lines are touching it, anyone who touches the vehicle while standing on the ground may be shocked or electrocuted. If it is your vehicle, sit quietly inside and wait for help to arrive. If bystanders arrive, roll down the window, and shout to them to **stand at least 15 feet clear of the vehicle** so they are not shocked or electrocuted and call 911 for help. **You are safe inside the vehicle as long as you do not step out and touch the vehicle and ground at the same time.** Remember that the electricity is not only traveling through the vehicle, but is also traveling in the ground around the area.

▶▶ **If the vehicle is on fire** and it is necessary to leave it, open the door and jump clear of the car, avoiding wires that may be on the ground. Stay calm and jump carefully so you don't fall back against the car or touch the ground and vehicle at the same time. Then shuffle with both feet together clear of the area, keeping both feet touching the ground at all times. Continue shuffling for at least 15 feet away from the accident.

Working Near Power Lines

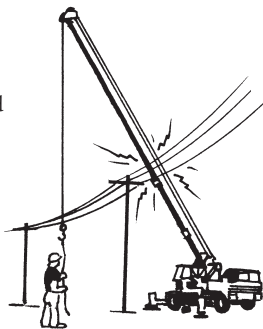
High voltage contact is the largest single cause of fatalities associated with cranes and derricks. All these could be prevented. Most power companies or utilities will consider (if given advance notification) shutting down the line temporarily or moving the line. If it is not possible to have the line moved or the power shut off, the following procedures should be enforced by the project supervisor and strictly followed by all operators. Review clearance requirements in WAC 296-155-53408.

OPERATORS

Before setting up or operating on any project **look for power lines** and if present, know your clearances, maintain them and **exercise extreme caution.**

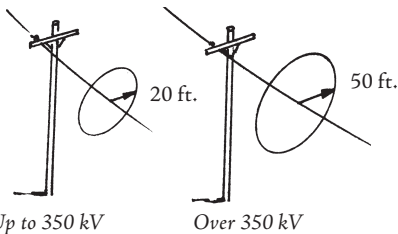
SITE SUPERVISOR

When powerlines are present on or near the site, the safety of the crane operation is totally the responsibility of the personnel in charge of the job site and the crane operator. **Establish clearances and enforce required safe work procedures to prevent contact.**

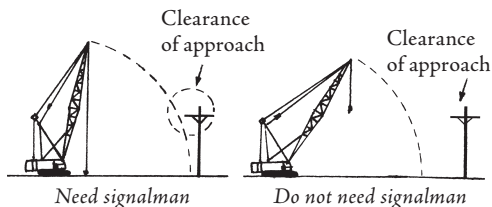


PRE-JOB PLANNING:

Address power line problems during pre-job planning after the first site survey is made by a contractor. Resolve problems prior to the crane/derrick arrival to avoid job delays and prevent accidents.



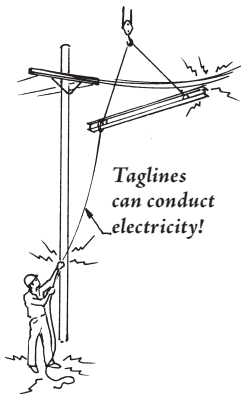
- (1) Keep your distance.** The area surrounding every live power line is referred to the clearance limit of approach. It is strictly forbidden to move any crane/derrick boom, load line, or load into this area unless proper steps are followed. Without knowing the voltage, the law requires you to ensure no part of the crane/derrick, load line or load (including rigging and lifting accessories), gets closer than twenty feet to a power line that is up to 350 kV or closer than fifty feet to a power line that exceeds 350 kV. Once the voltage has been determined and the crane/derrick needs to get closer to the line/equipment than these distances, there are options/exceptions you may consider to reduce the clearance in WAC 296-155-53408 (2) that must be followed when needed.
- (2) Notify the utility company** when and where any crane/derrick is to be working near power lines where you are not sure of the voltage and clearance or need assistance in maintaining the clearances.
- (3) Treat all wires/electrical equipment as HOT** until you have reliable a qualified utility worker confirms the system has been de-energized and properly protected.



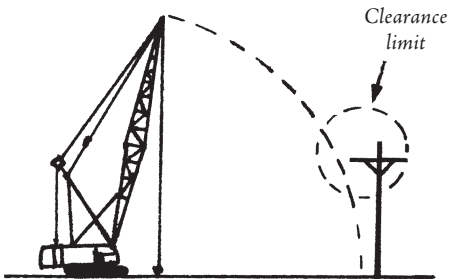
- (4) **Except for the operator**, keep ALL personnel well away from the crane/derrick whenever it is working close to power lines. If the crane operator accidentally makes contact with the energized line, anyone who touches the equipment and ground at the same time will probably be shocked or electrocuted.
- (5) **Don't allow anyone to touch** the load, the crane/derrick, or the crane/derrick hook until the signalman indicates that it is safe to do so, i.e., the crane/derrick is out of the wires.
- (6) **When a tagline is needed** to control a load that could accidentally swing into the restricted zone the taglines must be of a non-conductive type material and keep clean and dry when used for this purpose. Again, taglines must not intentional violate the minimum clearance requirements.
- (7) **Slow down the operating cycle** of the machine by reducing hoisting, booming, swinging, and travel speeds.
- (8) **Exercise extreme caution** when working near overhead lines having long spans as they tend to swing laterally in the wind and accidental contact could occur.

(9) Exercise extreme caution when traveling the crane/derrick as uneven ground can cause the boom to weave or bob into the lines.

(10) Ensure that whenever a crane/derrick must travel beneath power lines, clearances and other requirements in WAC 296-155-53408 (5) are followed.



(11) The operator should not leave the crane/derrick if the boom, when lowered, can enter the clearance limit.



In the Event of Electrical Contact:

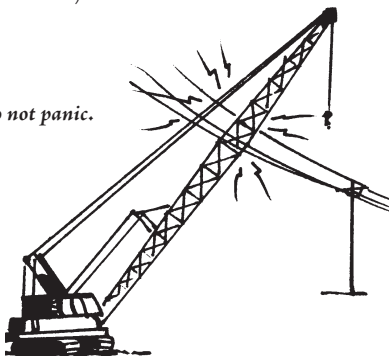
(1) Remain inside the cab

DO NOT PANIC! You should be safe where you are. **DO NOT TRY TO GET OFF THE MACHINE, TOUCHING IT AND THE GROUND AT THE SAME TIME.** Call the PUD at 425-783-1000, for help or call 911 and they will contact the utility.

(2) **Instruct all other personnel** to keep at least 15 feet away from the machine, ropes, and load. The complete machine, load, and the ground around it could be HOT.

(3) **The machine operator** may try to remove the contact (only if it is safe to attempt). Unaided and without anyone approaching the machine, try to remove boom away from the line/equipment. Move away from the line in the reverse direction to that which caused the contact (for example, if you swung left into the wire, swing right to break the contact).

Do not panic.

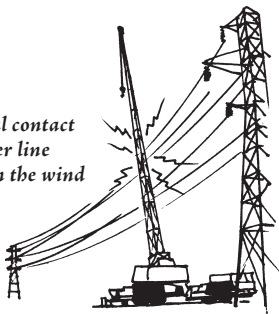


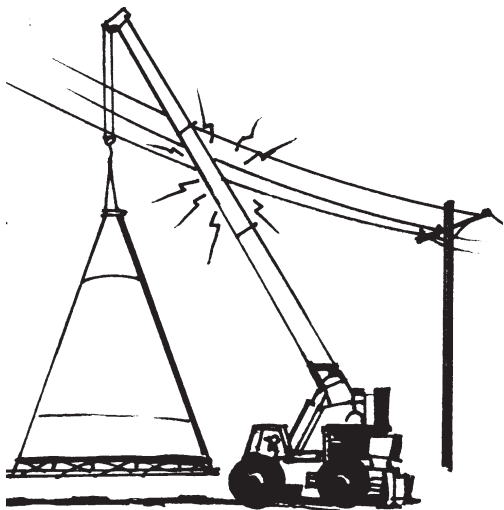
Remember: Once an arc has been struck, it can draw out a considerable distance before it breaks, so keep moving away from the line until the arc breaks and then continue moving until you are at least 15 feet away from the line.

CAUTION: If the boom or loads line appears to be welded to the power line, do not move away from the line as the line may break and fall to the ground. Stay where you are until help arrives.

- (4) **Remain inside the machine.** If the machine cannot be moved away or disengaged from the contact, remain inside until a qualified electrical utility worker de-energizes the circuit and confirms that conditions are safe.
- (5) **Report every incident involving contact** with a live line to the electrical utility so that inspections and repairs can be made to prevent damaged powerlines from falling at a later date.

*Accidental contact
from power line
swaying in the wind*



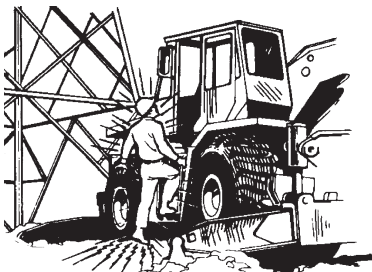


Bailout Procedure

If the operators decide to leave the machine, they must **JUMP CLEAR**. They must never step down allowing part of their body to be in contact with the ground while any other part of the body is touching the machine.

HIGH VOLTAGE CONTACT will result in electrical current flowing down the boom and through the machine to the ground. The ground will then be energized with high voltage near the machine and lower voltage farther away in rings or potentials (like ripples on water or like a dartboard).

→
WRONG



RIGHT (BUT STILL DANGEROUS)

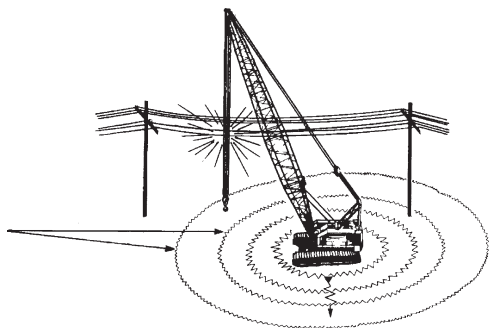
Never leave the machine unless absolutely necessary!



There is something called “step and touch” potential which states that if you have one leg in a ring (or potential) that has high voltage and take a step, putting your other leg in another ring (or potential) that has low voltage. This could result in electricity traveling up one leg, and down the other to ground, and you could be shocked or electrocuted.

Because of the hazardous voltage differential in the ground, the **operator should stand on the door ledge (rocker panel), jump clear with both feet together** making sure not to touch the vehicle and ground at the same time with ANY part of their body. **Land with both feet together on the ground, maintain balance and shuffle with both feet together slowly away from the vehicle for at least 15 feet.**

Do not take large steps because it is possible for one foot to be in a high voltage area and the other to be in a lower voltage area. The difference between the two can kill.



Voltage Differential

Quick References

Snohomish County PUD switchboard....	425-783-1000
Customer Service.....	425-783-1000
Engineering.....	425-783-8272
Safety	425-783-5557

Utilities Underground

Location Center 811 or 1-800-424-5555
or www.wucc.org

Emergency/Fire/Police 911

EMERGENCY INSTRUCTIONS

1. DO NOT PANIC!
2. Do not touch the victim or anything in contact with the victim. They could still be energized.
3. Try to de-energize the electrical source if it is safe and possible to do at the circuit breaker (customer owned equipment only).
4. Send for help — call 911 and the PUD.
5. Once the electrical source has been de-energized, provide immediate first aid to the victim.

NOTES

PUD Contact Numbers:

Customer Service

425-783-1000

Safety Department

425-783-5557

Engineering

425-783-8272

Tree Trimming (Vegetation Mgmt.)

425-783-5579

*Toll-free in Western Washington and
outside the Everett local calling area:*

1-877-783-1001

If your job requires any
excavation, you
must call the **Utility
Underground
Location Center at
811 or
1-800-424-5555**

at least two business
days before starting such excavation
(www.callbeforeyoudig.org)

**CALL BEFORE
YOU DIG**



Snohomish County PUD

PO Box 1107 • Everett WA 98206-1107

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