



**City of Vancouver – Engineering Services
High and Low Voltage - Crew Talk**

Effective Date: June 15, 2005.

Revision Date: September 1, 2005.

1. Introduction

Workers in close proximity to low and high voltage power lines must be educated in the hazards, control measures, and procedures to work safely. This crew talk primarily pertains to low and high voltage lines for Coast Mountain Bus Company and BC Hydro respectfully.

2. Dangers of Electricity (Low and High)

When current passes through the body it generates heat that can extensively damage internal and external tissue causing serious burns. Almost all voltages are potentially dangerous because of the general shock hazard. When the heart is exposed to an electrical current it can cause irregular heartbeats and/or induce a heart attack.

In addition, electricity can cause muscles to contract and prevent the worker from releasing their grip resulting in a greater exposure to the hazard.

Electricity will also seek all possible paths to the ground. These paths may include trees, equipment (vehicles, backhoes, excavators, poles, etc.), or human body. For example, if your equipment comes into contact with a power line, all objects in contact with the source will potentially become energized.

The ground can also become energized for an undetermined distances dependant on the voltage and conductivity of the earth. Electricity will generally spread out in a circular motion like ripples in a pool of water when it runs along the ground. High voltage contact can create rings extending 33 feet (10 meters) from the source. Wet ground for example will extend the distance and danger.

3. Low Voltage (Less Than 750 Volts)

Low voltage acts very similar to high voltage. Some examples of low voltage power sources include trolley wires (600 volt DC) and street lighting. There are two factors that increase the risk of contact with energized low-voltage power sources:

1. Applications such as trolley lines are located lower on poles which are ultimately closer to the workers. Small working clearances between low-voltage components leave little room for error when operating equipment.
2. Low-voltage lines may be supplied by an electrical system that can feed incredible amounts of energy into a fault (caused by a short-circuit, for example).

Low voltage dangers include arc flash burns that can result in serious injury. The heat of an arc flash can melt solids, vaporize liquids, and expand gases that may project molten metal at high velocities and/or result in fires.

Limits of Approach – Low Voltage

Workers must always be conscious of working in close proximity to low voltage power sources. The following excerpt from the Occupation Health and Safety Regulation provides the appropriate requirements pertaining to limits of approach to low voltage trolley lines.

19.12 Working close to energized equipment

(3) If uninsulated energized parts are not guarded with approved cabinets or enclosures

(a) suitable barriers or covers must be provided if a worker unfamiliar with the hazards is working within 1 m (3.3 ft) of the uninsulated, energized parts, or

(b) the worker must be informed of the potential hazards, and provided with and follow appropriate written safe work procedures.

The Coast Mountain Bus Company must be contacted when work is performed or equipment is operated within 1 meter of the trolley lines. It is the responsibility of Coast Mountain to determine if the lines can be de-energized, barriers or coverings can be provided, and/or alternate written procedures can be followed. See Engineering Services written procedures for work around Coast Mountain Trolley Wires for more specific information.

4. High Voltage (Greater than 750 Volts)

Hydro lines and transformers are normally high voltage power sources. Hydro lines are typically found at the top of utility poles while transformers are usually mounted lower on the pole. Workers need to use caution when operating mobile equipment around high voltage lines. Workers must not work and/or operate equipment within the limits of approach.

Note: Only workers trained with proper certification and/or WCB authorization may work within the limits of approach. (i.e. Electrician, Line Person, Arborist)

Limits of Approach

The below table provides the minimum distance that must be maintained between energized high voltage sources and workers. This includes any work, tools, machinery, equipment, material, and/or person. Only qualified personnel may assess voltage limits.

Voltage Phase to phase	Minimum distance	
	Meters	Feet
Over 750 V to 75 kV	3	10
Over 75 kV to 250 kV	4.5	15
Over 250 kV to 550 kV	6	20