

**Zaloumis Contracting Service, Inc.
dba Connect/One
Safety Manual-Truck Version**

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This reference manual is to remain in the vehicle at all times. Should replacement become necessary, please call Ann Kerlin at (203) 463-6167 immediately or www.connectone.wix.com/internal. Go to Forms, Trucks, Safety Manual Truck version.

CONTENTS

Objectives.....	i
Structure	ii
Module 1 – Personal Safety	1
Safety Accountability	1
Governing Agencies	2
Stretching Exercises	3
Dog Encounters.....	5
Plants and Insects	8
Working Environment Hazards.....	11
Health Hazards.....	17
Personal Protective Equipment	18
Hard Hat.....	19
Eye Protection.....	20
Clothing.....	21
Gloves	22
Boots	23
Dust Mask	24
Fall Protection Equipment	25
Customer Created Hazards.....	27
Safety Equipment	28
Clamp-On Voltmeter (VOM)	28
Tic Tracer	29
Foreign Voltage Detector (FVD).....	30
Outlet Tester.....	31
Hand Tools	32
Vehicle and Equipment Safety Inspection.....	34
Motor Vehicle Safety	34
Traffic Control	34
Module 2: Ladder Handling	35
Why Field Ladder Safety	35
Ladder Equipment	37
Inspecting Ladders.....	38
Mounting Ladders on Vehicle.....	38
Ladder Selection, Handling and Placement.....	39
Carrying Ladders	40
Placement, Setting Up and Climbing Ladders	43
Working from Ladders	45

Ladder Operation and Usage.....	47
Material and Equipment Handling	48
Retraction and Removal	48
Step Ladders - Indoor Climbing	48
Disconnecting Aerial Drops	49
Utility Poles.....	50
Module 3: Hazard Communication (Right to Know).....	53
Chemical Awareness - Right to Know	53
Why Hazard Communication?.....	53
Definitions.....	54
Procedure	55
Material Safety Data Sheet (MSDS).....	56
Labeling System	57

Objectives

After completing the Personal Safety Module of this Training Manual, participants will be able to:

- Name the authority governing occupational safety regulations for the nation and for the state.
- Describe various exercises that can help avoid muscle injury while working.
- Identify a dog's attitude by body language cues and describe:
 - How to avoid triggering aggressive behavior in dogs.
 - How to handle friendly and unfriendly dog encounters.
 - The steps in handling a dog bite.
- Identify the various types of poisonous plants and harmful insects.
- Describe how the environment can be hazardous to working conditions.
- Identify health hazards, including gas, asbestos, creosote, and unsanitary conditions.
- Identify personal protective equipment (PPE).
- Describe the proper use and inspection of personal protective equipment.
- Identify customer-created hazards that can affect your personal safety.
- Define safety accountability.
- Describe the use of VOM, tic tracer and foreign voltage detector (FVD)
- Describe the use of the outlet tester.
- Describe the safe use and care of hand tools.
- Describe the daily maintenance check for a vehicle.

After completing the Ladder handling Module of this Training Manual, participants will be able to:

- Describe various steps included in the ladder/pole inspection procedure.
- Identify correct extension ladder carrying.
- Describe the steps to safely climb a ladder.
- Describe how to safely belt off and work on an extension ladder.
- Determine ladder placement when disconnecting a drop.

After completing the Hazard Communication Module of this Training Manual, participants will be able to:

- Understand what Hazcom is.
- Read and understand the MSDS sheets and Product labels.
- Take precautions against any potential negative effects associated with chemicals in the workplace.

Structure

This Training Manual is organized into three Modules:

- Module 1: Personal Safety
- Module 2: Ladder Handling
- Module 3: Hazard Communication (Chemical Awareness - Right to Know)

Cablevision Safety Responsibility for Field Service Operations:

- Must attend all safety training classes.
- Must follow safety procedure at all times.
- Must use all proper safety equipment and Personal Protective Equipment (PPE).
- Must immediately report any and all safety violations, unsafe conditions and/or accidents to their respective supervisors.
- Must conduct required inspections (e.g. Vehicle and Equipment Safety Inspection).



The Cablevision Safety & Training Manual should be used with this training program as an additional reference manual.

Note: This training manual is part of the Field Operations New Hire Program.

Module 1 – Personal Safety

You will encounter many potentially hazardous conditions during your employment with Cablevision. Knowing how to identify these hazardous conditions and taking the correct precautions will help to minimize the risk of injury. This module will discuss some of the potential hazards you may encounter and how to maintain a safe working environment. Topics in this module are as follows:

- Governing agencies
- Stretching exercises
- Dog encounters
- Plants and insects
- Working environment hazards
- Health hazards
- Personal protective equipment
- Customer-created hazards
- Safety accountability
- Safety equipment
- Hand tools
- Vehicle and equipment safety inspection

Safety Accountability

In order to prevent personal injury as well as potential damage to customer property, the environment and equipment, personnel must follow all safety rules and procedures. You are accountable for your actions with regard to safety. How well employees maintain a safe working environment reflects how seriously they perceive all aspects of their jobs. Any willful disregard for safety is subject to disciplinary action up to and including dismissal.

Real safety performance begins and ends with each individual's awareness of and attitude toward safety.

Governing Agencies

This section discusses the Occupational Safety and Health Administration (OSHA), the National Electrical Code (NEC), and the National Electrical Safety Code (NESC) roles in establishing safety regulations. Cablevision safety policies are based on OSHA regulations and may be stricter than OSHA regulations. Following all Cablevision safety policies ensures compliance with the governing authorities' regulations.

Occupational Safety and Health Administration (OSHA)

The Occupational Safety and Health Administration (OSHA) is the authority governing all occupational safety regulations. OSHA uses the Occupation Safety and Health Act to establish regulations pertinent to occupational safety. OSHA regulations are enforceable as federal laws. Any employer found in violation of any OSHA regulation could be subject to severe penalties including fines, imprisonment, or both.

OSHA regulations related to telecommunication work, including CATV installers, are found in OSHA standard 1910.268. Other OSHA regulations pertaining to your work are located in the General Industrial Safety Orders.

While Cablevision can establish policies, provide equipment, conduct safety training, and check to see that safe practices are being followed at the job sites; it is your responsibility to ensure that safety is your first priority in the field. Failure to follow company safety policies and to manage your daily work practices in a safe and professional manner could result in n injury equipment and/or property damage. Your failure to comply with these requirements could lead to termination of your employment.

National Electrical Code (NEC)

Given the potentially dangerous environment created by electricity and electrical work, several national agencies have developed regulations, codes, and standards. The National Electrical Code (NEC) is a list of safety regulations and procedures for the installation of electrical wiring and equipment in the United States. It was created for the "practical safeguarding of persons and property from hazards arising from the use of electricity."

The NEC is not actually a law, but a code of practice. In order for the code to be legally enforced, the state, county, and/or community must first adopt the NEC.

First Aid

First Aid instructions can be found in Chapter I "Basic First Aid Precautions" of your Safety and Training Manual. Additionally, each first aid kit comes with a pamphlet describing basic first aid instructions. If you are unable to administer proper first aid for a resulting injury or medical condition seek immediate medical care or contact 911 for emergency response.

Note: All injuries or medical conditions experienced on the job must be reported to your supervisor immediately.

Stretching Exercises

The sudden and strenuous demand on muscles caused by work activities, such as climbing or lifting, can temporarily overload the muscles. This can lead to muscle cramps, pulls, and other injuries. Stretching your muscles, tendons, and ligaments before using them will help to avoid injuries.

Note: Stretching is not a muscle building or strengthening activity, rather a way to prepare muscles for the day's activities.

The following stretching exercises are for each muscle group you normally use when working.



Apply constant pressure to the muscles while stretching. Do not bounce. Bouncing can cause injury to the muscles, tendons, or ligaments.

Neck

With your feet shoulder-width apart and your hands on your hips, tilt your head down until your chin is near your chest. Slowly rotate your head by tilting it in all directions (toward your right shoulder, toward your back, toward your left shoulder, then back to your chest). Repeat this rotation five times, and then repeat by rotating your head in the opposite direction.

Shoulders

Cross one arm across your chest. With your other arm, grab the elbow of the arm to be stretched. With firm pressure, gradually pull the elbow toward the chest for a count of ten. Release the elbow and repeat for the other arm.

Back of Arm (Triceps)

With the arm to be stretched over your head, reach as far down your back as is comfortable. Using your other hand, apply firm gradual pressure against the elbow of the stretched for a count of ten. Release and repeat for the other arm.

Personal Safety

Side

With your feet approximately 12 inches wider apart than your shoulder place one hand over your head and gradually bend toward the opposite side at the waist. Allow your other hand to slide down your leg past your knee. Hold this position for a count of ten. Repeat for other side.

Back

Stand with your feet about shoulder-width apart. Place both hands in the small of your back and gradually bend backwards at the waist. Hold this position for a count of ten and then repeat.

Back of Thighs (Hamstring)

Stand with your feet about shoulder-width apart. Keeping your legs straight, bend forward at the waist until your hands are close to your ankles. Hold this position for a count of ten and then repeat.

Front of Thighs (Quadriceps)

While supporting yourself against a wall or other appropriate object with one hand, reach back and grab the foot farthest from the support with your other hand. Gradually pull the foot up behind you. Lean slightly forward and hold for a count of ten. Repeat for other leg.

Calf

With your feet about shoulder width apart, rock forward onto the balls of your feet. Hold this position for a count of ten.

Core Strengthening

It is also recommended that a daily regimen of core strengthening exercises be maintained to prevent musculoskeletal injuries.

Dog Encounters

Whenever you enter a customer's home or property, there is a possibility that you may encounter the family dog. Be alert to indications that there may be a dog on the property. Look for dog toys, food bowls, and patterns in the lawn; shake the gate latch; and ask the owner if he/she owns a dog. Even if the owner states the dog is not harmful, politely ask that the dog be restrained in a place away from your work area. While many dogs appear friendly, always be alert to the possibility that the dog may be dangerous.

If confronted by a dog, proceed cautiously at every step of the encounter. Determine the type of dog and the best course of action based on the dog type. There are three types of dogs that may threaten you.

- Dominant dogs – very dangerous
- Prey dogs
- Defensive dogs

Personal Safety

The table below describes how to identify the different dog types, what to avoid to prevent triggering a dog attack, and the best actions to take to try to avoid a confrontation.

Dominant Dogs		
Body Language	Triggers to Avoid	How to Handle
▪ Ears erect ▪ Tail up – wagging stiffly or held straight ▪ Standing on tip toes ▪ Eyes staring straight ahead ▪ Hair probably not up	▪ Shouting ▪ Gesturing ▪ Sudden movements ▪ Staring	▪ Do not threaten the dog ▪ Talk calmly ▪ Face the dog ▪ Do not look at the dog's eyes ▪ Give commands such as "Good boy," and "Sit" ▪ Try to avoid confrontation - move away in a submissive posture ▪ If you have to confront a dominant dog, have something in your hand for protection or to keep the dog away from you
Prey Dogs		
Body Language	Triggers to Avoid	How to Handle
▪ Ears up ▪ Excited – may be crouched in anticipation ▪ Eyes wide and focused on the object of desire (you) ▪ Tail wagging ▪ Hair down	▪ Sudden movement ▪ Gesturing ▪ Loud noise ▪ Threats	▪ Move calmly ▪ Shield yourself ▪ Talk very softly ▪ Move away ▪ Can look into the dog's eyes ▪ Try to distract the dog's attention by gently throwing a rock or stick, or give the dog food
Defensive Dogs		
Body Language	Triggers to Avoid	How to Handle
▪ Ears back ▪ Lips back ▪ Displays of threat ▪ Dog's barking sounds tense ▪ Dog moves a great deal ▪ Dog appears nervous or uneasy ▪ Hair up ▪ Eyes may be averted or staring at you	▪ Sudden movements ▪ Direct threat ▪ Loud noise ▪ Gesturing	▪ Move confidently and calmly ▪ Talk softly and calmly ▪ Give commands ▪ Try to ignore the dog ▪ Do not turn your back to the dog ▪ Do not trust this dog, even if it acts friendly ▪ Do not try to scare this dog off, unless you are sure it has an escape and you are not close enough to panic the dog

Table 1 Dog Encounter

If the dog attacks, do not lose control of the situation. Look for hidden dangers that could result in you tripping, falling down, or getting boxed in. Take actions to protect yourself as follows:

- Shield your body from the dog with any item available. If nothing is available, use your arm (preferably the left arm if you are right handed or the right arm if you are left handed).
- Kick at the dog, but stay on your feet.
- Move to a gate, door, or car door.
- Attempt to get the dog on one side of a barrier with you on the other and make the dog let go.

All wounds resulting from an animal bite must be thoroughly washed with soap and warm water, disinfected (hydrogen peroxide) and covered with a sterile dressing/bandage.

Precautions listed on the below table must be followed after an animal attack/bite:

Animal	Immediate Treatment	Follow-Up Procedures
Domestic Dog (Pet)	Wash wound with soap and warm water, Disinfect (hydrogen peroxide) wound and cover with a sterile dressing/bandage.	▪ Inquire/confirm whether the animal has been inoculated against rabies. ▪ Consult a doctor or medical professional in all cases whether or not the animal is inoculated.
Rat, Raccoon, Bat, Wild Dog or Cat	Wash wound with soap and warm water, Disinfect (hydrogen peroxide) wound and cover with a sterile dressing/bandage.	Immediately consult a doctor or medical professional.
Snake	▪ Wash wound with soap and warm water, Disinfect (hydrogen peroxide) wound and cover with a sterile dressing/bandage. ▪ Do not apply any cold compress and if possible keep the wound below the level of the heart.	Immediately seek medical attention.

Table 2 Procedures for Animal Attacks

Report all dog bites and attacks to your supervisor. Describe the location where the attack occurred, a description of the dog (size, color, breed, type of ears, hair, etc.) and injuries suffered.

Plants and Insects

This section discusses the different types of poisonous plants and harmful insects.

Plants

The best protection from poisonous plants such as poison ivy, poison oak, and poison sumac is recognition, avoidance and covering all exposed body parts. (i.e. long sleeved shirts, gloves)

The Figure below shows these common poisonous plants.

Note: Poison ivy, poison oak, and poison sumac take on different forms in different places. The leaflets may vary from groups of three to groups of five, seven, or even nine. It is best to learn what these poisonous plants look like where you live.



POISON IVY



POISON OAK



POISON SUMAC

Figure 1 Poisonous Plants

The oil of poison ivy, called urushiol [yu-RU-shee-uhl], is a sticky substance that stays active a long time. It can be easily transferred to your skin by touching your clothing, from a pet, or even from burning poison ivy leaves. Covering up against poison ivy with clothing and gloves is your best option from accidental contact.

However, if exposure does occur, the first step is to apply rubbing alcohol to the affected skin and wash with soap and water. If a rash/itch develops, consult a physician as needed.

Insects

Another hazard encountered in the field is insects. There are two categories of insect bites/stings: venomous and nonvenomous. The table below identifies the types of insects in each category.

Venomous	Nonvenomous
• Wasp • Hornet • Yellow Jackets • All Bees • Fire Ants	• Chiggers • Fleas • Lice • Scabies • Bed bugs • Ticks • Mosquitoes

Figure 2 Biting/Stinging Insects

Venomous insects attack in defense. These insects inject painful, toxic venom through a stinger. Venomous stings are always very painful, red, and swollen. This type of reaction is called a local reaction. In sensitive individuals, a more severe whole body reaction may occur. Allergic reactions, such as hives and swelling away from the sting site, are called systemic reactions. These systemic reactions can become life threatening if they involve the airways or circulation systems.

Nonvenomous insects bite and usually inject anticoagulant saliva in order to feed on your blood. Some local reactions occur due to insect bites, such as itching and swelling, but generally insect bites are not dangerous. It is extremely rare to suffer an allergic reaction to insect bites. Insects can spread diseases like Lyme disease, encephalitis, and malaria through their bites. However, this also is extremely rare, and most bites will result in only local reaction.

There are two methods for preventing insect bites and stings: repellents and avoidance. Insect repellents work well for biting insects but are not very effective against stinging insects. The most effective insect repellent ingredient available is DEET, which is available in most sprays and lotions. There are no proven effective insect repellent products that may be taken orally.

Personal Safety

The table below summarizes some techniques to avoid stinging and biting insects.

Table 3 Insect Avoidance Techniques

Stinging Insects	Mosquitoes, Chiggers, and Ticks
• Don't wear cologne, perfume or scented lotions. • Control odors at picnics, garbage areas, etc. • Avoid brightly colored clothing outdoors. • Destroy or relocate all known hives or nests near your home.	• Cover as much of your skin as possible with clothing, hats, socks, etc. • Pay special attention to cuff areas at ankles, wrists, and neck. • Avoid swamps or standing water (mosquitoes), dense woods, field, and brush (ticks, chiggers). • Examine exposed skin and scale areas for clinging ticks. • Use insect repellent.

Table 4 Procedures for Insect Attacks

Insect	Immediate Treatment	Follow-Up Procedures
Insects (Bee, reduce any swelling. Wasp, Mosquito, etc.)	<u>Non Allergic Person</u> Wash bite/sting with soap and warm water. Apply ice or a cold pack. This is recommended to Insects (Bee, reduce any swelling.	Consult a doctor or medical professional if the sting becomes infected. Known allergic persons, Individuals that develop itching, hives, facial swelling, and/or shortness of breath shortly after an insect bite may be having an allergic reaction and must seek medical care immediately.
	<u>Known Allergic Person</u> If applicable, the employees are to inject themselves or ingest specific medication to counteract the effects of the sting	
Ticks	If tick has burrowed into the skin perform the following: Gently remove the tick with tweezers. Make sure all signs of the tick are removed.	If flu like symptoms or a rash occurs, consult a doctor or medical professional. This could be the onset of Lyme Disease.

Working Environment Hazards

The environments that you work in have a significant effect on the potential for occurrence of accidents. Knowing the hazards associated with your environment allows you to take the necessary precautions to keep your working environment safe.

Working at Night

Low visibility at night presents several potential hazards including the following:

- Inability of oncoming traffic to see workers
- Inability of the worker to see hazards in the work area
- Increased crime
- Threatening feeling of the unknown in the dark

To ensure your safety when working at night, the following guidelines should be followed:

- Make sure you are as visible as possible.
- Wear your reflective Class II safety vest.
- Place the Utility Working sign well ahead of your work zone.
- Use cones with visiflars to enhance the visibility of your work zone.
- Turn on the emergency flashers and roof beacon light on your truck.

Note: See Chapter T "Traffic Safety of our Safety and Training Manual for more information on establishing a proper Traffic Control Work Area (TCWA)

- Use the buddy system, and check in with the office regularly.
- Never enter a customer's home if you feel uncomfortable with the customer or situation, e.g., illegal activities ongoing, only a minor is at home, or indication of domestic violence. What does this have to do with working at night??
- Make sure there is proper lighting to allow you to do your job safely and correctly. A flashlight might be sufficient in some cases, but a freestanding spotlight or a miner's light on your hat should be part of your equipment for night work
- Always use adequate lighting when you do have to climb your ladder at night.
- Be alert to any dangerous or threatening situation. Contact your supervisor and leave the area if you are threatened or subjected to a dangerous situation.

Note: If you are unable to perform your job competently in the dark or you are uncomfortable with the situation, contact your supervisor before continuing.

Bad Weather

The weather will create safety hazards that you must be aware of when performing work outside. Ice, snow, rain, fog, wind, and lightning are all hazards created due to the weather.

Snow and Ice

Along with the cold and wet conditions, which will be discussed later in this module, the biggest hazard created due to snow and ice is the slippery conditions. Extreme care must be taken while driving, walking, or climbing due to reduced traction. The following are some suggestions to help keep you safe during snow and icy conditions:

- When driving, leave extra distance between you and the vehicle in front of you (use the 4-second plus rule). Always brake slowly and smoothly to avoid sliding out of control.
- Be prepared for slippery roads and deep snow.
- Keep extra clothing and water in your truck if you are going to be in rural areas.
- Make sure your heater and defroster are working properly and that you have an ice scraper in the truck.
- Be careful when walking on icy ground.
- Put-on your ice grip sandals when necessary

Rain and Fog

Rain and fog present a slip hazard as well as a visibility hazard. The following should be followed when working in rainy or foggy conditions:

- Use your truck's parking lights to mark your position.
- Remember that roads are the most slippery when rain begins to fall because the oil and grease on the surface have not yet washed away.
- Reduce your speed and allow twice the normal following distances (use the 4-second plus rule).
- When raining, drive with your lights on even during the daytime.
- When driving in fog, reduce your speed and turn on your headlights (low beams) to help improve visibility.
- If the fog is too dense to see through, pull completely off the road and stop at a safe and legal place until visibility improves.

High Winds

High winds can cause objects to be blown over, creating severe hazards on the work site. Objects such as ladders, tree limbs, and trash can be blown over, striking and injuring the worker. The following guidelines should be followed to minimize injuries during high wind conditions:

- Extreme caution should be used when carrying large objects, such as ladders, during windy conditions. A wind gust can cause a loss of balance resulting in an accidental fall and injury.
- Do not stand on a ladder during windy conditions unless you are properly belted-off. If the wind causes your ladder to become unstable, stop work until the wind diminishes.
- Store the ladder in a stable position (horizontally on the ground/vehicle) when not in use, even if only for a few minutes.
- Wear your chinstrap with your hard hat.

Hot and Dry Weather

In hot and dry weather, the higher air temperatures increase the heat-stress risk factors. With these increased risk factors, employees must take special precautions to prevent the occurrence of heat-stress conditions. The table below lists the heat-stress conditions.

Table 5 Heat-Stress Conditions

Heat-Stress Disorders	Possible Signs and Symptoms
Heat fatigue and heat rash ▪ Usually the earliest and least serious form of heat stress	▪ Excessive sweating ▪ Muscle spasms ▪ Prickly heat bumps ▪ Irritability, mild dizziness, or weakness
Heat exhaustion ▪ A more serious form of heat stress	▪ Excessive sweating ▪ Cold, moist, clammy, pale skin ▪ Thirst ▪ Headaches, nausea, or loss of appetite ▪ Dilated pupils ▪ Dizziness or giddiness ▪ Rapid, weak pulse
Heat stroke ▪ A serious, life-threatening medical emergency	▪ Lack of sweat ▪ Hot, dry, flush skin ▪ Deep, rapid breathing ▪ Rapid, weak, and possibly irregular pulse ▪ Headache or nausea ▪ Dizziness or confusion ▪ Loss of consciousness ▪ Convulsions

Personal Safety

If you or a coworker is suffering from heat-stress disorder, the following actions should be taken:

- Heat fatigue – Notify supervisor immediately. Then, move the victim to a cool place out of the sun and give him/her water to drink.
- Heat exhaustion – Notify supervisor immediately. Then, move victim to a cool place and watch for signs of shock. Place the victim on his/her back with the feet slightly elevated. Use wet cloths to cool the victim, and give him/her a small glass of water about every 15 minutes.
- Heat stroke – Notify supervisor immediately. Then, get victim out of the heat quickly, and call for medical assistance.

The following are some guidelines to help prevent heat stress:

- Know your environment – Recognize that high temperature, high humidity, and a high exertion level can increase the risk of heat stress. For example, working in a hot attic can place you at an increased risk for heat stress.
- Drink plenty of water – Increasing the amount of water you drink replenishes the water lost due to sweating. Drink small amounts of water frequently throughout the day.
- Take appropriate breaks – Monitor air temperature, humidity, sun exposure, and physical exertion and take breaks as often as needed.
- Wear proper clothing.
- Acclimate yourself to the heat.
- Stay or get in shape – People in good condition tend to adapt to heat better because their cardiovascular system responds better.
- Eat wisely – Avoid heavy meals during the day.
- Know special risks – Alcohol, caffeine, medications such as those used to control high blood pressure or allergies, and increased age all increase your risk of heat stress.

Sunburn is another hazard of working in hot, dry conditions. The best treatment for sunburn is the use of a sunscreen prior to exposure. If you do become sunburned, using various sunburn ointments and limiting exposure of the affected areas to air can relieve the burning sensation. Medical assistance should be obtained in cases of severe sunburn.

Cold and Wet Weather

When working in cold weather, you must stay aware of the cold-related risk factors and illnesses. The table below describes the cold-related illnesses.

Table 6 Cold-related illnesses

Cold Weather Illness	Possible Signs and Symptoms
Hypothermia A condition in which the body core temperature drops below normal. This can occur at temperatures above or below freezing	- Feeling of excessive cold especially in the abdomen and back - Shivering - Slurred speech - Fumbling hands - Tingling or pain usually in the nose, cheeks, ears, fingers, or toes - Reduced mental alertness - Poor coordination - Sleepiness - Loss of consciousness
Frostbite The freezing of body tissue that occurs when the temperature drops below freezing	- Rigid skin - White or gray color - Numbness, tingling, or aching in the affected area, typically the feet, hands, ears, or nose - Pain that later subsides because the skin and nerves are damaged - Blisters appearing in 12 to 36 hours

Treatment for cold weather illnesses includes the following:

- Get the victim to a warm place as soon as possible.
- Warm the victim slowly; do not rub or massage the affected areas.
- Loosely bandage any frostbite areas.
- If the victim is suffering from hypothermia, do not give the victim anything to eat or drink.
- Seek immediate medical attention.

Personal Safety

The following guidelines can reduce cold weather illnesses or injury:

- Keep arms, legs, face, and ears well covered.
- Keep dry.
- Keep others informed of where you are and when you will return.
- Dress in layers. The layers of clothes trap air between them helping to insulate your body. Wool and hollow-fill clothing provide the best insulation in cold weather.
- Wear a hat to help keep you warm.
- Protect yourself from the wind, and use extra caution during windy conditions.
- Wear proper footwear.

Two-Tech Areas

Some areas in which you will be working have been identified as high-risk areas. This may be due to physical conditions or a high crime rate in the area. These areas are designated as two-tech areas. To ensure your safety, two-technicians will be assigned whenever work is performed in these areas. Some examples of two-tech areas are as follows:

- Running a long cable drop
- Running a difficult wall fish

Health Hazards

During the course of your work, you may encounter hazards, such as gas leaks, asbestos, creosote, and unsanitary conditions that could be detrimental to your health. The following sections describe how to identify and protect yourself from these hazards.

Gas

Gas leaks may be present in basements, crawl spaces, near furnaces, or by the outside gas meter. A gas leak can be recognized by the natural gas odor in the area. If exposed to a gas leak, you may become suddenly nauseated, suffer a headache, or feel tired.

If you suspect a gas leak, inform the customer of your suspicion and recommend he/she have the gas company check for leaks. Avoid the area of the leak and inform your supervisor. If necessary, reschedule the work after the gas line repairs are completed.

Asbestos

Asbestos may be present in basements, crawl spaces, or insulation for a furnace room or exterior walls. In homes built prior to 1972, asbestos could have been used in floor tiles, carpeting, dry wall, hot water pipe wrapping, or anything that may require a flame-retardant makeup.

When evaluating conditions for asbestos hazards, look for any disturbed asbestos fibers or damaged material that may contain asbestos (i.e. insulation, torn paper covering over old insulation, scratched paint, exposed drywall chalk). Any of these examples could indicate a condition that may result in your exposure to asbestos fibers.

If you suspect an asbestos problem, inform the customer. Attempt to reroute the installation to avoid disturbing the asbestos. If the problem is severe, inform your supervisor and reschedule the install if necessary.

Creosote

Creosote is used on utility poles, wooden foundations, decks, porches, landscaping ties, and fence posts. It can be recognized by the dark discoloration of the wood and its distinct odor.

When working around creosote, wear leather gloves, long sleeved shirts, and leatherwork boots to protect against exposure to your skin. If you receive a splinter or get creosote on exposed skin, remove the entire splinter and thoroughly clean the area.

Unsanitary Conditions

You may have the occasion to service a house where the sanitary conditions are less than expected. This may occur in homes that have several pets that are primarily confined to the house. In this case, proceed with the installation if possible and stay clear of the problem areas. If you are unable to continue, inform the customer and report the incident to your supervisor.

Personal Protective Equipment

CATV installation requires a number of items of personal protective equipment (PPE). In addition to an ammeter and voltage detector, some common PPE items (shown in the Figure below) used during CATV installation include the following:

- Hard hat
- Eye protection (safety glasses, safety goggles, and face shields)
- Body belt
- Gloves (leather work gloves, insulated gloves)
- Safety strap
- Work slacks
- Work boots

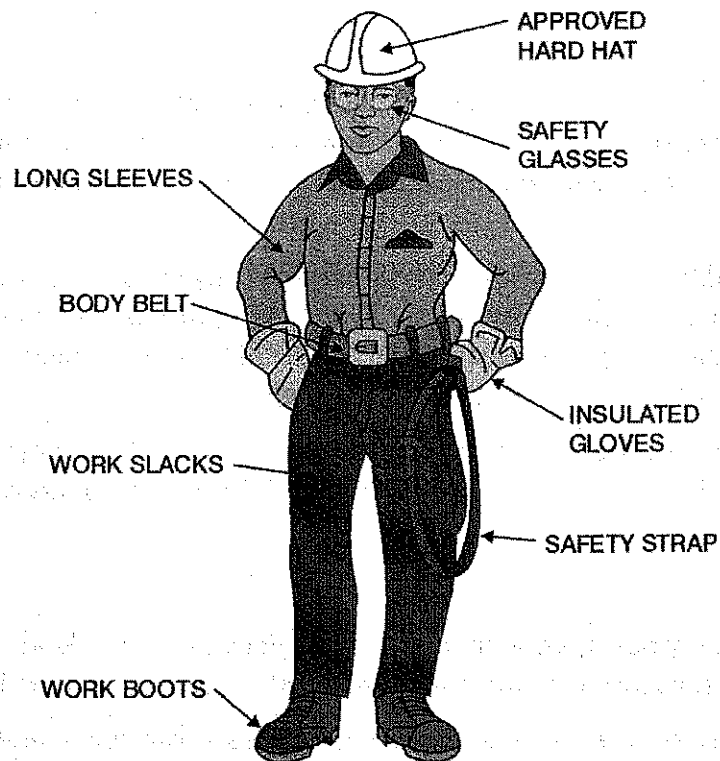


Figure 3 Personal Protective Equipment

Use and Inspection of Personal Protective Equipment

Cablevision will ensure that the required PPE to perform your job safely is available to you. It is your responsibility to inspect and maintain each PPE item before use to ensure that each item is in good condition. Most importantly, it is your responsibility to properly use the equipment when required.

Hard Hat

A hard hat is worn to protect your head from impact injuries or at least to reduce the seriousness of a sustained injury. A properly fitted and adjusted hard hat can absorb up to 75% of the force of a blow. A hard hat should be worn whenever there is a potential for injury due to falling objects or when working in areas such as attics, basements, or crawl spaces. A hard hat must be worn when working on a ladder or climbing a pole, when working near electrical lines or equipment to protect against electrical shock hazards.

Hard hats must be the insulated type and must meet ANSI Z-89.1 Class E and G or A and B standard. Metal hard hats are not allowed since they are not as impact resistant as plastic hard hats and are not safe around electrical hazards or lightning. A hard hat is shown in the Figure below. Only company issued hard hats are approved to be worn while working.

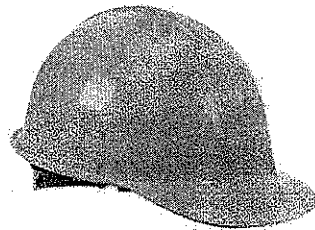


Figure 4 Hard Hat

Inspection

Daily inspections are performed to ensure that the hard hat is in good working condition. The shell is checked for cracks, soft spots, or badly faded areas. If any defects are found, the hat must not be used and must be replaced.

The suspension cradle and headbands must also be checked daily for deterioration. Items to be checked include twisted, cut, or frayed straps, and cuts or tears on the plastic clips. Check the suspension system for broken pieces, and check that all pieces are in place according to the design requirements. Only use the suspension system designed for your model hard hat. Never alter or modify the suspension system. The clearance between the suspension and the shell must be maintained in order to provide proper protection.

Proper Use

Hard hats must be worn correctly to be effective. Never wear the hat backwards. Wearing the hat incorrectly reduces the protection afforded. The hard hat should fit snugly on the top of the head with the brim no more than 1 inch above the upper edge of the ear. Always make sure the hat fits. Never place the hood of any hooded garment over or under a hard hat. If the hood is wet, it could become a conductor of electricity if it comes in contact with a power line.

Maintenance and Care

Hard hats should be cleaned regularly using mild soap and water. Never use a solvent to clean your hard hat. Solvents may make the shell brittle and more susceptible to cracks. The suspension liner and headband may be machine-washed.

Never paint, place decals on, or attach unauthorized material to the hard hat. Paints and glue may reduce the strength of the hard hat, reducing your protection. Do not bore or punch holes through any part of the hard hat to improve circulation. This again will reduce the impact resistance and the electrical insulating ability of the hard hat.

Never throw, kick, or drop a hard hat, and never use it as a seat or a support for other material. If a hard hat is dropped, the shell should be reinspected for any cracks or soft spots prior to reuse.

Eye Protection

The purpose of safety glasses is to keep debris out of your eyes and to protect your eyes from falling objects. Eye protection equipment is available as goggles, face shields, and safety glasses. All glasses must be made of impact-resistant materials and must meet ANSI standard ANSI Z-87. Field personnel wearing prescription eyeglasses should make sure the lenses and frames are rated as safety glasses, not just tempered. Cover-all goggles are required for prescription glasses that do not meet ANSI Z-87 standard. The illustration below shows an example of safety glasses.

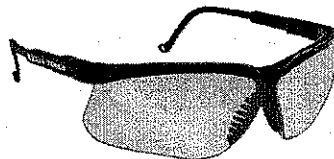


Figure 5 Safety Glasses

Approximately 90% of all eye injuries are preventable. It is Cablevision's policy that eye and face protection be worn while working in the field or when exposed to an eye or face hazard, such as flying particles, liquid chemicals, or light radiation. Specifically, eye or face protection must be worn when performing any of the following work activities:

- Hammering
- Using power tools
- Drilling
- Scraping
- Working in areas where dust is present
- Working near tree branches, shrubs, and thorn bushes
- Welding or using a propane torch
- Handling creosote material
- Working with chemicals including vehicle and power supply batteries
- Performing any activity that has the potential to result in an eye injury

Inspection

- Eye and face protective equipment must be inspected daily by the user. Inspect the lenses for the following:
- Lenses must be free of scratches.
- Lenses must be free of chips.
- Lenses must be free from anything else that obstructs the view.

Maintenance and Care

Eye and face protective equipment must be periodically cleaned to ensure that dirty or fogged lenses do not impair vision. Eye protection equipment can be cleaned with soap and hot water. Never use any solvents, gasoline, or similar cleaning agents to clean eye and face protective equipment.

Eyeglasses and goggles must not be left lying around or stored with other tools where they can be damaged.

Clothing

Cablevision-approved clothing/uniforms must be worn while performing all job-related assignments. Your clothes should be neat in appearance and as clean as possible. Protective clothing is generally intended to provide protection from the following:

- Chemical irritants such as creosote and transformer oil
- Burns
- Splinters
- Scratches
- Cold weather

Long-sleeved cotton shirts with sleeves rolled down and cuffs buttoned provide the best protection. Short-sleeved shirts are acceptable with adequate arm covering such as long gloves or sturdy work jackets.

Straight-legged trousers generally made of cotton or denim is the safest choice. Cuffed trousers may catch and hold hot or corrosive materials. Large cuffs on pants are a tripping hazard.

Under no circumstances will clothing made of a man-made fabric, such as polyester and/or rayon, be worn when working around exposed energized parts. These fabrics melt during an electric arc condition, causing severe burns. Only natural fibers such as cotton and/or wool are to be worn.

Gloves

Cut resistant or leather-faced work gloves must be worn when handling and/or working with coarse material such as cable, wire, ropes, wood, or chemicals. Cut resistant or leatherwork gloves are used to protect the hand from exposure to wood and fiberglass splinters, irritating chemicals such as creosote, and hazards related to power tools and sharp instruments.

Rubber-insulated safety gloves, or hot gloves, are worn to prevent electric shock in the event you contact an energized electric line. The rubber-insulated safety gloves used by Cablevision's field operation are a low-voltage Class "00" rubber glove. The rubber-insulated safety gloves are never worn alone.

Leather protectors (leather outer gloves) must be worn to protect the rubber glove against excessive abrasion and tears that could degrade the insulating abilities. Cotton inserts may be worn under the rubber glove for comfort. The leather and rubber-insulated safety gloves have an insulation value or rating of 500 volts. Always wear rubber-insulated safety gloves when there is a possibility of contacting electrical voltage. The Class "00" rubber-insulated safety gloves and protectors must be worn at the onset of any job or task that has a potential energy source. This includes all active and passive equipment such as:

- All pole work
- Grounding at house
- Drop connection at ground point
- Drop removal and disconnection
- Working on a power supply
- Working on an amplifier
- Plant maintenance (splicing feeder/trunk)
- Aerial and underground construction
- During storm restoration
- Any location where there is a difference in electrical potential

Note: The leather protectors are only to be used in conjunction with Class "00" rubber-insulated safety gloves. The leather protectors are not to be used as a general work glove.

The rubber-insulated safety gloves must be worn until all potentially energized components are tested and found to be de-energized. If working on a system or component that is normally energized, rubber-insulated safety gloves must be worn through the completion of the job.



Wearing a rubber-insulated safety glove does not mean you can intentionally grab a hot wire.

Inspection and Test

Gauntlet and leatherwork gloves should be inspected for loose stitching, excessive wear, and chemicals such as grease, oil, or other chemicals that might make the gloves hard, brittle, or slippery.

For inspection and testing of Rubber-insulated safety gloves refer to Cablevision's Safety and Training Manual (Chapter J) Electrical Safety.

Maintenance and Care

Leather gloves saturated with perspiration and water should be allowed to dry slowly. Rapid drying can result in the thick leather becoming very hard and brittle. After the gloves are dried, saddle soap is applied to clean the leather. After the leather is cleaned, apply a generous amount of neat's-foot oil. Leather gloves should be stored in a warm, dry place.

For maintenance and care of Rubber-insulated safety gloves refer to Cablevision's Safety and Training Manual (Chapter J) Electrical Safety.

Boots

Proper footwear is worn to protect your feet from injury and to ensure proper footing when climbing. Boots worn for CATV fieldwork should meet the following minimum requirements:

- Must have steel or fiberglass arch support (shank)
- Must have leather tops that protect the ankle
- Must have nonconductive rubber soles
- Must have well-defined heel (at least 1 inch is recommended for climbing with gaffs))
- Should have safety toes; but steel toes are not required

The figure below illustrates the requirements of proper footwear.

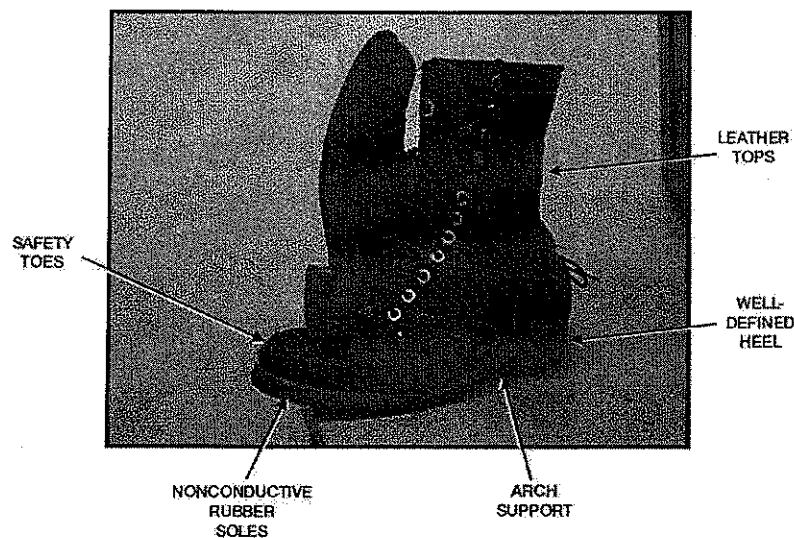


Figure 6 Requirements for Proper Footwear

Personal Safety

Employees are responsible for properly maintaining and polishing their boots in order to present a professional image and extend the life of the boots.

Dust Mask

Dust masks are available for all field and warehouse employees. Wearing a dust mask is voluntary. Employees are encouraged to wear a dust mask whenever working in a condition that poses a high concentration of dust. This may include drilling or disturbing insulation material. The figure below shows a dust mask.

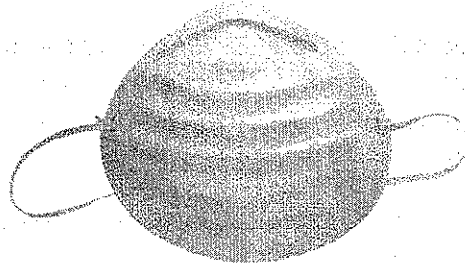


Figure 7 Dust Mask

The following guidelines should be followed when wearing a dust mask:

- The mask must fit properly on the face.
- The mask should be clean from dirt or debris.
- All straps must be affixed to the mask.

Fall Protection Equipment

The body belt, shown in the figure below, is an assembly of many parts. Its primary function is to connect with the safety strap and support the worker when working aloft on a pole or ladder. The safety strap connects to the body belt with spring-loaded snaps.

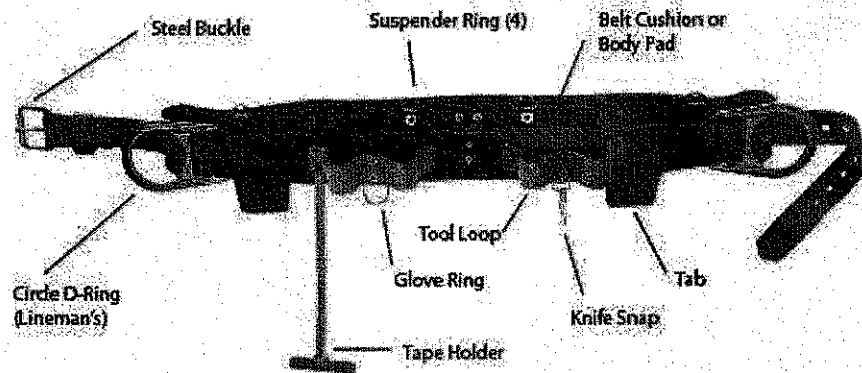


Figure 8 Body Belt

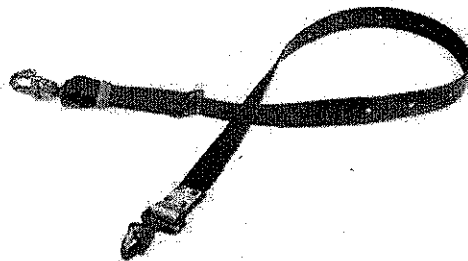


Figure 9 Safety Strap

The body belt and safety strap is inspected prior to the start of each work shift. The inspection should look for the following conditions:

- Cracks, cuts, and/or tears must not be present.
- Ensure that there are no excessive large buckle holes.
- The buckle must be properly functioning.
- Both D-rings must not be worn or deformed.
- Chemical damage from acids, flammables, and combustibles must not be present.
- Frayed stitching (internally and externally) from normal wear.
- Snap for easy action of the latch and proper spring tension.

The body belt and safety straps provided by Cablevision have red stitching that, when exposed, indicates the strap must be replaced.

Personal Safety

The figure below shows a body belt with safety strap.

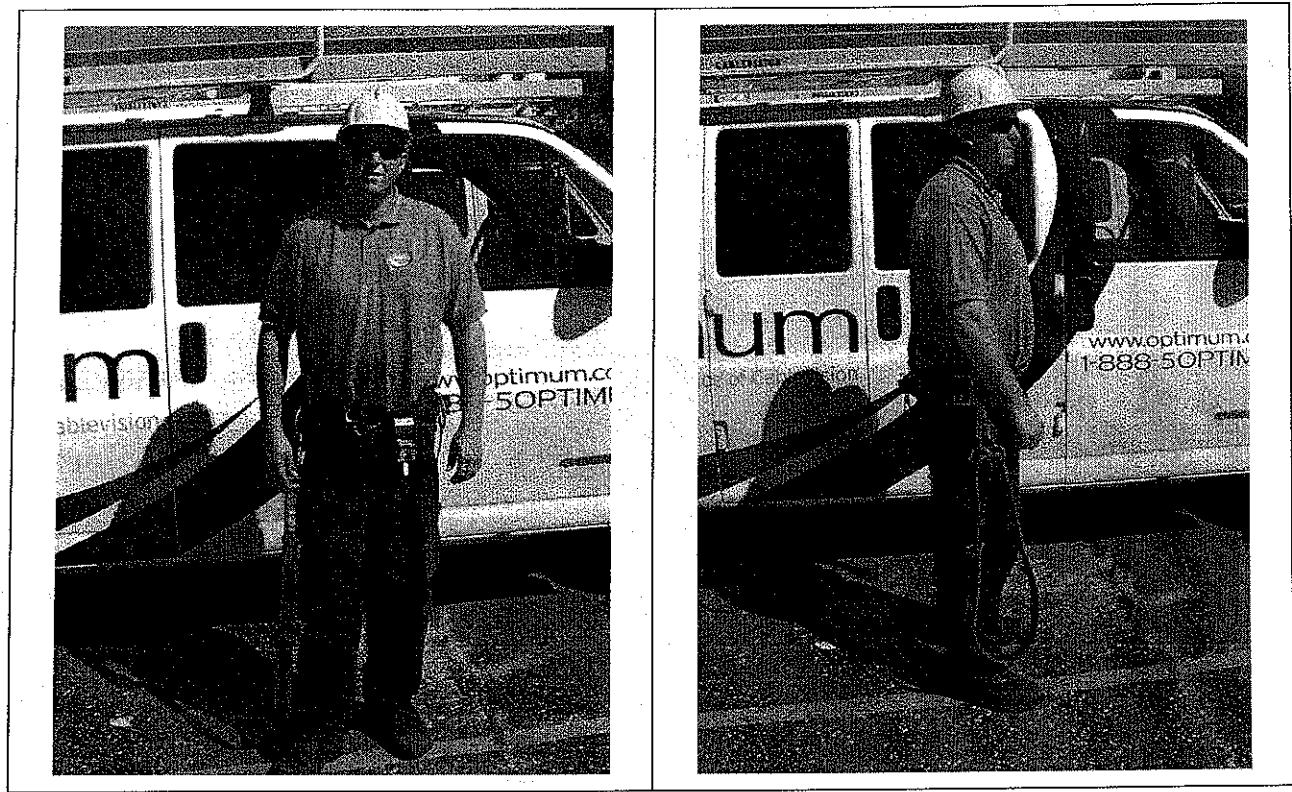


Figure 10 Wearing Body belt and Safety Strap

Body Belt with Safety Strap

When using a body belt and safety strap (lanyard):

- Make sure buckles are properly and completely fastened.
- Do not attach anything but a safety strap to a D-ring.
- Ensure that your supervisor and/or Area Safety Manager has evaluated any body belt and safety strap subjected to a shock or impact force due to a fall.
- Never use a belt or strap for anything but its intended purpose.
- Belts should be properly fitted for the user.

Customer Created Hazards

This section discusses customer-created hazards technicians might encounter.

Criminal Behavior

If criminal behavior or activity is present at the work site (drugs, theft, etc.), immediately exit the area and contact your supervisor.

Hazardous Material

If any hazardous material or chemicals are stored or located within the work area, you should make every effort to either avoid the material or request the customer to remove the material from the work area.

When running cables, avoid insulating material whenever possible. Wear dust masks if disturbing insulating material is unavoidable.

Observe any warning signs that may indicate "restricted" or "controlled environment" such as asbestos removal areas.

Safety Equipment

This section will briefly discuss the VOM meter and a voltage detector. The Electrical Safety Manual contains complete information on the Electrical Safety equipment and its use.

Clamp-On Voltmeter (VOM)

The clamp-on volt/ohm/ammeter (VOM) is used by the installer to measure voltage AC and DC, voltage, AC current, and, depending on the model, DC current. The clamp-on VOM will also measure frequency, continuity, and capacitance. The figure below shows a clamp-on VOM.

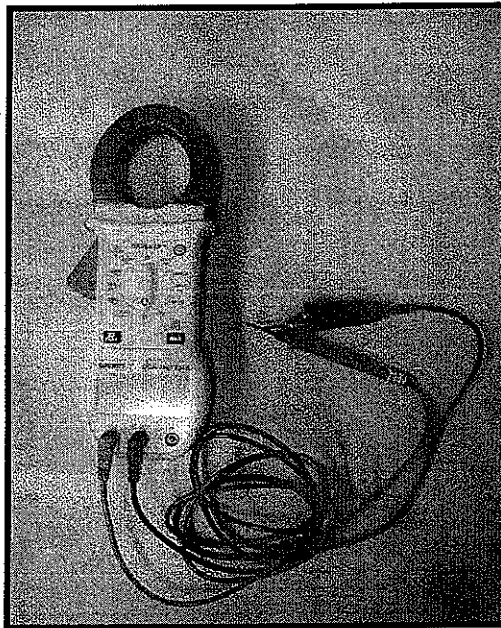


Figure 11 Clamp-On Volt/Ohm/Ammeter (VOM)

Tic Tracer

The Tic Tracer, shown in figure below, is an instrument used to locate sources of AC voltage. The Tic Tracer voltage detector probe senses the electromagnetic field produced by an energized AC source such as electrical wires.



Figure 12 Tic Tracer

The Tic Tracer does not require contact with an energized source to detect voltage. The instrument does not indicate electrical current flow, only that a voltage is present. When voltage is detected, the Tic Tracer emits a rapid audible ticking sound. The frequency of the ticking increases the closer the unit is positioned to the voltage source.

Using the Tic Tracer

Note: For a complete overview on using the Tic Tracer, see the Electrical Safety Training Manual.

Foreign Voltage Detector (FVD)

The FVD, shown in figure below, is an instrument used to locate sources of AC voltage. The FVD probe senses the electromagnetic field produced by an energized AC source such as electrical wires.



Figure 13 FVD

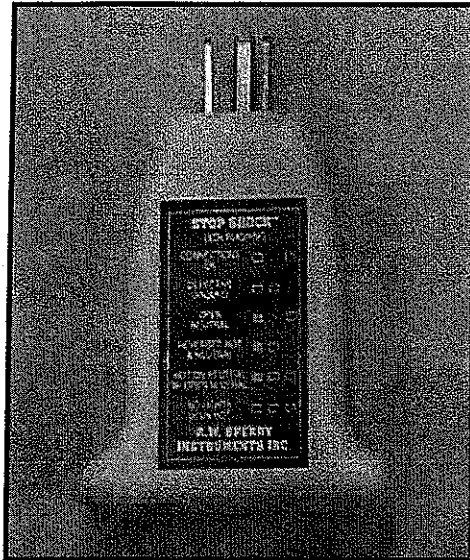
Similar to the Tic Tracer, the FVD requires no contact with an energized component. The FVD must be used for all electrical testing applications (same as the Tic Tracer) where the potential for hazardous voltage may exist. When voltage is detected, the FVD emits an audible sound.

Using the FVD

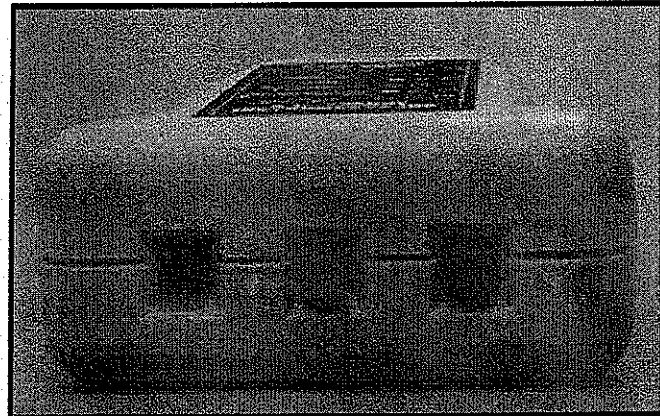
Note: For a complete overview on using the FVD, see the Electrical Safety Training Manual.

Outlet Tester

The Outlet Tester, a model is shown in the figure below, is an instrument used to determine the existence and polarity of AC voltage at a customer's outlet.



TOP VIEW



SIDE VIEW

Figure 14 Outlet Tester

A hazardous ground can exist in the customer's wiring inside a wall, a wall outlet, a multiple outlet strip, or an extension cord. The outlet tester checks for the existence of a ground through testing for low ground impedance. If an outlet tests "Green," a proper ground exists and the outlet is correctly wired.

Using the Outlet Tester

To use the Outlet Tester, plug it into the electrical outlet to be tested. Observe the end of the Outlet Tester for signs of light indications. . Use the light indication guide provided with the tester to determine the status of the outlet.

Note: For a complete overview on using the outlet tester, see the Electrical Safety Training Manual.

Hand Tools

Hand tools are very useful and required on the work site; however, hand tools should be used only for the job for which they were made. Many accidents are caused by the careless use of hand tools. Some examples of hand tools used are shown in figure below.

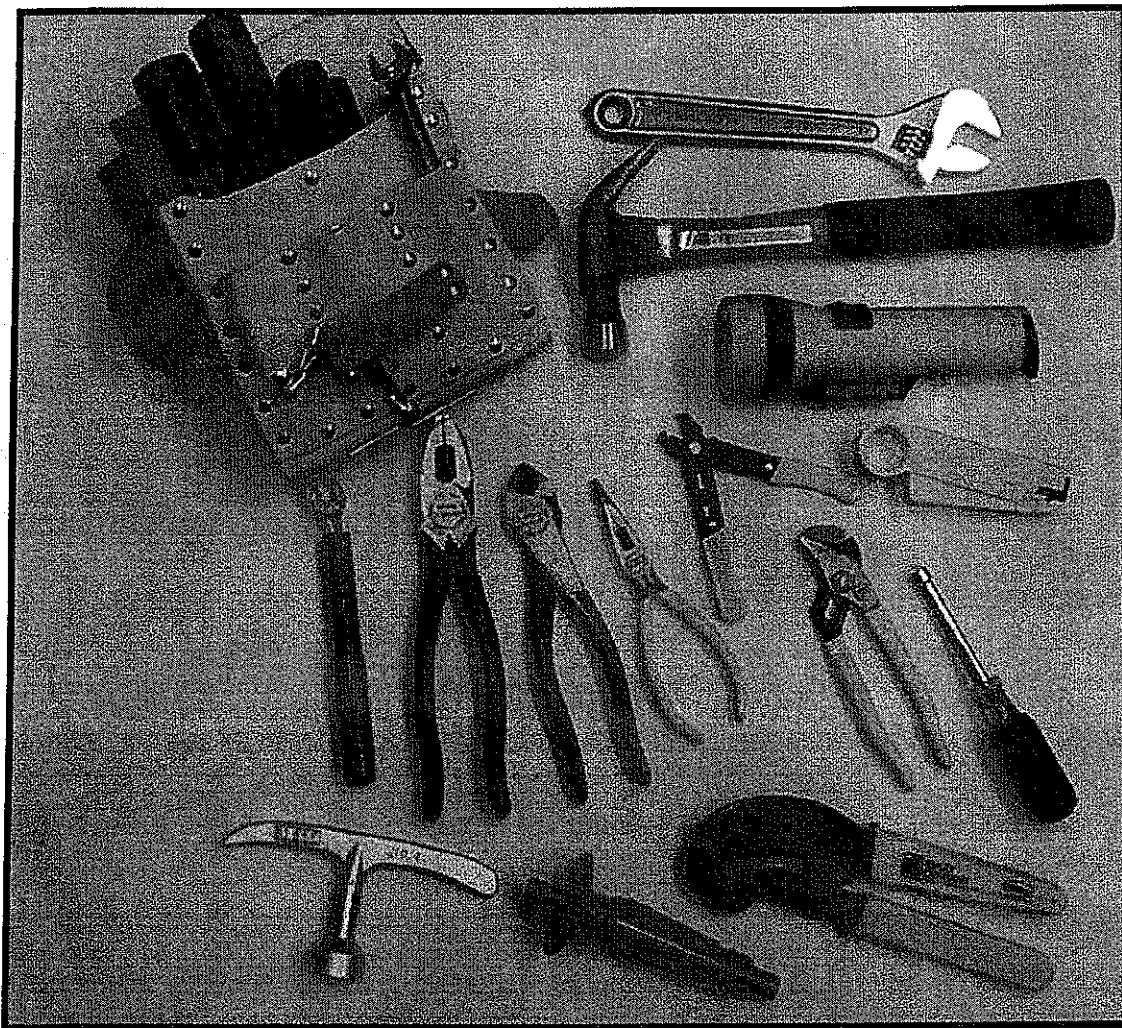


Figure 15 Hand Tools

The following six safety practices can eliminate most accidents related to hand tools:

- Wear the proper personal protective equipment.
- Select the right tool for the job.
- Know if a tool is in good condition, and keep it in good condition.
- Only use tools for their intended purpose.
- Keep tools in a safe place. Do not store on or in an open overhead shelf or compartment.
- Do not leave the cutting edges of knives, chisels, or any other sharp tools exposed when carrying them; use the proper pouches, belt holsters or other safe forms of transport.

When working with portable power tools, special care must be taken to ensure your safety while working. The following additional precautions must be observed when working with portable power tools:

- Ensure that electrical cords are not cracked, scraped, cut, or show any signs of other physical damage.
- Ensure that all plugs are not damaged and the ground pin is in place.
- Portable power tools must be disconnected when making repairs, adjustments, or tool bit changes.
- Safety glasses/eye protection is mandatory when using a power tool.
- Loose clothing must be secured or removed.

Whenever a tool is damaged or unsafe, it must be replaced. See your supervisor for a replacement.

Module 2: Ladder Handling

The purpose of Ladder Handling is to educate our employees on the correct ladder handling procedures during routine and non-routine work assignments. This information is being provided to ensure that all employees are aware of Cablevision's Ladder safety procedures.

Why Field Ladder Safety

Accidents involving the incorrect use of ladders are a frequent cause of injuries to TELECOM workers. Accident and injury statistics have revealed that ladder injuries from improper carrying, positioning and lifting have caused serious work-related injuries. Falls from ladders are another cause of injury that occurs from improper climbing and failure to properly "belt-off".

As a CATV Technician, you will frequently work from a ladder. Safely working from ladders involves an understanding of what ladders are designed for and how to properly use the ladder. This module will discuss the following ladder safety items:

- PPE
- Inspecting ladders
- Mounting ladders on vehicle
- Carrying ladders
- Setting up and climbing ladders
- Working from ladders
- Disconnecting aerial drops

Personal Protective Equipment (PPE)

The following PPE is required during the handling of ladders:

- Hard Hat
- Fall Arrest System (Body Belt and Safety Positioning Strap)
- Safety Glasses
- Applicable Work Gloves
- Approved Footwear
- Approved Apparel

Hard hats and safety glasses must be inspected and donned (put-on) prior to the start of any outdoor field assignment including assignments involving the use of ladders.

Only Cablevision issued Personal Protective Equipment shall be worn while performing work related tasks.

Body Belt and Positioning Strap

Body Belts must be properly fitted for each individual user. Contact your supervisor, Area Safety Manager (ASM) or technical trainer on the requirements to ensure a proper fit. All equipment must be inspected daily by the user and either monthly or quarterly (depending on the type of inspection) by user's supervisor.

The body belt/positioning strap must be used/worn for all pole and strand work assignments involving the use of an extension ladder. The following general guidelines must be reviewed and understood when using a body belt and positioning strap:

- Only a Cablevision issued body belt/positioning strap must be used while performing work related assignments.
- All positioning straps must be equipped with double locking clips to prevent "roll-out".
- As a result of the inspection process, all defective equipment must be repaired and/or replaced as needed.
- Any defective equipment that cannot be repaired and/or replaced, must be appropriately marked, reported and removed from service immediately.
- For further information on the body belt/positioning strap, refer to Module 1: Personal Protective Equipment (PPE).

Personal Protective Equipment (PPE) before Climbing

The following PPE must be worn before attempting to climb a ladder:

- Applicable Work Gloves
- Footwear
- Safety Glasses
- Hardhats
- Approved Apparel

For further information on the use and type of PPE listed above, refer to Module 1: Personal Protective Equipment (PPE).

Ladder Equipment

Specific ladders may vary by the needs and specifications of each area; however, standard ladders are being provided by Cablevision:

Table 7 Ladders Provided By Cablevision

Ladder type	Usage
Extension Ladder	Portable ladder consisting of a base and fly section. Commonly used for field and maintenance.
Combination/step ladder	Short field ladder that can be used as straight ladder or converted to A-Frame type ladder. Used almost exclusively in the field.
Special 2-step ladder	Ladder used in field and in facilities. Ladder opens up and locks for climbing low heights.

Note: All field ladders provided by Cablevision are made of a non-conductive durable construction (e.g. fiberglass) and must not be altered or modified from the manufacturer's original design. Only Cablevision-issued ladders are to be used while performing work-related tasks.

Defective ladders should be properly marked (indicating that they are out of service) and reported to a supervisor and/or maintenance person immediately. Replacement ladder(s) must be available as needed.

Any ladder that is thought to be responsible for an injury must be segregated and held as evidence. This ladder is only to be handled by authorized personnel. Only Corporate Risk Management can authorize the release of this ladder.

Inspecting Ladders

Visually inspect and physically test ladders prior to each work shift and each use to ensure that the ladder is safe for use. An effective inspection only takes a few minutes but can prevent severe injuries. The table below indicates the minimum criteria for all ladder inspections.

Table 8 Ladder Inspection Checklist

Equipment	Inspect for:
Feet (safety shoes)	Feet secured. Rubber treads in good condition and secure. Feet swivel freely.
Side rail	No cracks, warping, or other damage.
Fly section guides	Secure and properly set.
Extension rope	Not worn or frayed. Adequate length.
Extension rope pulley	Properly secured and functional. Pulley moves freely and mounting strap is in good condition.
Rungs	Good condition, properly secured, no damage.
Ladder locks	Properly secured, functional, locking without difficulty.
Strand hooks	Properly secured, moves freely, and locks securely.
V-bar	Properly secured and in good condition. Rubber securely attached.
Spreader (for step ladder/combination)	Properly secured, functional, no damage.

Note: If a ladder is found to be unsafe, the ladder should be tagged and removed from service. Notify your supervisor and obtain a replacement ladder. Never use a ladder with any defects or damage.

Mounting Ladders on Vehicle

Proper mounting is important to ensure the ladder is stable while the vehicle is in motion. The following procedures must be adhered to concerning the safe transportation of ladders:

- All field ladders are to be secured to vehicles using only a Cablevision-approved ladder rack and locking mechanism. Supporting points should be of a material to minimize chafing and the effects of road shock.
- When mounted on the vehicle for transportation, at no time should the ladder be allowed to slide forward or backward.
- Whenever possible, ladder should not extend beyond either bumper of a vehicle. If ladder over-extends 2 feet beyond bumper, an orange flag must be secured to the edge of the ladder.
- Preferably, extension ladders should be mounted on the passenger side of the vehicle so it can be safely handled away from traffic flow while parked alongside the road.

Ladder Selection, Handling and Placement

A significant number of TELECOM ladder related accidents are attributed to improper selection, handling and placement. It is critical that these procedures be followed.

Ladder selection and preparation should be made only after a thorough assessment of the job has been completed. As part of this assessment, the following conditions must be identified and addressed:

- Scope of job, including careful attention to the height at which the work will need to be performed.
- Proper selection of the ladder should be chosen to avoid overreach by the employee.
- The service vehicle should be safely positioned, as close to the work area as possible, therefore, reducing the distance the ladder needs to be carried.
- If a roadside worksite must be established, the employee's vehicle shall be placed in a manner that protects the worksite from oncoming traffic.
- Position cones and signs to mark a designated and visible safe work area around the vehicle and worksite.
- Try to ensure stable footing while removing your ladder. When ground hazards exist such as snow, ice, or tripping obstacles, try to position your vehicle to ensure that the best possible footing can be achieved.
- The route the ladder will be carried should be inspected prior to actually carrying the ladder. Efforts should always be made to avoid:
 - Slippery surfaces such as icy walkways and/or snow covered areas
 - Low lying branches
 - Shrubbery
 - Uneven and/or damaged pavement
- Always be aware of energized wires when placing the ladder on the TELECOM strand or pole.
- Always maintain a safe distance from all energized wire or sources.

Note: See the Training Manual on Electrical Safety for appropriate approach distances to energized components.

Carrying Ladders

There are many acceptable techniques for carrying a ladder. The main concern in carrying a ladder is to avoid back strain and injury. The following are some basic lifting guidelines to help prevent back injuries:

- Lift only what can be handled without overexertion. Get help if necessary.
- Lift comfortably. Choose the position that feels best.
- Lift gradually.
- Lift close to the body.
- Lift without twisting.
- Maintain strong abdominal muscles.

When removing the ladder from the truck, the ladder should be slid/pivoted off the truck with the end of the base section (foot) rested on the ground. The ladder may now be lifted and carried to the job site using approved carrying methods.

Shoulder Carry

The shoulder carry method balances the extension ladder at the center point on the person's shoulder during the carry. The figure below shows the shoulder carry method.

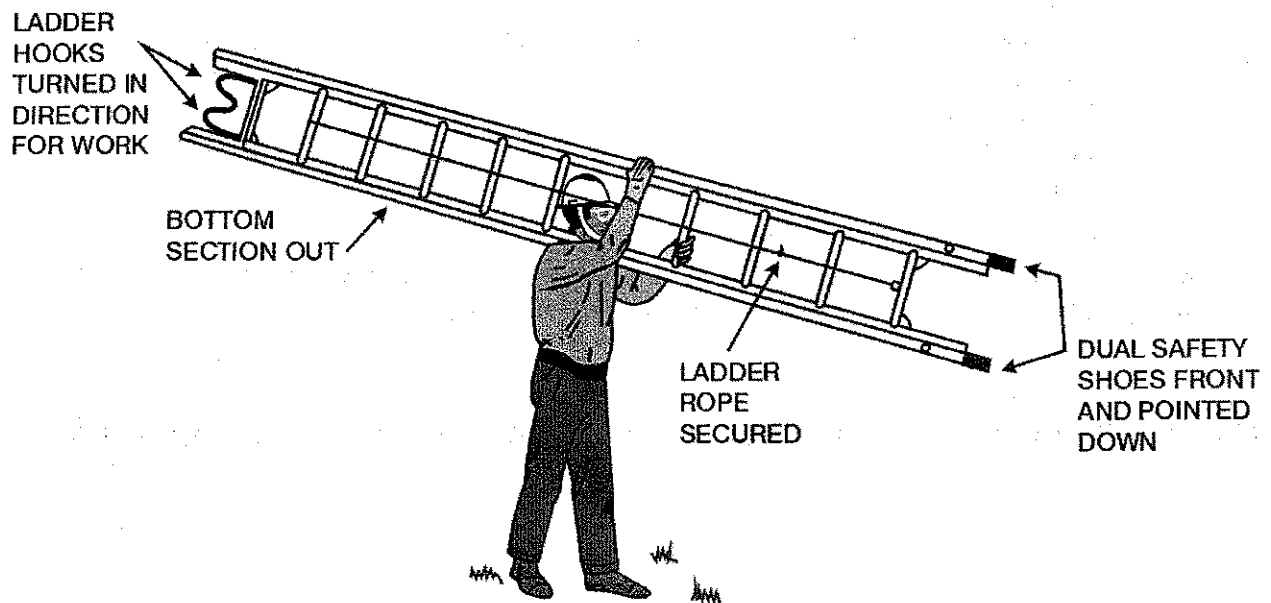


Figure 17 Shoulder Carry

Start with the ladder in the vertical position with the base section of the ladder facing you. Place one hand on the side rails of the base approximately chest high. Place your other hand on the opposite side rails approximately 1 foot higher. Allow the ladder to lean toward you with the lower side rails resting on your shoulder. Find the center of the ladder and adjust your hand position for comfort and control. Do not place your hands or arms through the ladder. Lift the ladder using your legs while keeping your back straight. The weight of the ladder will rest on your shoulder while your hands will provide control and balance.

Carry the ladder so that the front is slightly tilted forward. Watch for steps and other hazards, such as potholes, ice spots, or stones, that may be present in your path. Be aware of other obstacles around you while you are walking, and be very careful when turning.

Suitcase Carry

The suitcase carry lifts the extension ladder at the center point on the person's hip. The suitcase carry is used when overhead space is limited. The figure below shows the suitcase carry method.

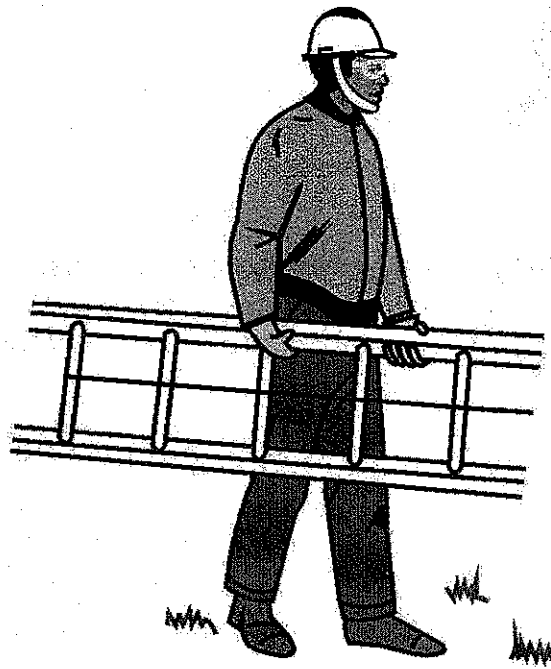


Figure 18 Suitcase Carry

Start with the ladder lying horizontally on a firm surface. Kneel next to the ladder, and rotate the ladder up onto the side rail with the base facing you. While facing the foot of the ladder, grasp the upper side rails with both hands to maintain balance at the ladder center. The D-ring of your climb belt may be placed under the flange of the upper side rail to assist in lifting. Lift the ladder using your legs. Always carry a ladder feet first.

Two-Person Carry

When two employees are present and weather or other obstructions make ladder carrying more hazardous, a two-person carry is recommended. Ladders 32 feet and longer should be carried by two people. The figure below shows the two-person carry method.

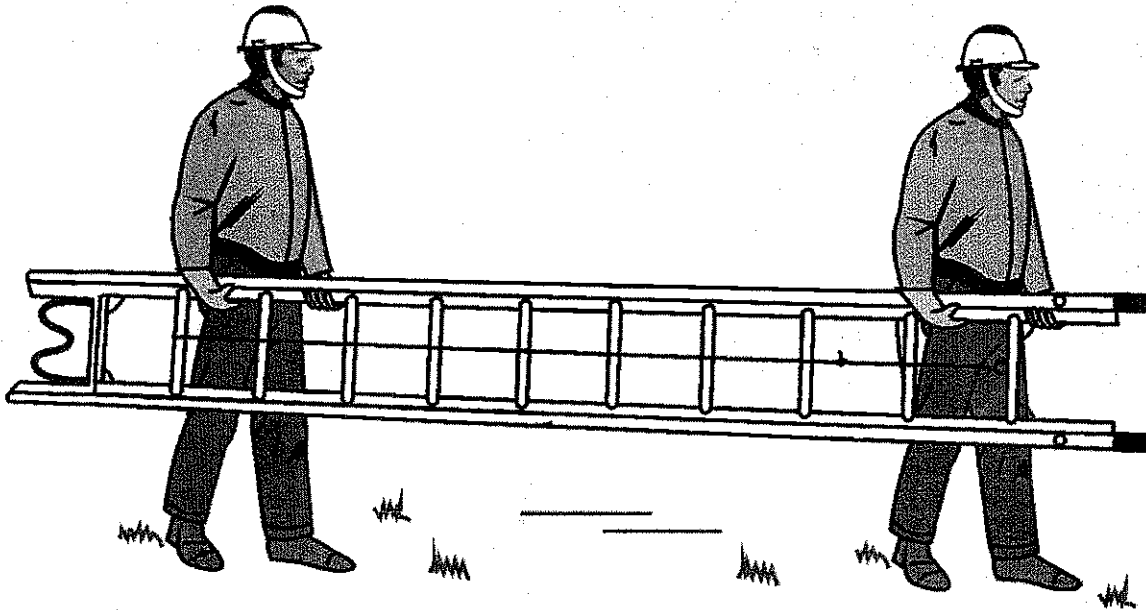


Figure 19 Two-Person Carry

The same techniques for lifting and carrying a ladder for one person are followed during a two-person lift, except the balancing is performed at the ends of the ladder versus the center. In a two-person carry, workers should communicate and coordinate lifting and carrying techniques to avoid injury.

Placement, Setting Up and Climbing Ladders

Ladders should always be placed on a firm, level surface when possible. If a level surface is not available, set up the ladder on the downhill side of your intended work area or use the ladder levelers. Check for any overhead obstacles and electrical hazards. If placing the ladder on a pole, inspect the pole to ensure that it is safe as described in Module 1 of this Manual. If placing the ladder on a strand, inspect both the strand and the supporting utility pole. Excessive slack and loose guy wires or branches on the strand are indications that the strand may be unsafe.

Position the ladder about 2 feet from the pole, strand, or building. Turn the strand hooks so they are turned out. When placing a ladder on the side of a building, always position the strand hooks so they are facing each other, as shown in the figure below. You should be positioned on the fly section side of the ladder with one foot against the base of the ladder and one foot back for balance. Raise the fly section using the pull rope until the top of the ladder is approximately 2 feet above the desired height. Check that the locks are fully engaged onto a base section rung, and tie off the pull rope. Move the feet of the ladder away from the pole, strand, or building until they are 1 foot away for every 4 feet of height.

Note: While raising and lowering the fly section, engage the rung locks every two or three rungs until the desired position is obtained.

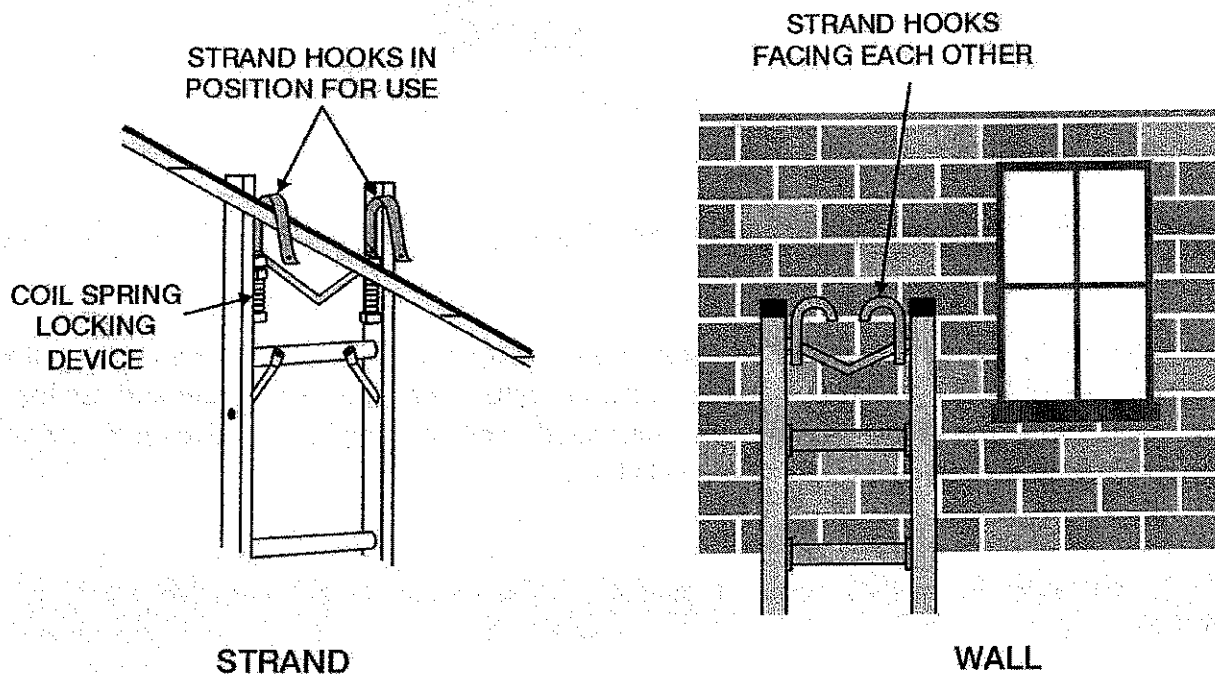


Figure 20 Proper Positioning of Strand Hooks

Ladder Safety

A 4:1 angle can be checked by the following (refer to figure below):

- Face the ladder with your toes touching the ladder base.
- Extend your arms/hands out so they are parallel to the ground.
- Once the tips of your fingers touch the side rails, the ladder is positioned at a safe angle to climb.

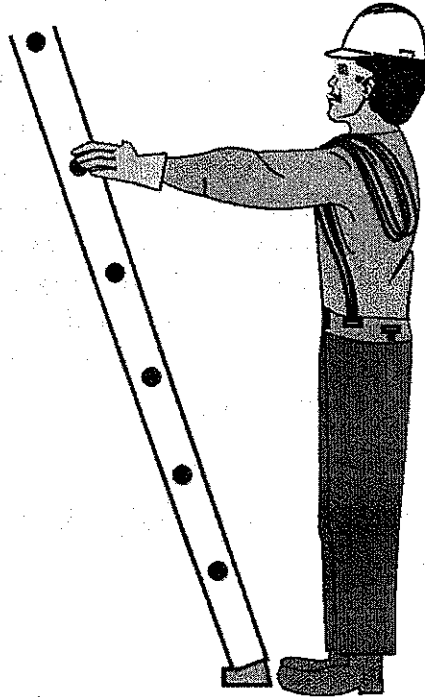


Figure 21 Determining Safe Ladder Angle

Note: Never climb a ladder during lightning storms.

When climbing or descending a ladder, always wear the proper PPE, including work boots with a well-defined heel, eye protection, hardhat, and body belt. Always face the ladder and use the three-point climb. Grasp the side rails with your hands while climbing or descending the ladder. Stop climbing four rungs from the top of the ladder.

Note: The three-point climb is having both hands and one foot or one hand and both feet on the ladder at all times.

Working from Ladders

Note: Prior to belting off, all equipment must be checked for the presence of voltage using the tic tracer or FVD.

When working on a ladder, you should secure your position and provide fall protection by using a body belt and safety strap. When using a ladder on a strand, the strap is laced inside the rail, around the strand twice, and then back to the D-ring. The strap is then clipped, with the clips out, to the D-rings on the body belt. The figure below shows how to properly belt-off when working on a strand.

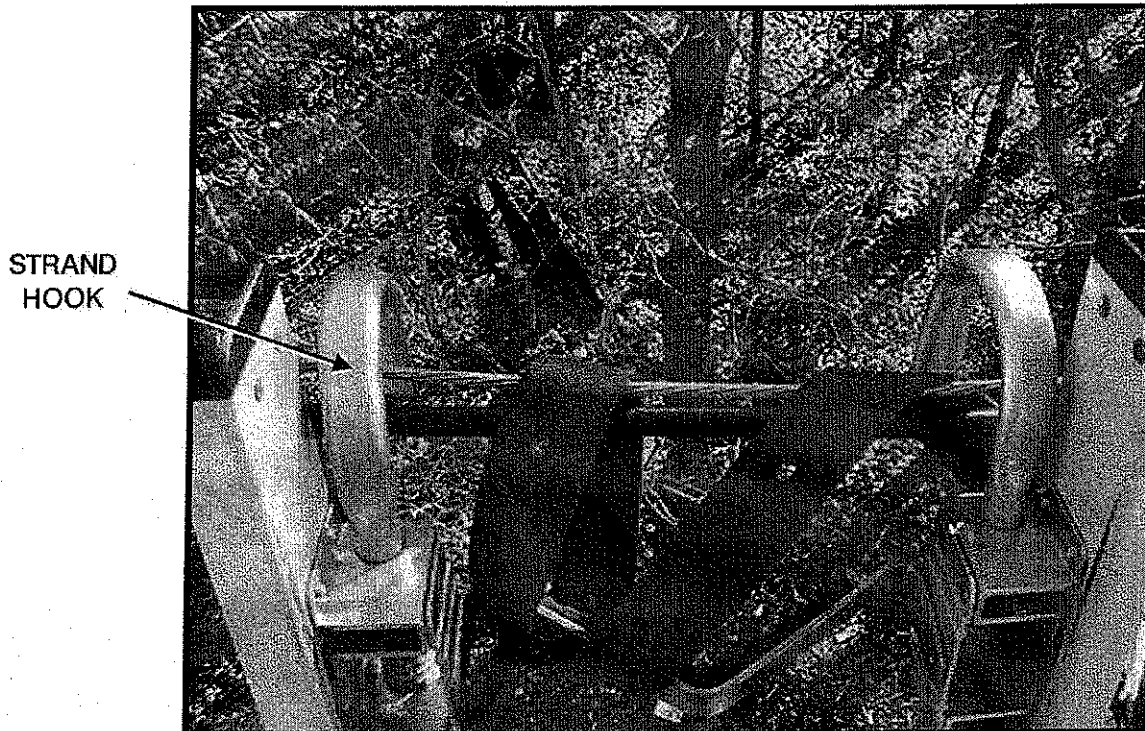


Figure 22 Safety Belt-Off on Strand

Ladder Safety

When using a ladder on a pole, the safety strap is run from one D-ring, through the ladder, around the pole, through the ladder again, and clipped to the opposite D-ring. The figure below shows how to properly belt-off when working on a pole.

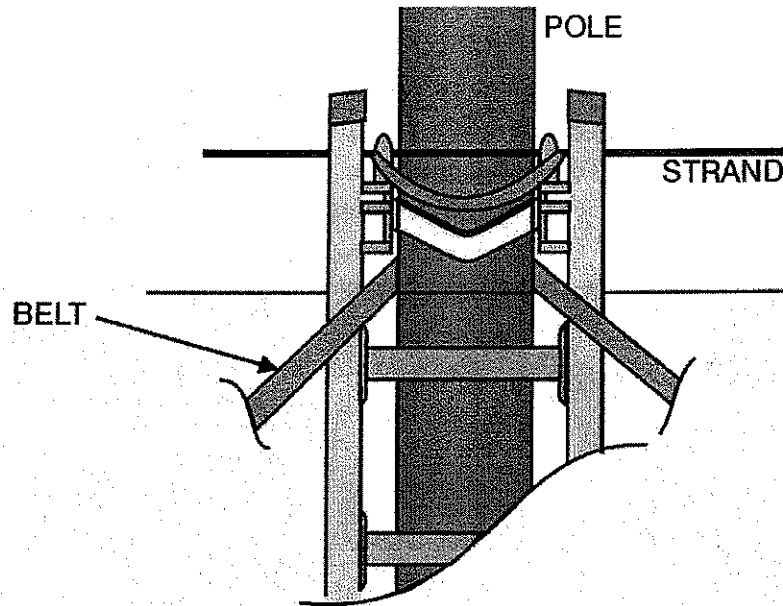


Figure 23 Safety Belt-Off on Pole

Be observant of potentially hazardous situations when working on a ladder. Items to be mindful of include the following:

- Traffic in the area of the ladder.
- Doorways should open away from the ladder. If the doorway opens toward the ladder, it should be blocked to prevent operation and to make the customer aware of your presence.
- Electrical conductors around the pole or strand. Use a voltage tester to check the strand for the presence of dangerous voltage. Be mindful of the clearance with an energized conductor.
- Tree branches, especially during high winds.
- Bird nests and insect nests that may be disturbed in the area.

Ladder Operation and Usage

The following steps must be reviewed and followed to ensure safe ladder usage:

- Make sure ladder locks are secured before climbing an extension ladder.
- Employees must always climb a ladder using the 3-point contact method. This method specifies that 2 hands and 1 foot, or 2 feet and 1 hand must be in contact with the ladder during climbing (ascending and descending).
- The employee should always face the ladder while working or climbing.
- Both hands must be free of materials, such as tools, when climbing.
- No more than one person is allowed to work on a ladder at any given time.
- The employee must never climb beyond the fourth rung (from the top of the ladder) to perform his/her work.
- The employee should not reach beyond a comfortable distance that causes imbalance, and never beyond 12" from the side-rail. (As a reminder -The Employee's belt buckle should never be outside the side rail of the ladder.)
- At no time will equipment or tools be thrown to an individual working on a ladder.
- Employees should never try to move the ladder by "hopping/walking". Employees must descend from the ladder and move it to its desired position, and then ascend following all safety procedures.
- Employees should observe and prepare for insects and nests while operating on the ladder. Sudden or accidental disturbances of nests could lead to an employee falling from the ladder.
- A ladder should never be left unattended or out of your sight for an extended period of time.
- Never use an extension ladder in the reverse position.
- If lightning appears when you are working in an elevated position, stop working, return to your vehicle and wait for weather conditions to improve. Contact your supervisor and/or dispatch.

Material and Equipment Handling

The employee should never carry materials and/or equipment while ascending or descending his/her ladder. If equipment needs to be transported from the ground level to the aerial work area the following steps should be taken:

1. Place all items to be transported into a canvas splice bag.
2. Ascend the ladder using conventional 3-point contact method.
3. Secure work position to prevent falls.
4. Hoist bag to work area and secure to strand to allow for easy access.
5. When work is complete lower canvas bag to ground level and descend using conventional 3-point contact method.

Retraction and Removal

At the completion of your assignment the following procedures are to be reviewed to safely remove the ladder from the work site and properly secure it to the vehicle:

1. Raise the ladder to form a 90-degree angle with the ground.
2. Extend fly section upward until ladder locks release.
3. Using the rope, lower fly section two rungs at a time.
4. Secure ladder with ladder locks and ensure that the rope is tied-off to both the fly and base sections.
5. Lift ladder and return to vehicle using steps outlined under Ladder Handling and Carrying.

Step Ladders - Indoor Climbing

The following procedures refer to the use of stepladders that are used indoors:

1. Spreaders must be fully extended and locked prior to climbing.
2. Step ladders should not be used as straight ladders.
3. Never climb beyond the second rung (from the top) of the ladder to work.
4. Do not stand on the top step or service tray of stepladder. Only Cablevision-issued ladders should be used for climbing. At no time, should any furniture, pails or other objects be used to climb.

The following are additional safety guidelines when working on a ladder:

- Do not exceed the maximum weight limit of the ladder or the strand.
- Never throw equipment or tools to an individual working on a ladder.
- Both hands must be free of materials, such as tools, when climbing.
- In order to prevent equipment damage, never place strand hooks over cable system components such as amplifiers, taps, line extenders, or drops.
- Never place the ladder base on the street side of the strand without establishing a proper traffic safety zone.
- Park your truck between the ladder location and oncoming traffic when working in the street. Ensure that your truck is at least 2 feet away from the ladder.

Disconnecting Aerial Drops

Prior to disconnecting a drop, always test the line and strand for the presence of any current or voltage using a Clamp-on VOM (Volt/Ohm/Ammeter) and Tic Tracer/FVD. When removing a drop, always disconnect the house end first. Never attempt to disconnect the drop from the strand first. Place the ladder on the opposite side of the strand from the drop. This prevents unnecessary pressure on the drop from your weight and the weight of your ladder.

Note: For a complete Electrical safety overview, see the Electrical Safety Training Manual.

Utility Poles

This section discusses the proper techniques and tests to use when inspecting a utility pole.

Inspection

As a CATV technician, you will be required to work on and around utility poles. Never attempt to climb or set a ladder against a pole that may be unsafe. This is also true for setting a ladder on a strand supported by a pole that may be unsafe. There are a few checks you should perform to check the condition of the utility pole to verify that it is safe.

First, test the pole for the presence of any hazardous voltage using the tic tracer or FVD. Next, the condition of the pole should be checked for any hazards and signs that the pole may be damaged. These checks include:

- Check for deep or severe cracks, knots, knotholes, drilled holes, or gaff cuts.
- Check for rotted outer surfaces.
- Check for bird and insect nests.
- Check for nails, conduit, ground wires, metal pole numbers, guy wires, vines, or any other material attached to the pole that may present a hazard.
- Check for warning tags indicating that the pole was previously identified as being unsafe.

Refer to the figures below.

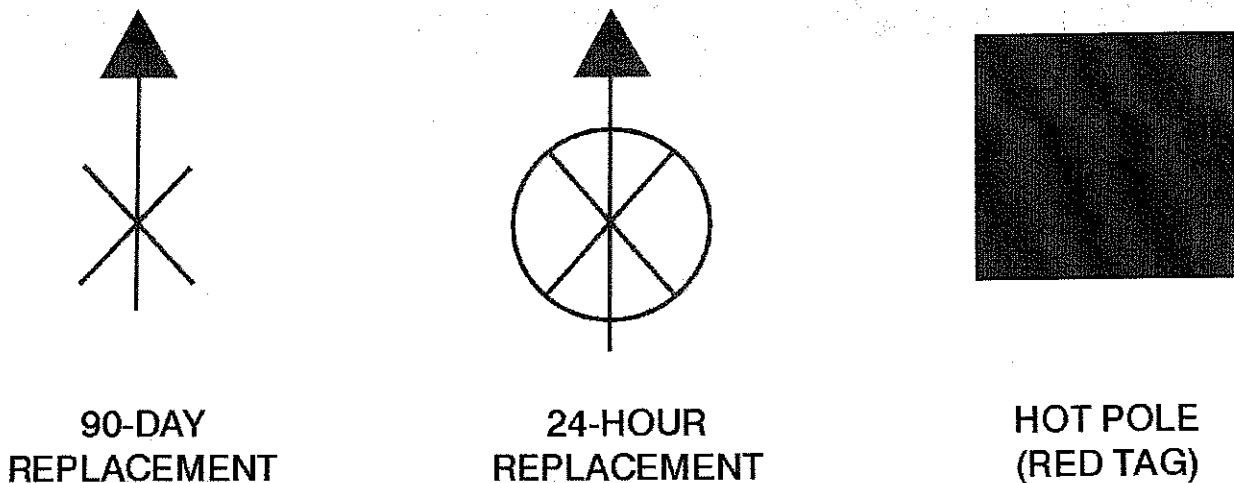


Figure 24 Red Warning Tags

If you suspect the pole is unsafe, do not climb the pole. Contact your supervisor for further instructions.

Prod Test

The prod test is performed to test the integrity of the pole structure below ground level. A long-shank screwdriver (5-inch minimum) is inserted at a 45-degree angle into the ground at the base of the pole. Softness when the screwdriver contacts the pole indicates that the pole may have decayed below ground level. Any sign of decay indicates that the pole is unsafe. This test must be repeated around the pole until you have tested the entire base of the pole.

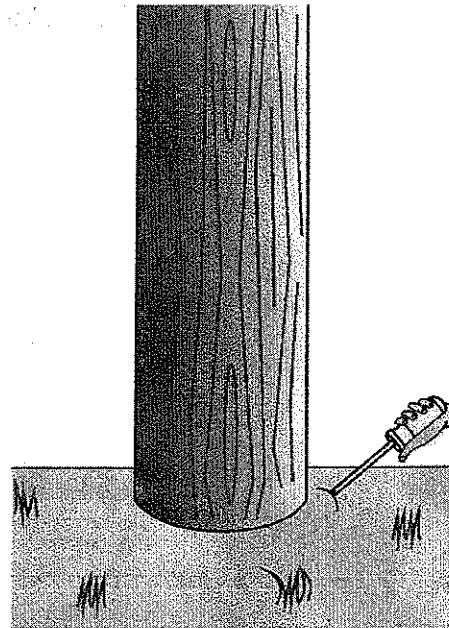


Figure 25 Prod Test

Sound Test

The sound test is performed to test the integrity of the pole structure above ground level. The pole is struck with a hammer while listening for sound and recoil to indicate signs of decay. A solid pole will produce a sharp bang sound and strong recoil. A soft recoil or dull sound indicates pockets of decay, indicating that the pole is unsafe. This test is repeated around and up the pole in a spiral pattern to test the entire pole.

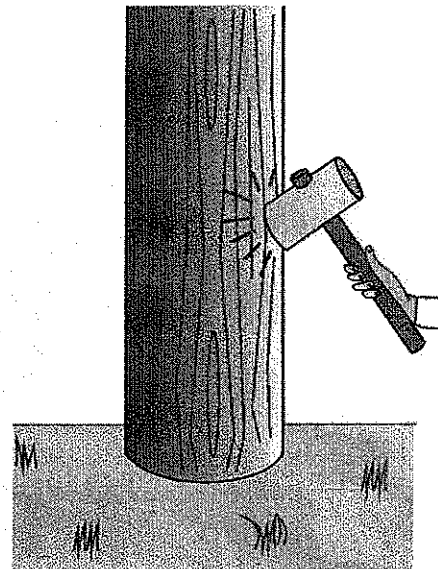


Figure 26 Sound Test

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Module 3: Hazard Communication (Right to Know)

Chemical Awareness - Right to Know

You have the right to know about the chemicals you work with and how to take precautions against any potential negative effects associated with these chemicals. The Hazard Communication (Hazcom) Training Program (Right to Know) is designed to educate the employee on the hazards and the precautions associated with these chemicals.

Why Hazard Communication?

Employees are sometimes injured while using chemicals on the job because they are unaware of the proper safety precautions that should be taken to protect themselves from the harmful chemical effects. Communicating the proper information is therefore important so that employees will know how to work safely with chemicals.

This is primarily accomplished by the procurement and availability of Material Safety Data Sheets (MSDS), which are documents concerning a hazardous chemical, which is prepared by the manufacturer and provided upon request to the user.

Technicians/Employees are responsible for reviewing and understanding the information and adhering to policies and procedures stated in this module.

Definitions

Chemical	Any element, chemical compound or mixture of elements and/or compounds.
Chemical Name	The scientific designation or name of a chemical, which clearly identifies the chemical for the purpose of conducting a hazard evaluation.
Common (Trade) Name	The name used by the retail distributor who sells hazardous chemicals.
HMIS Label: (Hazardous Material Information System)	Identifies the potential health hazards associated with a specific chemical. The hazard terms listed on the HMIS can have 1 of 4 numbers indicating its severity.
Hazardous chemical	Any chemical that is a physical hazard or a health hazard.
Hazardous Material	A material that releases hazardous components (e.g. dust vapor, fumes) during operations or processes. Examples are metals and welding rods during welding, metals or concrete during cutting, and exhaust fumes.
Label	Any written, printed or graphic material displayed on or affixed to containers of hazardous chemicals.
NFPA Diamond	A hazard warning labeling system that rates the hazard severity according to a numbered system. Zero (0) means no hazard and three (3) means the most severe hazard. The bottom section of the label is also used for other hazards, such as not to mix with water. (See example in this section).
Material Safety Data Sheet (MSDS)	Document concerning a hazardous chemical, which is prepared by the manufacturer and provided upon request to the user.

Procedure

When hazardous chemicals or materials are received, the receiver will obtain material safety data sheets (MSDS) for each item. MSDSs can be requested from the supplier, distributor or manufacturer. Contact your Area Safety Manager (ASM) should you have a problem obtaining an MSDS.

- MSDS will be kept in an accessible location for employees. (Example: tech rooms, lunchrooms, near eye wash stations etc).
- MSDS must be readily accessible during each work shift to employees when they are in their work area(s). Therefore, technicians working in the field must be previously trained on hazards and the safe use of all chemicals that will be used when working in the field.
- Prior to the initial use of a chemical or material, employees will familiarize themselves with the precautions needed to work safely with these chemicals and materials by reviewing applicable material safety data sheets.
- Employees must contact their regional Area Safety Manager and/or supervisor before engaging in any non-routine task(s) requiring the use of a chemical.
- Employees shall follow the safety precautions on the MSDS, including, but not limited, to proper use of personal protective equipment, proper storage, and proper disposal.
- If respiratory protection is needed, the employee must notify his or her supervisor, and then follow the Respiratory Protection Chapter found in the Cablevision Safety and Training Manual.
- Employees will not remove or deface any labels on hazardous chemicals/materials.
- If a hazardous chemical is transferred to a secondary container, the employee will properly label the secondary container in accordance with labeling system discussed in this section. Use of unlabeled secondary containers is prohibited to prevent the misuse or inadvertent application of a hazardous chemical.

Material Safety Data Sheet (MSDS)

Injuries resulting from chemical exposure can largely be attributed to their improper use and storage. Material Safety Data Sheets (MSDS) are chemical fact sheets that provide technical information about a chemical. Different manufacturers may arrange MSDSs differently, but they all contain the same basic information. A MSDS must contain:

- The chemical or common name
- Physical and chemical characteristics (e.g., vapor pressure, flashpoint, etc.)
- Physical hazards associated (e.g., potential for explosion, fire, reactivity)
- Health hazard including symptoms, common routes of entry, the permissible limit to the exposure, etc.
- Precautions for safe handling
- Spill or leak procedures including proper disposal
- Applicable control methods (e.g., work practices, protective equipment, engineering control, etc.)
- Emergency and first aid procedures
- Manufacturer's name, address, and phone number

An MSDS must be obtained for all new products brought into the facility. The MSDS is good for each product name and not just for each chemical. MSDSs must be readily available to those workers whose job function involves the use and/or potential contact of a hazardous chemical.

You should always check the MSDS for any chemical that you use, especially if you are unsure of the hazards of that chemical. MSDSs are available through your supervisor.

Labeling System

All chemical containers must have a label properly identifying the chemical. The label must contain the following information:

- Name of chemical
- Hazard warnings
- Name and address of the chemical manufacturer, distributor, or other responsible party

NFPA Chemical Hazard Label

The National Fire Protection Association (NFPA) has developed a system for indicating the health, flammability, and reactivity hazards of chemicals. In addition, a special precaution symbol may be used where necessary. The figure below shows the NFPA Chemical Hazard Label.

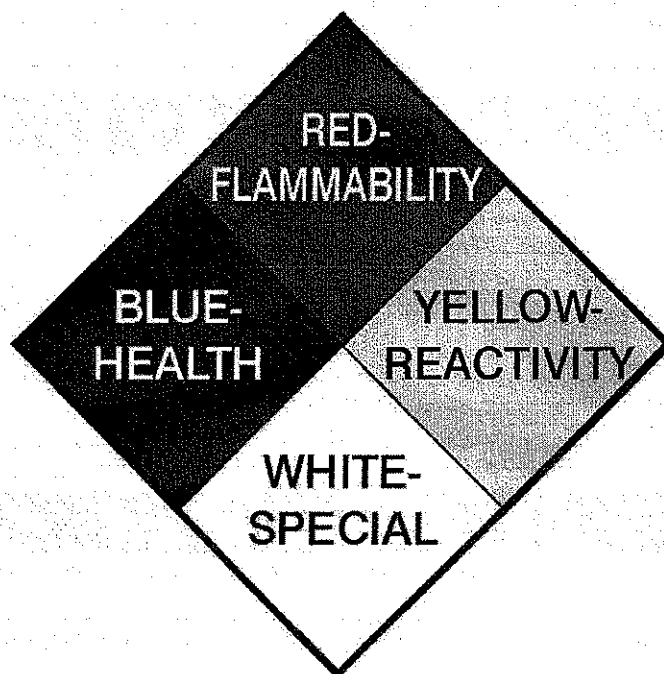


Figure 27 NFPA Chemical Hazard Label

The severity of the hazard is indicated by a numbering system and displayed in the associated colored diamond with the exception of Special. A range of 0 to 4 is used with 0 indicating minimal hazard and 4 indicating a severe hazard. The table below describes the rating for each hazard.

Hazard Rating

Flammability (Red)	
4	Materials that will rapidly or completely vaporize at atmospheric pressure and normal ambient temperature or that are readily dispersed in air and that will burn easily.
3	Liquids and solids that can be ignited under almost all ambient temperature conditions.
2	Materials that must be moderately heated or exposed to relatively high ambient temperatures before ignition can occur.
1	Materials that must be preheated before ignition can occur.
0	Materials that will not burn.

Reactivity (Yellow)	
4	Materials that in themselves are readily capable of detonation or of explosive decomposition or explosive reaction at normal temperatures and pressures.
3	Materials that in themselves are capable of detonation or of explosive reaction, but they require a strong initiating source or must be heated under confinement before initiation.
2	Materials that in themselves are normally unstable and readily undergo violent chemical change but do not detonate or react violently with water.
1	Materials that in themselves are normally stable, but they can become unstable at elevated temperatures and pressures or can react with water with some release of energy but not violently.
0	Materials that in themselves are normally stable, even under fire exposure conditions, and are not reactive with water.

Health (Blue)	
4	Materials that upon very limited exposure could cause death or major residual injury even though prompt medical treatment is given.
3	Materials that upon short-term exposure could cause serious temporary or residual injury even though prompt medical treatment is given.
2	Materials that on intense or continued exposure could cause temporary incapacitation or possible residual injury unless prompt medical treatment is given.
1	Materials that on exposure would cause irritation but only minor residual injury even if no treatment is given.
0	Materials that on exposure under fire conditions offer no hazard beyond that of ordinary combustible material.

Special (White)	
OX	Denotes materials that are oxidizing agents
W	Denotes materials that are water reactive
R	Denotes materials that are reproductive toxin
C	Denotes materials that are carcinogenic
CORR	Denotes materials that are corrosive
	Denotes materials that are radioactive

Hazardous Materials Identification Systems Label (HMIS)

Another frequently used marking system is the Hazardous Material Identification System (HMIS). The identity of the chemical is shown at the top of the label. Colored bars indicate the hazards: red for flammability, yellow for reactivity, and blue for health. The degree of hazard is expressed using the same numeric coding as described for the NFPA Chemical Hazard Label.

A white bar at the bottom contains a letter for the personal protective devices that must be used when handling the chemical. The figure below shows an example of a HMIS label for methanol. The table on the next page is a listing of the possible letters that can be displayed in the Personal Protection block.

METHANOL	
HEALTH	1
FLAMMABILITY	3
REACTIVITY	0
PERSONAL PROTECTION	

Figure 28 HMIS Label

Personal Protection Recommendations	
Letter	PPE Recommendation
A	safety glasses
B	safety glasses, gloves
C	safety glasses, gloves, apron
D	face shield, gloves, apron
E	safety glasses, gloves, dust respirator
F	safety glasses, gloves, apron, dust respirator
G	safety glasses, gloves, vapor respirator
H	splash goggles, gloves, apron, dust respirator
I	safety glasses, gloves, dust and vapor respirator
J	splash goggles, gloves, apron, dust and vapor respirator
K	airline hood/mask, gloves, full suit, boots
N	splash goggles
O	face shield
P	gloves
Q	boots
R	apron
S	full suit
T	dust respirator
U	vapor respirator
W	dust and vapor respirator
X	consult supervisor or Standard Operating Procedure
Y	full face respirator
Z	airline hood/mask

Figure 29 PP Recommendations Table

CONTENTS

Electrical Safety.....	1
Objectives	1
Safety	2
Cablevision Safety Responsibility for Field Service Operations:	2
Governing Agencies	3
Occupational Safety and Health Administration (OSHA)	3
National Electrical Code (NEC).....	3
National Electrical Safety Code (NESC).....	3
Definitions.....	4
AC Power Distribution	5
Generating Station and Switching Yard.....	5
Transmission Lines.....	5
Transmission Substations	5
Primary Distribution Lines	5
Secondary Distribution System	6
Residential Pole/Wire Configuration.....	7
Grounding.....	8
Types of Electrical Current.....	11
Types of Electrical Current.....	11
Electrical Formulas.....	12
Ohm's Law	12
Power Law	12
Electrical Hazards.....	13
Safe Work Distances - Exposed Energized Overhead Power Lines/Parts	13
Tree Trimming and Pruning.....	14
Step Potential	16
Touch Potential.....	16
Other Electrical Hazards	17
Results of Electrical Hazards.....	18
Electrical Hazard - Shock.....	18
Electrical Shock Prevention Guidelines	20
Electrical Hazard – Burns	21
Personal Protective Equipment (PPE)	22
Hard Hat and Safety Glasses (Electrical Safety).....	22
Insulating Gloves.....	22
Apparel: Clothing	24
Other Electrical Safety-Related PPE and Equipment.....	25
Electrical Safety Test Equipment	26
Clamp-On Voltmeter (VOM).....	26
Tic Tracer	32
Foreign Voltage Detector (FVD).....	34
Outlet Tester.....	37

Electrical Safety on the Job Site	38
Working on Pole and/or Strand (Routine Work Conditions).....	38
Hazard at the Pole	38
Non-Routine Conditions (Restoration)	39
Working In and Around Dwellings	40
Hazards at Customer's Home	41
Disconnecting / Reconnecting a House Drop	43
Work-site Protocol: Safety within the Customer's home	44
Hot Ground	45
Hazards of Cable Conductors.....	45
Hazards of Underground Systems	45
Other Potential Hazards	45
Electrical Hazards of Storm Conditions	46
Customer Created Hazards.....	48

Electrical Safety

Objectives

After completing the Electrical Safety Training Manual, participants will be able to:

- Name the authority governing occupational safety regulations for the nation and for the state.
- State basic electrical definitions.
- Identify the units of measure for voltage, current, resistance, impedance, and power.
- Describe basic electricity transmission.
- Define AC and DC.
- Use Ohm's Law to calculate resistance, voltage, or current.
- Calculate electrical power.
- List safe work distances for energized work.
- Define step and touch potential.
- Explain how factors affect the severity of electrical shock.
- List the inspection requirements for insulating rubber gloves.
- Describe the use of an audio/visual voltage detector, volt-ohm ammeter (VOM), and outlet tester.
- State the actions required for a hot ground.
- Describe the precautions taken during storm conditions (restoration) with respect to electrical safety.
- Identify customer-created electrical hazards.

Safety

Safety is the most important aspect of any job performed on or around electrical equipment. Everyone must know the electrical hazards associated with the job and how to protect themselves from these hazards. Every year, there are thousands of electrical shock related accidents within the United States. Most of the accidents are the result of inadequate training/knowledge, complacency and/or a neglect of safety procedures. Cablevision has prepared specific guidelines to ensure your safety within close proximity to energized sources.

The purpose of this Training Manual is to familiarize you with electrical hazards that may be encountered while working in the field during routine and non-routine assignments. This information is provided to ensure that all employees are aware of Cablevision's electrical safety procedures.

Cablevision Safety Responsibility for Field Service Operations:

- Must attend all safety training classes.
- Must follow safety procedure at all times.
- Must use all proper safety equipment and Personal Protective Equipment (PPE).
- Must immediately report any and all safety violations, unsafe conditions and/or accidents to their respective supervisors.
- Must conduct required inspections (e.g. Vehicle and Equipment Safety Inspection).



The Cablevision Safety & Training Manual should be used with this training Manual as an additional reference manual.

Note: This training Manual is part of the Field Operations New Hire Program and is also a stand-alone Manual for Electrical Safety training for all field service personnel

Governing Agencies

This section discusses the Occupational Safety and Health Administration (OSHA), the National Electrical Code (NEC), and the National Electrical Safety Code (NESC) roles in establishing safety regulation. Cablevision safety policies are based on OSHA regulation and may be stricter than OSHA regulation. Following all Cablevision safety policies ensures compliance with the governing authorities' regulations.

Occupational Safety and Health Administration (OSHA)

The Occupational Safety and Health Administration (OSHA) is the authority governing all occupational safety regulations. OSHA uses the Occupation Safety and Health Act to establish regulations pertinent to occupational safety. OSHA regulations are enforceable as federal laws. Any employer found in violation of any OSHA regulation could be subject to severe penalties including fines, imprisonment, or both.

OSHA regulations related to telecommunication work, including CATV installers, are found in OSHA standard 1910.268. Other OSHA regulations pertaining to your work are located in the General Industrial Code of Federal Regulations.

While Cablevision can establish policies, provide equipment, conduct safety training, and check to see that safe practices are being followed at the job sites; it is your responsibility to ensure that safety is your first priority in the field. Failure to follow company safety policies and to manage your daily work practices in a safe and professional manner could result in injury, equipment and/or property damage. Your failure to comply with these requirements could lead to termination of your employment.

National Electrical Code (NEC)

Given the potentially dangerous environment created by electricity and electrical work, several national agencies have developed regulations, codes, and standards. The National Electrical Code (NEC) is a list of safety regulations and procedures for the installation of electrical wiring and equipment in the United States. It was created for the "practical safeguarding of persons and property from hazards arising from the use of electricity."

The NEC is not actually a law, but a code of practice. In order for the code to be legally enforced, the state, county, and/or community must first adopt the NEC.

National Electrical Safety Code (NESC)

The National Electrical Safety Code (NESC) is issued by the Institute of Electronic and Electrical Engineers (IEEE). The NESC lists safety regulations and procedures for the "practical safeguarding of persons from hazards arising from the installation, operation, and maintenance of electric supply and communications cables and their associated equipment located throughout the cable plant." In other words, the NESC covers the entire cable system up to the tap port. The NESC does not cover the coaxial cable or materials in the customer's house drop. As with the NEC, the NESC must be adopted by the state, county, and/or local community in order for the codes to be enforced. It is recommended that you obtain a copy of your local requirements from the appropriate government agency.

Definitions

This training manual uses some terminology that may be unfamiliar. This section provides definitions of the terms that are used in this Manual.

Electricity	The flow of electrons through a conductor.
Voltage	Also known as electrical pressure (potential). It is the difference of electrical potential measured in Volts.
Current	The measurement of how much electricity passes a point on a wire in a given time frame. Current is measured in Amperes.
Resistance	The opposition to current flow in a direct current (DC) circuit. Resistance in a DC circuit is measured in Ohms.
Impedance	The total opposition a circuit offers to the flow of alternating current (AC).
Bond	The permanent joining of metallic parts to form an electrically conductive path.
Ground	A connection to earth or a conductor serving as earth potential. Ground is the point of reference in an electrical circuit considered to be at nominal zero potential when other potentials within the circuit are compared to it.
Neutral Wire	The electrical return path for current to travel back to the power source in a power transmission system.

AC Power Distribution

Generating Station and Switching Yard

- Generation from power plant generators
- Stepped up to transmission voltage at power plants

Transmission Lines

- 33 to 345 kV voltage range – depends on power provider
- Travels great distances
- High-voltage transmission at low-current condition to minimize line voltage loss
- Located on transmission towers – otherwise, located at highest point on the poles

Transmission Substations

- Transmission voltage stepped down at substations to distribution voltage
- Power from transmission substation distributed to distribution substation
- May be more than one step down
- Industrial distribution
- Residential and light industrial distribution

Primary Distribution Lines

- 2.4 to 13.8 kV voltage range
- Travels through neighborhoods
- Less voltage than transmission, still considered high voltage
- Location on poles without transmission (poles found in residential areas) top wires on poles

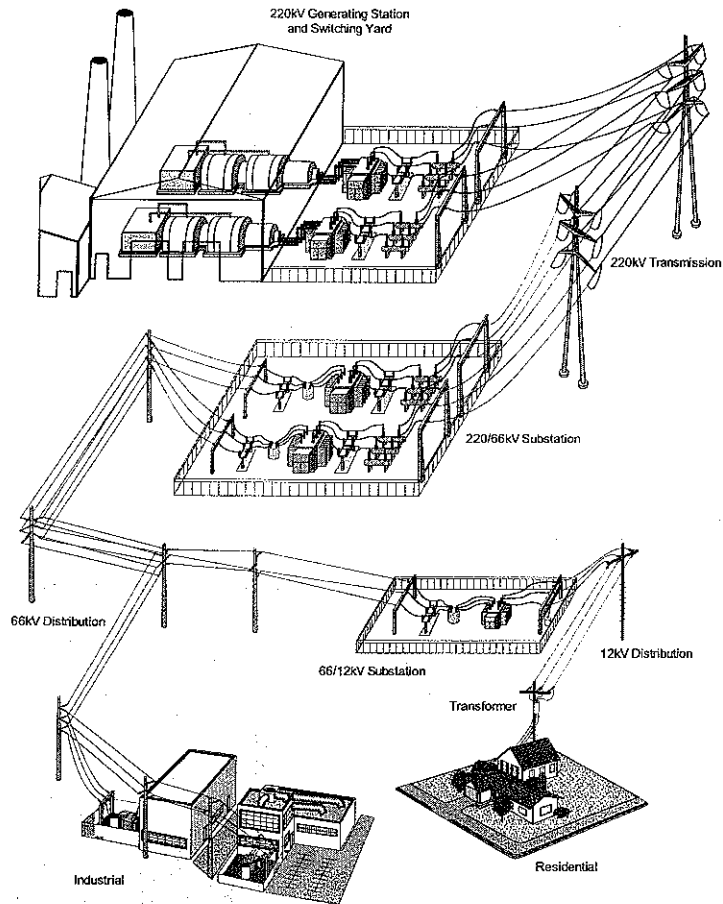


Figure 1 Power Distribution Overview

Secondary Distribution System

- nominal voltage
 - 120/240 single phase
 - 120/208 3 phase
 - 277/480 3 phase
- Travels from pole transformers to house service
- Utility considers low voltage – but not safe voltage!
- Depending on the power company, secondary wires may be positioned on pole below primary and below power company-installed fiber optic cable

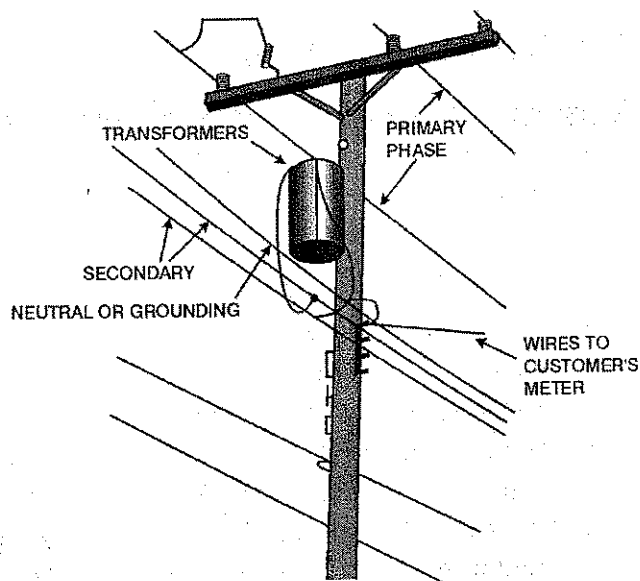


Figure 2 Secondary Distribution

Transformers

Two Types

- Step-Up: Steps up Voltage, current is stepped down
- Step-Down: Steps down Voltage, current is stepped up

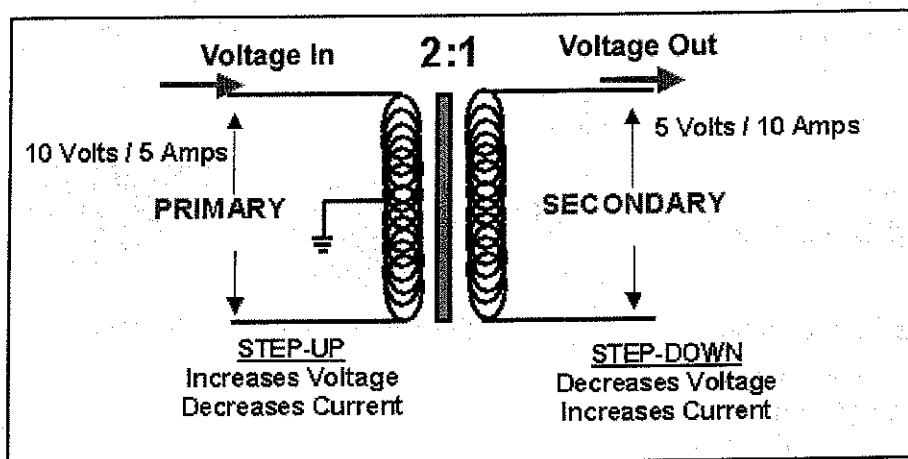


Figure 3 Transformer Overview

Residential Pole/Wire Configuration

Bond	Provides electrical continuity for all metal components.
Ground	Electrical reference in case of fault to provide protection to personnel.
Neutral	Electrical return path for a power line hot leg within a power transmission system.
Hot Leg	Power conductor from power supply.

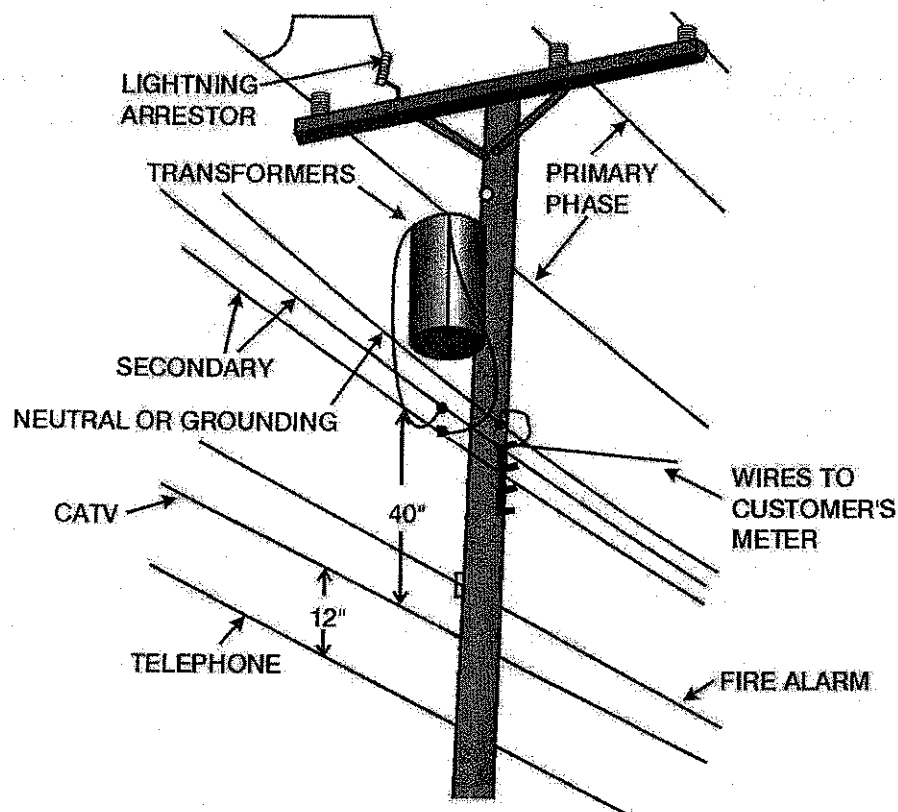


Figure 4 Residential Pole Configuration

Grounding

It is important to understand that electricity will always seek a state of "0" zero potential (ground). Therefore, it is very important that all TELECOM electrical components are properly connected and grounded. Failure to properly ground an energized source can result in the following:

- Television "Hum-Bar"
- Flickering house lights
- Visual inspection reveals loose connections
- Drop is warm to touch or melted
- No amperage reading on Ammeter

Cablevision has established a specific grounding protocol that should be followed. This protocol is a priority list of sources that must be used when installing TELECOM services.

Hazards at Customer's Home

- Poor or broken service neutral
- Poor or broken service ground
- Improper wiring/not to code
- Defective service equipment
- Customer's equipment

Typical House Service Setup

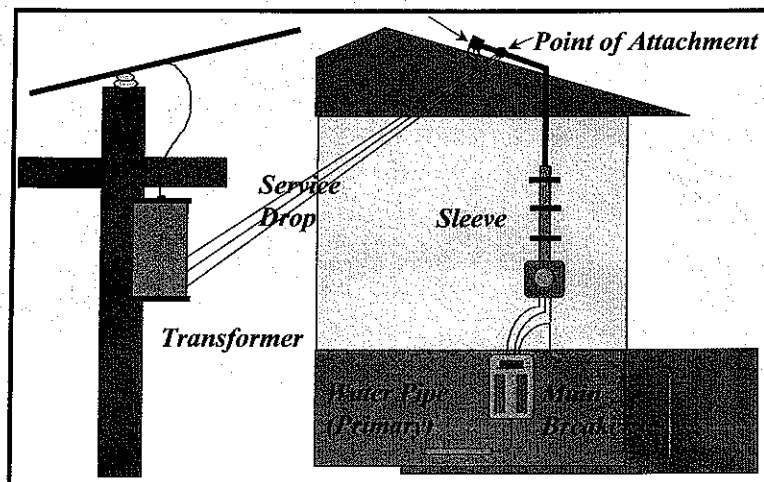


Figure 25

Walk down the Customer's Service Line and Visually Inspect

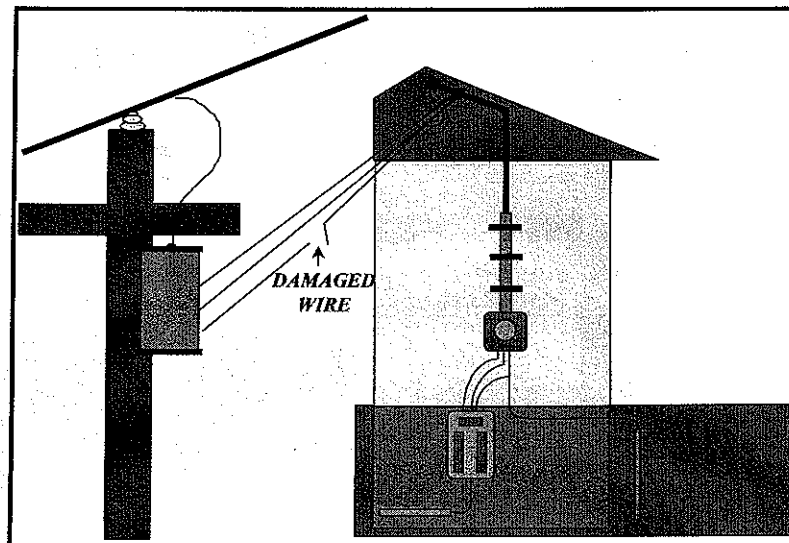


Figure 26

Broken Neutral connection

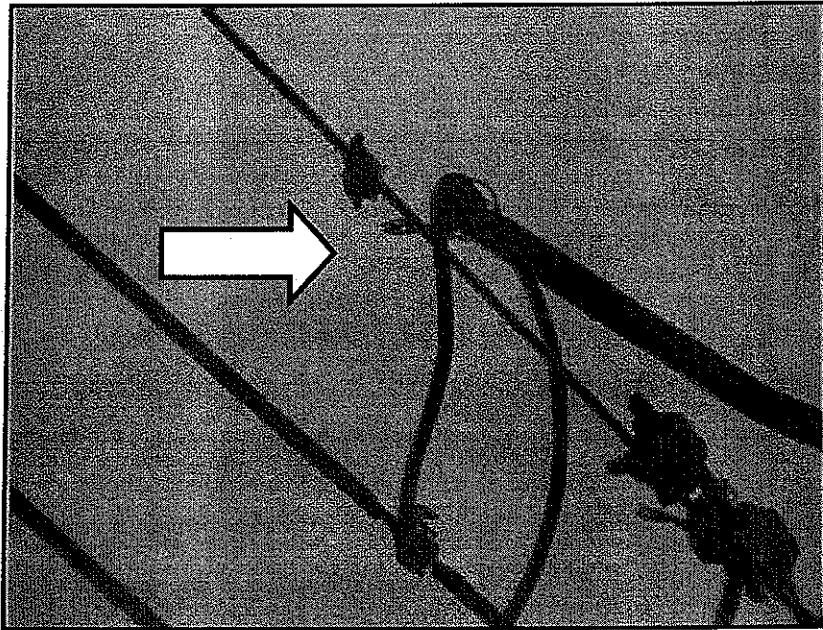


Figure 27

Visually Check Customer's Service Entrance

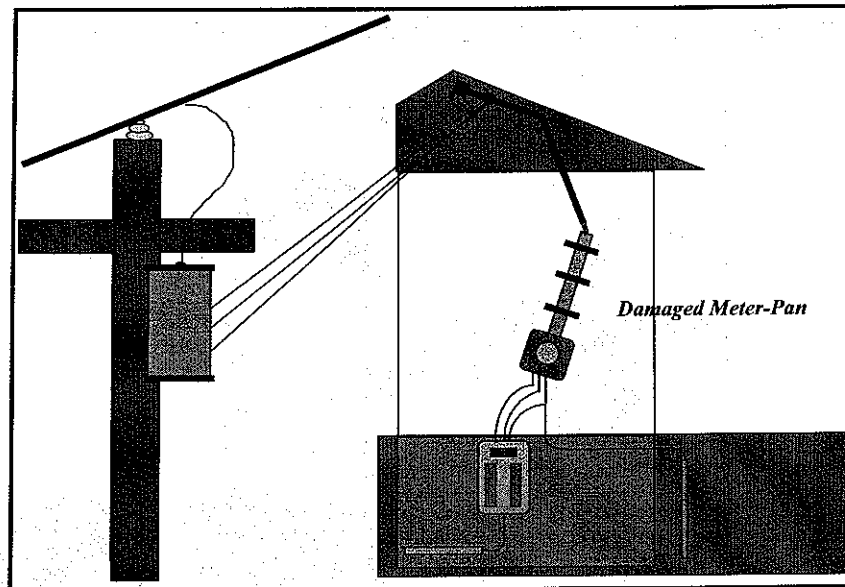


Figure 28

Disconnecting / Reconnecting a House Drop

When connecting/ disconnecting a house drop always adhere to the following steps:

1. Put on Insulating "00" Gloves and leather protectors. (Refer to Hot Drop Procedure Appendix C for further information).
2. Visually and manually inspect the cable drop to determine whether it is melted.
3. Using your Volt/OHM/Ammeter (VOM), test the grounding conductor to determine if the current is equal to or exceeds one (1) amp.
4. Disconnect Procedure:
If the current is equal to or exceeds one (1) amp; do not disconnect. Inform your supervisor and/or dispatch of the condition and await further instruction.

Note: The Area Safety Manager must ensure that a "hot ground" resolution protocol has been established and implemented for their region.

5. Re-connect Procedure:
Prior to connecting the drop to the tap; a current reading must first be taken from the customer's house electrical service ground to ensure electrical current activity.
 - A reading of no amperage can be a potential problem indicating the house's ground is not functioning.
 - A current reading up to 5 amps can be considered common and indicates the house's ground is properly functioning. Re-connecting our service drop should be electrically safe. A second current reading should be taken on the connected drop to determine if the current is below or above one (1) amp.
 - If the current is below one amp proceed with the remainder of the work
 - If the current is equal to or exceeds one amp contact your supervisor and await further instructions.
6. A visual inspection of the coaxial cable, power service and telephone grounding conductors must be made at both the ground block (house) and tap (pole). **The Power Company and customer must be notified of any potentially hazardous condition identified in the inspection.**
7. Always remember to follow proper grounding procedures as outlined in Section 8.0. Grounding.

Note: Excessive current on the drop cable is usually the result of a faulty power neutral. Any attempt to disconnect the coaxial cable drop may result in personal injury and/or damage to the customer's location.

Work-site Protocol: Safety within the Customer's home

When working inside a subscriber's home the following protocol should be followed to ensure your safety and the integrity of the installation.

- A 2" (two inch) TELECOM cable clearance shall always be maintained around all energized wires within the dwelling.
- When drilling through wall always maintain an 8" (eight inch) clearance from electrical outlets.
- When running TELECOM cable through insulating material such as fiberglass, always maintain the following rules.
 - Wear your dust mask filter.
 - If you suspect asbestos insulation do not disturb it. Always route the TELECOM cable to prevent any disturbance and/or contact with asbestos material.
 - Put-on and wear your eye protection and hardhat while working around insulating material. Also recommended are the use of work gloves and long sleeves.

Hot Ground

Defined as a ground wire or cable line that has electric current going through it.

Hazards of Cable Conductors

- Shock hazard 60 to 90 volts
 - Low-voltage gloves should be worn
 - Safety glasses required
- Cables may be elevated
- Follow proper ladder safety
 - Use approved safety belt when required
 - Properly secure ladder and yourself at all times
 - Follow all applicable work rules

Hazards of Underground Systems

- Cable identification may not always be easy
- Report any cable damage to your supervisor
- Make sure all utilities are marked out properly before digging
- Always dig carefully; depth of cables may be closer than you think

Other Potential Hazards

Fuses

- Designed to protect equipment
- Always replace fuses with the proper rating and type

Lighting

- Some types of lighting contain a ballast; this means high voltage is present, and care should be taken when working around this type of lighting

Batteries

- Designed to supply uninterrupted power
- Hazards are burns from acid or heat from a short
- Voltage levels can reach up to 600 volts

Note: Extreme caution should always be taken around any voltage supply.

Electrical Hazards of Storm Conditions

The weather plays an important role in outdoor work, especially during storm conditions. Use extreme caution during storm conditions. Ice, snow, high winds, and downed trees can damage power lines. Identification of the type of line is difficult during a storm condition. Always assume the line is energized until proven otherwise. Stay away from the line and call for help. There is a chance, during storm conditions, that the coaxial cable can become entangled with the secondary power lines, resulting in the coaxial cable becoming energized. For example, the secondary power line crosses the coaxial cable, or debris shorts the two together. The insulation on the coaxial cable is tough; however, it can be cut in extreme conditions, resulting in exposed messenger, braid, or center conductor. It is extremely important that during storm conditions, the technician uses the portable test equipment to check the coaxial cable before conducting repairs. The technician must not perform pole work during storm conditions.

Energized downed power lines create a phenomenon known as "step and touch voltage potential." The energized conductor in touch with the ground actually causes the ground to become energized. The voltage from the downed wire forms concentric circles of different voltage potentials around the point of contact. The voltage potential decreases as you go further away from the point of contact with the ground. If a person steps and walks through this energized area, his/her feet may be at two different voltage potentials.

Remember that electrical current flows through a conductor when there is a difference in voltage potential. Due to the separation between the worker's feet, a path is created through the person's body for current to flow. This can result in severe injury.



Figure 29 Storm Damage Entanglement

Lightning

Another hazardous storm condition is lightning, shown below. Lightning kills an estimated 93 people each year. It is Cablevision's policy that no construction or line maintenance work shall be performed during an electrical storm.

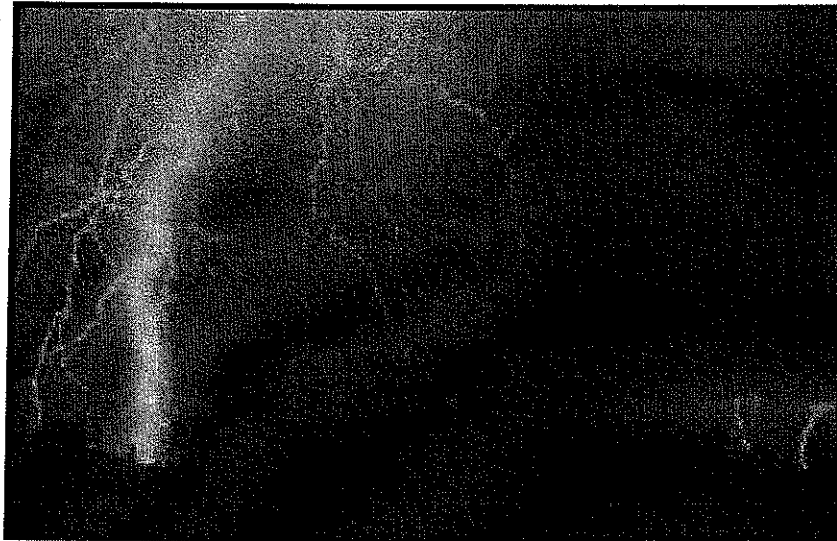


Figure 30 Lightning

Lightning often precedes rain and can strike as far as 10 miles away from the rain of a thunderstorm. So when lightning is present, follow these safety guidelines:

- Regardless of how far away the lightning is, you should stop outdoor work and go indoors or inside your vehicle if you see lightning.
- Stay off ladders.
- Avoid trees, golf carts, and tents. Stay away from metal fences, wires, and umbrellas.
- Do not handle electrical and/ or Telecom wiring within the customer's location until lightning is out of your immediate area.
- Seek safe shelter such as a vehicle or building.
- If lightning is striking near you, avoid direct contact with other people, remove metal objects such as tool belts, and crouch down with your feet together flat on the ground. Keep as low as possible, but do not lie flat on the ground.

Customer Created Hazards

Electricity is a very serious hazard. Unfortunately not everyone is as safety conscious as you about electrical safety. As you work in a customer's home, be aware of potential electrical hazards. Avoid all exposed electrical wires and energy sources, especially when crawling in basements, attics, or crawl spaces.

Sloppy electrical connections within the customer's dwelling can be dangerous. Improper grounding or neutral wire connections can present serious electrical hazards. Always check electrical components and circuits with a voltage tester and/or outlet tester before touching with a tool or any part of your body.

Typical Polarized Outlet

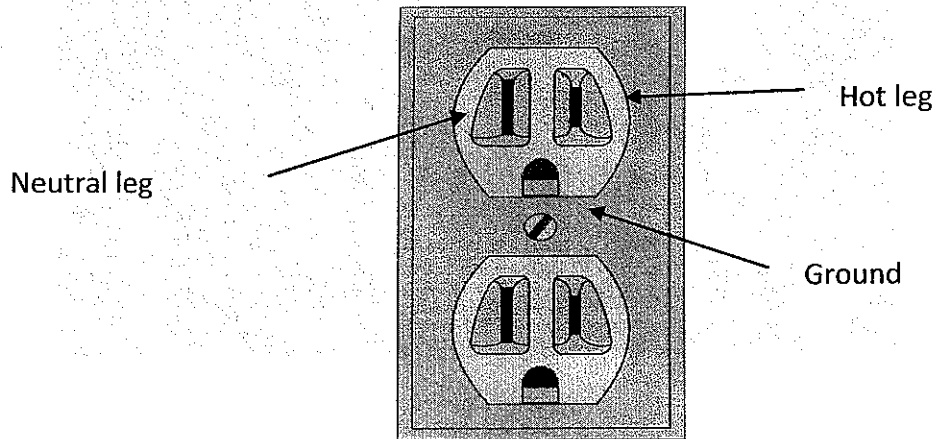


Figure 31 Duplex Outlet

The table below lists the electrical transmission components of a typical house utility system.

Household Utility System Components			
Component	Appearance	Function	Caution
NEUTRAL	Usually white or gray-white	Electrical return path for a power supply.	Tight connection is important. Could affect load on the power leg, damaging TV and other equipment.
GROUND	Green wire, wire with a green marking, or a bare wire	Electrical reference in case of a fault to provide personal safety.	A good ground should have 25 ohms or less of resistance. Proper grounding protocol must be followed.
HOT LEG	Black or red	Power conductor from a power supply.	Do not touch
BOND	Bare copper #6 wire	Provides electrical continuity/voltage potential for all metal components that make up electrical enclosures.	Should never be disconnected.

Table 6 Household Utility System Components

Common Outlet Problems

- **Broken ground:** Loss of your protection. Broken ground will compromise your safety.
- **Broken bond wire:** Possibility of equipment enclosures becoming energized. Broken bond could allow metal to be at different voltage potentials.
- **Broken neutral:** Loss of preferred return path. Broken neutral will put return current on the bond and ground, setting up a dangerous condition.

Note: Can be tested using the Outlet Tester, follow the manufacturer's instructions. Any damage found to the preceding components can jeopardize your safety. Contact your supervisor immediately.

1. The first part of the document is a list of names and dates, which appears to be a roster or a list of participants. The names are written in a cursive script, and the dates are written in a more formal, printed style. The list is organized into two columns, with names on the left and dates on the right.

2. The second part of the document is a list of names and dates, which appears to be a roster or a list of participants. The names are written in a cursive script, and the dates are written in a more formal, printed style. The list is organized into two columns, with names on the left and dates on the right.

3. The third part of the document is a list of names and dates, which appears to be a roster or a list of participants. The names are written in a cursive script, and the dates are written in a more formal, printed style. The list is organized into two columns, with names on the left and dates on the right.

4. The fourth part of the document is a list of names and dates, which appears to be a roster or a list of participants. The names are written in a cursive script, and the dates are written in a more formal, printed style. The list is organized into two columns, with names on the left and dates on the right.

5. The fifth part of the document is a list of names and dates, which appears to be a roster or a list of participants. The names are written in a cursive script, and the dates are written in a more formal, printed style. The list is organized into two columns, with names on the left and dates on the right.

6. The sixth part of the document is a list of names and dates, which appears to be a roster or a list of participants. The names are written in a cursive script, and the dates are written in a more formal, printed style. The list is organized into two columns, with names on the left and dates on the right.

7. The seventh part of the document is a list of names and dates, which appears to be a roster or a list of participants. The names are written in a cursive script, and the dates are written in a more formal, printed style. The list is organized into two columns, with names on the left and dates on the right.

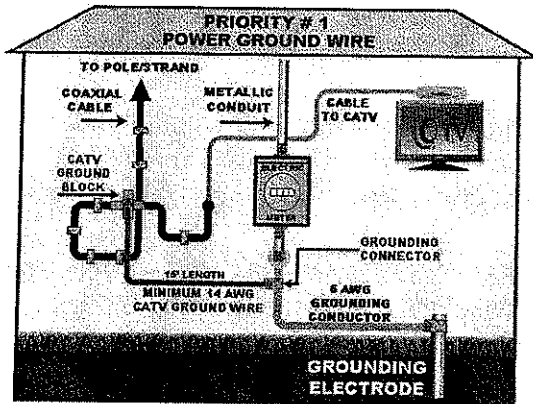
8. The eighth part of the document is a list of names and dates, which appears to be a roster or a list of participants. The names are written in a cursive script, and the dates are written in a more formal, printed style. The list is organized into two columns, with names on the left and dates on the right.

9. The ninth part of the document is a list of names and dates, which appears to be a roster or a list of participants. The names are written in a cursive script, and the dates are written in a more formal, printed style. The list is organized into two columns, with names on the left and dates on the right.

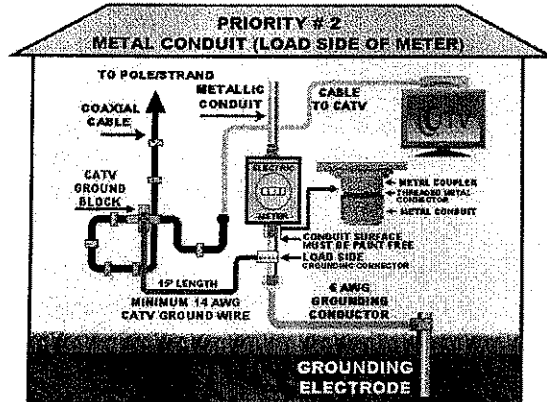
10. The tenth part of the document is a list of names and dates, which appears to be a roster or a list of participants. The names are written in a cursive script, and the dates are written in a more formal, printed style. The list is organized into two columns, with names on the left and dates on the right.

Grounding Priority Order

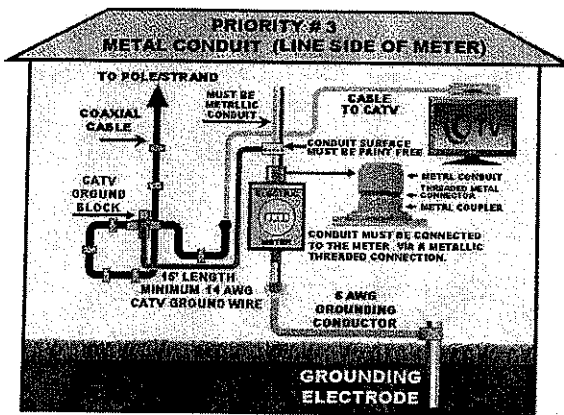
Priority #1: Power Ground Wire



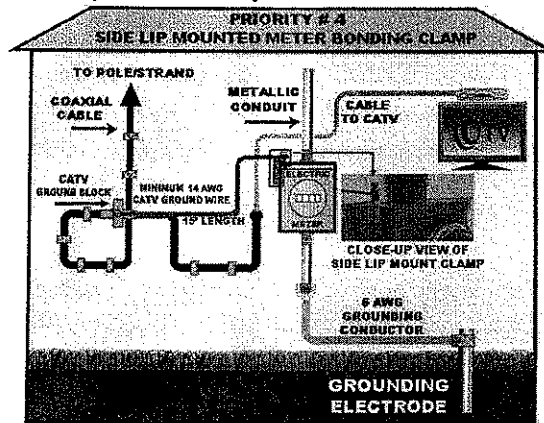
Priority #2: Metal Conduit, Load Side of meter



Priority #3: Metal Conduit, Line Side of Meter



Priority #4 : Side Lip Meter Box



Priority #5: Cold Water Main

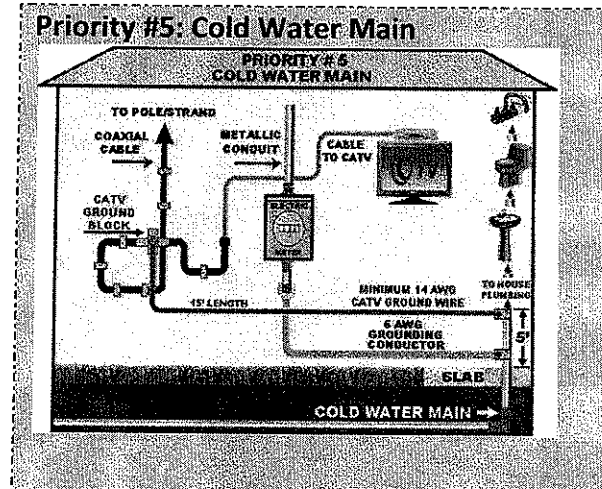


Figure 5

The following are the accepted grounding attachment locations in order of preference:

Priority	Acceptable Ground Attachment/Connector
1	Grounding through the use of an approved ground connector (i.e., UL-approved split-bolt of the proper size and a minimum #14 AWG copper wire) to the customer electrical service ground wire.
2	Attachment through the use of an approved grounding clamp (i.e., special clamp, UL-approved, for attachment to a 2-inch galvanized pipe and a minimum #14 AWG copper wire) to the continuous load side metallic conduit between the electrical meter housing and the electrical main breaker panel.
3	Attachment through the use of an approved grounding clamp (i.e., special clamp, UL-approved, for attachment to a 2-inch galvanized pipe and a minimum #14 AWG copper wire) to the continuous line side metallic conduit between and the electrical service main line and the electrical meter housing.
4	Grounding through the use of an approved clamp connector (i.e., special UL-approved meter box clamp for attachment to the meter box and a minimum #14 AWG copper wire) to the side lip of the metallic meter box enclosure.
5	Attachment through the use of an accepted clamp (i.e., special UL-approved clamp for attachment and a minimum #14 AWG copper wire to a metal conduit) to the grounded interior metal main water pipe within 5 feet of its entrance to the building/house. ▪ Must be approved by Supervisor.

Table 1 Accepted Grounding Attachment



All bonds are to be made with a minimum # 14 gauge wire. If proper grounding cannot be accomplished, then the installation must be terminated.



See the FO Bonding and Grounding TM for complete information, policy, process and procedure for grounding.

Types of Electrical Current

Types of Electrical Current

- Direct current (DC)
- Alternating current (AC)

Direct Current

- Primary source: batteries
- Direct current provides a steady and constant voltage

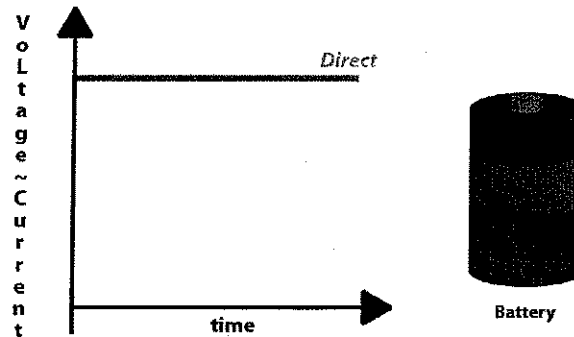


Figure 6 DC

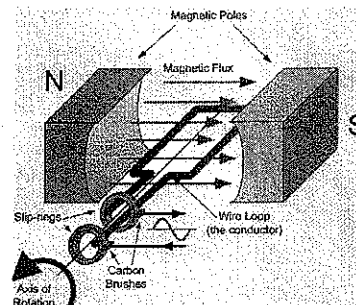
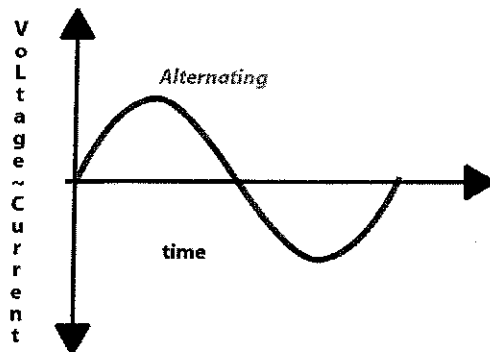


Figure 7 AC

Power Supplies

- Can be either AC or DC depending on their use
- Example use: Outside plant

Uninterrupted Power Supply (UPS) systems

- Uses both AC and DC to operate. AC is converted to become DC, while DC is inverted to become AC
- Example use: Headends

Control Systems

- Can be a combination of both AC and DC to maintain system reliability
- Example use: Air conditioning

Electrical Formulas

Electrical formulas are important not only to the daily technician tasks, but with regards to electrical safety.

Ohm's Law

$$E = I \times R$$

E = Voltage in Volts

I = Current in Amperes

R = Resistance in Ohms

Example: Ohm's Law calculation:

Given E = 260 V and R = 240 Ω , what current will flow through a circuit?

Solution: Since applied voltage and resistance are known, use Ohm's Law to solve for current.

$$I = \frac{E}{R}$$

$$I = \frac{260V}{240\Omega} = 1.083A$$

Power Law

$$P = E \times I$$

P = Power in Watts (746 watts is one horsepower)

E = Voltage in Volts

I = Current in Amperes

Electrical Hazards

Regulatory and industry standard - 600 volts and below is considered low voltage. Electrical current can travel approximately 1 inch per 1,000 volts in air. Electrical current will always seek easiest path to ground or the path of least resistance.

Safe Work Distances - Exposed Energized Overhead Power Lines/Parts

While performing work, it is important to understand the potential hazards associated with your assignment and your proximity to energized sources/wires. This is especially important when working in an elevated position such as on a utility pole or on a ladder.

Before beginning work, ensure that you are wearing all applicable PPE and that all electrical testing equipment is functioning properly. Conduct a work-site hazard assessment. The work-site inspection includes the following:

- Check for the presence of a damaged ground, bond, and/or neutral connection.
- Ensure that the utility wires, including primary and secondary, are properly connected.
- Ensure that all utility wires are connected to their appropriate insulators.

The following vertical clearances should be maintained between the cable strand and utility wires on the pole. See figure 6 below.

- The strand must be placed no closer than 12 inches from the telephone line.
- The strand must be placed no closer than 40 inches from secondary power lines.

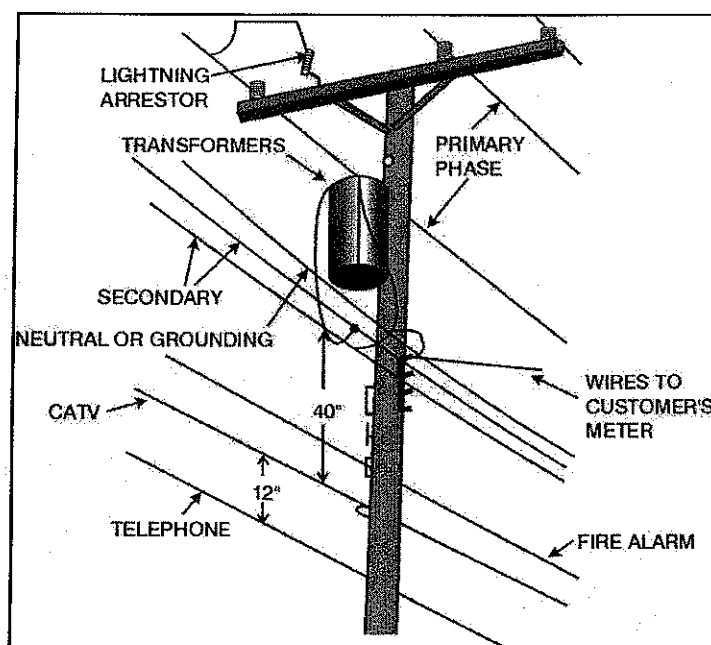


Figure 8 Residential Pole Configuration

Prior to coming in contact with any wire including TELCOM strand, it is necessary to determine the presence of any hazardous voltage.

Below is a list of safe working clearances for the various voltages you may encounter. Safe working clearances are measured from the employee's extreme reach or from the end of a tool that is being used to the energized conductor. Cablevision's policy is that you should always maintain a least a 10-foot working distance from any primary line.

Safe Working Clearances	
Voltage Range (Phase to Phase)	Approach Distance (Inches)
300 volts or less	Avoid Contact
Over 300 volts, but less than 750 volts	12
Over 750 volts, but not more than 2 kV	18
Over 2 kV, but not more than 15 kV	24
Over 15 kV, but not more than 37 kV	36
Over 37 kV, but not more than 87.5 kV	42
Over 87.5 kV, but not more than 121 kV	48
Over 121 kV, but not more than 140 kV	54

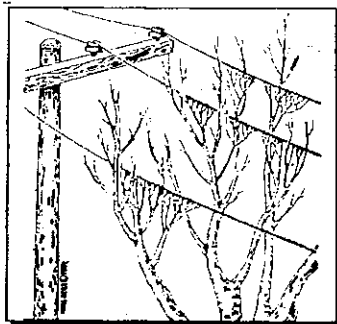
Table 2 Safe Working Clearances

Tree Trimming and Pruning

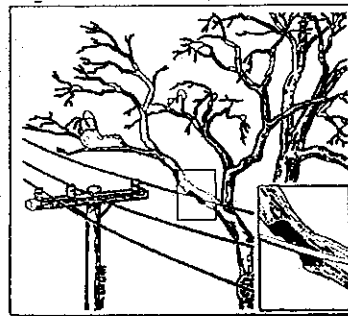
Trimming of trees around energized wires is restricted. On the occasion that a limited amount of branches must be removed to complete your work assignment, the following requirements must be followed prior to contact with the tree:

Put on all applicable PPE. It is your responsibility to ensure that all PPE must be properly tested, functioning and utilized for every work assignment.

Determine if any tree limbs are in contact with energized wires. The figures below show the result of tree branches/limbs that have been exposed to energized lines.



Branches begin to look like the bottom of a broom.



Tree limb develops a distinctive notch.

Pay close attention to any decayed, defective, diseased, hanging or broken branches. These branches may inadvertently come loose and come in contact with energized parts while you are working.

In addition, an inspection of the general work-site shall be conducted to include, but not be limited to, the following:

- Damaged ground bond and neutral wires.
- Damaged power utility wires, including primary and secondary energized wires. Ensure that all energized wires are connected to their appropriate insulators and properly connected.

Approach Distance – Tree Trimming and Pruning

The approach distances listed in the table below must never be compromised. Ladders, platforms, aerial devices and conductive equipment/tools must maintain the appropriate clearances for the voltage levels listed in the table below:

Nominal Voltage in Kilovolts (K or k) = 1,000 Volts	Phase To Ground Distance (Feet-Inches)	Phase To Phase Distances (Feet-Inches)
500 to 1kV	(1' – 0)	(1' – 0)
1.1K to 1.5kV	(2' – 6")	(2' – 6")
15.1K to 36kV	(3' – 0)	(3' – 0)
36.1K to 46kV	(3' – 6")	(3' – 6")
46.1K to 72.5kV	(4' – 0)	(4' – 0)
72.6K to 121kV	(4' – 6")	(4' – 6")
138K to 145kV	(5' – 0)	(5' – 0)
161K to 169kV	(6' – 0)	(6' – 0)

Table 3 Approach Distance

Note: If any of the above conditions are found to be present do not attempt to make any contact with either the tree or the telecom system. Contact your supervisor and await further instructions.

Step Potential

If an energized conductor comes in contact with the ground, the ground becomes energized. The voltage from the downed wire forms concentric circles of different voltage potentials around the point of contact. Voltage potential decreases from the point of contact with the ground. A person's feet in this energized area may be at two different voltage potentials, resulting in electrocution.

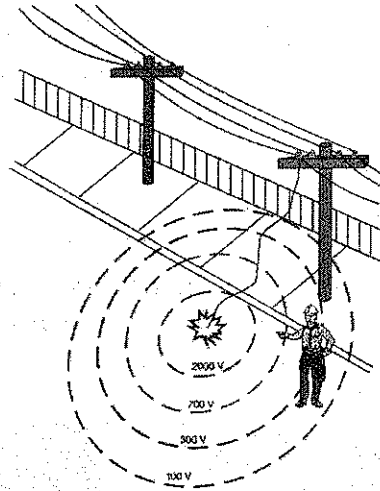


Figure 9 Step Potential

Touch Potential

Below is an example of the touch voltage potential. A person or vehicle in contact with an energized line is at a certain voltage potential. A voltage potential difference exists due to the insulating characteristics of the vehicle's tires. When a person touches the vehicle, the voltage potential difference causes a current through the person to ground, resulting in severe injury.

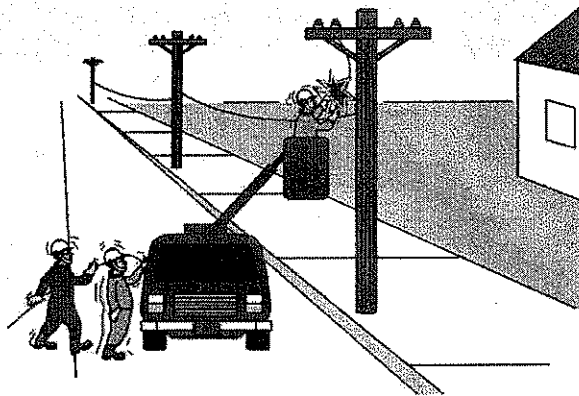


Figure 10 Touch Potential

Note: Never touch a vehicle or individual that is in contact with an energized source.

Other Electrical Hazards

- Fire alarm – possibly energized
- Cablevision plant – CATV coax
- Telephone
- Miscellaneous energized cables
- Risers from underground feeds
- Guy wires – braces for poles
- Any underground electrical distribution

Results of Electrical Hazards

As stated earlier, the human body can be a conductor for electrical current. If the human body contacts an electrically energized point in the circuit, the human body becomes a path for the current to return to its source. This is referred to as an electrical shock. Hazards of electrical shock include:

- Shock – Besides the pain that is suffered, there is a loss of muscle control, and continued contact could lead to death.
- Falling – Due to jump back resulting from the shock. Additional injuries can result due to falling.
- Burns – Heat generated from an electric arc could be greater than 20,000°C. In comparison, the surface of sun is ~40,000°C. Severe burns can result from an electric arc.
- Flash – A bright flash results with the electric arc. The flash and heat generated can cause spots and a sandy feeling in the eyes.
- Equipment damage – The electric arc could destroy equipment, which may be customer-owned equipment.
- Injury or death.

Electrical Hazard - Shock

Electrical Current

- It is important to be aware that any current of 15 milliamps (mA) or more can be fatal.
- Current values between 75 and 200 mA will probably be fatal causing ventricular fibrillation.
- Ventricular fibrillation is a condition where the heart's muscle fibers contract rapidly and independently of each other.
- This lack of synchronization prevents the heart from pumping.

Effects of Electrical Current on the Human Body

Current is the killing factor in electrical shock. Voltage is important only in that it determines how much current will flow through a body's resistance. Below is a chart of the different effects on an average human for different current levels.

Current Effects on an Average Human

Current Level	Effect
1 milliamp or less	No sensation.
1 to 8 milliamps	Sensation of shock. Not painful. You will be able to let go at will.
15 to 20 milliamps	Painful shock. Muscle control is lost. You cannot let go at will.
20 to 50 milliamps	Painful, severe muscle contractions. Breathing is difficult.
100 to 200 milliamps	Ventricular fibrillation. A heart condition that could result in death.
200 milliamps and above	Severe burns. Severe muscle contractions so severe that chest muscles clamp on the heart and stop it during the shock.

Table 4 Current Effects

Note: The amount of current necessary to operate a 10-watt light bulb is eight to ten times more current than the amount that would kill the average person, if the current were flowing through a break in the skin.

Although the human body is a conductor, it is a poor conductor and will offer resistance to the passage of current. When electricity enters the body, a substantial amount of heat is generated. This heat can result in significant internal tissue damage. It is important to remember that different people have different amounts of resistance, and different parts of the body have different resistance values.

Electrical Current through the Body and Ohm's Law

Electrical resistance through the body is variable, but in this example, the total resistance path to ground through the body is 500Ω.

Ohm's Law

$$E = I \times R \text{ or } I = E/R$$

$$25 \text{ Volts}/500\Omega = .05 \text{ Amps (50 mA)}$$

$$50 \text{ Volts}/500\Omega = .1 \text{ Amps (100 mA)}$$

$$100 \text{ Volts}/500\Omega = .2 \text{ Amps (200 mA)}$$

$$200 \text{ Volts}/500\Omega = .4 \text{ Amps (400 mA)}$$

$$500 \text{ Volts}/500\Omega = 1 \text{ Amp (1,000 mA)}$$

$$1,000 \text{ Volts}/500\Omega = 2 \text{ Amps (2,000 mA)}$$

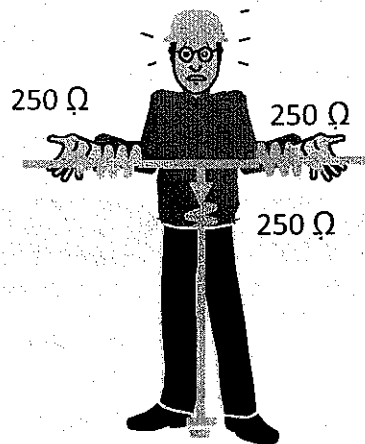


Figure 11 Body & Ohm's Law

Electrical Shock Prevention Guidelines

The following are some guidelines that will help prevent receiving a serious electrical shock.

- Whenever you work on or near any energized equipment, you must wear electrical insulating gloves.
- Jewelry will not be worn when performing work. Keys, chains, and wristwatches shall be removed from your body while working on or near electrical circuits. Any metal object can provide a path to your body if you come in contact with an exposed electrical conductor.
- Never reach inside a piece of equipment to the point that you lose sight of your hand. If you cannot see your hand, you do not know if your hand is coming close to an energized component or exposed conductor.
- Never drill into a wall without checking for electrical wires in the wall and on the opposite side of the wall to be drilled.
- Stand or squat when performing work. You should not kneel or lie down. These positions reduce your resistance to ground.

Path

The most dangerous path is through the chest because of the effect on the heart. Other paths through the body can be severe, but exposure to the heart has the most potential to be fatal. A current value of 300 mA or more passing through the chest will clamp the chest muscles around the heart, which will prevent the heart from beating.

Frequency

Most dangerous alternating current frequencies are from 50 to 100 hertz (Hz) because the frequency range closely approximates your heartbeat. A shock of 100 mA at 60 Hz can cause ventricular fibrillation. Current at higher frequencies tends to travel the surface of the skin, causing burns.

Voltage

Above 600 volts (V) the skin offers very little resistance to current flow, resulting in the current passing directly to the internal organs, muscle tissue, and bones. Rapid and severe burning is the major effect somewhere above 2,400 V.

Time

The longer the time in contact with the current source, the greater the risk of serious injury or death. The rule of thumb for ventricular fibrillation to occur is 100 mA at 60 Hz AC through the heart for 1 second. Currents as low as 15 mA can be fatal if contact is maintained long enough.

If you discover someone is being electrically shocked and are unable to separate themselves from the electrical source due to involuntary muscular contraction, **DO NOT** attempt to touch the victim. Your first step is to locate and disconnect the power source. If this is not possible put on your insulating gloves and use a non-conductive object (e.g. wood beam, fiberglass stick, dry rope) to separate the victim from the energy source. The power company should disconnect the power supply.

If you witness someone working from a bucket truck and they make contact with an energized line, stay away from the vehicle and **DO NOT** attempt to lower the person with the remote bucket controls on the vehicle. Wait for the power company to de-energize the line or equipment.

Electrical Hazard – Burns

Burns occur from current flow and from electrical arcs (flash burns) and arcs can reach temperatures of 43,000 °F.

Protection:

- Safety glasses
- Natural Fiber (cotton-fiber) clothing

Prevention:

Follow company work rules

Do not wear metal (jewelry) when working on energized circuits

Personal Protective Equipment (PPE)

The following PPE has been issued to provide protection against energized sources that may be encountered during routine and non-routine work conditions. It is imperative each employee understands the proper use, function and testing of the following equipment:

- Hard hat
- Safety glasses
- Insulating class "00" gloves/leather protectors
- Voltage/Ohm/Ammeter (VOM) Meter
- Voltage detector (Tic Tracer and Foreign Voltage Detector)
- Approved footwear

Hard Hat and Safety Glasses (Electrical Safety)

Your hardhat and safety glasses are PPE that can prevent/minimize an injury due to accidental contact with an energized source. This PPE should always be worn together while working outdoors or indoor if the potential of being struck by or against an object exists (including an energized source). The following tasks listed below will include, but not be limited to, the use of hardhat and eye protection.

- Drilling
- Snaking Cable
- Disconnecting/Reconnecting Tap
- Working in a bucket
- Working on the power supplies
- Working on a pole/Ladder
- Working inside Confined Area

Insulating Gloves

The Class "00" rubber-insulating safety gloves and leather protector must be worn at the onset of any job or task having the potential of encountering an energized component. This includes all active and passive equipment such as:

- All pole work
- Grounding at a house
- Work on a power supply
- Plant maintenance (splicing feeder/trunk)
- Any location where there is a difference in electrical potential
- Drop connection at ground point
- Drop removal and disconnection
- During storm restoration
- Aerial and underground construction
- Work on an amplifier that have exposed voltages

The gloves must be worn until all potential energized components are tested and found de-energized. If a qualified employee is working on a system and/or component that are normally energized, then the gloves must be worn through the completion of the job.

Insulating Gloves: Testing

The insulating glove used by Cablevision's field operations is a low voltage Class "00" rubber glove that must always be worn together with the appropriate leather protector (outer glove). The insulating glove and leather protector have an insulation value or rating of 500 volts.

These gloves must be inspected and air tested daily at the start of every work shift.

If at any point the glove fails the daily inspection process, notify your supervisor of the condition and request a new pair of gloves.

Each glove must be electrically tested every 9 months. An outside contractor will perform the test.

Insulating Glove: Inspection

Each insulating (rubber) glove will be inspected in the following format; using a Cablevision approved glove inflator and inflated insulating glove.

Crack abrasions and lacerations (including any small perforations, such as pinhole).

Ensure the rubber is soft, not hard or stiff.

Remember to inspect the entire glove. This includes the area between each finger, palm, back of the hand and cuff portion.

Ensure each glove is within the electrical test date (testing to be conducted every 9 months).

Ensure that the leather protector is worn with the correct insulating glove. The cuff of the insulating glove should extend $\frac{1}{2}$ inch beyond the cuff of the leather protector.

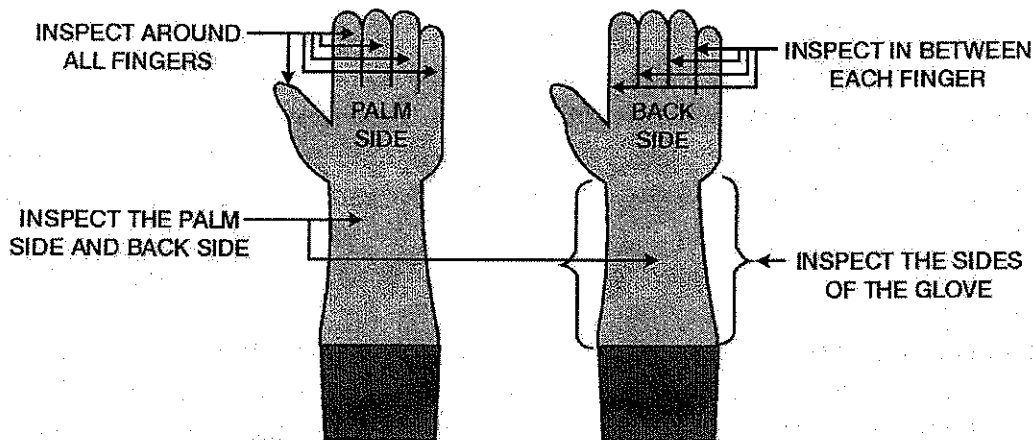


Figure 12 Glove Inspection

Note: If an insulating glove fails any inspection items, contact supervisor for a replacement pair. Supervisor will immediately cut a "V" shaped wedge across the cuff and discard the gloves if found to be defective.

Insulating Glove: Cleaning

When the "00" rubber-insulating safety gloves become soiled they should be washed with a mild soap or detergent and allowed to completely dry. Afterwards the glove could be dusted with talc and then stored in their appropriate bag.

Note: Never expose the insulating gloves to grease, minerals spirit, compounds containing copper, turpentine or strong acid.

Leather Protectors: Use and Care

The leather protector must be inspected daily for material or wear and tear that may cause puncture, abrasion or contamination to the insulating glove. Debris or material such as metal particles, imbedded wire and/or abrasive material must be carefully removed.

Leather protectors should not be worn as a general work glove. They should only be worn over the insulating gloves while working on an energized or potentially energized component. To prevent premature wear, do not wear the leather protector as a general glove.

Insulating Glove and Leather Protector: Storage

Insulating gloves and leather protectors must always be stored in their appropriate bag and placed, with their palms facing up.

When storing ensure that the insulating gloves and leather protectors are not:

- Compressed and/or folded by objects.
- Stored in close proximity to artificial heat sources.
- Expose to direct sunlight, excessive heat or cold for long duration.

Clothing Cablevision approved clothing/uniform will be worn while performing all job related assignments. Under no circumstance will clothing made of man-made fabric be worn. These fabrics can melt during electrical arc or fire exposure causing severe burns. Because of this, the following protocol must be followed:

- Man-made fiber such as Polyester and/or Rayon must never be worn around exposed energized parts.

Only natural fibers such as cotton and/or wool are to be worn when working on an energized or potentially energized source, and or around an open flame.

Apparel: Conductive (Jewelry)
When work is performed within reaching distance of exposed energized parts, any conductive apparel such as keys, chains, rings, wristwatches, earrings and/or metallic bands can be a potential conductor of electricity and cause injury.

It is Cablevision's policy that all conductive apparel be removed prior to the start of your work day.

Note: Under no circumstances shall any conductive apparel such as rings and/or bracelets be worn under your Class "00" rubber-insulating gloves

Other Electrical Safety-Related PPE and Equipment

- Neoprene apron, neoprene sleeves, gloves, and face shield for work on power supplies, designed to protect against battery acid
- 32-ounce eyewash – for battery acid splash accidents

Electrical Safety Test Equipment

- Sperry (Digisnap) Amp Probe or Equivalent Digital Volt/Ohm/Ammeter (VOM)
- Audio/Visual Voltage Detector - Tic Tracer and Foreign Voltage Detector
- Outlet Tester - Plug-in Polarity Tester

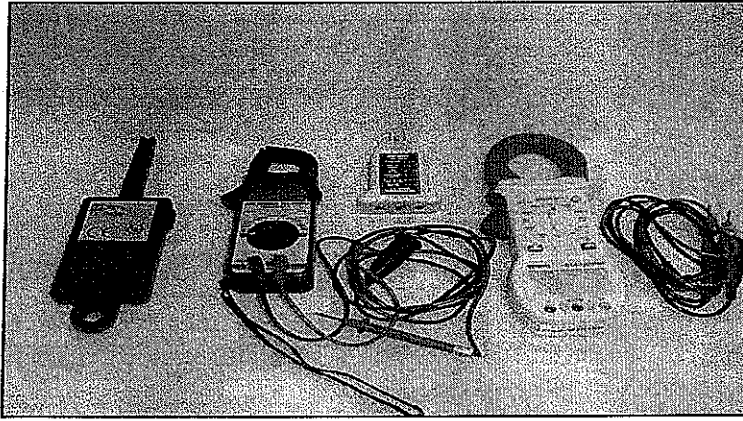
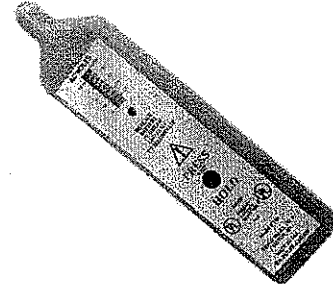


Figure 13 Electrical Safety Test Equipment



Note: The test equipment that is issued in your system might be a different model or make than the ones shown here. The operation of the safety equipment is basically the same. Read the manufacturer's user guide or manual for operational details on the equipment you are issued.

Clamp-On Voltmeter (VOM)

The clamp-on volt/ohm/ammeter (VOM) is used to measure voltage AC and DC, AC current, and, depending on the model, DC current. The clamp-on VOM will also measure frequency, continuity, and capacitance. The figure below shows a clamp-on VOM.

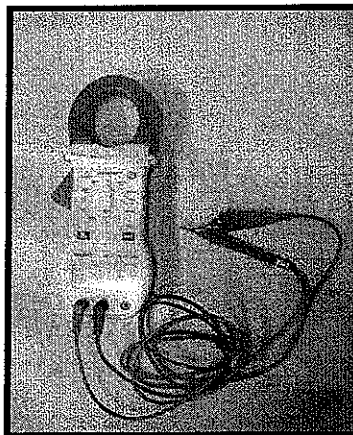


Figure 14 Clamp-On Voltmeter (VOM)

Note: Test current level prior to disconnecting/connecting any cable or ground wire.

The following safety precautions must be observed to ensure maximum personal safety during the operation of the meter:

- Review the operating instructions thoroughly. Pay attention to specific manufacturer's warning.
- Always inspect your meter, test leads and accessories for any sign of damage before each use. If a damaged condition exists, notify your supervisor immediately.
- Ensure that the transformer jaws are clean before taking a measurement.
- Never touch a conductive object such as a metal conduit when taking electrical measurements.
- Never touch exposed wiring, connections or any other live circuits when attempting to take measurements.
- Ensure that all conductive jewelry has been removed as required by Cablevision policy.
- Always grasp the test probes so that your fingers are positioned behind the flash guards
- Always be alert for the presence of a buzzing sound, pale blue glow or an odor of ozone. All of these conditions may indicate the presence of high voltage. If this occurs, do not attempt to use your meter. Contact your supervisor or call for assistance.
- Always check and replace the batteries if a low battery level exists or is displayed.

Clamp-On VOM Construction and Controls

The transformer jaws (amp clamp) pick up the AC or AC/DC current flowing through the conductor. When measuring current, only place one conductor (wire) inside the jaws, not both. The trigger is pressed to open the transformer jaws. When the trigger is released, the jaws will close. The LCD display will display indications of measured values and feature symbols indicating function. The function selector allows the operator to select the signal to be measured and the range of scale: AC voltage, DC voltage, AC current, DC current, and continuity.

The "H" (hold) button is used to hold the enunciator displayed. There are three modes for the "H" button:

- MIN is the lowest average reading.
- MAX is the highest average reading.
- PEAK is the highest point reached and is only functional in the AC mode.

Using a Clamp-On VOM to Measure Current (A)

Current measurements are taken by setting the function switch to the ACA 700A range. Make sure that the HOLD button is not on. Open the transformer jaws by pressing the trigger, and enclose one conductor (wire) only. Release the trigger and allow jaws to completely close before taking a reading. The reading will be indicated on the display. To hold the display, press the HOLD button.

Using a Clamp-On VOM to Measure Voltage (ACV/DCV)

Voltage measurements are taken by connecting the red test lead to V input connector and the black test lead to COM input connector. Set the function/range switch to the desired ACV or DCV position. If the magnitude of voltage is not known, set the switch to the highest range and reduce until a satisfactory reading is obtained. The voltage measurement should be checked on a power source of known voltage, such as an energized electrical outlet. Connect the test leads to the device or circuit being measured by placing the black test lead on ground and the red test lead on the voltage source.



Attempting resistance or continuity measurements on live circuits can cause electrical shock, damage to the instrument, and damage to the equipment under test. Resistance measurements must be made on de-energized (DEAD) circuits only for maximum personal safety. The electronic overload protection installed in this instrument will reduce the possibility of damage to the instrument but not necessarily avoid all damage or shock hazards.

Using a Clamp-On VOM to Measure Resistance (Ω)

All resistance ranges on the instrument are low-power ohms except for the 200-kilohm range. The low-power ohm allows accurate measurements of in-circuit resistance since the test voltage is below that necessary to turn on a diode junction. Connect the red test lead to the $\pm$ input connector and the black test lead to the COM input connector. Set the function/range switch to the desired ohm position. If the magnitude of resistance is not known, set the switch to the highest range and reduce until a satisfactory reading is obtained. If the resistance being measured is connected to a circuit, turn off the power to the circuit being tested and discharge all capacitors. Connect the test leads to the circuit being measured.

When measuring high resistance, be sure not to contact adjacent points even if they are insulated because some insulators have a relatively low insulation resistance. Read the resistance value on the digital display if a high resistance value is shunted by a large value of capacitance. Allow the digital LCD to stabilize.

Using a Clamp-On VOM to Measure Continuity ($\rightarrow \infty$)

Continuity measurements are taken by setting the selector switch to one of the resistance positions. Continuity between probe tips will be indicated by the audible buzzer when resistance is below 100 ohms.

Using a Clamp-On VOM to Measure Frequency (Hz)

Frequency measurements are taken by setting the selector switch to the Hz position. Connect the red test lead to the + input connector and the black test lead to the COM input connector. Connect the test leads to the point of measurements, and read the frequency from the display.

Check Service Ground on an Install

Taking a Reading on the Copper Service Ground

- Clamp around copper electric service ground before making new drop ground connection
- Must have a reading above 0.000 amps and less than 1 amps

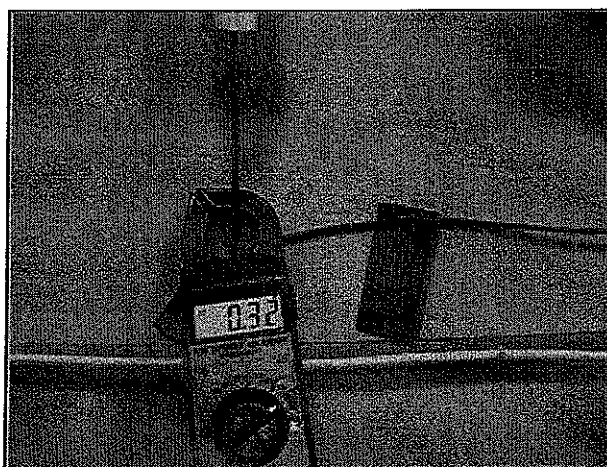


Figure 15 Check Service Ground on an Install

Check CATV Ground on a Disconnect or Before Maintenance

Clamp around Drop Ground

- To check drop ground for hazardous amperage before disconnecting or performing maintenance
- Make sure it is greater than 0.000 amps and below 1 amps

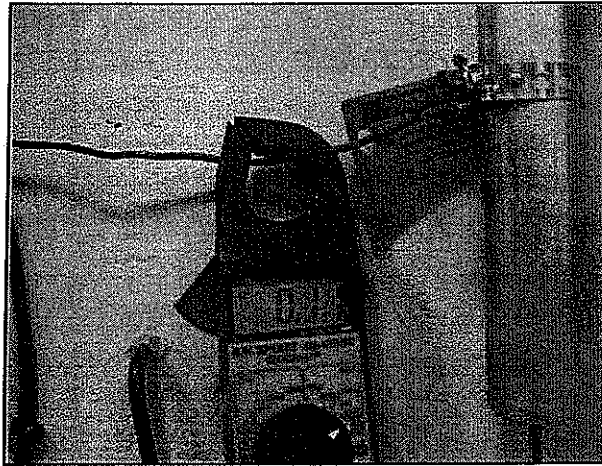


Figure 16 Check CATV Ground

Check for High Amperage on A Drop

Clamp around Drop Wire before Ground Block

- To check drop for high amperage, clamp around drop wire before ground block or grounding splitter if no ground block is present

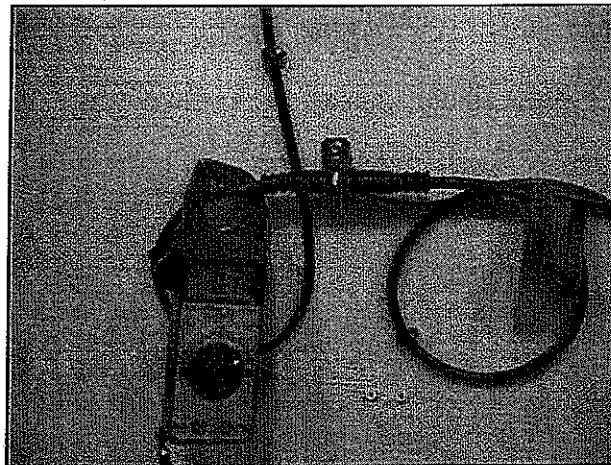


Figure 17 Check CATV Ground on Drop

Note: If current is present, it just tells you that the drop is energized. Further testing is required to determine if the problem is from the house or tap.

Checking for Voltage on the Cable Shield

Reading Voltage on Shield of Cable

- After verifying that amperage on drop is within safe limits, you can remove cable from ground block and measure voltage on the shield to a good ground

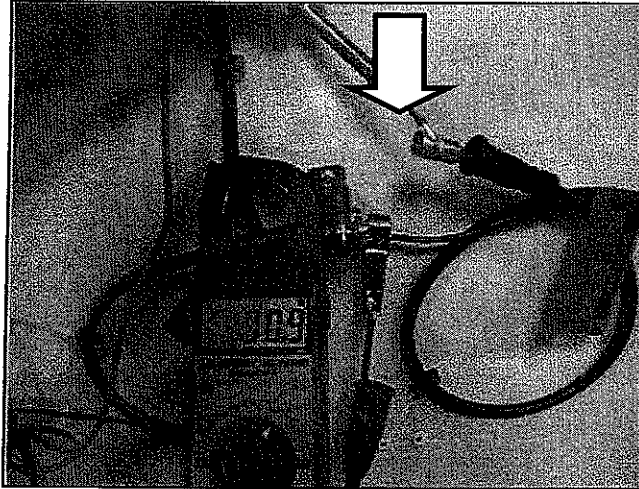


Figure 18 Checking for Voltage on the Cable Shield

Reading Voltage on a Center Conductor

- To read if voltage is present on the center conductor, place **Black** lead on a good ground like the ground block and carefully probe center conductor with **Red** lead
- Do not touch center conductor and shield at the same time

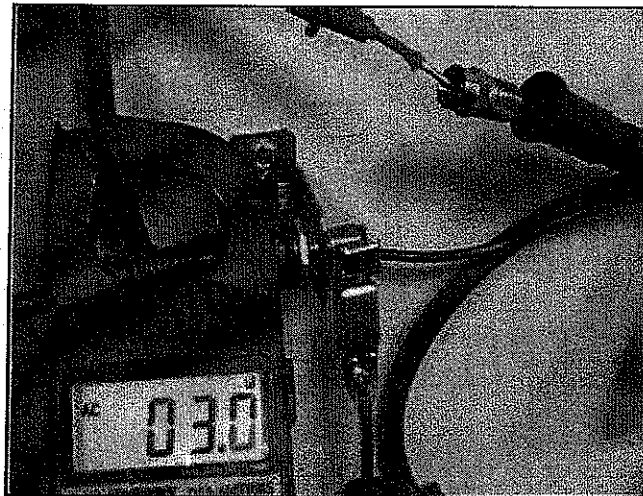


Figure 19 Reading Voltage on a Center Conductor

Tic Tracer

The Tic Tracer, shown in the figure below, is an instrument used to locate sources of AC voltage. The Tic Tracer voltage detector probe senses the electromagnetic field produced by an energized AC source such as electrical wires.



Figure 20 Tic Tracer

The Tic Tracer does not require contact with an energized source to detect voltage. The instrument does not indicate electrical current flow, only that a voltage (a difference in electrical potential) is present. When voltage is detected, the Tic Tracer emits a rapid audible ticking sound. The frequency of the ticking increases the closer the unit is positioned to the voltage source.



Closely bundled three-phase conductors will cancel out the detectable electromagnetic field and may result in an erroneous indication of no or low voltage present. Conductors must be separated by at least 5 inches for accurate detection. If wires are not separated, do not attempt to separate.

The Tic Tracer has a three-position OFF/ON-HIGH/LOW switch. The LOW position can detect voltages from 30 to 1500 volts. The HIGH position can detect voltages from 1.5 kV (1500 volts) to 122 kV. Detection starts in LOW mode and then can be switched to HIGH mode as required to determine source and minimum voltage.

The Tic Tracer has an alarm function that will always activate at a safe distance from the voltage source. The alarm indicates that the voltage is higher than the LOW range, and the switch should be shifted to the HIGH range.

Tic Tracer: Testing

The 300HV must be tested each day prior to a work shift. To ensure detector is properly functioning conduct the following procedure prior to the start of your work shift:

- Set the unit to the "LOW" position
- Place/position the unit next to a known AC voltage source such as a fluorescent light, AC power cord or electrical outlet.
- The frequency of the audio beeping sound should increase as you approach the source of the AC voltage when the unit is functioning properly.
- If the frequency of the beep neither increases nor occurs, replace the batteries and/or unit and retest.

Using the Tic Tracer

When working in the field, the following procedure must be conducted to ensure the proper use of the Tic Tracer:

- The unit should be set in the low position. If the unit does not produce a repeatable positive signal DO NOT USE IT and request a replacement.
- The 300HV Tic Tracer-Beeper has two sensitivity settings "High" and "Low". The voltage detection range for the unit while in the "Low" setting is 30 to 1500 volts. The voltage range of the unit in the "High" setting is 1.5 to 100 kV.
- The 300HV should always be set in the low position when initially using the unit to test/detect a hazardous or erroneous voltage. If the unit alarms, use the high setting to determine the location of the voltage.
- The 300HV Tic Tracer-Beeper does not require current to be flowing in order to alarm.
- The 300HV Tic Tracer-Beeper will always alarm at a safe distance since the distance at which a voltage can be detected increases as the voltage increases.
- Closely bundled three phase conductors will self cancel the AC voltage electric field. Conductors should be separated by 5 inches to record an accurate voltage reading.



Closely bundled three-phase conductors will cancel out the detectable electromagnetic field and may result in an erroneous indication of no or low voltage present. Conductors must be separated by at least 5 inches for accurate detection. If wires are not separated, do not attempt to separate.

Note: The battery life expectancy of the 300HV is approximately one year. Cablevision requires that the unit's battery be replaced every 9 months or as needed. This is a simple replacement of a nine-volt battery that can be performed by the technician. The battery is located inside the body of the unit.

Foreign Voltage Detector (FVD)

Similar to the Tic Tracer, the FVD requires no contact with an energized component. The FVD must be used for all electrical testing applications (same as the Tic Tracer) where the potential for hazardous voltage may exist.

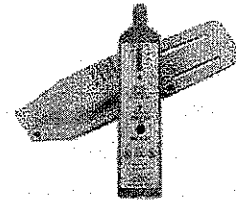


Figure 21 Model FVD and Tool Pouch

Introducing the Model FVD Foreign Voltage Detector

The Model FVD Foreign Voltage Detector (FVD) is:

- A handheld test set designed to identify hazardous AC voltage on an energized surface or component.
- A non-contact (remote) measurement device that does not require physical contact with an energized object to detect voltage
- A device with a non-conductive housing and will not allow electrical conductivity and/or shock from an energized component being tested.

The FVD also provides:

- A visual indication for the amount of AC Voltage being detected on a 10 step bar graph.
- An audible alarm that will sound if the detected voltage exceeds 50 volts.



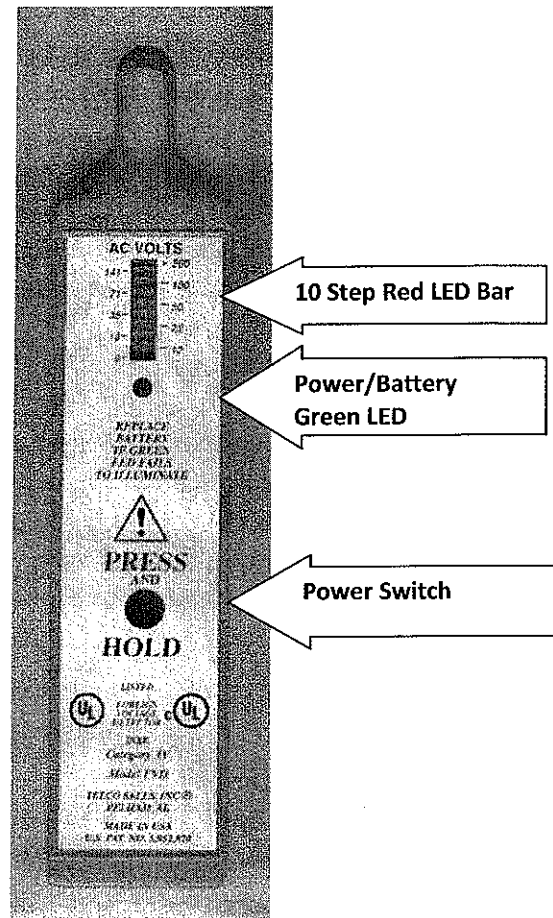
Read the entire document that is included with the Model FVD, Foreign Voltage Detector FVD prior to operating.



The FVD is UL listed to U.S. and Canadian safety standards and complies with NEBS requirements for portable use Test and Measurement Equipment.

Description of FVD

- The FVD has a non-conductive, moisture-resistant, plastic housing. It measures 1.7 inches wide, 7.8 inches long, 0.9 inches deep and weighs 4.8 ounces.
- The FVD contains one sealed power switch and has a green LED to indicate that the FVD is on and that the battery is in good condition.
- A 10 step LED bar graph display indicates the amount of AC being detected.
- All three are located on the face of the test set.
- The FVD is powered by a 9-volt alkaline battery. One battery will provide about 9 hours of continuous usage.
- The circuitry of the FVD contains software filters to suppress 20 Hz ringing and radio stations' signals.
- Our model comes with a leather pouch that can be attached to the tool belt.



Precautions



Risk of Electric Shock. Always Check Proper Operation of This Device on a Known Working Circuit before Using.

- Never touch an object that is suspected of being energized before proper testing.
- The FVD detects only AC voltage (not DC voltage or amperage).

Operating Instructions

- To operate the FVD, press and hold the power switch located on the face of the test set.
 - The voltage indicator (red bar graph) will step rapidly upward and the alarm will sound as the 50 volt bar is illuminated. All ten bars should illuminate. After the power-up test is completed, continue to hold pressure on the switch. The green LED should illuminate and stay on as long as the power switch is depressed. If no AC voltage is being sensed, the alarm will go silent and all steps of the bar graph will extinguish.
- The FVD automatically shuts off when the power switch is released.
- If the green LED does not illuminate, the battery must be replaced before use.
 - The battery housing is located on the back of the FVD. To replace the battery, insert the blade of a small screwdriver into the slot on the battery cover and use the screwdriver to pry the cover open. Use a good quality 9-volt alkaline battery for replacement.

Testing

1. To begin testing for hazardous voltage, first bring the FVD to within a few feet of the object being tested. While pressing the power switch, aim the probe (smaller end) of the FVD toward the object being tested. If the audible alarm sounds, more than 50 volts is present.
2. If the audible alarm does not sound, the FVD should be moved closer to the object being tested until the probe of the FVD is either in direct contact with the object or the audible alarm sounds. This indicates 50 volts or more has been detected. The bar graph will provide an indication of the voltage level present when the probe is against the voltage source.
3. If the tip of the probe is in direct contact with the object being tested and less than 50 volts is indicated, the source should not be considered hazardous.
4. The FVD may indicate a false positive reading in the presence of the high power transmission lines. When this condition exists the user must contact their supervisor and assume that all components are energized. Appropriate PPE must be worn throughout the entire work task.

Care and Storage

- The FVD should be kept clean and dry.
 - The FVD housing may be wiped clean with mild soap and water.
 - If water gets into the battery compartment, it should be opened and allowed to dry before use.
- If the plastic housing is cracked, the FVD should be returned for repair or replacement.
- When not in use, the FVD should be stored in the Model FVDP leather pouch.

Technical Specifications

Range	0 to 200 Vrms
Sensing Type Remote	AC only
Frequency	50 to 150 Hz
Display	10 step LED bar graph, Log response
Audible Warning	Frequency 2800+300 Hz
Level Approximately	75 dba@1 foot
Threshold	> 50 Vrms sensed voltage
Size	1.7" X.9"x7.8"
Weight	4.8 ounces
Battery	Type One (1) NEDA 1604A 9 Volt Alkaline, or equivalent Life > 9 hours continuous when idle(bar graph LED not activated)
Environmental	
Operating	-20°C to 50°C at 10% to 95% RH non-condensing
Storage	-40°C to 85°C at 0 to 100% RH non-condensing
Altitude	FVD is not sensitive to altitude variations
Dielectric	Withstand > 20 kV between the probe tip and operator contact area (tested to 20 kV by UL, to 40 kV by the manufacturer)
Shock & Vibration	TR-EOP-000063 Compliant Ordering Information

Outlet Tester

The Outlet Tester, shown in the figure below, is an instrument used to determine the existence and polarity of AC voltage at a customer's outlet.

A hazardous ground can exist in the customer's wiring inside a wall, a wall outlet, a multiple outlet strip, or an extension cord. The outlet tester checks for the existence of a ground through testing for low ground impedance.

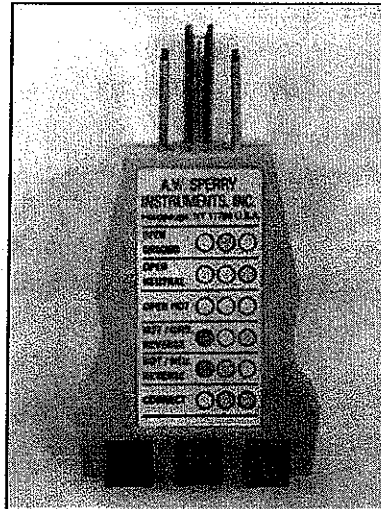


Figure 22 Outlet Tester

To use the Outlet Tester, plug it into the electrical outlet to be tested. Observe the end of the Outlet Tester for signs of light indications. Use the Table below or the table on the tool itself to determine the nature of the indications.

Indications on the Outlet Tester

STATUS	Red	Yellow	Yellow
Open Ground	☐	☒	☐
Open Neutral	☐	☐	☒
Open Hot	☐	☐	☐
Hot/Ground Reversed	☒	☐	☒
Hot/Neutral Reversed	☒	☒	☐
Correct	☐	☒	☒

Figure 23 Indications on Outlet Tester

Note: If no light it means the outlet is not connected or no power is on it.

Electrical Safety on the Job Site

Working on Pole and/or Strand (Routine Work Conditions)

While working in an elevated position it is important to understand the potential hazards associated with your assignment and your proximity to energized sources/wires. The following steps must be adhered to before beginning your work:

Step 1. All applicable PPE as outlined in this training program must be donned (put-on).

Step 2. Ensure that all electrical testing equipment is functioning properly.

Step 3. A work-site assessment must be conducted to determine the presence of any existing or potential hazards. The work-site inspection must include the following:

1. Check for the presence of a damaged ground, bond and/ or neutral connections.
2. Ensure that all utility wires including primary and secondary are properly connected.
3. Ensure that all wires are connected to their appropriate insulators.
4. The following vertical clearances should be maintained on a pole:
 - The strand shall be placed no closer than twelve (12) inches from the telephone line.
 - The strand shall be placed no closer than forty (40) inches from secondary power.
 - Prior to coming into contact with any wire, including TELECOM strand, it is necessary, (using your voltage detector) to determine the presence of any hazardous voltage.

Hazard at the Pole

- **Broken ground** = loss of your protection
- **Broken neutral** = loss of preferred return path
- **Broken bond wire** = Possibility of equipment becoming energized

Note: Any compromise of the above will create an electrical safety concern for you. Visually inspect before you work.

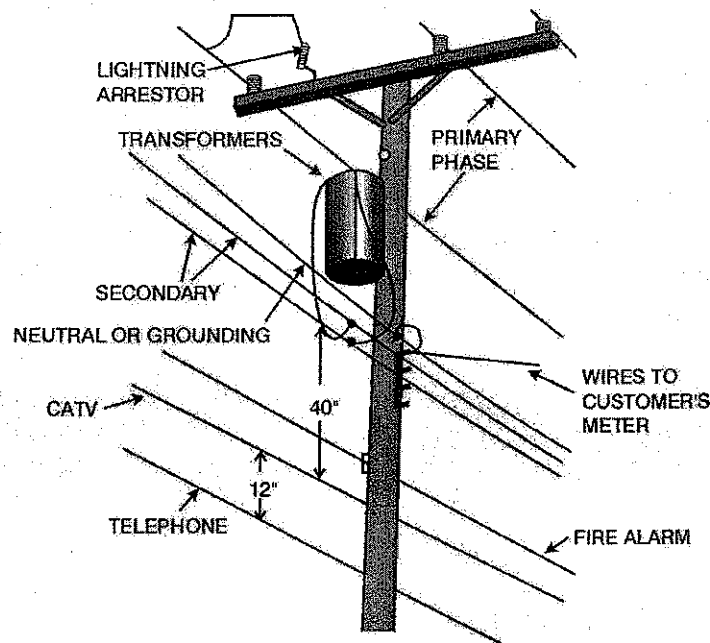


Figure 24 Hazard at the Pole

Non-Routine Conditions (Restoration)

When approaching a restoration site, such as in post storm conditions, the employee(s) is required to perform the following inspection to ensure the site is safe and free of potential (visual) hazards. The following conditions and protocol should be observed:

1. Proper PPE including electrically insulating "00" gloves must be worn throughout the completion of the assignment.
2. Initially treat all wires as energized until they are tested and found de-energized.
3. Do not come into contact with any wire unless its source has been identified.
4. Observe all procedures/protocol as outlined in the Tree Trimming and Pruning and Normal/Routine Conditions of this chapter.
5. Observe the work-site for any cables that may be in contact and/or entangled with energized sources. If this condition exists, notify your supervisor or dispatch. Do not approach or make any attempt to touch this cable until you have discussed the situation with your supervisor and/or dispatch.

If a drop cable is found entangled on a communication strand, such as a TELECOM or Telephone, never attempt to pull/de-tangle the cable from the ground. If this condition is encountered adhere to the following:

Use the voltage detector to determine if the cable is energized.

- If energized, secure the site with a cone barrier and contact your supervisor and/or Dispatch. Do not make any attempt to approach the site.
- If not energized, climb/ascend to the entangled area and cut the wire until it falls free from the strand. Never attempt to pull the wire down from the ground. This may result in an uncontrolled movement of the cable that could potentially come in contact with an energized source.

Note: Any reports of entangled wires communicated by a field technician(s) to dispatch or to their supervisor must immediately be reported to the proper authority having jurisdiction. If a visual confirmation of a suspected hazardous condition exists, do not hesitate to contact your supervisor or authorized person for assistance.

Working In and Around Dwellings

When working inside and around a subscriber's home it is important to follow the correct protocol to ensure your safety and the safety of your customers.

The following work clearances must be maintained when working in and around a dwelling. Refer to the following table:

Work Clearances for Cable Drop	
Object/Area	Clearance from object
Utility power service	12 inches
Telephone service drop	4 inches
Residential driveway	13 feet above driveway
Commercial driveway	18 feet above driveway
Railroad crossing	25 feet above RR crossing

Table 5 Work Clearances for Cable Drop

Note: Where any of these clearances are unable to be maintained consult with your supervisor.