

North Dakota State University

Electrical Safety

I. Introduction

Electricity is an integral part of our every-day life, and sometimes we tend to take it for granted, not thinking about the potential danger. Electrocution is one of the most common fatalities when working with and around electricity. Even if a person survives an electric shock, electrical burns, both internal and external, are extremely painful and can cause permanent disability. Electric shock can also cause involuntary muscle contractions causing a worker to fall off a ladder or scaffolding.

II. Purpose

To incorporate safety-related work practices at NDSU facilities in order to prevent electric shock or other injuries resulting from either direct or indirect electrical contacts. This would include work that is performed near or on equipment or circuits which are or may be energized. The specific safety related work practices shall be consistent with the nature and extent of the associated electrical hazards.

III. Goals

Only authorized, qualified personnel shall be permitted to repair, adjust, test, install or service electrical equipment on NDSU campus/facilities. Governmental codes regulate these requirements and impose strict guidelines to follow in the area of electrical safety.

IV. Procedures

It is a fact that electricity travels unheard, unseen, and rarely gives warning of impending danger. Keeping this in mind, there are basic guidelines one should follow when around electricity.

- A. Never expose yourself or others to energized electrical circuits. No type of work, tests or adjustments on energized circuits are permitted unless authorized. *NDSU's Safe Operating Procedure - Lockout/Tagout* must be used where applicable.
- B. Refrain from bringing or using personal portable electrical equipment such as radios, electric heaters, fans, and lamps, etc. The immediate supervisor must approve such equipment prior to its being used on NDSU property and in NDSU facilities. The *Fire/Building Inspection Report* will be official documentation of non-compliance with fire or building codes in regard to monitoring the appropriateness of the personal portable electrical equipment. Violations requiring attention will be documented and will require corrective action; compliance and/or documentation will be expected within 30 days of receipt of the notice.
- C. Electrical outlets or conduits shall not be installed by NDSU, the employer, for use of personal items.
- D. Check that all electrical implements are in safe working condition prior to use. If you have any doubts or questions regarding the safety of the equipment, notify your supervisor immediately and have the item or hazardous condition checked by the appropriate authorized personnel.

V. Operation of Electrical Equipment

A. All electrical equipment is to be handled in a manner which will not cause damage or personal injury. Preventative maintenance is necessary. Visually inspect all electrical equipment for the following before plugging in and using:

1. Check all electrical cords before use to ensure they are free of cuts or nicks in the outer insulation. Make sure you are using the appropriate cord for the job and never lay a cord in an area where it could be damaged by vehicular or pedestrian traffic. Do not run cords through walls, under carpet or furniture, across doorways, or draped over heaters or equipment.
2. Never unplug equipment by pulling the cord. Turn off the apparatus switch and then pull the plug from the receptacle. Wind the cord from the appliance to the plug end to prevent cord damage. **Be sure that all equipment is unplugged before you leave the work area.**
3. Examine the plug to be sure the protective insulation is present and intact, and that all the prongs are present and not loose.
4. When plugging in the equipment, be sure the plug is correctly seated in the receptacle.
5. Check all tools and equipment for loose or visually damaged parts, switches, shielding, nuts, bolts, etc. Do not use damaged, defective, or inoperable equipment. Disconnect the plug, remove the damaged equipment from service and report any defects to your supervisor.
6. Tools should be left to dry after a temperature change - moisture may condensate on the inside of the case and cause electrical shock if touched. If any shock sensation is felt when using the equipment, immediately shut it off, unplug it, and inform your supervisor.
7. Inspect the receptacle before plugging in an electrical cord. Check for burn marks, cracks, broken insulation, missing or loose cover plates, and defects. Do not use the receptacle and notify your supervisor immediately.
8. When your job is complete, recheck the tool/equipment to be sure it is ready for the next operator.
9. Supervisors must see that all electrically powered equipment is scheduled for general maintenance and emergency repairs.

B. When using electronic equipment/appliances be aware of the following:

1. A 3 foot clearance in front of and clear access to all electrical panels must be maintained at all times. No storage is allowed in front of panels.
2. Extension cords are not allowed as permanent wiring. When extension cords are not in temporary use, unplug and properly store.
3. Surge Protectors are recommended to protect equipment, but they do not protect from hazards of an overloaded circuit. Some signs of an overloaded circuits are:
 - a. Outlet or wall is warm to the touch
 - b. Outlet is discolored
 - c. Circuit breakers frequently trip or fuses frequently blow
 - d. A burnt smell of insulation is noticeable

- e. Extension cord is warm to the touch
- 4. Contact NDSU electricians to install outlets and dedicated circuits where needed.
- 5. Surge protectors must be plugged directly into the outlet. Do not use surge protectors with extension cords and/or another surge protector.
- 6. If an older building or room is converted in to an office, it is important that the electrical system can handle the load. Contact NDSU electricians to inspect your electrical system.
- 7. Freezers will be defrosted regularly as frost build-up in a freezer can cause the motor to overheat, potentially causing a fire.
- 8. Space heaters must be certified by a Nationally Recognized Testing Laboratory (NRTL) and equipped with an automatic shut-off device in the event the heater tips over. Prior to obtaining a space heater from NDSU Central Stores, you must submit a request to Facilities Management HVAC department so that the electrical systems in your area can be checked.
- 9. All office or break room appliances are required to be certified by a Nationally Recognized Testing Laboratory (NRTL). OSHA maintains a list of current and past NRTLs. Items include, but are not limited to: microwaves, refrigerators, coffee pots, freezers, toasters radios, etc. Coffee pots must have a two hour shut-off feature.

VII. Training

Supervisors must verify that all employees thoroughly understand the safe operating procedures regarding electrical safety. Basic training on electrical safety will be done annually. Specialized training or job specific safe operating procedures, to include the *NDSU Safe Operating Procedure - Lockout/Tagout*, will be provided at least annually with additional training provided as needed.