Understanding Utility Work
Zone Hazards

A guide for traffic detail personnel

Provided by: NU Transmission
This presentation provides an overview of various types of electric utility work and the hazards associated when providing traffic detail support.

Stay Alert
Stay Focused
Stay Safe!!!
How Electric Utilities Work

**DELIVERING ELECTRICITY TO A CUSTOMER**

After electricity is produced at a generating station, its voltage is increased at a substation. Next, it travels over transmission lines to the area where the power is needed. Once there, the voltage is decreased at another substation, and the electricity is carried over distribution lines until it reaches a customer’s home or business.

**GENERATING STATION**
- Fuel burned to produce electricity

**TRANSMISSION LINES**
- Carry high-voltage electricity

**SUBSTATION**
- Increases voltage

**CUSTOMER**
- Service line carries electricity from pole to home or business

**DISTRIBUTION LINES**
- Carry reduced voltage electricity to homes and businesses

**345kv**
**24kv**
**23kv**

**Substation**
- Reduces voltage

**Circuit breakers**
- 120V/240V

**Meters**
Safety Briefing

- Safety Briefings – Each day prior to the start of utility work a documented safety briefing takes place. The length of discussion varies with the complexity of the job task.

- Ask the job foreman to review the job briefing so that you are aware of the tasks and hazards associated with those tasks.

Stay Alert = Staying Informed
Have a questioning attitude!!
Remember the word “GEM”

G = Gravity
- Struck by falling object
- Work from heights

E = Electrical
- Shock / flash

M = Mechanical / Kinetic
- Heavy equipment operation
- Vehicle / equipment traffic

The “GEMs”

Wire stringing operation
Gravity

- Overhead electric line weights vary from 0.1lbs/ft to 2lbs/ft.
- Distribution voltage average wire weight between structures is 25 pounds.
- Transmission voltage average wire weight between structures is 1,500 pounds.

Work positioning from transmission line structure cross arm maintenance
Transmission structures are elevated and even a falling bolt can cause severe injuries to those located below.

*Never* stand below or in close proximity to overhead operations – gravity is a hazard!

Tower maintenance utilizing a helicopter
Gravity

Do not stand **under** or **near** the swing radius of an aerial lift or crane.

Construction of mono poles
NU Operations

- NU construction / maintenance activities:
  - Underground gas utility work
  - Overhead / underground electrical distribution ≤ 34,500 volts
  - Overhead / underground electrical transmission 69,000 volts to 345,000 volts
  - Communications infrastructure (radio, microwave)

Electrical maintenance using aerial lifts
Understanding Electrical Potentials

- **Step Potential** - The potential gradient developed across the surface of the earth as a result of current flowing through the earth.

- **Touch Potential** - The potential measured from an object that may be touched and the earth one would be standing on.
NU’s RULE FOR
NON-QUALIFIED PERSONS
(ex. traffic support)

MINIMUM - 10’ FOOT
CLEARANCE FROM
ANY OVERHEAD LINES
The ground around this line is energized, so walking too close could cause a “step potential” electrical hazard.

Contact NU when this hazard is observed.
Electrical

Contact NU when this hazard is observed.

Touching this truck could cause a “touch potential” electrical hazard.
Heavy Equipment Transport

- Transmission line infrastructure is large and requires specialized equipment and trailers to transport.

- Issues to consider:
  - Large turning radius
  - Temporary traffic stoppages
  - Multiple pieces of support equipment
  - Low electrical, phone, cable lines

Road transport of a transmission voltage auto transformer (single phase).
NU utilizes the most efficient transportation methods to move equipment. Equipment transported by rail will eventually be unloaded to a truck or crane.

- Learn the hazards of the task and stay focused on staying clear of identified concerns.
Heavy equipment operation hazards:

- Creates high noise levels.
- Equipment has limited 360° visibility.
- Can move extremely large and heavy loads.
- Use multiple types of tool extensions:
  - Hydraulic hammers / drills
  - Buckets
  - Cutting shears / claws

Trenching with tracked excavators
Heavy equipment operation hazards:
- Excavations are dangerous around the edges
- Overlapped road plates are trip hazards
- Wet road plates are slip hazards
- Stay clear of “caution” taped areas
Even with careful planning an accident can occur. The picture illustrates clear reasons to stand clear of the swing radius and work zone areas.

Rubber tire excavator flip over
Underground Construction

- Digging presents many challenges:
  - Trenching / spoil piles
  - Trench box installations
  - Road plate installations
  - Heavy equipment usage
  - Gas, water, electric dig-ups
Underground Construction

- **Hazards in this picture:**
  1. Heavy equipment swing radius
  2. Crane (overhead)
  3. Noise generated – limited verbal communication
  4. Vehicle traffic
  5. Uneven ground – slip, trips
  6. Fall hazard
  7. Limited access points – fenced barriers

Installation of an underground electrical vault
Not all roads have large breakdown lanes, so vehicles may have limited clearance to pass.

It is **not** recommended for traffic controllers to stand within the construction zone directing traffic. Your back will be exposed to the hazards of construction work.

3 cable underground pull
Working in the Street

- Using helicopters to string lines is efficient and effective but it also creates curiosity.

- Distracted drivers can be a hazard. Stay focused on your tasks to stay safe.
Wire stringing over major intersection

Hazards: Overhead cranes, elevated buckets, heavy street traffic, multiple street entrances, traffic lights, temporary business entrances.
Summary

- GEM – Gravity – Electrical – Mechanical / Kinetic
- Safety Briefing – ask for a review of job site activities before starting work
- Understand the hazards – ask questions
- Stay clear of the construction / work zones
- Have a questioning attitude – ask questions
Supporting utility-related work does have its associated hazards.

If you stay alert – to the hazards
If you stay focused –
  ▪ on your activities
  ▪ on staying clear of work zones

.....You will stay safe!!!!

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