



S.M.I.

## Best Practice Guidelines for Addressing Buried Hazards

### Masonry & Concrete Saw Manufacturers Institute

Buried hazards pose a substantial risk on many construction sites. Whether it's electrical, gas, water, structural, and/or fiber optic cable line, a buried hazard strike can turn any job into an instant nightmare. Personal injury, death, equipment damage, fines, legal battles, and lost time and revenue are just some of the potential outcomes related to a buried hazard strike. Fortunately, proper training, planning, and foresight can reduce the likelihood of such an unfortunate incident. The following guidelines can be used in conjunction with any concrete sawing and drilling safety program to help address the buried hazard risk.

Competent concrete sawing and drilling operators must do all of the following:

- be well prepared,
- use their best observation skills and common sense,
- take all available and appropriate steps to verify buried utility locations,
- ensure that identified utilities have been completely shut down,
- use appropriate personal protective equipment (PPE), and
- continue to exercise vigilance throughout the cutting process.

#### WARNING

Under no circumstances should you rely solely on equipment insulating features, circuit breakers, fuses, ground fault interrupters, or similar devices to completely protect you from unintended contact with an electrical utility. They are intended to protect the circuit and related equipment.

Buried hazards can come in many shapes and sizes and can present various levels of risk. Harm can occur to utility users, work site owners, the equipment involved, the utility line itself, and – importantly – the equipment operators, their co-workers, or bystanders.

The buried hazards can include such things as:

- electric lines
- gas lines
- fiber optic lines
- telecommunications and computer network lines
- water lines
- steam lines
- sewer lines
- pipes carrying various types of chemicals, liquids, or gases
- high pressure hydraulic lines
- storage tanks
- tensioning cables

These hazards can be contained within the material being cut, located on or near the materials being cut on the side opposite the cutting equipment, or in the substrate or base below the materials being cut. Keep in mind, a strike can adversely affect businesses and residences long distances from the actual contact point. Aside from the obvious cut-off of electrical power, gas leaks can travel undetected back underground for great distances, eventually emptying into homes and businesses. Cutting through a sewer line can cause methane sewer gas to escape, creating another explosion hazard.

Some hazards are not realized immediately at the point of contact, or the time of the strike. If a utility is not energized, pressurized or active at the time the strike occurs, then the danger from the hazard may not be evident until the utility is restored. Examples include such events as a nicked gaseous fuel line that could allow fuel vapors to pool in a nearby basement and become an explosive hazard, a damaged unpressurized fluid line could leak when repressurized, and an electrical conductor or telecommunication cable with damage to the insulation could corrode and short out over time. Another example of damage under the slab surface that might not be evident immediately is with tension cables that are a structural part of an elevated slab, whereby if damaged might still support the weight of the slab but fail when loaded as intended during normal use.

Successfully avoiding an unexpected strike of a buried hazard involves a series of steps, and can include visualizing the potential hazards through various imaging methods.

TIP: Occasionally, soft excavation may be a useful means of visualizing the buried utility.

### Locating the Hazard

Whenever there is any possibility of the presence of a buried hazard,

- 1) start by reviewing copies of the structure's as-built drawing, including all revisions.

TIP: This is a starting point, not the end point.

- 2) Inspect all surfaces of the material to be cut to the greatest extent possible, including the side opposite the cutting surface if accessible.
- 3) Where appropriate, contact your local one-call service and be sure all utilities have been marked. Again, as-installed drawings should be reviewed where available, but do not assume they are 100% accurate. The same admonition goes for the utility locator's markings.

TIP: If the property owner has already had the utilities located, verify that the cutting subcontractor is protected from liability under state and local laws in the event of incorrect locating by the utility locator. If in doubt, repeat the one-call contact yourself or the subcontractor may be legally liable even though the utilities were called and their location was incorrect.

- 4) Do not rely exclusively on the statements or representations of the property owner, its agents or representatives, other contractors, construction supervisors, or anyone else. Open your eyes, look around-observe-and ask questions. Inspect the jobsite, and look for clues to the presence of utilities, such as:
  - "buried utility" signs or notices
  - utility facilities without external lines
  - gas or water meters or valves
  - junction boxes
  - drop boxes
  - light poles
  - evidence of previous alterations to the cutting surface such as concrete sawing or drilling operations.
- 5) If you are not familiar with the type of hazard you believe may be present, do not proceed until you have contacted your supervisor, the job site supervisor or other competent/knowledgeable persons. Accurately document your contacts.

Once you have established the presence of buried utilities the next step is to ensure that they are disabled and accurately located.

Disabling the utilities may be accomplished by the involved utility company, the property owner, the job site supervisor, other person in control of the premises:

TIP: When confronted with buried electrical utilities, do not assume that the circuits are dead when one switch/breaker has been turned off. Conduit can carry multiple circuits controlled by more than one

switch/breaker and those controls may be in more than one location. Use your powers of observation, your common sense, and ask questions.

**TIP:** If utilities are disabled for purposes of allowing safe cutting or coring, it is absolutely imperative that the control devices (switches, valves, etc.) be locked out and tagged – for example, pursuant to OSHA 29 CFR 1926.417 for electrical circuits – to insure that someone does not inadvertently turn on the utility. Lock out keys must be in the possession of the person doing the cutting/coring or a knowledgeable supervisor who is familiar with the work being done.

If the work being done extends over a period of days, or the utility is periodically turned on and then back off, regular verification of the lockout/tagout is necessary.

Location of known or suspected utilities may be accomplished in a number of ways, with the appropriate method being based upon the nature of the work site, the seriousness of the potential hazard, the material to be cut, the utility to be located, the best locating equipment available, operation by a trained and qualified technician, the accuracy required, as well as other factors. Locating methods can include:

- Ground penetrating radar
- X-Ray
- Utility locator services

**TIP:** These location methods are not perfect. Do not assume that the inability to visualize a hazard is an indication that it is not present.

### Cutting with Care

Now that you are ready to proceed, do not lower your vigilance. Following all of the previously described procedures will greatly diminish the chances of striking an unexpected hazard, but they **DO NOT GUARANTEE** that you will avoid a strike.

**TIP:** If you are dealing with metallic electrical conduit, keep in mind that the conduit itself can be hot if there is a defect in the circuits at another location-away from the de-energized circuits in a work area – and it has shorted to the conduit.

Use PPE appropriate to protect against strikes of utilities of the type(s) known or suspected to be in the work area, such as properly rated electrically insulated boots and gloves.

## Emergency Response Plan

Prior to proceeding with the work, review emergency procedures, including emergency shutdown steps.

As work proceeds, be vigilant for indications that a strike has occurred. In the case of an electrical strike, these can include:

- power outage
- smoke
- explosion
- popping noises
- arcing of electricity

If any of these occur, assume that contact with an energized circuit has occurred.

- Do not touch the equipment
  - Alert others in the area to the strike
  - Contact the utility or person in charge of the work site immediately
- Be sure others are kept out of the work area

Indications of a gas line strike can include:

- Odor of gas
- Sound of gas escape
- Slurry being blown from the cut

In the event of possible contact with a gas line, take the following steps:

- Shut off the machine
- Leave the work area
- Alert others in the area about the strike
- Contact the utility or person in charge of the work site immediately
- Be sure others are kept out of the work area

Other buried hazards may be more difficult to recognize. For fiber optic and telecommunication lines, there may be little or no immediate indication of a strike. Buried vessels may contain substances that could create immediate or future explosions, chemical reactions, or ground contamination. Cut tensioning cables may cause immediate or future damage to the surrounding structure and injury to persons in or near the structure.

In all of the above cases, the following steps should be taken:

- Shut off the machine
- Leave the work area
- Alert others in the area to the strike
- Contact the utility or person in charge of the work site immediately
- Use all possible resources (maps, personal knowledge, etc.) to determine the exact nature of the strike.

In all cases of a utility strike, the person in charge of the work site, the utility company or other proper authority (police or fire department, EPA, etc.) must be contacted and advised of the strike. The operator's employer must also be alerted to the incident.

As soon as events permit, the operator should begin accurately documenting the incident. This will generally be done on incident reporting forms provided by the employer. Photographs can be a valuable and useful means of recording and preserving the work site situation, also allows for meaningful analysis of the incident at a later time.

### SUMMARY

In conclusion, even after all the preparation work is completed to mitigate an accidental strike, there are no guarantees that one will not occur. You must always be vigilant and prepared to act accordingly in the event of an accidental strike. Always wear the personal protective equipment needed for the job at hand and have a well rehearsed emergency response plan in place. Being prepared is essential to a safe operation.

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