michigan municipal league
Liability & Property Pool
Workers' Compensation Fund

RISK CONTROL SOLUTIONS

A Service of the Michigan Municipal League Liability and Property Pool and
the Michigan Municipal League Workers' Compensation Fund

EXCAVATING & TRENCHING

Many Fund members conduct operations or projects that involve excavations or trenches. This would generally include, but is not limited to, water and sewer line installation or repairs and road construction or repairs. DPW's, water departments and wastewater departments would typically be most likely to do this type of work.

Excavating is one of the highest risk jobs municipalities can conduct. Every year there are public employees who are seriously injured or killed in trench cave-ins or collapses. Preliminary data from *U.S. Occupational Safety and Health Administration* cite 21 trench fatalities nationwide in 2020.

The leading cause of collapse in 2020, and in previous years, has been **inadequate cave-in protection**, such as proper shoring, sloping or shielding (trench boxes). Cave-ins cause about three out of every four of these fatalities annually. The remainder are mostly due to being struck-by falling objects or electrocutions.

For these reasons, employers are obligated to train and supervise their employees to ensure they perform these critical job tasks correctly. MIOSHA's Construction Safety Standard is very clear in its requirements, found in *Part 9: Excavations, Trenching, and Shoring*. Members must be thoroughly familiar with this standard and conduct all excavations in full compliance of its requirements.

The Basics

A "trench" is defined as "an excavation having a depth greater than its width measured at the bottom." Regulations come into play at a depth of 48 inches. All excavations deeper than that require ladders that extend at least 3 feet above the edge. The sides of any excavation more than 5 feet deep (or less if it appears earth movement may be expected) must be sloped, benched, shored or employ a trench box. Spoils, the materials removed while digging, must be piled at least two feet away from the excavation.

MIOSHA is quite specific as to how to slope or shore dependent on the depth of the excavation and type(s) of soil involved. Trench boxes are not required under the standard if you are able to cut the sides back adequately, but they will provide a highly effective layer of additional safety protection and serve to mitigate injury or death risks.

Realize that you will usually be working in areas that are wide open for observation by the general public. They can and often do call MIOSHA to report what they perceive, rightly or wrongly, as unsafe conditions. The State will follow up on the complaint and inspect your site. Be prepared.

Complying with the regulations is important, but always remember that good common sense and experience matters greatly as well.

Training

Your main concern is obviously to understand the potential for wall collapse and the correct methods of preventing it. In some cases, there may be confined space exposures requiring atmospheric testing, and other safety hazards which also must be addressed.

Part 9 "Excavation, Trenching and Shoring" of the MIOSHA regulations delineates how your trenches are to be designed and what the responsibilities of the supervisor and employees are. This includes the designation of an on-site "qualified person" to oversee the operation. Rule 925 (6) defines that person as follows: *" 'Qualified person' means a person who, by possession of a recognized degree or certificate of professional standing, or who, by extensive knowledge, training, and experience, has successfully demonstrated the ability to solve or resolve problems relating to the subject matter and work."* A qualified person will be one of your most highly trained and experienced operators.

All other employees should be trained on hazards that may be present in or around excavations and what the means of prevention are. This would include but not be limited to the use of hard hats, safety glasses, gloves, high visibility vests, safety boots, emergency procedures, rescue equipment, and other MIOSHA Part 9 safety requirements.

Qualified Person

To be considered a "qualified person" under the standard an employee must have extensive training, certifications, and experience in excavating. Seniority or supervisory status alone will not satisfy the standard's requirements.

The designated qualified person must be sufficiently trained to determine soil classifications. Identifying soil types and soil stability is the first step in deciding appropriate excavation methods (sloping, benching, etc.) and the required protective systems needed (shoring, bracing, shielding, trench boxes, etc.), and must be intimately familiar with all requirements of MIOSHA Part 9. They must be capable of identifying possible hazards and authorized and empowered to immediately eliminate them. The qualified person must be present onsite whenever workers are in the excavation.

The qualified person must inspect the excavation, adjacent areas, and protective systems each day before the start of work, as needed throughout the shift, anytime environmental conditions change, and after every rainstorm. When work is paused for any period, such as for lunch breaks, the qualified person must inspect and reevaluate the site again before any work resumes.

The qualified person must remove workers from the excavation when any evidence of a situation develops that could cause a cave-in, such as accumulating water in the trench or protective system problems. The qualified person must also take actions for other types of hazards such as falling loads or hazardous atmospheres. They should develop an emergency action plan in the event of a collapse or cave-in and should instruct all personnel on their role and responsibility in an emergency.

Safety & Rescue Equipment

Necessary safety and rescue equipment (harnesses, ropes, tripods, etc.) should be determined by the qualified person and be located onsite prior to the dig. Employees should be properly trained on how to use this equipment. Trained emergency rescuers should be onsite until work is complete, or nearby on standby alert.

If you do not have your own trained rescuers available, arrangements should be made with a local rescue team, such as the local fire department. Or, transfer the risk by contracting with a competent experienced vendor that has its own trained rescue staff.

Contractors

Using contractors for trenching or excavation projects can be an effective method of risk avoidance. If contractors are to be used, starting with the bidding process, safety should be a primary concern. Request for Proposals (RFP's) should state "All work to be done in compliance with MIOSHA regulations" or a similar statement. This may serve as a defense for the municipality in the event an incident occurs. The contractor must state that they will comply with the regulations relevant to the project.

Be certain the contractor has the expertise, experience, equipment, and staff to do the job. As usual, the lowest bid on the project does not by any means guarantee the lowest overall cost of the project. Do your homework.

Contractors should be required to provide certificates of liability insurance and workers' compensation insurance coverage and sign a hold harmless and indemnification agreement. See the Risk Control Solution document "*Contractor Risk Management"* for more details on selecting qualified contractors.

Even if you have contractors conduct the dig, it is still imperative that your employees are trained in excavation operations. An example of this would be when a contractor digs the trench for a water tap but the municipal employee enters the trench to <u>install</u> the water line. The Workers' Compensation Fund has in fact <u>had</u> several trench collapses where an outside private contractor dug the trench, but it was the municipal employees in it who suffered the consequences. You are betting your well-being on the trench being properly constructed by an outside company. Make sure the contractor knows what your expectations are and be certain their work meets these expectations.

Even if a contractor is hired to do the excavation <u>and</u> the repair or new install, it would not be unusual for a municipal employee to be asked to enter the trench to make a project decision or to offer an opinion as requested by the contractor. Once again, if the trench is not safe your employee has every right to and should refuse to enter until the situation is remedied.

Other Vital Considerations

Trench boxes will provide the **<u>best</u>** level of protection for your workers. Members are encouraged to use a trench box in most cases where the depth of the dig will be 5-feet or deeper. This practice may add time to the job, but employee safety should be your primary consideration here. Other protective measures (bracing, shoring, etc.) may be used under the MIOSHA standard, but they do not provide the equivalent protection of a trench box. Please note though, using a trench box will not alleviate the need for proper soil identification and classification or sloping requirements under the standard. These elements must still be appropriately implemented.

When planning the excavation, safe worker entry and exit points must be decided. A stairway, ladder, or ramp must be present in excavations that are 4 or more feet deep and placed within 25-feet of where employees are working. When ladders are used, they must extend 3-feet or more above the excavation; Part 9, Rule 933(4).

In some cases, the excavation may be classified as a confined space with the possible existence of a poisonous, flammable or oxygen deficient atmosphere. Removal of a leaking underground fuel storage tank is an example of where this could occur. If a confined space is created during the work, MIOSHA Parts 90 & Part 490, Permit-Required Confined Spaces, must be adhered to, with regular air sampling conducted and recorded. Proper ventilation would be required as well. Air sampling is required for any excavations 4-feet or deeper; Part 9, Rule 934(a).

Water accumulation is a frequent problem, particularly as much municipal trenching is done to repair broken water or sewer lines. Even if it is a new installation, rainstorms and naturally high-water tables can accumulate water in the trench bottom. Saturated trench walls are a chronic collapse issue to be watched throughout the project. “Trash” pumps are commonly used to minimize water accumulation. Weather conditions and forecasts should be continuously monitored during all active operations. Pop-up storms or sudden rain showers can quickly overwhelm pumping equipment.

Materials, often referred to as spoils, being removed from the excavation should be kept more than 2-feet away from the edges of the excavation. This also applies to equipment and supplies needed for the job. The flow or movement of heavy equipment and vehicles should be controlled and kept well clear of the excavation to avoid soil movement that could trigger a collapse.

Traffic control is almost always required. Cones, barrels, fencing, reduced speed limit signs and arrow boards should be placed around the construction site as necessary. They serve not only to minimize the chance of vehicles driving into the site but also minimize liability concerns from people falling into the excavation. If it is a long-term project, lighting (flashers) will be necessary overnight. If it is a busy traffic area you must use flaggers (traffic regulator). In all projects that are in or adjacent to the roadway, employees need to wear the appropriate reflective materials and safety equipment. The use of cell phones and texting by motorists has greatly increased the hazards of working in or near the roadways. In some cases, you may want to ask your local police department to assist by stationing a patrol car in the immediate area of the project.

If it is summertime, there is little air circulation in the trench. Insure employees hydrate to prevent heat exhaustion/dehydration. In wintertime, chances are it will be one of the coldest days of the year. Make sure employees wear gloves, hats, overalls and boots suitable for the ambient temperature to prevent frostbite. Provide warming stations and allow employees to periodically exit the dig to warm themselves.

MISS DIG

Always call MISS DIG at 811 well in advance of any planned excavation. If you are not sure, call MISS DIG.

Do not be hesitant to use locators and hand dig when necessary. Many municipalities are using vactor trucks to assist in excavating when applicable.

Overhead Hazards

Power lines present another hazard. An observer should be in immediate, unrestricted communication with the excavator operator when working near high voltage lines. If possible, have the line(s) de-energized before starting the project.

And Now, Reality

So, your employees are properly trained, you have the right equipment, and everybody knows what they are supposed to do. It seems though that, as is common, the water line break has occurred in the middle of winter. Temperatures are in the single digits. The snow is coming down hard, the bottom of the trench is a half-frozen mud pit, some of the equipment is breaking down or freezing up, you are short on people and traffic is a mess making for miserable working conditions.

This is the time people will want to take shortcuts, disregarding most everything they know is right. *"No need to slope today." "We've done other breaks around here before and never had a collapse." "Let's just get in quick, get it done and get out." "Man, I am freezing, let's just do it." "We can dig under the curb/sidewalk just this one time." "Forget using the trench box, too much hassle and it takes too long."*

Most supervisors have already heard these excuses and more. There are lots of ways to make excavating easier or faster, but you must carefully consider the consequences. Always think of the consequences. When emergency personnel and vehicles are racing their way to your excavation site for a rescue of one or more of your employees, you will then realize that taking that extra time to do it right suddenly seems like it should have been the clear and obvious call. Don't place yourself in that position of eternal regret.

A designated qualified person must be personally on site for the duration of the job. Make certain that they know that you will <u>always</u> expect that the job be done correctly, regardless of weather or other outside factors. Also, your employees should never be afraid to question their supervisor regarding safety of the dig. Regularly tell them that as well.

Excavation and trenching work can be very dangerous. But employee injuries and fatalities are completely preventable. Follow MIOSHA standard requirements, have a competent "qualified person" overseeing the project, provide protective systems appropriate for the job, develop safe worksite practices, have an emergency plan, ensure that safety and rescue equipment is onsite, and require close supervision whenever personnel are in the hole. Together, these steps will significantly protect your employees and mitigate the risk of a tragic outcome.

Summary

1.) Call MISS DIG with enough time in advance to ensure that underground utilities are properly located and marked.

2.) Make sure that you have a properly trained and experienced designated qualified person overseeing the jobsite. They should be on scene whenever employees are in the hole.

3.) If work halts for breaks or between shifts, the qualified person must inspect and reevaluate the site prior to work resuming.

4.) Make sure your employees are properly trained.

5.) Make sure that you have the proper equipment and that it is appropriate for the job. For example, if your excavator boom is not long enough, don't try to "make it work".

6.) Watch for underground and overhead hazards.

7.) Cut it back and cut it back properly. If you're not sure, cut it back some more. Grass seed and asphalt are substantially cheaper than having a trench collapse.

8.) If you need shoring or a trench box, use it. It is better to use it and not need it than to need it and not have it. When in doubt, use a trench box. A trench box offers the highest level of protection. Your employees should be familiar with how to properly assemble and install it.

9.) Ensure your means of egress from the excavation is adequate (generally ladders).

10.) Be prepared and equipped to handle water accumulation.

11.) Have an emergency plan should a collapse or cave-in occur.

12.) Have safety and rescue equipment and trained rescuers onsite or immediately available.

13.) Meet with your employees and supervisors before you start and emphasize that the project will be done only one way, the right way.

14.) Ensure traffic control is adequate.

Important Telephone Numbers

Michigan Dept. of Labor and Economic Opportunity, CET Division	517/284-7720
MML Risk Management Services	734/662-3246 or 800/653-2483
Loss Control Services	800/482-2726

Other ***RISK CONTROL SOLUTIONS*** that address some of these issues are:

Contractors
Reducing Exposures from Confined Space Entry
Safety and Liability Exposures for Public Works Equipment

http://www.mml.org/insurance/risk_resources/index.html

Other Resources;

MIOSHA Construction Safety Standard Part 9: Excavations, Trenching, and Shoring
MIOSHA General Industry Safety & Health Standard Part 90: Permit-Required Confined Spaces
MIOSHA General Industry Safety & Health Standard Part 490: Permit-Required Confined Spaces

https://www.michigan.gov/leo/0,5863,7-336-94422_11407_15368-39941--,00.html

Note: This document is not intended to be legal advice. It does not identify all the issues surrounding the particular topic. Public agencies are encouraged to review their procedures with an expert or a competent attorney who is knowledgeable about the topic.