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Standard Guide for Safety, Access Rights, Construction, Liability, and Risk Management for Optical Fiber Networks in Existing Sewers[1]

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1. Scope

1.1 This guide addresses only primary safety concerns, easements, constructability, liability of the various parties, and risk management related to constructing, installing, maintaining, or changing an optical fiber network in an existing sewer.

1.2 The text of this standard references notes and footnotes which provide explanatory material. These notes and footnotes (excluding those in tables and figures) shall not be considered as requirements of the standard.

1.3 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory requirements prior to use.* See 4.1 and 5.1-5.1.7 for specific safety information.

2. Referenced Documents

2.1 *OSHA Documents:*

OSHA 29 CFR Part 1926 Occupational Safety and Health Standards for the Construction Industry[2]

2.2 *Other Documents:*

U.S. DOT MUTCD Part VI Manual on Uniform Traffic Control Devices[3]

3. Terminology

3.1 *Definitions of Terms Specific to This Standard:*

3.1.1 *access rights*—agreements between various parties to obtain temporary and permanent access to property for the purpose of constructing, maintaining, or changing optical fiber networks.

3.1.2 *competent person*—a person properly trained in the safety aspects of an activity.

3.1.3 *confined space*—man entry area that has restricted access and egress.

3.1.4 *constructability*—the term used to denote the condition of a completed set of plans and specifications for a optical fiber network and its impact to the host utility, which have been prepared with an analysis of practical, feasible methods of construction.

3.1.5 *liability*—the exposure to claims for damage to another party's health, well-being, or property; in the event that a "bond" is considered from a liability perspective, furnishing a bond will guarantee performance or payment of all bills, or both.

3.1.6 *optical fiber network*—telecommunications cable from central office to user.

3.1.7 *partnering*—in construction, teaming between the owner, engineer, contractor, and other involved parties.

3.1.8 *risk management*—the process of identifying the risks on a construction project, and assigning the risks to the parties most capable of controlling the risks.

3.1.9 *safety*—physical and mental activities that protect the health, well-being, and life of workers and third-party people, and activities that protect the property of all parties.

4. Significance and Use

4.1 Safety factors must be addressed and incorporated into the work to protect the workers and the public, and construction activities may need to be altered accordingly. Engineering and construction costs are a part of the analysis.

4.2 Access rights to the work should be considered in the design of the project.

4.3 A construction professional, who has field experience in construction activities similar to the scope of work anticipated, should review the plans for constructability prior to starting the project.

4.4 Proper insurance and surety bonding to protect the interests of all parties to the agreement or contract should be considered.

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[2] Available from Occupational Safety and Health Administration (OSHA), 200 Constitution Ave., NW, Washington, DC 20210, http://www.osha.gov.

[3] Available from the American Traffic Safety Services Association (ATSSA), 15 Riverside Parkway, Suite 100, Fredericksburg, VA 22406, http://www.atssa.com.

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4.5 Risk management assessment will identify the parties that are in the best position to control and be responsible for the different risks.

5. Performance Requirements

5.1 *Safety Practices*—Safety practices should follow the guidelines of OSHA 29 CFR Part 1926 and other state and local regulations. The installer should refer to OSHA, state, and local regulations before work begins. These guidelines will address confined spaces, a competent person, safety training, structural hazards, trench safety, manhole safety, traffic safety, and equipment safety.

5.1.1 *Confined Spaces*—Perhaps the most dangerous element of safety risk is exposure to underground confined spaces. In the United States, OSHA requires that confined space entrants, attendant, entry supervisor, and rescue team be trained, provide special equipment, and follow certain procedures when entering a manhole or underground sewer. The attendant must be equipped to test the atmosphere, monitor the atmosphere and the crew, control the activities in the confined space, and call an emergency response team for any accident. Besides the air atmosphere, the confined space crew must recognize and protect members from sewage or water in the sewers, which can injure or drown a crew member.

5.1.2 *Structural Hazards*—When cleaning, inspecting, repairing the sewer, or installing and maintaining and changing the fiber and conduit, the crew should inspect entry structures and large diameter sewers for structural deficiencies, and consider possible point collapses, which could flood the pipe with sudden infiltration, or subject the crew to other hazards. Therefore, appropriate judgment and other precautions should be considered.

5.1.3 *Trench Safety*—Some open trench work or directional drilling is required for interconnections and for final connections to users and other telecommunication companies. A competent person trained to recognize dangerous conditions and to protect the crew must be on site. The most common safety concerns in open trench work are cave-ins and other utility hits. Therefore, shoring, trench boxes, manhole boxes, ladders, locating equipment, and air atmosphere monitoring devices are needed to perform these activities. All OSHA construction standards must be followed.

5.1.4 *Traffic Safety*—Crews cleaning, inspecting, repairing, installing optical fiber and conduit, repairing sewers and manholes, and installing new conduit in open trench may be exposed to traffic. U.S. DOT MUTCD Part VI requires that traffic control devices and flaggers must be in place to protect the crew and the public, if there is exposure to traffic. A competent person should be in charge of these activities.

NOTE 1—The AGC[4] offers information on Safety, Constructability, Liability and Risk Management, and Partnering through its website. Additional information about constructability issues is available at the website www.engr.wisc.edu/cee/courses/cee596.html, which is the "Constructability Analysis" course at the College of Engineering, University of Wisconsin-Madison.

5.1.5 *Equipment Safety*—All construction equipment and personal protective gear must meet OSHA regulations, and be in good repair. Crew members should receive proper training in safety for all exposures, and weekly (more frequent if warranted) safety meetings should be conducted to identify anticipated hazards, and plan appropriate processes to protect the crew and public from injury or death. Prior to starting a project, a safety plan should be prepared by the installer or owner's designated representative. This plan should be implemented and followed during the construction.

NOTE 2—Safety videos are available from various vendors, including a variety from the AGC.

5.1.6 *Manhole Safety*—Whenever optical fiber devices are installed in manholes, certain procedures are used to protect people entering the confined space in the future. Cable bend guards are to be closed to avoid a tripping and entanglement hazard. Where practical, splice enclosures are to be installed next to the manhole steps or ladder so that workers or rescue workers can get into the manholes with self-contained breathing apparatuses without hindrance or risk of entrapment.

5.1.7 *Installation Safety*—Certain electrically powered devices for cable installation, such as robots, can have an electrical potential difference from the pipeline. An electrical failure in the robot and certain conduit attachment methods may create sparks. Engineering and construction professionals should assess the conditions and methods, and use appropriate safety measures to guard against any potential explosion or electrical shock hazard.

5.2 *Access Rights*—As in any construction project, access rights are extremely important for constructability, timely execution of the project, legal risk management, and public relations. It is recognized that for a project to be constructable, the installer must have access to sewers, manholes, streets, public and private property, and be able to execute the work without interfering with other public or private activities.

NOTE 3—The APWA[5] has manuals covering procedures for street access management.

5.2.1 In the initial stages of the project the telecommunications company (or equivalent) will contract with the sewer utility for the use of its facilities. Consideration should be given to all needed access to sanitary and storm sewers, manholes, streets, and temporary street or "parking" access for all construction activities, including temporary pumping discharge piping and storage of job materials.

5.2.2 If street closures or partial closures are needed, the street utility director needs to be contacted and necessary permission acquired prior to construction. Barricading of streets, lane closures, and other traffic rerouting should be carefully planned and the designated authority should give permission to perform such activities.

5.2.3 Construction equipment needs should be planned, including enough room for maneuvering equipment and construction materials. For instance, sewer cleaning, pumping equipment, generators, directional boring machines, and open

[4] Available from the Associated General Contractors (AGC) of America, 333 John Carlyle Street, Suite 200, Alexandria, VA 22314, http://agc.org.

[5] Available from the American Public Works Association (APWA), 2345 Grand Boulevard, Suite 500, Kansas City, MO 64108-2641, http://www.apwa.net.

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