CONDUIT AND MANHOLES

PRECAUTIONS

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1. GENERAL

1.01 This section covers the precautions to be observed when placing conduit or when constructing manholes. Due to the variety of situations that may arise, it is recognized that every contingency cannot be covered. However, if the employees bear in mind that safety to all is of primary importance, much will be accomplished toward minimizing the hazards of the job.

1.02 This section is reissued to revise protective measures to be taken to safeguard excavated openings for conduit or manholes and to update to conform to present standards. Since this is a general revision, arrows ordinarily used to indicate changes have been omitted.

1.03 The material covered in this section is not intended to supersede state or municipal regulation. When such regulations exist, the inspector, supervisor, and foreman are expected to familiarize themselves with the requirements and see that they are observed.

1.04 In addition to the precautions covered herein it will be necessary to observe the precautions outlined in the following sections:

SECTION	TITLE
620-102-010	Outside Plant Precautions Underground and Buried Work
620-135-010	Guarding Work Areas
620-140-501	Testing and Ventilating Manholes
622-300-200	Main Conduit—Trench Work
622-500-015	Manholes—Excavations

2. ORDINANCES, PERMITS, AND NOTIFICATIONS

2.01 State and local laws and ordinances pertaining to traffic control, warning signals, color of lenses in flashers, guards, and similar devices ***must be complied with.*** It is good practice to notify local law enforcement officials when a minor traffic dislocation is involved. When a major traffic dislocation will occur, such as blocking a traffic lane on a highway or a main traffic artery within a town, the police force having jurisdiction should be consulted before work is begun.

2.02 Permits which are required to do work in accordance with the detail plans should be secured before starting the job. All permits or a record of the permits should be retained on the job for immediate reference.

2.03 Permits may be required for the following:

(a) Opening streets

(b) Closing a thoroughfare to traffic

(c) Excavating on private property

(d) Placing materials on the street or on private property

(e) Blasting

(f) Use of water

(g) Crossing under railroads

(h) Placing conduit on bridges.

2.04 Give advance notification of proposed trench and manhole excavation to other utilities in the area. Make every effort to avoid making contact with the underground plant of other utilities, municipalities, etc.

3. MAINTENANCE OF TRAFFIC-WARNING SIGNALS

3.01 When excavating along or across highways, streets, or alleys, perform the work in a manner that will minimize interference with traffic. If necessary, the opening may be bridged with a structure of adequate strength to provide suitable passage for any traffic which is likely to pass over it. Guard against loose stones or rocks rolling into the driving area. Keep shoulders of excavation clear of all loose objects and keep excavated material at least 18 inches away from the edge.

3.02 Protect all openings, construction material, excavated material, or machinery left on streets, highways, or other accessible locations, with standard warning devices as described in the 620 Division of the Bell System Practices. Observe any other precautions which may be required by local regulations or by existing conditions.

3.03 Arrange spoil and material piles to infringe as little as practicable on the driving area. Arrange for regulation of traffic when the operation of equipment or movement of trucks to and from the vicinity of the work will interfere with the normal movement of traffic.

3.04 Do not have open at any one time any more trench than is necessary. Coordinate the various operations from the point of opening pavement to completion of backfill so that the space thus occupied is the minimum consistent with the conditions governing the work. Close as much trench as practicable before the end of each day's work. This is particularly important where the trench is adjacent to such locations as hospitals, police and fire department buildings, service stations etc.

3.05 Close streets to traffic only when other measures are impracticable and then only after obtaining permission from the Police and Fire Departments or other responsible authorities.

3.06 Fire hydrants must be accessible at all times. If necessary to maintain accessibility, bridge the trench with timbering strong enough to support fire apparatus. Do not place any materials in front of a fire hydrant. Leave a clear space of 10 feet (or more, if required by municipal or other regulations) on both sides of fire hydrants.

4. WORKING ON PRIVATE PROPERTY

4.01 Before starting work on private property, make sure the necessary permission has been obtained.

4.02 Special care should be exercised to avoid damage to fences, trees, shrubs, flowers, etc. Disturbance of the ground surface by heavy apparatus should be kept to a minimum.

4.03 When opening a trench in an established lawn, the sod should be carefully removed so it can be replaced when the job is completed. The sod should be cut into long strips and rolled up or cut into pieces and stacked with grass-to-grass and soil-to-soil. It is desirable that the sod be kept wet from the time it is removed until at least three days after it is replaced. To avoid damage to the grass, tarpaulins should be placed along the side of the trench to receive the soil taken from the excavation.

4.04 It is important that the work be conducted to minimize inconvenience to the occupant of the property. After the work is finished, the property should be left in good condition and as clean as it was found. If any foreign structure is damaged, report the damage to the supervisor or inspector. Do not make permanent repairs until the consent of the property owner has been obtained.

4.05 Close as much trench as practical before the end of each workday and avoid having more trench open at one time than is necessary.

4.06 The trench should be firmly tamped. In addition, it should be periodically inspected for settling of the fill, especially following the first rain after completion of the work.

5. TRENCHING AND EXCAVATING

5.01 A conduit placing project will often require the use of heavy construction equipment and the transportation of heavy loads. Certain soil conditions may be encountered that will not support these loads. To avoid hazards, unnecessary delays, or to prevent the equipment from becoming mired, carefully observe local conditions when using this heavy equipment.

5.02 The location of all subsurface structures across or near the proposed route must be determined before excavation begins.

5.03 When foreign objects are encountered while digging, trenching, or pipe pushing, stop operations immediately. Expose with wood handled hand digging tools, and investigate them with caution. Do not cut, chop through, or break off underground obstructions without first determining if they serve a useful purpose. Under no circumstances should underground electrical plant or pipe line (gas or water) be disturbed.

5.04 Only qualified personnel should operate construction equipment.

5.05 Trenches or other excavations 4 or more feet in depth in which men are required to work shall be supported by shoring in accordance with Section 622-300-200, except in solid rock or when the sides are cut down to an angle which leaves a rise of not more than 1 foot for each 1/2 foot of horizontal measurement. A workman shall be above the excavation to keep the workman in the trench in sight during the trenching and timbering operations.

5.06 Trenches over 5 feet should be supported by timbering the side walls in accordance with the tables shown in Section 622-300-200. A workman shall be above the excavation to keep the workman in the trench in sight during the trenching and timbering operation.

5.07 Because of the hazard of oxygen deficiency or the presence of harmful gases due to decomposed waste materials in excavation, a check of the atmosphere should be made periodically if there is any question as to the safety of working conditions. Ordinarily this will apply only to deep excavations.

5.08 In dewatering excavations, make certain that the discharge is carried to a suitable runoff point.

5.09 When removing, bracing, or shoring, always remove lower bracing first, leaving the upper ones until last for protection.

6. PROTECTION OF OPENINGS AND CONSTRUCTION MATERIAL

6.01 Do not use open flame warning devices in any excavation exposing or containing telephone plant or cable. Warning devices shall be electrically-operated flasher-type lights and beacons.

6.02 ***When flammable materials are being used, make provisions to have on-site fire fighting equipment readily available and when the importance or quantity of plant warrants, have a fire guard available during nonworking hours.***

6.03 Debris, refuse, etc, that can be easily ignited shall be kept to a minimum and shall be cleared from the work area each night.

6.04 Frequent work area inspections shall be made to ensure compliance with the precautions in 6.01 through 6.03.

6.05 Under constricted working conditions or in fast-moving traffic areas, flagmen should be used to guide traffic safely past the point of operation.

7. JOINT OCCUPANCY OF MANHOLES WITH POWER FACILITIES

7.01 Where it appears necessary to have joint occupancy, as is possible in customer-owned manholes on private property, the case shall be reviewed by the chief engineer to ensure that an alternate arrangement is not feasible. Joint

occupancy of manholes with power facilities shall be avoided in all other cases.

7.02 Where it becomes necessary for a craftsman to work in a jointly occupied manhole, he shall be accompanied by his supervisor who shall ensure that the following precautions are taken:

(a) Temporary protection (insulating blankets) from contact with power conductors, cables, or apparatus has been placed by an authorized representative of the owner of the manhole, or the person responsible for the customer's electrical system. Except for splicing operations, covering should be as complete as may be practical to obtain. When only splicing is involved, cover need only extend for a distance of approximately two feet beyond the splice (in both directions). If power cables are on the opposite wall, they should be covered for a distance of approximately 5 feet. If the sheath of any power cable has been cut back, that portion should be covered with insulating blankets regardless of where it is located.

(b) All telephone cables shall be tagged in accordance with Section 632-020-101. ***In addition, a positive identification of the cable shall be made with a 76C Test Set and exploring coil before making a sheath opening. (See Section 632-020-240.)***

(c) ***Do not move power conductors.*** Any power conductors, cables, or apparatus requiring removal to gain access to telephone plant shall be moved only by an authorized representative of their owner.

(d) Do not climb on, stand on, or brace against power cables or equipment.

(e) If upon removing the cover, the manhole atmosphere seems unusually warm or if while working in the manhole the atmosphere seems to be noticeably warming, have the conditions of the power cables checked immediately by the customer's electrician.

(f) ***Do not connect bonds to power cable sheath.*** Where bonds have to be placed, connection to the power cable sheath shall be placed by either the customer's electrician or the power company. The removal of a bond from the telephone cable, where necessary, may be made by the telephone craftsman after testing satisfactorily with a B Voltage Tester. Insulating gloves shall be worn for this operation. Do not attempt to test any power cable with a B Voltage Tester.

8. GENERAL PRECAUTIONS ON WORKING IN MANHOLES

8.01 Manholes shall be tested and ventilated as described in Section 620-140-501.

8.02 Exercise caution when entering and leaving manholes particularly those located on traveled thoroughfares. Always use a ladder when entering or leaving manholes. Keep hands free of materials or tools when ascending or descending ladders.

8.03 The precautions to take with open flames, torches, lighted cigars, cigarettes, or pipes around manholes are described in Section 620-140-501.

8.04 The precautions to take in using lighting equipment in and around manholes are also described in Section 620-140-501.

8.05 The precautions to take to prevent exhaust fumes of vehicles or engines from entering manholes are described in Section 628-200-208.

9. SEPARATIONS FROM FOREIGN STRUCTURES

9.01 The minimum desirable separations between foreign structures and telephone conduit and manholes should be as follows:

From Telephone Conduit

(a) Electric light, power, or other conduits—at least 3 inches of concrete, 4 inches of brick masonry, or 12 inches of earth.

(b) Other foreign pipes such as gas, water, oil mains, etc—at least 6 inches clearance when crossing and 12 inches when paralleling.

From Telephone Manholes

(c) Electric light, power, or other conduits—at least 3 inches of clearance from the outside surface of the manhole wall or roof.

(d) Other foreign pipes such as gas, water, oil mains, etc—at least 6 inches clearance when crossing and 12 inches when paralleling.

9.02 The clearances in (b) and (d) above are provided to facilitate maintenance of the foreign structure and are subject to adjustment to meet particular conditions. In the event a question arises as to the practicability of these clearances, consult with the owning company.

9.03 For clearances at railroad crossings refer to 622-300-205.