BELL SYSTEM PRACTICES
Outside Plant Construction and Maintenance

SECTION G42.110.1
Issue 1, December, 1946
AT&T Co Standard

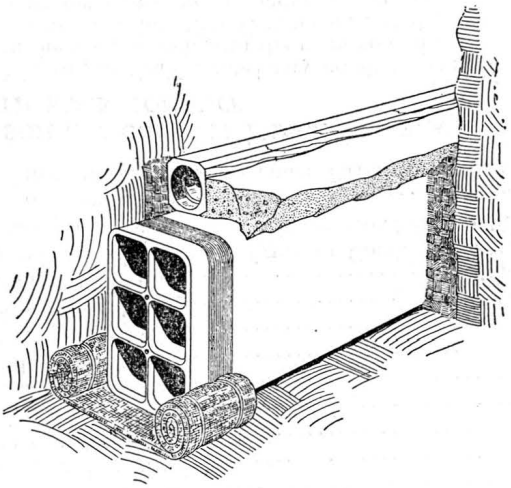
SUBSIDIARY CONDUIT LAYING

1. SUBSIDIARY CONDUIT PLACED IN SAME TRENCH WITH MAIN CONDUIT

1.01 Where practicable, subsidiary conduit should be placed in the same trench with the main conduit. It may either be included in a multiple Clay Conduit unit of the main conduit or placed on top of the main conduit formation.

1.02 If it is included in a multiple unit of the main conduit, the use of expanded web conduit and conduit couplings as described in G42.120.1 may be indicated at the point where the subsidiary branches away from the main run.

1.03 Where subsidiary conduit of a type not normally requiring protection is laid on top of the main conduit, the top protection, if specified on the detail plans, should be placed on the portion of the main conduit not covered by the subsidiary ducts. If the width of the subsidiary ducts is sufficient to cover the main conduit, no other protection need be placed.



1.04 Where the subsidiary ducts are laid on top of the main conduit and complete encasement is specified for the main conduit, the subsidiary ducts should be placed above the encasement unless shown otherwise on the detail plans.

2. SEPARATE TRENCH FOR SUBSIDIARY CONDUIT

2.01 Where subsidiary ducts are to be placed in a separate trench, the trench should be dug deep enough to provide a cover of at least 24 inches for the topmost ducts.

2.02 The width of the trench will depend on the type of conduit employed. For a single duct of C Cement, C Fibre, or Pine Conduit a 9-inch width is sufficient. For single Clay Conduit or Sewer Pipe a minimum of 15 inches is required to permit the joints to be made. Larger complements of subsidiary duct will require a corresponding increase in width.

2.03 The trench should be graded evenly toward the manhole with a fall of at least 3 inches per 100 feet. All rocks or other objects projecting into the sides or bottom of the trench which would possibly damage the conduit should be removed. The bottom should be leveled with fine material to provide a smooth, firm bed for the ducts. When installing C Cement or C Fibre Conduit, it is particularly important that uniform support be provided along its entire length between couplings. If the bottom of the trench is found to be unstable or to have soft spots, consult the inspector or supervisor to determine the need for a concrete base. If concrete base is specified it should be placed in accordance with the instructions covering such work.

2.04 In backfilling, follow the instructions included in G41.110. For C Cement and C Fibre Conduit, particular care should be given to placing and compacting fine material at the sides and on top of the ducts. All wood blocking used in grading the trench or conduit should be removed, exercising care not to disturb the alignment of the ducts.

3. LAYING SUBSIDIARY DUCTS

3.01 The following precautions should be observed in laying all types of subsidiary ducts.

(a) Clean conduit bore, remove projecting burrs, dirt, etc.

(b) Stagger all joints, horizontally and vertically.

(c) Align conduit sections carefully to avoid disturbing joints after they are made.

3.02 Single, two-duct and three-duct Clay Conduit and Pine Conduit, when used for subsidiaries, shall be laid in the manner outlined for main conduit runs.

3.03 Subsidiaries constructed of steel pipe shall be laid in accordance with the instructions for main conduit construction, except that the concrete base and encasement may be omitted.

3.04 In laying Sewer Pipe, special care should be taken to remove all projecting burrs that would injure a cable sheath. Line up the Sewer Pipe before making the joints. Curves should be constructed with 1/8 Sewer Pipe bends.

3.05 The size of CI bends to be used in the construction of underground dips or for changes in the direction of subsidiaries should conform to the size of conduit employed, e.g., Type 2L CI bend for 2-inch duct, Type 3R or Type 3L CI bend for 3-inch duct, etc. See G42.120.1 for a list of CI bends.

3.06 If it is known that a cable is to be placed in the immediate future, place a threading wire of the proper size, e.g., 109 Construction Wire, at the time the subsidiary ducts are laid. Otherwise do not place a threading wire.

3.07 In general, no top protection is required for subsidiary ducts and protection shall not be placed unless specified on the detail plans. Where protection is specified, it shall be provided in accordance with the instructions for placing top protection.

4. JOINTS IN SUBSIDIARY DUCTS

Clay Conduit

4.01 The methods outlined for joints in main conduit shall be followed in making joints in Clay Conduit used in subsidiary conduit runs.

Cement Conduit

4.02 Adjacent lengths of Cement Conduit are joined with the associated straight couplings. Apply the coupling to the conduit by hand, then place a wooden slat against it, and tap lightly on the slat with a hammer. The succeeding length of conduit is then placed in the open end of the coupling and tightened in like manner.

Caution: The wedging action of the tapered joint can exert a tremendous force on the coupling, and care should be exercised in driving the joints together to avoid breaking the coupling.

4.03 Watertight joints can be made by applying a coating of any good asphalt base compound to the tapered end of the conduit just before placing the coupling over it. By using this method, any excess compound is forced away from the open end of the joint instead of into the duct.

4.04 An untapered end of Cement Conduit, caused by cutting, is joined to a tapered end by using a Duplex Adapter. Two untapered ends are joined by using a Double Duplex Adapter. The untapered end of the conduit is first wrapped with a strip of building paper or other suitable material to center the conduit in the opening of the adapter. The adapter is then placed and the space between the wall of the conduit and the adapter caulked to form a tight joint. The adapter and the adjacent 6 inches of conduit on each side of the adapter should then be encased in 3 inches of concrete or mortar.

Fibre Conduit

4.05 The methods for preparing joints in Fibre Conduit are similar to those outlined for Cement Conduit joints.

Pine Conduit

4.06 Joining lengths of Pine Conduit is accomplished simply by inserting the tenon end of one piece into the mortise end of the adjoining piece. When necessary, a tenon can be formed on a cut end of Pine Conduit in the field. When it is desired to have a Pine Conduit subsidiary terminate in mortises at each end, one of the 18- to 20-inch double mortised pieces, quantities of which are usually furnished with each lot of Pine Conduit, should be inserted in the line.

Steel Pipe

4.07 Steel pipe, when used in subsidiary construction should, in general, be joined with threaded couplings. Sleeve couplings are used with the pipe having unthreaded ends in situations where space limitations or the need to use curved lengths of pipe make it impracticable to turn the pipe into the couplings. Sleeve couplings should be encased in concrete as specified for Conduit Couplings.

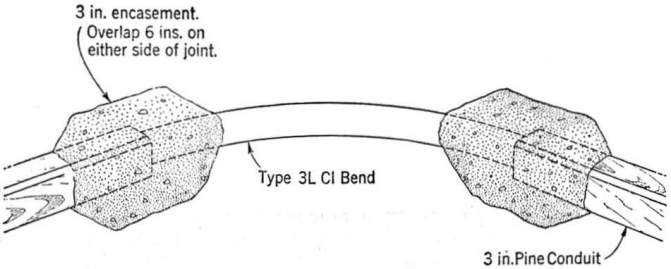
Sewer Pipe

4.08 In joining Sewer Pipe, the space between the bell and spigot of adjoining lengths should be packed with oakum, paper or other similar material to center the pipe in the bell and to prevent mortar from entering the bore of the pipe. Fill with mortar the remaining space in the bell and then cover the entire joint with a 1/2 inch layer of mortar extending 3 inches on each side of the joint.

Joining Two Different Types of Conduit

4.09 Where two types of subsidiary conduit are joined together, the joints or conduit couplings connecting the two types of conduit shall be encased in cement mortar or concrete. This encasement shall include 6 inches of the conduit on either side of the joint or coupling.

4.10 Where CI bends are placed in subsidiary conduit runs, the conduit joints at the bends shall be encased in cement mortar or concrete. This mortar or concrete shall be 3 inches thick and shall include 6 inches of conduit on both sides of the joint.



5. CONSTRUCTING TURNS FOR SUBSIDIARY CONDUIT

5.01 The number of turns permissible in a subsidiary duct will be limited by the length of radius of the turns, the length of the subsidiary, and the size of the cable to be installed therein. If obstructions in the trench or other conditions require more turns than are shown on the detail plans, the inspector or supervisor should be consulted as to whether turns of longer radii than originally planned or a service manhole should be constructed. Reverse curves in subsidiary ducts should be avoided.

5.02 The materials required to construct turns, curves or offsets in subsidiaries are described in G40.060.1 and G42.120.1.

6. USE OF SPLIT CONDUIT

6.01 As described in G40.060.1, split conduit or conduit scored to facilitate splitting is available for repairing or relaying subsidiaries containing cables. The methods outlined in G41.410 shall be used for this work. Bear in mind that the effective inside diameter of Cement or Fibre Conduit will be reduced as much as 3/8 inch by the process of splitting.

7. PUSHING SUBSIDIARY DUCTS UNDER PAVEMENT

7.01 Where it is not desirable to disturb pavement or other surface materials by trenching, steel pipe subsidiary ducts may be placed under the pavement, etc., by means of a pipe pusher.

7.02 The methods of pushing pipe are outlined in instructions covering the operation of the pipe pusher and whenever this equipment is employed the instructions governing its use should be followed.