BELL SYSTEM PRACTICES **SECTION G45.160.1**
Outside Plant Construction **Issue 1, May, 1945**
and Maintenance **AT&T Co Standard**

CONCRETE AND MORTAR

MORTAR

1. GENERAL

1.01 This section provides information relative to the preparation of cement mortar for use in underground construction. In general, three types of mortar are required—mortar for brick masonry, mortar for mortar bandage joints and mortar for patching defective concrete.

2. MATERIALS

2.01 Cement as specified in G45.110.1 shall be used for all mortar.

2.02 Fine aggregate of the quality specified in G45.120.1 shall be used for all mortar. Fine aggregate for brick masonry mortar shall contain no particles which will not pass a No. 4 sieve. Fine aggregate for mortar bandage joint mortar shall be plaster sand containing no particles which will not pass a No. 8 sieve. The mortar used for patching concrete should preferably be mixed with the same grade of fine aggregate as that originally used in the concrete.

2.03 The inert filler used in the preparation of mortar for mortar bandages shall be celite or approved equivalent.

2.04 The water used in mixing mortar shall be clean and free from acids, alkalis, oils and organic materials. In general, water suitable for drinking purposes is satisfactory.

2.05 No materials other than herein specified shall be used in mortar.

3. MORTAR FOR BRICK MASONRY

3.01 Mortar for brick masonry shall be proportioned by volume and shall consist of 1 part cement and 3 parts fine aggregate with sufficient water to make the mixture workable.

3.02 The mortar shall preferably be mixed in a mechanically operated mixer of the drum type. It shall be mixed for a period of at least 3 minutes after all materials are in the mixer and the mixer shall be completely emptied before the succeeding batch is placed therein. If the mortar is to be mixed by hand, a tight box shall be used and the cement and fine aggregate mixed together first. The water shall then be added gradually and the ingredients thoroughly mixed until the mortar has the desired consistency.

3.03 Only sufficient mortar for immediate use shall be prepared. Any mortar that has set shall not be reworked with water or used in any way in the work.

4. MORTAR FOR MORTAR BANDAGE JOINTS

4.01 Either normal cement or high early strength cement, as described in G45.110.1, may be used for mortar for mortar bandage joints. While the mixture prepared with either cement makes a satisfactory bandage, mortar made with high early strength cement gains strength more rapidly, requires less cement per cubic foot of mortar, and in general tends to produce a better bond with the conduit.

4.02 An inert filler in the proportion recommended below should be mixed with the cement and sand before the addition of water. This material as described in G45.130.1 improves the workability of the mortar and, because of the large volume of water it absorbs, aids in preventing the bandage from drying out too rapidly.

4.03 The approximate proportions for the mortar are as follows:

(a) Using normal cement
1 Sack of Cement
1 Sack of Aggregate
(86 lbs sand)
(9 lbs inert filler)
7 Gallons of Water

(b) Using high early strength cement
1 Sack of Cement
1-1/2 Sacks of Aggregate
(138 lbs sand)
(5 lbs inert filler)
6 Gallons of Water

In G40.055.1 will be found tables listing the amounts of materials required for various quantities and sizes of mortar bandages.

4.04 The above quantities may vary slightly with different aggregates. In mixing use only enough water to produce a plastic, smooth-working mixture. Avoid an over-wet mix. A bandage made of thin mortar will bunch up in the middle as it is rolled. In the trench it will thin out at the upper corners when stroked and tend to slump at the sides of the joint. There is danger when using a thin mortar that, while stroking, some of the mortar may be forced out at the ends of the bandage and get into the ducts. A good test for consistency is to trowel the bare tray level full of mortar and then hold the tray by one end so that it hangs vertically. A mortar which is too thin will run out.

4.05 Mix mortar in quantities small enough to enable the entire batch to be used before it is necessary to stop work for any considerable length of time. Only freshly mixed mortar should be used. Any mortar which shows signs of hardening before it is used should be discarded. Do not attempt to rework such mortar with additional water or cement.

4.06 The mortar may be mixed in a wheelbarrow or, if larger amounts are required, in a mixing trough from which it is transferred to a wheelbarrow and wheeled to the table on which the mortar bandages are prepared. It is best to trowel the mortar directly from a wheelbarrow placed at the end of the table. This facilitates the transfer of the mortar to the tray and permits the excess mortar to be troweled off into the barrow.

5. MORTAR FOR PATCHING

5.01 Mortar for patching honeycombed or porous areas in manhole walls, concrete encasement, etc., should be mixed with approximately the same ratio of fine aggregate to cement as was used originally in the concrete. For example, the proportions by volume of classes 1A and 1C gravel concrete as given in G45.140.1 are 1:2-1/2:2-3/4. Mortar for patching concrete of these classes, therefore, should be composed as nearly as practicable of 2-1/2 parts of sand to each part of cement by volume.

5.02 To facilitate handling, mortar for patching should be mixed with as little water as practicable. It should be dry almost to the point of being crumbly. Mortar of this consistency can be forced into crevices more readily and will have less tendency to slump or fall away from vertical surfaces than a wetter mix. Wet the surface to be patched before applying mortar as specified in G45.150.1.

5.03 The preparation and use of accelerated cement mortar for patching masonry under conditions of seepage or flow of water are described in G43.410.1.