

SECTION 622-340-200

5.05 In straight sections up to and including three tiers high, stack the ducts one upon the other with no vertical separation. A minimum separation of 1 inch between vertical columns is obtained by use of temporary fork-type separators (Fig. 6). A monolithic (single pour) concrete encasement may be made with this duct formation.

(1) Place a wood or plastic strip approximately every 4 feet along the trench bottom so as to provide a minimum of 1-1/2 inches of clearance between the first tier of ducts and the trench bottom.

(2) Build up the duct structure in full formation; i.e., when each tier of full lengths is laid 20 to 60 feet in the trench, place the second tier, and then the third tier. As the ducts are laid, do not follow deviations in trench alignment to maintain side clearance. Lay the duct as straight as possible, even though it may reduce side clearance for short distances. This is important to ensure against excessive pulling loads when placing cable.

(3) To provide the required horizontal separation between vertical columns of ducts, and from the trench sidewalls during construction, place locally fabricated separators. These should be on not more than 8-foot centers (Fig. 6).

5.06 In straight sections over three tiers high, either of two arrangements can be used, depending on the concrete encasing procedure:

(a) A monolithic (single pour) concrete encasement can be made in duct formations up to and including ten tiers high, provided that a minimum horizontal and vertical separation of 1 inch is obtained between adjacent ducts. These separations can be obtained by using permanent, commercially available plastic spacers. A minimum of 1-1/2 inches clearance is required between the first tier of ducts and the trench bottom.

(1) The base spacers should be placed along the trench bottom at intervals of not more than 8 feet. Set the first tier of ducts into the spacer grooves. Then place a tier of intermediate spacers, then the second tier of ducts, etc., and finally the spacer over the top tier, making cer-

tain that each tier of spacers is securely locked to the next lower tier. If the formation will exceed ten tiers, place approximately one-half the total number of tiers but not more than ten so that the concrete can be poured in successive stages.

(2) Where the formation will be wider than the maximum width of spacer available, slightly offset groups of four unit spacers in the same tier.

(b) The ducts can be stacked one upon the other up to four tiers high, with a minimum clearance of 1 inch between vertical columns obtained by the use of temporary fork-type separators. Place a wood or plastic strip approximately every 4 feet along the trench bottom so as to provide a minimum of 1-1/2 inches of clearance between the first tier of ducts and the trench bottom. The concrete is then poured to encase to the top of the third tier; then up to three additional tiers can be added. Where the duct structure is wider than the maximum width of spacer available, slightly offset groups of four unit spacers in the same tier. Always provide a cap spacer tier over the top tier of conduit to help prevent duct flotation.

5.07 At Bends, Sweeps, or Grade Changes: At bends having radii of 80 feet or less, or at grade changes of 20 percent (11.3 degrees) or more, permanent spacers are required to provide a minimum horizontal and vertical separation of 1 inch between adjacent ducts and a minimum clearance of 1-1/2 inches between the first tier of ducts and the trench bottom. The spacers should be located on not more than 8-foot centers and should be held in place with reinforcing rods driven 6 to 12 inches into the ground. A monolithic (single pour) concrete encasement can be made, provided the formation does not exceed ten tiers high. If the formation will exceed ten tiers, place approximately one-half the total number of tiers, but not more than ten, so the concrete can be poured in successive stages.