BELL SYSTEM PRACTICES
Outside Plant Construction and Maintenance

SECTION G55.105.1
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UNDERGROUND CABLE PLACING
SELECTION OF DUCTS AND MEASURING FOR CABLE

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1. GENERAL

1.01 This section is a revision of information previously contained in G55.105. The principal addition is the selection of ducts for pulling through intermediate manholes, "pull-throughs." The rodding of ducts is now covered in G55.106.1 and the sealing of ducts is now covered in a separate series of the Bell System Practices.

2. SELECTION OF DUCTS

2.01 Select ducts for new cables as they are required. When selecting the duct for any particular cable, do not assign a duct the occupancy of which may block other vacant ducts or racking positions on the manhole wall. It should be borne in mind that, in some cases, a good assignment in one manhole may prove bad in the next manhole.

2.02 It is preferable to select the top ducts first in runs containing loaded toll cables only, working progressively downward as subsequent cables are installed, in order that the work of setting up the stub cables in loading manholes may be facilitated. When practicable, the top ducts of runs containing toll and exchange cables should be assigned to non-loaded cables and the lower ducts reserved for loaded cable plant. Since large numbers of circuits are carried in coaxial cables, they should be given ducts which offer the best protection against external damage. Usually this will be at the bottom of the duct run.

2.03 The largest manholes and heaviest cable runs are invariably nearest the central office. For this reason, it is desirable to select ducts in these sections first in order to maintain the best cable condition in the heavier runs. If any changes are necessary, such as crossing from one side of the manhole to the other, they should preferably be made in the smaller conduit runs.

2.04 Avoid crossing cables in the splicing chamber back of the main frame or in the central office manhole.

2.05 Where double racking of cables is used in a manhole, use the center ducts last, if possible.

2.06 If the subway contains ducts of smaller diameter than three inches, use these ducts in preference to the larger ducts whenever the size of the cable will permit.

2.07 Ducts are designated by numbers or according to the row and the bank (counting from the bottom or top, preferably the bottom); thus, third bottom, second east, indicates the duct in the third row from the bottom and the second from the east wall of the manhole.

3. SELECTION OF DUCTS FOR PULL-THROUGHS

3.01 When checking a subway route for sections where a pull-through can be made, the following requirements should be observed.

3.02 No splice shall be planned at pull-through manholes.

3.03 Ducts in opposite ends of pull-through manholes should be in the same line. Where this is not possible, a variation of two intervening ducts in any direction, or its equivalent of thirteen inches change of position should not be exceeded, unless conditions are favorable.

3.04 Sections of conduit having sharp bends are not always suitable for pull-throughs. Long radius bends, including those in a conduit run following a gradual curve in a street, can be included in a pull-through section.

3.05 Where conditions are favorable, the length of full size cable that can be handled as a pull-through is limited by the quantity of cable that can be shipped on a reel.

4. MEASURING FOR CABLE

4.01 Measure the length of cable required in each manhole before the cable is ordered. Record this information on a print of the cable work to be done.

4.02 In measuring, allow sufficient cable for proper racking. To obtain the length of cable required for a section, add to the length of the duct in the section, the lengths of the

ends required in the two manholes and the amount of excess cable required for splicing, testing and pulling. The length of excess cable required for splicing and testing will usually amount to 1-1/2 feet per cable end or 3 feet per section. If pulling eyes are not furnished and a core hitch is to be used in pulling the cable, add 1-1/2 feet more to the length of the section. For sections of toll cables at test points, add 1 foot for capacity unbalance tests.

4.03 For pull-throughs, add the additional length for set-up in each pull-through manhole. This length is the bent length of a flexible rule in the set-up position to be occupied by the cable, minus the straight length of the cable as it will extend between ducts before it is set up.

4.04 If the manhole is not of sufficient size to accommodate the cable or if for any reason the conditions appear unsuitable for properly placing the cable, the matter should be reported to the splicing supervisor at once.

4.05 It is advisable to consult the splicing supervisor in case any question arises with regard to the choice of ducts to obtain a satisfactory splicing arrangement.

4.06 After the manhole inspection has been made, make a report to the supervisor, giving the following information:

(a) Size and type of duct selected.

(b) Designation of duct selected. (State wall on which duct enters and location of duct selected.)

(c) Whether duct is spare or occupied by dead or working cable. (If occupied, give cable number.)

(d) If duct is occupied, state work which will release it.

(e) Length of cable end to be left in each manhole.

(f) Whether cable is to be pulled through and additional length required for set-up in each intermediate manhole.

(g) Any existing cables which will interfere with placing the new cable.

(h) Whether manhole contains gas, water or foreign material requiring removal.

5. RUNNING SHEETS

5.01 When the plans furnished the foreman are in the form of running sheets, these sheets will give detail information regarding the cable and duct for each subway section. A typical running sheet is shown below:

PRINT A

ESTIMATE NO.
REQUISITION NO.
ORDER NO.

MANHOLE NUMBER	LOCATION	*SECTION LENGTH	PAIRS	**REEL NUMBER	REEL LENGTH
C.O.C.V.	Central Office Cable Vault (Duct selected #6) Prospect C.O. to M.H. #101 (31 st. St.) End-45 ft. End-6 ft. 6 in.	97 ft.	2121-BST	767	523 ft.
101	ON FIRST AVE. (Duct sel. on N. Wall) (#101) 31 st. St. to (#102) 32 nd St. End-7 ft. End-6 ft. 2 nd Bottom, 1 st. East	426 ft.	2121-BST	767	523 ft.
102	ON FIRST AVE. (Duct sel. on N. Wall) (#102) 32 nd St. to (#103) 33 rd. St. End-6 ft. End-6 ft. 2 nd Bottom, 1 st. East	532 ft.	2121-BST	768	532 ft.
WATER 103	ON FIRST AVE. (Duct sel. on N. Wall) (#103) 33 rd. St. to (#104) 34 th St. End-6 ft. 6 in. End-6 ft. 6 in. 2 nd Bottom, 1 st. East	493 ft.	2121-BST	769	493 ft.
WATER 104	ON FIRST AVE. (Duct sel. on N. Wall) (#104) 34 th St. to (#105) 35 th St. End-6 ft. 6 in.-Pull thru, Leave 9 ft. 6 in. 2 nd Bottom, 1 st. East	495 ft.	2121-BST	770	790 ft.
105	ON FIRST AVE. (Duct sel. on N. Wall) (#105) 35 th St. to (#106) 36 th St. See above End-6 ft. 2 nd Bottom, 1 st. East	295 ft.	2121-BST	770	See above
106	ON FIRST AVE. (Duct sel. on N. Wall) (#106) 36 th St. to (#107) 37 th St. End-6 ft. End-6 ft. 1 st. Bottom, 1 st. East	311 ft.	2121-BST	771	311 ft.
GAS 107	ON FIRST AVE. (Duct sel. on N. Wall) (#107) 37 th St. to (#108) 38 th St. End-6 ft. End-6 ft. 6 in. 1 st. Bottom, 1 st. East	533 ft.	1515-DSM	772	533 ft.

* The length of cable required to make the section good. It is the total of the distance between manholes plus the set-up and splicing length needed in each manhole.

** This column to be included only when Special Reel number is assigned by the Telephone Company.

5.02 The running sheet will contain the following information:

(a) Estimate, Print, Requisition and Order Numbers to which both labor and material should be charged.

(b) Street through which cable will extend.

(c) Subway in which cable will be placed (if there are two subways in the same street).

(d) Manhole number.

(e) Locations of the manholes between which the sections extend.

(f) Number of reel when special reel number is assigned by the Telephone Company.

(g) Total length of cable on reel.

(h) Total length of cable in the section (including ends to be left in the manholes).

(i) If cable is to be pull-through, slack required in each intermediate manhole.

(j) Length of cable to be left in each manhole.

(k) Size and code of cable. This should include the code letters for polyethylene jacketed cables, CA drawing numbers or code letters for the various types of outer coverings, any special features.

(l) Duct in which cable will be placed.

(m) Wall in which duct is selected (to be shown once for each street through which cable extends).

(n) Group of ducts in which selection is made (when more than one group of ducts enter the manhole through the same wall).

5.03 The following information should be given in the form of notes on the running sheet:

(a) Location of reel, if it has not been delivered on the street.

(b) Manholes which are likely to contain gas or foreign material requiring removal.

(c) Description of any obstruction found in the duct when rodding.

(d) Statement as to where reels are to be delivered. The following information will be kept on file in the office:

(1) Ducts tested and wired (date).

(2) Any changes from original running sheet which are made during construction.

(3) Date of notification from manufacturer that cable is ready for delivery.

(4) Dates on which reels were delivered on the street.

(5) Sections of cable that have been placed.

(6) Date of return of empty reels.

5.04 When the cable has been placed, forward for record purposes in accordance with local instructions the running sheet showing the completed work and a description of any unusual conditions existing in the subway. The completed running sheet or work print should show the length of cable lap (excess cable required for pulling, testing and splicing) included in the total length of cable and left in each manhole.

6. CABLE MEASUREMENT PRINT

6.01 A print may be furnished instead of running sheets. In such cases, all the information necessary for doing the work will be furnished on the print. An example of such a drawing is shown below.