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BELL SYSTEM PRACTICES
Outside Plant Construction and Maintenance

SECTION G43.122.1
Issue 1, June, 1946
AT&T Co Standard

MANHOLES
MANHOLE FLOORS

1. DESIGN OF FLOORS

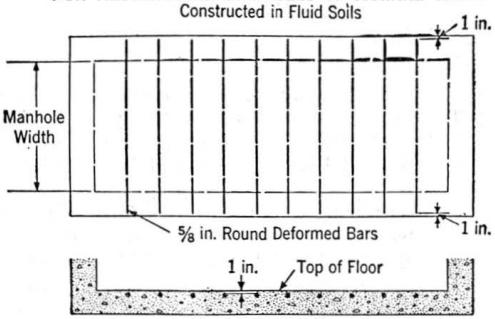
1.01 The construction of manhole floors will be governed by the nature of the soil and the depth of the floor below grade as discussed in Part 3, G43.118.1. In no case, however, shall the floor consist of less than 4 inches of sound concrete of the grade specified in G45.140.1.

1.02 If the detail plans call for a plain concrete floor and upon excavating it is found that the underlying soil is of a fluid nature, the matter should be discussed with the supervisor or inspector to determine whether a stronger floor should be laid.

1.03 **Firm Soil.** If the excavation is in firm soil, concrete without reinforcing shall be used for the floor. For a manhole with plain concrete or brick walls, the floor shall be 4 inches thick and for a manhole with reinforced walls the floor shall be 6 inches thick.

1.04 **Fluid Soil.** If the excavation is in fluid soil, reinforced concrete shall be used for the floor. The design of reinforcing and thickness of concrete for floors in fluid soil are shown in the following figures and tables.

DESIGN OF FLOORS
FOR RECTANGULAR MANHOLES OF NORMAL WIDTH
Constructed in Fluid Soils

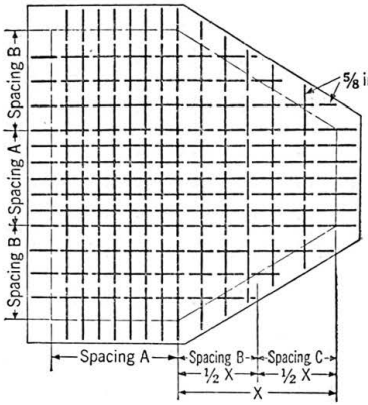


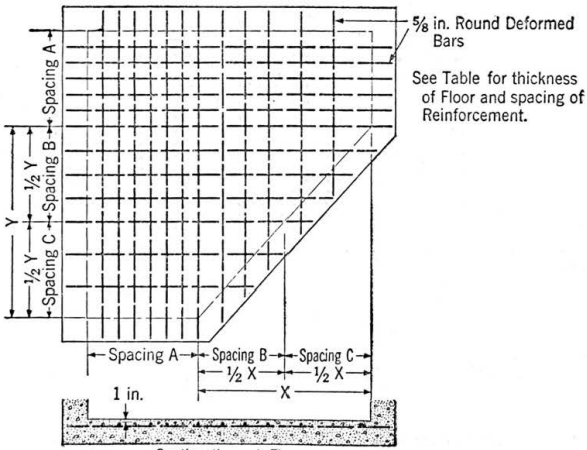
Section through Floor

Depth of Manhole Floor Below Street (Feet)	Manhole Width less than 5 Feet		Manhole Width 5 Feet but less than 6 Feet		Manhole Width 6 Feet but less than 7 Feet	
	Thickness of Floor (Inches)	Spacing of Reinforcem't (Inches)	Thickness of Floor (Inches)	Spacing of Reinforcem't (Inches)	Thickness of Floor (Inches)	Spacing of Reinforcem't (Inches)
8	6	8	6	8	6½	7
9	6	8	6	8	7	6½
10	6	8	6	8	7	6½
11	6	8	6½	7	7½	6
12	6	8	6½	7	7½	6
13	6	8	7	6½	8	5½
14	6	8	7	6½	8	5½
15	6	8	7	6½	8	5½
16	6	8	7½	6	8½	5
17	6½	7	7½	6	8½	5
18	6½	7	7½	6	9	5
19	6½	7	8	5½	9	5
20	6½	7	8	5½	9	5
21	7	6½	8	5½	9½	4½
22	7	6½	8	5½	9½	4½
23	7	6½	8½	5	10	4
24	7	6½	8½	5	10	4
25	7½	6	8½	5	10	4

For fractional depths use next heavier floor.
All reinforcement to consist of 5/8 in. Round Deformed Bars.

DESIGN OF FLOORS
FOR TYPE V AND MODIFIED V MANHOLES
Constructed in Fluid Soil



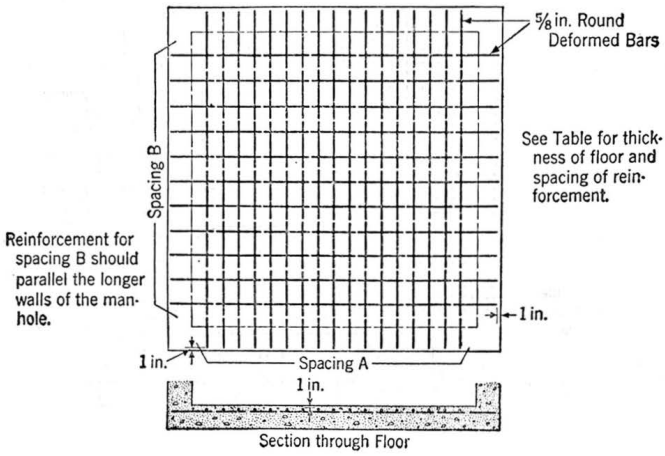


Section through Floor

DESIGN OF FLOORS

FOR RECTANGULAR MANHOLES OF GREATER THAN NORMAL WIDTH

Constructed in Fluid Soil



THICKNESS OF FLOORS

For Types V, Modified V, and Wide Rectangular Manholes

Depth of Manhole Floor below Street	Maximum Inside Dimensions of Manhole															
	8 ft. × 8 ft.				9 ft. × 9 ft.				10 ft. × 10 ft.				11 ft. × 11 ft.			
	Thickness of Floor	Spacing of Reinforcement			Thickness of Floor	Spacing of Reinforcement			Thickness of Floor	Spacing of Reinforcement			Thickness of Floor	Spacing of Reinforcement		
		Spacing A	Spacing B	Spacing C		Spacing A	Spacing B	Spacing C		Spacing A	Spacing B	Spacing C		Spacing A	Spacing B	Spacing C
(Feet)	(Inches)				(Inches)				(Inches)				(Inches)			
8	6	8	9	11	6	8	9	11	7	6½	8	10	8½	5	6½	9½
9	6	8	9	11	6	8	9	11	7½	6	7½	10	8½	5	6½	9½
10	6	8	9	11	6½	7	8	10	7½	6	7½	10	9	5	6½	9½
11	6	8	9	11	6½	7	8	10	8	5½	7	9½	9	5	6½	9½
12	6	8	9	11	7	6½	8	10	8	5½	7	9½	9½	4½	6	9
13	6	8	9	11	7	6½	8	10	8½	5	6½	9½	9½	4½	6	9
14	6½	7	8	10	7½	6	7½	10	8½	5	6½	9½	10	4	6	9
15	7	6½	8	10	8	5½	7	9½	9	5	6½	9½	10	4	6	9
16	7	6½	8	10	8	5½	7	9½	9	5	6½	9½	10½	4	6	9
17	7½	6	7½	10	8½	5	6½	9½	9½	4½	6	9	10½	4	6	9
18	7½	6	7½	10	8½	5	6½	9½	9½	4½	6	9	11	4	6	9
19	8	5½	7	9½	9	5	6½	9½	10	4	6	9	11	4	6	9
20	8	5½	7	9½	9	5	6½	9½	10	4	6	9	11½	3½	5½	8½
21	8½	5	6½	9½	9½	4½	6	9	10½	4	6	9	11½	3½	5½	8½
22	8½	5	6½	9½	9½	4½	6	9	10½	4	6	9	12	3½	5½	8½
23	9	5	6½	9½	10	4	6	9	11	4	6	9	12	3½	5½	8½
24	9	5	6½	9½	10	4	6	9	11	4	6	9	12½	3½	5½	8½
25	9½	4½	6	9	10½	4	6	9	11½	3½	5½	8½	12½	3½	5½	8½

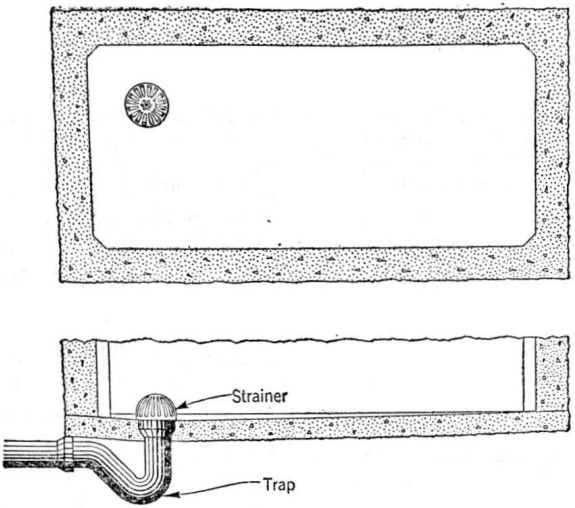
For fractional depths or manhole sizes use floor thickness for next depth or larger size of manhole.

All reinforcement to consist of ⅝ in. round deformed bars.

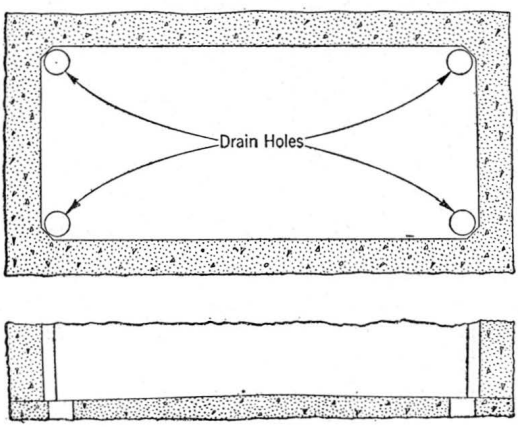
2. PROVISION FOR DRAINAGE IN FLOORS

2.01 Drainage facilities or sumps shall be provided for all manholes as discussed in Part 7, G43.110.1.

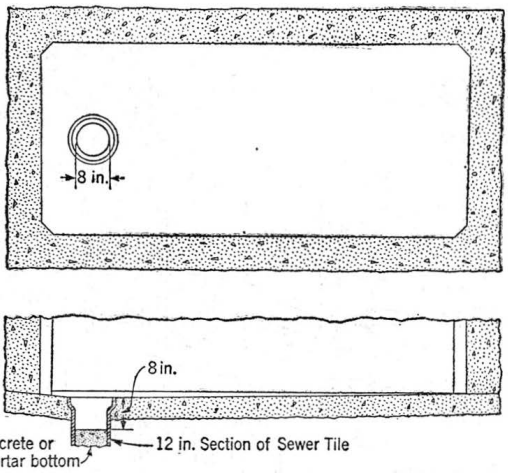
2.02 **Sewer Connection.** If a sewer pipe drain is to be provided, it should be built as illustrated on the following page. Grade the floor surface toward the drain. Use 4-inch sewer tile unless a larger size is required by local regulations.



2.03 Weep Holes in Manhole Floor. If weep holes for drainage are to be provided in the manhole floor, they shall be placed as shown in the following illustration. Wooden duct plugs may be used as cores in forming the holes. The surface of the floor shall be graded toward these holes.



2.04 **Sump.** If a sump is to be provided, it shall be located near one end of the manhole and at a depth such that the finished surface of the floor may be graded toward the sump. The sump should be at least 8 inches deep and 8 inches in diameter or 8 inches square. A satisfactory sump can be made of a 12-inch length of 8-inch sewer pipe by sealing the spigot end with 4 inches of cement mortar or concrete before placing the pipe in position.

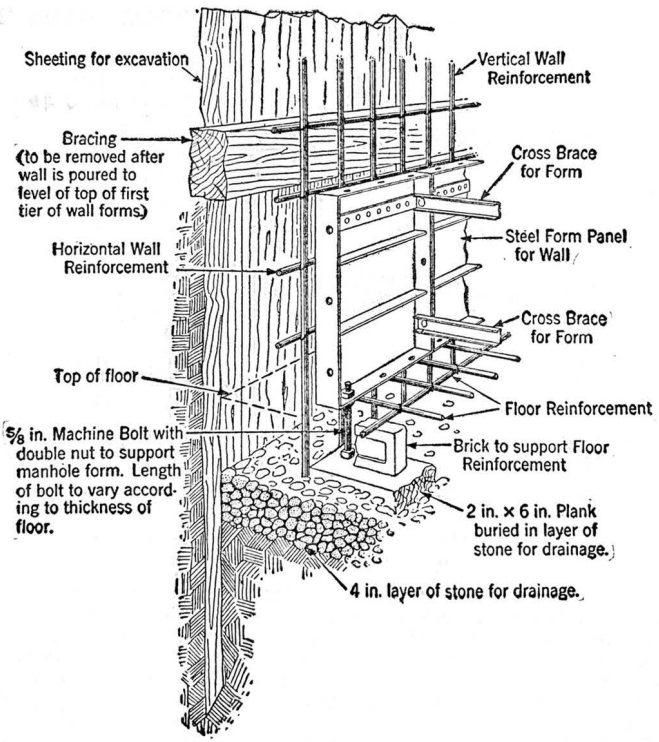


3. MONOLITHIC CONSTRUCTION

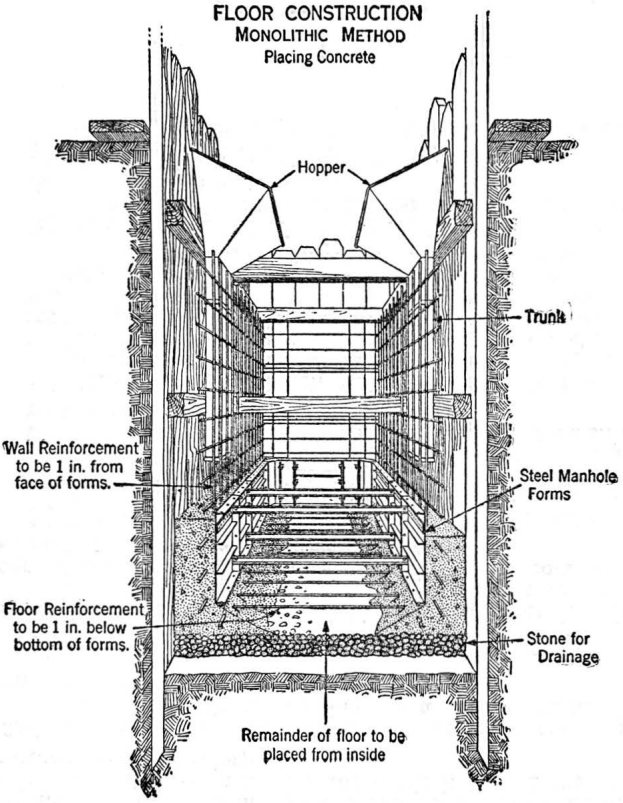
3.01 After the manhole excavation has been completed, place a 2-inch x 6-inch plank across the width and near each end of the manhole to provide a solid support for the manhole form and floor reinforcement, if any. The top of the plank should be at a level about even with the bottom of the floor.

The form can then be supported on the planks with four 5/8-inch machine bolts equipped with double nuts as shown in the following illustration. The length of the bolts will vary according to the thickness of the floor. The first tier of wall forms may then be erected. If floor reinforcement is required, it may be supported on bricks or concrete blocks.

FLOOR CONSTRUCTION
MONOLITHIC METHOD
Placing Reinforcement and Forms



3.02 As shown in the following illustration, pour the walls to just below the top of the first tier of wall forms using concrete as specified in G45.140.1 and following the procedures for mixing and placing as outlined in G45.150.1. The bottom row of timber bracing can then be removed and additional tiers of wall forms placed.



3.03 Some of the concrete from the walls will flow below the form into the space to be occupied by the floor. Additional concrete should be placed directly into the floor area to bring the floor up to the proper level. Finish the floor surface roughly with a tamper and grade it toward the sump or other point of drainage.

3.04 After the forms have been removed at the completion of the job, finish the floor to a smooth surface by troweling with cement mortar.

4. FLOOR AND WALLS POURED SEPARATELY

4.01 If, for any reason, monolithic construction as described above is not practicable and it is necessary to let the floor set before placing the walls the floor shall be constructed as follows:

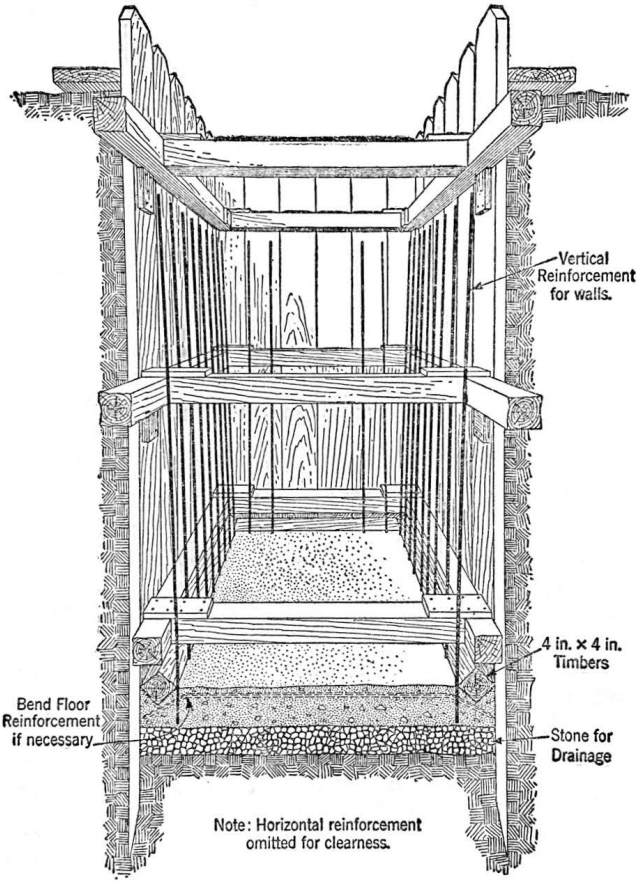
(a) Place the concrete as specified in G45.140.1 following the procedures for mixing and placing as outlined in G45.150.1. If reinforcement is required, pour the floor to within one inch of the top, place the reinforcement, and then pour the remainder of the floor. Grade and finish off to a rough surface with a tamper.

(b) Place 4-inch by 4-inch timbers on edge in the soft concrete of the floor as shown in the following illustration, so as to form a "V" shaped depression about 4 inches wide at the top and extending completely around the manhole under the walls. The timbers may be mitered at the corners or the concrete may be chipped out to make the "V" continuous, after the timbers are removed.

(c) Place the vertical reinforcing for the walls, if required, allowing the upper ends to rest against the walls or timbering of the excavation.

(d) After the concrete has set, the bottom row of bracing and the timbers forming the "V" can be removed.

FLOOR CONSTRUCTION
ALTERNATIVE METHOD



(e) After the manhole forms have been removed at the completion of the job, finish the floor to a smooth surface by troweling with cement mortar.