

BELL SYSTEM PRACTICES
Outside Plant Construction
and Maintenance

SECTION G43.120.1
Issue 1, June, 1946
AT&T Co Standard

MANHOLES

CONCRETE FORMS

GENERAL

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1. GENERAL

1.01 This section furnishes information concerning details of the various panels and accessory items which make up the standard steel manhole form. It also describes in detail the forms used in the construction of manhole wall recesses at duct entrances and the forms for making the opening in the manhole roof.

1.02 The manhole form consists of several sizes of galvanized steel panels and corners which are joined by means of pins and wedges. Galvanized steel channels provide the necessary bracing at the corners and across the width of the manhole. The dimensions for width, length and headroom of the manhole are adjustable in 6-inch increments by the use of panels of appropriate size in the assembly.

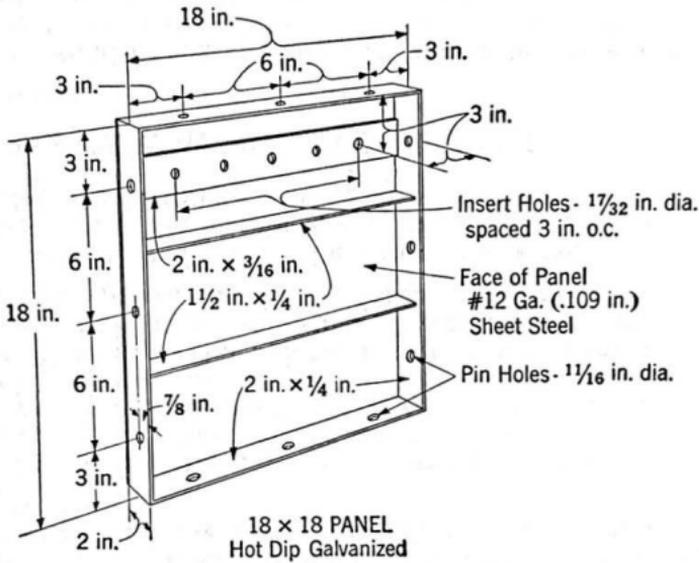
1.03 Provision is made in the panels for attaching concrete inserts for the installation of cable racks. Slotted panels are provided for installing pulling-in irons.

2. DETAILS OF MANHOLE FORM PARTS

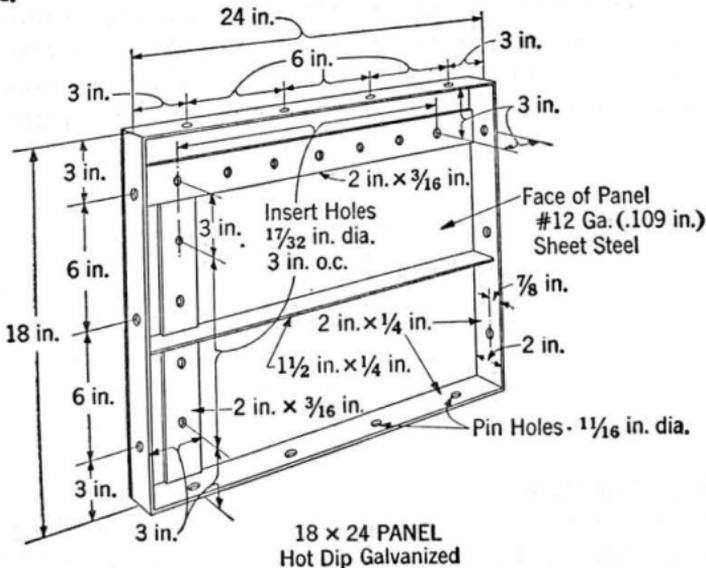
Solid Panels

2.01 The solid panels used in the roof, side and end walls of the form are of the general type illustrated at the top of the next page. Four other panels, identical to this as to spacing of pin holes and location and spacing of insert holes, but varying as to number of stiffeners and over-all dimensions, are

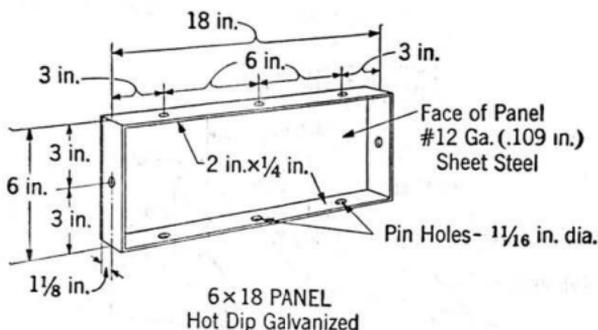
used. They are known by designations corresponding to their over-all dimensions as, 18 x 30, 18 x 36, 24 x 30, and 24 x 36.



2.02 The 18 x 24 panel is similar to the above except that it is provided with a row of insert holes parallel to both sides of the panel so that it can be used with either the 18-inch or 24-inch dimension vertical with insert holes in the desired position.

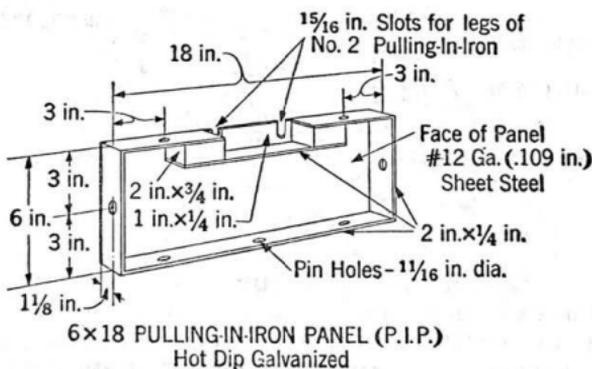


2.03 The smaller 6 x 18 and 6 x 24 panels, the former of which is illustrated below, are used as fill-in pieces in the roof, around pulling-in iron panels and occasionally in the side walls. They are also useful for filling in around duct entrances in the reconstruction of manholes or when adding manholes in existing conduit lines.



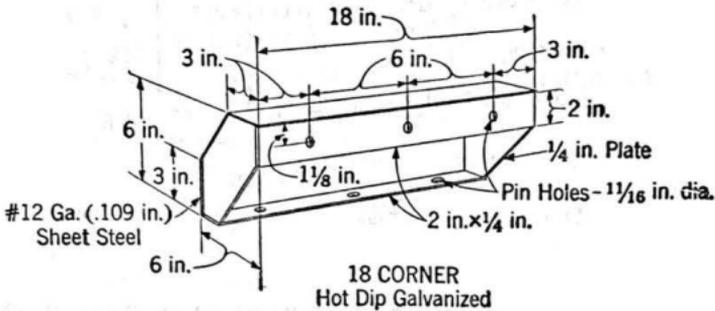
Pulling-In Iron Panels

2.04 The pulling-in iron panels 6 x 18 and 6 x 24, the former of which is shown below, are designed to accommodate standard No. 2 pulling-in irons. The pulling-in iron is placed in the slots in the panel during assembly of the parts and is held in position by the adjoining panel. They may be assembled in either a vertical or horizontal position.

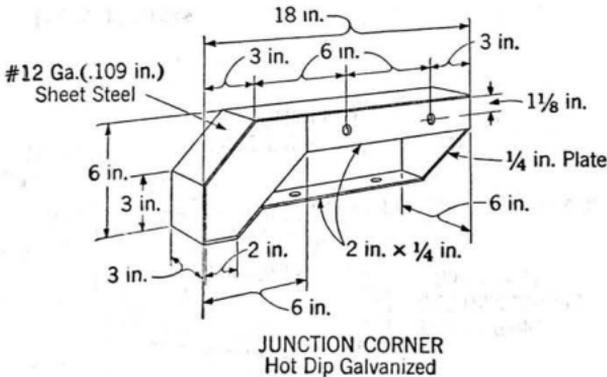


Corner Pieces

2.05 **18-inch and 24-inch Corners.** The corner pieces are used in a horizontal position between the roof panels and those of the side and end walls and also in a vertical position between the side and end wall panels.

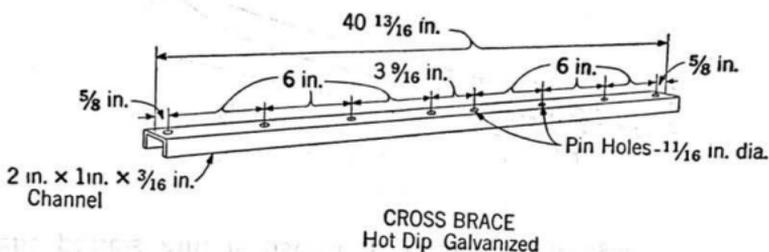
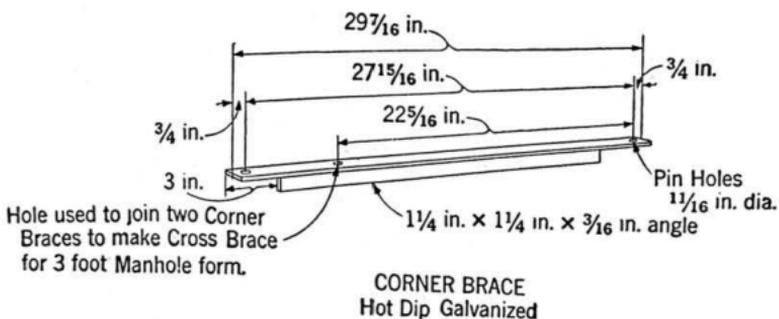


2.06 **Junction Corner.** The junction corner forms the connection between the horizontal side and end corners at the roof and the vertical corners of the side and end walls.



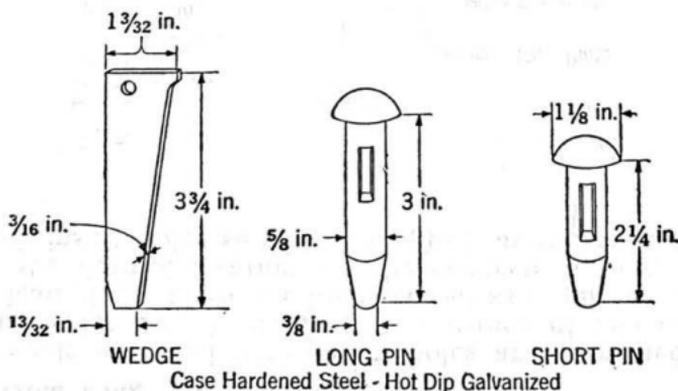
Braces

2.07 In the erection of the forms, two types of braces are used, a corner brace for squaring up the form assembly and a cross brace for stiffening the form. The cross brace furnished is of the proper length for use with a form assembly 3 feet 6 inches wide. For wider forms, two cross braces can be joined with short pins and wedges to make a single brace of the proper length. Two corner braces are joined to make a cross brace for a manhole of 3-foot width.



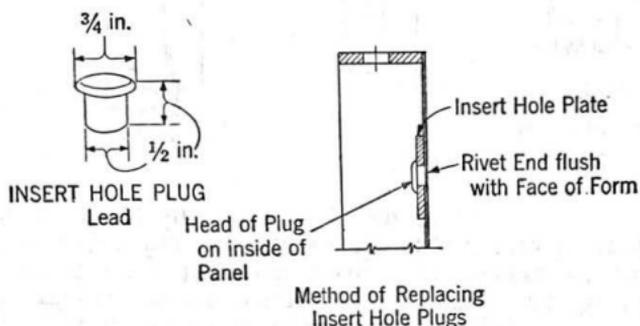
Pins and Wedges

2.08 Two lengths of pins are used in the erection of the forms, a short and a long pin. The former is used to join the flanges of the panels and corners and to join two cross braces or corner braces to obtain extra length. The long pin is used only where braces connect with flanges of the panels and the pin must pass through three thicknesses of metal. The wedge illustrated fits the slot of either pin and is used to draw the parts together into a rigid connection.



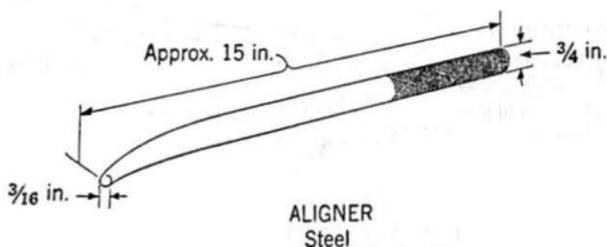
Insert Hole Plug

2.09 Panels equipped with insert holes are furnished with the holes sealed against the entrance of concrete by means of lead plugs. These are knocked out as required in order to obtain the desired location for the concrete inserts. When not needed, insert holes should be plugged, as indicated below.



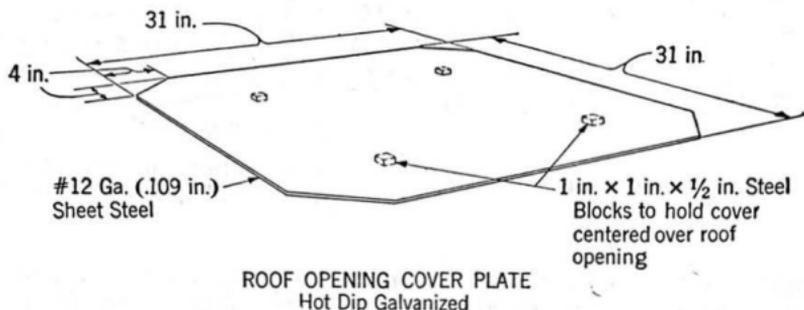
Aligner

2.10 With each set of forms is furnished one or more aligners for use when erecting or dismantling forms. The tool can be used as a drift-pin to line up the holes in adjacent panels and is useful in removing wedges.



Roof Opening Cover Plate

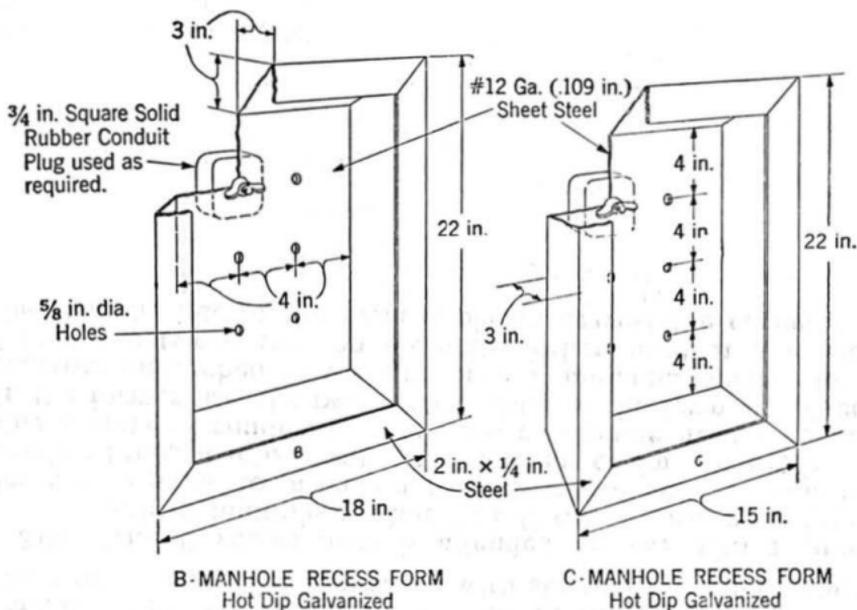
2.11 The roof opening cover plate is intended to be placed over the hole in the roof of the assembled form when placing concrete for the walls. It is removed before placing the manhole opening form for the roof.



3. MANHOLE RECESS FORM

3.01 The manhole recess forms illustrated on the following page produce a recess 3 inches deep with a flat panel 2 inches in width around the conduit. They are designed to be held in position against the manhole form by means of rubber conduit plugs inserted into the ducts of the entering conduit. Each form is supplied assembled with six rubber conduit plugs.

3.02 The B recess form is intended for use with a single unit of multiple conduit. The C recess form is designed for use in pairs, to provide a recess for two units of multiple conduit brought into a wall close together or for use singly for single units of conduit brought into a manhole near a corner. In the former use, the two straight sides of the form are placed together and, when so used, produce a minimum separation of 3 inches between the conduit units. When used at a corner, the straight side of the form is placed nearest the corner.



4. MANHOLE OPENING FORM

4.01 Five sizes of B Manhole Opening Forms are provided to form openings in concrete roofs to accommodate the various sizes of manhole frames. The form is held closed by means of pinned couplings and, in the two largest sizes, is braced by three bars connected to lugs by means of short pins and wedges. These details and their dimensions are shown below.

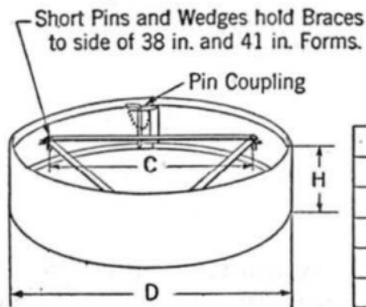


Table of Dimensions - Inches

Size of Form	D	H	C
41 in. Opening	41	12	33 ⁹ / ₁₆ in.
38 in. Opening	38	12	31 in.
34 in. Opening	34	12	None Required
31 in. Opening	31	12	
28 in. Opening	28	12	

B-MANHOLE OPENING FORM
Hot Dip Galvanized