(4) Where workmen or frequenters may be exposed to material or objects which may accidentally fall from upper working levels, the exposed area shall be shut off from access by means of standard guard railings, or better. If the structure to be demolished is more than 2 stories or 25 feet high above the sidewalk and the horizontal distance from the inside of the sidewalk to the structure is 15 feet or less, a substantial sidewalk shed shall be constructed over the entire width of the sidewalk adjacent to the structure. The sidewalk shed shall be capable of sustaining a live load of 150 pounds per square foot, or more, and shall be lighted by natural or artificial means to produce an intensity of illumination of not less than 2 foot-candles.

Ind 35.07 Excavation. (1) All work in excavation more than 8 feet in minimum horizontal dimension and which is 4 feet or more in depth, where there is danger of slides or cave-ins, shall be supported by substantial sheet-piling and bracing, or other effective means, or the sides of the excavation sloped to the angle of repose of the material being excavated.

(2) Excavations, in other than hard rock, below the level of the top of the footing or base of any foundation or retaining wall shall not be permitted unless the wall is properly shored, braced, or underpinned to insure the stability of the wall.

(3) A guard railing as described in section Ind 35.03, or other effective guard or barricade, shall be provided at or near the edge of an excavation as soon as possible, except where the installation of such safeguard will interfere with the excavation or other work.

(4) All excavation to which employes or frequenters may be exposed at night shall have red lanterns or torches placed at unbarricaded points, and along the exposed side where the excavation adjoins a public thoroughfare.

Note. The protection of workmen in excavation less than 8 feet in minimum horizontal dimension shall be as required under the general orders on tunnel, caisson and trench construction issued by the industrial commission. Where explosives are used, the requirements of the general orders on explosives, issued by the industrial commission shall be complied with.

Ind 35.08 Shoring. (1) All shoring, as defined in section Ind 35.02, done on projects within the scope of this code shall be done in a manner which will not overstress any part of the structure being shored or any part of the shoring construction or device. By overstress is meant exceeding the stresses permitted for various materials under section Ind 35.13.

(2) The shoring construction or device shall in every case be stable in itself and shall not disturb the stability of the structure, or part thereof, being shored.

Ind 35.09 Falsework. All falsework, as defined in section Ind 35.02, which supports workmen, material or equipment at any time shall comply with the requirements that apply to scaffolds in this code, except that the requirements for guard rails and toeboards need not apply.

Ind 35.10 Scaffolds required. Scaffolds which comply with the requirements of this code shall be provided to furnish reasonably safe working places for workmen in exposed or elevated places except that ladders may be used where work can be safely done for short periods.

Ind 35.11 General scaffold requirements. (1) All scaffolds, and parts thereof, shall be erected, installed, maintained and inspected in accordance with the provisions of this code, and such work shall be done, and the scaffold removed, only by persons experienced in such work. Dismantling and removal of scaffolds shall always proceed systematically, and the platform planks shall first be removed, proceeding from top to bottom, before any braces, ledgers or putlogs are removed or loosened. When braces are removed, this removal shall also proceed from top to bottom but no braces or other supports shall be disturbed while any person is on the scaffold.

(2) All post, square and outrigger scaffolds shall be braced to prevent the lateral movement or distortion of the whole or any part thereof.

(3) No scaffold post shall stand directly on the ground but shall be provided with a footing or foundation of sufficient size and strength to spread the load from the post over a sufficient area to prevent settlement. If the footing is of wood, it shall be a solid block or plank not less than 2 inches nominal thickness and not less than one foot square and shall be securely nailed to the post and shall be placed on solid soil sufficiently below the surface to prevent displacement. The use of objects, such as building tile or blocks, loose brick, boxes, barrels, loose board construction, and similar material for the support of posts or scaffolds is prohibited.

(4) No scaffold or part thereof shall at any time be loaded or used in a manner such that the loads and stresses permitted under section Ind 35.13 will be exceeded.

(5) Every scaffold member, except floor planks or boards, subjected to bending stress shall be set in the position to resist greatest bending load.

Ind 35.12 Scaffold materials. (1) All lumber used in scaffolds, except lumber used for braces only, shall be of stress grade material and shall be of sufficient size, quality, and strength to carry the imposed loads safely without exceeding the allowable working stresses specified in section Ind 53.28 of the Wisconsin state building code. Lumber used for braces shall be sound, free from cross grain, shakes, or other defects that will impair its strength or durability.

(2) All metal used in any part of a scaffold shall conform to the standard specifications of the American Society for Testing Materials, as follows:

(a) For Steel, Standard Specifications for Structural Steel for Bridges and Buildings, Serial Designation A7–50 T

(b) For Wrought Iron, Standard Specifications for Refined Wrought Iron Plates, Serial Designation A42–47

(c) For Cast Iron, Standard Specifications for Gray Iron Castings, Serial Designation A48–48

Ind 35.13 Scaffold design and workmanship. (1) All scaffolds shall be so designed and built that the unit stresses in the material of any member when under maximum loading will not exceed those specified for that material in chapter 53 of the Wisconsin state building code issued by the industrial commission.

(2) The following tables show the allowable safe load for some of the beams and posts commonly used in scaffold construction. These

TOTAL SAFE LOAD FOR BEAMS—LOAD CONCENTRATED AT CENTER OF BEAM

Allowable Unit Stress—1200 Lb. Per Square Inch

Span, in Feet	Nominal Size of Beams, in Inches, Greatest Dimension Vertical												
	2x4	2x6	2x8	2x10	2x12	3x4	3x6	3x8	4x4	4x6	6x6	6x8	8x8
4	356	857	1523	2444	3582	575	1384	2460	794	1912	2773	5156	7031
6	237	571	1015	1630	2388	383	923	1640	529	1275	1849	3437	4688
8	178	429	762	1222	1791	288	692	1230	397	956	1387	2578	3515
10	142	342	609	978	1432	230	554	984	318	765	1110	2062	2812
12	119	286	508	815	1194	192	461	821	264	638	925	1719	2344
14	101	245	435	698	1027	164	395	707	228	545	793	1477	2008
16	89	214	380	611	895	144	346	615	199	478	693	1289	1758

Where the load is distributed over the length of the beam, the safe loads in the above table may be doubled.

tables are based on an allowed unit stress of 1200 pounds per square inch. For other kinds of timber with higher or lower allowable unit stresses, see section Ind 53.28 of the Wisconsin state building code. The safe load is in direct proportion to the allowed unit stress.

(3) No wheeling shall be done on scaffold platforms supported by posts which are less than nominal 4 x 4 inches, or equivalent in strength.

(4) Scaffolds shall not be built higher than as follows:

(a) Where the posts are of nominal 2 inch material, 24 feet;

(b) Where the posts are of nominal 3 inch material, 40 feet;

(c) Where the posts are of nominal 4 inch material, or better, no height limit.

(5) No nail smaller than the following sizes shall be used for the various thicknesses of materials in the construction of any scaffolding:

(a) 1 inch (nominal) material, 8d common (2½ inches), or 10d double head (3 inches).

(b) 2 inch (nominal) material, 16d common (3½ inches), or 20d double head (4 inches).

(c) 3 inch (nominal) material, 30d common (4½ inches), or 40d double head (5 inches).

(d) 4 inch (nominal) material, 50d common (5½ inches), or 60d double head (6 inches).

MAXIMUM PERMISSIBLE SPAN (IN FEET) FOR PUTLOGS

Allowable Unit Stress—1200 Lb. Per Sq. In.

Carpenter, Painter, Decorator and Similar Light Duty Scaffolds		Mason, Plasterer and Similar Heavy Duty Scaffolds	
Nominal Cross-Sectional Dimensions of Putlog in Inches	Span	Nominal Cross-Sectional Dimensions of Putlog in Inches	Span
2 x 6	4	2 x 8	4
2 x 8	5	2 x 10	5
2 x 10	7	2 x 12	6
2 x 12	8	4 x 4	4
4 x 4	4	4 x 6	5
4 x 6	6	6 x 6	6
		6 x 8	8

TOTAL SAFE LOADS FOR DOUGLAS FIR POSTS

Compression Parallel to Grain—1100 Lb. Per Sq. In.

Clear Height Between Braces or Ties in Feet	Nominal Cross-Sectional Dimensions of Posts in Inches							
	2x4	2x6	2x8	3x4	4x4	4x6	6x6	8x8
4	2,782	4,317	5,757	9,236	13,991	21,711	33,300	61,800
6	1,233	1,944	2,553	5,212	12,055	18,706	32,243	61,800
8	693	1,070	1,430	2,980	7,720	11,900	29,981	60,142
10	-------	-------	-------	1,873	4,929	7,649	25,322	57,606
12	-------	-------	-------	1,300	3,426	5,317	18,112	52,965
14	-------	-------	-------	-------	2,512	3,909	13,365	45,416
16	-------	-------	-------	-------	1,930	2,980	10,207	35,276
18	-------	-------	-------	-------	-------	-------	8,050	27,873
20	-------	-------	-------	-------	-------	-------	6,540	22,577

(6) No nail shall be subjected to straight pull in any portion of a scaffold except nails which fasten sheathing boards to the framework that supports carpenter's bracket scaffolds as specified in section Ind 35.17.

(7) All nails shall be driven full length, except in the case of double-headed nails, the nails shall be driven tightly to the guard head. A sufficient number of nails shall be driven at each connection to develop the designed strength of the scaffold.

(a) For load supporting members, such as ledgers, a minimum of 5 nails shall be driven at each connection.

(b) For braces and guard rails, a minimum of 2 nails shall be driven at each connection.

History: 1–2–56; am. (1), Register, October, 1963, No. 94, eff. 11–1–63.

Ind 35.14 Built-up wood scaffolds and sectional metal scaffolds. (1) WOOD SCAFFOLDS. (a) Posts for wood post scaffolds shall be spaced not more than 8 feet center to center, measured along the platform, and shall conform to the requirements of section Ind 35.13.

(b) Where necessary to increase the height of a wood post by splicing, the squared end of the upper section shall rest evenly upon the squared end of the lower section, and the 2 ends shall be held in place by fastening not less than 2 wood cleats, each not less than 4 feet in length, centered approximately at the joint, to adjoining sides of such post. The combined sectional area of the cleats shall be not less than that of the post. Every post having joints shall be braced at a point not more than 3 feet from the joint.

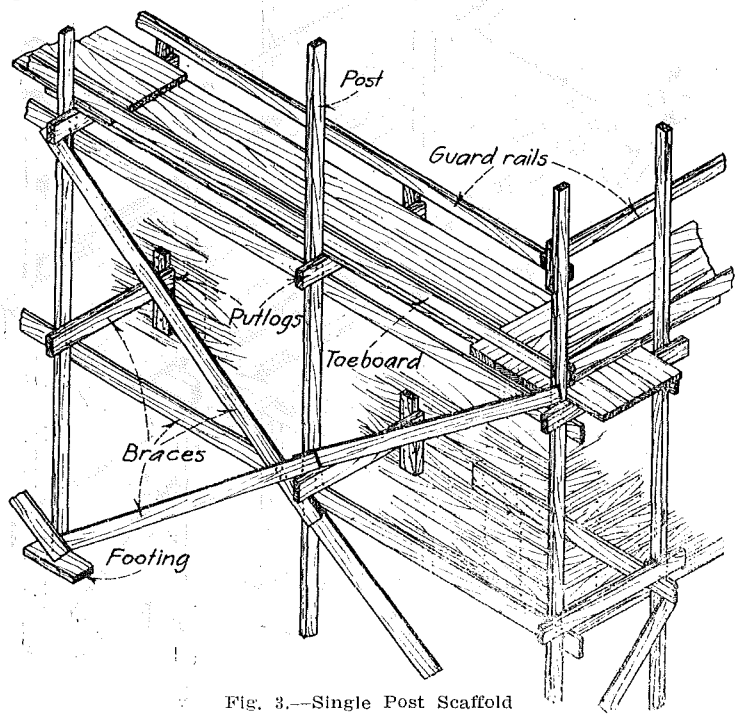

Fig. 3.—Single Post Scaffold

(c) In the construction of single post scaffolds, the scaffold framework shall be braced to the adjoining permanent structure. In the case of independent post scaffolds, the scaffold framework shall be braced independent of the adjoining permanent structure.

(d) Ledgers shall be not less than nominal 2 x 8 inches in sectional dimension, except that where putlogs are supported only at posts, the section of the ledger may be reduced to not less than nominal 2 x 6 inches in sectional dimension. Ledgers shall not be loosened or removed until the scaffold is dismantled.

(e) Ledgers shall be fastened to the inside (platform side) of posts, except where they interfere with bracing. In the case of scaffolds used by masons and upon which wheeling is done, where such fastening is by nailing to a post, the nail support shall be reinforced by a cleat of the same thickness as the ledger, nailed to the post directly under the ledger.

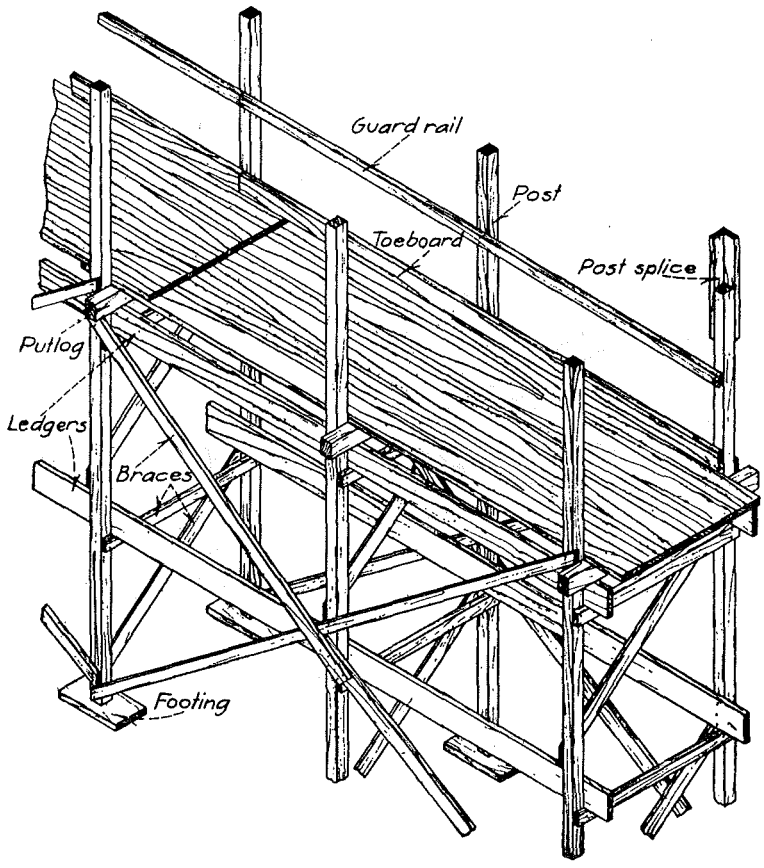

Fig. 4.—Independent Post (Masonry and Wheeling) Scaffold