CHAPTER 3

STANDARD LIGHT-EQUIPMENT SUSPENSION BRIDGE

SECTION I

GENERAL

56 GENERAL.—The bridge will carry foot troops with full field pack, pack mules and handlers, or ¼-ton trucks and trail tractors, as follows:

A *Foot troops* (fig. 4).—Troops with full field pack spaced one-fortieth span length apart and crossing at route

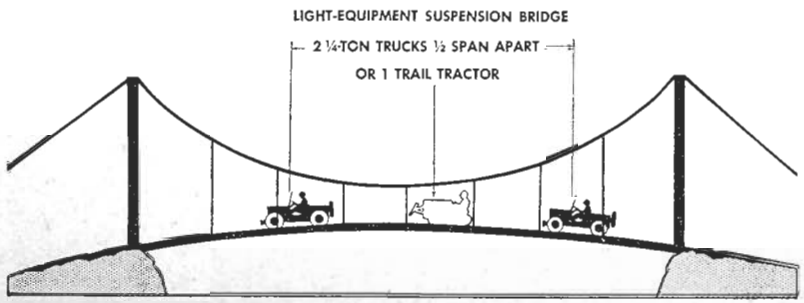


FIGURE 33. *Capacity of light-equipment suspension bridge. The bridge will carry two ¼-ton trucks or one trail tractor.*

step in single file. For example, 40 men can cross a 300-foot span at 3-pace intervals.

B *Pack mules* (fig. 4).—Seven pack mules, each with handler, spaced one-seventh span length apart. For example, on a 300-foot span mules maintain 15-pace intervals.

C *Quarter-ton trucks and trail tractors* (fig. 33).—Two ¼-ton trucks one-half span length apart or one trail tractor (fig. 34).

57 SPAN LENGTH.—A Maximum span length is 300 feet.

B For spans under 140 feet a modified tower must be used. See paragraph 10B.

FIGURE 34. *Trail tractor. Used to clear and construct trails and light-equipment roads.*

DESCRIPTION OF BRIDGE AND ERECTION EQUIPMENT

58 GENERAL.—The light-equipment suspension bridge is similar in design and construction to the suspension footbridge. To avoid repetition similar parts are referred to but not described.

59 ERECTION CABLEWAY.—See paragraph 11.

60 TOWERS.—Towers are constructed from materials found at the site.

A *Improvised towers.*—Improvised towers, types 1 and 2, are built as shown in figures 35 and 36. Timbers are 12-inch logs; bracing is made of 2- by 10-inch cut lumber. The uprights are doweled to the sill and the cap pieces are 12 feet inside to inside.

B *Prefabricated tower* (fig. 37).—If dimension lumber is available the tower can be built using plank 2 by 10 inches by 10 feet. The sill base is constructed as shown in figure 38. It is a built-up, lap-jointed piece, 4 by 10 inches by 15 feet.

Two built-up, lap-jointed, 8- by 10-inch posts are nailed to the sill 12 feet 2 inches inside to inside of posts. Two 2- by 10-inch pieces are nailed to the sides of the sill base and posts as shown and are scabbed to the lap joints. Two 2- by 10-inch by 10-foot cap pieces are nailed across the top of the posts, and one 2- by 10-inch cross brace is nailed to each side of the posts 11 feet above the sill. Diagonal bracing is nailed to both sides of the posts above the cross braces. Tower saddle blocks and cover plates are nailed to the top of each post. Cover plates support the main cables.

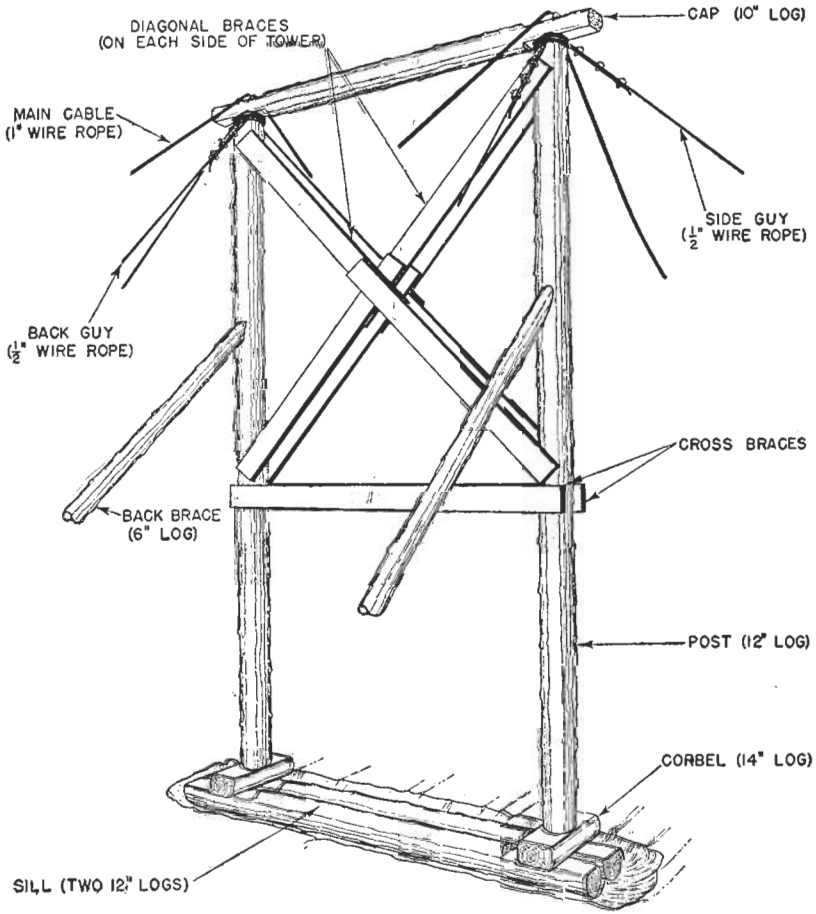


FIGURE 35. *Improvised tower, type-1, for light-equipment suspension bridge. Used on long spans when dimension lumber is available for bracing.*

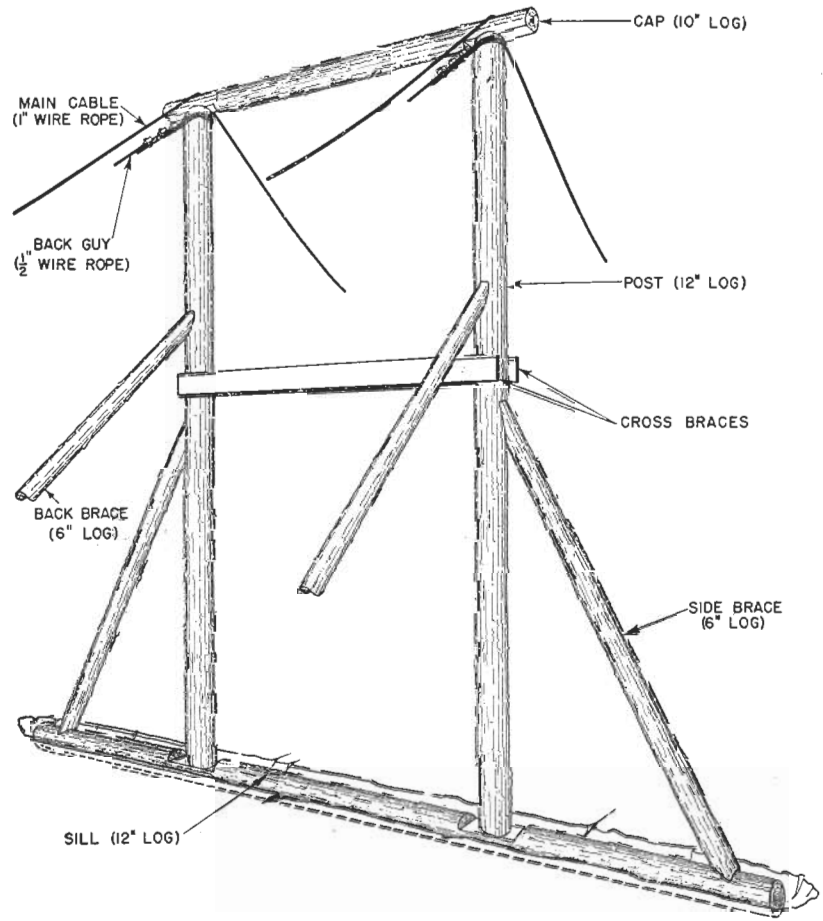


FIGURE 36. *Improvised tower, type-2, for light-equipment suspension bridge. Used for long spans when dimension lumber is not available.*

61 SADDLE-BLOCK COVERS.—See paragraph 13.

62 TOWER GUYS.—See paragraph 14.

63 MAIN-CABLE DEADMAN.—The main-cable deadman must hold against a 30-ton pull. For deadman design see paragraph 15.

64 MAIN CABLES.—The main cables are 1-inch, 6 x 19, wire ropes W.R.C., H.G.P.S. For details on installing cables see paragraphs 16 and 43.

65 SUSPENDERS.—See paragraph 17A. Table VI gives the effective and cut lengths of suspenders and the total number of suspenders of each length required for 40- to 300-foot spans of the light-equipment suspension bridge.

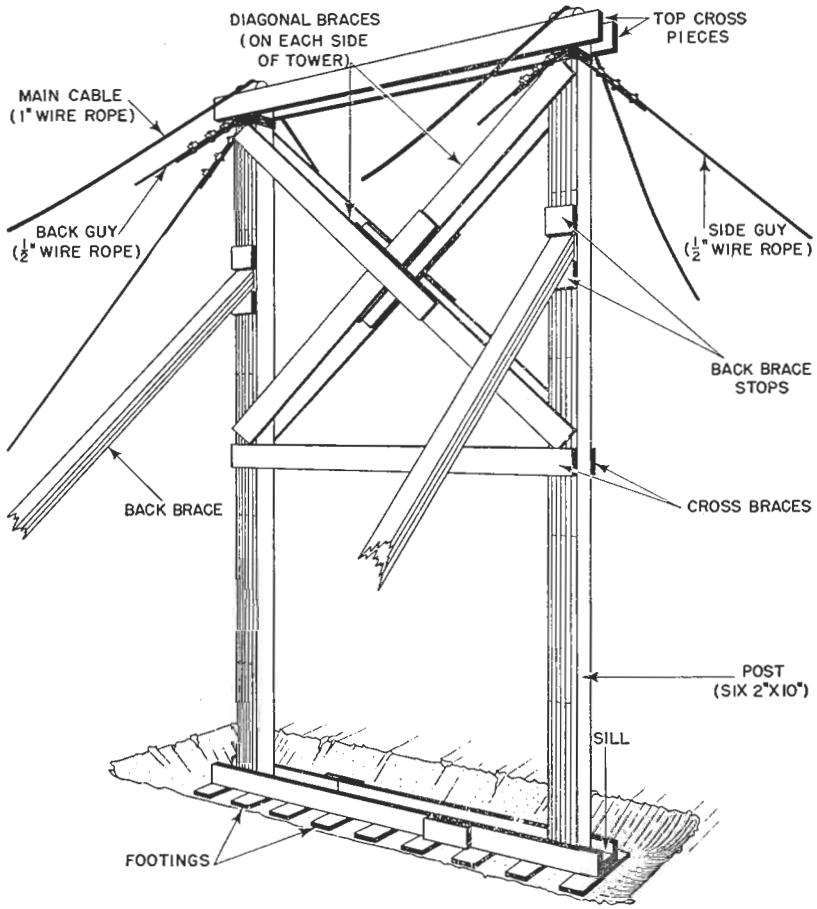


FIGURE 37. *Prefabricated tower for light-equipment suspension bridge. Used for long spans when dimension lumber is available.*

66 CABLE CLIPS AND BANDS.—Suspenders and main cables are tied back with ½- and 1-inch wire-rope clips respectively. To connect the ½-inch suspenders to the 1-inch main cables, clip-type cable bands (1 inch - ½ inch) are used. Thimbles are used at the main cable to suspender connections to prevent shearing the ½-inch suspender cable.

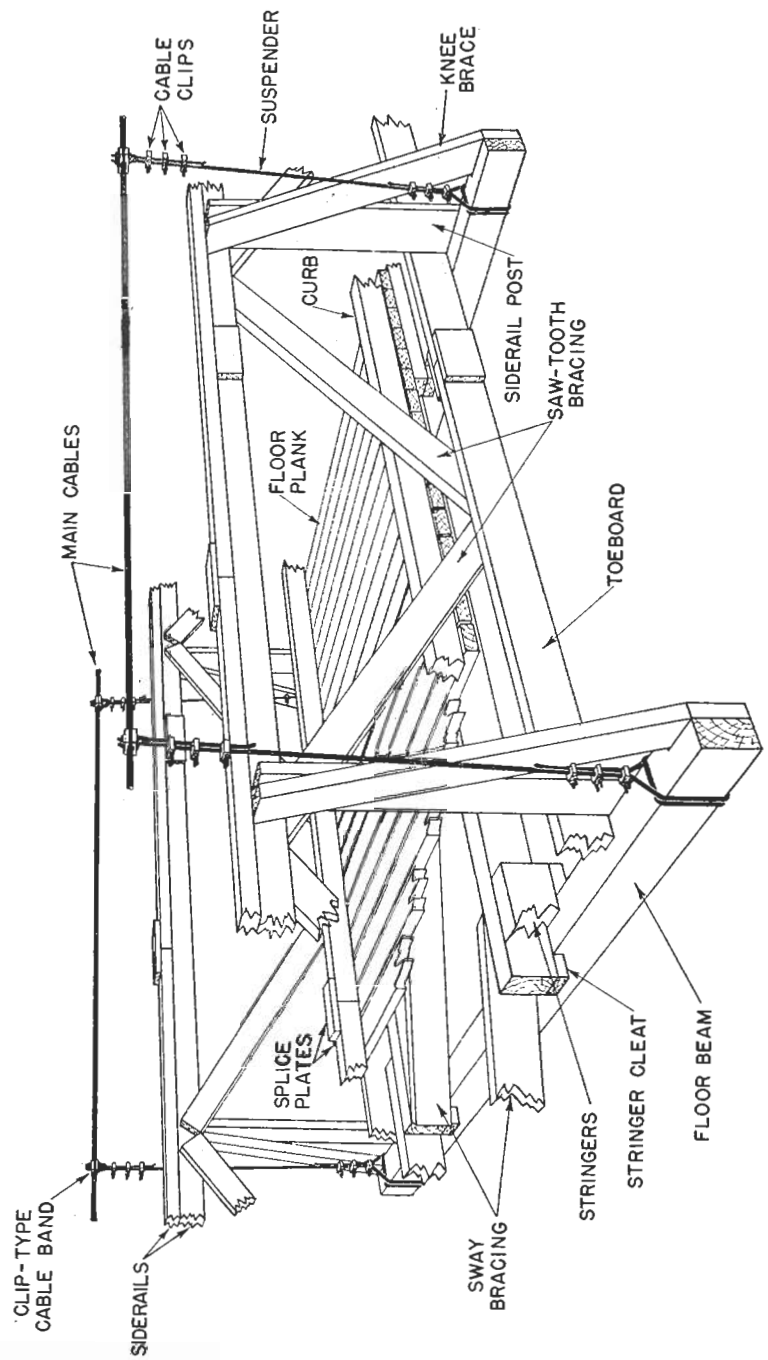


FIGURE 38. *Floor and siderail system of light-equipment suspension bridge.*

TABLE VI. *Effective and cut suspender lengths for various spans of light-equipment suspension bridge.*

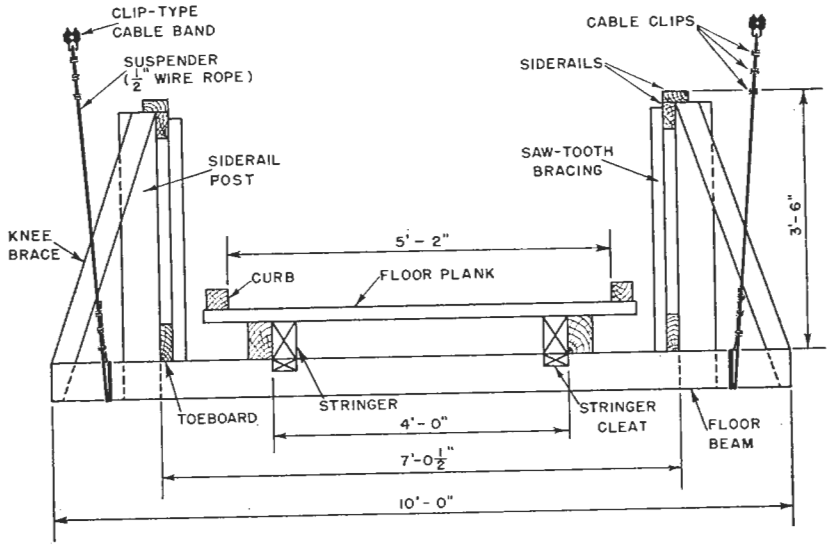
Panel Point	Number Required	40 Feet *		60 Feet *		80 Feet *		100 Feet *	
		Effective	Cut	Effective	Cut	Effective	Cut	Effective	Cut
0	2	2′ 4″	7′ 7″	2′ 4″	7′ 7″	2′ 4″	7′ 7″	2′ 4″	7′ 7″
1	4	3′ 11″	9′ 2″	2′ 10″	8′ 2″	2′ 8″	7′ 11″	2′ 7½″	7′ 10½″
2	4		TOWER	4′ 4″	9′ 7″	3′ 10½″	9′ 1½″	3′ 7″	8′ 10″
3	4				TOWER	5′ 9½″	11′ 0½″	5′ 1″	10′ 4″
4	4						TOWER	7′ 2″	12′ 5″
5	4								TOWER

* Use improvised tower.

Panel Point	Number Required	120 Feet *		140 Feet		160 Feet		180 Feet	
		Effective	Cut	Effective	Cut	Effective	Cut	Effective	Cut
0	2	2′ 4″	7′ 7″	2′ 4″	7′ 7″	2′ 4″	7′ 7″	2′ 4″	7′ 7″
1	4	2′ 7″	7′ 10″	2′ 6½″	7′ 9½″	2′ 6½″	7′ 9½″	2′ 6″	7′ 9″
2	4	3′ 4″	8′ 7″	3′ 1″	8′ 4″	2′ 11½″	8′ 2½″	3′ 0½″	8′ 3½″
3	4	4′ 0½″	9′ 10½″	4′ 8″	9′ 6″	4′ 0½″	9′ 3½″	3′ 10½″	9′ 1½″
4	4	6′ 4″	11′ 7″	5′ 10½″	11′ 1¼″	5′ 5″	10′ 8″	5′ 1″	10′ 4″
5	4	7′ 8½″	12′ 11½″	7′ 10″	13′ 1″	8′ 1″	13′ 4″	6′ 7½″	11′ 10½″
6	4		TOWER	10′ 3″	15′ 6″	9′ 2½″	14′ 5½″	8′ 6″	13′ 9″
7	4				TOWER	11′ 8½″	16′ 11½″	10′ 8″	15′ 11″
8	4						TOWER	13′ 3″	18′ 6″
9	4								TOWER

TABLE VI. (*Continued*).

Panel Point	Number Required	200 feet		220 feet		240 feet		260 feet		280 feet		300 feet	
		Effective	Cut	Effective	Cut	Effective	Cut	Effective	Cut	Effective	Cut	Effective	Cut
0	2	2′ 4″	7′ 7″	2′ 4″	7′ 7″	2′ 4″	7′ 7″	2′ 4″	7′ 7″	2′ 4″	7′ 7″	2′ 4″	7′ 7″
1	4	2′ 6″	7′ 9″	2′ 5½″	7′ 8½″	2′ 5½″	7′ 8½″	2′ 5½″	7′ 8½″	2′ 5½″	7′ 8½″	2′ 5″	7′ 8″
2	4	2′ 11½″	8′ 2½″	2′ 11″	8′ 2″	2′ 10″	8′ 1″	2′ 9½″	8′ 0½″	2′ 9½″	8′ 0½″	2′ 8½″	7′ 11½″
3	4	3′ 8½″	8′ 11½″	3′ 7″	8′ 10″	3′ 6″	8′ 9″	3′ 5″	8′ 8″	3′ 4″	8′ 7″	3′ 3″	8′ 6″
4	4	4′ 9½″	10′ 0½″	4′ 7″	9′ 10″	4′ 4½″	9′ 7½″	4′ 2″	9′ 5″	4′ 1″	9′ 4″	3′ 11½″	9′ 2½″
5	4	6′ 2″	11′ 5″	5′ 8″	10′ 11″	5′ 7″	10′ 10″	5′ 3½″	10′ 6½″	5′ 1″	10′ 4″	4′ 11″	10′ 2″
6	4	7′ 10″	13′ 1″	7′ 4½″	12′ 7½″	6′ 11½″	12′ 2½″	6′ 7″	11′ 10″	6′ 3½″	11′ 6½″	6′ 0½″	11′ 3½″
7	4	9′ 10″	15′ 1″	9′ 2½″	14′ 5½″	8′ 7½″	13′ 10½″	8′ 1½″	13′ 4½″	7′ 8½″	12′ 11½″	7′ 4½″	12′ 7½″
8	4	12′ 1½″	17′ 4½″	11′ 3″	16′ 6″	10′ 6½″	15′ 9½″	9′ 10½″	15′ 1½″	9′ 4½″	14′ 6½″	8′ 11″	14′ 2″
9	4	14′ 5½″	20′ 0″	13′ 5″	18′ 8″	12′ 8½″	17′ 11½″	11′ 10½″	17′ 1½″	11′ 1½″	16′ 4½″	10′ 8″	15′ 11″
10	4		TOWER	16′ 3½″	21′ 8½″	15′ 2″	20′ 5″	14′ 1½″	19′ 4½″	13′ 3½″	18′ 6½″	12′ 7″	17′ 10″
11	4				TOWER	17′ 10″	23′ 1″	16′ 7½″	21′ 10½″	15′ 7½″	20′ 10½″	14′ 9″	20′ 0″
12	4						TOWER	19′ 4″	24′ 7″	18′ 1½″	23′ 4½″	17′ 1½″	22′ 4½″
13	4								TOWER	20′ 11″	26′ 2″	19′ 8½″	24′ 11½″
14	4										TOWER	22′ 6″	27′ 9″
15	4												TOWER



ARTICLE	NO. REQD. PER PANEL	SIZE
SIDERAILS	4	2" x 4" x 10'-0"
SIDERAIL POST	2	2" x 6" x 3'-10"
SAW-TOOTH BRACES	4	2" x 4" x 5'-8"
KNEE BRACE	2	2" x 4" x 4'-1"
TOEBOARD	2	2" x 6" x 10'-0"
FLOOR BEAM	2	6" x 6" x 10'-0"
STRINGER	2	4" x 6" x 11'-0"
STRINGER CLEAT	2	2" x 4" x 3¼"
FLOOR PLANK	18	2" x 6" x 5'-10"
CURB	2	4" x 4" x 10'-0"

FIGURE 39. *Hanger assembly and parts required for floor and siderail system of light-equipment suspension bridge.*

67 FLOOR AND SIDERAIL SYSTEM (fig. 38 and 39).—A *Floor beams.*—A 6- by 6-inch floor beam 10 feet long is used at each panel point.

B *Stringers.*—Two 11-foot stringers are used in each panel.

C *Floor plank.*—Eighteen 2- by 6-inch floor planks 5 feet 10 inches long are used in each bay. They are spaced ¾ inch apart.

D *Curbs.*—Two 4- by 4-inch by 10-foot curbs are used in each panel.

E *Toeboards, siderail posts, siderails, saw-tooth braces, siderail braces, and cleats and scabs.*—See paragraph 19 and figure 39.

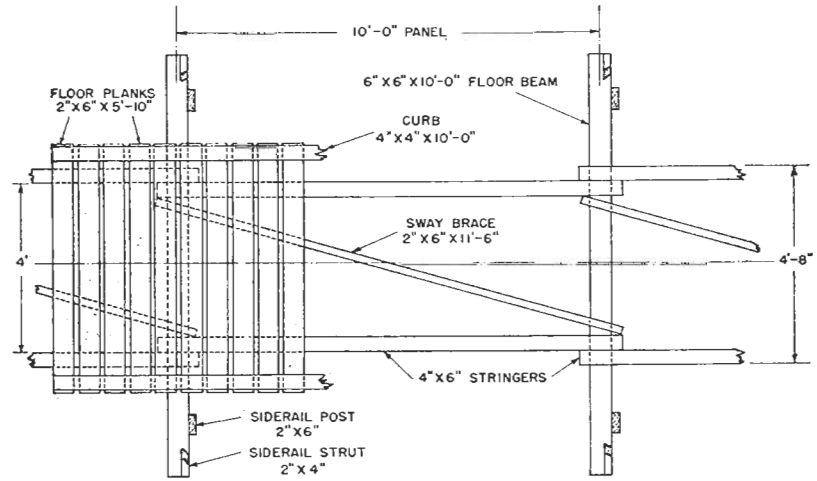


FIGURE 40. *Timber sway bracing of light-equipment suspension bridge.*

68 HORIZONTAL SWAY BRACING (fig. 40).—One 2- by 6-inch plank 11 feet 6 inches long is used for horizontal sway bracing in each bay.

69 ERECTION EQUIPMENT.—The construction equipment needed to build the bridge is given in Appendix II. This is a suggested list of equipment which may be varied to meet the situation and the terrain at the bridge site.

70 SPECIAL EQUIPMENT.—A *Portable sawmill.*—See paragraph 22.

B *Portable air compressors.*—See paragraph 23.

C *Chain saw.*—See paragraph 24.

D *Radio sets.*—See paragraph 25.

E *Transit.*—See paragraph 26.

TRANSPORTATION

71 PACK MULES AND VEHICLES.—For transportation by pack mule see paragraph 27 and Table IV. Three extra mules are required to carry the heavier main cables. The materials may be split up and carried in ¼-ton trucks and trailers or in trail-tractor trailers.

72 CABLE PACK.—See paragraph 28.

SECTION IV

SITE SELECTION

73 SITE SELECTION.—See paragraph 29.

CONSTRUCTION OF BRIDGE AND WORKING PARTIES

74 GENERAL.—The bridge is constructed simultaneously from both banks. Organization of personnel is as given in Section VI, Chapter 2. Construction procedure varies only in the time required to construct the bridge and in the placing of flooring.

75 ERECTION TIME.—The bridge is constructed in three phases or shifts. Each phase takes about 5 daylight hours.

76 ERECTION PROCEDURE.—A Hangers are placed and spaced as described in paragraphs 32 and 49. Two stringers are nailed to the floor beams and suspenders are given final adjustment. Sway bracing is nailed diagonally corner to corner of the stringers and flooring is placed and nailed.

B Siderails are placed after the flooring of the whole bridge has been completed.

C Siderails, toeboards, saw-tooth braces, and curbs are placed in the last 5-hour period.

Note.—All hangers, panel points 0 to 14, are alike and are constructed as shown in figures 38 and 39.

77 SUSPENDERS.—Suspenders are cut to length and installed as described in paragraph 39. Lengths of suspenders for the light-equipment suspension bridge are given in Table VI.