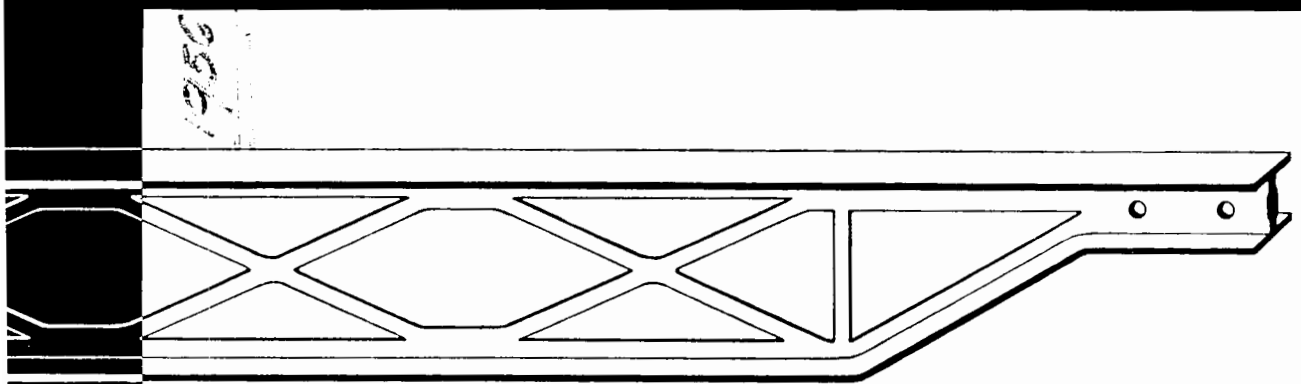
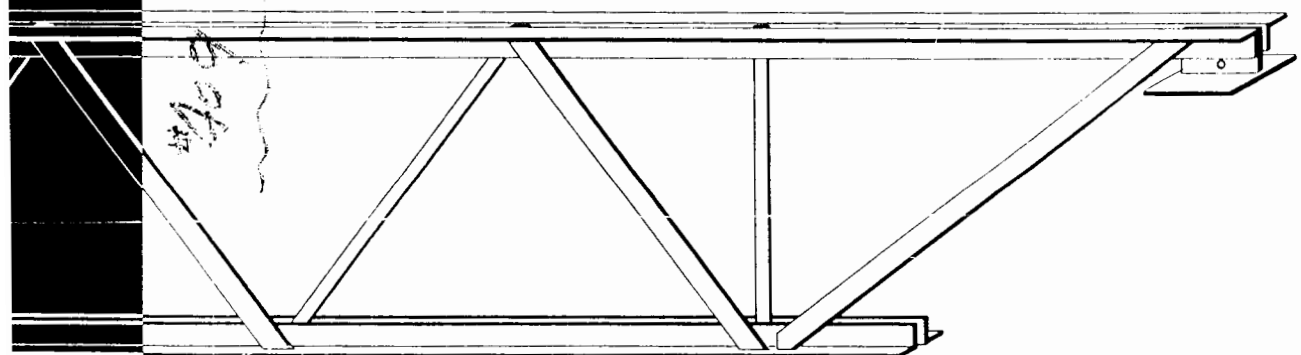


BETHLEHEM OPEN-WEB STEEL JOISTS



SHORTSPANS
EXPANDED TYPE



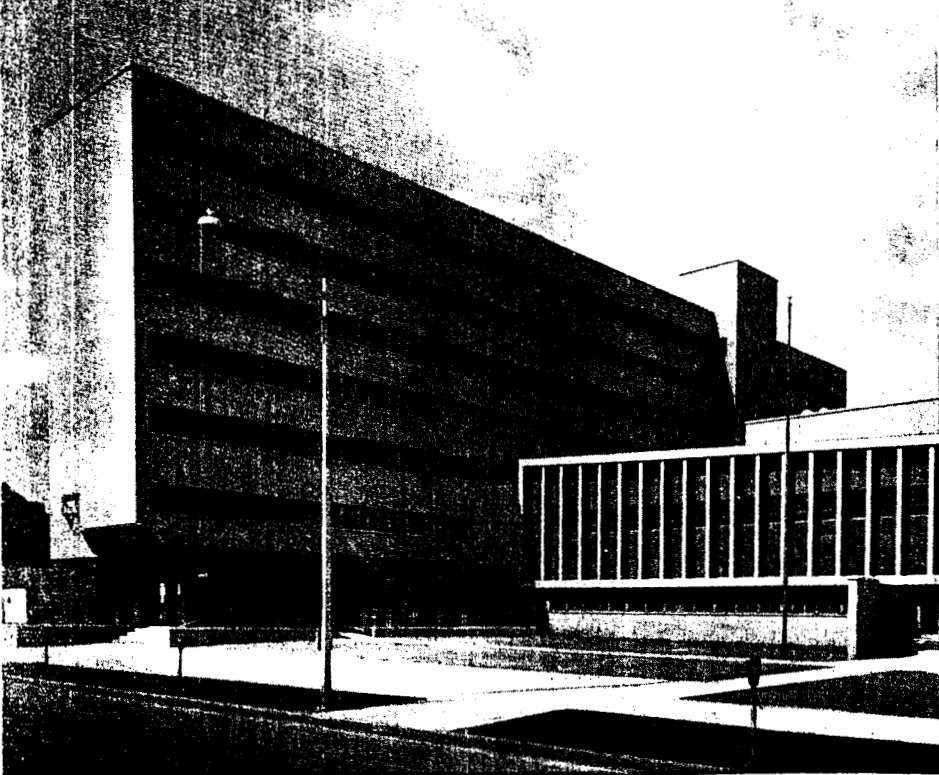
LONGSPANS

YEAR 1956

BETHLEHEM
L

CATALOG 409

A.I.A. FILE No. 138



(left) Seven-story residence wing, Peoria, Ill., Y.M.C.A. contains Bethlehem Open-Web Steel Joists. Architects: Gregg and Briggs; general contractor: Fred Harber's Sons; both of Peoria.

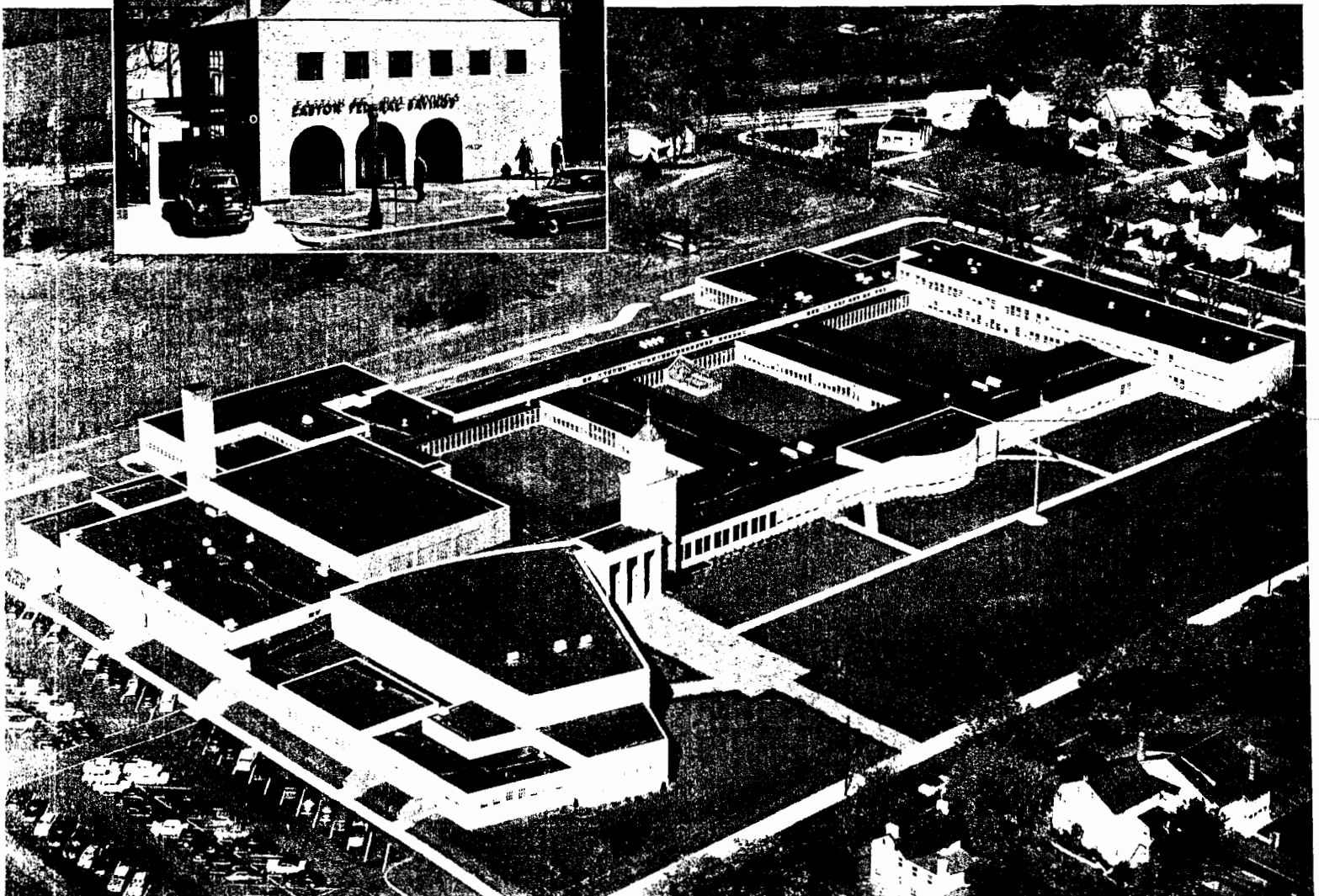
(inset) Steel joists in bank building in Easton, Pa., contribute to permanent fire-resistant construction. Architect: Hugh Moore, Jr., Easton; general contractor: Collins and Maxwell, Inc., also of Easton.

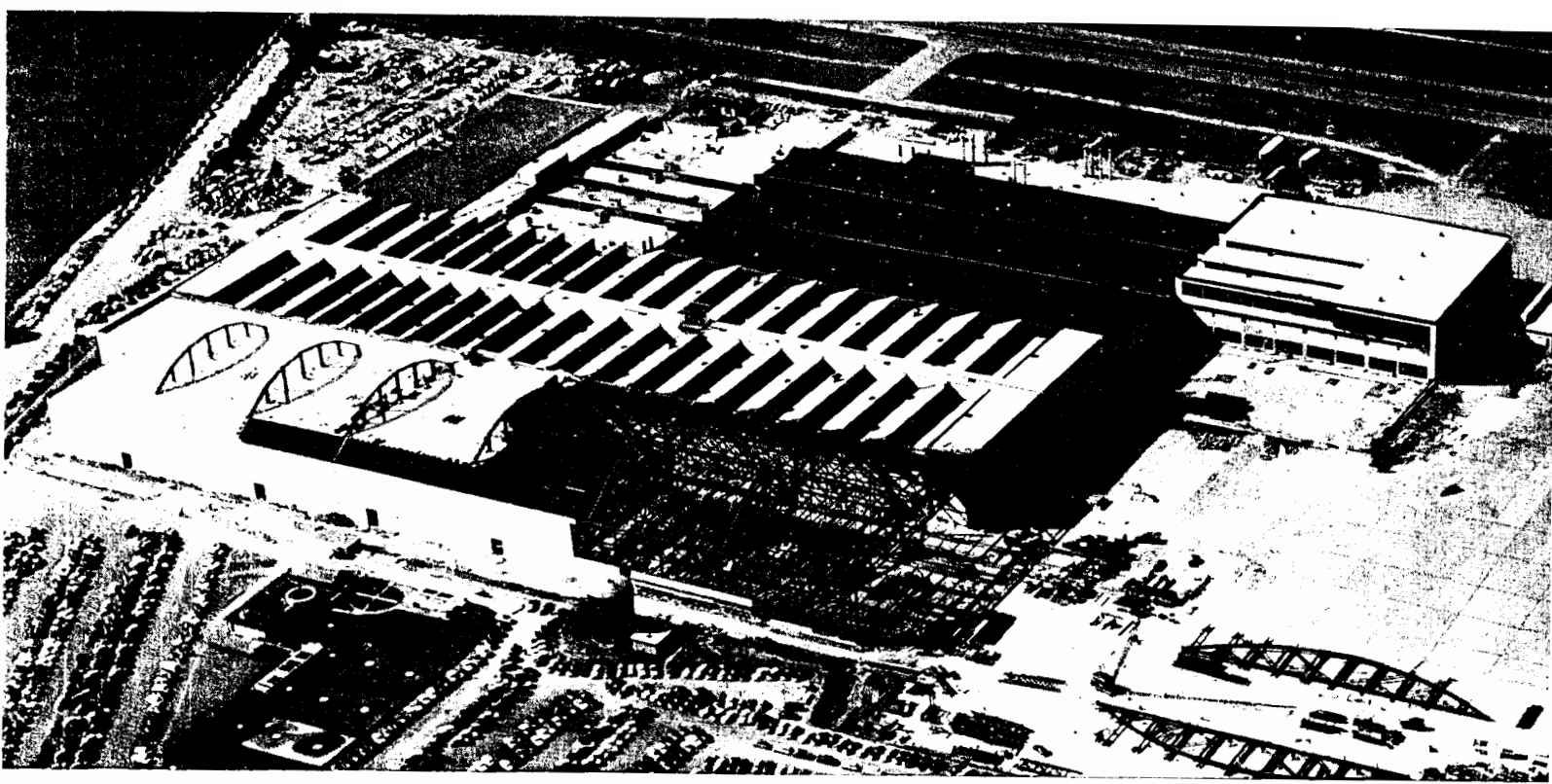
(bottom) Bethlehem joists are ideal for floor and roof structures in schools such as the Central Bucks School, Bucks County, Pa. Architects: Davis, Dunlap and Carver; general contractor: Wark and Co. Both are Philadelphia firms.

(opposite page, top) An unusual combination of steel joists and camel-back trusses was used in building the roof of an aircraft construction bay in Hagerstown, Md. Architects and engineers: Fordyce, Hamby, Strobel and Panero, New York City; steel fabricators: Lehigh Structural Steel Co., Allentown, Pa.

(opposite page, lower) The library at Bradley University in Peoria, Ill., has floor structures containing Bethlehem Open-Web Joists. Architects: Gregg and Briggs; general contractor: V. Jobst and Sons; both of Peoria.

BETHLEHEM





OPEN-WEB STEEL JOISTS

Bethlehem Open-Web Steel Joists are light-weight Warren-type steel trusses designed to support floors and roofs between beams, girders and walls in all types of light-occupancy structures. Bethlehem Shortspan Joists have been used in apartments, hotels, schools, hospitals, office and other commercial buildings, as well as in light manufacturing buildings of all types. Longspans have proved ideal in roofs of auditoriums, gymnasiums, supermarkets and garages—in fact any structure where large column-free space below is essential.

Bethlehem manufactures both Shortspan and Longspan Joists in a complete range of sizes. Shortspans are made for clear spans up to 40 ft., and Longspans to 96 ft.

Bethlehem Open-Web Steel Joists, Shortspan Series, conform in all respects to the Steel Joist Institute Standard Specifications for Open-Web Steel Joist Construction and they are fully approved by the Steel Joist Institute. They conform, also, to the Simplified Practice Recommendation R94-53 of the Department of Commerce.

Bethlehem Open-Web Longspan Steel Joists conform to the Steel Joist Institute Standard Specifications for Open-Web Steel Joists, Longspan Series, and all member sizes are in accordance with a Steel Joist Institute approved design.

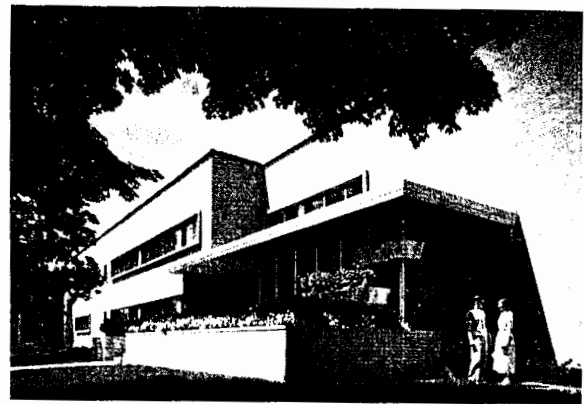
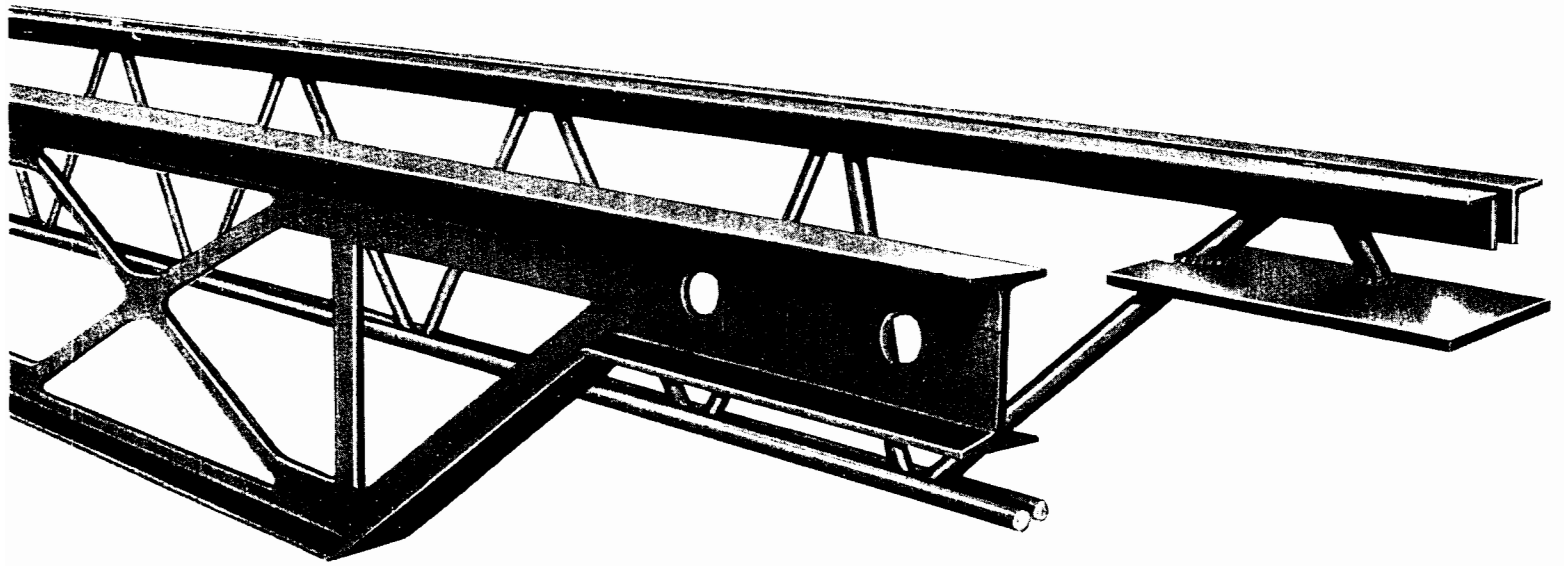


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BETHLEHEM

SHORTSPAN



EXPANDED TYPE

(For Joist Depths 8 in. to 16 in., inclusive)

A single piece of steel is hot-rolled, slit and expanded to make this joist. The T-shaped chords are integral with the double Warren web at the panel points. With lines of stress in the chords and web meeting at a point, eccentricity of joints is eliminated. Bearing ends are virtually solid I-beams formed by the bottom chord bent up and arc-welded to the top chord.

ARC-WELDED TYPE

(For Joist Depths 18 in. and 20 in.)

Modern arc-welding equipment is used in fabricating this joist. The top chord consists of pairs of hot-rolled angles, the bottom chord of pairs of round bars with the web made of a plain, round bar, bent to form a Warren-type truss. Ends of the joists are supported on plates arc-welded in place and located to provide a 2½-in. standard depth of bearing.

The expanded type and the arc-welded type joist, like all Bethlehem Open-Web Joists, Short-span Series, are fully approved by, and subject to the quality control of, the Steel Joist Institute.

Construction Advantages

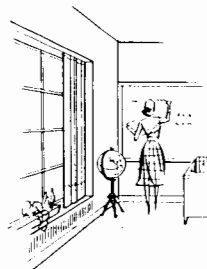
FIRE-RESISTANCE

When steel joists are used in building construction, particularly in schools, hospitals, apartments and other types of human occupancy buildings, greater fire-safety is an important benefit. Steel joists with concrete floor slab and plaster ceiling form a barrier with up to four hours' fire-resistance, depending on slab thickness and type of plaster.



NON-SHRINKING, NON-WARPING CONSTRUCTION

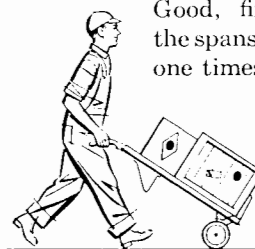
Steel joists provide a type of permanent, non-shrinking, non-warping construction which eliminates sagging floors and cracked ceilings. Future building maintenance is not only simplified, but also held to an economical minimum. Steel joists are also immune to termite attack and are insect- and rodent-proof.



VIBRATION-RESISTANCE

Good, firm floor construction requires that the spans of steel joists be not more than twenty-one times joist depths.

The table on page 8 gives the proper span-depth ratios of open-web Short-span steel joists to provide adequate stiffness in floors.



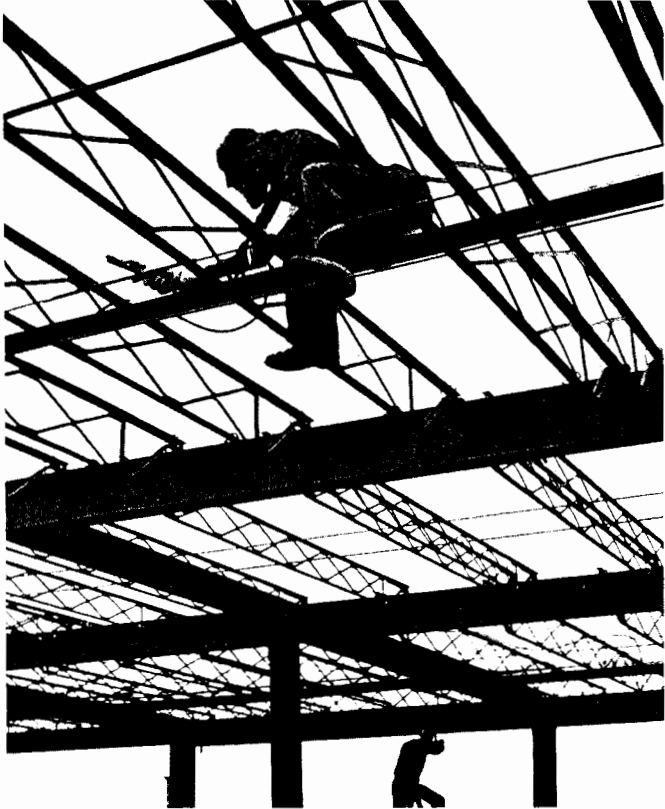
OPEN-WEB STEEL JOISTS



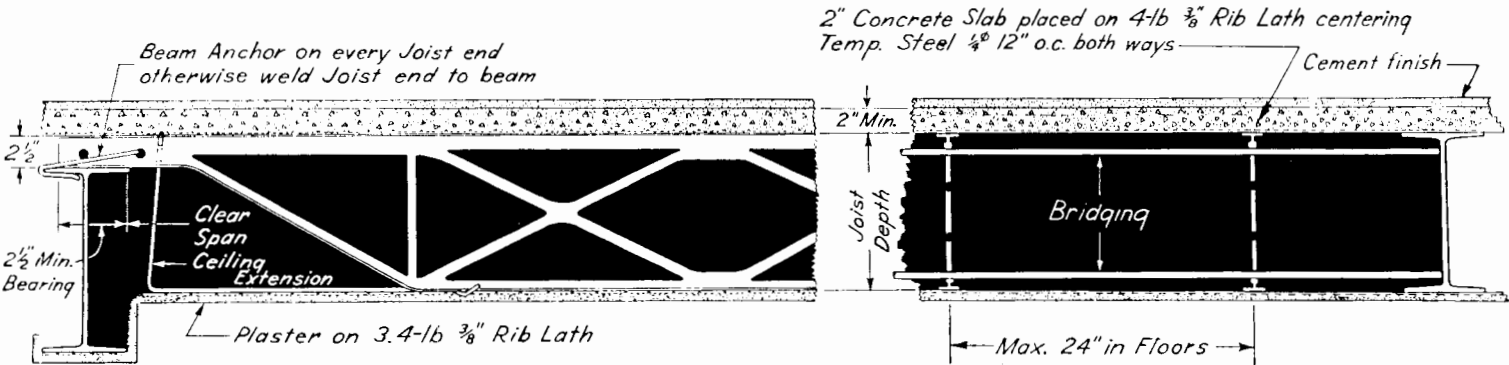
SOUND-RESISTANCE

Bethlehem Shortspan Joists used with concrete floor slabs and plaster ceilings provide a type of construction that resists the passage of sound, an advantage of particular benefit in building multi-story hospitals, apartments and offices.

The dead-air space and the minimum direct contact between floor above and ceiling below effectively dampen the transmission of sound in both directions.



Field-welding secures Bethlehem Shortspans permanently.



RAPID, ECONOMICAL CONSTRUCTION

Bethlehem Shortspan Joists are completely fabricated in the shop and reach the job clearly tagged and ready for immediate placing. Two men or a simple derrick can lift them into place, and only field-welding is required to secure them permanently. No expensive falsework is necessary. Erection can be carried out simultaneously throughout the structure, assuring speed and economy.

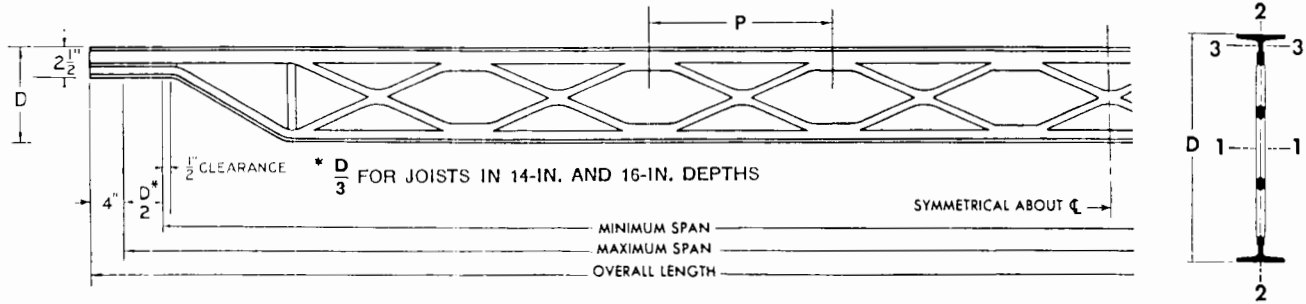
The open webs permit the concealment of pipes, ducts and conduits, and greatly simplify the installation of recessed lighting fixtures.

Light-weight construction with open-web joists often results in more economical footings, columns and beams, and frequently permits the addition of one or more stories to existing buildings.



Bethlehem Joists arrive at the job site ready for placing.

DIMENSIONS AND PROPERTIES OF EXPANDED TYPE, BETHLEHEM SHORTSPAN JOISTS

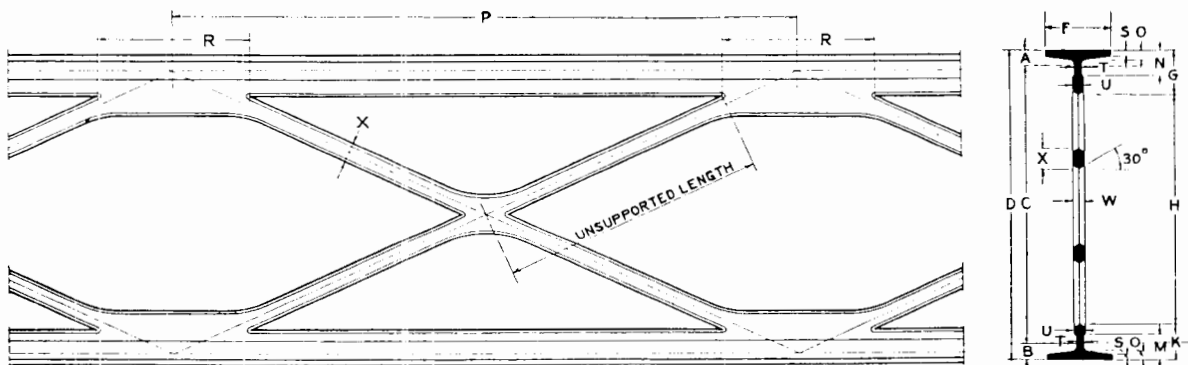


1—PROPERTIES

Type	Depth	* Moment of Inertia Axis 1-1	Top Chord				r of Top Plate Axis 2-2	Bottom Chord Area	Web		Strut		S. J. I. Standard Properties		Approx. Weight per ft
			Area	r Axis 2-2	r Axis 3-3	Section Modulus Axis 3-3			Area	r Axis 2-2	Area	r Axis 2-2	Resisting Moment	End Reaction	
In.	In.	In. ⁴	In. ²	In.	In.	In. ³	In.	In. ²	In. ²	In.	In. ²	In.	In.-lbs.	Lbs.	Lbs.
SJ- 82	8	12.2	.467	.344	.363	.074	.425	.401	.151	.078	.175	.074	52,500	1900	4.3
SJ-102	10	18.8	.444	.353	.323	.059	.425	.381	.170	.077	.175	.074	63,000	1900	4.4
SJ-103	10	23.4	.585	.351	.435	.116	.444	.489	.197	.096	.349	.089	82,000	1950	5.1
SJ-104	10	28.9	.715	.425	.431	.133	.524	.604	.206	.101	.386	.094	100,000	2200	6.0
SJ-123	12	32.5	.542	.368	.374	.086	.444	.454	.233	.094	.349	.089	92,000	2200	5.2
SJ-124	12	40.5	.670	.438	.366	.098	.524	.567	.244	.099	.386	.094	115,000	2300	6.1
SJ-125	12	48.8	.840	.443	.500	.183	.557	.702	.238	.111	.566	.102	142,000	2500	7.1
SJ-126	12	63.5	1.078	.563	.486	.216	.679	.918	.246	.116	.621	.106	175,000	2700	8.7
SJ-145	14	64.1	.790	.455	.440	.143	.557	.651	.284	.108	.566	.102	156,000	2900	7.2
SJ-146	14	84.9	1.027	.576	.431	.168	.679	.865	.294	.113	.621	.106	205,000	3100	8.9
SJ-147	14	100.7	1.228	.640	.437	.202	.758	1.033	.335	.131	.708	.121	246,000	3400	10.2
SJ-166	16	115.9	1.083	.578	.421	.174	.689	.892	.335	.127	.692	.118	232,000	3200	9.2
SJ-167	16	132.1	1.220	.642	.428	.195	.758	1.025	.346	.131	.708	.121	281,000	3600	10.2

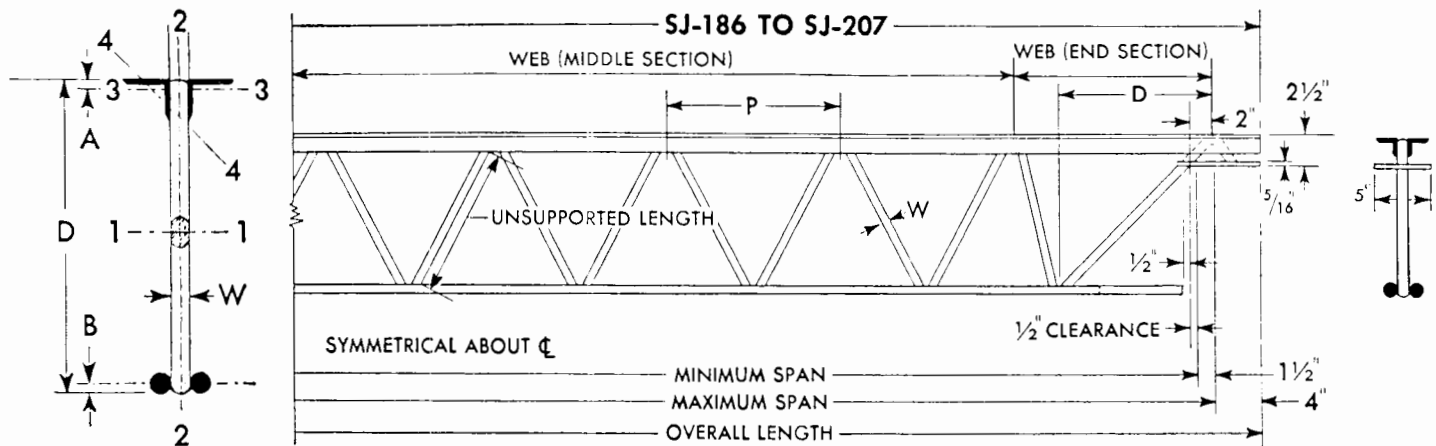
* Of the chords only.

2—DIMENSIONS



Type	A	B	C	D	F	G	H	K	M	N	O	P	R	S	T	U	W	X
SJ- 82	.330	.178	7.492	8	1.625	1.205	6.138	.657	.244	.890	.244	16	4.38	.125	.140	.255	.280	.620
SJ-102	.290	.156	9.554	10	1.625	1.115	8.306	.579	.244	.890	.244	20	4.34	.125	.140	.255	.274	.700
SJ-103	.415	.232	9.353	10	1.680	1.413	7.749	.832	.492	1.042	.272	20	5.02	.145	.160	.310	.348	.666
SJ-104	.400	.230	9.370	10	2.000	1.444	7.687	.869	.521	1.071	.301	20	5.18	.150	.186	.325	.369	.665
SJ-123	.345	.193	11.462	12	1.680	1.275	10.000	.725	.492	1.042	.272	24	4.99	.145	.160	.310	.337	.785
SJ-124	.337	.195	11.468	12	2.000	1.306	9.938	.756	.521	1.071	.301	24	5.14	.150	.186	.325	.356	.787
SJ-125	.465	.260	11.275	12	2.125	1.665	9.360	.975	.593	1.288	.322	24	5.77	.162	.200	.355	.406	.702
SJ-126	.446	.259	11.295	12	2.625	1.715	9.260	1.025	.641	1.336	.370	24	6.03	.170	.234	.368	.424	.704
SJ-145	.401	.214	13.385	14	2.125	1.527	11.641	.832	.593	1.288	.322	28	5.72	.162	.200	.355	.391	.835
SJ-146	.389	.220	13.391	14	2.625	1.577	11.541	.882	.641	1.336	.370	28	5.96	.170	.234	.368	.408	.839
SJ-147	.394	.223	13.383	14	2.920	1.614	11.467	.919	.671	1.366	.400	28	6.10	.180	.280	.420	.479	.838
SJ-166	.401	.222	15.377	16	2.667	1.563	13.569	.868	.641	1.336	.370	32	5.90	.170	.276	.410	.462	.855
SJ-167	.386	.218	15.396	16	2.920	1.594	13.507	.899	.671	1.366	.400	32	6.09	.180	.280	.420	.479	.860

DIMENSIONS AND PROPERTIES OF ARC-WELDED TYPE, BETHLEHEM SHORTSPAN JOISTS



PROPERTIES OF CHORDS

Type	Nominal Depth "D"	Top Chord 2-Ls					Bottom Chord 2-Bars			"P"	Web End Section			Web Middle Section			*Moment of Inertia Axis 1-1	S. J. I. Std. Properties		Approx. Weight per ft
		Angles	Area	r Axis 4-4	S Axis 3-3	"A"	Diameter	Area	"B"		Dia. W	Area	r Axis 2-2	Dia. W	Area	r Axis 2-2		Resist Moment	End React.	
		In.	In. ²	In.	In. ³	In.	In.	In. ²	In.		In.	In.	In. ²	In.	In.	In. ²		In.	In. ⁴		In.-lbs.	Lbs.
SJ-186	18	1 1/2 x 1 1/2 x 3/16	1.06	.29	204	.44	3/4	.88	.38	20	3/4	.442	.188	1 1/16	.371	.172	142.2	255,000	3,600	9.4
SJ-187	18	1 3/4 x 1 3/4 x 3/16	1.24	.34	290	.51	13/16	1.04	.41	20	13/16	.519	.203	1 1/16	.371	.172	165.4	310,000	3,800	10.8
SJ-207	20	1 3/4 x 1 3/4 x 3/16	1.24	.34	290	.51	13/16	1.04	.41	22	13/16	.519	.203	1 1/16	.371	.172	206.3	340,000	3,900	10.9

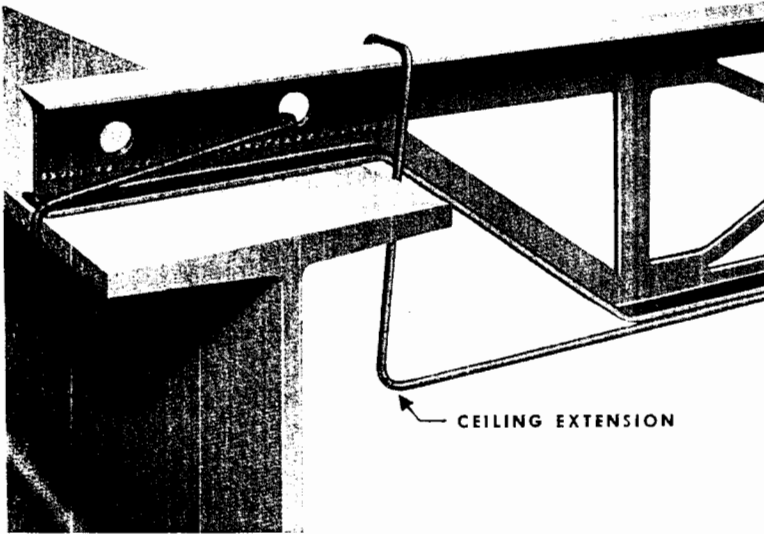
*Of the chords only.

When required, ceiling extensions are provided by extending one bottom chord bar from each end of joist, as shown above.



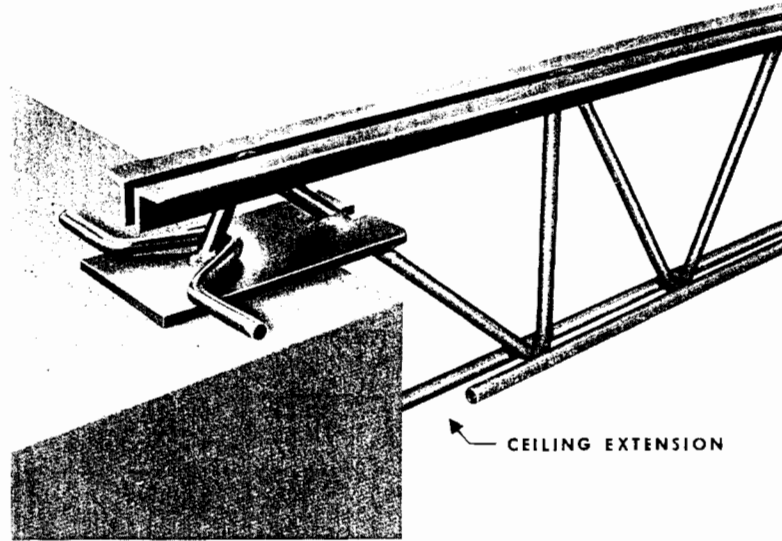
CONSTRUCTION ACCESSORIES FOR

BEAM ANCHOR



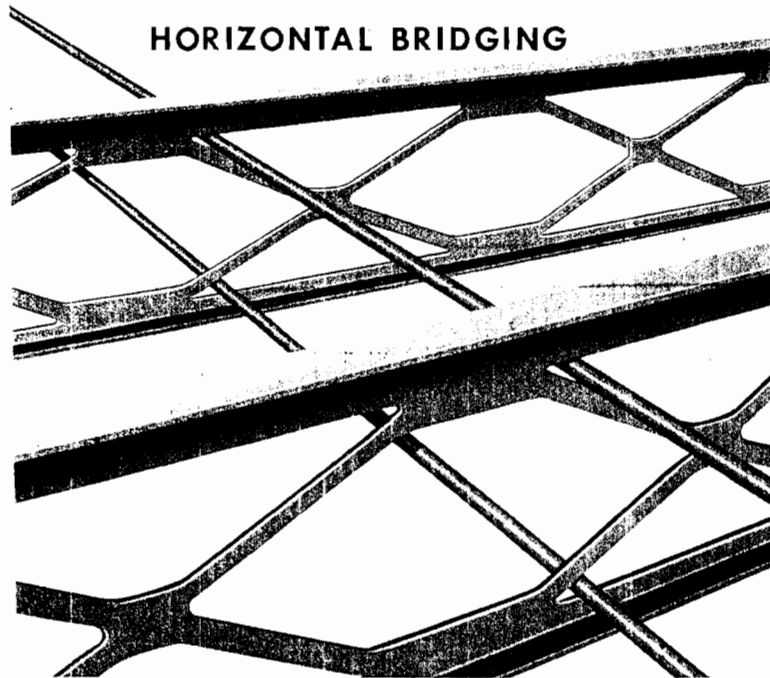
Welded anchorage is desirable where joists are supported on steel beams. When welding facilities are not available, beam anchors can be used. They are made of $\frac{3}{8}$ -in. steel rod and can be installed with an ordinary hammer.

END WALL ANCHOR



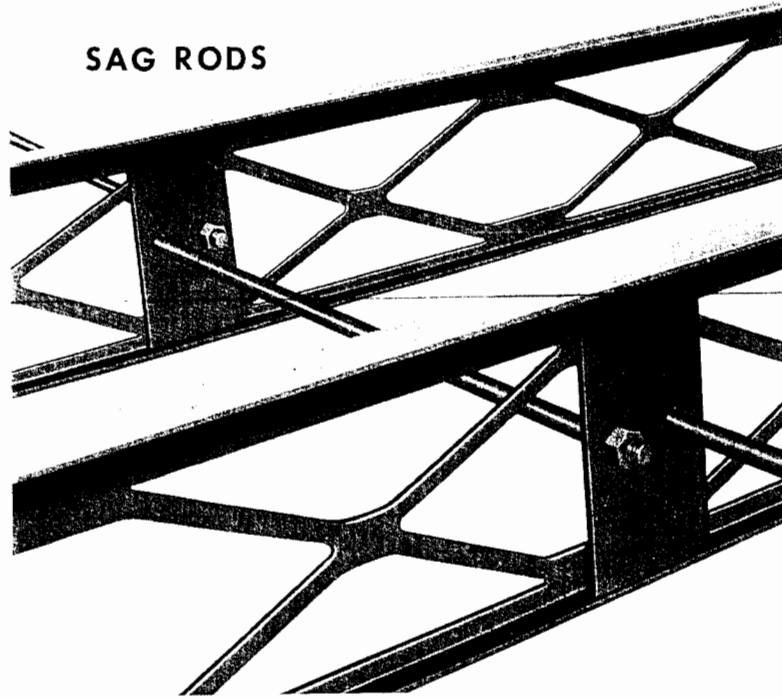
Where masonry or concrete walls support joists, rod anchors are used to secure the bearing ends to the walls. These anchors are made of $\frac{3}{8}$ -in. steel rod placed through the end of the joist and built into the wall.

HORIZONTAL BRIDGING



Bridging should be installed immediately after the joists are placed in the structure. This holds the joists in correct alignment and provides the necessary lateral bracing during construction.

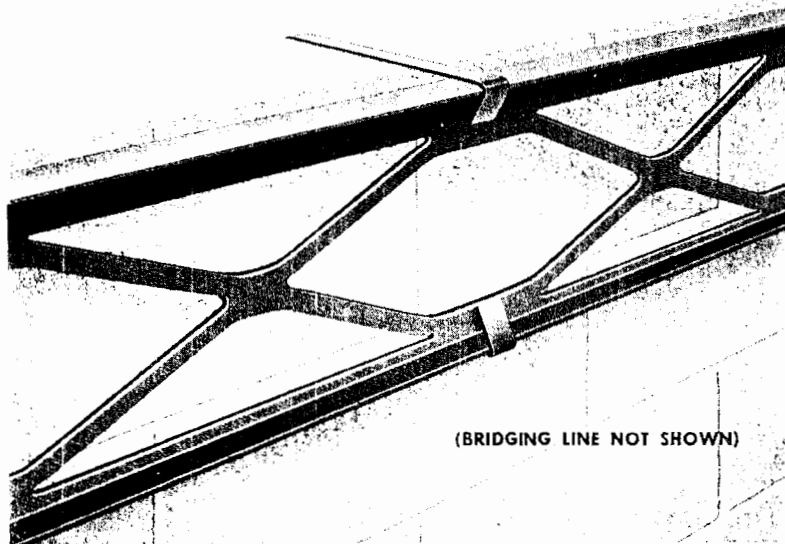
SAG RODS



Where joists are used as purlins in a sloping roof, sag rods are required to transmit a component of the roof load to the ridge line.

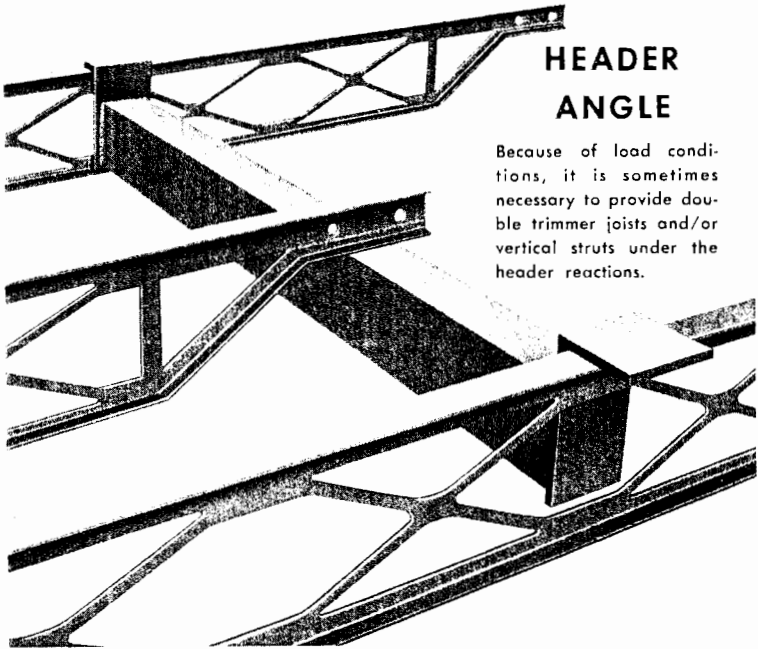
BETHLEHEM SHORTSPAN JOISTS

BRIDGING ANCHOR

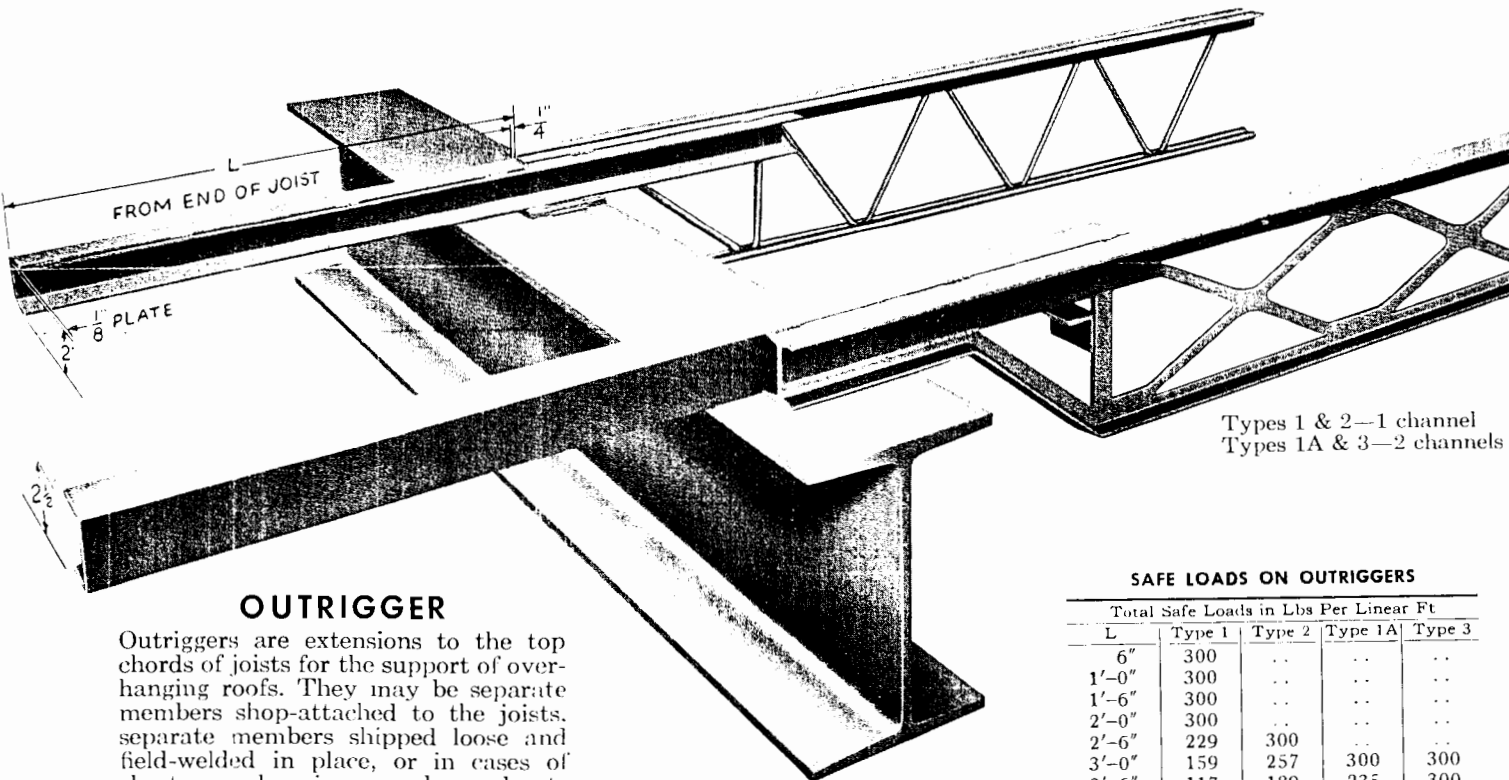


Bridging anchors are required to secure the ends of bridging lines into masonry walls. Where a steel beam occurs at the end of a floor panel, however, the ends of bridging lines are field-welded directly to the beam.

HEADER ANGLE



Small floor openings for shafts and ducts can be framed with header angles. The tail joist is attached to the header angle with bolts or beam anchors, which hold the header in position until the floor slab is placed on the joists.



OUTRIGGER

Outriggers are extensions to the top chords of joists for the support of overhanging roofs. They may be separate members shop-attached to the joists, separate members shipped loose and field-welded in place, or in cases of short overhangings and moderate loads, the top chord angles may be extended. For longer extensions and greater loads, the type of outrigger required is shown in the table at right.

SAFE LOADS ON OUTRIGGERS

Total Safe Loads in Lbs Per Linear Ft				
L	Type 1	Type 2	Type 1A	Type 3
6"	300	..	..	..
1'-0"	300	..	..	..
1'-6"	300	..	..	..
2'-0"	300	..	..	..
2'-6"	229	300	..	..
3'-0"	159	257	300	300
3'-6"	117	189	235	300
4'-0"	89	144	180	288
4'-6"	70	114	142	227
5'-0"	..	92	115	184
5'-6"	..	76	95	152

SHORTSPAN JOIST SIZES AND SPACINGS

RECOMMENDED FOR MAXIMUM ECONOMY AND STIFFNESS IN FLOORS

Joists listed first provide maximum economy. Joists in bold type are recommended for stiffness.

CLEAR SPAN	TOTAL LOADS IN POUNDS PER SQUARE FOOT					
	80	90	100	110	120	130
8'-0"	81 @ 24	81 @ 24	81 @ 24	81 @ 24	81 @ 24	81 @ 24
9'-0"	81 @ 24	81 @ 24	81 @ 24	81 @ 24	102 @ 24 81 @ 24	102 @ 24 82 @ 24
10'-0"	81 @ 24	81 @ 24	102 @ 24 81 @ 24	102 @ 24 82 @ 24	102 @ 24 82 @ 24	102 @ 24 82 @ 24
11'-0"	81 @ 24	102 @ 24 82 @ 24	102 @ 24 82 @ 24	102 @ 24 82 @ 24	102 @ 24 82 @ 24	102 @ 24 82 @ 24
12'-0"	102 @ 24 82 @ 24	102 @ 24 82 @ 24	102 @ 24 82 @ 24	102 @ 24 82 @ 24	102 @ 24 82 @ 24	102 @ 24 82 @ 22
13'-0"	102 @ 24 82 @ 24	102 @ 24 82 @ 24	102 @ 24 82 @ 24	102 @ 24 82 @ 22	102 @ 24 82 @ 21	102 @ 23 82 @ 19
14'-0"	102 @ 24 82 @ 24	102 @ 24 82 @ 24	102 @ 24 82 @ 21	102 @ 23 82 @ 19	123 @ 24 103 @ 24	123 @ 24 103 @ 24
15'-0"	102 @ 24 82 @ 23	102 @ 24 82 @ 21	123 @ 24 102 @ 22	123 @ 24 103 @ 24	123 @ 24 103 @ 24	123 @ 24 103 @ 22
16'-0"	123 @ 24 102 @ 24	123 @ 24 102 @ 22	123 @ 24 103 @ 24	123 @ 24 103 @ 23	123 @ 24 104 @ 24	123 @ 24 104 @ 22
17'-0"	123 @ 24 102 @ 22	123 @ 24 103 @ 24	123 @ 24 103 @ 23	123 @ 23 104 @ 24	124 @ 24 104 @ 23	124 @ 24 104 @ 21
18'-0"	123 @ 24 103 @ 24	123 @ 24 104 @ 24	123 @ 23 104 @ 24	124 @ 24 104 @ 22	124 @ 24 104 @ 20	124 @ 22 104 @ 19
19'-0"	123 @ 24 103 @ 23	123 @ 23 104 @ 24	124 @ 24 104 @ 22	124 @ 23 104 @ 20	124 @ 21 104 @ 18	125 @ 24 104 @ 17
20'-0"	123 @ 23 104 @ 24	124 @ 24 104 @ 22	124 @ 23 104 @ 20	124 @ 21 104 @ 18	125 @ 24 104 @ 17	145 @ 24 125 @ 22
21'-0"	124 @ 24	124 @ 23	124 @ 21	125 @ 23	145 @ 24 125 @ 21	145 @ 22 126 @ 24
22'-0"	124 @ 24 145 @ 24	124 @ 21 145 @ 24	145 @ 24 125 @ 23	145 @ 23 125 @ 21	145 @ 21 126 @ 24	146 @ 24 126 @ 22
23'-0"	124 @ 22 145 @ 24	124 @ 19 145 @ 24	145 @ 23 125 @ 21	145 @ 21 126 @ 24	146 @ 24 126 @ 22	146 @ 24 126 @ 20
24'-0"	125 @ 24 145 @ 24	145 @ 24 125 @ 22	145 @ 22 126 @ 24	146 @ 24 126 @ 22	146 @ 24 126 @ 20	166 @ 24 146 @ 22
25'-0"	145 @ 24 166 @ 24	145 @ 22 166 @ 24	146 @ 24 166 @ 24	146 @ 24 166 @ 24	166 @ 24 146 @ 22	166 @ 23 147 @ 24
26'-0"	145 @ 23 166 @ 24	146 @ 24 166 @ 24	146 @ 24 166 @ 24	166 @ 24 146 @ 22	166 @ 23 147 @ 24	167 @ 24 147 @ 22
27'-0"	145 @ 21 166 @ 24	146 @ 24 166 @ 24	166 @ 24 147 @ 24	166 @ 23 147 @ 24	167 @ 24 147 @ 22	167 @ 24 147 @ 21
28'-0"	146 @ 24 166 @ 24	146 @ 23 166 @ 24	166 @ 24 147 @ 24	167 @ 24 147 @ 23	167 @ 24 147 @ 21	167 @ 22 147 @ 19
29'-0"	166 @ 24 186 @ 24	166 @ 24 186 @ 24	166 @ 22 186 @ 24	167 @ 24 186 @ 22	187 @ 24 167 @ 22	187 @ 23 167 @ 20
30'-0"	166 @ 24 186 @ 24	166 @ 23 186 @ 24	167 @ 24 186 @ 22	187 @ 24 167 @ 22	187 @ 23 167 @ 21	207 @ 23 187 @ 21
31'-0"	166 @ 24 186 @ 24	186 @ 24 167 @ 24	167 @ 23 187 @ 24	187 @ 23 167 @ 21	207 @ 24 187 @ 21	207 @ 22 187 @ 20
32'-0"	166 @ 23 186 @ 24 207 @ 24	167 @ 24 186 @ 22 207 @ 24	187 @ 24	207 @ 24 187 @ 22	207 @ 22 187 @ 20	207 @ 20 187 @ 19
33'-0"	186 @ 23 207 @ 24	187 @ 24 207 @ 24	207 @ 24 187 @ 23	207 @ 23 187 @ 21	207 @ 21 187 @ 19	207 @ 19 187 @ 17
34'-0"	186 @ 22 207 @ 24	187 @ 24 207 @ 24	207 @ 23 187 @ 21	207 @ 21 187 @ 19	207 @ 20 187 @ 18	207 @ 18 187 @ 16
35'-0"	187 @ 24 207 @ 24	207 @ 24 187 @ 22	207 @ 22 187 @ 20	207 @ 20 187 @ 18	207 @ 18 187 @ 17	207 @ 17 187 @ 15
36'-0"	187 @ 24 207 @ 24	207 @ 23 187 @ 21	207 @ 21 187 @ 19	207 @ 19 187 @ 17	207 @ 17 187 @ 16	207 @ 16 187 @ 15
37'-0"	207 @ 24	207 @ 22	207 @ 20	207 @ 18	207 @ 16	207 @ 15
38'-0"	207 @ 24	207 @ 21	207 @ 19	207 @ 17	207 @ 16	207 @ 14
39'-0"	207 @ 22	207 @ 20	207 @ 18	207 @ 16	207 @ 15	207 @ 14
40'-0"	207 @ 21	207 @ 19	207 @ 17	207 @ 15	207 @ 14	207 @ 13

DESIGN TABLE

SHORTSPAN STEEL JOISTS

Note: Total safe loads consist of live load plus dead load plus weight of joist. The dead load averages 40 psf where 2-in. concrete slabs are used, including 10 psf for plastered ceiling.

Maximum deflection for tabulated spans and safe loads will not exceed 1/360th of the span. Tabulated safe loads are based on joists being properly braced laterally as in standard construction.

Joists designed to conform to the standards of the Steel Joist Institute.

Design Tensile Stress 18,000 psi.

Spacings shown to right of heavy vertical line are intended for roof construction only.

To secure stiffer floors it is recommended that the clear span should not exceed 21 times the depth of joist.

Clear Span	Joist Type	Total Safe Load Pounds	TOTAL SAFE LOADS IN POUNDS PER SQUARE FOOT FOR JOIST SPACINGS SHOWN																Joist Type
			12"	13"	14"	15"	16"	17"	18"	19"	20"	21"	22"	23"	24"	26"	28"	30"	
4'-0"	81	3200	800	738	685	640	600	565	533	505	480	456	436	417	400	369	343	320	81
4'-6"	81	3200	711	657	610	568	533	503	474	449	427	406	388	371	355	328	305	284	81
5'-0"	81	3200	640	590	549	512	480	453	427	404	384	366	349	334	320	295	274	256	81
5'-6"	81	3200	582	537	498	465	436	411	388	367	349	332	317	303	291	268	249	233	81
6'-0"	81	3200	530	492	457	426	400	376	356	337	320	305	291	278	267	246	229	213	81
6'-6"	81	3020	464	428	398	371	348	328	310	293	278	265	253	242	232	214	199	186	81
7'-0"	81	2810	402	370	344	321	301	283	268	254	241	229	219	209	202	185	172	160	81
7'-6"	81	2620	349	322	299	279	262	246	233	220	209	199	190	182	174	161	150	140	81
8'-0"	81	2460	308	284	264	246	231	217	205	194	184	176	168	160	154	142	132	123	81
	82	3800	475	438	407	380	356	335	316	300	285	271	259	248	238	219	204	190	82
8'-6"	81	2310	272	251	233	218	204	192	181	172	163	155	148	142	136	125	116	109	81
	82	3800	447	413	383	358	336	316	298	282	268	255	244	233	223	206	192	179	82
9'-0"	81	2180	243	224	208	194	182	171	162	153	145	138	132	127	121	112	104	97	81
	82	3800	422	390	362	338	316	298	282	266	254	242	230	220	211	195	181	169	82
9'-6"	81	2070	218	201	187	174	163	154	145	138	131	124	119	113	109	101	93	87	81
	82	3690	388	358	332	310	291	274	259	245	233	222	212	202	194	179	166	155	82
10'-0"	81	1970	197	182	169	158	148	139	131	125	118	113	108	103	99	91	85	79	81
	82	3500	350	323	300	280	263	247	233	221	210	200	191	183	175	162	150	140	82
	102	3800	380	351	326	304	285	268	253	240	228	217	207	198	190	175	163	152	102
	103	3900	390	360	334	312	292	275	260	246	234	223	213	203	195	180	167	156	103
	104	4400	440	406	377	352	330	312	293	278	264	252	240	230	220	203	189	176	104
10'-6"	81	1860	177	164	152	142	133	125	118	112	106	101	96	92	88	82	76	71	81
	82	3335	317	293	272	254	238	224	212	201	190	181	173	165	158	146	136	127	82
	102	3800	362	334	310	290	271	255	241	228	217	207	197	189	181	167	155	145	102
	103	3900	371	342	318	297	278	263	248	234	223	212	203	194	186	171	159	149	103
	104	4400	419	387	359	335	314	296	280	265	252	240	229	219	210	193	180	168	104
11'-0"	81	1780	162	150	139	130	121	114	108	102	97	92	89	85	81	75	70	65	81
	82	3180	289	267	248	232	217	205	193	183	174	165	158	151	145	134	124	116	82
	102	3800	346	319	297	277	259	244	230	218	208	197	189	180	173	160	148	138	102
	103	3900	355	328	304	284	266	250	236	224	213	202	194	185	178	164	152	142	103
	104	4400	400	370	343	320	300	283	267	253	240	228	218	208	200	185	172	160	104
11'-6"	81	1700	148	136	127	118	111	104	99	93	89	84	80	77	74	68	63	59	81
	82	3040	264	244	227	212	198	187	176	167	159	151	144	138	132	122	113	106	82
	102	3650	317	293	272	254	238	224	211	201	191	181	173	165	159	147	136	127	102
	103	3900	339	313	291	271	254	239	226	214	203	194	185	177	170	157	145	136	103
	104	4400	383	353	328	306	287	270	255	242	230	219	209	200	192	177	164	153	104
12'-0"	81	1635	137	126	117	109	102	96	91	86	82	78	74	71	68	63	58	55	81
	82	2920	243	224	208	195	183	172	162	154	146	139	133	127	122	112	104	98	82
	102	3500	292	269	250	233	219	206	194	184	175	167	159	152	146	135	125	117	102
	103	3900	325	300	279	260	244	230	217	205	195	186	177	170	163	150	139	130	103
	104	4400	367	339	314	294	275	259	244	232	220	210	200	191	183	169	157	147	104
	123	4400	367	339	314	294	275	259	244	232	220	210	200	191	183	169	157	147	123
	124	4600	384	354	329	307	288	271	256	242	230	219	209	200	192	177	164	153	124
	125	5000	417	385	358	333	312	294	278	263	250	238	228	218	208	192	179	167	125
	126	5400	450	415	386	360	338	318	300	284	270	257	246	235	225	208	193	180	126

DESIGN TABLE—SHORTSPAN STEEL JOISTS

Clear Span	Joist Type	Total Safe Load Pounds	TOTAL SAFE LOADS IN POUNDS PER SQUARE FOOT FOR JOIST SPACINGS SHOWN																Joist Type
			12"	13"	14"	15"	16"	17"	18"	19"	20"	21"	22"	23"	24"	26"	28"	30"	
12'-6"	81	1570	126	116	108	100	94	89	84	79	75	72	68	65	63	58	54	50	81
	82	2800	224	208	192	179	168	158	149	142	134	128	122	117	112	103	96	90	82
	102	3360	269	248	231	215	202	190	179	170	161	154	147	140	134	124	115	108	102
	103	3900	312	288	268	250	234	220	208	197	187	178	170	163	156	144	134	125	103
	104	4400	352	325	302	282	264	248	235	222	211	201	192	184	176	162	151	141	104
	123	4400	352	325	302	282	264	248	235	222	211	201	192	184	176	162	151	141	123
	124	4600	368	340	316	295	276	260	246	233	221	210	201	192	184	170	158	147	124
	125	5000	400	369	343	320	300	283	267	253	240	229	218	209	200	185	172	160	125
	126	5400	432	398	370	345	324	305	288	273	259	247	236	226	216	199	185	173	126
13'-0"	81	1510	116	107	100	93	87	82	78	73	70	66	63	61	58	54	50	46	81
	82	2690	207	191	177	165	155	146	138	131	124	118	113	108	103	96	89	83	82
	102	3230	248	230	213	199	187	176	166	157	149	142	136	130	124	115	107	99	102
	103	3900	300	277	257	240	225	212	200	190	180	172	164	157	150	138	129	120	103
	104	4400	338	312	290	270	254	239	225	214	203	193	184	177	169	156	145	135	104
	123	4400	338	312	290	270	254	239	225	214	203	193	184	177	169	156	145	135	123
	124	4600	354	327	303	283	265	250	236	224	212	202	193	185	177	163	152	142	124
	125	5000	384	355	330	308	288	272	256	243	231	220	210	201	192	177	165	154	125
	126	5400	415	384	356	332	312	293	277	262	249	237	226	217	208	192	177	166	126
13'-6"	81	1450	107	99	92	86	81	76	72	68	64	61	59	56	54	50	46	43	81
	82	2590	192	177	164	154	144	135	128	121	115	110	105	100	96	89	82	77	82
	102	3110	230	213	197	184	173	163	154	146	138	132	126	120	115	106	99	92	102
	103	3900	289	267	248	232	217	204	193	183	173	165	158	151	145	133	124	116	103
	104	4400	326	301	280	261	244	230	217	206	196	186	178	170	163	150	140	130	104
	123	4400	326	301	280	261	244	230	217	206	196	186	178	170	163	150	140	130	123
	124	4600	341	315	292	273	256	241	227	216	204	195	186	178	170	157	146	136	124
	125	5000	371	342	318	296	278	262	247	234	222	212	202	194	186	171	159	148	125
	126	5400	400	370	343	320	300	282	267	252	240	229	218	209	200	185	171	160	126
14'-0"	81	1400	100	92	86	80	75	71	67	63	60	57	55	52	50	46	43	40	81
	82	2500	178	165	153	143	134	126	119	113	107	102	98	93	89	82	77	71	82
	102	3000	214	198	184	172	161	152	143	135	129	123	117	112	107	99	92	86	102
	103	3900	278	257	239	223	209	197	186	176	167	159	152	145	139	129	119	111	103
	104	4400	314	290	270	252	236	222	210	199	189	180	172	164	157	145	135	126	104
	123	4380	313	289	268	250	235	221	209	198	188	179	171	163	156	144	134	125	123
	124	4600	328	303	282	263	246	232	219	208	197	188	179	171	164	152	141	131	124
	125	5000	357	330	306	286	268	252	238	226	214	204	195	187	179	165	153	143	125
	126	5400	386	356	331	309	289	272	257	244	232	220	210	201	193	178	165	154	126
14'-6"	81	1350	93	86	80	75	70	66	62	59	56	53	51	49	47	43	40	37	81
	82	2420	167	154	143	134	125	118	111	105	100	96	91	87	84	77	72	67	82
	102	2900	200	185	171	160	150	141	133	126	120	114	109	104	100	92	86	80	102
	103	3790	261	241	224	209	196	185	174	165	157	149	142	136	131	121	112	104	103
	104	4400	304	280	260	243	228	214	202	192	182	173	166	158	152	140	130	121	104
	123	4230	292	270	250	234	219	206	195	184	175	167	159	152	146	135	125	117	123
	124	4600	317	293	272	254	238	224	212	200	190	181	173	166	159	147	136	127	124
	125	5000	345	318	296	276	259	244	230	218	207	197	188	180	172	159	148	138	125
	126	5400	372	344	319	298	279	263	248	235	224	213	203	194	186	172	160	149	126
15'-0"	81	1310	87	81	75	70	66	62	58	55	52	50	48	46	44	40	37	35	81
	82	2330	155	143	133	124	116	110	104	98	93	89	85	81	78	72	67	62	82
	102	2810	187	173	161	150	141	132	125	118	112	107	102	98	94	87	80	75	102
	103	3640	243	224	208	194	182	172	162	153	146	139	133	127	122	112	104	97	103
	104	4400	293	271	252	235	220	207	196	185	176	168	160	153	147	135	126	117	104
	123	4090	272	252	234	218	204	192	182	172	163	156	148	142	136	126	117	109	123
	124	4600	307	284	263	246	230	217	204	194	184	175	167	160	153	142	132	123	124
	125	5000	333	308	286	267	250	235	222	210	200	191	182	174	167	154	143	133	125
	126	5400	360	332	308	288	270	254	240	227	216	206	196	188	180	166	154	144	126
15'-6"	145	5800	387	357	332	310	290	273	258	244	232	221	211	202	193	179	166	155	145
	146	6200	413	381	354	330	310	292	276	261	248	236	225	216	207	191	177	165	146
	147	6800	454	419	389	363	340	320	302	286	272	259	248	237	227	209	194	181	147

DESIGN TABLE—SHORTSPAN STEEL JOISTS

Clear Span	Joist Type	Total Safe Load Pounds	TOTAL SAFE LOADS IN POUNDS PER SQUARE FOOT FOR JOIST SPACINGS SHOWN																Joist Type
			12"	13"	14"	15"	16"	17"	18"	19"	20"	21"	22"	23"	24"	26"	28"	30"	
15'-6"	81	1270	82	76	70	66	62	58	55	52	49	47	45	43	41	38	35	33	81
	82	2260	146	135	125	117	109	103	97	92	88	83	80	76	73	67	63	58	82
	102	2710	175	162	150	140	131	124	117	111	105	100	96	91	88	81	75	70	102
	103	3530	228	210	195	182	171	161	152	144	137	130	124	119	114	105	98	91	103
	104	4300	278	256	238	222	208	196	185	175	167	159	152	145	139	128	119	111	104
	123	3960	256	236	219	204	192	180	170	161	153	146	139	133	128	118	109	102	123
	124	4600	297	274	254	237	223	210	198	188	178	170	162	155	148	137	127	119	124
	125	5000	323	298	276	258	242	228	215	204	193	185	176	168	161	149	138	129	125
	126	5400	349	322	299	279	262	246	233	220	210	199	190	182	174	161	149	139	126
	145	5800	374	346	321	300	281	264	250	236	224	214	204	195	187	173	160	150	145
	146	6200	400	369	343	320	300	282	267	253	240	228	218	209	200	184	171	160	146
	147	6800	439	405	376	351	329	310	292	277	263	250	239	229	219	202	188	175	147
16'-0"	81	1230	77	71	66	62	58	54	51	49	46	44	42	40	38	35	33	31	81
	82	2190	137	126	117	109	103	97	91	86	82	78	75	71	68	63	59	55	82
	102	2630	164	152	141	132	123	116	110	104	99	94	90	86	82	76	70	66	102
	103	3420	213	197	182	170	160	150	142	134	128	122	116	111	106	98	91	85	103
	104	4170	260	240	223	208	195	184	173	164	156	149	142	136	130	120	112	104	104
	123	3840	240	222	206	192	180	170	160	152	144	137	131	125	120	111	103	96	123
	124	4600	287	265	246	230	216	203	192	182	172	164	157	150	144	133	123	115	124
	125	5000	312	288	268	250	234	221	208	197	187	178	170	163	156	144	134	125	125
	126	5400	337	312	289	270	253	238	225	213	202	193	184	176	169	156	145	135	126
	145	5800	363	335	311	290	272	256	242	229	218	208	198	189	182	167	156	145	145
	146	6200	387	358	332	310	290	274	258	245	233	222	212	202	194	179	166	155	146
	147	6800	425	392	364	340	319	300	283	268	255	243	232	222	213	196	182	170	147
	166	6400	400	369	343	320	300	282	266	253	240	228	218	208	200	185	171	160	166
	167	7200	450	416	386	360	338	318	300	284	270	257	246	235	225	208	193	180	167
16'-6"	102	2540	154	142	132	123	116	109	103	97	93	88	84	81	77	71	66	62	102
	103	3310	201	185	172	161	151	142	134	127	120	115	109	105	100	93	86	80	103
	104	4040	245	226	210	196	184	173	164	155	147	140	134	128	123	113	105	98	104
	123	3720	226	208	193	180	169	159	150	143	135	129	123	118	113	104	97	90	123
	124	4600	279	257	239	223	209	197	186	176	167	159	152	146	140	129	120	111	124
	125	5000	303	280	260	242	227	214	202	192	182	174	166	158	152	140	130	121	125
	126	5400	328	302	280	262	246	231	218	207	197	187	179	171	164	151	140	131	126
	145	5800	352	325	302	281	264	248	235	222	211	201	192	184	176	163	151	141	145
	146	6200	376	347	322	301	282	265	250	237	226	215	205	196	188	174	161	150	146
	147	6800	412	380	353	330	309	291	275	260	247	236	225	215	206	190	177	165	147
	166	6400	388	358	332	310	291	274	259	245	233	222	212	202	194	179	166	155	166
	167	7200	437	403	374	349	328	308	291	276	262	249	238	228	218	201	187	175	167
17'-0"	102	2470	145	134	125	116	109	103	97	92	87	83	79	76	73	67	62	58	102
	103	3220	189	175	162	152	142	134	126	120	114	108	103	99	95	87	81	76	103
	104	3920	230	212	197	184	173	162	153	145	138	132	126	120	115	106	99	92	104
	123	3610	212	196	182	170	159	150	142	134	127	121	116	111	106	98	91	85	123
	124	4510	265	245	227	212	199	187	177	168	159	152	145	139	133	122	114	106	124
	125	5000	294	272	252	235	220	208	196	186	177	168	161	154	147	136	126	118	125
	126	5400	318	293	272	254	238	224	212	201	191	182	173	166	159	147	136	127	126
	145	5800	342	315	292	273	256	241	228	215	205	195	186	178	171	158	146	137	145
	146	6200	365	337	313	292	273	258	243	230	219	209	199	191	183	169	157	146	146
	147	6800	400	370	343	320	300	282	267	253	240	229	219	209	200	185	172	160	147
	166	6400	376	348	323	301	282	266	251	238	226	215	205	197	188	174	162	151	166
	167	7200	424	392	363	339	318	299	283	268	255	242	231	221	212	196	182	170	167
17'-6"	102	2400	137	127	118	110	103	97	92	87	82	78	75	72	69	63	59	55	102
	103	3120	178	165	153	143	134	126	119	113	107	102	97	93	89	82	76	71	103
	104	3810	218	201	187	174	163	154	145	138	131	125	119	114	109	100	93	87	104
	123	3500	200	185	172	160	150	141	133	126	120	114	109	104	100	92	86	80	123
	124	4380	250	231	214	200	188	177	167	158	150	143	137	131	125	115	107	100	124
	125	5000	286	264	245	229	215	202	191	181	172	163	156	149	143	132	122	114	125
	126	5400	309	285	265	247	232	218	206	195	185	177	169	161	154	143	133	124	126
	145	5800	331	306	284	265	249	234	221	209	199	190	181	173	166	153	142	133	145
	146	6200	354	327	304	284	266	250	236	224	213	203	194	185	177	164	152	142	146
	147	6800	389	359	333	311	292	274	259	245	233	222	212	203	195	180	167	156	147
	166	6400	366	338	314	293	275	258	244	231	220	209	200	191	183	169	157	147	166
	167	7200	411	380	353	329	308	290	274	260	247	235	225	215	206	190	176	165	167

DESIGN TABLE—SHORTSPAN STEEL JOISTS

Clear Span	Joist Type	Total Safe Load Pounds	TOTAL SAFE LOADS IN POUNDS PER SQUARE FOOT FOR JOIST SPACINGS SHOWN																	Joist Type
			12"	13"	14"	15"	16"	17"	18"	19"	20"	21"	22"	23"	24"	26"	28"	30"		
18'-0"	102	2330	129	120	111	104	97	92	86	82	78	74	71	68	65	60	56	52	102	
	103	3040	169	156	145	135	127	119	113	107	101	97	92	88	85	78	73	68	103	
	104	3710	205	190	177	165	155	146	138	130	124	118	113	108	103	95	88	83	104	
	123	3410	189	175	163	152	142	134	126	120	114	108	103	99	95	88	81	76	123	
	124	4260	236	218	203	190	178	167	158	150	142	135	129	124	119	109	101	95	124	
	125	5000	278	256	238	222	208	196	185	175	167	159	152	145	139	128	119	111	125	
	126	5400	300	277	257	240	225	212	200	190	180	172	164	157	150	139	129	120	126	
	145	5780	321	296	275	257	240	227	214	203	193	184	175	168	161	148	138	129	145	
	146	6200	344	318	295	276	259	243	230	218	207	197	188	180	172	159	148	138	146	
	147	6800	378	349	324	302	284	267	252	239	227	216	206	197	189	175	162	151	147	
	166	6400	356	328	305	285	267	251	237	225	213	203	194	186	178	164	153	143	166	
167	7200	400	369	343	320	300	282	267	253	240	229	219	209	200	185	172	160	167		
18'-6"	102	2270	123	113	105	98	92	87	82	78	74	70	67	64	61	57	53	49	102	
	103	2960	160	148	137	128	120	113	107	101	96	92	88	84	80	74	69	64	103	
	104	3600	195	180	167	156	146	138	130	123	117	111	106	102	98	90	84	78	104	
	123	3320	180	166	154	144	135	127	120	113	108	103	98	94	90	83	77	72	123	
	124	4150	225	207	193	180	169	159	150	142	135	128	122	117	112	104	96	90	124	
	125	5000	270	250	232	217	203	191	181	171	162	155	148	141	135	125	116	108	125	
	126	5400	292	270	250	234	219	206	195	185	175	167	159	152	146	135	125	117	126	
	145	5630	305	281	261	244	229	215	203	193	183	174	166	159	153	141	131	122	145	
	146	6200	335	309	287	268	251	236	224	212	201	192	183	175	168	155	144	134	146	
	147	6800	367	339	315	294	276	259	245	232	221	210	201	192	184	170	158	147	147	
	166	6400	346	320	297	277	260	245	231	219	208	198	189	181	173	160	148	138	166	
167	7200	389	359	334	312	292	275	260	246	234	223	212	203	195	180	167	156	167		
19'-0"	102	2210	116	107	100	93	87	82	78	74	70	66	63	61	58	54	50	47	102	
	103	2880	151	140	130	121	114	107	101	96	91	87	83	79	76	70	65	61	103	
	104	3510	184	171	159	148	139	131	123	117	111	106	101	97	93	85	79	74	104	
	123	3230	170	157	146	136	128	120	113	107	102	97	93	89	85	79	73	68	123	
	124	4040	212	197	183	170	160	150	142	135	128	122	116	111	106	98	91	85	124	
	125	4990	263	243	225	210	197	186	175	166	158	150	143	137	132	121	113	105	125	
	126	5400	284	263	244	228	214	201	190	180	171	162	155	148	142	131	122	114	126	
	145	5480	288	266	247	231	217	204	193	183	173	165	158	151	145	134	124	115	145	
	146	6200	326	301	280	261	245	230	218	206	196	187	178	170	163	151	140	131	146	
	147	6800	358	330	307	286	269	253	239	226	215	205	195	187	179	165	154	143	147	
	166	6400	337	311	289	270	253	238	225	213	202	193	184	176	168	156	145	135	166	
167	7200	379	350	325	303	284	268	253	239	227	217	207	198	190	175	163	152	167		
19'-6"	102	2150	110	102	95	88	83	78	74	70	66	63	60	58	55	51	47	44	102	
	103	2810	144	133	124	115	108	102	96	91	87	83	79	75	72	67	62	58	103	
	104	3420	176	162	151	141	132	124	117	111	105	100	96	92	88	81	75	70	104	
	123	3140	161	149	138	129	121	114	107	102	97	92	88	84	80	74	69	64	123	
	124	3930	202	186	173	161	151	142	134	127	121	115	110	105	101	93	86	81	124	
	125	4850	249	230	213	199	187	176	166	157	149	142	136	130	124	115	107	99	125	
	126	5400	277	256	238	222	208	196	185	175	167	158	151	145	139	128	119	111	126	
	145	5340	274	253	235	219	206	194	183	173	165	157	150	143	137	126	117	109	145	
	146	6200	318	293	273	255	239	225	212	201	191	182	174	166	159	147	136	127	146	
	147	6800	349	322	299	280	262	246	233	220	210	200	191	182	175	161	150	140	147	
	166	6400	328	303	282	263	247	232	219	208	197	188	179	172	164	152	141	131	166	
167	7200	369	341	317	295	277	261	246	234	222	211	202	193	185	171	159	148	167		
20'-0"	102	2100	105	97	90	84	79	74	70	66	63	60	57	55	53	49	45	42	102	
	103	2730	137	126	117	109	102	96	91	86	82	78	75	71	68	63	59	55	103	
	104	3340	167	154	143	134	125	118	111	105	100	95	91	87	84	77	72	67	104	
	123	3060	153	141	131	123	115	108	102	97	92	88	84	80	77	71	66	61	123	
	124	3830	192	177	164	153	144	135	128	121	115	109	104	100	96	89	82	77	124	
	125	4740	237	219	203	190	178	168	158	150	142	135	129	124	119	109	102	95	125	
	126	5400	270	249	232	216	203	191	180	171	162	154	148	141	135	125	116	108	126	
	145	5200	260	240	223	208	195	184	174	164	156	149	142	136	130	120	112	104	145	
	146	6200	310	286	266	248	232	219	207	196	186	177	169	162	155	143	133	124	146	
	147	6800	340	314	292	272	255	240	227	215	204	195	186	178	170	157	146	136	147	
	166	6400	320	295	275	256	240	226	213	202	192	183	175	167	160	148	137	128	166	
	167	7200	360	332	309	288	270	254	240	228	216	206	197	188	180	166	155	144	167	
	186	7200	360	332	309	288	270	254	240	228	216	206	197	188	180	166	155	144	187	
	187	7600	380	351	326	304	285	268	253	240	228	217	207	198	190	175	163	152	168	
207	7800	390	360	334	312	293	275	260	246	234	223	213	203	195	180	167	156	207		
20'-6"	123	2990	146	135	125	117	110	103	97	92	88	83	80	76	73	67	63	58	123	
	124	3740	182	168	156	146	137	129	122	115	109	104	99	95	91	84	78	73	124	
	125	4620	225	208	193	180	169	159	150	142	135	129	123	117	112	104	97	90	125	
	126	5400	264	243	226	211	198	186	176	167	158	151	144	138	132	122	113	106	126	
	145	5070	247	228	212	198	186	175	165	156	148	141								

DESIGN TABLE—SHORTSPAN STEEL JOISTS

Clear Span	Joist Type	Total Safe Load Pounds	TOTAL SAFE LOADS IN POUNDS PER SQUARE FOOT FOR JOIST SPACINGS SHOWN																Joist Type
			12"	13"	14"	15"	16"	17"	18"	19"	20"	21"	22"	23"	24"	26"	28"	30"	
21'-0"	123	2920	139	128	119	111	104	98	93	88	83	79	76	73	70	64	60	56	123
	124	3650	174	161	149	139	130	123	116	110	104	99	95	91	87	80	75	70	124
	125	4510	215	198	184	172	161	152	143	136	129	123	117	112	107	99	92	86	125
	126	5400	257	237	220	206	193	182	172	162	154	147	140	134	129	119	110	103	126
	145	4950	236	217	202	189	177	166	157	149	142	135	129	123	118	109	101	94	145
	146	6200	295	273	253	236	222	209	197	187	177	169	161	154	148	136	127	118	146
	147	6800	324	298	277	259	243	229	216	205	194	185	177	169	162	149	139	129	147
	166	6400	305	281	261	244	229	215	203	193	183	174	166	159	153	141	131	122	166
	167	7200	343	316	294	274	257	242	229	217	206	196	187	179	172	158	147	137	167
	186	7200	343	316	294	274	257	242	229	217	206	196	187	179	172	158	147	137	186
	187	7600	362	334	310	290	272	255	241	229	217	207	198	189	181	167	155	145	187
	207	7800	371	343	319	298	279	263	248	235	223	212	203	194	186	171	159	148	207
21'-6"	123	2850	133	122	114	106	100	94	88	84	80	76	72	69	66	61	57	53	123
	124	3560	165	153	142	132	124	117	110	104	99	95	90	86	83	76	71	66	124
	125	4400	204	189	175	164	153	144	136	129	123	117	112	107	102	95	88	82	125
	126	5400	251	232	215	201	188	177	167	158	150	143	137	131	125	116	107	100	126
	145	4840	225	208	193	180	169	159	150	142	135	129	123	117	113	104	97	90	145
	146	6200	288	266	247	230	216	203	192	182	173	165	157	150	144	133	123	115	146
	147	6800	316	292	271	253	237	223	211	200	190	181	172	165	158	146	135	126	147
	166	6400	298	275	255	238	223	210	199	188	178	170	162	155	149	137	128	119	166
	167	7200	335	309	287	268	251	236	223	211	201	191	183	175	167	154	143	134	167
	186	7200	335	309	287	268	251	236	223	211	201	191	183	175	167	154	143	134	186
	187	7600	353	327	304	283	266	250	236	224	213	202	193	185	177	163	151	141	187
	207	7800	363	335	311	290	272	256	243	230	219	208	199	190	182	168	156	145	207
22'-0"	123	2790	127	117	109	101	95	90	85	80	76	73	69	66	63	59	54	51	123
	124	3480	158	146	136	127	119	112	105	100	95	91	86	83	79	73	68	63	124
	125	4300	196	181	168	157	147	138	130	124	117	112	107	102	98	90	84	78	125
	126	5300	241	223	207	193	181	170	161	152	145	138	132	126	121	111	103	97	126
	145	4730	215	199	185	172	162	152	144	136	129	123	117	112	108	100	92	86	145
	146	6200	282	260	242	226	212	199	188	178	169	161	154	147	141	130	121	111	146
	147	6800	309	285	265	247	232	218	206	195	185	177	168	161	154	143	132	123	147
	166	6400	291	269	250	233	218	206	194	184	175	166	159	152	146	134	125	116	166
	167	7200	327	302	280	262	245	231	218	206	196	187	178	171	164	151	140	131	167
	186	7200	327	302	280	262	245	231	218	206	196	187	178	171	164	151	140	131	186
	187	7600	345	318	296	277	260	245	231	219	208	198	189	180	173	159	148	138	187
	207	7800	354	328	304	284	267	251	237	224	213	203	194	185	177	164	152	142	207
22'-6"	123	2730	121	112	104	97	91	86	81	77	73	69	66	63	61	56	52	48	123
	124	3410	152	140	130	121	114	107	101	96	91	87	83	79	76	70	65	61	124
	125	4210	187	173	160	150	140	132	125	118	112	107	102	98	94	86	80	75	125
	126	5180	230	213	197	184	173	163	154	146	138	132	126	120	115	106	99	92	126
	145	4620	205	189	176	164	154	145	137	130	123	117	112	107	103	95	88	82	145
	146	6060	269	249	231	215	202	190	180	170	162	154	147	141	135	124	115	108	146
	147	6800	302	279	259	242	227	214	202	191	181	173	165	158	151	140	130	121	147
	166	6400	284	263	244	228	214	201	190	180	171	163	155	149	142	131	122	114	166
	167	7200	320	296	274	256	240	226	214	202	192	183	175	167	160	148	137	128	167
	186	7200	320	296	274	256	240	226	214	202	192	183	175	167	160	148	137	128	186
	187	7600	338	313	290	271	254	239	226	214	203	193	185	176	169	156	145	135	187
	207	7800	347	320	297	278	261	246	232	220	209	198	190	182	174	160	149	139	207
23'-0"	123	2670	116	107	100	93	87	82	77	73	70	66	63	61	58	54	50	46	123
	124	3330	145	134	124	116	109	102	97	92	87	83	79	76	72	67	62	58	124
	125	4120	179	165	154	143	134	126	119	113	107	102	98	94	90	83	77	72	125
	126	5060	221	203	189	176	165	155	147	139	132	126	120	115	110	102	94	88	126
	145	4520	197	182	169	157	147	139	131	124	118	112	107	103	98	91	84	79	145
	146	5940	258	238	221	206	194	182	172	163	155	147	141	135	129	119	111	103	146
	147	6800	296	273	254	237	222	209	197	187	178	169	161	154	148	137	127	118	147
	166	6400	278	257	238	223	209	197	186	176	167	159	152	145	139	128	119	111	166
	167	7200	313	289	268	250	235	221	209	198	188	179	171	163	157	144	134	125	167
	186	7200	313	289	268	250	235	221	209	198	188	179	171	163	157	144	134	125	186
	187	7600	330	305	283	264	248	233	220	208	198	188	180	172	165	153	142	132	187
	207	7800	339	313	290	271	254	239	226	214	203	194	185	177	170	157	145	136	207
23'-6"	123	2610	111	103	95	89	83	78	74	70	67	64	61	58	56	51	48	44	123
	124	3260	139	128	119	111	104	98	93	88	83	79	76	72	70	64	59	56	124
	125	4040	172	159	147	138	129	121	115	108	103	98	94	90	86	80	74	69	125
	126	4960	211	195	181	169	158	149	141	133	127	121	115	110	106	97	90	84	126

DESIGN TABLE—SHORTSPAN STEEL JOISTS

Clear Span	Joist Type	Total Safe Load Pounds	TOTAL SAFE LOADS IN POUNDS PER SQUARE FOOT FOR JOIST SPACINGS SHOWN																	Joist Type
			12"	13"	14"	15"	16"	17"	18"	19"	20"	21"	22"	23"	24"	26"	28"	30"		
23'-6" cont'd	145	4430	189	174	162	151	141	133	126	119	113	108	103	98	94	87	81	76	145	
	146	5800	247	228	212	198	185	174	165	156	148	141	135	129	123	114	106	99	146	
	147	6800	290	267	248	232	217	204	193	183	174	165	158	151	145	134	124	116	147	
	166	6400	272	252	234	218	204	192	182	172	164	156	149	142	136	126	117	109	166	
	167	7200	306	283	263	245	230	216	204	194	184	175	167	160	153	142	131	123	167	
	186	7200	306	283	263	245	230	216	204	194	184	175	167	160	153	142	131	123	186	
	187	7600	323	298	277	258	242	228	215	204	194	185	176	168	162	149	139	129	187	
207	7800	332	306	284	266	249	234	221	210	199	190	181	173	166	153	142	133	207		
24'-0"	123	2550	106	98	91	85	80	75	71	67	64	61	58	55	53	49	46	42	123	
	124	3190	133	123	114	106	100	94	89	84	80	76	73	69	67	61	57	53	124	
	125	3950	164	152	141	132	124	116	110	104	99	94	90	86	82	76	71	66	125	
	126	4860	202	187	174	162	152	143	135	128	121	116	110	105	101	93	87	81	126	
	145	4340	180	167	155	145	135	127	120	114	108	103	99	94	90	83	77	72	145	
	146	5690	237	219	203	190	178	168	158	150	142	135	129	124	119	110	102	95	146	
	147	6800	283	261	242	226	212	200	189	179	170	162	155	148	142	131	121	113	147	
	166	6400	267	246	228	214	200	188	178	168	160	152	145	139	133	123	114	107	166	
	167	7200	300	277	257	240	225	212	200	190	180	171	164	157	150	138	129	120	167	
	186	7080	295	272	253	236	221	208	197	186	177	168	161	154	148	136	127	118	186	
	187	7600	317	293	272	254	238	224	212	200	190	181	173	165	159	147	136	127	187	
207	7800	325	300	278	260	244	230	216	205	195	186	177	170	163	150	139	130	207		
24'-6"	145	4250	174	160	149	139	130	122	116	110	104	99	95	91	87	80	74	69	145	
	146	5570	227	210	195	182	170	160	151	143	136	130	124	119	114	105	98	91	146	
	147	6690	273	252	234	218	205	192	182	172	163	156	149	142	136	126	117	109	147	
	166	6310	258	238	221	206	193	182	172	163	155	147	141	135	129	119	110	103	166	
	167	7200	294	271	252	235	221	208	196	186	176	168	160	153	147	136	126	117	167	
	186	6930	283	261	242	226	212	200	188	179	170	162	154	148	142	131	121	113	186	
	187	7600	310	286	265	248	233	219	207	196	186	177	169	162	155	143	133	124	187	
207	7800	318	294	272	254	239	224	212	201	191	182	174	166	159	147	136	127	207		
25'-0"	145	4160	166	153	142	133	125	117	111	105	100	95	91	87	83	77	71	66	145	
	146	5450	218	201	187	174	163	154	145	137	131	125	119	114	109	101	93	87	146	
	147	6560	262	242	225	210	197	185	175	166	157	150	143	137	131	121	112	105	147	
	166	6180	247	229	212	198	186	175	165	156	148	141	135	129	124	114	106	99	166	
	167	7200	288	266	247	230	216	204	192	182	173	165	157	150	144	133	123	115	167	
	186	6800	272	251	233	218	204	192	181	172	163	155	148	142	136	126	117	109	186	
	187	7600	304	280	260	243	228	214	203	192	182	174	166	158	152	140	130	122	187	
207	7800	312	288	267	250	234	220	208	197	187	178	170	163	156	144	134	125	207		
25'-6"	145	4080	160	148	137	128	120	113	107	101	96	91	87	83	80	74	69	64	145	
	146	5350	210	194	180	168	158	148	140	133	126	120	114	110	105	97	90	84	146	
	147	6430	252	233	216	202	189	178	168	159	151	144	137	131	126	116	108	101	147	
	166	6060	238	220	204	190	178	168	159	150	143	136	130	124	119	110	102	95	166	
	167	7200	282	261	242	226	212	199	188	178	170	162	154	148	141	130	121	113	167	
	186	6660	261	241	224	209	196	184	174	165	157	149	142	136	131	121	112	105	186	
	187	7600	298	274	255	238	224	210	198	188	179	170	163	155	149	137	128	119	187	
207	7800	306	282	262	245	230	216	204	193	184	175	167	160	153	141	131	123	207		
26'-0"	145	4000	154	142	132	123	115	108	102	97	92	88	84	80	77	71	66	61	145	
	146	5250	202	187	173	162	152	143	135	128	121	115	110	105	101	93	87	81	146	
	147	6300	243	224	208	194	182	171	162	153	146	138	132	127	121	112	104	97	147	
	166	5950	229	211	196	183	172	162	153	145	137	131	125	119	115	106	98	92	166	
	167	7200	277	256	237	222	208	196	184	175	166	158	151	145	139	128	119	111	167	
	186	6530	251	232	215	201	188	177	167	159	151	143	137	131	126	116	108	101	186	
	187	7600	292	270	250	234	219	206	195	185	175	167	159	152	146	135	125	117	187	
207	7800	300	276	257	240	225	212	200	190	180	171	164	156	150	138	129	120	207		
26'-6"	145	3920	148	137	127	118	111	105	99	94	89	85	81	77	74	68	63	59	145	
	146	5150	194	179	167	155	146	137	130	123	117	111	106	101	97	90	83	78	146	
	147	6180	234	216	200	187	175	165	156	147	140	133	127	122	117	108	100	93	147	
	166	5840	220	203	189	176	165	155	147	139	132	126	120	115	110	102	94	88	166	
	167	7060	267	246	229	213	200	188	178	168	160	152	146	139	133	123	114	107	167	
	186	6410	242	223	207	194	182	171	161	153	145	138	132	126	121	112	104	97	186	
	187	7600	287	265	246	230	215	203	191	182	172	164	157	150	144	133	123	115	187	
207	7800	294	271	252	235	221	208	196	186	176	168	160	153	147	136	126	118	207		
27'-0"	145	3850	143	132	122	114	107	101	95	90	86	82	78	75	71	66	61	57	145	
	146	5050	187	173	160	150	140	132	125	118	112	107	102	98	94	86	80	75	146	
	147	6070	225	208	193	180	169	159	150	142	135	129	123	117	112	104	96	90	147	
	166	5730	212	196	182	170	159	150	141	134	127	121	116	111	106	98	91	85	166	

DESIGN TABLE—SHORTSPAN STEEL JOISTS

Clear Span	Joist Type	Total Safe Load Pounds	TOTAL SAFE LOADS IN POUNDS PER SQUARE FOOT FOR JOIST SPACINGS SHOWN																Joist Type
			12"	13"	14"	15"	16"	17"	18"	19"	20"	21"	22"	23"	24"	26"	28"	30"	
27'-0"	167	6940	257	237	220	206	193	181	171	162	154	147	140	134	128	119	110	103	167
	186	6290	233	215	200	186	175	165	155	147	140	133	127	121	117	108	100	93	186
	187	7600	281	259	241	225	211	198	187	178	169	161	153	147	141	130	121	113	187
	207	7800	289	266	248	231	217	204	193	183	173	165	158	151	145	133	124	116	207
27'-6"	145	3780	137	127	118	110	103	97	92	87	83	79	75	72	69	63	59	55	145
	146	4960	180	166	154	144	135	127	120	114	108	103	98	94	90	83	77	72	146
	147	5960	217	200	186	173	162	153	144	137	130	124	118	113	108	100	93	86	147
	166	5630	204	189	175	164	154	144	136	129	123	117	112	107	102	94	88	82	166
	167	6810	248	229	212	198	186	175	165	156	149	142	135	129	124	114	106	99	167
	186	6190	225	208	193	180	169	159	150	142	135	128	123	117	113	104	97	90	186
	187	7500	273	252	234	218	205	193	182	173	164	156	149	142	137	126	117	109	187
	207	7800	284	262	243	227	213	200	189	179	170	162	155	148	142	131	122	114	207
28'-0"	145	3720	133	123	114	106	100	94	89	84	80	76	72	69	66	61	57	53	145
	146	4880	174	161	149	139	131	123	116	110	105	100	95	91	87	81	75	70	146
	147	5850	209	193	179	167	157	147	139	132	125	120	114	109	105	96	90	84	147
	166	5520	197	182	169	158	148	139	131	124	118	113	107	103	99	91	84	79	166
	167	6690	239	221	205	191	179	169	159	151	143	137	130	125	119	110	102	96	167
	186	6080	217	200	186	174	163	153	145	137	130	124	118	113	109	100	93	87	186
	187	7390	264	244	226	211	198	186	176	168	158	151	144	138	132	122	113	106	187
	207	7800	279	258	239	223	209	197	186	176	167	160	152	145	140	129	120	112	207
28'-6"	166	5430	191	176	163	152	143	135	127	120	114	109	104	100	96	88	82	76	166
	167	6570	230	213	197	184	173	163	153	145	138	132	126	120	115	106	98	92	167
	186	5960	209	193	178	167	157	148	140	132	125	119	114	109	105	97	89	84	186
	187	7240	254	234	218	202	191	179	169	160	152	145	139	132	127	117	109	102	187
	207	7800	274	253	235	219	206	193	183	173	164	157	150	143	137	127	118	110	207
29'-0"	166	5340	184	170	158	147	138	130	123	116	111	105	100	96	92	85	79	74	166
	167	6460	223	206	191	178	167	157	148	141	134	127	122	116	111	103	96	89	167
	186	5860	202	186	173	162	152	143	135	128	121	115	110	105	101	93	87	81	186
	187	7130	246	227	211	197	185	174	164	155	148	141	134	128	123	114	106	99	187
	207	7800	269	248	231	215	202	190	179	170	161	154	147	140	135	124	115	108	207
29'-6"	166	5240	178	164	152	142	133	125	118	112	107	102	97	93	89	82	76	71	166
	167	6350	215	198	184	172	162	152	143	136	129	123	117	112	108	99	92	86	167
	186	5750	195	180	167	156	146	138	130	123	117	111	106	102	98	90	84	78	186
	187	6990	237	218	203	190	178	167	158	150	142	135	129	124	119	109	102	95	187
	207	7700	261	241	224	209	196	184	174	165	157	149	142	136	131	121	112	105	207
30'-0"	166	5150	172	159	147	138	129	121	114	109	103	98	94	90	86	79	74	69	166
	167	6240	208	192	178	167	156	147	139	131	125	119	113	108	104	96	89	83	167
	186	5670	189	174	162	151	142	133	126	120	113	108	103	98	95	87	81	76	186
	187	6870	229	211	196	183	172	162	153	145	137	131	125	119	115	106	98	92	187
	207	7560	252	232	216	202	189	178	168	159	151	144	137	131	126	116	108	101	207
30'-6"	166	5070	166	153	142	133	125	117	111	105	100	95	91	87	83	78	71	67	166
	167	6140	201	186	172	161	151	142	134	127	121	115	110	105	100	93	86	81	167
	186	5550	182	168	156	146	137	128	121	115	109	104	99	95	91	84	78	73	186
	187	6770	222	205	190	178	167	157	148	140	133	127	121	116	111	103	95	89	187
	207	7440	244	225	209	195	183	172	163	154	146	140	133	127	122	113	105	98	207
31'-0"	166	4990	161	149	138	129	121	114	107	102	97	92	88	84	81	74	69	64	166
	167	6050	195	180	167	156	146	138	130	123	117	111	106	102	98	90	84	78	167
	186	5490	177	163	152	142	133	125	118	112	106	101	97	92	89	82	76	71	186
	187	6670	215	198	184	172	161	152	143	136	129	123	117	112	108	99	92	86	187
	207	7320	236	218	202	189	177	166	157	149	142	135	129	123	118	109	101	95	207
31'-6"	166	4910	156	144	134	125	117	110	104	99	94	89	85	81	78	72	67	62	166
	167	5950	189	174	162	151	142	133	126	119	113	108	103	99	95	87	81	76	167
	186	5390	171	158	147	137	128	121	114	108	103	98	93	89	86	79	74	69	186
	187	6550	208	192	178	166	156	147	139	132	125	119	113	108	104	96	89	83	187
	207	7210	229	211	196	183	172	162	153	145	137	131	125	120	115	106	98	92	207
32'-0"	166	4840	151	140	130	121	113	107	101	96	91	86	82	79	76	70	65	60	166
	167	5860	183	169	157	146	137	129	122	116	110	105	100	96	92	85	79	73	167
	186	5310	166	153	142	133	125	117	111	105	100	95	91	87	83	77	71	67	186
	187	6460	202	186	173	162	151	143	135	128	121	116	110	105	101	93	87	81	187
	207	7070	221	204	189	177	166	156	147	140	133	127	121	115	111	102	95	89	207

DESIGN TABLE—SHORTSPAN STEEL JOISTS

Clear Span	Joist Type	Total Safe Load Pounds	TOTAL SAFE LOADS IN POUNDS PER SQUARE FOOT FOR JOIST SPACINGS SHOWN																Joist Type
			12"	13"	14"	15"	16"	17"	18"	19"	20"	21"	22"	23"	24"	26"	28"	30"	
32'-6"	186	5230	161	148	138	129	121	114	107	102	97	92	88	84	81	74	69	65	186
	187	6370	196	181	168	157	147	138	131	124	118	112	107	102	98	91	84	79	187
	207	6990	215	198	184	172	161	152	143	136	129	123	118	112	108	99	92	86	207
33'-0"	186	5150	156	144	134	125	117	110	104	99	94	89	85	81	78	72	67	63	186
	187	6270	190	175	163	152	142	134	127	120	114	109	104	99	95	88	82	76	187
	207	6860	208	192	178	166	156	147	139	132	125	119	114	109	104	96	89	83	207
33'-6"	186	5090	152	140	130	122	114	107	101	96	91	87	83	79	76	70	65	61	186
	187	6160	184	170	158	147	138	130	123	116	110	105	100	96	92	85	79	74	187
	207	6770	202	186	173	162	151	143	135	128	121	115	110	105	101	93	87	81	207
34'-0"	186	5000	147	136	126	118	110	104	98	93	88	84	80	77	74	68	63	59	186
	187	6050	178	164	152	142	134	126	119	113	107	102	97	93	89	82	76	71	187
	207	6660	196	181	168	157	147	138	131	124	118	112	107	102	98	91	84	79	207
34'-6"	186	4930	143	132	122	114	107	101	95	90	86	82	78	75	72	66	61	57	186
	187	5970	173	160	148	138	130	122	115	109	104	99	95	90	87	80	74	69	187
	207	6560	190	175	163	152	143	134	127	120	114	109	104	99	95	88	82	76	207
35'-0"	186	4870	139	128	119	111	104	98	93	88	83	80	76	73	70	64	60	56	186
	187	5880	168	155	144	134	126	119	112	106	101	96	92	88	84	78	72	67	187
	207	6480	185	171	158	148	139	131	123	117	111	106	101	97	93	86	79	74	207
35'-6"	186	4790	135	125	116	108	101	95	90	85	81	77	74	70	68	63	58	54	186
	187	5820	164	151	140	131	123	116	109	104	98	94	90	86	82	76	70	66	187
	207	6390	180	166	154	144	135	127	120	114	108	103	98	94	90	83	77	72	207
36'-0"	186	4720	131	121	112	105	98	93	87	83	79	75	72	68	66	61	56	53	186
	187	5760	160	148	137	128	120	113	107	101	96	92	87	83	80	74	69	64	187
	207	6300	175	161	150	140	131	124	117	111	105	100	96	91	88	81	75	70	207
36'-6"	207	6210	170	157	146	136	128	120	113	107	102	97	93	89	85	79	73	68	207
37'-0"	207	6110	165	152	141	132	124	117	110	104	99	94	90	86	83	76	71	66	207
37'-6"	207	6040	161	148	138	129	121	114	107	102	97	92	88	84	82	74	69	65	207
38'-0"	207	5970	157	145	135	126	118	111	105	99	94	90	86	82	79	73	68	63	207
38'-6"	207	5890	153	141	131	122	115	108	102	97	92	88	84	80	77	71	66	61	207
39'-0"	207	5810	149	137	128	119	112	105	99	94	89	85	81	78	75	69	64	60	207
39'-6"	207	5730	145	134	124	116	109	102	97	92	87	83	79	76	73	67	62	58	207
40'-0"	207	5640	141	130	121	113	106	100	94	89	85	81	77	74	71	65	61	57	207

SPECIFICATIONS

SHORTSPAN OPEN-WEB STEEL JOIST CONSTRUCTION

GENERAL—Floor construction shall consist of a concrete slab of proper mix and thickness supported by a system of adequately designed and properly erected steel joists.

Ceiling construction shall consist of plaster on metal lath of specified weight.

Where wood-strip flooring is specified, wood sleepers shall be provided and installed according to specifications.

JOISTS—Joists shall be either Bethlehem Shortspan Open-Web Steel Joists as manufactured by Bethlehem Steel Company and approved by the Steel Joist Institute, or other Institute-approved joists. Joists shall be designed and fabricated so that all welding develops fully the maximum design stresses of all the members. The steel used in their manufacture shall conform to the standard specifications of American Society for Testing Materials for Steel for Buildings, Designation A7 of latest adoption. Joists shall receive a shop coat of black asphalt paint.

DESIGN—Joist design shall conform to requirements of the Steel Joist Institute Specifications, Shortspan Series and be approved by the Steel Joist Institute.

LOCATION AND SPACING—There shall be one typical joist not more than 4 in. in the clear from each end wall or other bearing walls parallel to run of joist.

Where partitions extend parallel to run of joists there shall be at least one typical joist provided under each such partition, and joists shall be doubled if necessary to safely support the extra load of the partition. Where partitions extend across joists their weight must be included in computations as a part of the dead load. Maximum spacing of joists shall be 24 in. in floors and 30 in. in roofs, except that steel joists may be used at greater spacings to support roof decks of sheet steel, concrete or gypsum slabs, or wood planks.

Tie beams in skeleton framed buildings shall not be considered as taking the place of a joist unless plans indicate otherwise. (If tie beams are designed to carry any part of floor load, specifier should so state.)

BEARING—Where joists rest on masonry or concrete supports, a minimum bearing of 4 in. in length shall be provided.

Where joists rest on steel supports, length of bearing shall be not less than 2½ in.

All supports shall be finished to a true level surface at proper elevation.

ANCHORS—Where joists bear on masonry, ¾-in. round wall anchors shall be built into the wall for every third joist end. Where joists rest on structural steel supports, all joist ends shall be welded to the support or else secured by ⅝-in. rod anchors fastened over the flange of the supporting beam.

BRIDGING—As soon as joists have been erected, and before application of construction loads, Bethlehem Bridging shall be installed between the joists.

Bridging shall be of the continuous horizontal type. Continuous horizontal bridging shall not be less than ½-in. round continuous steel bars, one bar at top chord and one bar at bottom chord per bridging line. Bridging shall be attached in a positive manner to both top and bottom chords of all joists.

Bridging shall be spaced in accordance with the following table:

<i>Span</i>	<i>Number of Lines of Bridging</i>
Up to 14 ft.	one row, near center
14 to 21 ft.	two rows, at third points
21 to 32 ft.	three rows, at quarter points
32 to 40 ft.	four rows, at fifth points

FLOOR LATH—As centering for concrete floor or roof slabs, metal lath shall be used as follows:

Joist spacing up to 24 in.: ⅝-in. rib—weight, 4 lb per sq yd;

Joist spacing 24 to 30 in.: ¾-in. rib—weight, 0.60 lb per sq ft.

Lath shall be laid ribs up, lengthwise across the joists and securely attached to the joists with Bethlehem Floor Lath Clips of 12-gage bethanized wire, spaced not over 8 in. on centers.

CEILING LATH—For attached ceilings, rib metal lath shall be used as follows:

Joist spacing up to 19 in.: ⅝-in. rib—weight, 3 lb per sq yd;

Joist spacing from 19 to 24 in.: ⅝-in. rib—weight, 3.4 lb per sq yd;

Joist spacing from 24 to 30 in.: ¾-in. rib—weight, 4 lb per sq yd.

Lath shall be erected with ribs up, lengthwise across joists and securely attached to joists with Bethlehem Ceiling Lath Clips or with 18-gage bethanized annealed tie wire applied at each lath rib.

Where lath sheets are spliced between joists, the lap shall be not less than 4 in. and the sheets shall be laced securely together at the over-lap ends with 18-gage bethanized annealed wire. Splices shall be staggered.

FLOOR SLAB—Floor slab shall consist of stone or gravel Portland cement concrete not less than 2 in. thick. Maximum size of coarse aggregate shall not exceed ¾ in.

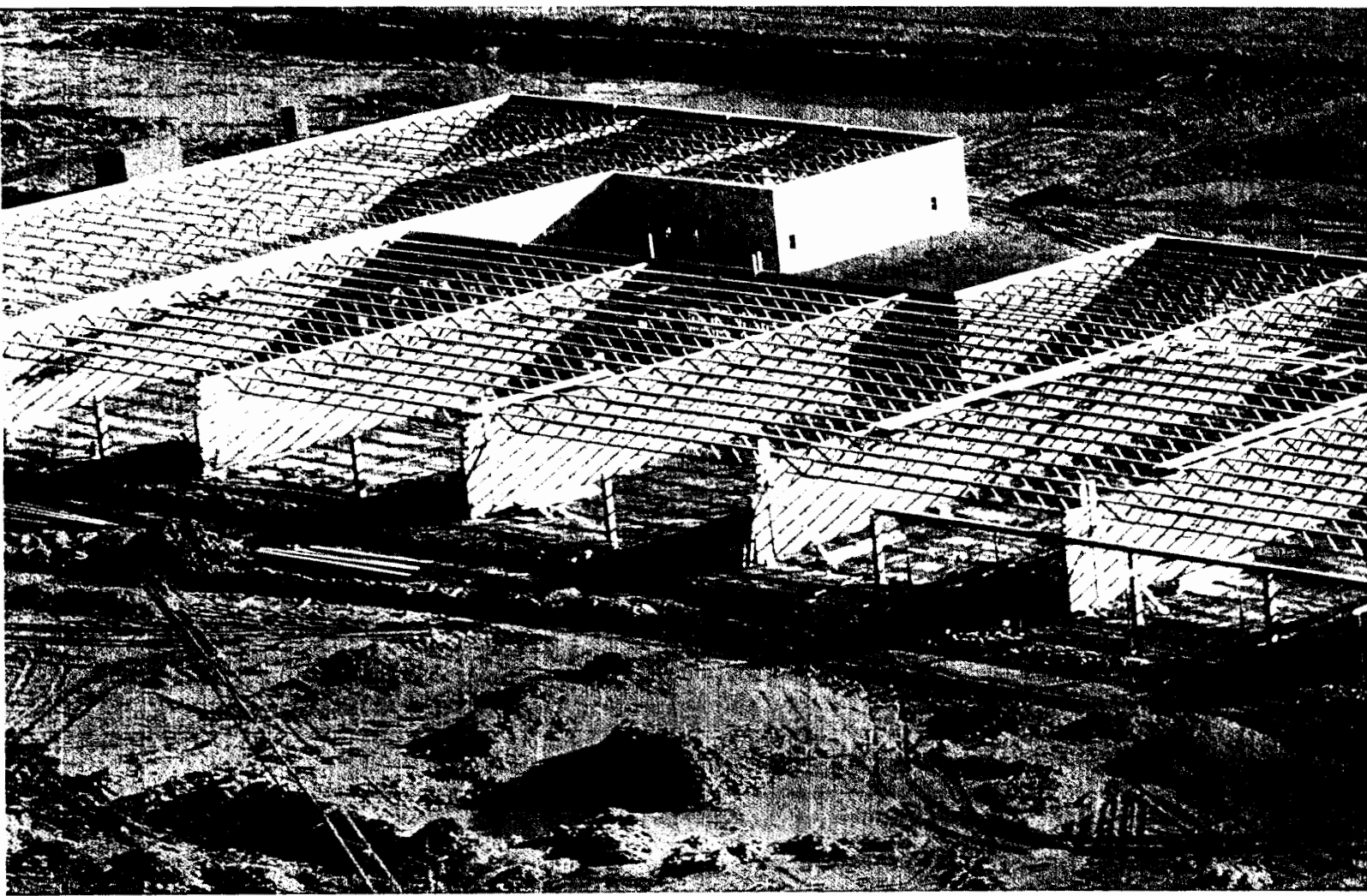
Concrete shall be a dry mix and shall not be placed until bridging, floor lath and anchors have been completely installed as specified. Bulk concrete must not be dumped between joists during the concreting operation.

Where finish other than wood on nailing strips is specified, ¼-in. temperature rods, 12 in. on centers both ways, shall be furnished.

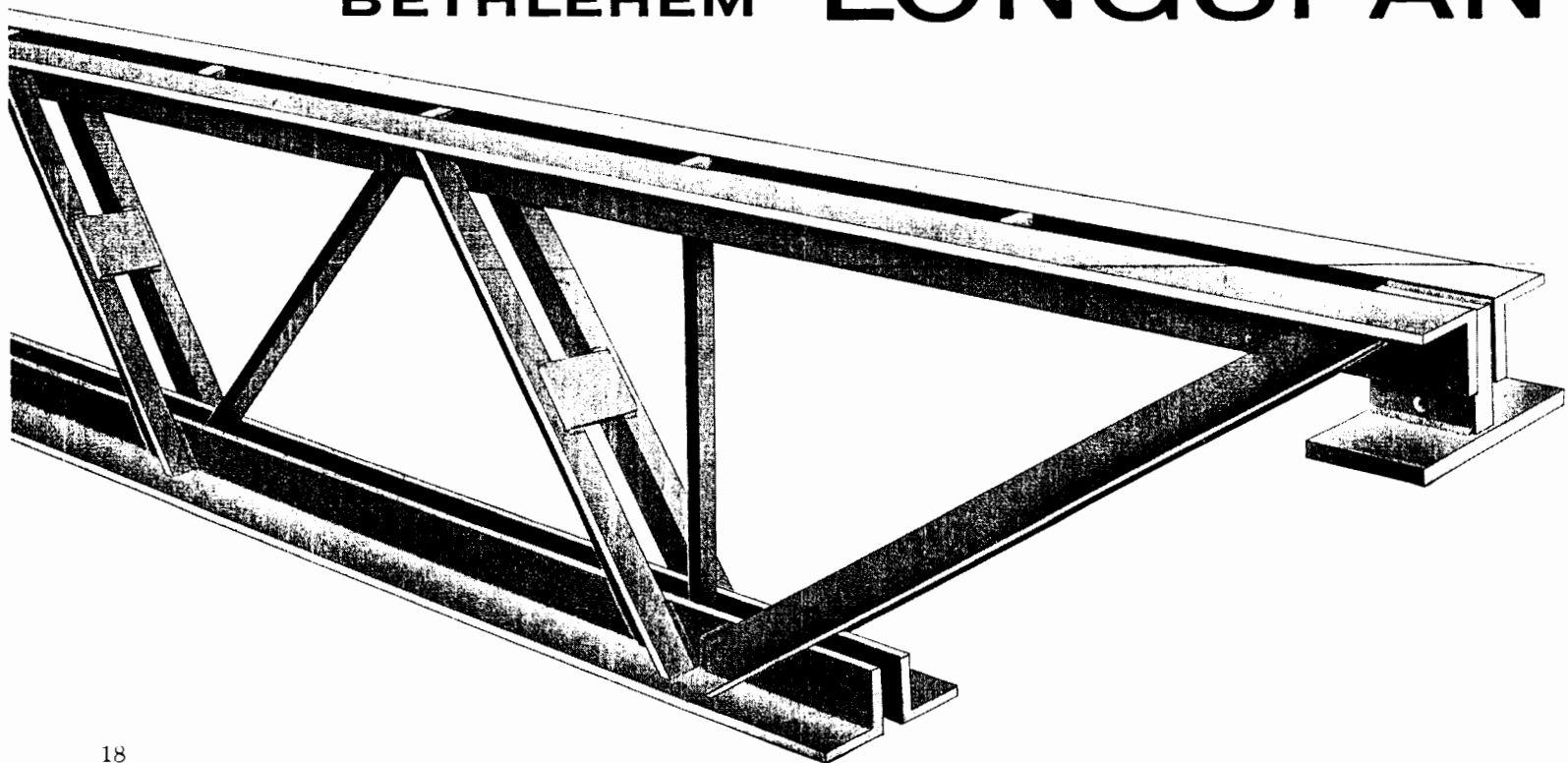
WOOD SLEEPERS—Where wood-strip flooring is specified, 2-in. by 2-in. wood sleepers shall be provided.

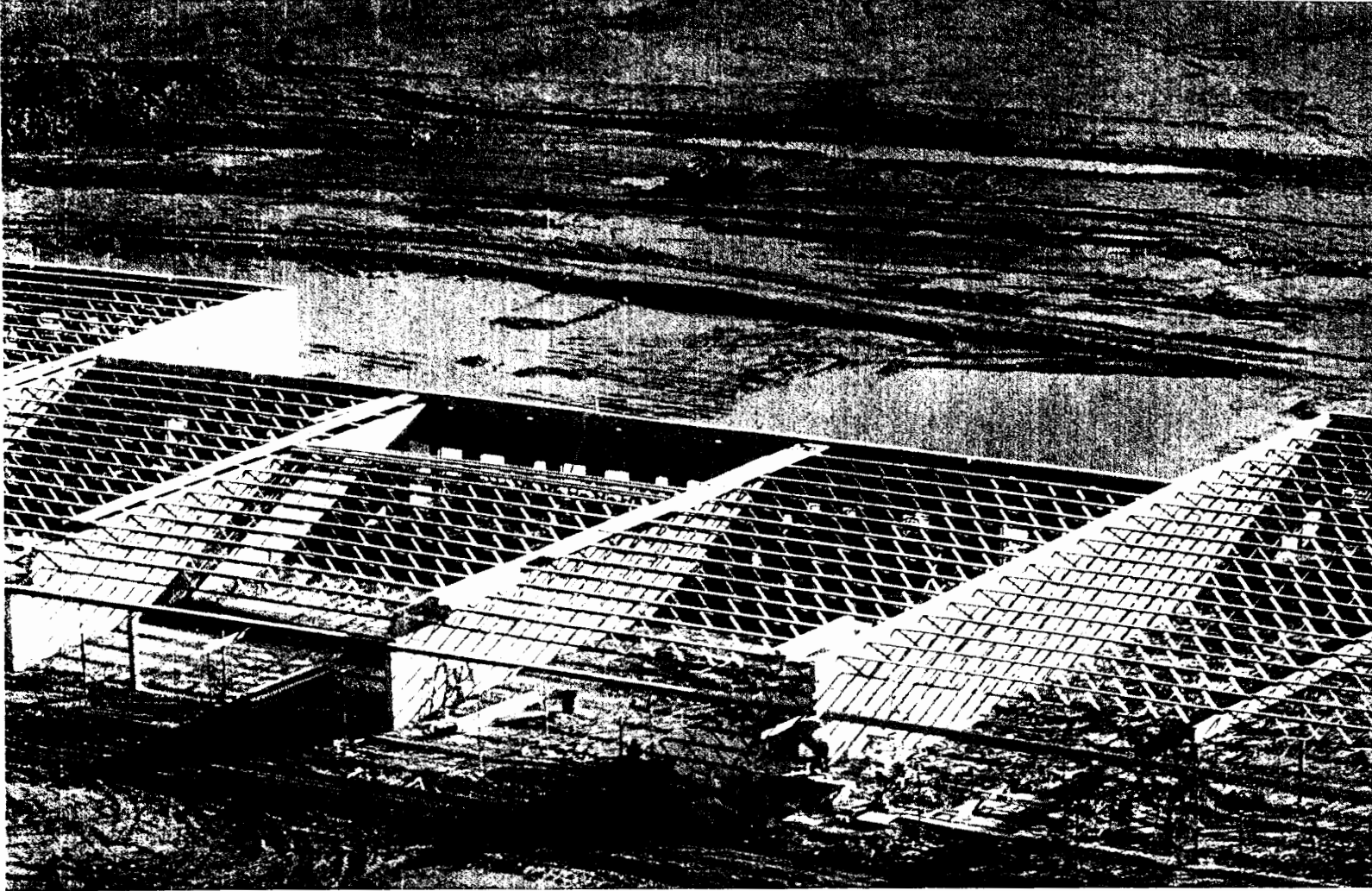
If a wood sub-floor is used, nailing strips may be spaced 20 in. on centers. If single thickness wood flooring is used, nailing strips should be spaced 12 in. on centers.

The underside of all sleepers shall be set approximately 1 in. above joists and they shall be attached securely thereto with Bethlehem Sleeper Anchors.



BETHLEHEM LONGSPAN



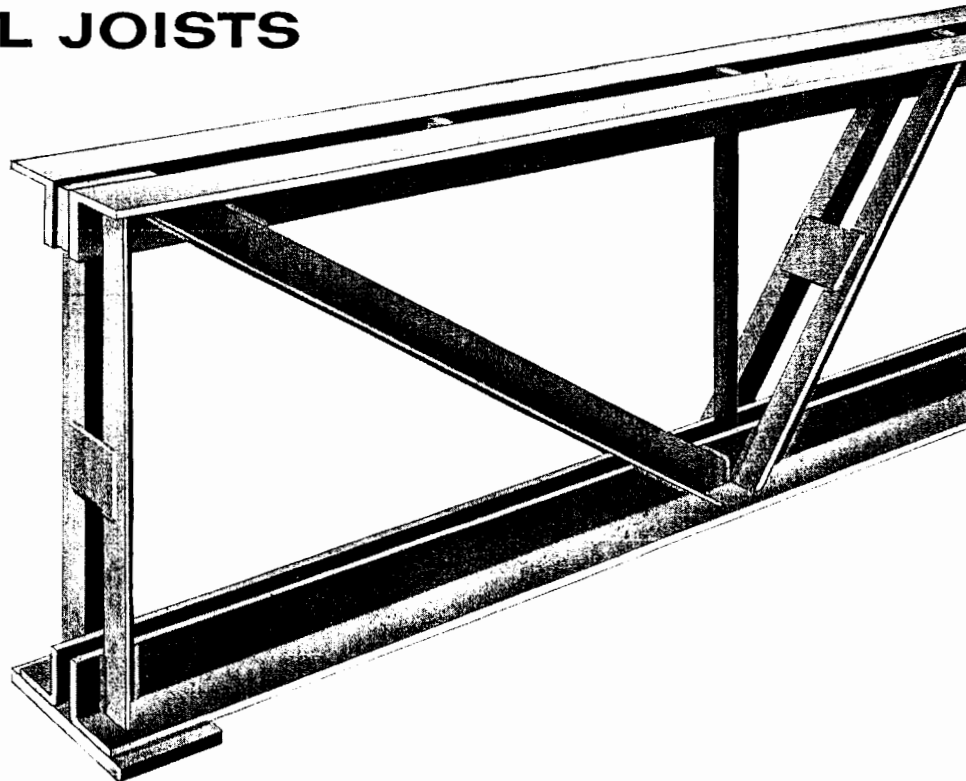


The stores in this shopping center near Buffalo will have plenty of column-free space because Bethlehem Longspan Joists were used in the roof construction. Architect: Stanley C. Podd; general contractor: Roxie Gian, both of Buffalo.

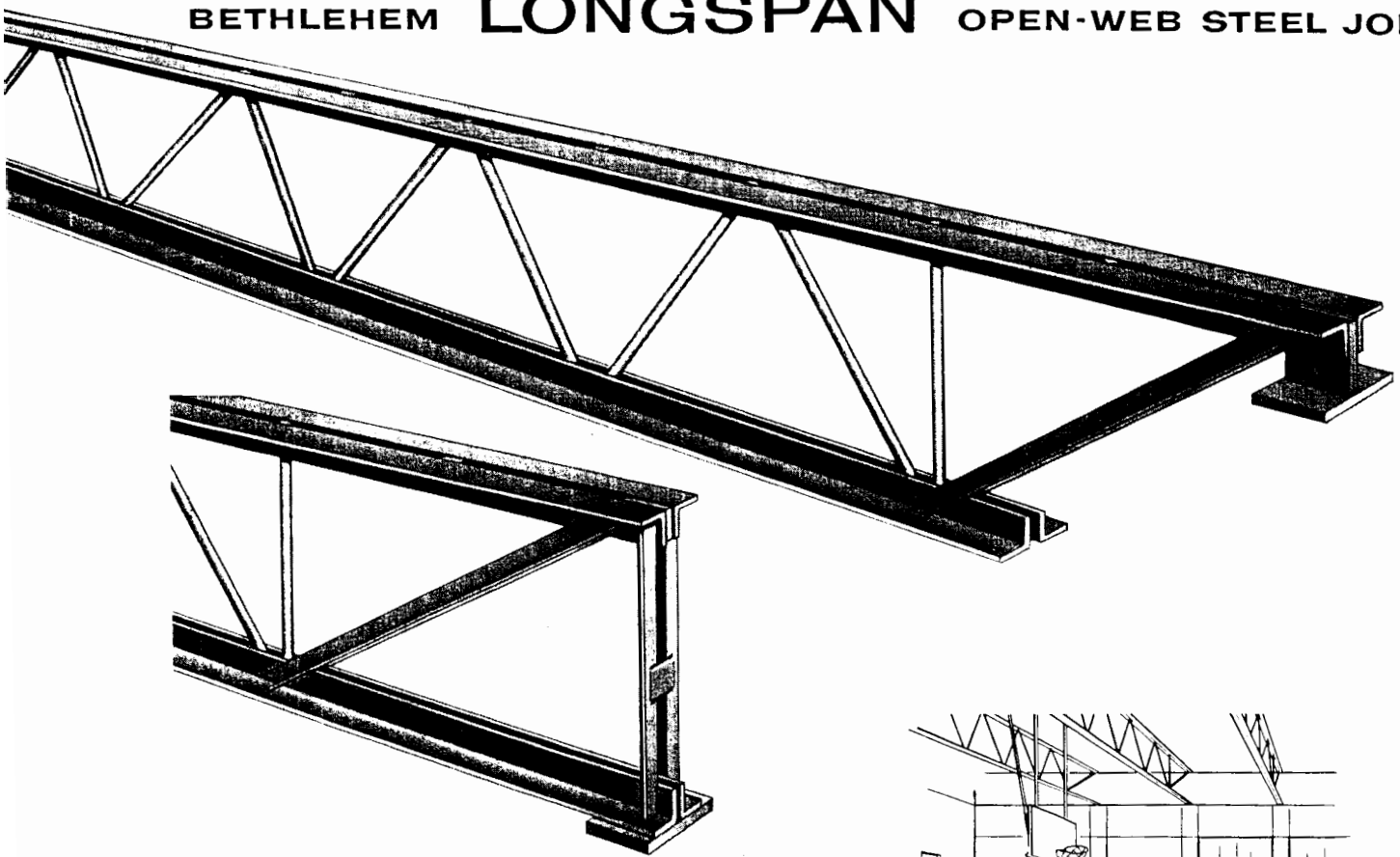
OPEN-WEB STEEL JOISTS

Bethlehem Longspan Joists are light-weight Warren-type steel trusses fabricated from hot-rolled sections by electric-arc welding. Chords are made of pairs of angles. The web consists of a combination of double-angle compression members and single-rectangular tension members. In the small sizes the interior web is made entirely of round or rectangular bars.

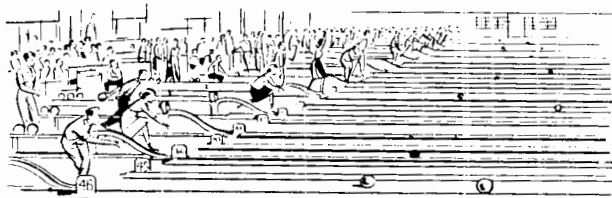
Battens on double-angle compression web members are omitted on the shallower Longspans, 28 in. and less in depth.



BETHLEHEM LONGSPAN OPEN-WEB STEEL JOISTS



Construction Advantages

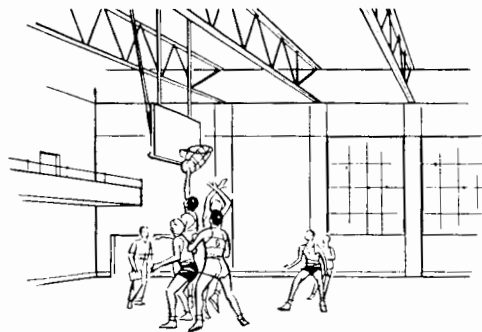


CLEAR FLOOR SPACE INCREASED

Longspan Joists are used in light-occupancy structures for clear spans beyond the range of the Shortspan series. Spans of from 25 to 96 ft can be provided for by the use of these joists. For spans somewhat greater than 96 ft, special joists may be furnished.

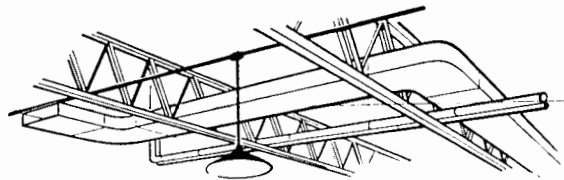
Longspan Joists are particularly suitable for roof construction. With Longspans, the architect can design storerooms, garages and smaller industrial buildings without interior columns. The elimination of such columns allows unrestricted arrangement of store fixtures, office partitions and equipment, permitting economical use of the entire floor area.

The use of Longspans allows large interiors such as auditoriums, gymnasiums and supermarkets to be designed with a minimum of columns, permitting the most efficient use of floor space.



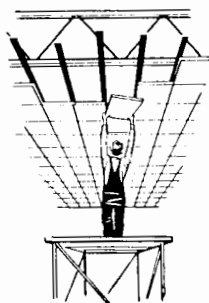
PILASTERS ELIMINATED

The relatively close spacing of Longspan Joists distributes floor and roof loads uniformly to bearing walls. This distribution of load eliminates the need for pilasters, allowing greater freedom in the location of doors and windows.



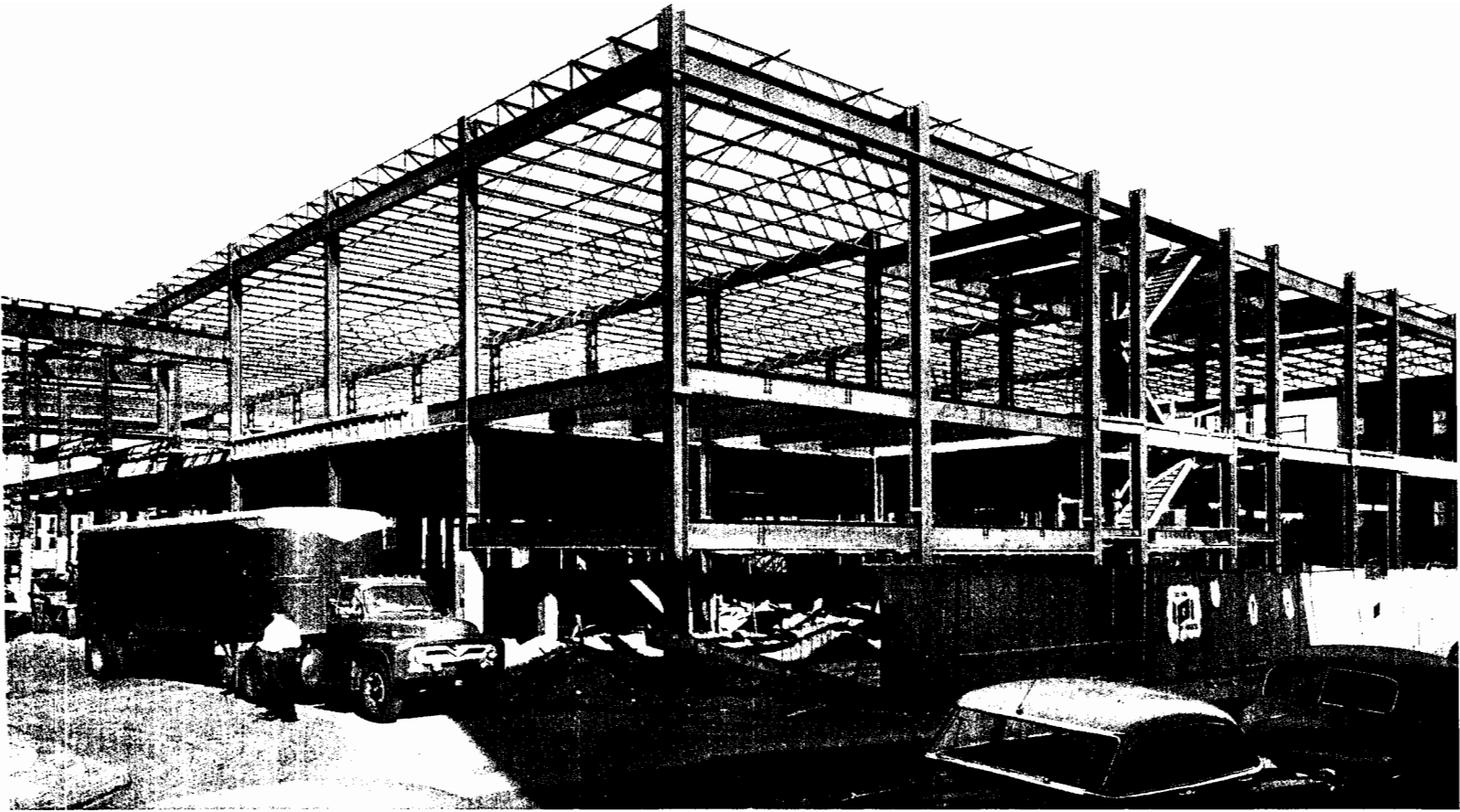
DUCTWORK SIMPLIFIED

The large open webs in Bethlehem Longspan Joists readily accommodate ductwork, pipes and wiring, materially simplifying the installation of heating, air-conditioning, plumbing and wiring.



CEILINGS READILY INSTALLED

Plaster ceilings can be attached to the lower chords of Longspan Joists in the same way as to Shortspans. Suspended ceilings are simple to install, using runner and furring channels hung from the lower chords.



PARALLEL-CHORD LONGSPANS WITH HORIZONTAL TOP CHORD

Parallel-chord Longspan Joists are available with either top-bearing or bottom-bearing ends.

PITCHED-CHORD LONGSPANS

Bethlehem Longspans can be furnished with the top chord sloping in one direction or sloping in both directions from the mid-point to provide for adequate roof drainage.

Pitched-chord Longspan Joists are available in any combination of top- or bottom-bearing ends, with either structural or bar webs.

Pitched-chord Longspan Joists are made with the same number of panels as corresponding parallel-chord Longspans. The depth at the midpoint is the nominal depth of the joist.

The slope of the top chord is a standard $\frac{1}{8}$ in. per ft.

The total rise or drop of top chord measured at midspan for spans from 22 ft to 100 ft are listed at right.

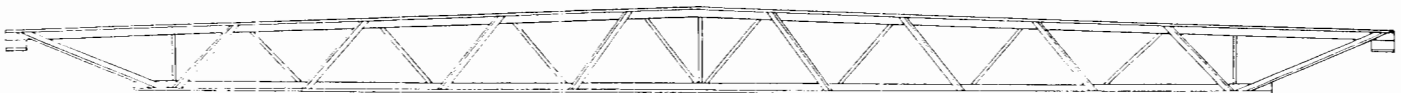
Greater drops reduce the safe carrying capacities and special design and fabrication are necessary.

Carrying capacity and weight are determined by the depth at the middle of the clear span.

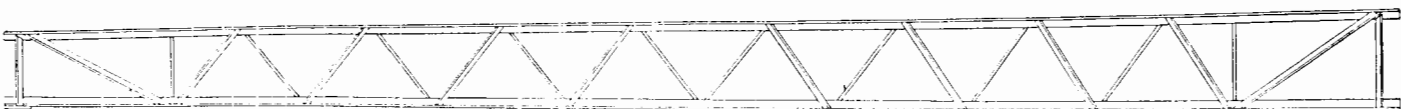
Span ft	Rise or Drop in.	Span ft	Rise or Drop in.	Span ft	Rise or Drop in.	Span ft	Rise or Drop in.
22	$1\frac{3}{8}$	42	$2\frac{5}{8}$	62	$3\frac{7}{8}$	82	$5\frac{1}{8}$
24	$1\frac{1}{2}$	44	$2\frac{3}{4}$	64	4	84	$5\frac{1}{4}$
26	$1\frac{5}{8}$	46	$2\frac{7}{8}$	66	$4\frac{1}{8}$	86	$5\frac{3}{8}$
28	$1\frac{3}{4}$	48	3	68	$4\frac{1}{4}$	88	$5\frac{1}{2}$
30	$1\frac{7}{8}$	50	$3\frac{1}{8}$	70	$4\frac{3}{8}$	90	$5\frac{5}{8}$
32	2	52	$3\frac{1}{4}$	72	$4\frac{1}{2}$	92	$5\frac{3}{4}$
34	$2\frac{1}{8}$	54	$3\frac{3}{8}$	74	$4\frac{5}{8}$	94	$5\frac{7}{8}$
36	$2\frac{1}{4}$	56	$3\frac{1}{2}$	76	$4\frac{3}{4}$	96	6
38	$2\frac{3}{8}$	58	$3\frac{5}{8}$	78	$4\frac{7}{8}$	98	$6\frac{1}{8}$
40	$2\frac{1}{2}$	60	$3\frac{3}{4}$	80	5	100	$6\frac{1}{4}$

CAMBER

All Longspan Joists are made with camber. The amount of camber is specified on page 28.



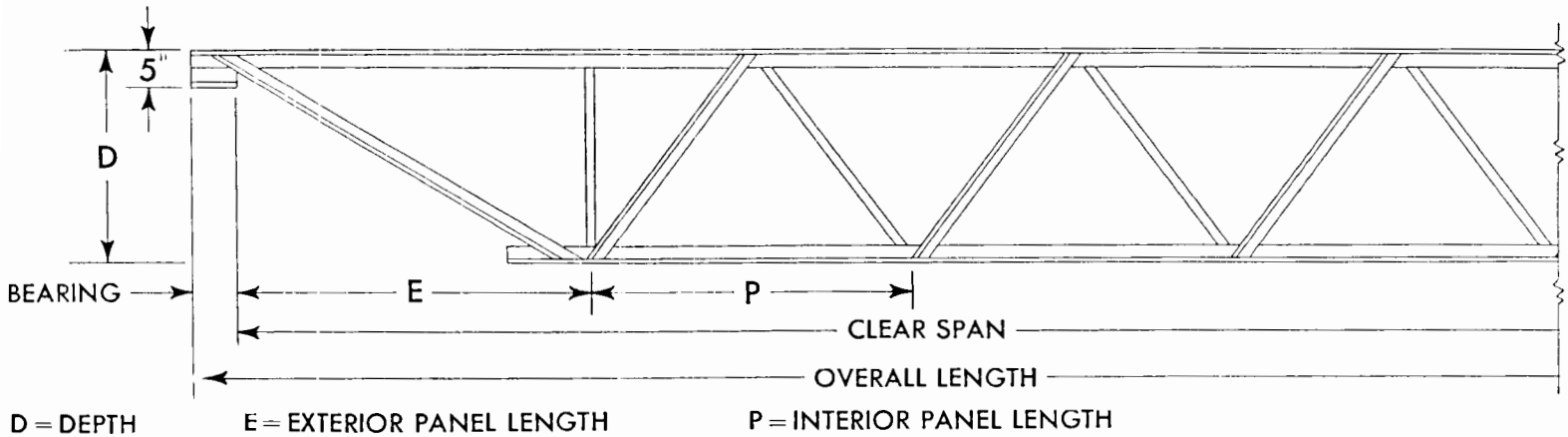
TOP-BEARING DOUBLE PITCH



BOTTOM-BEARING SINGLE PITCH

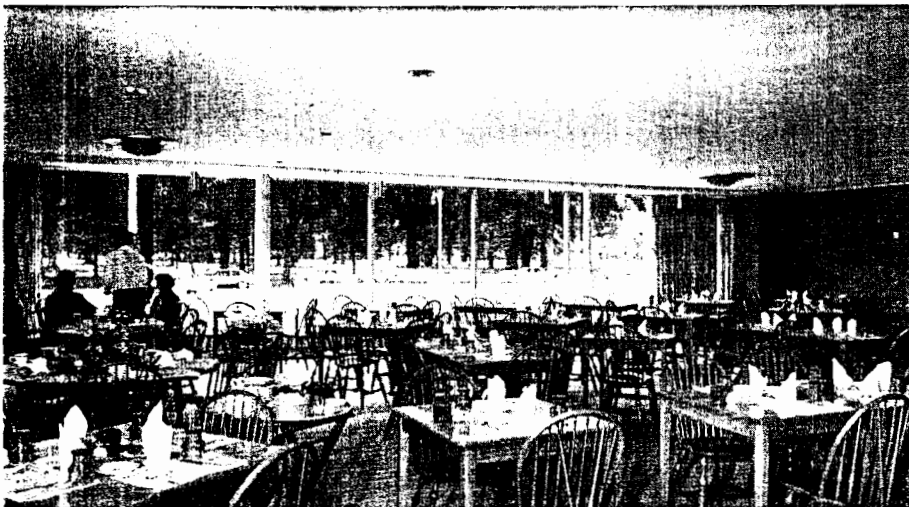
DIMENSIONS AND PROPERTIES OF

TOP BEARING

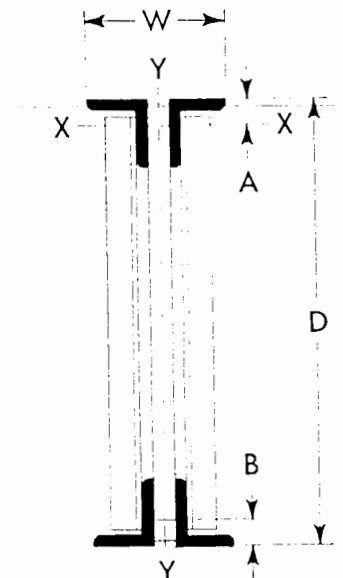
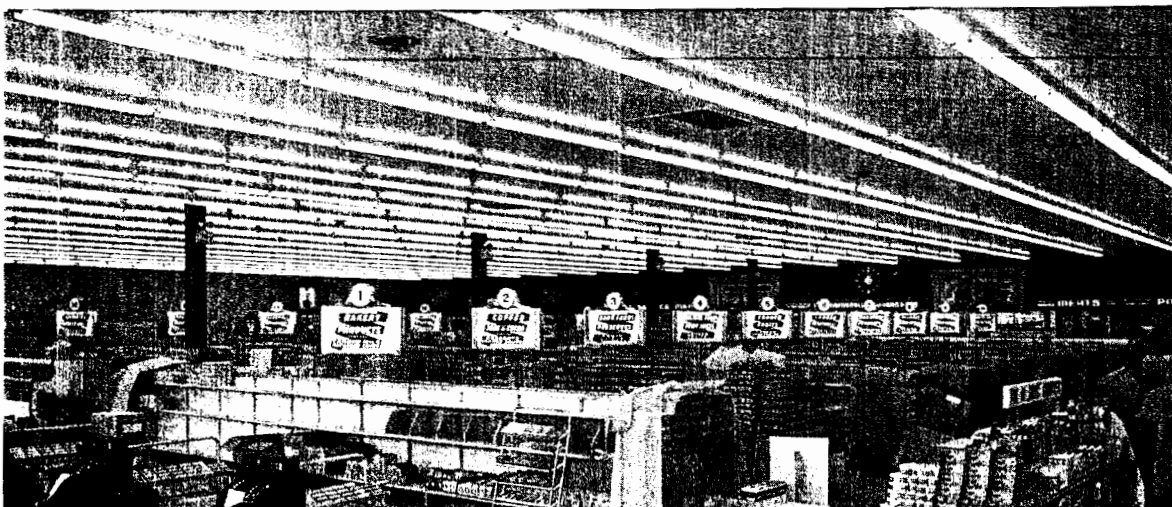


PANEL LENGTHS

Joist Depth D in.	Exterior "E"		Interior "P"
	Minimum	Maximum	
18	1'- 7"	2'-10"	2'-6"
20	1'- 9 1/4"	3'- 1 3/4"	2'-9"
24	2'- 1 3/4"	3'- 9 1/4"	3'-8"
28	2'- 6 1/4"	4'- 4 3/4"	3'-9"
32	2'-10 3/4"	5'- 0 1/4"	4'-3"
36	3'- 3 1/4"	5'- 7 3/4"	4'-9"
40	3'- 7 3/4"	6'- 3 1/4"	5'-3"
44	4'- 0 1/4"	6'-10 3/4"	5'-9"
48	4'- 4 3/4"	7'- 6 1/4"	6'-3"

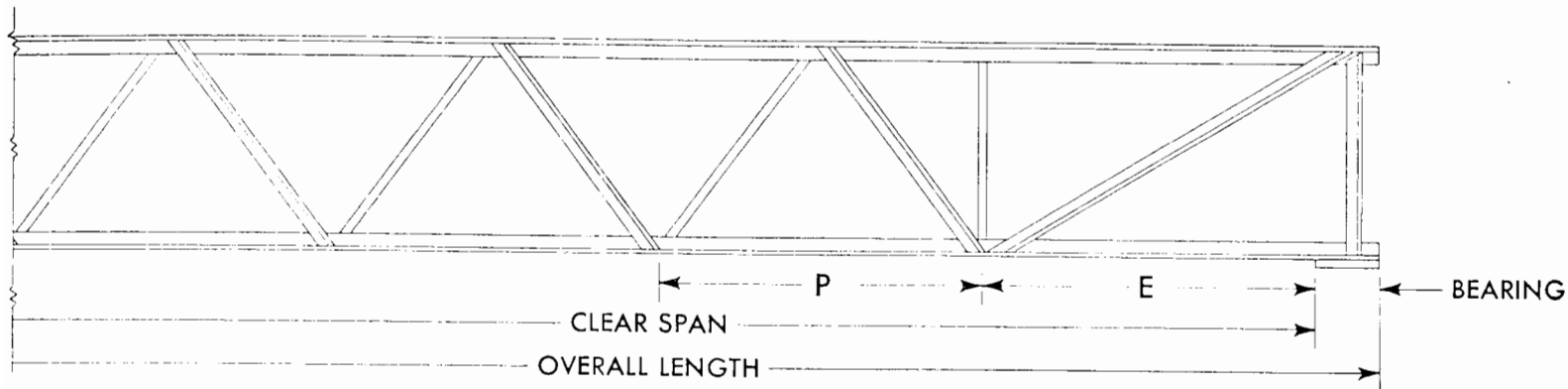


Dining room of the Oberlin Inn, Oberlin, Ohio. Architect: Eldredge Snyder, New York City; general contractor: Knowlton Construction Co., Bellefontaine, Ohio.
(below) Best Supermarket, Philadelphia. Architect: Joseph Margolis, Philadelphia.



BETHLEHEM LONGSPAN JOISTS

BOTTOM BEARING



PROPERTIES OF CHORDS

Joist Section Number	TOP CHORD									BOTTOM CHORD				A + B in.
	2 Angles in.	Wt Ft lb	Area in. ²	r _x in.	r _y in.	Axis x-x*		A in.	W (min) in.	2 Angles in.	Wt/Ft lb	Area in. ²	B in.	
						S _x in. ³	S _y in. ³							
L02	2 x 1½ x ¾	4.24	1.24	.63	.88	.78	.36	.64	3¾	1½ x 1½ x ¾	3.60	1.06	.44	1.08
L03	2 x 2 x ¾	4.88	1.42	.62	1.15	.95	.38	.57	4¾	1½ x 1½ x ¾	3.60	1.06	.44	1.01
L04	2½ x 2 x ¾	5.50	1.62	.79	1.10	1.34	.58	.76	4¾	2 x 1½ x ¾	4.24	1.24	.39	1.15
L05	2 x 2 x ¼	6.38	1.88	.61	1.19	1.19	.50	.59	4¾	2 x 2 x ¾	4.88	1.42	.57	1.16
L06	2½ x 2 x ¼	7.24	2.12	.78	1.14	1.64	.76	.79	4¾	2½ x 2 x ¾	5.50	1.62	.51	1.30
L07	2½ x 2½ x ¼	8.20	2.38	.77	1.44	1.95	.78	.72	6	2½ x 2½ x ¾	6.14	1.80	.69	1.41
L08	3 x 2½ x ¼	9.00	2.62	.95	1.38	2.64	1.12	.91	6	2½ x 2 x ¼	7.24	2.12	.54	1.45
L09	3 x 3 x ¼	9.80	2.88	.93	1.57	2.86	1.16	.84	6¾	2½ x 2½ x ¼	8.20	2.38	.72	1.56
L10	3½ x 3 x ¼	10.80	3.12	1.11	1.53	3.65	1.56	1.04	6¾	3 x 2½ x ¼	9.00	2.62	.66	1.70
L11	3 x 3 x ⅝	12.20	3.56	.92	1.60	3.45	1.42	.87	6¾	3 x 3 x ¼	9.80	2.88	.84	1.71
L12	3½ x 3 x ⅝	13.20	3.86	1.10	1.54	4.34	1.90	1.06	6¾	3½ x 3 x ¼	10.80	3.12	.79	1.85
L13	3½ x 3 x ¾	15.80	4.60	1.09	1.56	5.00	2.20	1.08	6¾	3 x 3 x ⅝	12.20	3.56	.87	1.95
L14	4 x 3 x ¾	17.00	4.96	1.26	1.50	6.25	3.00	1.28	6¾	3½ x 3 x ⅝	13.20	3.86	.81	2.09
L15	4 x 4 x ¾	19.60	5.72	1.23	2.00	7.72	3.00	1.14	8¾	3½ x 3½ x ⅝	14.40	4.18	.99	2.13
L16	4 x 4 x ⅞	22.60	6.62	1.23	2.02	8.62	3.60	1.16	8¾	3½ x 3½ x ¾	17.00	4.96	1.01	2.17
L17	4 x 4 x 1½	25.60	7.50	1.22	2.03	9.50	4.00	1.18	8¾	4 x 4 x ¾	19.60	5.72	1.14	2.32
L18	5 x 5 x ⅞	28.60	8.36	1.55	2.41	14.20	5.60	1.41	10¾	4 x 4 x ⅞	22.60	6.62	1.16	2.57
L19	5 x 5 x 1½	32.40	9.50	1.54	2.42	15.80	6.40	1.43	11	4 x 4 x 1½	25.60	7.50	1.18	2.61

* S_L —Maximum section modulus for computing bending stress at mid-panel.

S_s —Minimum section modulus for computing bending stress at panel point.

NOTE: In top chord, long legs of angles are vertical.

In bottom chord, long legs of angles are horizontal.

CONSTRUCTION ACCESSORIES FOR

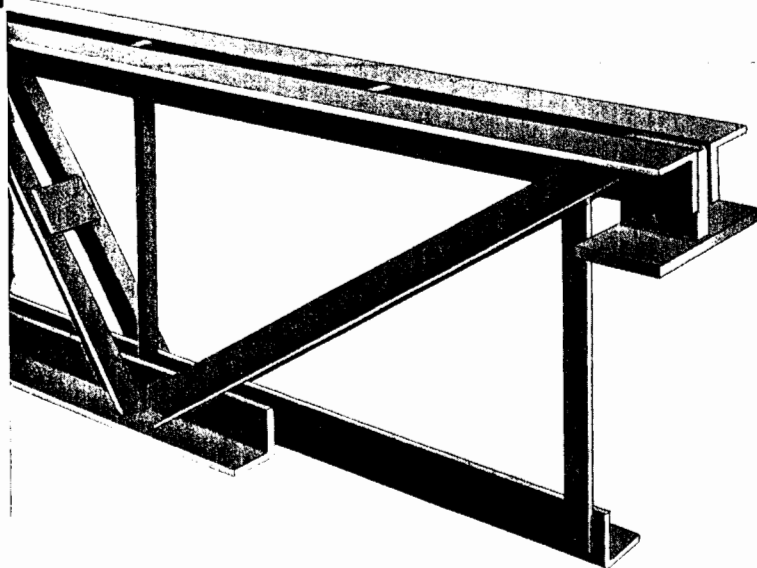


▲ RIGID BRIDGING

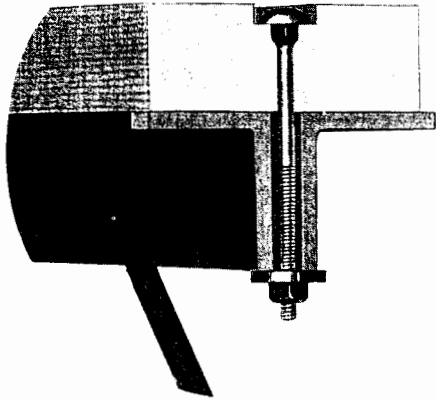
Strut bridging or cross-bracing for Bethlehem Longspan Joists is made of hot-rolled angles, $1\frac{1}{4}$ -in. x $1\frac{1}{4}$ -in. x $\frac{1}{8}$ -in. or larger, depending on the joist spacing. This bracing is bolted to plates which are welded to the chords of the joists.

◀ CEILING EXTENSION RODS

When contact ceilings are required with the top-bearing Longspan Joist, ceiling extension rods are needed. These consist of an angle section extended beyond the end of the lower chord, stayed by a flat bar shop-welded in position.

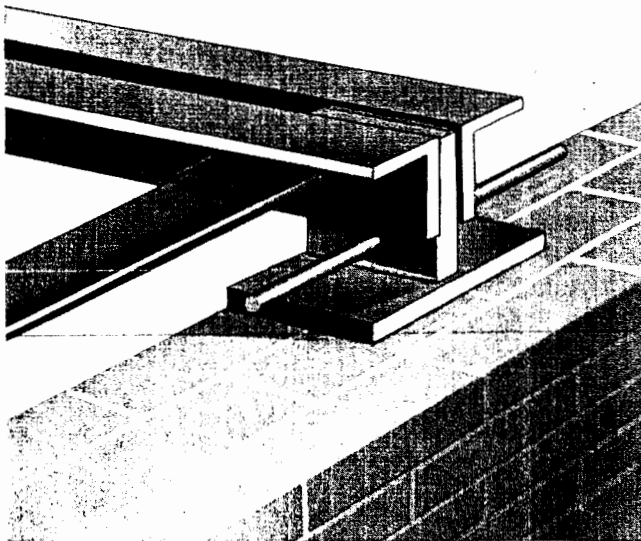


BETHLEHEM LONGSPAN JOISTS



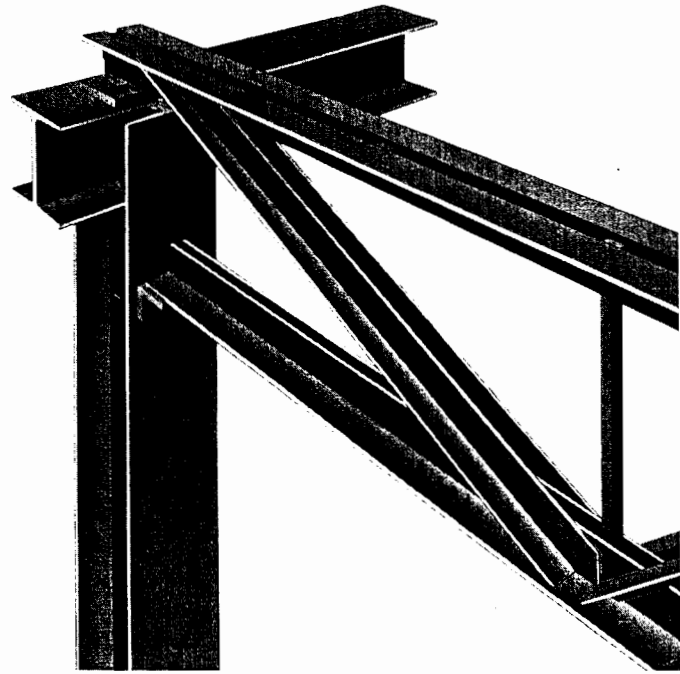
NAILER ATTACHMENTS

Wherever construction calls for a nailing surface along the top chord of a Longspan Joist, wood nailers may be attached in the field. Nailers of the required size are fastened to the top chord with $\frac{1}{2}$ -in. carriage bolts placed between the chord angles.



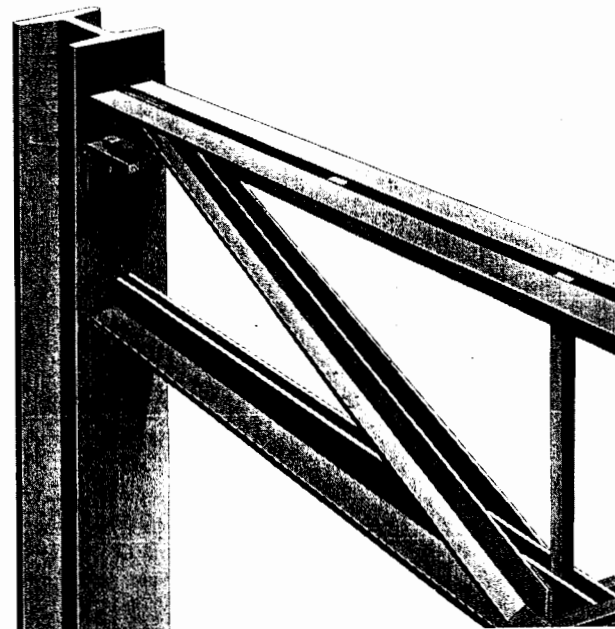
MASONRY WALL ANCHORS

The method of anchoring Longspan Joists to masonry or concrete walls is similar to that used with standard open-web joists. An anchor consisting of a $\frac{3}{4}$ -in. bar 12 in. long is inserted through the web at end of the joist and built into the masonry wall.



WELDED OR BOLTED CONNECTIONS

Where Longspan Joists are supported on steel they may be connected by either bolting or welding. When bolts are used, round or slotted holes are provided in the bearing ends of the joists. Where welding is specified, welds 2 in. long, one on each side of the joist bearing end, are recommended. Column connections are made by bolting the top bearing plate to shelf angle and field welding extended lower chord to connection angle.



STANDARD LOADING TABLE FOR

Adopted by the Steel Joist Institute, April 28, 1953. Effective April 28, 1953.

The following table gives the TOTAL safe uniformly distributed load-carrying capacities of Longspan Joists in pounds per linear foot of span.

This load table applies to Longspan Joists with either parallel chords or standard pitched top chords.

The carrying capacities of Longspan Joists with top chords pitched are determined by the nominal depth of the Longspan Joist at the center of the span.

Standard pitch is $\frac{1}{8}$ in. per ft. If pitch exceeds this standard, the load table does not apply and special design and fabrication are necessary.

Joist Designation	Depth in.	Approx* Weight Per Ft. lb	Maximum End Reaction lb	CLEAR SPAN IN FEET															
				2 5	2 6	2 7	2 8	2 9	3 0	3 1	3 2	3 3	3 4	3 5	3 6				
18L02	18	13	3,632	283	267	251	237	224	211	200	190	180	171	163	155				
18L03	18	14	4,094	319	300	283	267	253	239	227	215	204	194	185	176				
18L04	18	16	4,941	385	361	339	319	301	284	268	254	241	229	217	207				
18L05	18	17	5,364	418	394	372	351	331	313	298	282	268	254	242	231				
18L06	18	19	6,417	500	469	440	414	391	369	349	330	313	297	282	268				
18L07	18	21	6,880	536	516	486	458	432	408	386	365	346	329	313	296				
18L08	18	23	7,462	583	561	541	522	491	463	437	414	392	371	352	335				
18L09	18	25	7,697	600	577	556	537	519	502	474	449	425	403	383	364				
18L10	18	27	8,265	644	620	597	577	557	539	522	493	466	442	419	398				
18L11	18	29	8,753	682	656	633	611	590	571	553	536	520	493	469	445				
18L12	18	31	9,166	714	687	663	639	618	598	579	561	544	529	514	488				
				2 5	2 6	2 7	2 8	2 9	3 0	3 1	3 2	3 3	3 4	3 5	3 6	3 7	3 8	3 9	4 0
20L03	20	14	4,235	330	312	296	280	266	252	240	228	217	207	197	188	180	172	164	157
20L04	20	16	5,185	404	381	360	340	320	304	288	273	259	247	235	224	213	204	194	186
20L05	20	17	5,557	433	409	387	367	348	331	314	299	285	271	259	247	236	226	216	207
20L06	20	19	6,763	527	496	467	441	417	395	374	355	337	320	305	290	277	264	252	241
20L07	20	21	7,110	554	533	514	486	459	435	412	391	372	354	337	321	306	292	279	267
20L08	20	23	7,832	610	587	566	546	528	499	472	447	425	403	383	365	348	332	317	303
20L09	20	25	8,107	632	608	586	566	547	529	512	485	460	437	416	396	377	360	344	329
20L10	20	27	8,568	668	643	619	598	578	559	541	525	509	483	459	436	415	396	378	361
20L11	20	29	9,095	709	682	657	634	613	593	574	557	540	525	510	485	462	441	421	403
20L12	20	31	9,605	748	720	694	670	647	626	607	588	571	554	539	524	510	486	463	442
20L13	20	36	10,533	821	790	761	735	710	687	665	645	626	608	591	575	559	545	531	518
				3 3	3 4	3 5	3 6	3 7	3 8	3 9	4 0	4 1	4 2	4 3	4 4	4 5	4 6	4 7	4 8
24L04	24	16	4,798	285	272	260	249	238	228	219	210	201	193	186	179	172	166	160	154
24L05	24	17	5,117	304	292	279	268	257	247	237	228	219	211	203	196	189	182	175	169
24L06	24	19	6,245	371	354	339	324	310	297	284	273	262	251	242	232	224	215	207	200
24L07	24	21	6,868	408	390	373	357	342	328	314	301	289	278	267	257	248	238	230	222
24L08	24	23	7,996	475	453	432	412	394	377	361	346	332	318	306	294	283	272	262	252
24L09	24	25	8,652	514	490	468	447	427	409	391	375	360	345	331	319	306	295	284	274
24L10	24	27	9,345	555	539	524	500	477	456	436	417	400	383	368	353	339	326	314	302
24L11	24	29	9,686	575	559	543	528	514	501	480	460	441	424	407	391	376	362	349	336
24L12	24	31	10,431	619	601	585	569	554	539	526	513	491	471	452	434	417	401	386	371
24L13	24	36	11,479	682	662	644	626	610	594	579	565	551	538	526	514	494	475	457	440
24L14	24	38	12,087	718	697	678	659	642	625	609	594	580	567	554	541	529	518	496	476
				4 1	4 2	4 3	4 4	4 5	4 6	4 7	4 8	4 9	5 0	5 1	5 2	5 3	5 4	5 5	5 6
28L06	28	19	5,875	282	272	262	253	244	235	227	220	212	205	199	192	186	180	175	170
28L07	28	21	6,479	311	300	289	279	269	260	251	243	235	227	220	213	206	200	194	188
28L08	28	23	7,542	362	348	335	323	312	300	290	280	270	261	252	244	236	229	221	215
28L09	28	25	8,167	392	377	363	350	337	325	314	303	293	283	274	265	256	248	240	233
28L10	28	27	9,208	442	425	408	393	378	365	351	339	327	316	305	295	285	276	267	259
28L11	28	29	10,000	480	463	445	429	414	399	385	372	359	347	336	325	314	304	295	286
28L12	28	31	10,960	526	514	502	483	465	448	432	417	402	388	375	363	351	339	328	318
28L13	28	36	12,202	586	572	559	546	534	523	512	494	477	460	445	430	415	402	389	377
28L14	28	38	12,793	614	600	586	573	561	549	537	526	515	505	488	471	455	440	426	412
28L15	28	43	13,443	645	630	616	602	589	576	564	552	541	531	520	510	501	482	465	499

*To be used for designing purposes only.

LONGSPAN STEEL JOISTS

Joist Designation	Depth in.	Approx* Weight Per Ft lb	Maximum End Reaction lb	CLEAR SPAN IN FEET															
				4 9	5 0	5 1	5 2	5 3	5 4	5 5	5 6	5 7	5 8	5 9	6 0	6 1	6 2	6 3	6 4
32L07	32	21	6,159	248	240	233	226	220	213	207	201	196	190	185	180	175	171	166	162
32L08	32	23	7,177	289	280	271	263	256	248	241	234	227	220	214	208	202	197	191	186
32L09	32	25	7,798	314	304	295	285	277	269	260	253	246	239	232	225	219	213	207	202
32L10	32	27	8,791	354	343	332	321	311	302	292	283	275	267	259	252	245	238	231	225
32L11	32	29	9,586	386	374	362	351	340	330	321	311	302	294	285	277	270	262	255	249
32L12	32	31	10,827	436	422	409	396	383	371	360	349	339	329	319	310	301	293	285	277
32L13	32	36	12,667	510	500	485	469	453	440	427	414	401	390	378	367	357	347	338	328
32L14	32	38	13,470	543	532	522	512	502	486	471	457	443	429	417	404	393	382	371	360
32L15	32	43	14,445	582	570	559	549	538	528	519	510	501	484	468	452	438	424	411	398
32L16	32	48	15,729	633	621	609	597	586	575	565	555	546	536	527	519	510	502	487	472
				5 7	5 8	5 9	6 0	6 1	6 2	6 3	6 4	6 5	6 6	6 7	6 8	6 9	7 0	7 1	7 2
36L08	36	23	6,920	240	234	227	221	216	210	205	199	194	189	185	180	176	172	167	164
36L09	36	25	7,497	260	253	246	240	233	227	221	216	210	205	200	195	191	186	182	177
36L10	36	27	8,506	295	287	279	271	264	257	250	243	237	231	225	219	214	209	204	199
36L11	36	29	9,198	319	310	302	294	286	279	272	265	258	252	246	240	234	228	223	218
36L12	36	31	10,467	363	352	343	333	324	316	307	299	291	284	277	270	263	257	250	244
36L13	36	36	12,398	430	418	406	395	384	374	364	355	346	337	328	320	312	304	297	290
36L14	36	38	13,782	478	464	451	438	426	414	403	392	382	372	362	353	344	336	327	319
36L15	36	43	15,275	530	521	512	497	484	471	458	446	434	423	412	400	389	378	368	357
36L16	36	48	16,482	572	562	552	543	535	526	518	510	502	489	476	464	453	442	431	420
36L17	36	54	17,765	616	606	595	586	576	567	558	549	541	533	525	517	510	497	485	473
				6 5	6 6	6 7	6 8	6 9	7 0	7 1	7 2	7 3	7 4	7 5	7 6	7 7	7 8	7 9	8 0
40L09	40	25	7,223	220	215	210	205	200	196	191	187	183	179	175	171	168	164	161	157
40L10	40	27	8,208	250	244	238	233	227	222	217	212	207	202	198	193	189	185	181	177
40L11	40	29	8,865	270	264	258	252	246	241	235	230	225	220	215	211	206	202	198	193
40L12	40	31	10,113	308	301	294	287	280	273	267	261	255	249	243	233	233	228	223	218
40L13	40	36	12,017	366	357	348	340	332	324	316	309	302	295	289	282	276	270	264	259
40L14	40	38	13,396	408	397	387	378	369	360	351	343	335	327	320	312	305	299	292	286
40L15	40	43	15,136	461	450	439	428	418	408	399	389	380	372	363	355	347	341	332	324
40L16	40	48	17,187	523	516	508	495	483	472	461	450	440	430	420	410	401	392	384	376
40L17	40	54	18,421	561	553	545	537	529	521	514	507	495	484	473	463	452	442	433	423
40L18	40	61	19,981	609	599	591	582	574	566	558	550	542	535	528	521	515	508	496	485
				7 3	7 4	7 5	7 6	7 7	7 8	7 9	8 0	8 1	8 2	8 3	8 4	8 5	8 6	8 7	8 8
44L10	44	27	7,993	217	212	208	203	199	195	191	187	183	179	176	172	169	165	162	159
44L11	44	29	8,582	233	228	224	219	215	210	206	202	198	194	191	187	183	180	177	173
44L12	44	31	9,835	267	261	256	250	245	240	235	230	225	221	216	212	208	204	200	196
44L13	44	36	11,639	316	310	303	297	290	284	278	273	267	262	257	251	246	242	237	232
44L14	44	38	13,039	354	346	338	331	324	317	310	304	297	291	285	279	274	268	263	258
44L15	44	43	14,733	400	392	383	375	367	359	352	344	337	330	324	317	311	305	299	293
44L16	44	48	17,054	463	453	443	434	424	415	407	398	390	382	374	367	360	352	345	339
44L17	44	54	19,040	517	510	499	489	478	468	458	449	439	430	422	413	405	397	389	382
44L18	44	61	20,743	563	556	548	541	534	527	521	514	508	497	487	477	467	457	448	439
44L19	44	68	22,311	606	598	590	582	575	567	560	553	546	540	533	527	521	515	509	498
				8 1	8 2	8 3	8 4	8 5	8 6	8 7	8 8	8 9	9 0	9 1	9 2	9 3	9 4	9 5	9 6
48L11	48	29	8,330	204	200	197	193	189	186	183	179	176	173	170	167	164	162	159	156
48L12	48	31	9,596	235	230	226	221	217	213	209	205	201	198	194	191	187	184	181	178
48L13	48	36	11,352	278	273	268	262	257	253	248	243	239	234	230	226	222	218	214	211
48L14	48	38	12,740	312	305	299	294	288	282	277	272	266	261	257	252	247	243	238	234
48L15	48	43	14,373	352	345	338	332	326	319	313	308	302	296	291	285	280	275	270	266
48L16	48	48	16,660	408	400	392	384	377	370	363	356	349	343	337	331	325	319	313	308
48L17	48	54	18,743	459	450	441	433	425	416	409	401	394	386	379	372	366	359	353	346
48L18	48	61	21,336	523	516	510	504	494	485	475	466	457	448	440	432	424	416	408	401
48L19	48	68	23,029	564	557	550	544	538	531	525	519	514	508	498	489	480	471	462	454

Note: Total safe loads consist of live load and dead load including weight of Longspan, uniformly distributed along the top chord. When otherwise loaded, Longspans must be investigated. The top chord is considered as stayed laterally by floor slab or roof deck. When holes are punched in governing members, the safe load must be reduced accordingly.

Spans shown to the right of the heavy vertical line in the table should be used for roof construction only. Loads shown below heavy lines are limited by end reaction.

*To be used for designing purposes only.

SPECIFICATIONS

LONGSPAN OPEN-WEB STEEL JOIST CONSTRUCTION

Adopted by the Steel Joist Institute, April 28, 1953. Effective April 28, 1953.

Section 1. SCOPE—(a) These specifications cover the design and use of Longspan Series Open-Web Joists in any structure to be erected under the provisions of these specifications.

(b) Longspan Steel Joist construction as governed by these specifications shall be that type of construction where decks and top slabs are supported directly by separate steel members herein referred to as Longspan Steel Joists. The span and spacing of Longspan Steel Joists shall be as defined in Section 6 of these specifications.

Section 2. DEFINITION OF LONGSPAN STEEL JOISTS—

(a) The term Longspan Steel Joist as used herein refers to relatively lightweight steel trusses having substantially parallel chords and designed for the direct support of floors, roof slabs and decks, between walls, beams and main structural trusses at spans and spacings specified in Section 6.

(b) This specification shall not be construed to cover steel joists or steel joist construction as defined by the Standard Specifications for Open-Web Steel Joist Construction of the Steel Joist Institute.

Section 3. MATERIALS—(a) The steel used shall conform to the American Society for Testing Materials Standard Specifications for Steel for Bridges and Buildings, Designation A7 of latest adoption.

(b) All Longspan Steel Joists shall receive one coat of rust-inhibitive paint before leaving the manufacturer's shop.

(c) Top and bottom chords of Longspan Steel Joists shall be composed of angles or other shapes. Web members shall consist of angles, bars, or other shapes.

Section 4. CONNECTIONS—(a) All joints of Longspan Steel Joists shall be made by welding, bolting, riveting or other approved methods. Connections at ends of members shall be proportioned to develop the actual design stress but not less than 50 pct of the allowable design strength of the members.

Section 5. DESIGN AND STRESSES—(a) Except as otherwise specified herein, Longspan Steel Joists shall be designed as structural trusses in accordance with the American Institute of Steel Construction "Specifications for Design, Fabrication and Erection of Structural Steel for Buildings."

(b) The top chords shall be designed as continuous members subject to direct and bending stresses. The allowable bending stress at mid-panels and at panel points shall be 20,000 psi and 24,000 psi respectively.

(c) The unsupported length of top chord for the purpose of computing the permissible axial compressive stress at mid-panel and at panel point shall be considered equal to the panel length and half the panel length respectively.

(d) The method of attachment of floors or roof decks and slabs shall be adequate to support the top chords laterally.

Section 6. SPAN AND SPACING—(a) The clear span of Longspan Steel Joists shall not exceed twenty-four times the depth for roofs or twenty times the depth for floors.

(b) Where Longspan Steel Joists rest on masonry walls, it is recommended that the clear span be limited to 80 ft 0 in. and that the masonry walls be adequately designed with respect to height, thickness and spacing of pilasters.

(c) The spacing of the Longspan Steel Joists shall not exceed the safe span of the floor slab or roof deck.

Section 7. APPROXIMATE CAMBER—(a) All Longspan Steel Joists shall have approximate cambers in accordance with the following:

Top Chord Length	Camber	Top Chord Length	Camber
30'-0"	$\frac{3}{8}$ "	70'-0"	$2\frac{1}{8}$ "
40'-0"	$\frac{5}{8}$ "	80'-0"	$2\frac{3}{4}$ "
50'-0"	$1\frac{1}{8}$ "	90'-0"	$3\frac{1}{2}$ "
60'-0"	$1\frac{1}{2}$ "	96'-0"	4"

Section 8. BEARING AND ANCHORAGE—(a) Where Longspan Steel Joists are supported by masonry or concrete walls, the joists shall be anchored by a $\frac{3}{4}$ -in. round bar anchor not less than 12 in. long or other equivalent method. Where Longspan Steel Joists rest on steel beams or steel trusses they shall be connected with not less than two $\frac{3}{4}$ -in. bolts or welds of equal strength.

(b) The ends of Longspan Joists shall bear not less than 6 in. on masonry or concrete and not less than 4 in. on steel. The bearing areas shall be such that the average bearing pressure does not exceed 250 psi on brick or stone masonry and 600 psi on poured concrete.

Section 9. BRIDGING—Bridging shall consist of a cross-bracing with l/r ratio of not more than 200 where "l" is the distance in inches between connections and "r" is the least radius of gyration of the bracing member. Where cross-bracing members are connected at their point of intersection, the "l" distance shall be taken as the distance in inches between connections at the point of intersection of the bracing members and the connection to the chord of the Longspan Joist.

The maximum spacing of lines of bridging for the different joist types shall not exceed the values tabulated below:

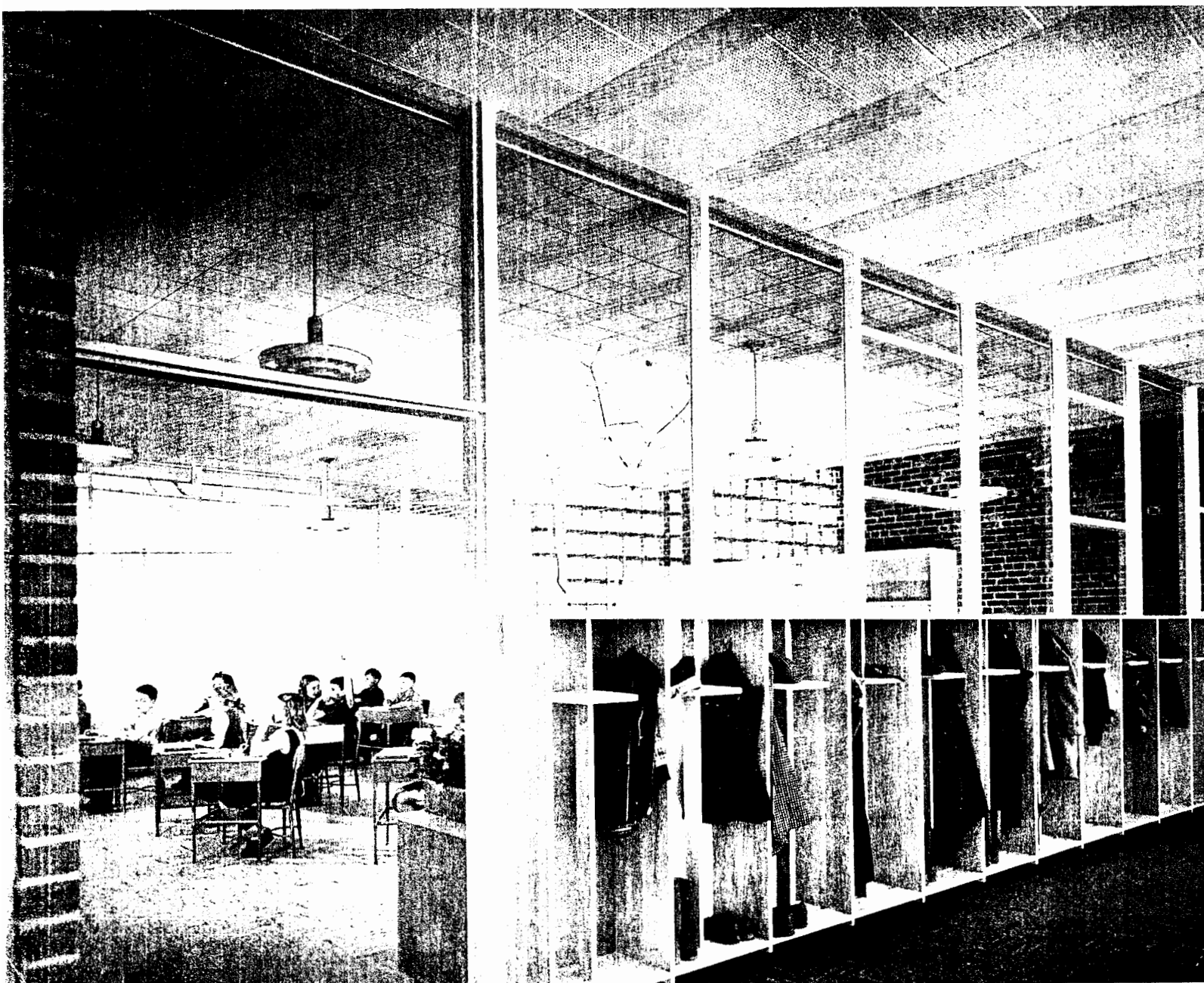
Joist Type	Maximum Spacing of Lines of Bridging
No. 2 to No. 8 incl.	10'-0"
No. 9 to No. 16 incl.	12'-0"
No. 17 to No. 19 incl.	16'-0"

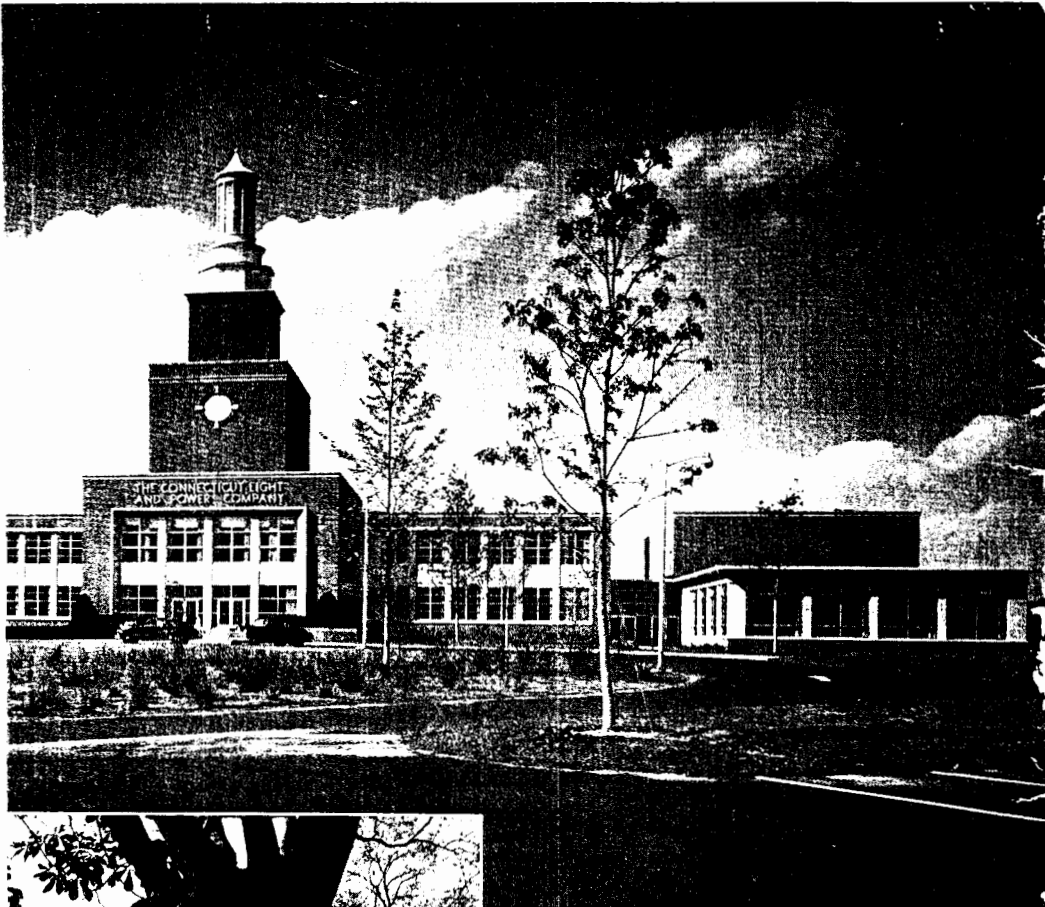
Section 10. INSPECTION—(a) All Longspan Joists shall be thoroughly inspected before shipment to make certain that materials and workmanship conform to the requirements of these specifications.

Section 11. ERECTION—(a) Longspan Steel Joists shall be unloaded from shipping facilities, erected and hoisted into place by hooking to the top chord of joists at approximately the third points. Hoisting facilities shall not be released during erection procedure until the line of bridging nearest mid-span is installed, and in the case of bottom chord bearing Longspan Joists, the ends of the top chords shall be restrained laterally. Care shall be exercised at all times to avoid damage through careless handling. As soon as Longspan Joists are erected they shall be permanently fastened in place and all bridging completely installed before the application of loads.

Bethlehem Open-Web Steel Joists were used in the roof construction of the Palisades Joint High School in Bucks County, Pa. Architect: H. F. Everett and Associates, Allentown, Pa.; contractor: William P. Doall, Bangor, Pa.

(below) Planning of non-bearing walls is simplified when the roof contains Bethlehem Joists, as in the Holmes Elementary School, Darien, Conn. Architects: Ketchum, Gina & Sharp, New York City; general contractor: Sam Grasso Co., Inc., Darien, Conn.





Connecticut Light and Power Co.'s administration building on Wilbur Cross Parkway at Berlin, Conn., contains Bethlehem Longspan Steel Joists. Architect: Douglas Orr, New Haven; general contractor: W. J. Megin, Inc., Naugatuck, Conn.

Bethlehem Shortspan Joists were used in the floor structures of The Texas Company's Buffalo, N. Y., office building. Architect: Duane Lyman and Associates; general contractor: George W. Walker and Sons, Inc. Both are Buffalo firms.

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