



# Council of American Building Officials

INTERNATIONAL CONFERENCE  
OF BUILDING OFFICIALS

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SOUTHERN BUILDING CODE  
CONGRESS INTERNATIONAL, INC.

900 Montclair Road  
Birmingham, Alabama 35213

Report No. NER-148

Printed July, 1988

THIS REPORT IS SUBJECT TO  
RE-EXAMINATION IN ONE YEAR

## NATIONAL EVALUATION SERVICE COMMITTEE

TJL™, TJH™, TJM™, TJW™, TJ/50™ and TJ/60™ OPEN  
WEB TRUSS SERIES

TRUS JOIST CORPORATION  
9777 WEST CHINDEN BOULEVARD  
P.O. BOX 60  
BOISE, IDAHO 83707

I. **Subject:** TJL, TJH, TJM, TJW, TJ/50 and TJ/60 Open  
Web Truss Series.\*

II. **Properties for Which Evaluation is Sought:**

1. Structural Members
2. Fireresistance Rating

III. **Description:** A. **General:** The trusses are Warren web  
trusses with structural wood chords, steel tube web members  
and steel pinned connections.

**Wood Chords:** The wood chords are MICRO=LAM®\*\*  
laminated veneer lumber or stress-graded structural lumber  
as set forth in the applicable building code, or machine-  
stress-rated structural lumber visually graded as set forth in  
the TRUS JOIST™\* Open Web Product Grading Rules and  
identified by one of the following grade symbols: A(1.8E),  
AA(2.0E), AAA(2.2E), 2100f 1.8E, 2400f 2.0E or 2700f 2.2E.  
Cutting a board into shorter lengths with loss of the grading  
symbol requires that the symbol be reproduced with a  
crayon on the unmarked board. Additional restrictions are  
imposed on the stress-graded lumber, and strength-reducing  
characteristics are not allowed at finger joints or drilled  
areas in tension members of all truss series and compression  
members of the TJH open web truss and TJM open web  
truss series. Knots, holes or any equivalent combination up  
to 3/4 inch in the wide face are permitted in the drilled areas of  
the TJL and TJW open web truss compression chords.

**Wood Chord Design:** Wood chords are designed in accord-  
ance with recognized engineering principles. Allowable  
unit stresses for machine-stress-rated lumber and MICRO=  
LAM laminated veneer lumber shall be as set forth in Table  
No. IV.

\* TJL, TJH, TJM, TJW, TJ/50, TJ/60 and Trus Joist are  
trademarks of Trus Joist Corporation, Boise, Idaho.

\*\* MICRO=LAM is a registered trademark of Trus Joist  
Corporation, Boise, Idaho.

**Steel Tube Web Members:** The steel tube web members are  
made from cold-rolled electrically welded steel tubing of  
various diameters and wall thicknesses as required for spe-  
cific installations. Allowable load values are given in Table  
No. I. The tubing is fabricated from flat-rolled carbon sheets  
of structural steel having a minimum yield point of 45,000  
pounds per square inch. The web members' ends are  
swedged flat and contain holes punched for the pins by die  
stamping. Bearing details shall be in accordance with Figure  
No. 2.

**B. TJL Open Web Truss: General:** The TJL open web trusses  
are fabricated with either parallel chords, double-pitched  
top chord profile or tapered top profile and range from 12"  
to 48" deep. They are spaced up to 48" on center with  
sheathing materials nailed directly to the top chord. Ceilings  
may be directly attached to the bottom chord or applied to  
stripping or suspended. The wood chords are single nominal  
2" by 4" members installed in a flat position.

The chords are routed on the wide face to accommodate the  
pin connections. The drilled holes are equal in diameter to  
the net sizes of the pins to provide a drive fit. The web  
members are inserted in the routed portion of the chord and  
pins inserted through the drilled holes to engage the web  
members.

**Connecting Pins:** The web members are connected to the  
chords with 3/8" solid pins made from ASTM A 449 bolt  
stock heat treated or 5/8" pins made from ASTM A 194 Grade  
8 bolt stock.

**C. TJH Open Web Truss: General:** The TJH open web truss  
is similar to the TJL open web truss. It is composed of two 2"  
by 6" members for the bottom chord and two 2" by 6"  
members for the top chord. The two 2" by 6" members are in  
an upright position with their wide axis in the plane of the  
truss.

**Connecting Pins:** The web members are connected to the  
chords with 1/4" outside diameter .165-inch wall tubing  
(tensile strength of 60,000 psi minimum) or 3/4" solid pins  
made from ASTM A 307 bolt stock, held in place by spring  
clip washers.

**D. TJM Open Web Truss: General:** The TJM open web truss  
is similar to the TJH open web truss, except that the top and

*This report is limited to the specific product and data and test reports submitted by the applicant in its application requesting this report. No independent tests were performed by the National Evaluation Service Committee and the committee specifically does not make any warranty, either expressed or implied, as to any finding or other matter in this report or as to any product covered by this report. This disclaimer includes, but is not limited to, merchantability. This report is also subject to the limitations listed herein.*

bottom chords each consist of two upright 2" by 4" members and the solid steel pins are  $\frac{3}{8}$ " and 1" diameter.

**E. TJW Open Web Truss: General:** The TJW open web truss is similar to the TJJ open web truss. The chords consist of single members (see Table No. III for chord section properties). The solid steel pins are  $\frac{3}{8}$ " and  $\frac{1}{2}$ " diameter.

**F. TJ/50 Open Web Truss and TJ/60 Open Web Truss: General:** The TJ/50 and TJ/60 open web trusses are composed of double top and bottom chord members. Refer to Table No. III for chord section properties. The webs are connected to the chords with solid steel pins,  $\frac{5}{8}$ " and  $\frac{3}{8}$ " diameter for the TJ/50 open web truss and  $\frac{3}{4}$ " and  $\frac{1}{2}$ " diameter for the TJ/60 open web truss. All pins are solid, made from ASTM A 307 or ASTM A 449 bolt stock.

The wood chords are MICRO=LAM laminated veneer lumber, each chord consisting of two members side by side with the steel web inserted between them. Each member has the glue lines vertical. The tension chords are continuous length. The compression chord may contain finger joints.

**G. Tension Connector: General:** The tension connector is a variable density laminated veneer component designed to splice wood truss structural members used in tension. Densification is obtained by adding pieces of veneer in the area where greater density is required. The entire specimen is then compressed under heat and pressure to the desired thickness. The nondensified portion is connected to solid sawn members by means of approved finger joints. Densified portions of the assembly are spliced with steel plates installed on either side of the wood member and connected with bolts. See Figure No. 4 for additional details.

**Design:** The MICRO=LAM densified laminated veneer lumber tension connector is designed as follows:

Bolt bearing in wood	7200 lb. per sq. in.
Tension in densified net area	2700 lb. per sq. in.
Tension in nondensified area	1970 lb. per sq. in.
The bolt end distance $e$ shall not be less than $4d$ or	

$$e = P/1200(t)$$

whichever is greater. Where  $t$  = thickness of connector measured along the bolt,  $P$  = load per bolt and  $d$  = diameter of bolt. Steel side plates and bolts shall be designed according to the applicable building code.

**H. Design:** Open web trusses are designed in accordance with recognized design criteria. Allowable load on web members, allowable wood bearing loads on pins, chord section properties at pin locations, allowable unit stresses and allowable reactions are set forth in Table Nos. I, II, III, IV and V respectively.

The allowable tension and compression parallel to the grain unit stresses noted in Table No. IV may be increased 7 percent for southern pine and 4 percent for MICRO=LAM, provided the trusses qualify as repetitive members as defined in the applicable building code.

All two-member chord open web trusses must have lateral support to each member of the compression chord at least every 24 inches.

Each connection shall be capable of transmitting a 75-pound horizontal load. Other nailing criteria are described in Figure No. 1.

**I. One-Hour Fire Resistance Rated Floor/Roof/Ceiling Assemblies are Assigned to the Following Constructions: Descriptive details for each assembly are noted below and in Figure No. 5:** 1. A double-wood floor consisting of either of the following: (a) subfloor of 1" nominal sheathing, a layer of asbestos paper weighing not less than 14 pounds per 100 square feet and a layer of 1" nominal tongue-and-groove finish flooring, or (b) subfloor of 1" nominal tongue-and-groove sheathing or  $\frac{1}{2}$ " interior plywood with exterior glue, and a layer of either minimum 1" nominal tongue-and-groove finish flooring,  $\frac{3}{8}$ " thick interior-type plywood finish flooring or a layer of  $\frac{3}{8}$ " thick Type 1 Grade 1-M-1 particle-board. The flooring shall be applied to trusses spaced a maximum of 48 inches on center.

The ceiling construction must consist of a suspended ceiling of  $\frac{5}{8}$ " thick, 2' by 2' USG FIRECODE AURATONE® lay-in acoustical board, supported by an approved exposed fire-rated suspension system, attached to the bottom flange of the trusses with cold-rolled channels spaced not over 4' on center. Installed above the acoustical board are 1" thick 4-pounds-per-cubic-foot (minimum) USG THERMA-FIBER® mineral wool blankets. Light fixtures having a maximum size of 2' by 4' may be installed in the ceiling, provided the aggregate areas of fixtures do not exceed 12 square feet per 100 square feet of ceiling and the fixtures are protected by a 2 $\frac{1}{4}$ " by 48" piece of USG THERMAFIBER® laid along the long dimensions each side of the fixture and against adjacent suspension members; a 17" by 48" piece is laid over each side of the fixture and a 4 $\frac{1}{2}$ " by 24" piece at each end and tied to top pieces at corners of the fixture with No. 18 SWG steel wire. See Figure No. 3. In addition, ceiling openings for air diffusers up to a maximum size of 12" in diameter are allowed, provided openings are protected with labeled fire dampers and the aggregate areas do not exceed 100 square inches per 100 square feet of ceiling. The distance from the bottom of the truss to the face of the ceiling shall be at least 10 inches.

2. A single-layer floor of  $\frac{3}{4}$ " tongue-and-groove plywood or  $\frac{23}{32}$ " tongue-and-groove APA rated structural-use panel (Exposure 1 or exterior glue), with trusses spaced up to 24" on center and a ceiling of two layers of  $\frac{1}{2}$ " thick Type X gypsum board applied to the bottom chord. All butt joints of the  $\frac{3}{4}$ " plywood or  $\frac{23}{32}$ " APA rated structural-use panel (Exposure 1 or exterior glue), must fall on framing members. The first layer of gypsum board shall be attached with 1 $\frac{1}{2}$ " long Type S screws placed 12" on center. The second layer shall be installed with the joints staggered from the first layer. It shall be fastened with 2" long Type S screws spaced 12" on center in the field (intermediate framing members) and 8" on center at the butt joints. Additional Type G screws 1 $\frac{1}{2}$ " long shall be spaced 8" on center and 6" each side of the butt joint. The second layer shall be finished with joint tape and compound.

Resilient channels at 16" on center (24, if trusses are 16" on center) may be fastened perpendicular to trusses, with 1" long, case-hardened steel, .15" shank diameter, self-drilling and self-tapping Phillips head screws. The ceiling is attached to the resilient channels as described above.

When used as a roof/ceiling assembly, the decking shall be as provided in the applicable building code, and the truss spacing may exceed 24" on center. When trusses are spaced

more than 24" on center, the ceiling may be applied to stripping spaced 24" on center. The attachment to the stripping is similar to the attachment to the trusses described above. The stripping may be 2" by 4" Construction grade Douglas fir lumber for spans up to 5', attached to the bottom chord with 10d nails.

3. A single-layer floor of  $\frac{3}{4}$ " tongue-and-groove plywood, or  $\frac{23}{32}$ " tongue-and-groove APA rated structural-use panel (Exposure 1 or exterior glue), with trusses spaced up to 24" on center and a ceiling consisting of a single layer of  $\frac{1}{2}$ " thick Type X gypsum wallboard attached to the trusses, or to stripping spaced 24" on center fastened with  $1\frac{1}{8}$ " long Type S drywall screws located 6" on center at end joints and 8" on center in the field. All butt joints of the  $\frac{3}{4}$ " plywood or  $\frac{23}{32}$ " APA rated structural-use panel (Exposure 1 or exterior glue), must fall on framing members. In addition, an approved exposed fire-rated tension suspension system must be installed beneath the gypsum wallboard ceiling a minimum distance of 12". The grid system is suspended with No. 12 SWG galvanized steel wire fastened to the furring, or trusses with 3" long flathead hanger screws. Light fixture protection consists of 6" wide pieces of ceiling grid panels 4' long for the sides and 2' long for the ends with a full grid panel placed on top. Fixture protection is held together at the corners by No. 18 SWG steel wire. A galvanized steel duct with a maximum 12" diameter steel diffuser opening without damper and a maximum 6" by 12" return air opening are permitted for each 200 square feet of ceiling. Ceiling panels may be either  $\frac{5}{8}$ " USG FIRECODE AURATONE® or  $\frac{5}{8}$ " Gold Bond Fire-Shield Solitude Panels as manufactured by Gold Bond Building Products Division of National Gypsum Company. Only noncombustible insulation rated at R-30 or less may be installed above the gypsum wallboard.

When used as a roof/ceiling assembly, square-edge plywood meeting the structural requirements of the applicable building code may be used for roof sheathing, and trusses may be spaced up to 48" on center.

4. A single-layer floor of  $\frac{3}{4}$ " tongue-and-groove plywood, with trusses spaced a maximum of 24" on center and a ceiling consisting of  $\frac{1}{2}$ " USG Type C FIRECODE® gypsum wallboard screw attached to standard steel furring channels at 24" on center and suspended from the trusses by a specially designed No. 24 gauge Simpson Co. ceiling support clip (CSC). One inch of (6 pcf minimum) THERMAFIBER® mineral wool fire-proofing is placed between the bottom chord of the trusses and the top of the furring channel.

All butt joints of the  $\frac{3}{4}$ " plywood must fall on framing members.

5. A double-wood floor as described in Section III.I.1. above or a single layer of  $\frac{3}{4}$ " tongue-and-groove plywood floor sheathing or plywood roof sheathing meeting the structural requirements of the applicable building code applied over trusses spaced 24" on center with any approved ceiling system, which will provide 40-minute finish rating. When used as a roof/ceiling assembly, square-edge plywood meeting the requirements of the applicable building code may be used for roof sheathing, and trusses may be spaced up to 48" on center.

Substantiating data, which may include results of fire endurance tests conducted in accordance with ASTM E 119, shall be furnished to the code official verifying that a particular ceiling system meets the 40-minute finish rating requirements.

6. A  $\frac{5}{8}$ " plywood floor over trusses spaced at a maximum of 24" on center with either  $1\frac{1}{2}$ " of lightweight concrete or 1" of GYP-CRETE® may be considered as an alternate deck for the five systems described above. When the trusses are limited to a maximum spacing of 20" on center, a  $\frac{3}{4}$ " thick topping of GYP-CRETE® may be used. GYP-CRETE® is produced by the Gyp-Crete Corporation.

**Identification:** Each truss shall be stamped with the Trus Joist Corporation logo, the NER report number and the quality control agency (PFS Corporation) logo.

**IV. Evidence Submitted:** A. Results of load tests and descriptive details under the cover of an application dated September 18, 1980.

B. Results of a fire test, Report No. File R5492-2, dated October 6, 1981, conducted by Underwriters Laboratories Inc. in accordance with ASTM E 119.

C. "Evaluation of Proposed Revisions to Fire Resistive Construction Sections" prepared by Don Sharp, P.E., Trus Joist Corporation, dated December, 1979.

D. Results of fire tests, Report No. J.I. OC6Q9.AC, dated February 13, 1978, conducted by Factory Mutual Research in accordance with ASTM E 119.

E. Evidence submitted with the application dated November 22, 1985, was Analysis of TJJ<sup>tm</sup> Tension Chord Capacity by D. Sharp, P.E., of Trus Joist Corporation, dated July, 1985; Code Submittal Evaluation Test of the 14 gage/6 inch No-Notch Clip, Exp. No. 311, dated August 28, 1985, and signed by W. Reetz, P.E., of Trus Joist Corporation on November 20, 1985; and Parallel to Grain Pin Bearing Enhancement for TJJ<sup>tm</sup> Trusses by D. Larson, P.E., of Trus Joist Corporation, dated October 3, 1985.

F. Evidence submitted with Trus Joist Corporation's letter dated February 28, 1986, was Code Submittal Evaluation of a 14 Gage/6 inch TJJ No-Notch Clip, Exp. No. 401, dated February 2, 1986 and revised February 20, 1986, and signed by W. Reetz, P.E., of Trus Joist Corporation on February 9, 1986; Code Submittal Evaluation of a 14 Gage TJJ "U" Bearing Clip, Exp. No. 397, dated January 27, 1986, and signed by W. Reetz, P.E., of Trus Joist Corporation on February 6, 1986; and  $1\frac{1}{8}$ " Diameter, 13 Gage and 1" Diameter, 16 Gage TJJ<sup>tm</sup> Truss Web Testing by D. Larson, P.E., of Trus Joist Corporation and dated November 22, 1985.

G. Trus Joist Corporation's letter dated May 8, 1986, with revised sketches.

H. Evidence included with Trus Joist Corporation's letter dated May 19, 1986, was TJW Chord Properties by D. Larson, P.E., of Trus Joist Corporation, dated November 18, 1985; Pin Bearing Design Values for TJW Trusses by D. Larson, P.E., of Trus Joist Corporation, dated October 30, 1985; Code Submittal Evaluation of a 13 Gage TJW Standard Bearing Clip, Exp. No. 374, dated November 21, 1985, and signed by W. Reetz, P.E., of Trus Joist Corporation on December 6, 1985; Code Submittal Evaluation of a 6" TJW No-Notch Bearing Clip, Exp. No. 373, dated November 15, 1985, and signed by W. Reetz, P.E., of Trus Joist Corporation on November 25, 1985; and 13 Gage - 1.125" Diameter TJJ/TJW Split Tension Web Test, Exp. No. 398, dated

January 28, 1986, and signed by W. Reetz, P.E., of Trus Joist Corporation on February 9, 1986.

**V. Conditions of Use:** The National Evaluation Service Committee finds that Trus Joist Corporation's Open Web Truss Series are acceptable alternate materials, products, or methods of construction to that specified in the 1987 BOCA National Building Code with the 1988 Supplement, the 1985 Standard Building Code with the 1986/87 Revisions and the 1985 Uniform Building Code, subject to the following conditions:

1. The open web trusses are designed in accordance with this report and the allowable loads and stresses do not exceed the values set forth in Table Nos. I, II, III and IV. Drawings and design details signed and sealed by a registered engineer verifying compliance with the allowable loads and stresses must be furnished to the code official.
2. Increases for duration of loading as provided for wood members and their connections may be used in accordance with the applicable building code.
3. The top chord shall be designed as a continuous member,

subject to combined axial and bending stress. The bottom chord shall be designed as an axially loaded tension member when ceilings are directly applied to the chords or to stripping not more than 24 inches on center and the ceiling load does not exceed 10 pounds per square foot. For conditions more severe than this, the bottom chord shall be analyzed and designed as a continuous member subject to combined axial and bending stresses.

4. Deflections are limited as set forth in the applicable building code using beam formulas and considering the full areas of the top and bottom chords and the modulus of elasticity assigned to the lumber used.
5. Where a one-hour fire-resistance rating is required, construction shall comply with Section III.I. of this report.
6. End bearing reactions shall be limited by compression perpendicular to the grain of the supporting member and shall not exceed the allowables listed in Table No. V.

This report is subject to re-examination in one year.

**TABLE NO. I—ALLOWABLE LOAD<sup>1</sup> ON WEB MEMBERS (In Pounds)**

TUBE DIA. (")	GAUGE	WALL THICKNESS (")	LOAD COND.	OPEN WEB TRUSSES											
				TJL		TJN		TJM		TJW		TJ/50		TJ/60	
				3/4" Pin	3/4" Pin	3/4" Pin	1 1/4" Pin	3/4" Pin	1" Pin	3/4" Pin	3/4" Pin	3/4" Pin	3/4" Pin	3/4" Pin	3/4" Pin
3/4	19	.042	Tension Bearing	1275 1050	—	—	—	—	—	—	—	—	—	—	—
1	20	.035	Tension Bearing	900 900	1100 900	—	—	—	—	—	—	—	—	—	—
1	19	.042	Tension Bearing	1275 1275	1530 1275	—	—	—	—	1275 1275	1530 1530	1559 1559	1995 2598	2079 2079	—
1	18	.049	Tension Bearing	1490 1490	1800 1490	—	—	—	—	1490 1490	1800 1800	—	—	—	—
1	16	.065	Tension Bearing	—	2370 2370	—	—	—	—	1975 1975	2370 2370	—	—	—	—
1	14	.083	Tension Bearing	—	3025 3025	—	—	—	—	—	3025 3025	—	—	—	—
1 1/4	16	.065	Tension Bearing	—	2370 2370	—	—	3290 2630	—	1975 1975	2370 2370	—	—	—	—
1 1/4	13	.095	Tension Bearing	—	3800 3800	—	—	—	—	—	4200 4200	—	—	—	—
1 1/4	19	.042	Tension Bearing	—	—	—	—	—	—	—	—	1559 1559	2154 2598	2079 2079	2602 3118
1 1/4	18	.049	Tension Bearing	—	—	—	—	—	—	—	—	1819 1819	2513 3031	—	—
1 1/4	16	.065	Tension Bearing	—	—	—	—	—	—	—	—	—	3334 4021	3217 3217	3901 4826
1 1/4	14	.083	Tension Bearing	—	—	—	—	—	—	—	—	—	4257 5135	4108 4108	4854 6162
1 1/2	16	.065	Tension Bearing	—	—	3950 3160	—	3290 3290	4430 3550	—	—	—	—	3217 3217	4036 4826
1 1/2	14	.083	Tension Bearing	—	—	—	—	—	5530 4430	—	—	—	—	4108 4108	5154 6162
1 1/2	13	.095	Tension Bearing	—	—	—	—	—	6240 4990	—	—	—	—	—	—
2	16	.065	Tension Bearing	—	—	3950 3950	6325 5060	—	—	—	—	—	—	—	—
2	14	.083	Tension Bearing	—	—	5050 5050	7950 6360	—	—	—	—	—	—	—	—
2	13	.095	Tension Bearing	—	—	5770 5770	9000 7200	—	—	—	—	—	—	—	—

<sup>1</sup> Allowable load values for web members in compression shall not exceed the values set forth above and shall be further reduced where L/r controls or where allowable wood bearing controls as set forth in Table No. II.

**TABLE NO. II—ALLOWABLE WOOD BEARING LOADS ON PINS<sup>1 4</sup>**

ANGLE OF LOAD TO GRAIN	ALLOWABLE LOAD (In Pounds) OPEN WEB TRUSSES											
	TJL		TJH <sup>2</sup>		TJM <sup>2</sup>		TJW		TJ/50		TJ/60	
	3/8" Pin	5/8" Pin	3/4" Pin	1 1/4" Pin	5/8" Pin	1" Pin	3/4" Pin	5/8" Pin	3/4" Pin	5/8" Pin	1/2" Pin	3/4" Pin
Perpendicular	720	720	1080	1620	970	1300	855	1075	850	850	1010	1270
Parallel <sup>3</sup>	1350	2940	3360	6040	2500	4800	1975	3990	1510	2940	1910	3940

<sup>1</sup>Values may be increased for duration of load.

<sup>2</sup>Values are for the pin installed in two 2-inch nominal chord members.

<sup>3</sup>Minimum end distance in the direction of force shall be 12 diameters for maximum allowable stresses.

<sup>4</sup>Values are for Douglas fir-larch, southern pine, hem-fir, spruce-pine-fir, and Englemann spruce-lodgepole pine (1.8E or higher).

**TABLE NO. III—CHORD SECTION PROPERTIES AT PIN LOCATION FOR OPEN WEB TRUSSES**

NOMINAL MEMBER SIZE (In Inches)	NET DIMENSIONS AT 19 PERCENT MOISTURE (In Inches)	PIN DIAMETER (In Inches)	NET AREA COMPRESSION (Square Inches)	NET AREA TENSION (Square Inches)	SECTION MODULUS (Cubic Inches)
<b>TJL</b>					
one 2 x 4	1 1/2 x 3 1/2	3/8	4.87	3.66	1.20
one 2 x 4	1 1/2 x 3 1/2	5/8	3.38	2.73	1.09
<b>TJH</b>					
two 2 x 6	1 1/2 x 5 1/2	3/4	16.50	14.25	15.09
two 2 x 6	1 1/2 x 5 1/2	1 1/4	16.50	12.75	14.95
<b>TJM</b>					
two 2 x 4	1 1/2 x 3 1/2	5/8	10.50	8.62	6.09
two 2 x 4	1 1/2 x 3 1/2	1	10.50	7.50	5.98
<b>TJW</b>					
one 2 x 5	1 1/2 x 4 3/4	3/8	5.06	5.06	1.67
one 2 x 5	1 1/2 x 4 3/4	5/8	3.83	3.83	1.56
<b>TJ/50</b>					
2 members	1 1/2 x 1.90	3/8	4.58	4.58	1.79
2 members	1 1/2 x 1.90	5/8	3.83	3.83	1.74
<b>TJ/60</b>					
2 members	1 1/2 x 2.30	1/2	5.40	5.40	2.62
2 members	1 1/2 x 2.30	3/4	4.65	4.65	2.56

**TABLE NO. IV—ALLOWABLE UNIT STRESSES IN POUNDS PER SQUARE INCH**

LUMBER GRADE I.D.	TRUSS PROFILE <sup>6</sup>	TENSION (TJL)			TENSION (TJH, TJM, TJ/50, TJ/60)		TENSION (TJW)			COMPRESSION PAR. TO GRAIN (TJL, TJH, TJM, TJ/50, TJ/60)		COMPRESSION PAR. TO GRAIN (TJW)			EXTREME FIBER IN BENDING	MOE x 10 <sup>6</sup>
		At PP <sup>1</sup>		Other	At PP <sup>1</sup>	Other	At PP <sup>1</sup>			At PP <sup>1</sup>	Other	At PP <sup>1</sup>				
		3/8" Pin	5/8" Pin				3/8" Pin	5/8" Pin	Other			3/8" Pin	5/8" Pin	Other		
MICRO=LAM <sup>®</sup> Laminated Veneer Lumber	All Profiles	2300 <sup>3</sup>	2300 <sup>3</sup>	2100	2300 <sup>3</sup>	2100	—	—	—	3000	2550	—	—	—	3000 <sup>4</sup>	2.2
TJ A <sup>5</sup> or 2100 <sup>5</sup> 1.8E	Par. & T P	1945 1860	1860 1770	1460	1700	1460	1850 1750	1765 1675	1460	1700	1700	2100 2100	1940 1940	1700	2100 <sup>2</sup>	1.8
AA <sup>5</sup> or 2000 <sup>5</sup> 2.0E	Par. & T P	2250 2150	2150 2050	1650	1925	1650	2140 2030	2040 1940	1650	1925	1925	2430 2430	2245 2245	1925	2400 <sup>2</sup>	2.0
J AAA <sup>5</sup> or 2700 <sup>5</sup> 2.2E	Par. & T P	2550 2440	2440 2325	2150	2200	1900	2425 2300	2315 2200	2150	2500	2500	2760 2760	2550 2550	2200	2700 <sup>2</sup>	2.2

<sup>1</sup>At PP is used at drilled areas.

<sup>2</sup>Stress shown is for lumber used on edge. When loaded flatwise,  $F_b$  may be increased 18 percent.

<sup>3</sup>For panel point spacing less than 24 inches on center, tension stress shall be reduced to 2100 psi.

<sup>4</sup>3000 psi is established for a 12-inch-deep member. Values for other depths should be adjusted by multiplying by  $(12/d)^{1/6}$ .

<sup>5</sup>Species used are Douglas fir-larch, southern pine, hem-fir, spruce-pine-fir, and Englemann spruce-lodgepole pine.

<sup>6</sup>Par. = parallel profile T = tapered profile P = pitched profile.

TABLE NO. V—TRUS JOIST ALLOWABLE REACTIONS

OPEN WEB TRUSS SERIES	DETAIL <sup>1</sup>	MAX. REACTION <sup>2</sup> (In Pounds)	BEARING AREA <sup>3</sup> (Sq. In.)
TJL	L-1	2,910	7.0
	L-2	2,910	7.0
	L-3	3,000	6.25
	L-4	2,300	5.2
	L-5/2.25 <sup>4</sup>	3,290	8.2
	L-5/3.25 <sup>4</sup>	3,520 <sup>5</sup>	11.8
	L-5/4.00 <sup>4</sup>	3,665 <sup>5</sup>	14.5
TJH	H-1	9,200	23.6
	H-2	9,200	29.3
	H-3	12,470	24.1
TJM	M-1	4,330	10.4
	M-2	7,390	20.3
	M-3	8,310	21.9
	M-4	7,610	15.8
	M-5	6,500	20.6
TJW	W-1	4,300	14.5
	W-2	5,860	13.1
TJ/50	50-1	5,390	16.2
	50-2	5,390	10.2
TJ/60	60-1	5,390	16.2
	60-2	5,390	13.8

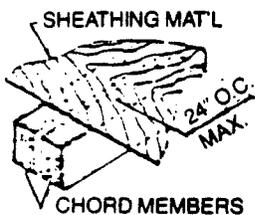
<sup>1</sup>Details are referenced to Figure No. 2.

<sup>2</sup>Maximum reactions are absolute limits and may not be increased. Also see Footnote No. 3.

<sup>3</sup>Effective area is in square inches and shall be used to determine allowable reactions based on allowable compression perpendicular to grain of the plate.

<sup>4</sup>2.25", 3.25" and 4.00" are minimum distances from pin to end of chord.

<sup>5</sup>The maximum bearing reaction may be increased to 3780 pounds and 3930 pounds for the L-5/3.25 and L-5/4.00 clips respectively provided no bearing error (full bearing) exists.



NAILING PATTERN TO BE PER PLANS AND SPECIFICATIONS. IN NO CASE SHALL NAIL SPACING BE MORE THAN 24 INCHES O.C. IN EACH CHORD MEMBER. NAILS SHALL NOT BE LESS THAN 8 PENNY NOR GREATER THAN 16 PENNY.

CLOSEST ON-CENTER SPACING ALLOWABLE FOR NAILS IN A ROW			
Nail Size	Nail Type	Nail Gauge	Closest Spacing
8d	Box Common	11½ Ga.	4" o.c.
		10¼ Ga.	6" o.c.
10d	Box Common	10½ Ga.	6" o.c.
		9 Ga.	6" o.c.
12d	Box Common	10½ Ga.	6" o.c.
		9 Ga.	6" o.c.
16d	Box Common	10 Ga.	6" o.c.
		8 Ga.	8" o.c.

Note: If more than one row is used, the rows must be offset at least ½".

TJ/50 AND TJ/60 OPEN WEB TRUSS SHEATHING NAILING PATTERN

FIGURE NO. 1

FIGURE NO. 2  
OPEN WEB TRUSS DETAILS

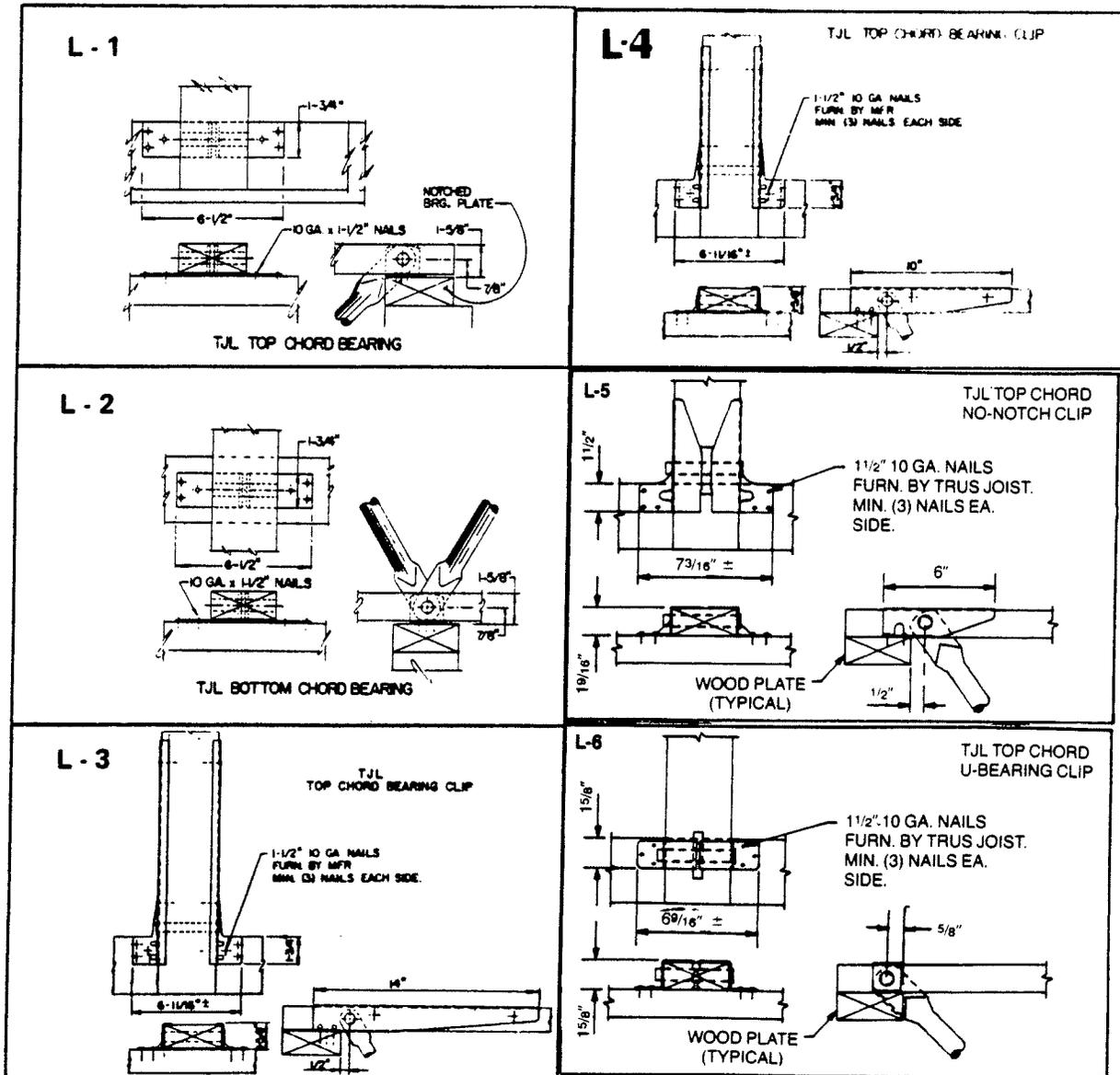




FIGURE NO. 2 -continued  
OPEN WEB TRUSS DETAILS

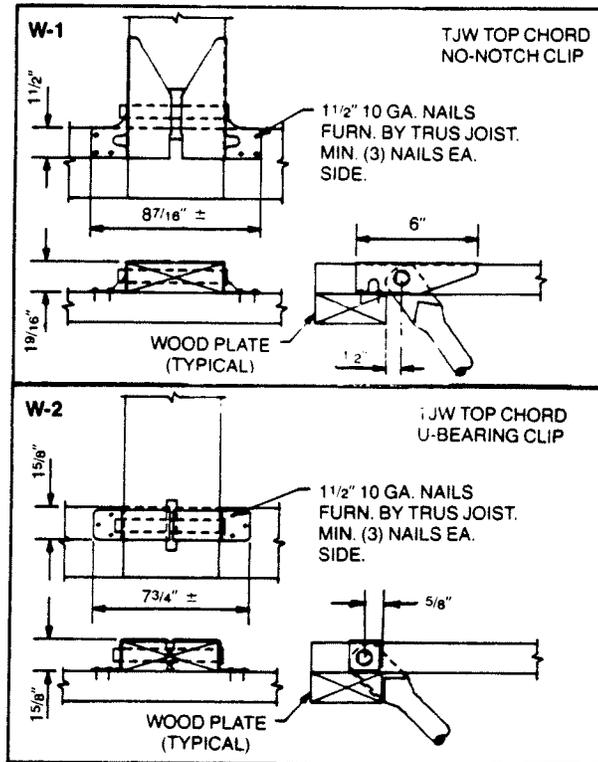
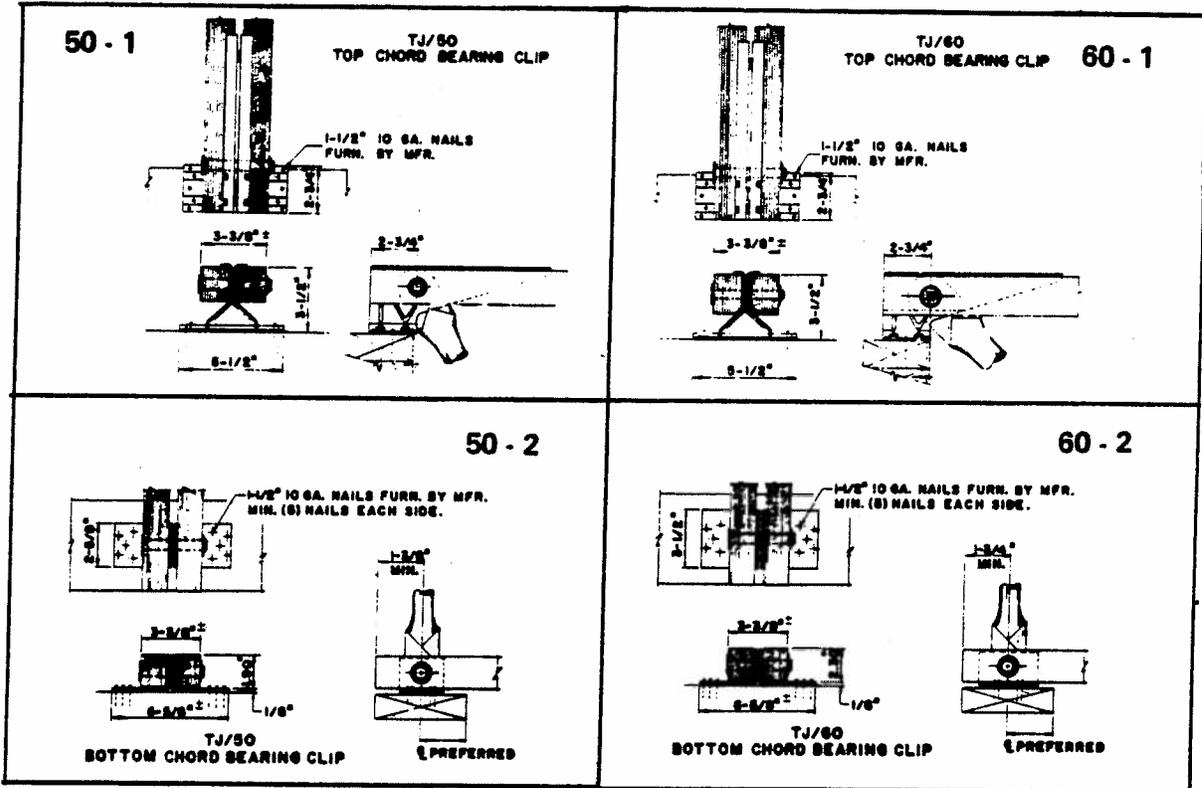


FIGURE NO. 2 -continued  
OPEN WEB TRUSS DETAILS



**NOTE:** Structural performance of the bearing hardware is not dependent upon the nails used to connect the bearing hardware to the supporting structure. The connection may be considered, however, by the building designer in the design requirements of the structure.

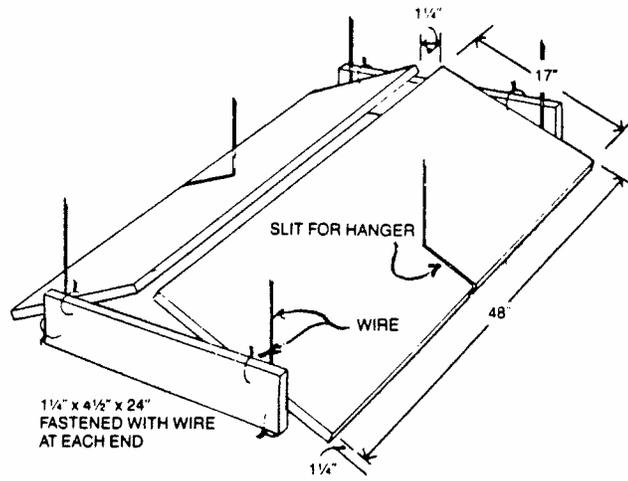


FIGURE NO. 3—LIGHT FIXTURE PROTECTION

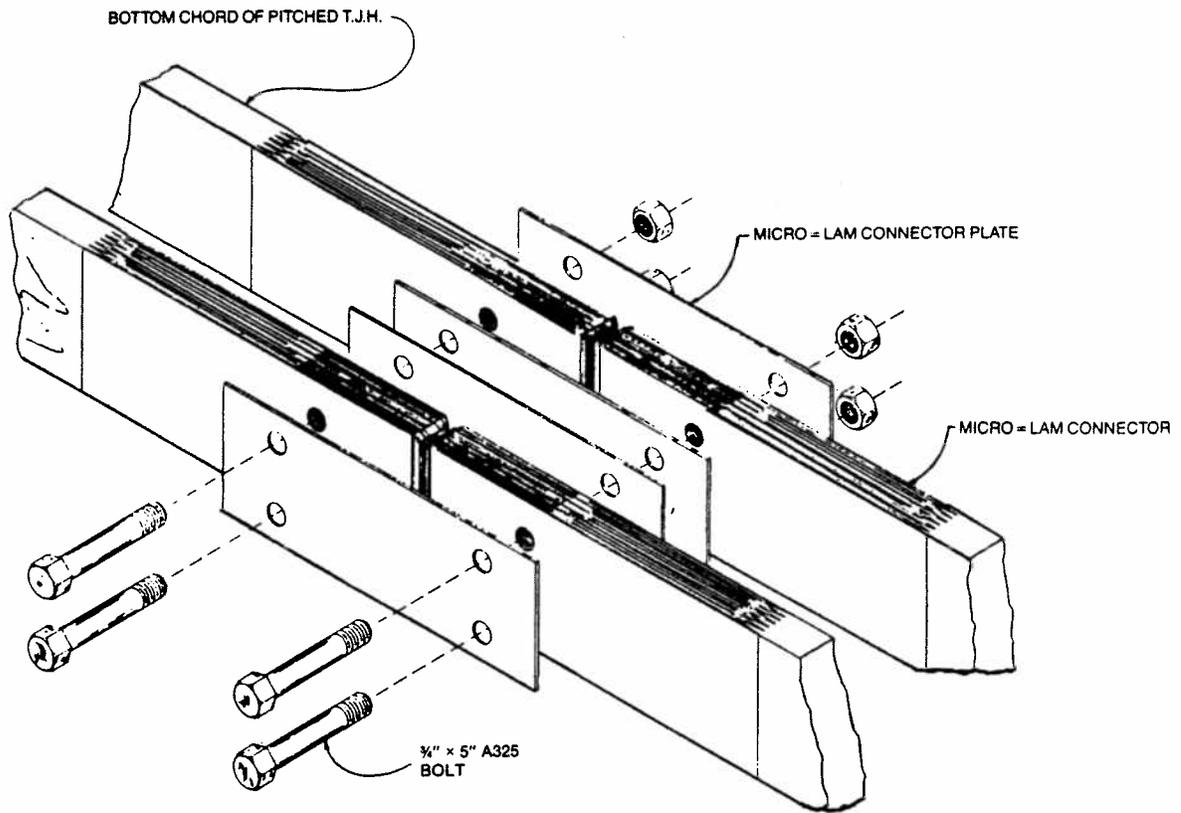
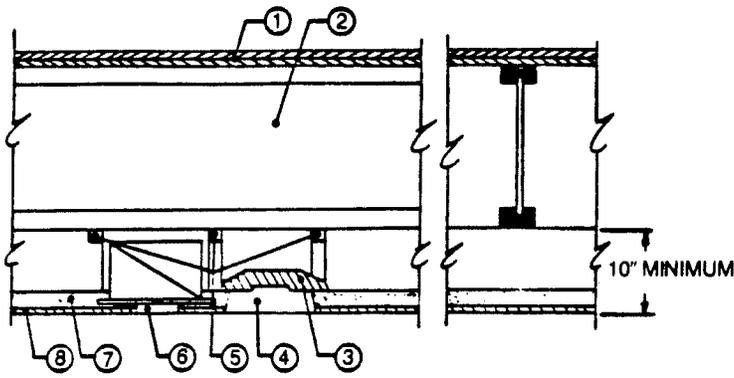
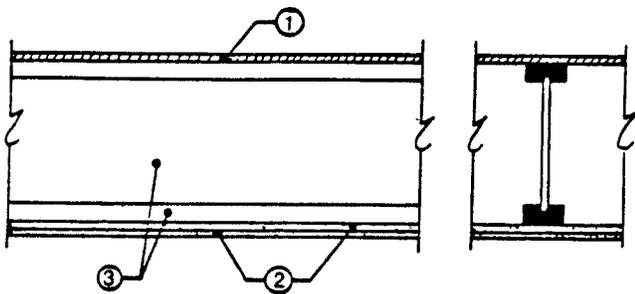


FIGURE NO. 4—TENSION CONNECTOR



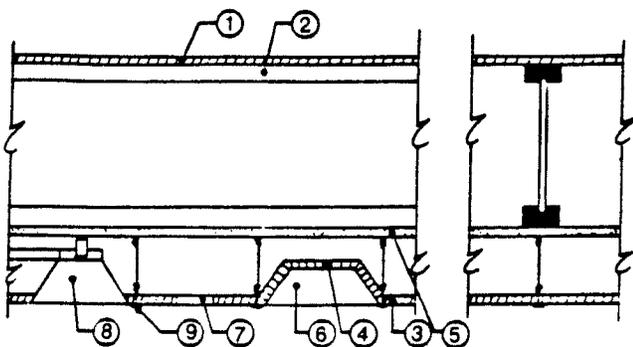
**ASSEMBLY I-1.**

1. DOUBLE-WOOD FLOOR.
2. OPEN WEB TRUSS.
3. FIXTURE PROTECTION.
4. 24-INCH X 48-INCH RECESSED LIGHT FIXTURE.
5. COLD-ROLLED CHANNELS.
6. 12-INCH AIR DIFFUSER.
7. USG THERMAFIBER MINERAL WOOL BLANKETS.
8. 3/4-INCH ACOUSTICAL PANELS 24 INCHES X 24 INCHES SUPPORTED BY AN APPROVED EXPOSED FIRE-RATED TENSION SUSPENSION SYSTEM.



**ASSEMBLY I-2.**

1. 3/4-INCH TONGUE-AND-GROOVE PLYWOOD.
2. TWO LAYERS 1/2-INCH TYPE X GYPSUM BOARD.
3. OPEN WEB TRUSS.



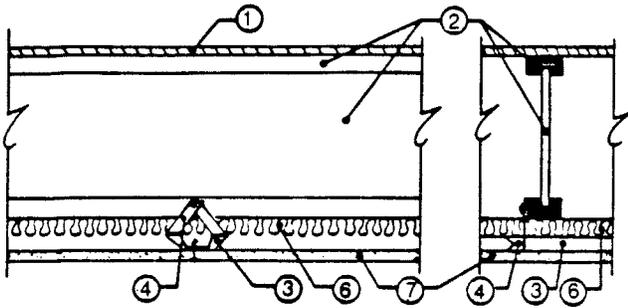
**ASSEMBLY I-3.**

1. 3/4-INCH TONGUE-AND-GROOVE PLYWOOD.
2. OPEN WEB TRUSS.
3. 3/4-INCH X 24-INCH X 48-INCH PANELS AND STEEL SUSPENSION GRID.
4. FIXTURE PROTECTION.
5. 1/2-INCH TYPE X GYPSUM WALLBOARD.
6. 24-INCH X 48-INCH RECESSED LIGHT FIXTURE.
7. 6-INCH X 12-INCH OPENING FOR RETURN AIR.
8. 12-INCH DIAMETER DIFFUSER OPENING.
9. STEEL SUSPENSION GRID.

**FIGURE NO. 5  
FIRERESISTANCE RATED ASSEMBLY DETAILS**

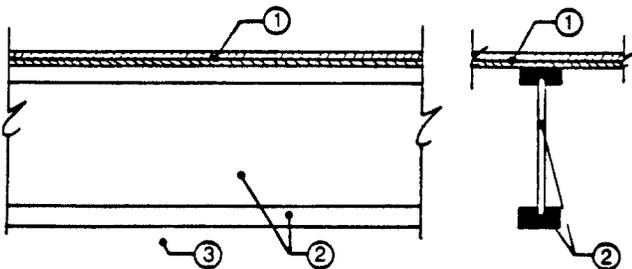
**ASSEMBLY I-4.**

1. SINGLE-LAYER FLOOR OF 3/4-INCH TONGUE-AND-GROOVE PLYWOOD.
2. OPEN WEB TRUSS.
3. NO. 26 GAUGE GALVANIZED STEEL FURRING CHANNEL INSTALLED PERPENDICULAR TO JOISTS. FURRING CHANNELS SPACED 1 1/2 INCHES FROM AND ON EACH SIDE OF WALLBOARD END JOINTS AND 24 INCHES ON CENTER AWAY FROM END JOINTS. CHANNEL SECURED TO JOISTS WITH SUPPORT CLIPS (ITEM 4) AT EACH JOIST LOCATION. AT CHANNEL SPLICES, ADJACENT PIECES OVERLAPPED 6 INCHES AND TIED WITH DOUBLE STRAND OF NO. 18 SWG GALVANIZED STEEL WIRE AT EACH END OF OVERLAP.
4. SIMPSON CO. TYPE CSC SUPPORT CLIPS TO BE USED TO SUPPORT FURRING CHANNELS AT THE INTERSECTION WITH EACH TRUSS. SUPPORT CLIPS NAILED TO SIDE OF JOIST BOTTOM FLANGE WITH 1 1/2-INCH-LONG 11 GAUGE NAIL.
5. STABILIZER STRAP (NOT SHOWN)—3/4-INCH X 6-INCH 24 GAUGE GALVANIZED STEEL STRAP USED TO PREVENT ROTATION OF THE SUPPORT CLIPS AT WALLBOARD END JOINTS AND ALONG WALLS.
6. 1-INCH (6 PCF MINIMUM) USG THERMAFIBER MINERAL WOOL FIRE-PROOFING.
7. 1/2-INCH USG TYPE C FIRECODE 5 GYPSUM WALLBOARD.



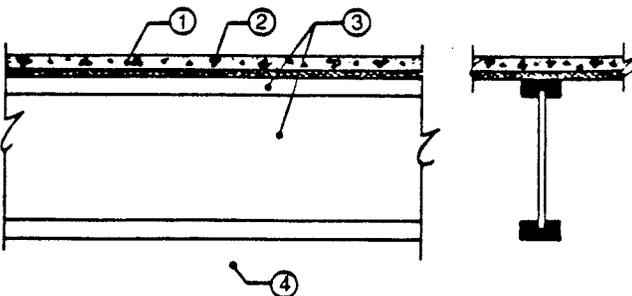
**ASSEMBLY I-5.**

1. DOUBLE-WOOD FLOOR.
2. OPEN WEB TRUSS.
3. AN APPROVED CEILING SYSTEM THAT WILL PROVIDE A 40-MINUTE FINISH RATING.



**ASSEMBLY I-6.**

1. LIGHTWEIGHT CONCRETE OR GYPCRETE\*
2. PLYWOOD.
3. OPEN WEB TRUSS.
4. ANY OF THE FIVE CEILING SYSTEMS AS SPECIFIED IN I-1 THROUGH I-5.



**FIGURE NO. 5—Continued  
FIRERESISTANCE RATED ASSEMBLY DETAILS**