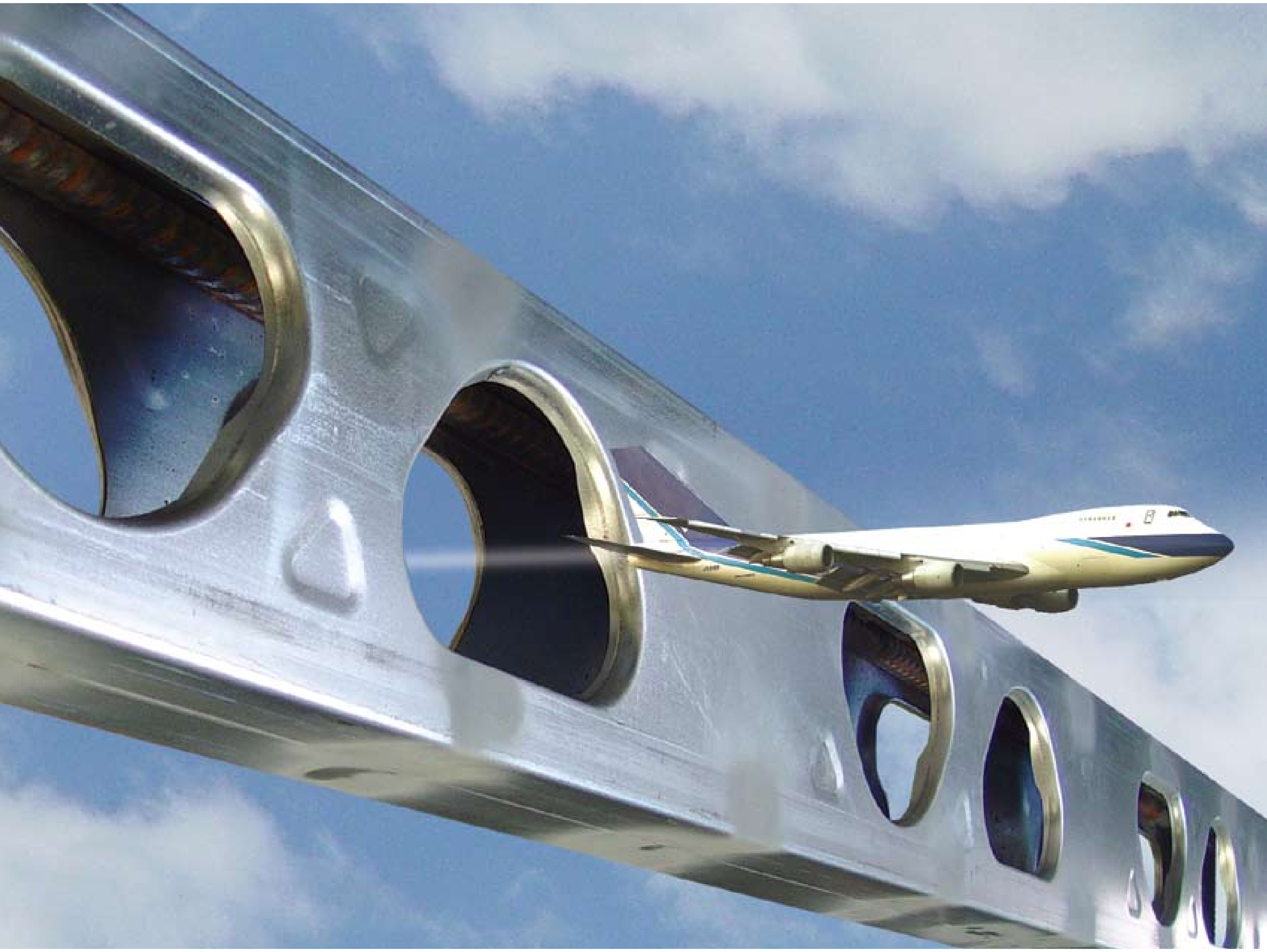
METWOOD™
BUILDING SOLUTIONS

A Publicly Traded Company, OTC-MTWD



BIG IDEAS
BETTER SOLUTIONS

SPAN*technologies*™ *by Metwood*

SQUARE*columns*™ *by Metwood*

FRAMING*systems*™ *by Metwood*

REINFORCER™ *technologies* *by Metwood*

METWOOD™
BUILDING SOLUTIONS
A Publicly Traded Company, OTC-MTWD

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Greetings,

There are plenty of building materials manufacturers. But right at the beginning, in 1993, we determined that Metwood would specialize in high value, innovative products that would help builders become more productive and profitable while delivering greater value to the end user. Today we call them BIG IDEAS, and we probably have some for you. This focus has set Metwood apart from the rest of the industry as a leader in innovation and building technology. To date Metwood has been awarded eight patents by the U.S. Patent Office, and four Industrial Design Certificates with the Canadian Intellectual Property Office (see back cover). Our commitment to innovation continues. That's why you can look forward to more and better products from Metwood. ***Stay in touch, there are plenty more BIG IDEAS in the works.***

Whether you are a home builder or specialize in commercial or institutional structures, Metwood has a product that will improve your productivity and your bottom line. Check out the new "5 Ways Better" information below. There are five important areas where Metwood provides better value; Versatility, Strength, Green, Fire Resistant, Corrosion and Pest Resistant. When you see the new Five Ways Better logo you'll know you're getting a great value.

We hope you find the information contained in this brochure helpful. Feel free to call with questions about specific products and applications and visit our website for current product info and news. www.metwood.com

Sincerely,
Robert M. "Mike" Callahan, President / C.E.O.

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5 WAYS BETTER

Metwood CFS Building Components: 5 Ways Better.

Cold Formed Steel (CFS) has come a long way as a building product. Long used in commercial and industrial construction, builders are now discovering the benefits of CFS for residential and light commercial buildings.

1. Versatile - All Metwood Building products can be cut and installed onsite using common power tools. No welding or cutting torches required; trimming can be done quickly with a reciprocating saw or circular saw with a metal cutting blade, with easy assembly using self-tapping screws. All Metwood CFS products can be used as a complete system or as individual components.

2. Strength - Our Metal Building Products surpass equivalent wood components in every strength category, allowing us to achieve higher load capacities, longer spans and fewer vertical supports, with components that require less space.

3. Green - Metwood is committed to the continual development of environmentally friendly products. Although there are very few applications for recycled wood products, currently 60% of the steel used in our building products come from recycled materials.

4. Fire Resistant - If you're looking for kindling, typically you want wood or a wood based product. Steel is currently the most fire resistant building material available.

5. Corrosion and Pest Resistant - Our Cold Formed Steel building components are treated for maximum resistance to corrosion. Pests can't get a foothold in CFS.

SPAN*technologies*™ *by Metwood*

*tru*SPAN™ *by Metwood* | *through*SPAN™ *by Metwood* | *floor*SPAN™ *by Metwood* | *deck*SPAN™ *by Metwood*

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METWOOD BUILDING SOLUTIONS
A Publicly Traded Company, OTC-MTWD

FRAMING*systems*™ by Metwood

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REINFORCER™ *technologies* by Metwood

Metwood's **SPAN***technologies*™ Advanced Beam Division covers a family of four product lines included under its original patent for the Internally Reinforced Structural Beam. The **SPAN***technologies*™ Division is dedicated exclusively to the research and development, engineering and sales of products within the group. The products included in the **SPAN***technologies*™ family are *tru***SPAN**™, *through***SPAN**™, *floor***SPAN**™, and *deck***SPAN**™.

5 WAYS BETTER

Metwood products truly are **5 Ways Better**, but how does that translate to, and effect the outcome of a project? It really means doing more, better, faster, at a lower cost, and giving customers a better value. What this means to the builder/contractor is a stronger more competitive position in the marketplace, and of course more profit.

Metwood products are extremly adaptable to all types of building systems, and fit right in with wood, log, ICF, SIP, metal, or just about anything else. Start with a complete Metwood system or try several components to get comfortable with the working aspects of Cold Formed Steel, and try others when the time is right. In any case, **5 Ways Better** is a good thing for everyone.

SPAN*technologies*™ *by Metwood*

*tru***SPAN**™ *by Metwood* *through***SPAN**™ *by Metwood* *floor***SPAN**™ *by Metwood* *deck***SPAN**™ *by Metwood*

SPANtechnologies™
by Metwood

*tru***SPAN**™

The Original Internally Reinforced Structural Beam

Metwood's Internally Reinforced Structural Beams are smaller, lighter and more versatile than any product of similar strength. The Light Gauge CFS construction enables *tru***SPAN**™ Beams to be cut with typical power tools, and screwed in place with self-tapping screws. That means no welding is required. *tru***SPAN**™ Beams are simple to adapt to any project. We make it easy, but the results can be amazing. *tru***SPAN**™ Beams can be ordered in stock specifications or custom made to meet specific load and design criteria. The possibilities are endless: *tru***SPAN**™ Beams are available in two, three and four ply configurations with internal reinforcing designed to match your load requirements. *tru***SPAN**™ can even be fabricated with camber to offset deflection. In some cases unsupported spans of up to 50 feet can be achieved by using three or four ply cambered *tru***SPAN**™ Beams.

We can even achieve all this while maximizing vertical space by using beams that feature a higher strength to weight ratio than their wood counterparts.

Now you can span greater distances with fewer vertical supports, improve capability, speed schedules, and lower costs. *tru***SPAN**™ will revolutionize your projects and your bottom line.

5 WAYS BETTER

Beam Reinforcers Now Available
See Page 15

*tru*SPAN™ *by Metwood*

*through***SPAN**™

Run Utilities Through Structural Beams

The application of Metwood **SPAN***technologies*™ to popular framing products yields a major breakthrough in construction technology. We call it *through***SPAN**™, a smaller, lighter hybrid structural beam of incredible strength, capable of spanning greater distances with fewer vertical supports while allowing the passage of utilities right through the structural member. This opens up new possibilities in routing utilities efficiently and with less accomodation and less intrusion into useable space. It also provides a simple means to very efficient pathways when routing general utilities. *through***SPAN**™ does this with no compromise in the strength department, and the possiblity of achieving very long spans with smaller beams, and fewer vertical supports.

*through***SPAN**™ Beams can be ordered in standard lengths and trimmed onsite or they can be custom fabricated to the exact specifications with the application determining the configuration of each Beam. An engineering certificate is provided to insure compliance.

*through***SPAN**™ Beams are the perfect solution for *floor***SPAN**™ concrete pourovers, eliminating several challenges related to routing utilities. 1) What is the best way to route the utilities, and 2) what is the best way to cover up utilities that hang below the joist? Both of these questions are answered by *through***SPAN**™, while saving time, materials, effort, and space consumed by routing utilities below joists. All this with the same strength and versatility every **SPAN***technology*™ product is famous for.

Increase versatility even more by attaching wood blocking to the Beams with self-drilling screws. Forget welding and fasten with screws, or even nails. *through***SPAN**™ adapts perfectly with any construction system, whether you want to use a single component, or a complete system.

Beam Height	Beam Opening
9 1/4”	5 1/2”
12”	7 1/4”
14”	9 1/4”

5 WAYS BETTER

*through***SPAN**™ by Metwood

FRAMING*systems*™ by Metwood

SQUARE*columns*™ by Metwood

REINFORCER™ *technologies* by Metwood

*floor***SPAN**™

The Ultimate Concrete Floor System

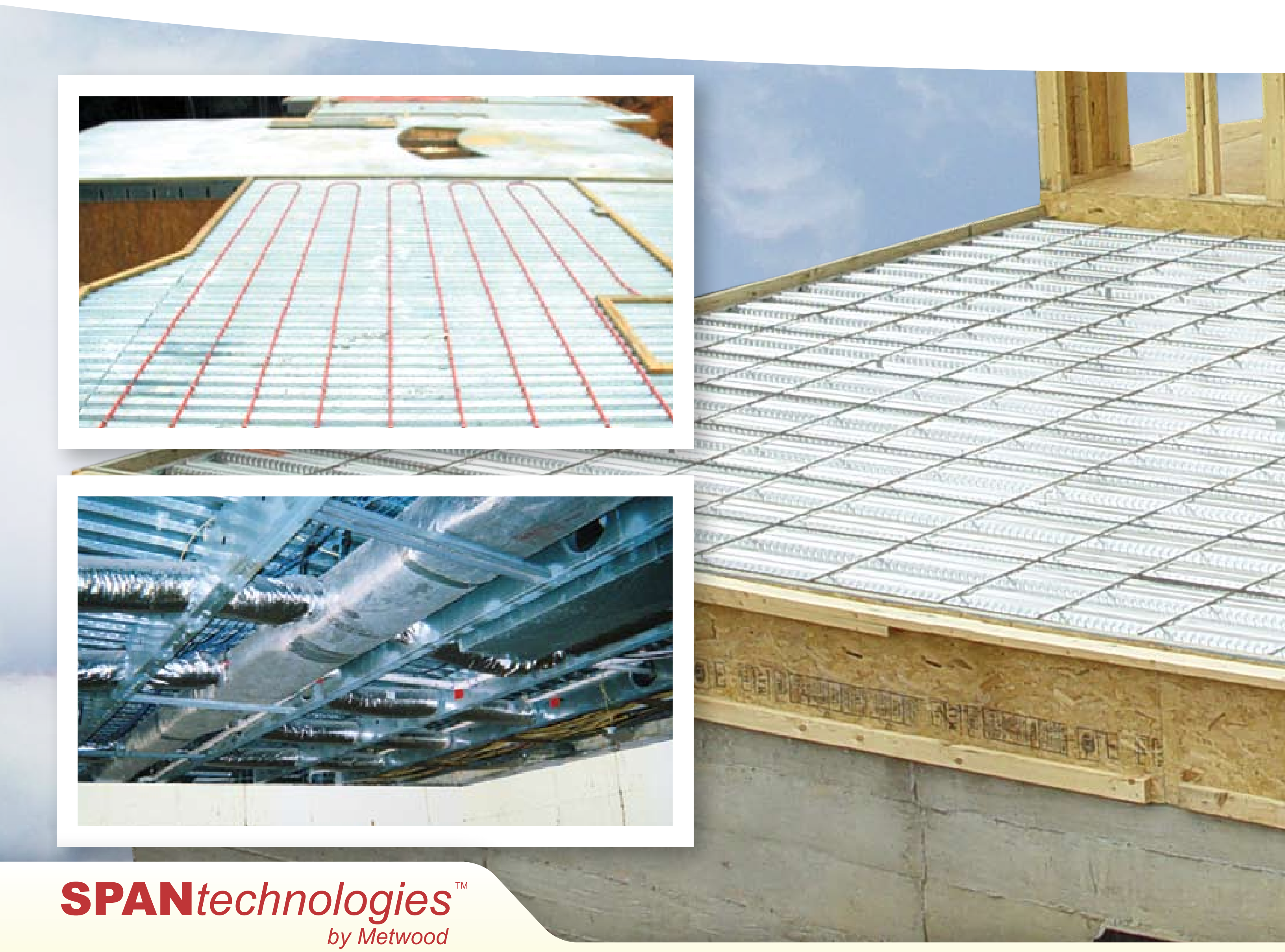
*floor***SPAN™** systems are custom engineered to meet the requirements of the project providing the ultimate solution for commercial and residential floors. Based on Metwood's patented **SPAN***technologies***™** beams, *floor***SPAN**™ systems can accommodate longer spans with fewer vertical supports than conventional floor systems. This maximizes the space below, and provides a ready-made solution for in-floor heating systems.

When it comes to quality, nothing provides the strength, quiet and solid assurance like a concrete floor. And *floor***SPAN™** is the versatile solution that provides greater space, strength, and versatility for whatever you're doing under the floor; full finished basement, garage, workroom, exercise room or just additional storage.

5 WAYS BETTER

*floor***SPAN™** systems have been field tested in hundreds of homes and garages with proven results. *floor***SPAN™** Systems provide a solid, radiant ready floor, maximizing space below and increasing use potential like nothing else. All *floor***SPAN™** CFS components are light enough to position by hand, trimmable on the job, and can be fastened in place with self-drilling screws.

*floor***SPAN™** systems provide strength, versatility, and economy, opening up new possibilities for builders and home owners alike.



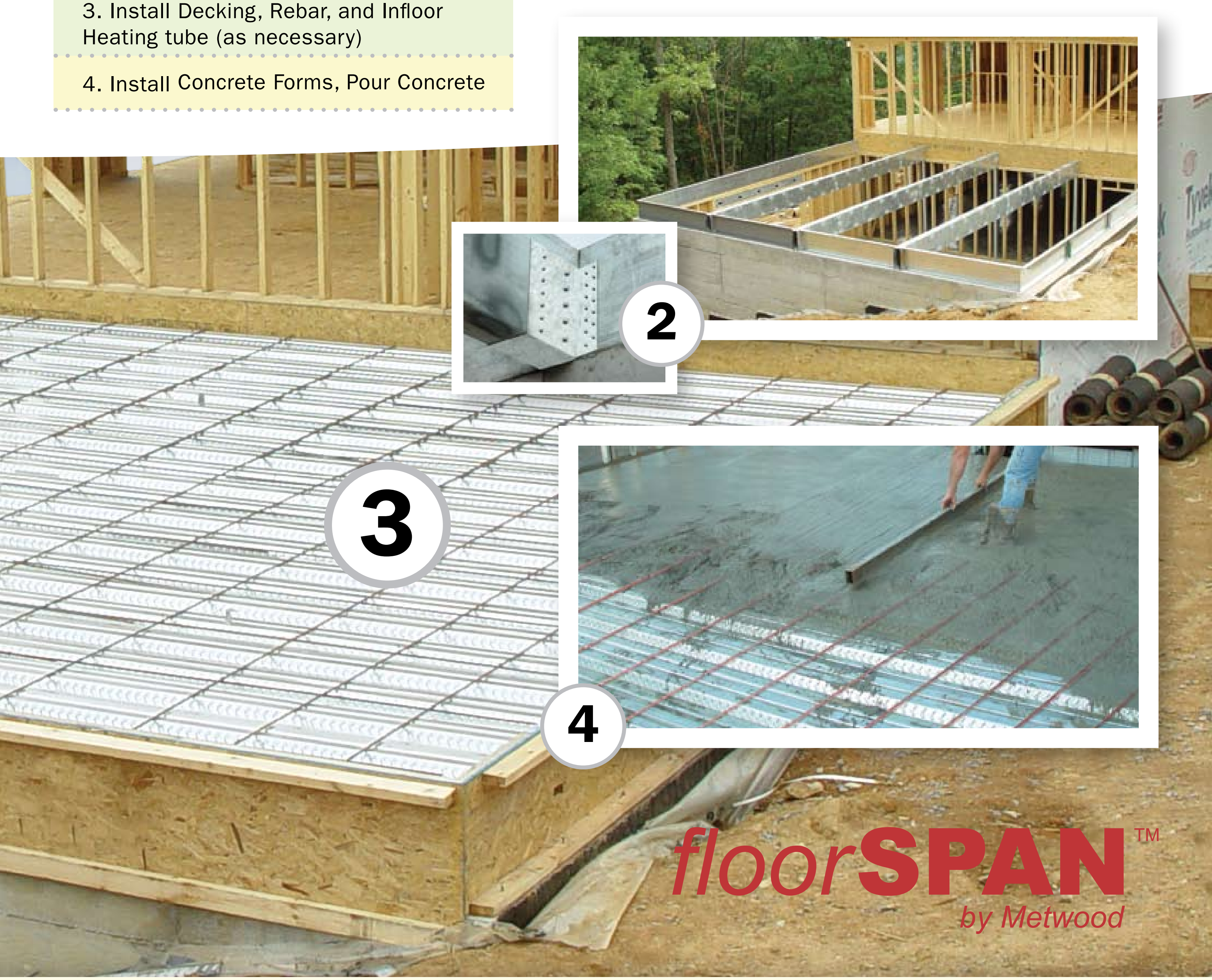
SPAN*technologies*™ *by Metwood*

*tru***SPAN**™ *by Metwood* | *through***SPAN**™ *by Metwood* | *floor***SPAN**™ *by Metwood* | *deck***SPAN**™ *by Metwood*

Simple Installation

Metwood CFS System components can be positioned by hand, trimmed with a reciprocating saw or Circular saw with an abrasive blade and attached with a screwgun and self-drilling screws.

1. Prepare Beam Pockets and Supports based on design
2. Install *tru***SPAN**/*through***SPAN** Beams
3. Install Decking, Rebar, and Infloor Heating tube (as necessary)
4. Install Concrete Forms, Pour Concrete



FRAMINGsystems™ by Metwood

SQUAREcolumns™ by Metwood

REINFORCER™ technologies by Metwood

*deck***SPAN**™

Rock Solid, Ready for Anything.

Years of research and development have paid off with the introduction of Metwood Pourover Systems. Metwood's patented **SPAN***technologies*™ has allowed the development of a Pourover system that is both practical and versatile, optimizing space and adding square footage, while adding value to the project.

Nothing compares to the solid feel and security of concrete. *deck***SPAN**™ accommodates any handrail, or ceiling finish, and is radiant ready. Based on our patented **SPAN***technologies*™, Metwood's ultimate deck system is pre-engineered and available with either *tru***SPAN**™ or *through***SPAN**™ Beams, providing a strong, light-weight support system that installs quickly, used in conjunction with metal decking for concrete support. The Beams can be trimmed onsite and installed with screws, so no welding is required.

5 WAYS BETTER

*deck***SPAN**™ creates new possibilities for concrete decks and can accomodate any hand railing or asthetic floor treatment, including wood, ceramic tile, decorative concrete or wood flooring materials. The choice is yours and the possibilities are endless.

The Sky is the Limit!

SPAN*technologies*™ *by Metwood*

*tru***SPAN**™ *by Metwood* | *through***SPAN**™ *by Metwood* | *floor***SPAN**™ *by Metwood* | *deck***SPAN**™ *by Metwood*

Unlimited Finish Options

Tile, Brick, Stamped, Stained

Unlimited Handrail Options

Wrought Iron, Steel, Wood

deck**SPAN**™
by Metwood

FRAMINGsystems™ by Metwood

SQUAREcolumns™ by Metwood

REINFORCER™ technologies by Metwood

FRAMING*systems*™

Metwood offers a complete line of metal framing products including Headers and Girders, Trusses and Rafters, as well as studs, bracing, and fasteners. Metwood CFS products can be fabricated in almost any configuration desired. They are available in custom and stock lengths and can be easily trimmed in the field. Metwood **FRAMING***systems*™ are capable of functioning as a complete system or in applications where a combination of wood and metal is required. Wood blocking can be attached at the factory or onsite to allow greater fastening versatility.

HEADERS AND GIRDERS

Stronger and lighter than their wood counterparts, Metwood Headers and Girders save space while spanning greater distances and providing greater versatility. Metwood Headers and Girders are engineered to meet the specific codes and requirements of each project and are delivered with a certification by a professional engineer.

TRUSSES AND RAFTERS

CFS Trusses and Rafters can be fabricated to satisfy almost any load requirement and are available in either in-line or typical web style with webs welded and/or screwed for additional strength. All customer preferences, job criteria, load requirements, and time frames are taken into consideration to determine the right design for each application. The additional strength and versatility will open up new possibilities. Metwood Trusses and Rafters provide greater support for HVAC and other mechanical units, and the possibility of using four foot centers, and longer open spans.

METAL FRAMING

Metwood offers a complete line of metal framing products including: studs, track, bracing, and fasteners. We can also provide completed panels for projects including hospitals, schools, and hotels, as well as private residences.

SPAN*technologies*™ by Metwood

*tru***SPAN**™ by Metwood | *through***SPAN**™ by Metwood | *floor***SPAN**™ by Metwood | *deck***SPAN**™ by Metwood

SQUARE*columns*™

A perfect match for *tru***SPAN**™ and *through***SPAN**™ Beams, but the fact is they'll support just about anything. Square Columns have several advantages over round columns or jack posts and at comparable prices they feature strength and flexibility not found in most column products on the market. Metwood Square Structural Columns, together with *tru***SPAN**™ Beams, will give you a whole new set of possibilities.

- "Tabbed" Top Plate for flexibility at the job site. This allows for immediate use of the column and no need for "temporaries".
- Fasten with screws, and trim easily with a reciprocating saw, hacksaw, or saw with abrasive blade.
- Easier to plumb and attach treatments such as wood, masonry, vinyl, dryvit, and more.
- 3" Square Columns fit inside 2 x 4 framed walls, and are perfect as supports or wall stiffeners.
- Lighter gauge than round columns but featuring higher load capacities.
- Galvanized with an in-line Flo-Coat for a triple layer of corrosion protection. An excellent choice for exterior applications.
- Available lengths are 9', 10' and 12' along with custom lengths and end plates.

5 WAYS BETTER

Available Loads (lbs.)

3" - 13 Ga.	9' - 18,637 lbs.	10' - 16,162 lbs.
4" - 13 Ga.	10' - 29,776 lbs.	12' - 25,280 lbs.
4" - 11 Ga.	10' - 37,204 lbs.	12' - 31,503 lbs.

SQUARE*columns*™

by Metwood

REINFORCER™ *technologies* *by Metwood*

A Solutio

Run Utilities Right Through Conventional Floor Joists.

Metwood Joist Reinforcers are engineered light gauge steel attachments for engineered I-Joists or conventional framing. By allowing larger openings in Floor Joists, the Joist Reinforcer simplifies the routing and installation of utilities.

- Strength

Metwood Joist Reinforcers restore the strength of Floor Joists weaked by the placement of large holes or cut-outs.

- Simplifies Construction

Allows utilities to be placed through the floor system rather than routing them below and decreasing ceiling height. Eliminates the need for bulkheads, chases and special engineering.

- Easy Installation

Metwood Joist Reinforcers are simply glued and screwed to the side of the Floor Joist (screws included).

Legacy Report 97-73

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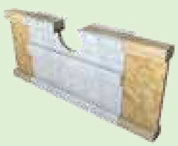
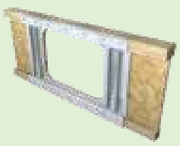
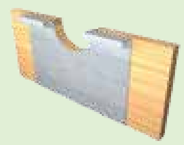
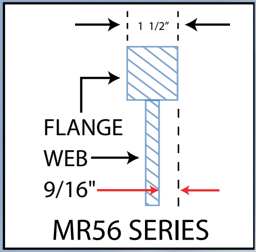
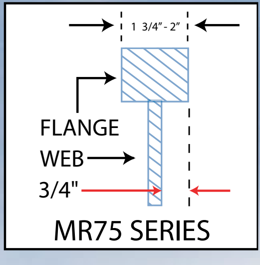
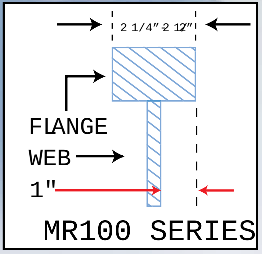
on to Fit Every Application

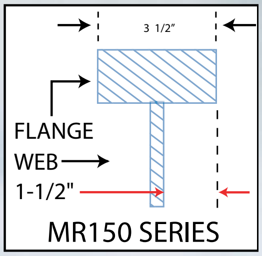
Legacy Report 97-73

I-Joist Flange Reinforcer		I-Joist Web Reinforcer		Hole Reinforcer		Notch Reinforcer		Beam Reinforcer	
				Legacy Report 97-73 					
Joist Depth	Notch Size	Joist Depth	Hole Size	Size	Hole Size	Size	Notch Size	Size	Opening Size
9-1/2"	3-1/4"H x 5"W	9-1/2"	5-1/2"H x 12"W	2" x 8"	4"	2" x 10"	3-1/2"H x 5"W	Opening sizes and locations are determined by load and span on a per project basis	
11-7/8"	4"H x 5"W	11-7/8"	7-7/8"H x 12"W	2" x 10"	6"				
14"	4"H x 5"W	14"	10"H x 16"W	2" x 12"	6"				
16"	4"H x 5"W	16"	12"H x 16"W						









REINFORCER™ technologies by Metwood

PROVIDENCE engineering

Let us help you with your next project…

Providence Engineering is a consulting engineering firm that specializes in providing our clients with the engineering services that best meet their needs. Providence is one of the few firms in the area that offers structural and civil engineering services for a variety of situations and circumstances. Our client base includes individual residential homeowners, contractors, developers, architects, insurance companies, mortgage companies, and realtors. Since our acquisition by Metwood, Inc. we have successfully provided structural engineering to many of the Metwood customers that needed engineered solutions to uncommon situations. We provide engineering services in the following areas:

CIVIL ENGINEERING

SITE PLANS
SUBDIVISIONS
OFFICE PARKS
UTILITY DESIGN
DRAINAGE & EROSION CONTROL
CONCEPTUAL LAYOUTS
MASTER PLANNING
INVESTIGATIONS & CERTIFICATIONS

STRUCTURAL ENGINEERING

FRAMING DESIGN
FOUNDATION DESIGN
RETAINING WALL DESIGN
STRUCTURAL INVESTIGATIONS

Providence Engineering, a Metwood Company
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www.metwood.com/providence

Metwood Patents and Design Certificates

Metwood has been innovating from day one, and our commitment to innovation continues. It's not about having the latest and greatest, it's about providing real solutions and profitability for customers, and real value for end users. That's why you can look forward to more and better products from Metwood. ***There are plenty more BIG IDEAS in the works.***

U.S. Patent No. 5,519,977, Joist Reinforcing Bracket.
U.S. Patent No. 5,625,997, Composite Beam.
U.S. Patent No. 5,832,691, Composite Beam, a continuation in part of the U.S. Patent No. 5,625,997.
U.S. Patent No. 5,591,053, Internally Reinforced Girder with Pierce-able Nonmetal Components.
U.S. Patent No.'s D472,210, D472,791, D472,792, and D472,793, Joist Reinforcing Brackets.
Canadian Intellectual Property Industrial Design Certificates: 101892, 101893, 101894, and 101895.

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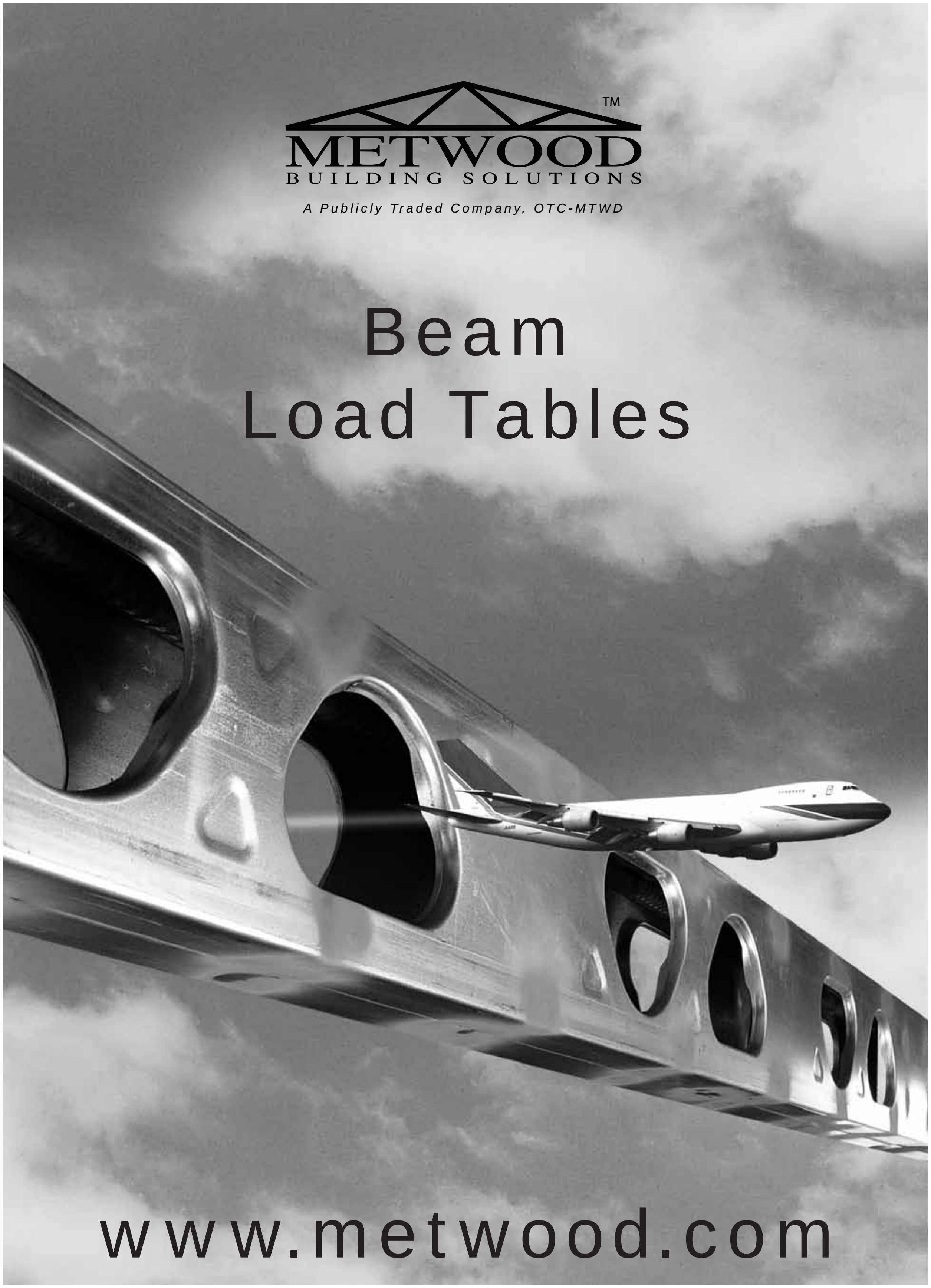
Beam Load Tables



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SPAN*technologies*™ *by Metwood*

5 WAYS BETTER

*e*SPAN™ *by Metwood*

Allowable Uniform Load* (In Pounds Per Lineal Foot)

Span (Ft)	Condition	7 1/4" x 3 1/4"			9 1/4" x 3 1/4"			12" x 3 1/4"			14" x 3 1/4"		
		734	737	739	934	937	939	1234	1237	1239	1434	1437	1439
8'	Live Load L/480	1263	2216	3011	2204	3599							
	Live Load L/360	1660	2941	3337	2205	3599							
	Total Load	1660	2941	3337	2205	3599							
10'	Live Load L/480	647	1135	1542	1129	1992	2739	1890	3177		2236	3459	
	Live Load L/360	862	1513	2056	1411	2547	2880	1890	3177		2236	3459	
	Total Load	1062	1882	2567	1411	2547	2880	1890	3177		2236	3459	
11'	Live Load L/480	486	852	1158	848	1496	2058	1528	2696	2888	1848	3144	
	Live Load L/360	648	1137	1544	1131	1195	2618	1562	2861	2888	1848	3144	
	Total Load	878	1556	2121	1166	2105	2618	1562	2861	2888	1848	3144	
12'	Live Load L/480	374	657	892	653	1153	1585	1177	2077	2648	1553	2864	2882
	Live Load L/360	499	876	1190	871	1537	2113	1312	2404	2648	1553	2864	2882
	Total Load	738	1307	1783	980	1769	2400	1312	2404	2648	1553	2864	2882
13'	Live Load L/480	294	516	702	514	907	1247	925	1633	2263	1309	2306	2661
	Live Load L/360	392	689	936	685	1209	1662	1118	2048	2444	1323	2441	2661
	Total Load	589	1033	1403	835	1507	2090	1118	2048	2444	1323	2441	2661
14'	Live Load L/480	236	414	562	411	726	998	741	1308	1812	1048	1846	2471
	Live Load L/360	314	551	749	548	968	1331	964	1744	2269	1141	2104	2471
	Total Load	471	827	1124	720	1299	1802	964	1766	2269	1141	2104	2471
15'	Live Load L/480	192	336	457	334	590	811	602	1063	1473	852	1501	2085
	Live Load L/360	255	448	609	446	787	1082	803	1418	1965	994	1833	2306
	Total Load	383	672	914	627	1132	1570	840	1538	2118	994	1833	2306
16'	Live Load L/480	158	277	376	276	486	669	496	876	1214	702	1237	1718
	Live Load L/360	211	369	502	367	648	891	662	1168	1619	874	1611	2162
	Total Load	316	554	753	551	972	1337	738	1352	1901	874	1611	2162
17'	Live Load L/480		231	314	230	405	557	414	730	1012	585	1031	1432
	Live Load L/360		308	418	306	541	743	552	974	1350	774	1375	1910
	Total Load		462	628	459	881	1115	654	1198	1684	774	1427	2020
18'	Live Load L/480		195	264	194	341	470	349	615	853	493	869	1207
	Live Load L/360		259	352	258	455	626	465	820	1137	658	1158	1609
	Total Load		389	529	387	683	939	583	1068	1502	690	1273	1802
19'	Live Load L/480		165	225	165	290	399	296	523	725	419	739	1026
	Live Load L/360		221	300	219	387	532	395	698	967	559	985	1368
	Total Load		331	450	329	581	799	523	959	1348	620	1143	1617
20'	Live Load L/480			193		249	342	254	449	622	359	633	880
	Live Load L/360			257		332	456	339	598	829	479	844	1173
	Total Load			385		498	685	472	865	1217	559	1031	1459
21'	Live Load L/480			166		215	296	220	388	537	311	547	760
	Live Load L/360			222		287	394	293	517	716	414	729	1013
	Total Load			333		430	591	429	775	1074	507	935	1324
22'	Live Load L/480					187	257	191	337	467	270	476	661
	Live Load L/360					249	343	255	449	623	360	634	881
	Total Load					374	514	382	674	934	462	852	1206
24'	Live Load L/480						198		260	360	208	366	509
	Live Load L/360						264		346	480	277	489	679
	Total Load						396		519	719	388	716	1013
26'	Live Load L/480						156		204	283	164	288	400
	Live Load L/360						208		272	377	218	384	534
	Total Load						312		408	566	327	576	801

*Can be applied to the beam in addition to its own weight.

KEY TO TABLES
Live Load L.480 = Maximum Live Load - Limits Deflection to L/480
Live Load L.360 = Maximum Live Load - Limits Deflection to L/360
Total Load = Maximum Total Load - Limits Deflection to L/240

Allowable Uniform Load* (In Pounds Per Lineal Foot)

Span (Ft)		7 1/4" x 5"			9 1/4" x 5"				11 7/8" x 5"				14' X 5"			
	Condition	754	757	759	954	957	959	9511	1254	1257	1259	12511	1454	1457	1459	14511
10'	Live Load L/480	733	1261	1688	1352	2215	2880		2103	3177			2484	3459		
	Live Load L/360	1031	1681	2224	1681	2814	2880		2103	3177			2484	3459		
	Total Load	1222	2042	2670	1681	2814	2880		2103	3177			2484	3459		
12'	Live Load L/480	447	730	965	783	1282	1714	2276	1385	2285	2648		1725	2882		
	Live Load L/360	597	973	1287	1043	1709	2285	2400	1461	2553	2648		1725	2882		
	Total Load	849	1418	1893	1167	1954	2400	2400	1461	2553	2648		1725	2882		
14'	Live Load L/480	282	460	608	493	807	1079	1433	872	1439	1943	2269	1229	2026	2471	
	Live Load L/360	376	613	811	657	1076	1439	1911	1073	1876	2269	2269	1267	2232	2471	
	Total Load	563	919	1216	857	1436	1937	2057	1073	1876	2269	2269	1267	2232	2471	
16'	Live Load L/480	189	308	407	330	541	723	960	584	964	1302	1753	823	1357	1838	2162
	Live Load L/360	252	411	543	440	721	964	1280	779	1285	1736	1986	970	1709	2162	2162
	Total Load	377	616	815	656	1081	1446	1800	822	1436	1986	1986	970	1709	2162	2162
17'	Live Load L/480	157	257	340	275	451	603	800	487	804	1085	1462	686	1131	1533	2035
	Live Load L/360	210	342	453	367	601	804	1067	649	1071	1447	1869	860	1509	2035	2035
	Total Load	315	513	679	550	901	1206	1601	728	1272	1759	1869	860	1514	2035	2035
18'	Live Load L/480		216	286	232	380	508	674	410	677	914	1231	578	953	1291	1748
	Live Load L/360		288	381	309	505	667	899	547	903	1219	1642	767	1271	1722	1922
	Total Load		432	572	464	759	1016	1349	649	1135	1569	1765	767	1350	1879	1922
19'	Live Load L/480		184	243	197	323	432	573	349	576	777	1047	492	810	1098	1487
	Live Load L/360		245	324	263	430	576	765	465	767	1036	1396	655	1081	1464	1820
	Total Load		368	486	394	646	863	1147	583	1018	1408	1672	688	1212	1687	1820
20'	Live Load L/480		158	209	169	277	370	492	299	493	666	898	421	695	941	1275
	Live Load L/360		210	278	225	369	494	655	399	658	889	1197	562	926	1255	1699
	Total Load		315	417	338	554	740	983	526	919	1271	1589	621	1094	1522	1729
21'	Live Load L/480			180		239	320	425	258	426	576	775	364	600	813	1101
	Live Load L/360			240		319	426	566	345	568	768	1034	485	800	1084	1468
	Total Load			360		478	640	849	477	834	1151	1513	563	992	1381	1647
22'	Live Load L/480			157		208	278	369	225	371	501	674	317	522	707	958
	Live Load L/360			209		277	371	492	300	494	668	899	422	696	943	1277
	Total Load			313		416	556	739	435	741	1001	1349	513	904	1258	1572
23'	Live Load L/480					182	243	323	197	324	438	590	277	457	619	838
	Live Load L/360					243	325	431	262	433	584	787	369	609	825	1117
	Total Load					364	487	646	393	649	876	1180	470	827	1151	1504
24'	Live Load L/480					160	214	284	173	286	386	519	244	402	545	738
	Live Load L/360					214	286	379	231	381	514	693	325	536	726	983
	Total Load					320	428	569	346	571	771	1039	431	759	1057	1441
25'	Live Load L/480						190	252	153	253	341	460	216	356	482	653
	Live Load L/360						253	336	204	337	455	613	288	474	643	870
	Total Load						379	503	306	505	682	919	397	700	964	1305
26'	Live Load L/480						168	224		225	303	409	192	316	428	580
	Live Load L/360						225	298		299	404	545	256	422	571	774
	Total Load						337	448		449	607	817	367	633	857	1160
28'	Live Load L/480							179		180	243	327	154	253	343	464
	Live Load L/360							239		240	324	436	205	338	457	619
	Total Load							358		360	486	654	307	506	686	929
30'	Live Load L/480										197	266		206	279	378
	Live Load L/360										263	355		275	372	504
	Total Load										395	532		412	558	755

*Can be applied to the beam in addition to its own weight.

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Using Allowable Uniform Load Tables

1. Tables are based on uniform loads, the more restrictive or simple or continuous spans, and dry-use conditions. For other loads or span configurations, contact a Metwood representative.

2. The Beam Depth is designated by the first group of numbers in the beam nomenclature: 7 –> 7 ¼”, 9 –> 9 ¼”, 12 –> 11 7/8”, 14 –> 14”.

3. The Beam Width is designated by the second group of numbers in the beam nomenclature: 3 –> 3 ¼”, 5 –> 5”, 7 –> 7 ½”, 10 –> 10”.

4. To size a beam it is necessary to check both live and total load. Selected beam must work in both rows.

5. For 7 ½” Width Beam Capacity, multiply the 5” Width Beam Capacity by 1.5. For 10” Width Beam Capacity, multiply the 5” Width Beam Capacity by 2.

6. To size a member for a span not shown, use capacities for the next larger span shown (example: for 7’ span, use values shown for 8’ span).

7. Verify deflection limit with local building code requirements.

8. Bearing across full width of beam is assumed. Minimum beam bearing length is 2”. Adequate bearing condition and material are the responsibility of the contractor or end user of the beam.

9. Provide lateral support at bearing points, and continuous lateral support along the top edge of beam.

Example:

Select a Metwood beam to carry 400 PLF live load + 400 PLF dead load floor loading, spanning 20’, with a Live Load Deflection of L/360.

Adding 400 PLF Live Load and 400 PLF Dead Load gives a total load of 800 PLF. Determine if width or depth is a factor. For this example, we can utilize a 5” width beam. Find 20’ in the left most columns. To the right are three rows showing Live Load L/480, Live Load Load L/360, and Total Load. In the row marked Total Load, move to the right to locate a total load of at least 800 PLF. The 1257 beam can carry 919 PLF Total Load. Next, check Live Load capacity. The 1257 beam can carry 658 PLF Live Load. Therefore, 1257 is adequate to carry the required loading and meets the deflection criteria.

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Metwood, Inc.
819 Naff Rd. Boones Mill, VA. 24065
540-334-4294 www.metwood.com

Specification Data Sheet

Dynatruss Pre-Engineered Cold Formed Steel Trusses

Manufacturer

Allied Tube & Conduit
16100 South Lathrop Avenue
Harvey, IL 60426

Phone: 877-336-4332
Fax: 708-339-2399
www.dynatruss.com

Product Description

Dynatruss truss products are proprietary, patented, cold-formed steel sections for use in the fabrication of pitched or flat pre-engineered cold formed steel trusses for light commercial and residential applications. Symmetrical sections and in-plane geometry combine to produce an exceptional strength to weight ratio and easy handling.

Dynatruss manufactures multiple chord depths in several gauges along with 1.5" square and 1.5" X 2.5" – 3.5" rectangular web sections in three gauges to ensure maximum efficiency and design flexibility while greatly reducing the need for permanent in-plane and out of plane bracing. Dynatruss steel trusses offer the most cost effective solution for the shortest jack trusses to 70' clear spans.

Dynatruss steel trusses are increasingly being specified on structures needing to meet non-combustible requirements such as schools, care facilities, hotels/motels, churches and institutional structures. Dynatruss steel trusses are compatible with steel c-stud, wood stud, structural steel, CMU support or nearly any other wall system.

Technical Data

Truss components are manufactured from quality steel conforming to ASTM A-653 or ASTM A-500, and have galvanized coatings in accordance with ASTM A-924 and ASTM A-653, G-90 minimum or G-90 equivalent exterior coating weight (G-60 on CW20). The following table provides minimum requirements for thickness and yield strengths for chord and web material:

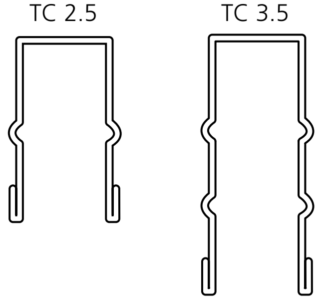
Truss Chord Material

22ga	.0269	50 ksi
20ga	.0329	50 ksi
18ga	.0428	50 ksi
16ga	.0538	50 ksi
14ga	.068	50 ksi

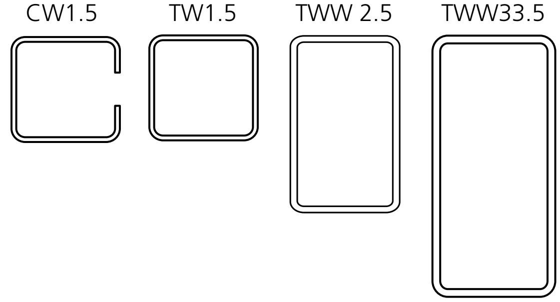
Truss Web Material

22ga	.027	50 ksi	C-Shape
20ga	.033	33 ksi	C-Shaped & Square
18ga	.043	45 ksi	Square & Rectangle
16ga	.061	45 ksi	Square & Rectangle
14ga	.071	45 ksi	Square & Rectangle

TC 2.5 TC 3.5



CW1.5 TW1.5 TWW 2.5 TWW33.5



Structural properties of Dynatruss chord and web members are calculated in accordance with the American Iron and Steel Institute (AISI) "Specification for the Design of Cold-Formed Steel Structural Members, August 1986 Edition with December 11, 1989 Addendum." Also, conforms to AISI Standard for Cold-Formed Steel Framing – Truss Design, December 2004 Edition.

Specification Data Sheet

Dynatruss Pre-Engineered Cold Formed Steel Trusses

Truss member connections shall be made with either #10, #12, or ¼" self-drilling screws. The following allowable shear capacities are used in design.

Self Drilling Screw	Allowable Shear Capacity (lbs.) for Chord Material Thickness			
	22ga	20ga	18ga	16ga
#10	166	240	263	370
#12	166	240	280	569
¼"	166	240	302	613

Product Availability and Cost

Dynatruss cold formed steel trusses are available from a nationwide network of authorized fabricator affiliates. Project, layouts, component designs, and project costs are obtained directly from the affiliate. In budgeting a project, Dynatruss steel trusses will be very cost-effective versus fire retardant lumber, concrete, bar joist and other non-combustible framing products. Contact Dynatruss at 877-336-4332 for assistance in locating an authorized Dynatruss affiliate.

Technical Services

Dynatruss cold formed steel trusses are designed through authorized Dynatruss fabricator affiliates with Dynatruss truss engineering software developed by Keymark Enterprises. Individual components and truss to truss connection designs are reviewed and certified by Keymark Engineering as required. The overall building design remains the responsibility of the building designer. Building designer may be an Engineer, Architect, the Engineer of Record, a registered building designer, the building owner, or the contractor as appropriate.

Installation

Cold formed steel trusses are planar structural components. Structural performance depends on the trusses being installed vertically, in-plane, at specified spacing and being properly braced. Field installation of trusses, including proper handling, safety precautions, temporary erection bracing and any other safeguards or procedures consistent with good workmanship and good building installation practices, shall be the responsibility of the contractor and/or truss installer. If it is necessary to store trusses prior to installation, trusses shall be adequately supported, whether stacked either vertically or horizontally, in order to avoid damage. Framing anchors and/or truss hangers shall be installed by the installation contractor in accordance with the building designer's drawings, or truss-to-truss connection drawings provided. Concentration of construction loads greater than the design loads shall not be applied to the trusses at any time.

The field removal, cutting or alteration of any truss chord, web or bracing member is not allowed without the prior written approval of the truss designer. Dynatruss truss components require no maintenance when installed in an enclosed, properly ventilated roof or floor cavity designed to maintain relative humidity below 95%.

Code Application

Dynatruss truss chord section properties are recognized under ICBO ER5226 and Dynatruss trusses carry four (4) UL assembly ratings. Dynatruss personnel are active members of the Committee on Framing Standards, Light Gauge Steel Engineers Association, American Society for Testing and Materials, and the American Iron and Steel Institute.

Limited Warranty

Seller only warrants to Buyer that the goods to be shipped hereunder will meet the applicable specifications as state in Seller's technical literature. The foregoing express warranty is exclusive and in lieu of any and all other warranties, whether written, oral or implied, including any warranty of merchantability or of fitness for a particular purpose. If it appears within thirty (30) days from the date of receipt by Buyer or Buyer's agent that the goods shipped do not meet Seller's above express warranty and Buyer notifies Seller, in writing within such period, Seller, at its option, will repair or replace such defective goods or return the purchase price paid therefore by Buyer. The liability of Seller to Buyer arising out of the sale of goods or their use, whether on warranty, contract or negligence is limited only to the replacement or repair of defective goods or the return of purchase price, as herein provided. Upon the expiration of said thirty (30) days period all such liability shall terminate. The foregoing shall constitute the sole remedy of the Buyer and the sole liability of the Seller. In no event shall the Seller be liable for special, incidental or consequential damages. Buyer shall bear all costs of disassembly, shipment, and reinstallation of any defective, repaired or replaced goods and shall return to Seller upon written request of Seller, all goods for which refund of purchase price is made.

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DYNATRUSS™ 16100 S. Lathrop Avenue, • Harvey, IL 60426 • ph 877-336-4332 • fax 708-339-2399

Innovative Technologies of Cold-Formed Steel Components

Purpose Statement:

The purpose of this presentation is to inform and educate builders, architects, engineers, and more on the innovative technologies surrounding the uses of Cold-Formed Steel Components in the Building Industry.

This presentation will show how the use of CFS Components can be utilized in wood, steel, ICF, SIP, Log, Timber-Frame, and any additional framing material that may be used for construction. Furthermore, this presentation will also highlight the many advantages of using CFS Components, such as durability, material quality, strength, Green Building product, and more.

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SQUAREcolumns™
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FRAMINGsystems™
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Metwood offers a complete line of CFS framing products including studs, bracing, fasteners, trusses, and wall panels. Metwood can also design and fabricate additional items including stairs, walkways, and more.

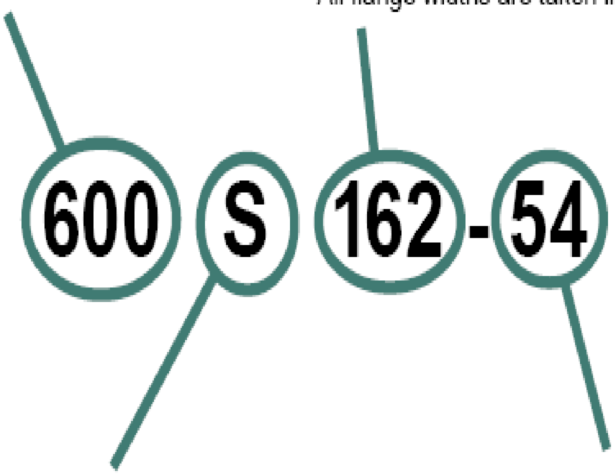
Product Identification

All SSMA products have a four part identification code which identifies the size (both depth and flange width), style, and material thickness of each member.

Example:

Member Depth:
*(Example: 6″ = **600** × $\frac{1}{100}$ inches)*
All member depths are taken in $\frac{1}{100}$ inches. For all "T" sections member depth is the inside to inside dimension.

Flange Width:
*(Example: 1 ⅝″ = 1.625″ ≈ **162** × $\frac{1}{100}$ inches)*
All flange widths are taken in $\frac{1}{100}$ inches.



Style:
*(Example: Stud or Joist section = **S**)*
The four alpha characters utilized by the designator system are:

S = Stud or Joist Sections
T = Track Sections
U = Channel Sections
F = Furring Channel Sections

Material Thickness:
*(Example: 0.054 in. = **54** mils; 1 mil = $\frac{1}{1000}$ in.)*
Material thickness is the minimum base metal thickness in mils. Minimum base metal thickness represents 95% of the design thickness.

Note: For those sections where two different yield strengths (33 ksi and 50 ksi) are shown, the yield strength used in the design, if greater than 33 ksi, needs to be identified on the design and ordering of steel. (i.e., 600S162-54 (50 ksi))

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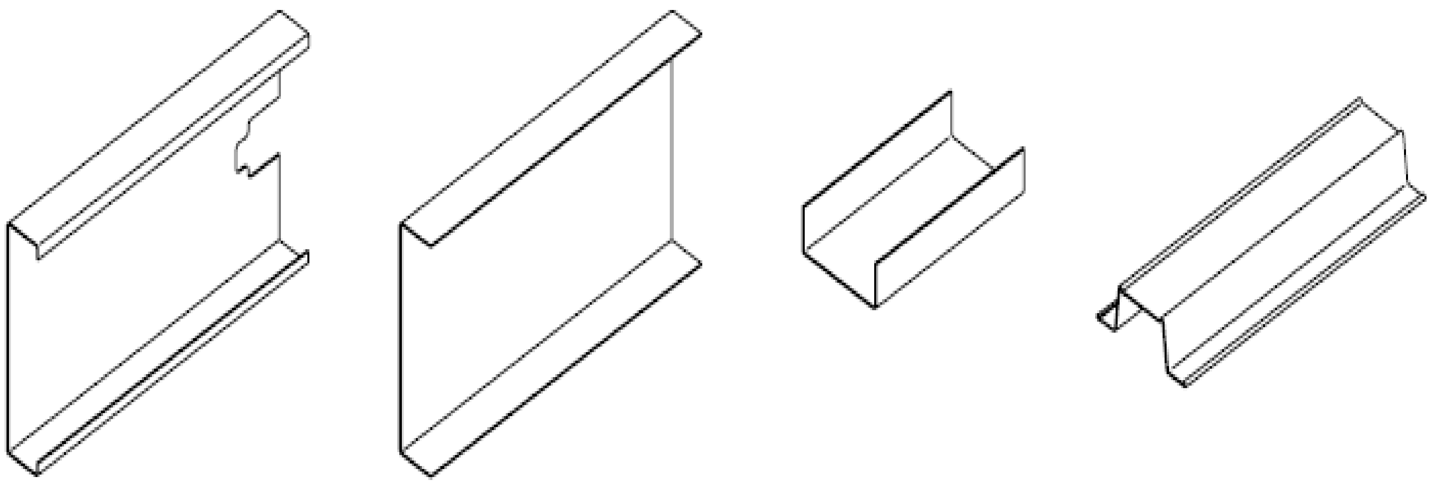
Nomenclature



C-STUD / JOIST — *S-SECTIONS*
TRACK — *T-SECTIONS*
CHANNEL — *U-SECTIONS*
FURRING CHANNEL — *F-SECTIONS*

Component Thickness

Minimum Thickness[1] (mils)	Design Thickness (in)	Inside Corner Radii (in)	Reference Only Gauge No.
18	0.0188	0.0843	25
27	0.0283	0.0796	22
30	0.0312	0.0781	20 - Drywall
33	0.0346	0.0764	20 - Structural
43	0.0451	0.0712	18
54	0.0566	0.0849	16
68	0.0713	0.1069	14
97	0.1017	0.1525	12

Stiffening Lip Length

Section	Flange Width	Design Stiffening Lip Length (in)
S125	1 1/4"	0.188
S137	1 3/8"	0.375
S162	1 5/8"	0.500
S200	2"	0.625
S250	2 1/2"	0.625

[1]*Minimum Thickness represents 95% of the design thickness and is the minimum acceptable thickness delivered to the job site based on Section A2.4 of the 2001 NASPEC.*

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Specifications

Material Specification *(ASTM)*

Drywall Nonstructural Framing Members & Accessories	A1003
Structural Framing Members & Accessories	A1003
FrameRite Framing Members & Accessories	A1003
Beads & Trims (Metal, Paper, Vinyl)	A653/
Plaster Steel Products	
Veneer & Plaster Accessories	A65

Product Specification *(ASTM)*

Drywall Nonstructural Framing Members & Accessories	
Structural Framing Members & Accessories	
FrameRite Framing Members & Accessories	
Beads & Trims (Metal, Paper, Vinyl)	
Plaster Steel Products	
Veneer & Plaster Accessories	C841/

Coating Specification *(ASTM)*

Drywall Nonstructural Framing Members & Accessories	
Structural Framing Members & Accessories	
FrameRite Framing Members & Accessories	C645/
Beads & Trims (Metal, Paper, Vinyl)	
Plaster Steel Products	
Veneer & Plaster Accessories	(

Design Specification *(AISI)*

The Specification for the Design of Cold Formed Steel Structural Members.

Coating Specification Explanation

Drywall Products Nonstructural Including StudRite G40 min or equ
Non structural products have a coating conforming to ASTM Specifi
A1003-G40 minimum weight or have a protective coating with the in
standard requirements of ASTM C645.

Structural Products Including StudRite G60 min or equ
Structural products have a protective coating conforming to ASTM Specifi
A1003-G60 minimum coating weight or have a protective coating wi
industry standard requirements of ASTM C955.

FrameRite Products (Except StudRite) & Special Orders G90 min or equ
A G90 coating weight is standard for JoistRite and TrussRite systems and
available as a special order for structural framing products. G90 must be requ
at the time of order and may require additional cost and delivery time.

ASTM Specification Descriptions

A591

Standard Specification for Steel Sheet, Electrolytic Zinc-Coated, for Light Coating Weight [Mass] Applications

A653

Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy Coated (Galvannealed) by Hot-Dip Process

A1003

Standard Specification for Steel Sheet, Carbon, Metallic- and Nonmetallic-Coated for Cold Formed Framing Members

B69

Standard Specification for Rolled Zinc

C645

Standard Specification for Nonstructural Steel Framing Members

C841

Standard Specification for Installation of Interior Lathing and Furring

C847

Standard Specification for Metal Lath

C955

Standard Specification for Load-Bearing (Transverse and Axial) Steel Studs, Runners (Tracks), and Bracing or Bridging for Screw Application of Gypsum Panel Products and Metal Plaster Bases.

C1047

Standard Specifications for Accessories for Gypsum Wallboard and Gypsum Veneer Base

C1063

Standard Specifications for Installation of Lathing and Furring to Receive Interior and Exterior Portland Cement-Based Plaster.

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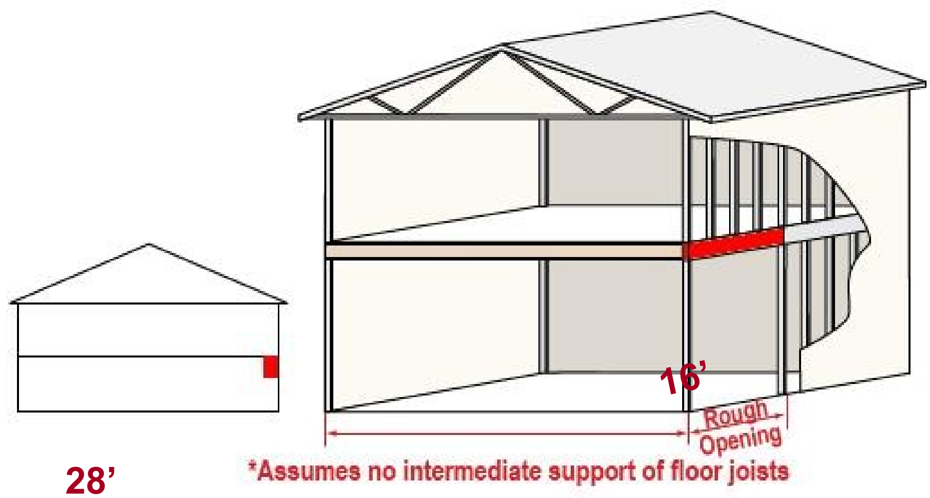
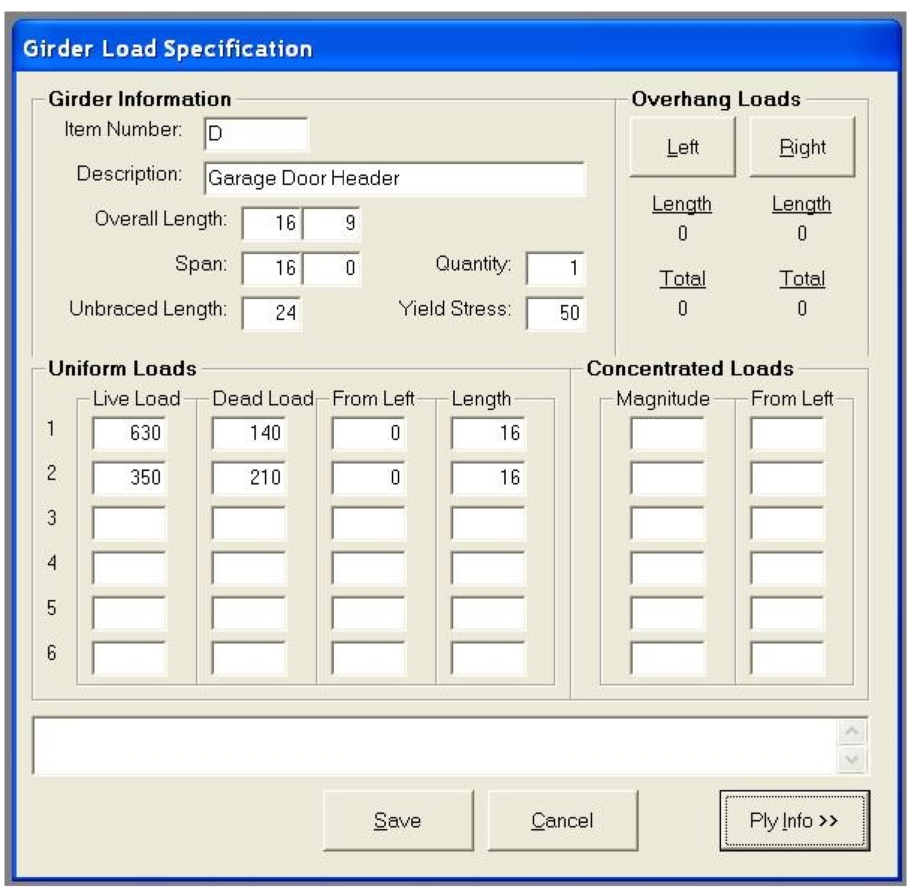
OrderEntry Program





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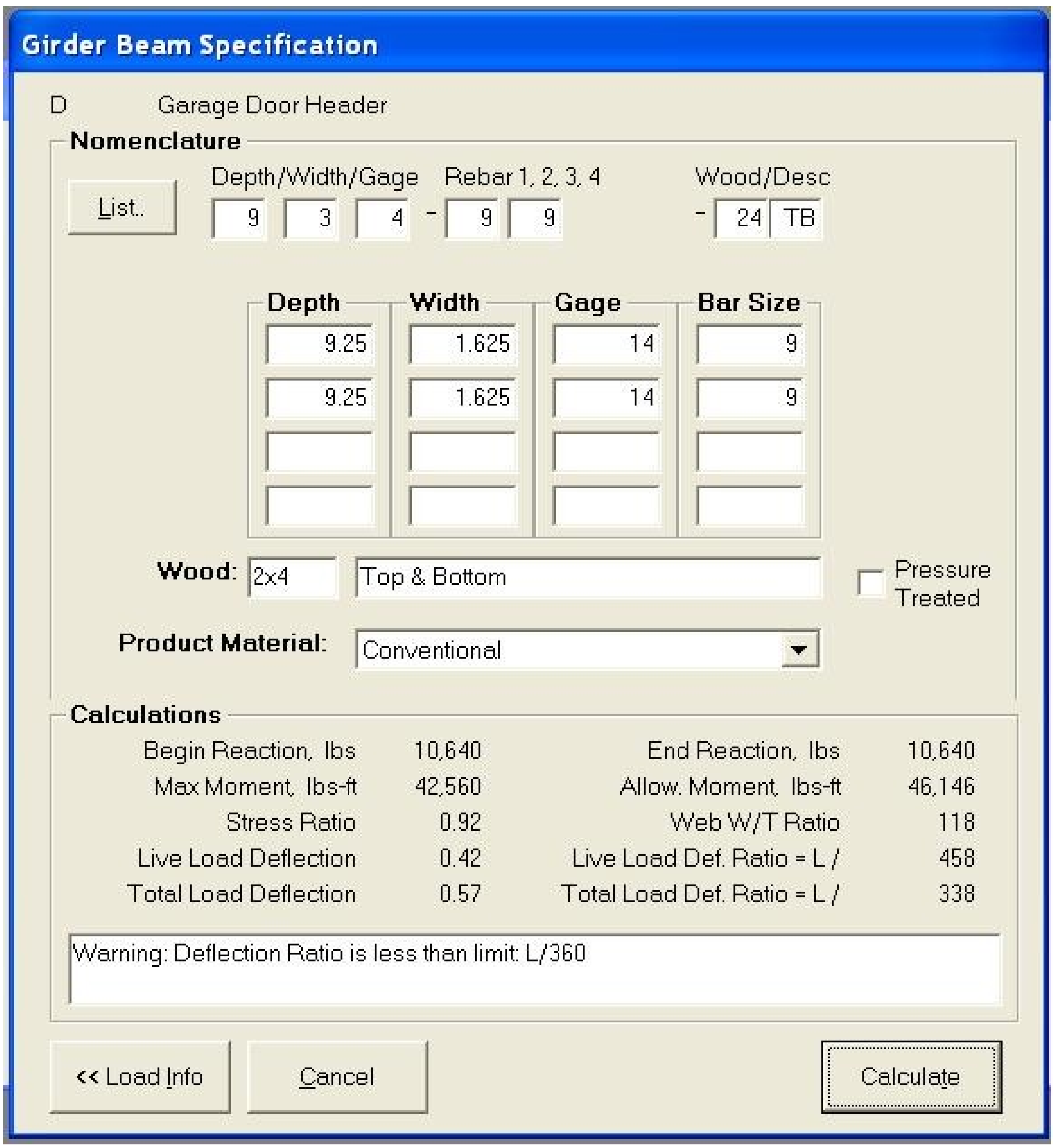

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OrderEntry Program

METWOOD BUILDING SOLUTIONS

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Girders
Copy 1 Of 1

Item Number D
Overall Length: 16' 9"
Span: 16' 0"
Unbraced Len: 24 Inches
Quantity: 1
Product: 934-99-24TB

Customer: TEMPORARY TEST
Job Number: 23133 Sales Rep: RAY
Job Site: METZ JOB
Location: ROANOKE,VA.
Order Date: 9/9/2005
Finish Date: 9/9/2005
Deliver Date: 9/9/2005

Description: Garage Door Header Conventional
Wood: 2x4 Top_Bottom

Load Information

Description	Live Load	Dead Load	From Left	Length
1. Uniform	630 Lbs	140 Lbs	0 Ft	16 Ft
2. Uniform	350 Lbs	210 Lbs	0 Ft	16 Ft

Ply Information

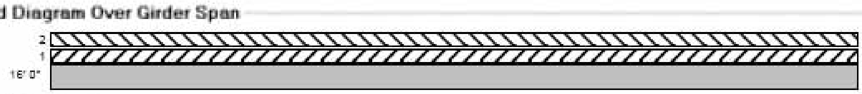
Description	Size	Yield Stress	Rebar
1	9.25X1.625	50 KSI	No. 9
2	9.25X1.625	50 KSI	No. 9

Engineering Specification

Begin Reaction 10640 Lbs
Maximum Moment: 42560 Lbs-Ft
Stress Ratio: 0.92
Live Load Deflection: 0.42
Total Load Deflection: 0.57

End Reaction: 10640 Lbs
Allowable Moment: 46146 Lbs-Ft
Web w/t Ratio 118
Live Load Deflection Ratio: L/458
Total Load Deflection Ratio: L/338

Load Diagram Over Girder Span



Special Instructions

Disclaimer

This certification indicated on this sheet is limited to the adequacy of the Metwood beam to support the indicated loads within the parameters listed in the 2000 International Building Code. This certification is null and void if additional loads or load patterns differing from those indicated on this sheet are applied to the beam.

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CFS Trusses

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Authorized
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Fabricator!

Pre-Engineered

Tubular Webbing

In-Line Design

Easier to Handle

Fire Resistant

Code Compliant

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CFS Wall-Panels

StudRite™

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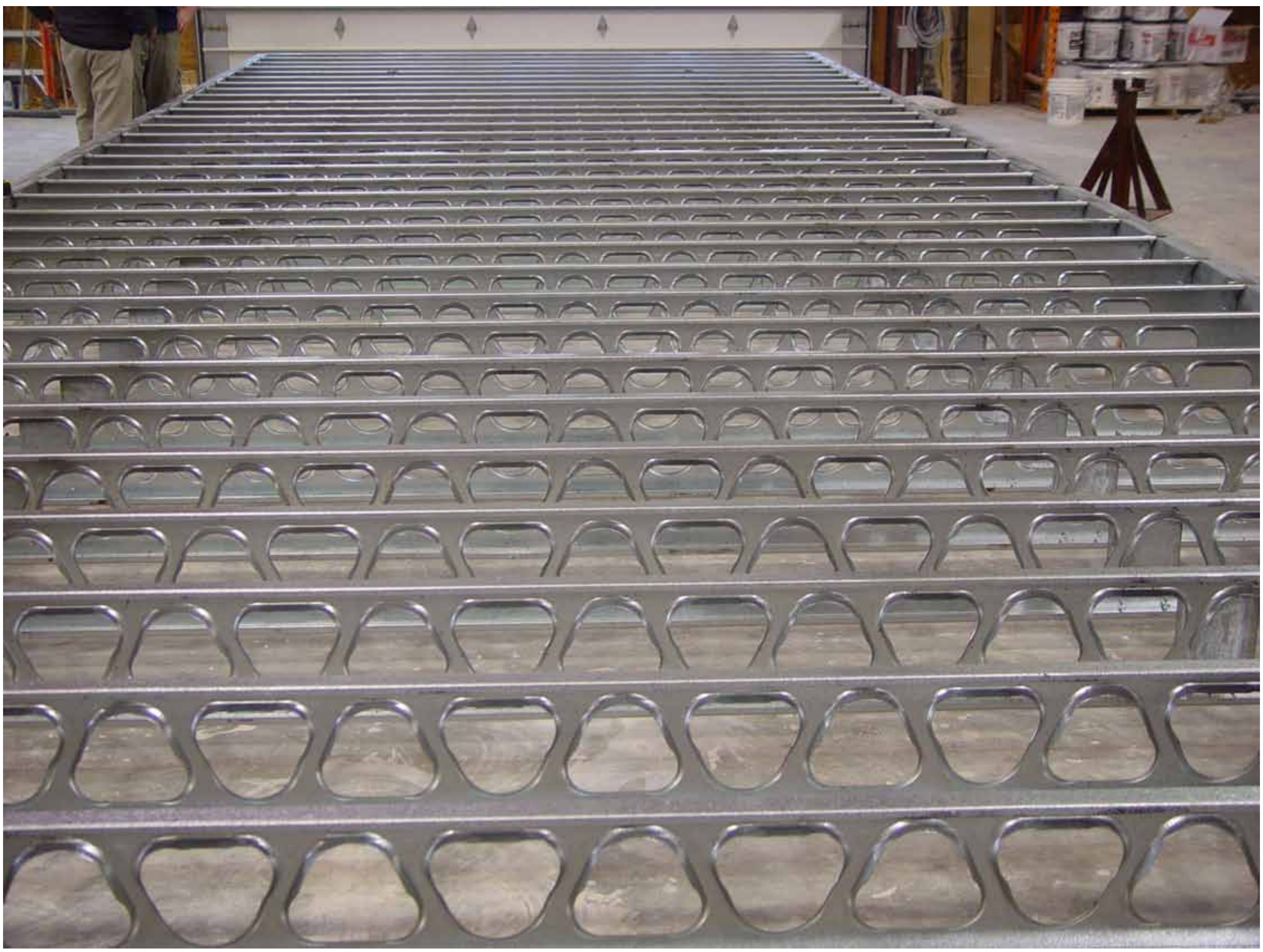
Modular Floor Systems



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Modular Floor Systems

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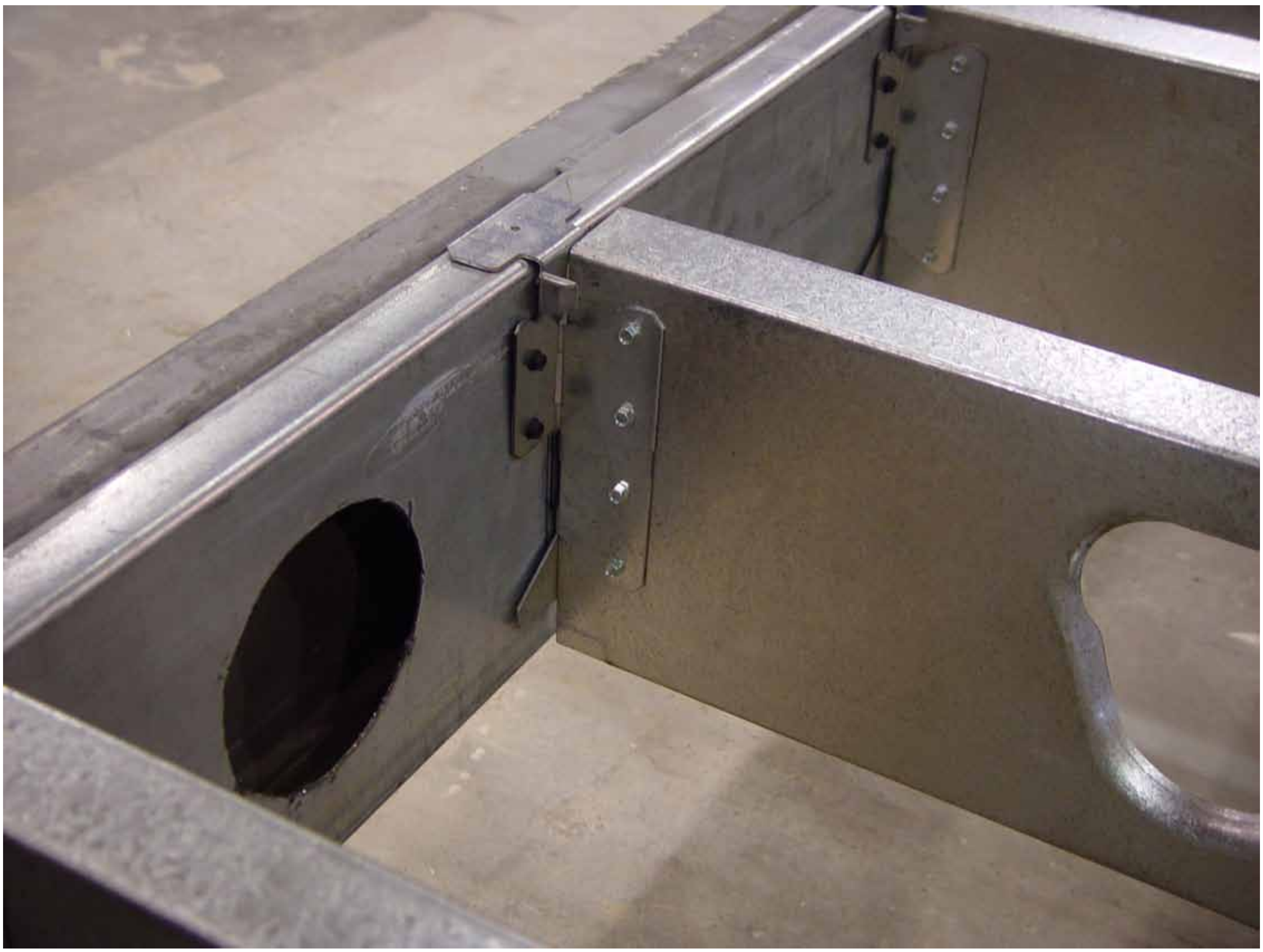
Modular Floor Systems



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Modular Floor Systems

*tru***SPAN**™

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*tru*SPAN™ Internally Reinforced Structural Beams are smaller, lighter, more versatile than any product of similar strength, and they screw in place so no welding is required. Now you can span greater distances with fewer vertical supports, improve capability, speed schedules, and lower costs. *tru*SPAN™ will revolutionize your projects!

truSPAN™

by Metwood

Flush Mounted Girder

truSPAN™

by Metwood

Applications

*through*SPAN™

by Metwood

*through*SPAN™ Internally Reinforced Structural Beams give the builder and designers all of the same advantages of the *tru*SPAN™ beams. *through*SPAN™ are a major breakthrough in construction technologies that allow the passage of utilities through the structural member.

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Flush Mounted Girders

throughSPAN™

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Applications

*deck*SPAN™

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*deck*SPAN™ is the ultimate suspended concrete deck system. While utilizing the strength and advantages of *tru*SPAN™ and / or *through*SPAN™, the systems can be designed to accommodate the dimensions and desires required for the project. These decks can be designed with angles, a radius, offsets, and more with limitless finishing options. They are sure, solid, and Radiant Ready.

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Angled Deck with Sunroom

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Upper Floor creates Dry Space Below

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Screened Deck **No Bugs**

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Radius Deck with Cantilever

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*floor*SPAN™ is the ultimate suspended concrete floor system. While utilizing the strength and advantages of *tru*SPAN™ and / or *through*SPAN™, the systems can accommodate large rooms with fewer vertical supports. The technologies of *floor*SPAN™ can be applied to garages, porches, mezzanines, and entire floor systems. These floors are sure, solid, and Radiant Ready.

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Radiant Ready Floors

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Utilities within 12" System

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Garage on Main Floor / Room Below

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Applications

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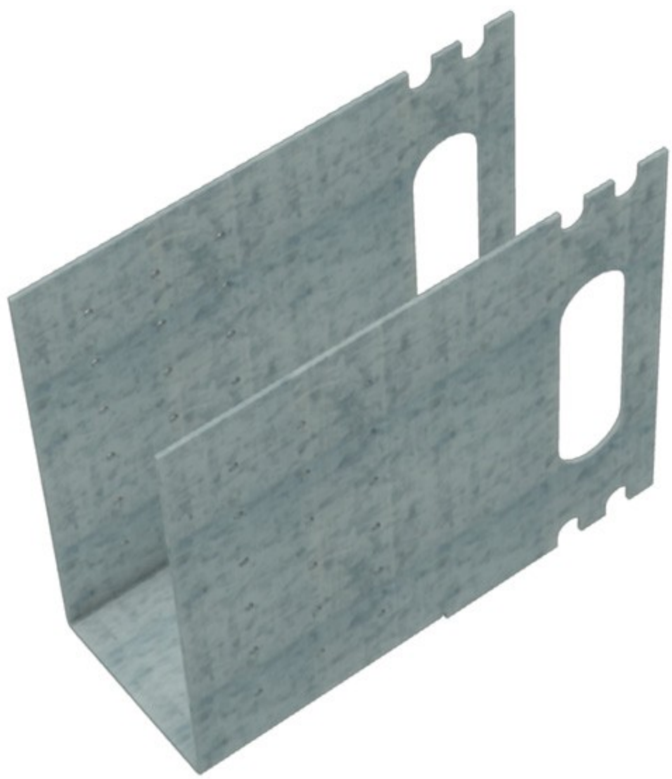
ICF Hanger



Metwood ICF Hanger

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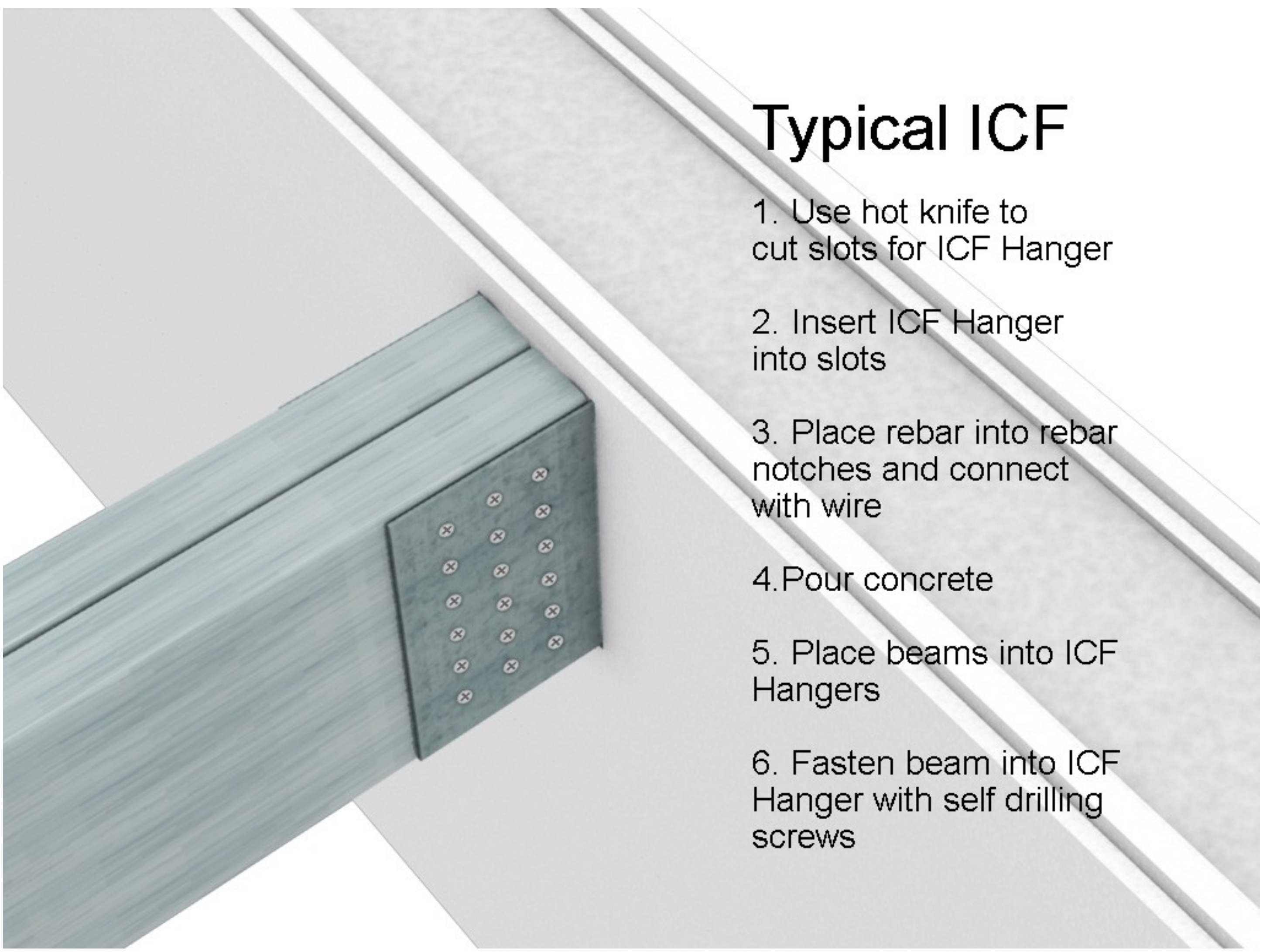
ICF Hanger



REINFORCER™
technologies
by Metwood

Metwood's Patented CFS Joist Reinforcers allow the routing of large pipe, conduit, utilities, and small HVAC ducts through wood floor joists.

REINFORCER*technologies*™ are available in several styles including a notched version to accommodate Offset Commode Flanges. They are available for I-Joists, 2x8's, 2x10's and 2x12's.

REINFORCER™ technologies

by Metwood

I-Joists

I-Joist Flange Reinforcer

Joist Depth	Notch Size
9-1/2"	3-1/4" H x 5" W
11-7/8"	4" H x 5" W
14"	4" H x 5" W
16"	4" H x 5" W

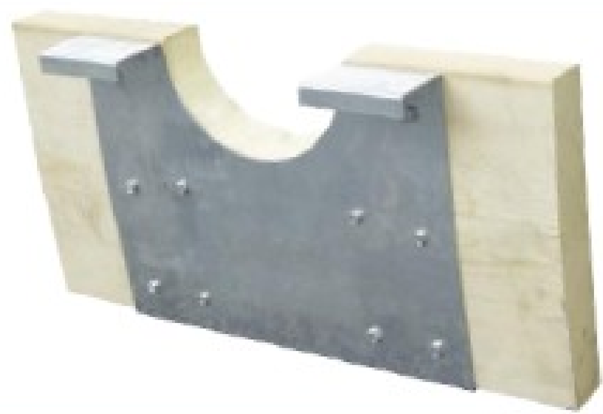
I-Joist Web Reinforcer

Joist Depth	Opening Size
9-1/2"	5-1/2" H x 12" W
11-7/8"	7-7/8" H x 12" W
14"	10" H x 16" W
16"	12" H x 16" W

REINFORCER™
technologies
by Metwood

Conventional Framing

Notch Reinforcer	
Joist Depth	Notch Size
2"x 10"	3-1/2" H x 5"W



Hole Reinforcer	
Joist Depth	Hole Size
2"x 8"	4"
2"x 10"	6"
2"x 12"	6"

210HR Joist Reinforcer
ICC ES Legacy Report 97.73

SQUAREcolumns™

by Metwood

Metwood's CFS Structural Columns have many advantage:

2. Small enough to fit inside a stud wall
3. Easily attached to, as well as easy to plumb.
4. Can be cut to length on the jobsite.
5. Higher strength values.

SQUAREcolumns™

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Load Stickers

TRIMMABLE COLUMN
3" X 3" X 13GA.

ALLOWABLE AXIAL LOAD
CAPACITIES

9' - 18,637
10' - 16,162
12' - 11,386

FOR YOUR LOCAL DEALER CALL
866-METWOOD
OR VISIT OUR WEBSITE
www.metwood.com

TRIMMABLE COLUMN
4" X 4" X 13GA.

ALLOWABLE AXIAL LOAD
CAPACITIES

10' - 29,776
12' - 25,280
14' - 20,263

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TRIMMABLE COLUMN
4" X 4" X 11GA.

ALLOWABLE AXIAL LOAD
CAPACITIES

10' - 37,204
12' - 31,503
14' - 25,139

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SQUARE*columns*™

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Cut-to-Length and Install

REINFORCER™
technologies
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Reports

Legacy Report

ICC Evaluation Service, Inc.

In-situ Repair for Improperly cut I-Joists

Department of Wood Science and Forest Products
Virginia Polytechnic Institute and State University

LEGACY REPORT

97-73

Reissued April 1, 2005

ICC Evaluation Service, Inc.
www.icc-es.org

Business/Regional Office ■ 5360 Workman Mill Road, Whittier, California 90601 ■ (562) 699-0543
Regional Office ■ 900 Montclair Road, Suite A, Birmingham, Alabama 35213 ■ (205) 599-9800
Regional Office ■ 4051 West Flossmoor Road, Country Club Hills, Illinois 60478 ■ (708) 799-2305

Legacy report on the BOCA® *National Building Code*/1999 and the 1998 *International One- and Two-Family Dwelling Code*®

DIVISION: 06—WOOD AND PLASTICS
Section: 06090—Wood and Plastic Fastenings

REPORT HOLDER:

METWOOD, INC.
819 NAFF ROAD
BOONES MILL, VIRGINIA 24065
(540) 334-4294
www.metwood.com

EVALUATION SUBJECT:

METWOOD 2×10 JOIST REINFORCER

EVALUATION SCOPE

Compliance with the following codes:

BOCA® *National Building Code*/1999

- Section 106.4 Alternative materials and equipment
- Section 2305.3 Cutting and notching
- Section 2305.3.1 Solid lumber joists

1998 *International One- and Two-Family Dwelling Code*®

- Section 108.1 Alternative materials, methods, and equipment
- Section 502.6 Drilling and notching
- Section 502.6.1 Sawn lumber

DESCRIPTION

The Metwood 2×10 Joist Reinforcer is a steel plate bracket with fasteners that allows for holes larger than those allowed by the applicable code to be used on nominal 2×10 solid sawn No. 2 Southern pine lumber joists. The Metwood 2×10 Joist Reinforcer is fabricated from 18 gauge steel with a yield strength (Fy) of 50 ksi conforming ASTM A 446, to allow for a 6-inch-diameter (51 mm) hole located in the center of the joist depth. See Figure 1 of this report for a diagram of, and installation requirements for, the Metwood 2×10 Joist Reinforcer.

CONDITIONS OF USE

This report is limited to the applications and products as stated in this report. The ICC-ES Subcommittee on National Codes intends that the report be used by the code official to determine that the report subject complies with the code requirements specifically addressed, provided that this product is installed in accordance with the following conditions:

- The Metwood 2×10 Joist Reinforcer shall be installed in accordance with this report.
- The Metwood 2×10 Joist Reinforcer shall be limited to use with nominal 2×10 solid sawn No. 2 Southern pine lumber joists with a maximum span of 15 feet (4570 mm).
- A maximum of one Metwood 2×10 Joist Reinforcer shall be used along the span of the joist.
- Holes in the joists, other than the Metwood 2×10 Joist Reinforcer, shall be limited to a maximum size of $1^1/_2$-inch-diameter (38 mm), and shall be no closer than 20 inches (508 mm) from either outside edge of the Metwood 2×10 Joist Reinforcer.
- The application of the Metwood 2×10 Joist Reinforcer is limited to covered, dry conditions of use. Dry conditions of use are those conditions at which the moisture content for solid-sawn lumber is less than 16 percent.
- Use of the Metwood 2×10 Joist Reinforcer with preservative treated lumber is outside the scope of this report.
- The Metwood 2×10 Joist Reinforcer shall not be located closer than 12 inches (305 mm) from the closest support.
- This report is subject to periodic re-examination. For information on the current status of this report, contact the ICC-ES.

APPLICATION FOR PERMIT

To aid in the determination of compliance with this report, the following represents the minimum level of information to accompany the application for permit:

- The language "See ICC-ES Legacy Report No. 97-73" or a copy of this report;
- Construction documents indicating compliance with this report. The following items shall be clearly shown on the construction documents:
  - Location and quantity of the Metwood 2×10 Joist Reinforcer, consistent with this report.
  - Species, Grade, nominal cross-sectional size, and span of the solid sawn lumber joists used with the Metwood 2×10 Joist Reinforcer, consistent with this report.
  - Design calculations and details verifying the ability of the building structure, in which the Metwood 2×10 Joist Reinforcer is used, to carry all superimposed loads as required by Chapter 16 of the BOCA® *National Building Code*/1999. These documents shall be prepared by an individual competent and qualified in the application of the structural design principles involved. The individual shall possess the registration or license in accordance with the professional registration laws of the state in which the project is constructed.

ICC-ES legacy reports are not to be construed as representing aesthetics or any other attributes not specifically addressed, nor are they to be construed as an endorsement of the subject of the report or a recommendation for its use. There is no warranty by ICC Evaluation Service, Inc., express or implied, as to any finding or other matter in this report, or as to any product covered by the report.

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ITEMS REQUIRING VERIFICATION

The following items are related to the use of the report subject, but are not within the scope of this evaluation. However, these items are related to the determination of code compliance:

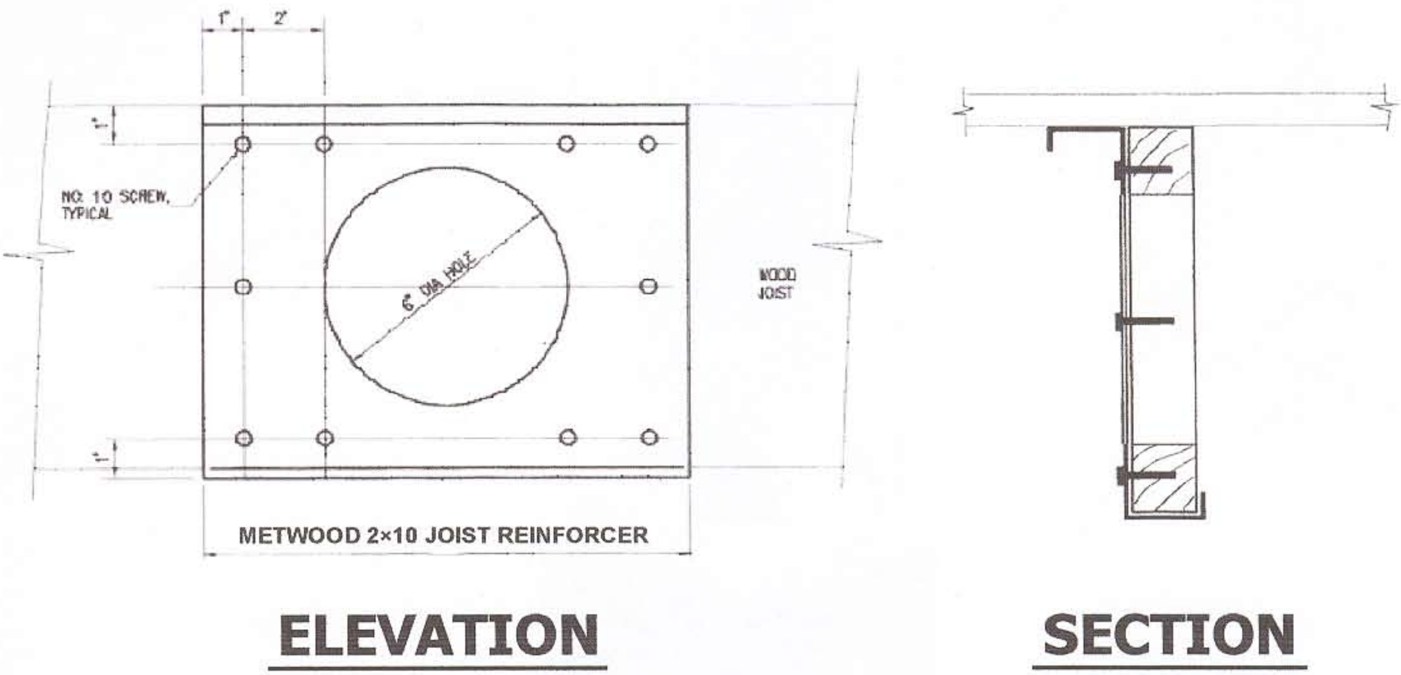
- • Details, notes and calculations for the design and construction of the building structure in which the Metwood 2×10 Joist Reinforcer is used, as required by the BOCA® *National Building Code*/1999, prepared by a qualified individual as indicated in this report.

INFORMATION SUBMITTED

- Report to Metwood Incorporated, prepared and signed by Dr. Joseph R. Loferski, dated July 20, 2000, containing physical testing and statistical analysis. The physical testing compared the maximum strengths and modulus of elasticity of nominal 2×10 solid sawn No. 2 Southern pine lumber joists, at a 15 foot span, with and without the Metwood 2×10 Joist Reinforcer installed. The joists without the Metwood 2×10 Joist Reinforcer installed were tested without holes or notches. The joists with the Metwood 2×10 Joist Reinforcer installed were tested with a 6-inch-diameter hole located at the Metwood 2×10 Joist Reinforcer in accordance with the manufacturer's instructions. Both bending and shear were investigated. The testing and analysis indicate no significant difference in maximum strength and modulus of elasticity of the joists tested.
- Standard specification for the sheet steel used for Metwood 2×10 Joist Reinforcer manufacture, by Metwood, Inc., containing minimum submittal, material and finish specifications for steel sheet to be used to manufacture the Metwood 2×10 Joist Reinforcer, consistent with this report.

PRODUCT IDENTIFICATION

- Metwood 2×10 Joist Reinforcer shall be marked at the plant with the identifying language "See ICC-ES Legacy Report No. 97-73."



10 fasteners shall be used in the predrilled holes located as indicated above.
The fasteners shall be $1^1/_4$-inch-long (32 mm) No. 10 wood screws.

FIGURE 1*—METWOOD 2×10 JOIST REINFORCER

*THIS DRAWING IS FOR ILLUSTRATION PURPOSES ONLY. IT IS NOT INTENDED FOR USE AS A CONSTRUCTION DOCUMENT FOR THE PURPOSE OF DESIGN, FABRICATION OR ERECTION.

In-situ Repair for Improperly Cut I-joists

Final Report for Metwood, Inc.

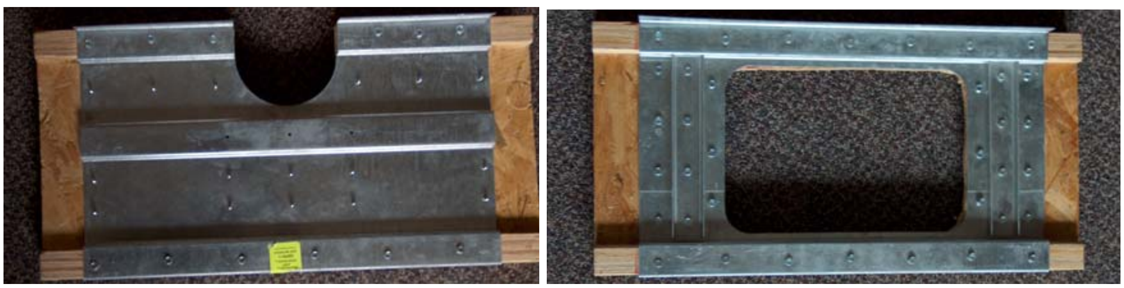
Department of Wood Science and Forest Products
Virginia Polytechnic Institute and State University

Prepared by Daniel P. Hindman and Joseph R. Loferski

May 1, 2006

Introduction and Purpose

Metwood, Inc. has invented two novel reinforcement products for in-situ repairs of improperly cut I-joists. These reinforcers are designed to increase the strength and stiffness of the improperly cut I-joists to appreciable levels. The two reinforcers address different repairs for the I-joist – one for flange repairs and one for web repairs. The "Metwood I-joist Flange Reinforcer" is a flange reinforcement that can accommodate a 5 inch diameter hole cut into the flange and part of the web with approximately 5 inches of the flange removed. The "Metwood I-joist Web Reinforcer" is a web reinforcement that can be used with a maximum hole size of 12 inches wide by 8 inches tall. For the I-joists tested, this maximum hole size of the web reinforcer leaves ½" of web connected to the top and bottom flange. Figure 1 shows the flange reinforcer (a) and web reinforcer (b).



(a) (b)

Figure 1: Metwood I-joist Reinforcers Tested, a) Metwood Ijoist Reinforcer MR100 Series, b) Metwood Web Reinforcer MR100 Series

The purpose of this testing was to determine the capacity of the I-joist Flange and I-joist Web Reinforcer products developed by Metwood, Inc. when subjected to bending loadings. All reinforcers were tested on 11-7/8" tall Boise BCI 600S I-joists. Table 1 lists the design properties of the I-joists from the Boise literature (www.bc.com/wood/ewp/east.jsp). The MR100 series Metwood I-joist Reinforcer and Metwood Web Reinforcer products were used with these I-joists.

Table 1: Mechanical Properties of 11-78" Boise BCI/60 2.0 I-joists

Property	Value
Weight	3 lbs per lineal foot
Moment	5307 ft-lbs
Bending Stiffness, EI	417×10^6 lb-in^2
Shear Deformation Coefficient, K	6.52×10^6 lbs
Maximum End Reaction on 3½" Bearing Support Without Web Stiffeners	1475 lbs

Test Methodology

Figure 2 shows the bending test configuration used for all specimens. A simply supported beam with a span of 15 feet was loaded at the third points (5 feet from each end). A series of lateral supports were positioned at approximately 32 inch intervals along the length of the beam to prevent lateral buckling of the specimen during the test.

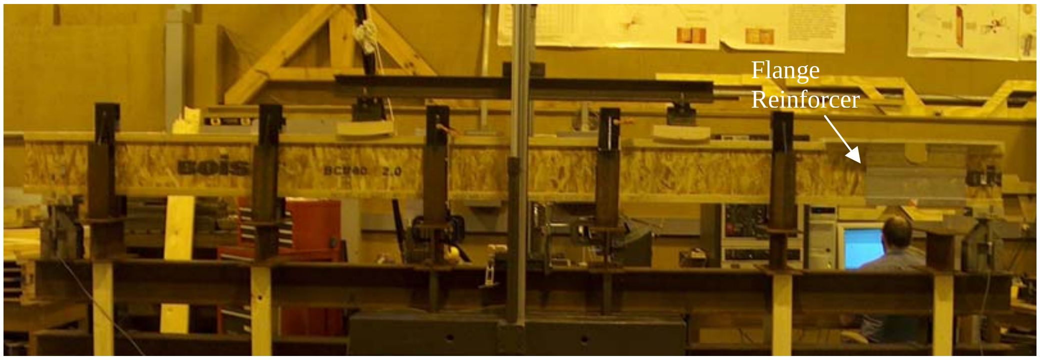


Figure 2: Simply Supported Beam with Load Applied at the Third Points, Specimen With Flange Reinforcer With Sheathing 11" From Support

An MTS universal test machine with a 50,000 lb maximum capacity was used for load application. Load was applied at 0.25 inches per minute until failure occurred. Deflection was measured by an integral LVDT in the MTS and also by an external LVDT attached to the specimen at the neutral axis at the center of the span. All data was collected and processed by HP Vee data acquisition software.

Test Plan

Table 2 shows the test plan used for this work. The variables studied included the type of reinforcement used, the location of the reinforcement, if a section of sheathing was used in the testing and if the reinforcer was glued to the I-joist. The Control group consisted of 5 uncut I-joists with no reinforcer used to provide a direct comparison for the other test results. The standard 'Flange' reinforcer used a U-channel reinforcement which was attached with self-tapping screws and used two reinforcers, one on either side of the I-joist. Variations of the flange reinforcer include 'FlangeGW##', which used two reinforcers with a welded rebar instead of the U-channel glued to the I-joist, 'FlangeG##' which used standard flange reinforcers glued to each side of the I-joist and single 'FlangeSS##', which was a single standard Flange reinforcer without glue. The standard 'Web' reinforcer was only applied to a single side. Variations of the web reinforcer included 'WebG##', which was a glued single web reinforcer and 'WebDG##' which was a glued double web reinforcer, one per side.

The location of the reinforcement ('##' portion of the sample nomenclature) was varied to study if the moment capacity of the I-joist changed as the position of the reinforcement changed. Eleven inches was the closest distance that the reinforcer could be placed to the end support. This condition represents the distance from the wall of a typical toilet drain pipe, which is one of the stated uses of the flange reinforcer. Other locations tested included 40 inches from the support, 60 inches from the support, which was directly under one of the load points, and 90 inches from the support, which was the midspan of the beam.

After some initial testing with bare I-joists (no sheathing), some of the flange reinforcers failed due to buckling of the top flange out of plane. Since the reinforcers are intended to be installed in-situ with sheathing already covering the I-joists, a 4 foot section of sheathing was centered over the reinforcer to simulate expected conditions for all other testing. A 5 inch diameter hole was also placed in the sheathing for the flange reinforcer and centered over the 5 inch hole in the reinforcer. The sheathing was attached to both the I-joist and reinforcer using a construction adhesive if noted and also self-tapping screws were placed in all pre-punched holes on the reinforcer (approximately 3 inches on center). Also note that all control samples were tested without sheathing. An 'S; was added to the end of the sample nomenclature t indicate that sheathing was applied during testing.

Table 2: Test Plan For Evaluation of Flange and Web Reinforcers

Name	**Type of Reinforcement**	**Location of Reinforcement (from support)**	**Include Sheathing?**	**Glue?**	**Number of Samples**
Control	No Reinforcement	N/A	No	No	5
FlangeGW90	Flange, welded rebar	90 inches	No	Yes	5
FlangeG90	Flange	90 inches	No	Yes	5
FlangeGS90	Flange	90 inches	Yes	Yes	1
FlangeSS90	Flange on one side only	90 inches	Yes	No	1
FlangeS90	Flange	90 inches	Yes	No	4
FlangeS60	Flange	60 inches	Yes	No	4
FlangeS40	Flange	40 inches	Yes	No	5
FlangeS11	Flange	11 inches	Yes	No	2
WebG11	Web	11 inches	No	Yes	2
WebDG11	Web Reinforcer on both sides of I-joist	11 inches	No	Yes	5
Web90	Web	90 inches	No	No	2
WebS90	Web	90 inches	Yes	No	5
WebS60	Web	60 inches	Yes	No	2
WebS40	Web	40 inches	Yes	No	6
WebS11	Web	11 inches	Yes	No	3

The standard installation instructions provided by Metwood include the use of construction adhesive to attach the reinforcers to the I-joists. However, the IBC only allows for the structural attachment using adhesive if an independent certified third party inspects the joints. Since this procedure was felt to be too tedious, the majority of the reinforcers were tested without construction adhesive. This lack of adhesive should provide a worst case scenario for the reinforcers.

Criteria to compare the performance of the I-joist reinforcers need to be created. The following criteria were used, as well as analysis and description of the failures of each test group.

a) Maximum load at failure – the maximum load that the I-joist held

b) Load-deflection slope – this slope is used for stiffness comparisons due to the difficulty of determining EI for the reinforced sections

c) Load at a deflection of L/240 (or 15 ft *12 in/ft / 240 = 0.75 in) – this is the standard deflection limit criteria for dead loads used for residential applications

Results and Discussion

Table 3 shows the average and coefficient of variance (COV) results of the three criteria described above (maximum load, load-deflection slope and load at 0.75 in.) for all cases tested.

The COV is calculated as the standard deviation divided by the average expressed as a percentage. No COV values are given for the FlangeG90 and FlangeGS90 since these treatments had only one specimen each. The greatest COV value was 12.6% for the maximum load of the 'WebS60' samples, where only 2 samples were observed. The COV values demonstrate little variation in the strength and stiffness of the I-joists tested. The maximum load values for the Control specimens were greater than the maximum load for the flange reinforcers, but were less than the maximum load for the glued web reinforcers (WebDG11, WebS90 and WebS60). The 'FlangeS11' and 'WebS60' reinforcers were the only reinforcers with load-deflection slopes greater than the average 'Control' value. The 'Web90' reinforcer was the only reinforcer with a load at 0.75 inches of deflection greater than the average 'Control' value.

Table 3: Maximum Load Results from I-joist Reinforcer Testing

Name	Maximum Load, lbs (COV)	Load-Deflection Slope, lb/in (COV)	Load at Δ=0.75 in, lbs (COV)
Control	6339 (9.6%)	3437 (1.5%)	2559 (5.5%)
FlangeGW90	4345 (8.8%)	2295 (5.2%)	2133 (3.0%)
FlangeG90	4073 (3.2%)	2265 (3.8%)	2129 (2.8%)
FlangeGS90	3683[1]	2750[1]	2024[1]
FlangeSS90	2066[1]	1986[1]	1702[1]
FlangeS90	3483 (7.7%)	2240 (6.0%)	1725 (7.7%)
FlangeS60	3267 (5.7%)	2164 (0.7%)	1725 (4.9%)
FlangeS40	4865 (6.2%)	3065 (6.3%)	2175 (4.3%)
FlangeS11	4901 (66.5%)	3454 (7.1%)	2500 (1.8%)
WebG11	5120 (5.3%)	2835 (0.3%)	2409 (0.2%)
WebDG11	7157 (5.4%)	3074 (1.9%)	2503 (4.4%)
Web90	5354 (3.5%)	3251 (1.9%)	2614 (3.7%)
WebS90	7435 (1.3%)	3357 (4.0%)	2185 (7.5%)
WebS60	7742 (12.6%)	3459 (2.2%)	2262 (2.0%)
WebS40	4656 (5.8%)	3093 (2.6%)	2279 (4.9%)
WebS11	4835 (7.5%)	3165 (2.9%)	2271 (2.3%)

[1] These values represent singles samples and no COV can be determined.

Comparison of Flange and Web Reinforcer Results to Control Results

Table 4 shows the percentage difference of the control values with the flange and web reinforcer cases studied. A negative percent difference value indicates that the reinforcer value was less than the 'Control' value. Table 4 is useful to observe the differences between the flange and web reinforcers to the 'Control' samples.

The average maximum load of the flange reinforcers varies from 22.7% less to 67.4% less than the maximum load of the average 'Control' value. The lowest average maximum load was for the 'FlangeSS90', which was markedly less than all other flange reinforcers located at midspan. There is a large difference between the maximum load of the single-sided flange reinforcer and the double sided reinforcers. There is littlechange in the percent difference between the flange reinforcers that were glued and the non-glued flange reinforcers. As the flange reinforcer is moved towards the end support, the maximum load increases as noted in the results for the 40 inch and 11 inch reinforcer locations.

The average load-defection slope of the flange reinforcers varies from 42.2% less than to 0.5% greater than the average ‘Control’ value. The lowest average load-deflection slope was from the ‘FlangeSS90 ‘, which is the single-sided flange reinforcer. There is little difference in the slope of the glued flange reinforcers compared to the non-glued flange reinforcers. As in the maximum load, there is a dramatic change in the percent difference of the load-deflection slope for the reinforcers placed 40 inches and 11 inches from the support. The flange reinforcer at 11 inches from the support actually has a slightly higher average load-deflection slope than the average ‘Control’ value.

Table 4: Percent Difference Values Comparing Control to Reinforcers[1,2]

Name	% Difference Maximum Load	% Difference Load-Deflection Slope	% Difference Load at 0.75 in Deflection
FlangeGW90	-31.5%	-33.2%	-16.7%
FlangeG90	-35.8%	-34.1%	-16.8%
FlangeGS90	-41.9%	-20.0%	-20.9%
FlangeSS90	-67.4%	-42.2%	-33.5%
FlangeS90	-45.1%	-34.8%	-32.6%
FlangeS60	-48.5%	-37.0%	-32.6%
FlangeS40	-23.3%	-10.8%	-15.0%
FlangeS11	-22.7%	+0.5%	-2.3%
WebG11	-19.2%	-17.5%	-5.9%
WebDG11	+12.9%	-10.6%	-2.2%
Web90	-15.5%	-5.4%	+2.2%
WebS90	+17.3%	-2.3%	-14.6%
WebS60	+22.1%	+0.6%	-11.6%
WebS40	-26.6%	-10.0%	-10.9%
WebS11	-23.7%	-7.9%	-11.3%

[1] % Difference = (Test Value – Control)/Control * 100%.
[2] A negative percent difference indicates the value was less than the control.

The average load at 0.75 inches deflection for the flange reinforcers varied from 33.5% to 2.3% less than the load at 0.75 inches of the average ‘Control’ value. The ‘FlangeSS90’ had a similar percent difference to the ‘FlangeS90’ and ‘FlangeS60’ samples. The g1ued reinforcers have greater loads at 0.75 inch deflection (approximately 19% less than the average ‘Control’ value) compared to the non-glued reinforcers (approximately 33% less than the average ‘Control’ value). As in the maximum load and load-deflection slope values, the flange reinforcer loads at 11 inches and 40 inches from the support had greater loads than the reinforcers at 60 inches and 90 inches from the support.

The average maximum load of the web reinforcers varied from 26.6% less than to 22.1% more than the average ‘Control’ maximum load value. The web reinforcers located in the middle third of the beam had higher maximum load values compared to the reinforcers located in the outer third of the beam. The ‘WebS90’ and ‘WebS60’ samples had greater average maximum load values than the average ‘Control’ value. The double web reinforcer ‘WebDG11’ had a maximum load 12.9% greater than the average ‘Control’ value, while the single web reinforcer ‘WebG11’ had a maximum load 19.2% less.

The average load-deflection slope of the web reinforcers varied from 17.5% less than to 0.6% greater than the average ‘Control’ value. As in the maximum load values, the ‘WebS90’ and

‘WebS60’ load-deflection slopes were very similar to the average ‘Control’ value, while the other web reinforcers had average values less than the average ‘Control’ value. The double web reinforcer ‘WebDG11’ had an average load-deflection slope 10.6% less than the average ‘Control’ value, while the single web reinforcer ‘WebG11’ had an average load-deflection slope 17.5% less.

The average load at 0.75 inches of the web reinforcers varied from 14.6% less than to 2.2% greater than the average ‘Control’ value. The load at 0.75 inches follows a different trend than the maximum load and load-deflection slopes for the web reinforcers. All of the web reinforcers with sheathing, regardless of location, had very similar load values (all approximately 11% less than the average ‘Control’ value) . The web reinforcer with the highest average load at 0.75 inches is the web reinforcer in the center of the beam with no sheathing. The double web reinforcer ‘WebDG11’ had an average load at 0.75 inches of 2.2% less than the average ‘Control’ value, while the single web reinforcer ‘WebG11’ had an average load at 0.75 inches of 5.9% less than the average ‘Control’ value. The double web reinforcer increased the maximum load value more than the load at 0.75 inches of the I-joist.

Effect of Glue on Reinforcer Properties

Table 5 shows the comparison between the glued and non-glued flange and web reinforcers. For the flange reinforcers, the most direct comparison is between ‘FlangeG90’ and ‘FlangeS90’. A comparison could be made with the ‘FlangeGS90’ but only a single specimen was tested, so this comparison was not considered valid. There is a definite difference between the glued and non-glued reinforcer in terms of the maximum load and load at 0.75 inches, while the load-deflection slope had little change for the flange reinforcer. For the web reinforcers, the most direction comparison is between the ‘WebG11’ and ‘WebS11’. This comparison is confounded with the sheathing variable. The non-glued reinforcer load values were approximately 5% less than the glued reinforcer values, while the load-deflection slope of the non-glued reinforcer was almost 9% greater than the glued reinforcer. This change in stiffness of the web reinforcer may be due to the addition of the sheathing rather than the glue.

Table 5: Percent Difference Values Comparing Glued and Non-glued Reinforcers[1]

Test Name or Comparison	% Difference Maximum Load	% Difference Load-Deflection Slope	% Difference Load at 0.75 in Deflection
FlangeG90 vs. FlangeS90	+14.5%	+1.1%	+19.0%
WebG11 vs. WebS11	+5.6%	-8.6%	+5.7%

[1] % Difference = (Glued – Non-glued)/Glued * 100%

Effect of Location on Reinforcer Properties

The ‘FlangeS90’, ‘FlangeS60’, ‘FlangeS40’ and ‘FlangeS11’ as well as the ‘WebS90’, ‘WebS60’, ‘WebS40’ and ‘WebS11’ test values can be displayed as functions of the distance from the support for comparison.

Figure 3 shows the maximum load values for the flange and web reinforcers as a function of the position from the end support. The flange and web reinforcers at the 11 inch and 40 inch positions show almost identical maximum load values. These average maximum loads were approximately 23% less than the average maximum load of the ‘Control’ samples. As the flange reinforcers move to the middle third of the beam, the average maximum load decreases to approximately 45% less than the average maximum load of the ‘Control’ samples. As the moment reaches the maximum value in the center third of the beam, the maximum load carried by the flange reinforcer decreases. The web reinforcers show the reverse trend compared to the flange reinforcers. As the location of the web reinforcer moves to the middle third of the beam, the average maximum load increases to approximately 20% greater than the average maximum load of the ‘Control’ samples , shown by the thick solid line.

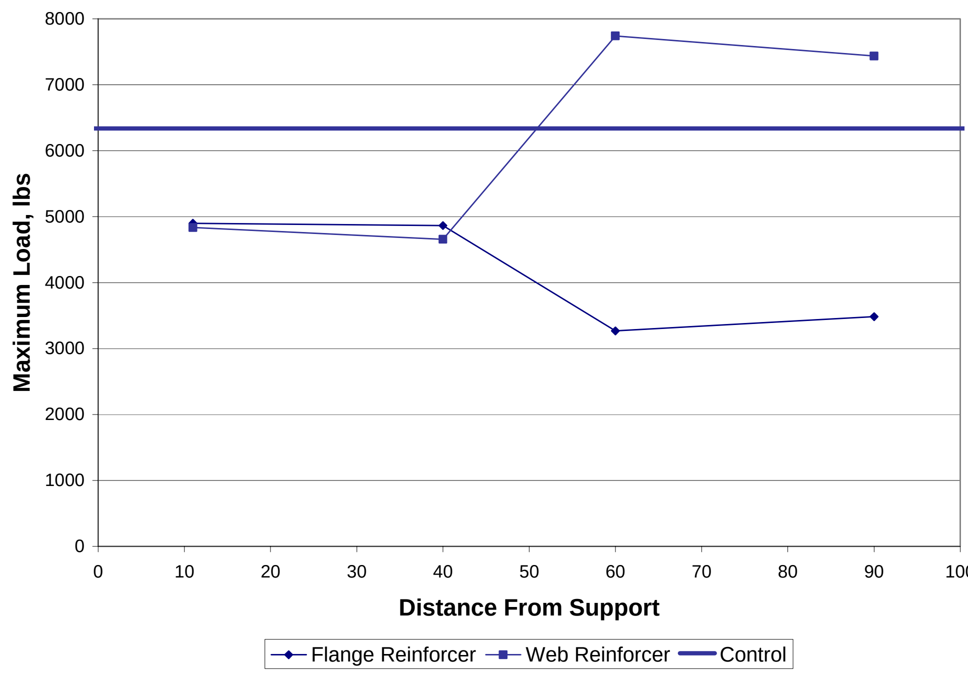


Figure 3. Graph of Maximum Load vs. Position of Reinforcer

Figure 4 shows the average load-deflection slope compared to the position of the reinforcer. The flange and web reinforcers in the 11 inch and 40 inch positions showed similar magnitudes for the average load-deflection slope, approximately 7% less than the average load-deflection slope of the ‘Control’ samples , shown by the thick solid line. The flange reinforcer shows a similar trend to the maximum load shown in Figure 3 with the load-deflection slope of the 11 inch and 40 inch flange reinforcer positions being greater than the load-deflection slopes of the 60 inch and 90 inch positions. The web reinforcer shows a similar trend to the maximum load shown in Figure 3. The change in the load-deflection slope between the 11 inch and 40 inch samples and the 40 inch and 60 inch samples is not as dramatic as the maximum load, but a better performance of the web reinforcer for the load-deflection slope is achieved by location in the middle third of the beam.

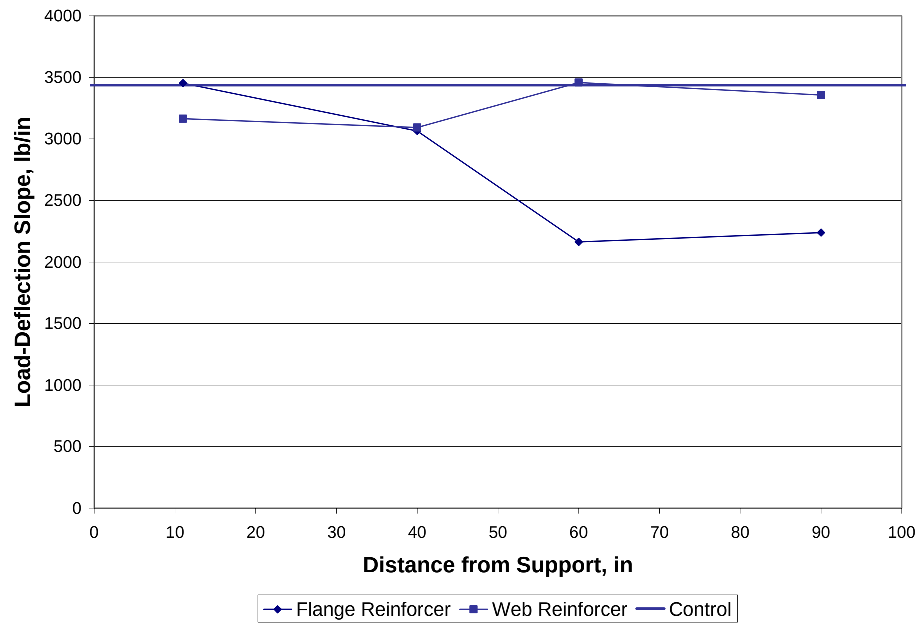


Figure 4. Graph of Load-Deflection Slope vs. Position of Reinforcer

Figure 5 shows the load at 0.75 inch deflection as a function of the position of the flange and web reinforcer. For the flange reinforcer, the load at 0.75 in decreases as the distance from support increases, where the flange reinforcer is only 2.3% less than the average load at 0.75 in of the 'Control' samples at 11 inches from the support but decreases to 32.6% less at 90 inches from the support. This trend is consistent with the maximum load and load-deflection slope. The web reinforcer load at 0.75 in is similar for the different positions of the reinforcer along the beam and is approximately 12% less than the average load at 0.75 in of the 'Control' samples over the distances measured..

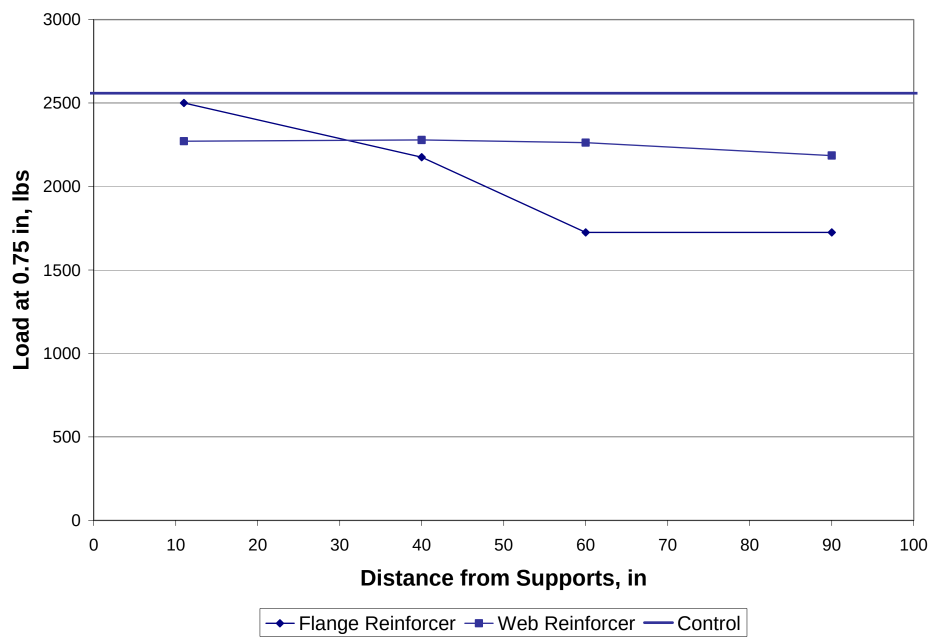


Figure 5. Graph of Load at 0.75 in Deflection vs. Position of Reinforcer

Reinforcer Failure Analysis

The following section describes the typical failures observed for each group of samples tested. The appendix contains a list of failure descriptions for each individual sample tested. There was some variation in failures observed, but as evidenced by the low COV values in Table 3, most of the failures for each group had the same root causes.

Figure 6 shows the failure of a Control sample. All of the ‘Control’ beams failed in pure bending towards the center of the span. Figure 6 shows fracture in the bottom flange, delamination of the lower veneers in the top flange and a crack running through the web (white arrows).

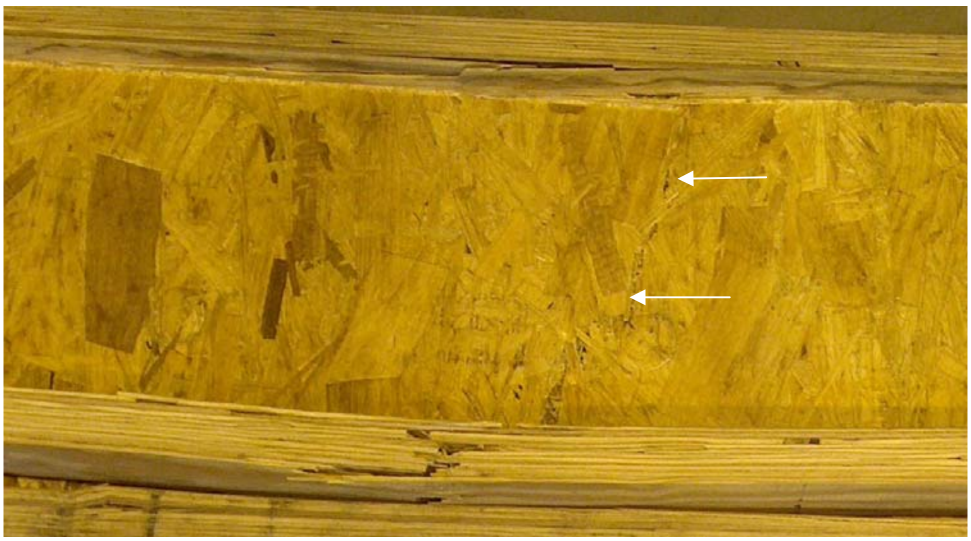


Figure 6: Failure of Control

Figure 7 shows the failure of the FlangGW90 samples. Failure was initiated by buckling of the top flange at the hole in the flange reinforcer. The second image in Figure 7 is a top view showing the permanent deflection of the flanges and the wrinkling of the web and reinforcer below. As stated earlier, this failure mode was considered unrealistic for the situation where the I-joist reinforcers are installed in a sheathed floor, where buckling of the top flange would be prevented by the sheathing material.

Figure 7: Failure of FlangeGW90 Showing Close-Up of Flange Buckling

Figure 8 shows the failure of the FlangeG90 samples. This failure was consistent with the FlangeGW90 samples discussed in Figure 7. Buckling of the top flange at the point of the cut caused the failure. Note the resulting failure of plies in the top flange to the left of the reinforcer.

Figure 8: Failure of FlangeG90

Figure 9 shows the failure of the FlangeGS90 sample. This sample failed by fracture in the bottom flange and the screws attaching the reinforcer to the sheathing pulling out. The bending deformation of the I-joist became so great as to pull out the screws attaching the sheathing to the reinforcer. The fracture of the bottom flange indicates that the failure was caused by bending in the I-joist but not the reinforcer, which is similar to the failures in the Control samples.

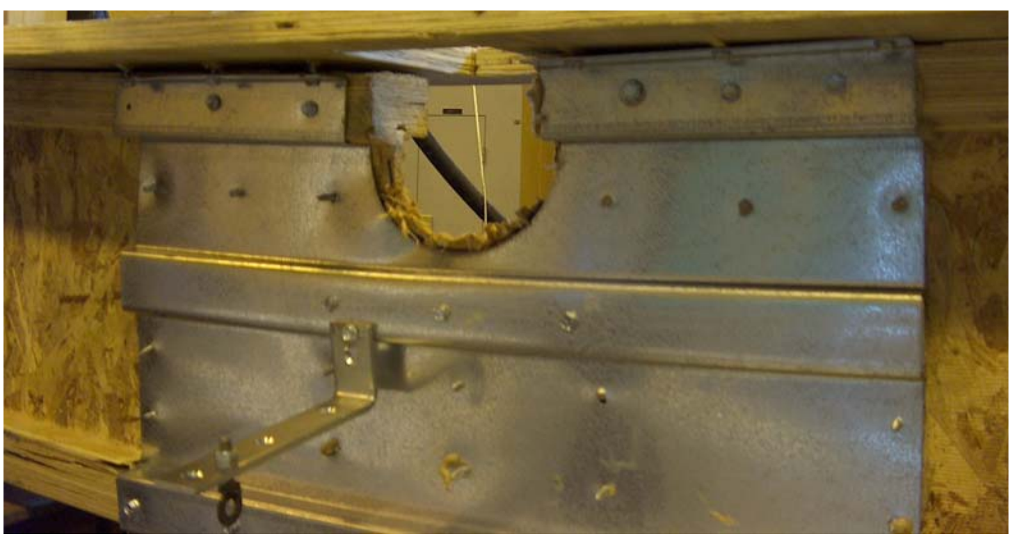


Figure 9: Failure of FlangeGS90

Figure 10 shows the failure of the FlangeSS90 sample. This reinforcer experienced web buckling (white arrows in Figure 10) underneath the hole that was made in the flange. As was noted in the discussion of Tables 3 and 4, using a single flange reinforcer does not produce adequate loads compared to using two flange reinforcers.

Figure 10: Failure of FlangeSS90

Figure 11 shows the failure of the FlangeS90 samples. The reinforcer broke at the bottom flange and also split the top flange along the line of fasteners connecting the reinforcer to the top flange. Also, the excessive deflection of the I-joist caused the screws attaching the reinforcer to the sheathing to pull out.

Figure 11: Failure of FlangeS90

Figure 12 shows the failure of the FlangeS60 samples. The failure was a break in the bottom flange caused by horizontal shear in the outer third of the beam. Figure 12 also shows the change in angle of the beam at the outer corner of the reinforcer. In the higher shear area underneath the load head (the reinforcer was initially centered on the load head), the reinforcer acted to strengthen the I-joist, causing a failure in shear at the outer side. Figure 12 also shows the uplift of the top sheathing as the deflection became excessive and the I-joist curvature became large.

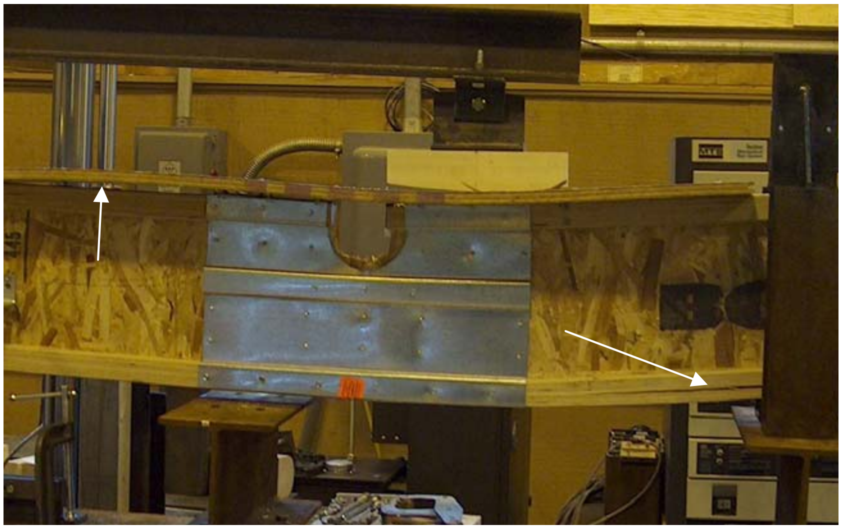


Figure 12: Failure of FlangeS60

Figure 13 shows the failure of the FlangeS40 samples. These samples failed due to web buckling between the reinforcer and the load head. The white arrows point to the buckled material. The buckling initiated with a peeling of the lowest veneer of the top flange. Again, this failure seems to be caused by high shear in the I-joist itself.

Figure 13: Failure of FlangeS40

Figure 14 shows the failure of the FlangeS11 samples. The failure was due to bending in the flanges and shear in the web of the I-joist itself. The bottom flange is broken at a location away from the reinforcer, the web experienced a shear failure progressing at 45 degrees from the top corner of the reinforcer, while the top flange was broken at the line of screws connecting the flange to the reinforcer.

Figure 14: Failure of FlangeS11

Figure 15 shows the failure of the WebG11 samples. The failure was caused by horizontal shear in the section which caused the reinforcer to become a parallelogram.

Figure 15: Failure of WebG11

Figure 16 shows the failure of the WEBDG11 samples. The I-joist failed due to crushing in the web and failure of the top flange. This failure occurred approximately 2 feet away from the reinforcer underneath the load point.

Figure 16: Failure of WebDG11

Figure 17 shows the failure of the Web90 samples. The failure was caused by buckling of the cross-section, which caused the failure of the top flange, noted by the veneer fibers upraised and broken on the side without the reinforcer. This reinforcer was tested without sheathing and this failure mode was felt to be unrealistic for the situation where the reinforcer is used in an already constructed floor system. The inclusion of sheathing may have prevented this failure from occurring.

Figure 17: Failure of Web90

Figure 18 shows the failure of the WebS90 samples. This failure was caused by brash tension in the top flange due to bending stresses with buckling in the web (series of white arrows). This failure occurred approximately 24 inches from the center of the reinforcer at the edge of the sheathing section. In Figure 18, the web reinforcer itself is not visible.

Figure 18: Failure of WebS90

Figure 19 shows the failure of the WebS60 samples. These reinforcers were positioned directly underneath the support points. Failure occurred through brash tension in the flange due to bending stresses approximately 6 inches from the edge of the reinforcer. Also, note the failure of the web section underneath the flange failure (white arrow).

Figure 19: Failure of WebS60

Figure 20 shows the failure of the WebS40 samples. The samples failed in horizontal shear, which caused failure of the web-flange joint in the top flange (note the peeling of the top flange veneers in the upper right corner) and failure of the web (white arrow in lower left hand corner). The outer third of the beam tested is where the highest shear force , which led to failure, was present.

Figure 20: Failure of WebS40

Figure 21 shows the failure of the WebS11 samples. The web reinforcer failed in horizontal shear which caused breakage web-flange interface in the top flange along with distortion of the web reinforcer into a parallelogram shape. In this position, which was in the high shear zone, the fai1ure was due to shear stress.

Figure 21: Failure of WebS11

Conclusions of Reinforcer Failure Analysis

Table 6 shows the summary of the types of reinforcers and the elements involved in the failure. The reinforcers were involved in the failures of the FlangeGW90, FlangeG90, FlangeS90, WebG11, Web90, and WebS40. There are no clear trends of the elements involved in the failures for certain types of reinforcers used. However, some trends can be observed. For the single unglued flange reinforcers, the failures away from the center of the beam did not involve the reinforcers. Note that the typical toilet is placed 11 inches from a wall. For the single unglued web reinforcers, the reinforcers in the center third of the beam (90 and 60 inch positions) did not involve the reinforcers.

Table 6: Summary of Elements involved in Reinforcer Failures

Reinforcer	Elements Involved in Failure
FlangeGW90	Reinforcer
FlangeG90	Reinforcer
FlangeGS90	Screws in Reinforcer / Flange
FlangeSS90	Web
FlangeS90	Flange / Reinforcer
FlangeS60	Flange
FlangeS40	Web
FlangeS11	Web
WebG11	Reinforcer
WebDG11	Flange / Web
Web90	Flange / Reinforcer
WebS90	Flange / Web
WebS60	Flange / Web
WebS40	Reinforcer
WebS11	Flange

Conclusions

This research documents the strength and stiffness of the Metwood I-joist flange and web reinforcers. The test method produced low COVs for all strength and stiffness assessments, demonstrating a uniformity in the types of failures between the different kinds of reinforcer arrangements. For the set of Metwood I-joist flange reinforcers using the two-sided reinforcer with sheathing, the lowest maximum load was 48.5% less than the average ‘Control’ value, the lowest load-deflection slope was 37.0% less and the lowest load at 0.75 inches was 32.6% less. For the set of Metwood I-joist web reinforcers using a single-sided reinforcer with sheathing, the lowest maximum load was 26.6% less than the average ‘Control’ value, the lowest load-deflection slope was 10.0% less than the average ‘Control’ value, and the lowest load at 0.75 inches was 14.6% less than the average ‘Control’ value.

The types of failures observed from the two-sided unglued flange reinforcers and single-sided unglued web reinforcer do not show a trend in the failures observed. The two-sided unglued flange reinforcers had failures which did not involve the reinforcer when placed in the outer third of the beam (areas of low moment). The single-sided unglued web reinforcers had failures which did not involve the reinforcer when placed in the center third of the beam (area of zero shear).

Several other combinations of reinforcers were tested with different results. The use of a single-sided flange reinforcer produced the greatest percent difference values compared to the 'Control' samples. This was the reinforcer which had the lowest strength and stiffness. The use of a single flange reinforcer is not recommended. The double-sided web reinforcer increases the strength and stiffness of the I-joist more than the single-sided web reinforcer, but this increase in strength and stiffness was small. The double-sided web reinforcer was effective in separating the failure of the I-joist from the area immediately surrounding the reinforcer, indicating that the section of the I-joist with the reinforcer had equivalent or greater stiffness to the uncut I-joist. The use of construction adhesive to secure the reinforcer to the I-joist increased the loads that the reinforcers can carry, but did not increase the stiffness of the I-joist.

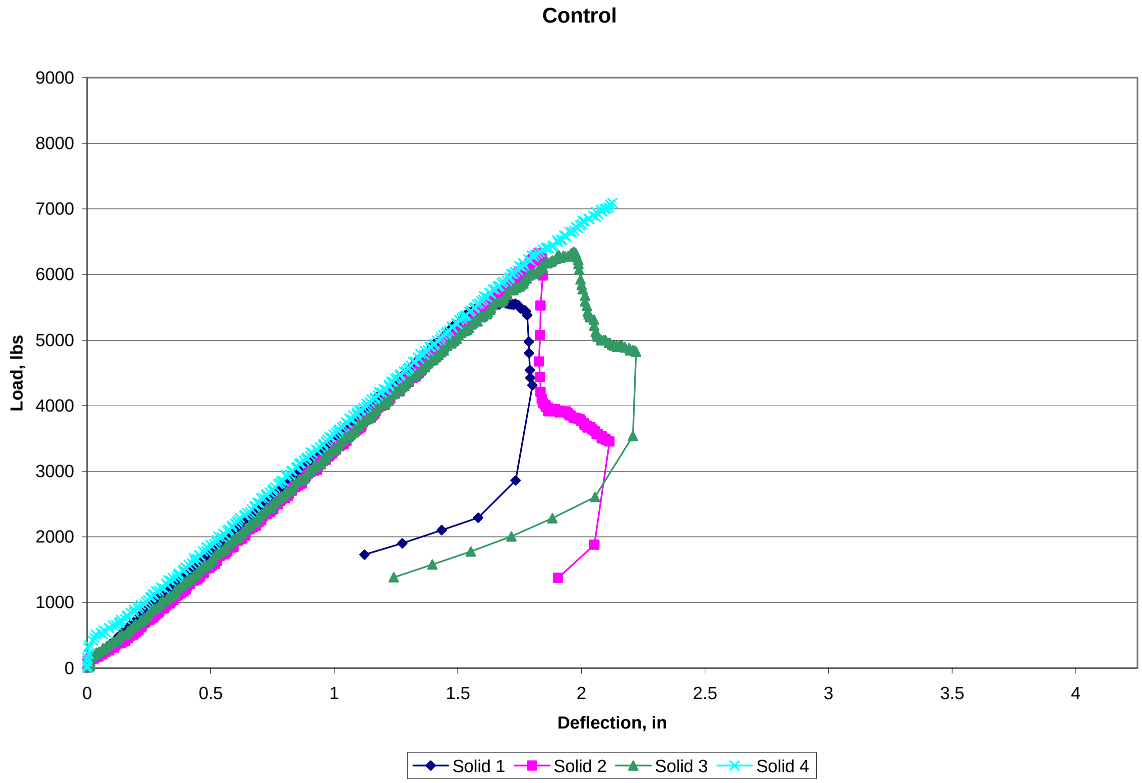
Appendix

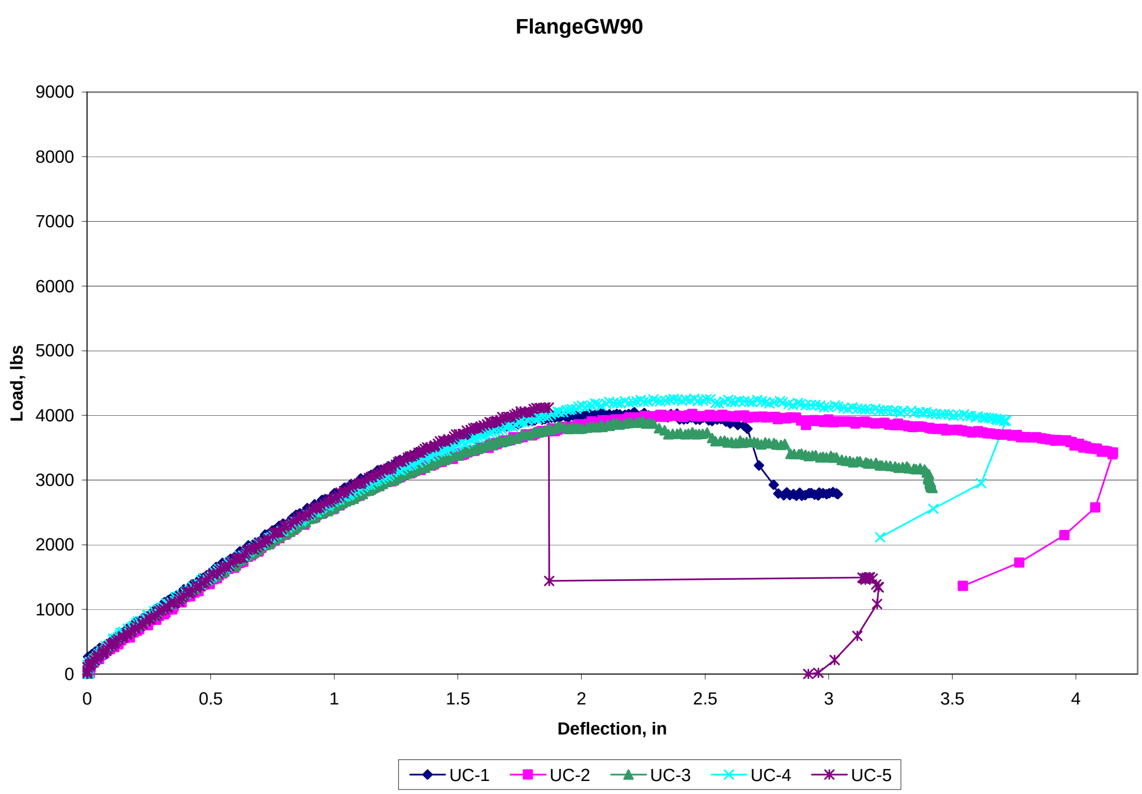
Appendix A: Failure Analysis of Individual Specimens

Name	Failure Description
FlangeGW90-1	Web buckling under hole. Left hand side flange deflected downward and outward. Patch has cut into web. Cracks in wood flange to the left of patch.
FlangeGW90-2	Downward movement of both flanges. No web buckling. Crinkle at bottom of cutout.
FlangeGW90-3	Downward movement of both flanges. No web buckling. Crinkle at bottom of cutout. Web buckling on left hand side involving knockout hole. Flange split on left hand side.
FlangeGW90-4	Crinkle in bottom of patch cutout.
FlangeGW90-5	Little damage to the patch itself. Web buckling on left hand side of patch. Left flange is displaced to the right compared to the patch. Left flange is split from the screws.
FlangeG90-1	Web buckling on left hand side. Splitting of flange from screws on left hand side. Flange is almost split in half.
FlangeG90-2	Web buckling on right hand side of patch. Crinkle in the sheet metal at the bottom of patch cutout.
FlangeG90-3	Crinkle in bottom of patch cutout.
FlangeG90-4	Web buckling under hole. Left hand side flange deflected downward and outward. Patch has cut into web. Cracks in wood flange to the left of patch.
FlangeG90-5	Same as FlangeG90-4. Separation of laminations in top flange LVL on left hand side of patch.
FlangeGS90	Break in bottom flange. Screws pulled from sheathing at top.
FlangeSS90	Web buckling from flange notch on side where reinforcer was not attached
FlangeS90-1	Break in bottom flange.
FlangeS90-2	Break in bottom flange. Break in top flange at screws
FlangeS90-3	Kink in reinforcer at the center of beam. Bending in reinforcer and flange. Screws pulled from sheathing at top.
FlangeS90-4	Break in bottom flange. Screws pulled from sheathing at top.
FlangeS60-1	Break in bottom flange.
FlangeS60-2	Break in bottom flange.
FlangeS60-3	Break in bottom flange. Break in top flange at screws
FlangeS60-4	Break in bottom flange. Sheathing pulled up, looks cupped
FlangeS40-1	Web butt joint separation approximately 6" from edge of reinforcers. Break in bottom flange.
FlangeS40-2	Web buckling at load point. Break in top flange at screws.
FlangeS40-3	Break in top flange at screws. Web buckling 6 inches from reinforcer.
FlangeS40-4	Web buckling starting at upper corner of reinforcer through punchout. Break in top flange at screws.
FlangeS40-5	Web buckling starting at upper corner of reinforcer through punchout. Break in top flange at screws.
FlangeS11-1	Break in bottom and top flanges. Web buckling starting at upper corner through punchout. Screws in top flange sheared off.
FlangeS11-2	Brash tension of top flange at support.
WebG11-1	Shear failure at patch. Hole shape began as rectangular, deformed to parallelogram. Tension breakage of flange at top left and bottom right corners, which were forced outwards. Compression failure at top right corner, which was forced inwards.
WebG11-2	Same as WebG11-1

Name	Failure Description
WebDG11-1	Failure next to patch towards center of beam. Delaminaton of flange and web at top. Splintering of bottom web. Web buckling in two places - one from top to bottom of wood flange approximately 12 inches from patch and one from top flange to center of patch at a 45 degree angle.
WebDG11-2	Failure at center of joist (approximately 9 feet from left end). Bending failure in the flange and associated web buckling.
WebDG11-3	Same as WebDG11-2
WebDG11-4	Same asWebDG11-2. Web buckling wrinkle went through a knockout in the web.
WebDG11-5	Large failure area extending from the edge of the patch. Failure area was 46 inches from left end to 68 inches from left end. At 68 inches from left end, there was a bending failure in the flange. There were two web failures, one extending from the top to bottom of the wood flange and another from the top wood flange to the patch at a 45 degree angle.
Web90-1	Failure in wood flange on the top left side. Compression type failure.
Web90-2	Failure in wood flange on the top left side. Compression type failure.
WebS90-1	Web separation at butt joint under support
WebS90-2	Web buckling under load support near punchout. Break in bottom and top flanges.
WebS90-3	Web buckling near support. Break in top and bottom flange.
WebS90-4	Failure in web butt joint and splintering of the top and bottom flanges.
WebS90-5	Web failure under support through punchout. Break in bottom flange.
WebS60-1	Web crushing about 6 inches from reinforcer. Break in bottom flange.
WebS60-2	Break in bottom flange.
WebS40-1	Break in bottom flange. Web separation in hole cut due to butt joint. Shear failure forming parallelogram of reinforcer.
WebS40-2	Break in bottom flnage. Shear over hole area forming parallelogram of reinforcer. Top flange screws pulled out of sheathing.
WebS40-3	Break in bottom and top flanges. Failure of butt joint near hole.
WebS40-4	Web crushing. Horizontal shear in top flange at the web-flange interface. Break at bottom web corner. Bending of reinforcer.
WebS40-5	Buckling of beam. Top flange broke. Reinforcer bent out of plane. Horizontal shear in flange.
WebS40-6	Break in the bottom flange and top. Web crushing under support.
WebS11-1	Beam buckling. Horizontal shear in flange.
WebS11-2	Beam buckling. Horizontal shear in flange.
WebS11-3	Beam buckling. Horizontal shear in flange.

Load-Deflection Plots of Specimens





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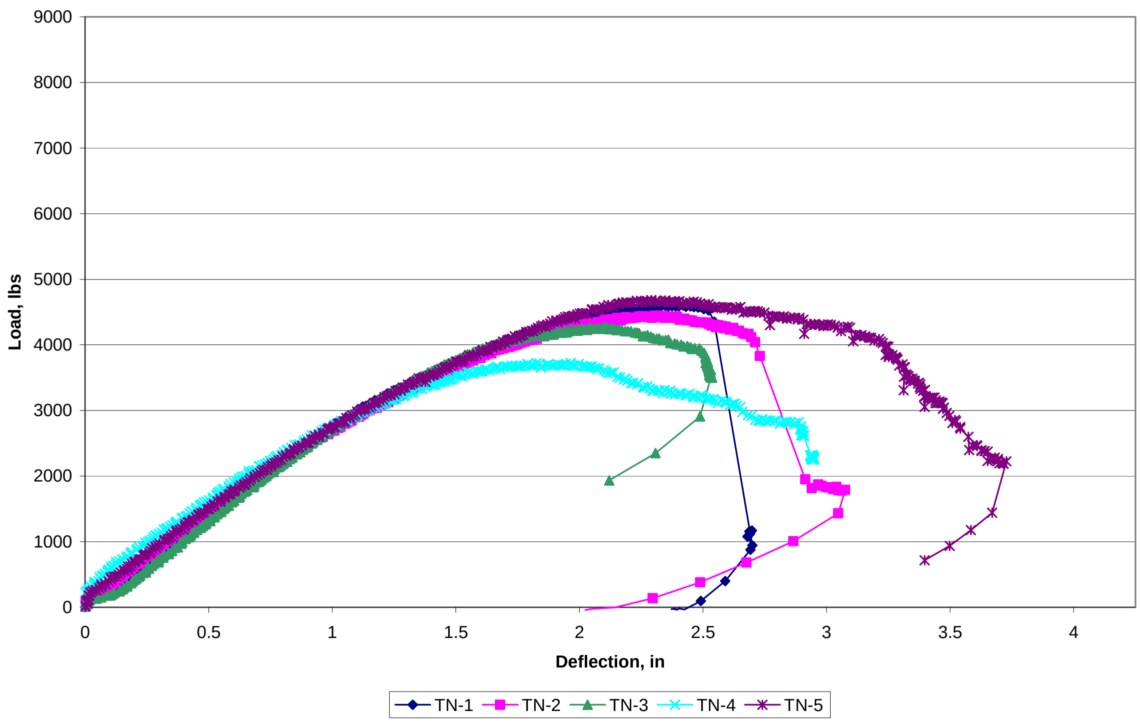
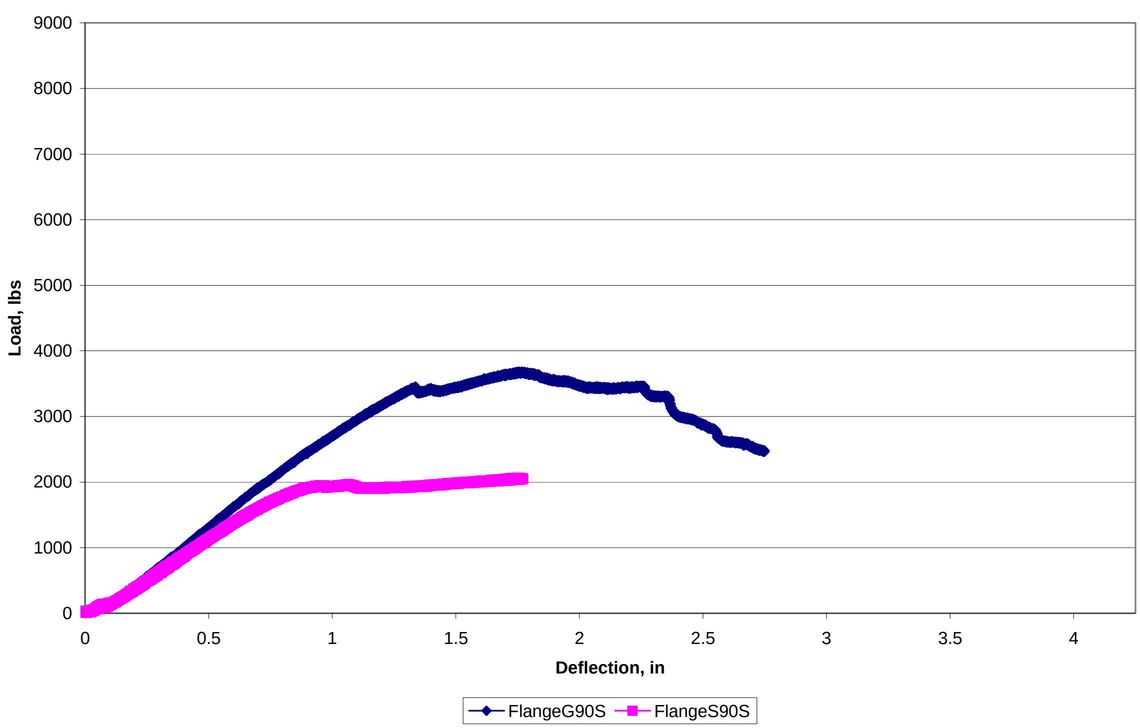
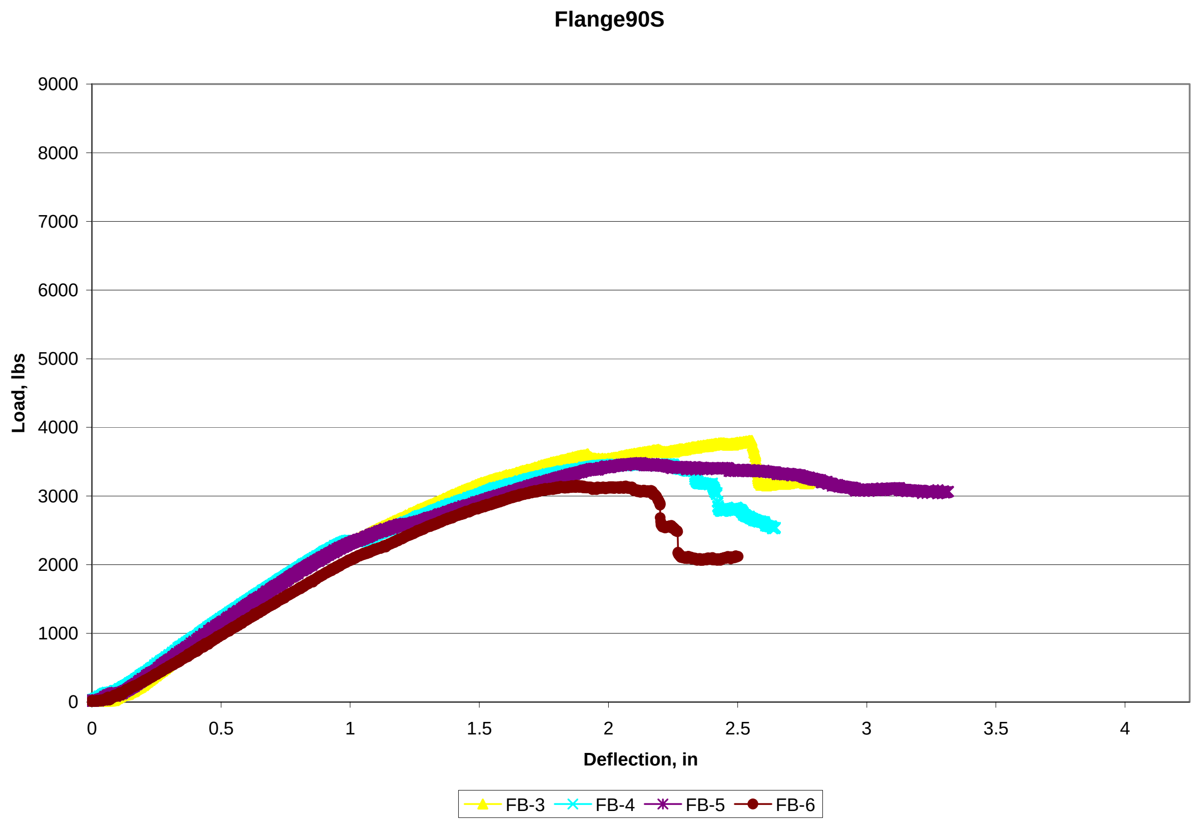


FlangeG90S and FlangeS90S





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7000
6000
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4000
3000
2000
1000
0
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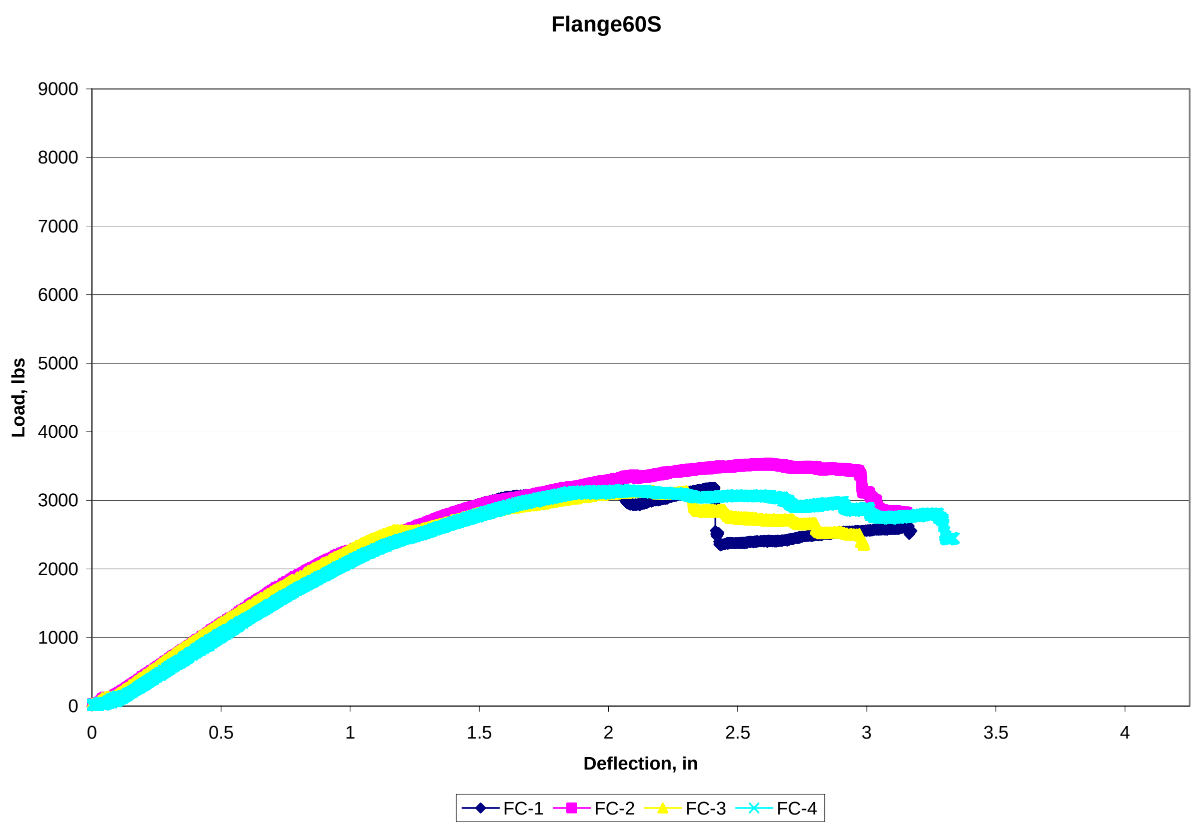
1.5
2
2.5
3
3.5
4
Deflection, in
FB-3
FB-4
FB-5
FB-6



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7000
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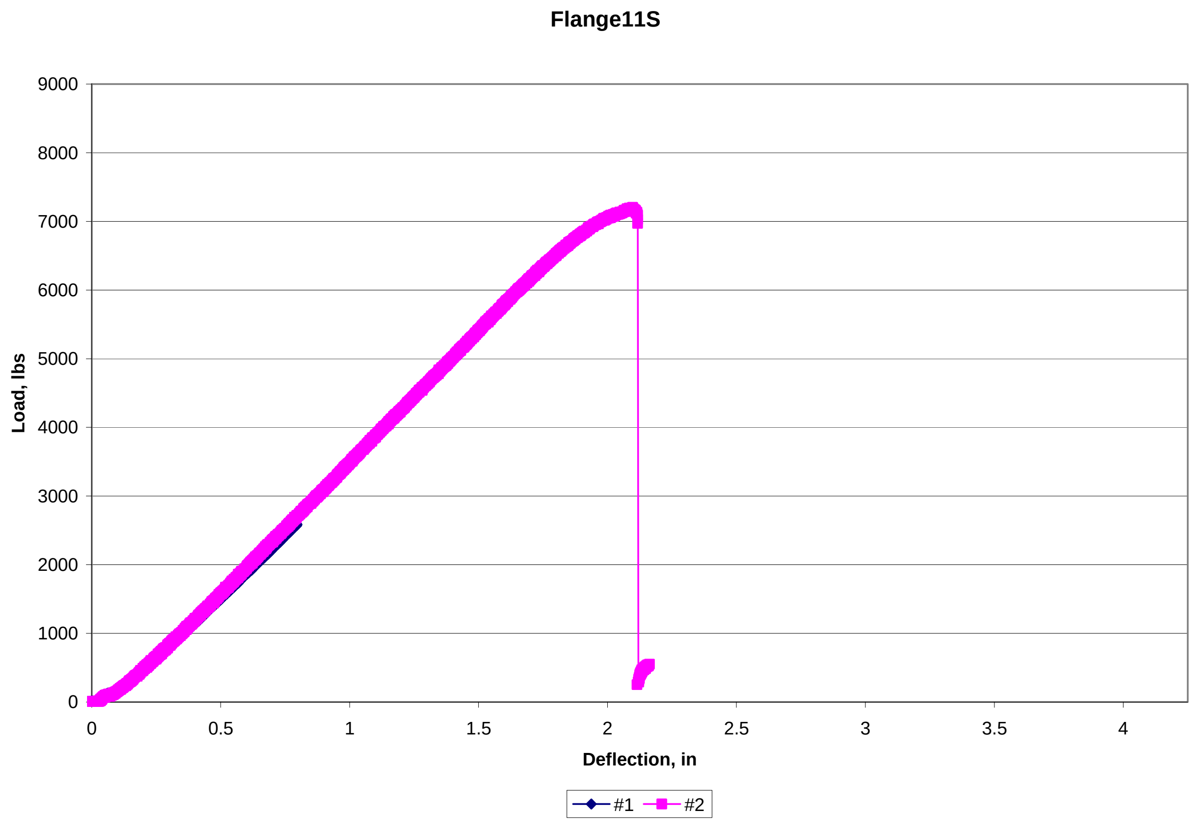
3
3.5
4
Deflection, in
FC-1
FC-2
FC-3
FC-4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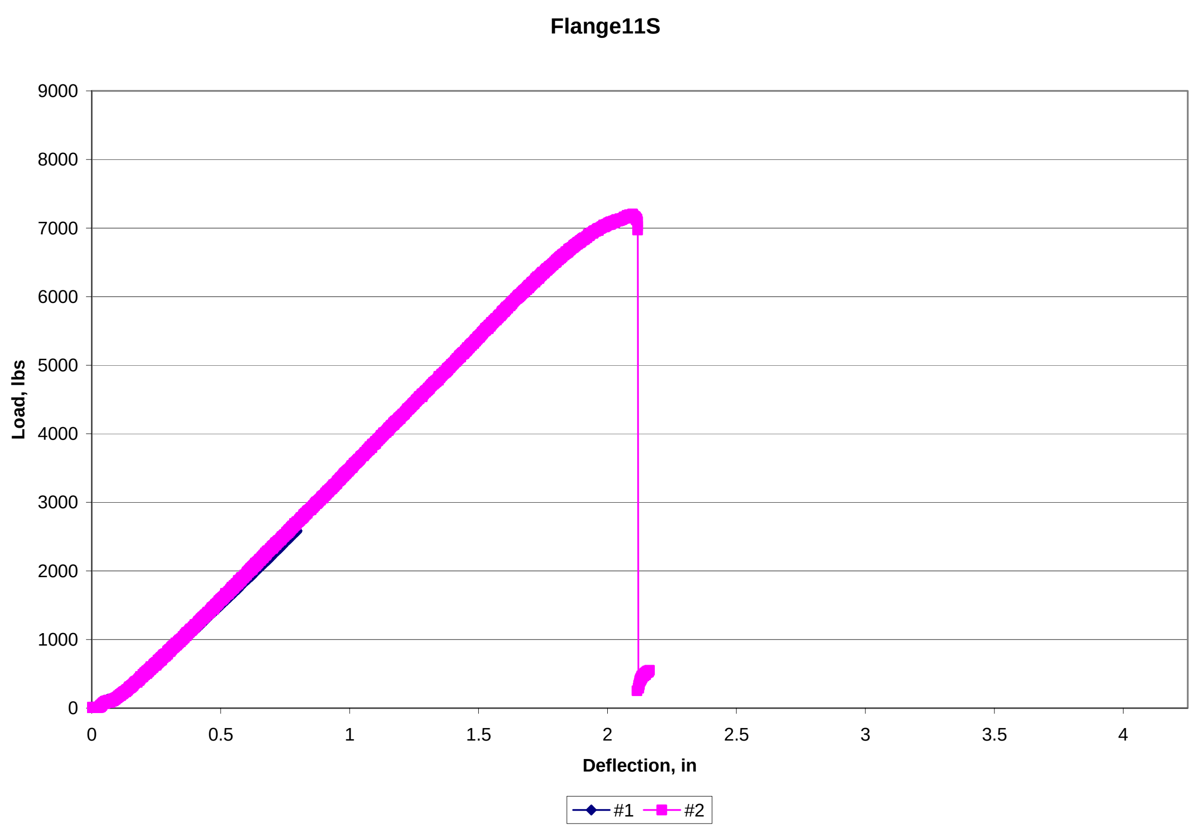
3.5
4
Deflection, in
#1
#2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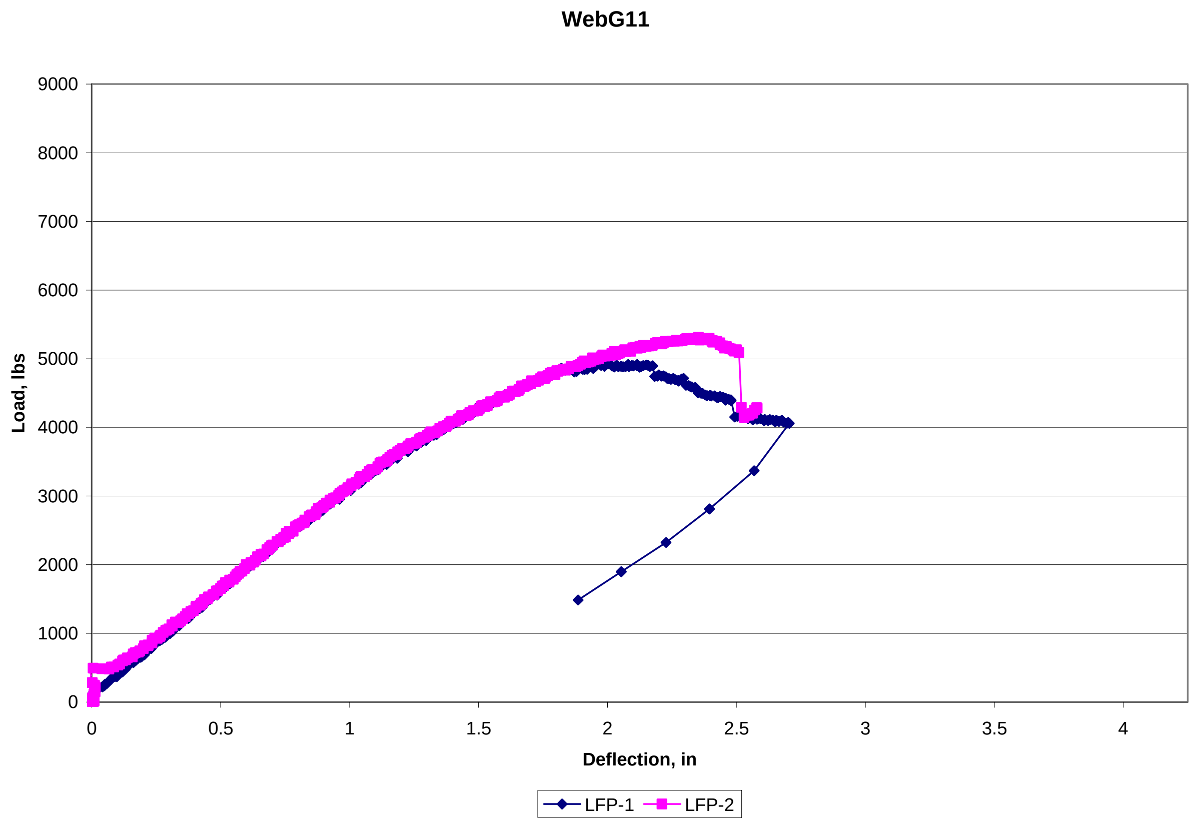
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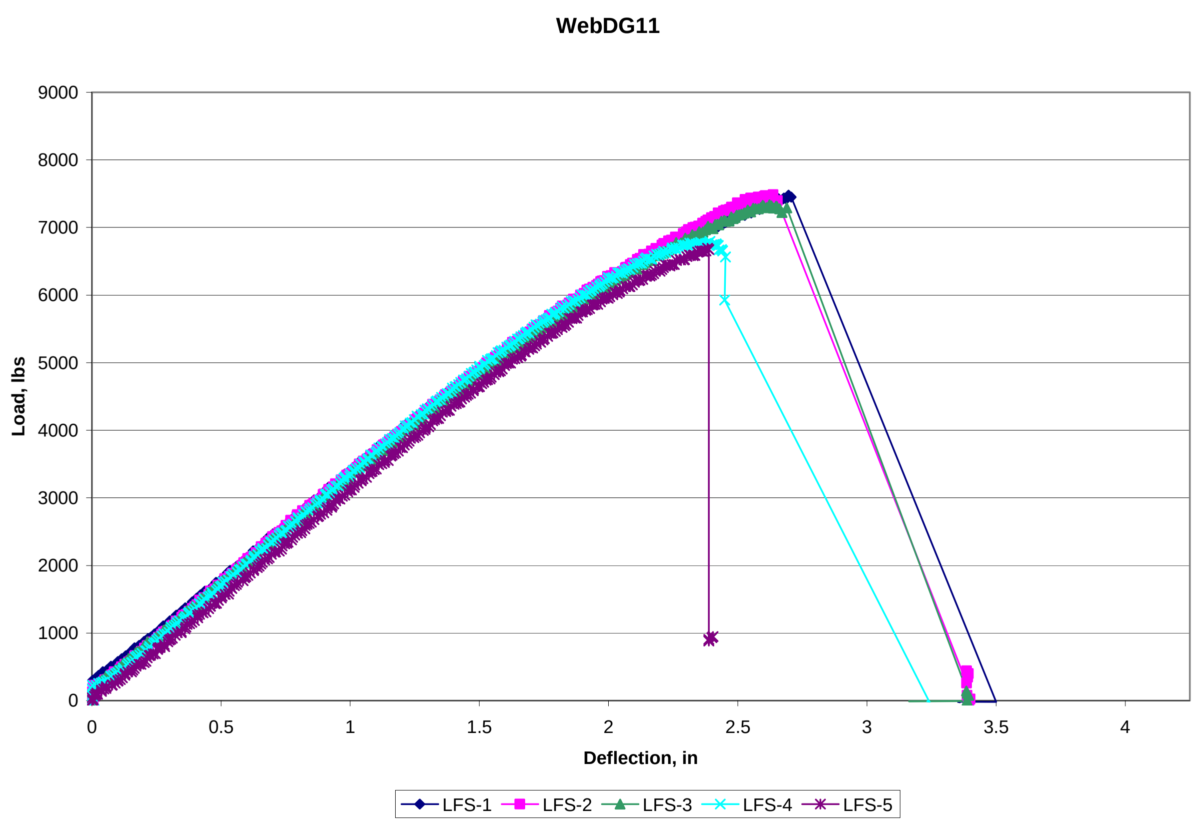
LFP-2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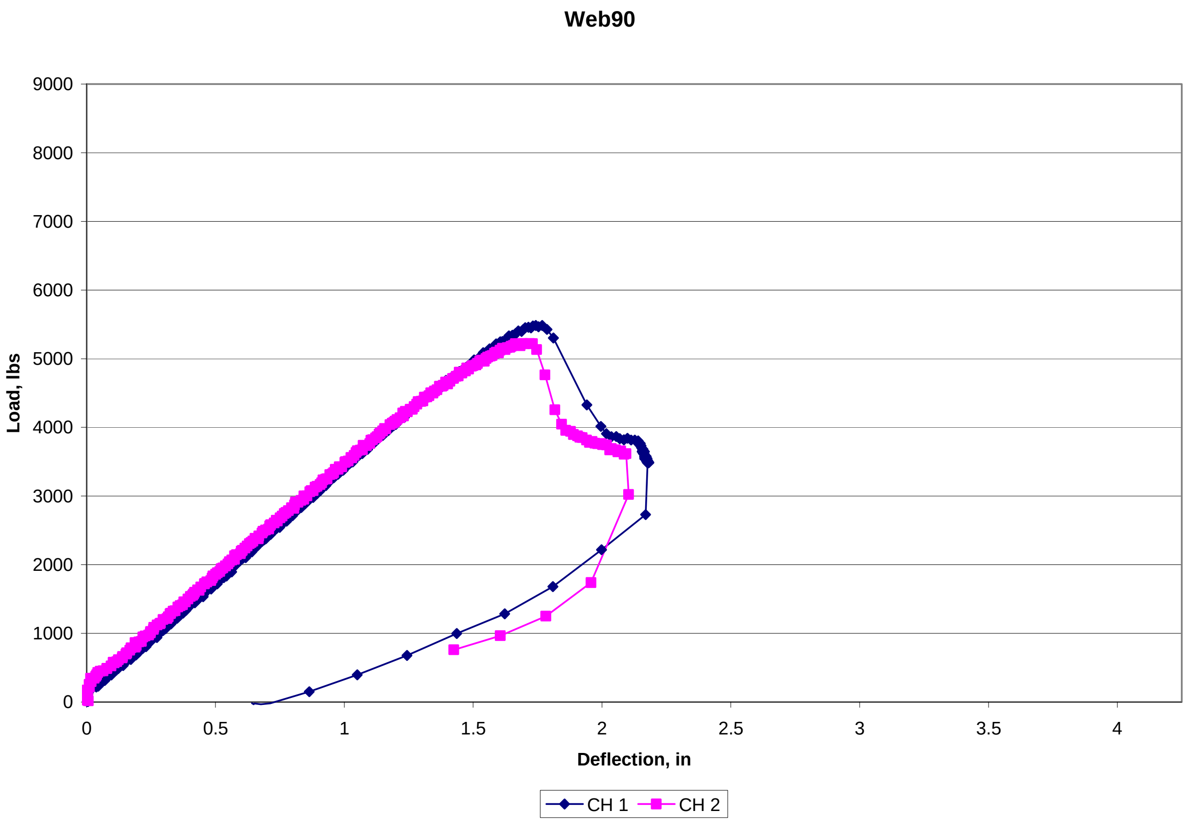
LFS-3
LFS-4
LFS-5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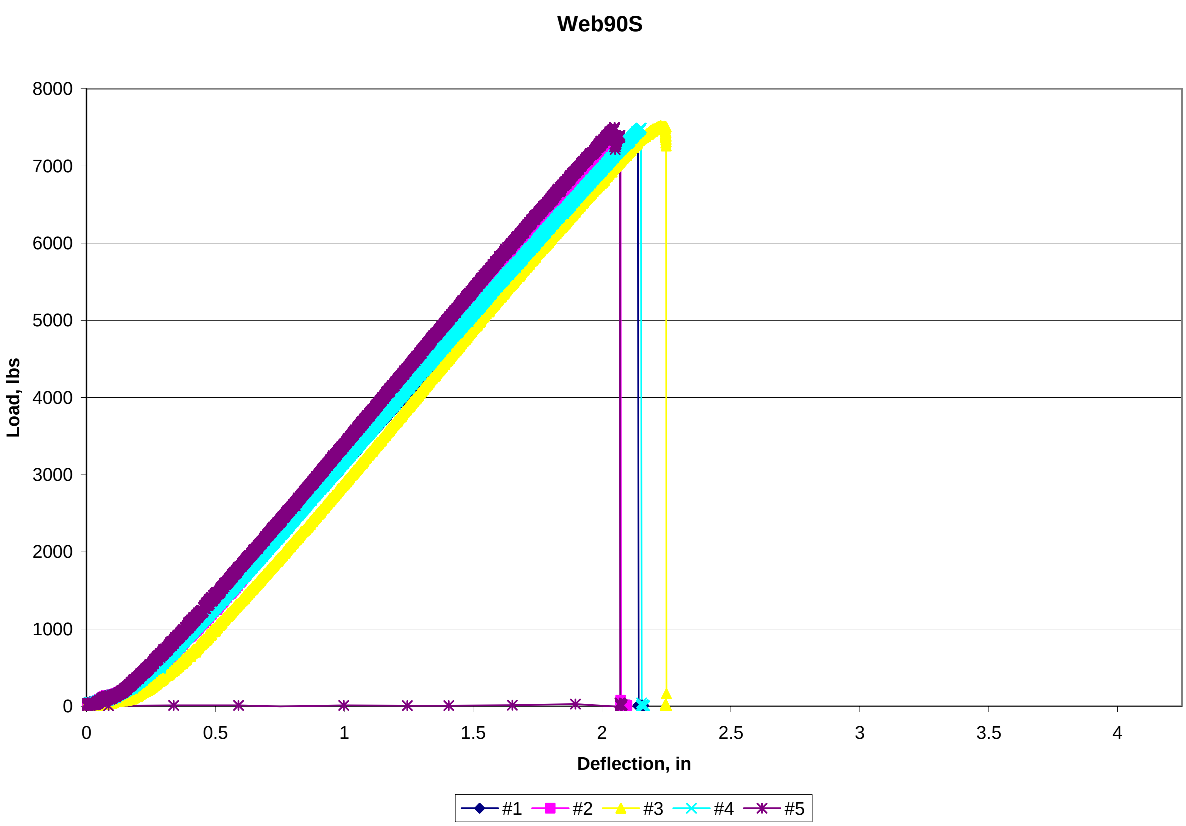
CH 2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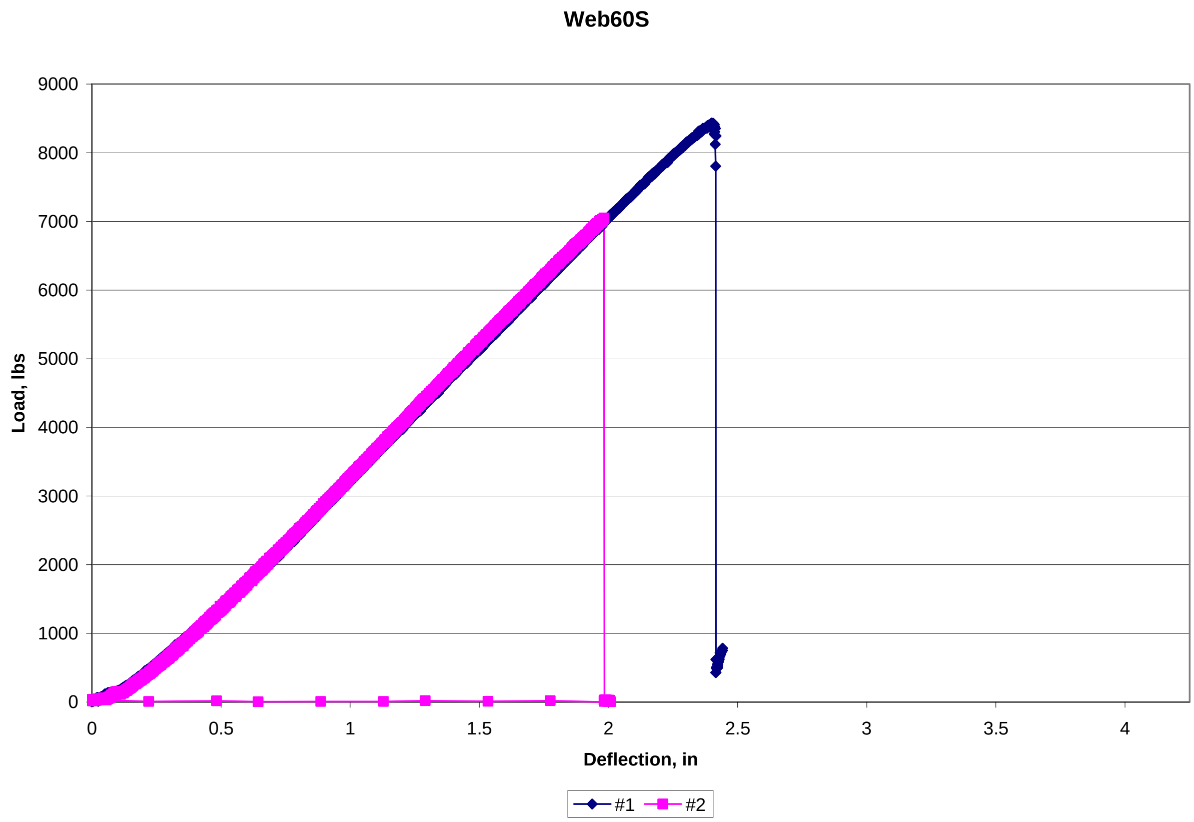
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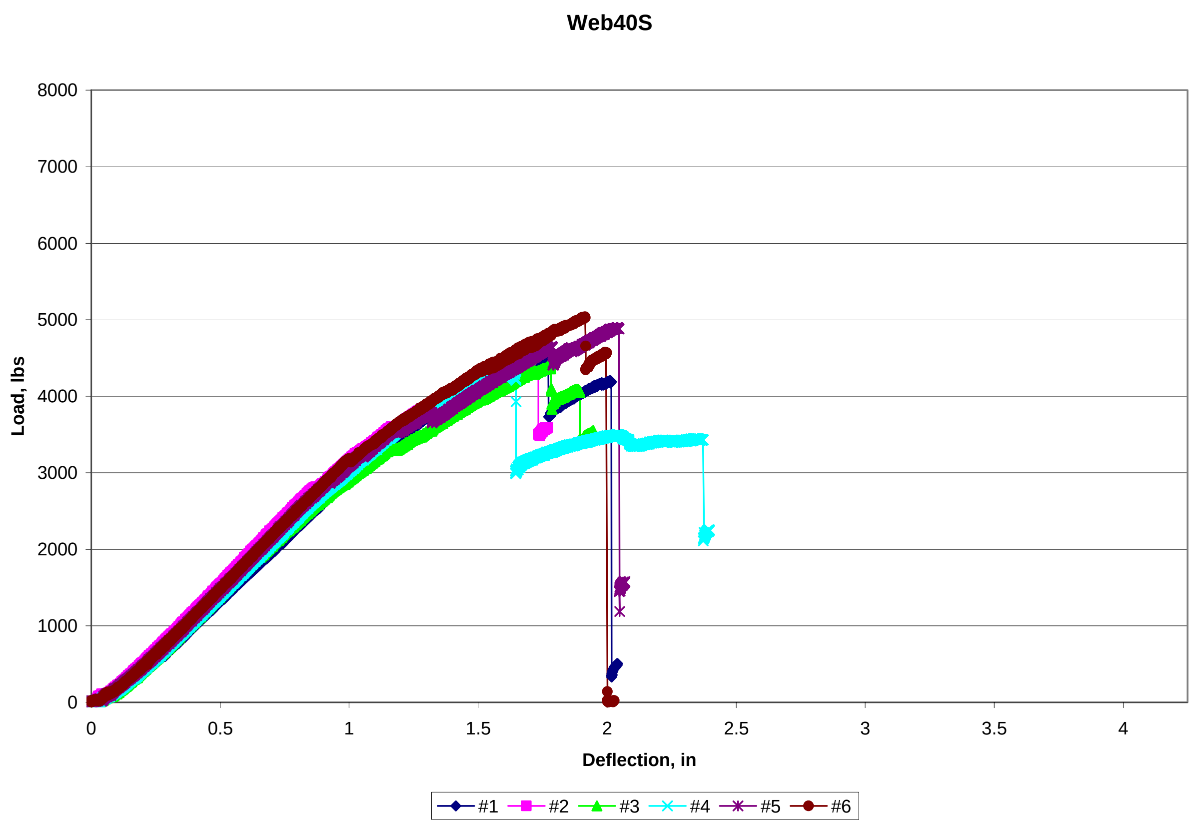
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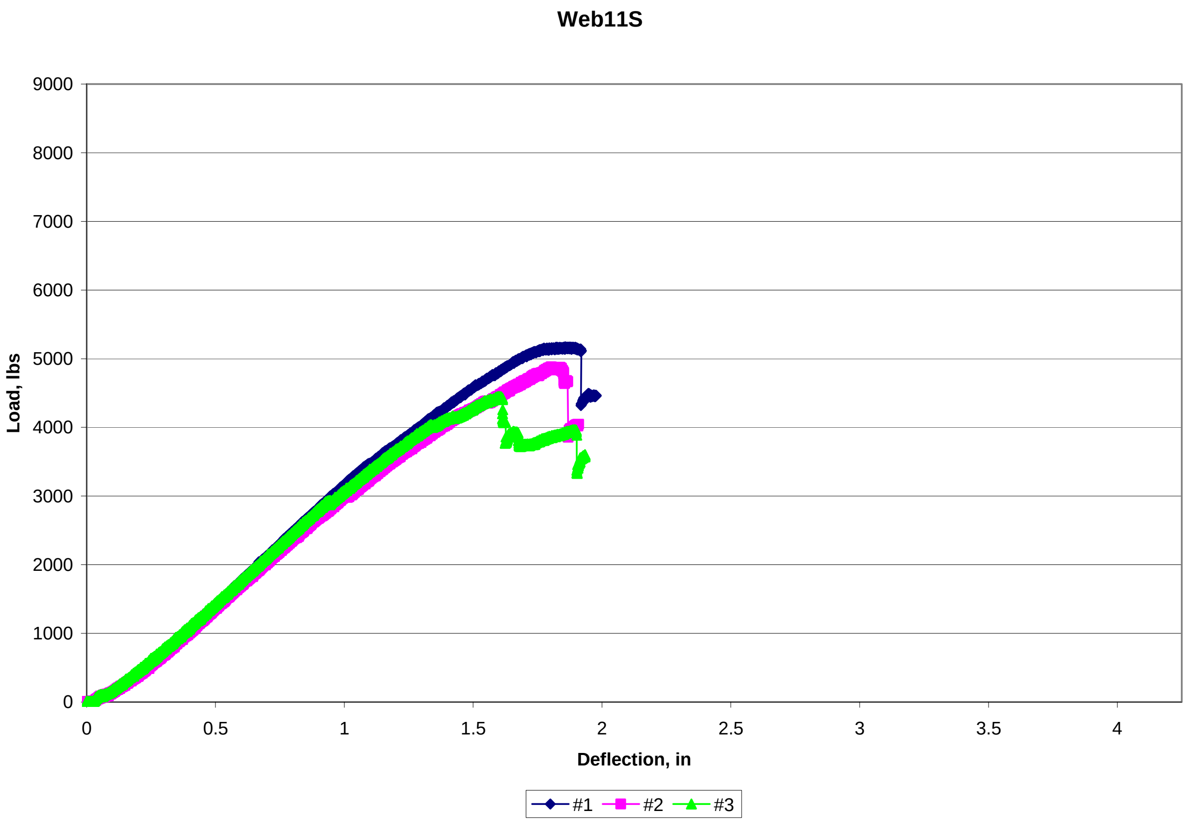
1000
0
Load, lbs
0
0.5
1
1.5
2
2.5
3
3.5
4
Deflection, in
#1
#2
#3
#4
#5
#6


Web11S
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
Load, lbs
0
0.5
1
1.5
2
2.5
3
3.5
4
Deflection, in
#1
#2
#3

SQUAREcolumns™
by Metwood

Reports

Axial Compression of Steel Columns

Applied Testing & Geosciences, LLC

SQUARE*columns*™

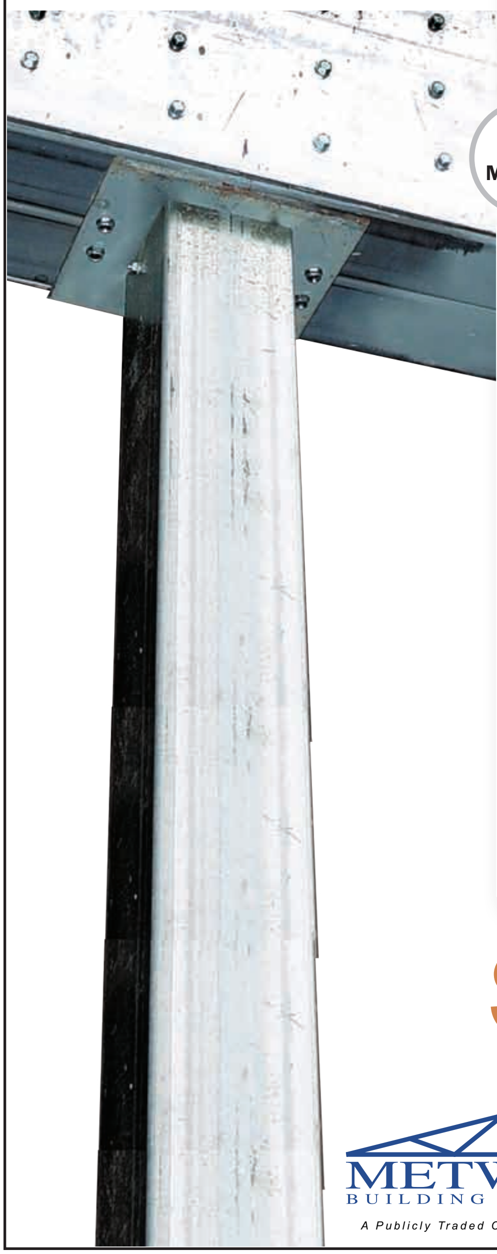
A perfect match for truSPAN™ and throughSPAN Beams, but the fact is they'll support just about anything. Square Columns have several advantages over round columns or jack posts and at comparable prices they feature strength and flexibility not found in most column products on the market. Metwood Square Structural Columns together with *tru***SPAN**™ Beams will give you a whole new set of possibilities.

- "Tabbed" Top Plate for flexibility at the job site. This allows for immediate use of the column and no need for "temporaries".
- Fasten with screws, and trim easily with a reciprocating saw, hacksaw, or saw with abrasive blade.
- Easier to plumb and attach treatments such as wood, masonry, vinyl, dryvit, and more.
- 3" Square Columns fit inside 2 x 4 framed walls, and are perfect as supports or wall stiffeners.
- Lighter gauge than round columns but featuring higher load capacities.
- Galvanized with an in-line Flo-Coat for a triple layer of corrosion protection. An excellent choice for exterior applications.
- Available lengths are 9', 10' and 12' along with custom lengths and end plates.

5 WAYS BETTER

Available Loads (lbs.)

3" - 13 Ga.	9' - 18,637 lbs.	10' - 16,162 lbs.
4" - 13 Ga.	10' - 29,776 lbs.	12' - 25,280 lbs.
4" - 11 Ga.	10' - 37,204 lbs.	12' - 31,503 lbs.



1 Measure

2 Cut

3 Assemble

4 Install

SQUARE*columns*™

by Metwood

METWOOD™ BUILDING SOLUTIONS

A Publicly Traded Company, OTC-MTWD

819 Naff Road Boones Mill, VA. 24065 Ph: 540-334-4294 www.metwood.com

Report of Axial Compression of Steel Columns

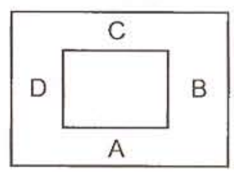
Name of Project	Metwood - Column Testing
Client	Metwood, Inc., Boones Mill, VA
Description of Work	Axial Compression of Steel Columns
Location of Work	Applied Testing & Geosciences, LLC, Bridgeport, PA
Material Supplier	Allied Tubing
Test Pump/Gauge	Enerpac RCH-606, P-80 Jack, Serial No. 257 - Calibration Services, Inc. 4/10/2007
Test Cylinder	TFL42-200K, Serial No. 200016
Load Calibration	Morehouse Instrument Company, Inc. / Certificate # 20016F2507
Indicator	Load Cell Central AHM Readout, Serial No. 1000341745
Test Procedure	ASTM E72 Modified
Test Engineer	Joss / Ianuli / Rivera

Section Properties

Column Label	Gauge #	Column Size	Side A thk (inches)	Side B thk (inches)	Side C thk (inches)	Side D thk (inches)	Average thk (inches)
1	13	3"x3"x10'	0.101	0.100	0.093	0.106	0.100
4	13	3"x3"x10'	0.096	0.096	0.097	0.092	0.095
7	13	3"x3"x10'	0.107	0.094	0.095	0.092	0.097

Results

Column Label	Gauge #	Initial Load (lbf)	Ultimate Load (lbf)	Allowable Load (lbf)	Ultimate vs. Allowable
1	13	20	24,400	15,884	1.5
4	13	80	25,120	15,884	1.6
7	13	480	25,960	15,884	1.6
		Average:	25,160		1.6



Reported to: Al Smith
Report Date 6/26/2007

Respectfully Submitted,
Applied Testing & Geosciences, LLC

Craig J. Joss, Ph.D., P.E.
Technical Manager

401 E. Fourth Street, Bldg 12-B, Bridgeport, PA 19405
Phone: 610-313-3227 Fax: 610-313-9667
Email: info@appliedtesting.com Web: www.appliedtesting.com

Report of Axial Compression of Steel Columns

Name of Project	Metwood - Column Testing
Client	Metwood, Inc., Boones Mill, VA
Description of Work	Axial Compression of Steel Columns
Location of Work	Applied Testing & Geosciences, LLC, Bridgeport, PA
Material Supplier	Allied Tubing
Test Pump/Gauge	Enerpac RCH-606, P-80 Jack, Serial No. 257 - Calibration Services, Inc. 4/10/2007
Test Cylinder	TFL42-200K, Serial No. 200016
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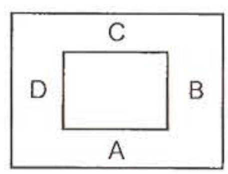
Indicator	Load Cell Central AHM Readout, Serial No. 1000341745
Test Procedure	ASTM E72 Modified
Test Engineer	Joss / Ianuli / Rivera

Section Properties

Column Label	Gauge #	Column Size	Side A thk (inches)	Side B thk (inches)	Side C thk (inches)	Side D thk (inches)	Average thk (inches)
10	-	3"x3"x10'	0.113	0.116	0.119	0.112	0.115
5	-	3"x3"x10'	0.114	0.116	0.114	0.114	0.115
3	-	3"x3"x10'	0.114	0.117	0.112	0.112	0.114

Results

Column Label	Gauge #	Initial Load (lbf)	Ultimate Load (lbf)	Allowable Load (lbf)	Ultimate vs. Allowable
10	-	400	31,090	-	-
5	-	330	41,230	-	-
3	-	100	41,270	-	-
		Average:	37,863		



Reported to: Al Smith
Report Date 6/27/2007

Respectfully Submitted,
Applied Testing & Geosciences, LLC

Craig J. Joss, Ph.D., P.E.
Technical Manager

401 E. Fourth Street, Bldg 12-B, Bridgeport, PA 19405
Phone: 610-313-3227 Fax: 610-313-9667
Email: info@appliedtesting.com Web: www.appliedtesting.com

Report of Axial Compression of Steel Columns

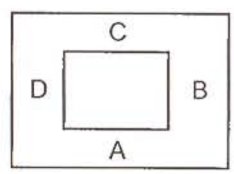
Name of Project	Metwood - Column Testing
Client	Metwood, Inc., Boones Mill, VA
Description of Work	Axial Compression of Steel Columns
Location of Work	Applied Testing & Geosciences, LLC, Bridgeport, PA
Material Supplier	Allied Tubing
Test Pump/Gauge	Enerpac RCH-606, P-80 Jack, Serial No. 257 - Calibration Services, Inc. 4/10/2007
Test Cylinder	TFL42-200K, Serial No. 200016
Load Calibration	Morehouse Instrument Company, Inc. / Certificate # 20016F2507
Indicator	Load Cell Central AHM Readout, Serial No. 1000341745
Test Procedure	ASTM E72 Modified
Test Engineer	Joss / Ianuli / Rivera

Section Properties

Column Label	Gauge #	Column Size	Side A thk (inches)	Side B thk (inches)	Side C thk (inches)	Side D thk (inches)	Average thk (inches)
9	11	4"x4"x10'	0.121	0.135	0.135	0.120	0.128
12	11	4"x4"x10'	0.118	0.121	0.135	0.133	0.127
11	11	4"x4"x10'	0.136	0.134	0.119	0.121	0.128

Results

Column Label	Gauge #	Initial Load (lbf)	Ultimate Load (lbf)	Allowable Load (lbf)	Ultimate vs. Allowable
9	11	60	61,840	38,072	1.6
12	11	1570	66,170	38,072	1.7
11	11	-30	67,930	38,072	1.8
		Average:	65,313		1.7



Reported to: Al Smith
Report Date 6/28/2007

Respectfully Submitted,
Applied Testing & Geosciences, LLC

Craig J. Joss, Ph.D., P.E.
Technical Manager

401 E. Fourth Street, Bldg 12-B, Bridgeport, PA 19405
Phone: 610-313-3227 Fax: 610-313-9667
Email: info@appliedtesting.com Web: www.appliedtesting.com

Report of Axial Compression of Steel Columns

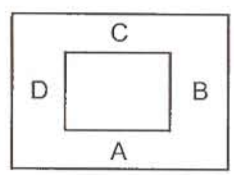
Name of Project	Metwood - Column Testing
Client	Metwood, Inc., Boones Mill, VA
Description of Work	Axial Compression of Steel Columns
Location of Work	Applied Testing & Geosciences, LLC, Bridgeport, PA
Material Supplier	Allied Tubing
Test Pump/Gauge	Enerpac RCH-606, P-80 Jack, Serial No. 257 - Calibration Services, Inc. 4/10/2007
Test Cylinder	TFL42-200K, Serial No. 200016
Load Calibration	Morehouse Instrument Company, Inc. / Certificate # 20016F2507
Indicator	Load Cell Central AHM Readout, Serial No. 1000341745
Test Procedure	ASTM E72 Modified
Test Engineer	Joss / Ianuli / Rivera

Section Properties

Column Label	Gauge #	Column Size	Side A thk (inches)	Side B thk (inches)	Side C thk (inches)	Side D thk (inches)	Average thk (inches)
2	13	4"x4"x10'	0.097	0.097	0.094	0.097	0.096
8	13	4"x4"x10'	0.095	0.095	0.095	0.097	0.096
6	13	4"x4"x10'	0.096	0.097	0.095	0.097	0.096

Results

Column Label	Gauge #	Initial Load (lbf)	Ultimate Load (lbf)	Allowable Load (lbf)	Ultimate vs. Allowable
2	13	90	48,280	28,361	1.7
8	13	-100	50,030	28,361	1.8
6	13	-60	53,140	28,361	1.9
		Average:	50,483		1.8



Reported to: Al Smith
Report Date 6/29/2007

Respectfully Submitted,
Applied Testing & Geosciences, LLC

Craig J. Joss, Ph.D., P.E.
Technical Manager

401 E. Fourth Street, Bldg 12-B, Bridgeport, PA 19405
Phone: 610-313-3227 Fax: 610-313-9667
Email: info@appliedtesting.com Web: www.appliedtesting.com

METWOOD™
BUILDING SOLUTIONS

A Publicly Traded Company, OTC-MTWD

Engineering Certification Samples

Engineering Certification
Metwood I-Joist Web Reinforcer for Plywood I-Joist Products

Date:	April 30, 2008	Invoice #:	34292
Customer:	NC / Terrasimco 803 Sanderson Drive Durham, NC 27704	Building Permit #:	0710338
Contractor:	Terrasimco	Job Name:	Willardville Station
Job Location:	7801 Willardville Station Durham, NC	Overall Joist Span:	12'
Web Cut From Bearing:	3'	Reinforcer:	75FR11

This is to certify that the Metwood I-Joist Reinforcer, when applied according to the installation instructions published by Metwood, Inc., will assure the following load carrying capacities for plywood I-joist products:

Joist Spacing (inches)	**Live Load** (psf)	**Dead Load** (psf)
16	60	15
19.2	50	15
24	40	15

Maximum Joist Flange Width: 2.00

Sincerely,

James C. Pugh, P.E.

Engineering Certification
Metwood I-Joist Flange Reinforcer for Plywood I-Joist Products

Date: June 11, 2008

Invoice #: 34703

Customer: City Lumber Company
114 Airways Blvd.
Jackson, TN 38302

Building Permit #:

Contractor: Larry Karl

Job Name: Nicola

Job Location: Jackson, TN

Overall Joist Span: 10'

Top Flange Cut From Bearing: 24"

Reinforcer: 100FR11

This is to certify that the Metwood I-Joist Reinforcer, when applied according to the installation instructions published by Metwood, Inc., will assure the following load carrying capacities for plywood I-joist products:

Joist Spacing (inches)	**Live Load** (psf)	**Dead Load** (psf)
16	60	15
19.2	50	15
24	40	15

Maximum Joist Flange Width: 2.50

Sincerely,

Jason Conn, P.E.

METWOOD
BUILDING SOLUTIONS

819 Naff Rd
Boones Mill, VA 24065
(540) 334-4294 Fax: (540) 334-4293
http://www.metwood.com

Girders
Copy 1 Of 1

Item Number:	A
Overall Length:	14' 0"
Span:	13' 6"
Unbraced Len:	24 Inches
Quantity:	1
Product:	934-77-24TB

Customer:	Timber Truss-Salem
Job Number:	33408 Sales Rep: MTC
Job Site:	BAHR
Location:	SALEM, VA
Order Date:	2/13/2008
Finish Date:	2/13/2008
Deliver Date:	2/13/2008

Description: 2ND FLOOR GIRDER (DROPPED) Conventional
Wood: 2x4 Top_Bottom

Disclaimer

This certification indicated on this sheet is limited to the adequacy of the Metwood beam to support the indicated loads within the parameters listed in the 2003 International Building Code. This certification is null and void if additional loads or load patterns differing from those indicated on this sheet are applied to the beam.

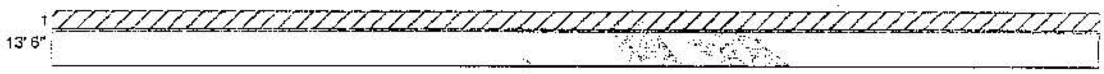
Engineering Specification

Begin Reaction	4556 Lbs	End Reaction:	4556 Lbs
Maximum Moment:	15377 Lbs-Ft	Allowable Moment:	33480 Lbs-Ft
Stress Ratio:	0.46	Web w/t Ratio:	118
Live Load Deflection	0.18	Live Load Deflection Ratio:	L/882
Total Load Deflection:	0.28	Total Load Deflection Ratio:	L/588

Load Information

Description	Live Load	Dead Load	From Left	Length
1. Uniform	450 Lbs	225 Lbs	0 Ft	13.5 Ft

Load Diagram Over Girder Span



Ply Information

Description	Size	Yield Stress	Rebar
1	9.25X1.625 14	50 KSI	7
2	9.25X1.625 14	50 KSI	7

Special Instructions

CERTIFICATION FOR
BUILDING INSPECTOR
DO NOT DISCARD!

COMMONWEALTH OF VIRGINIA
JAMES C. PUGH
Lic. No. 038561
2/13/08
PROFESSIONAL ENGINEER

METWOOD
BUILDING SOLUTIONS

STANDARD DETAILS

METWOOD

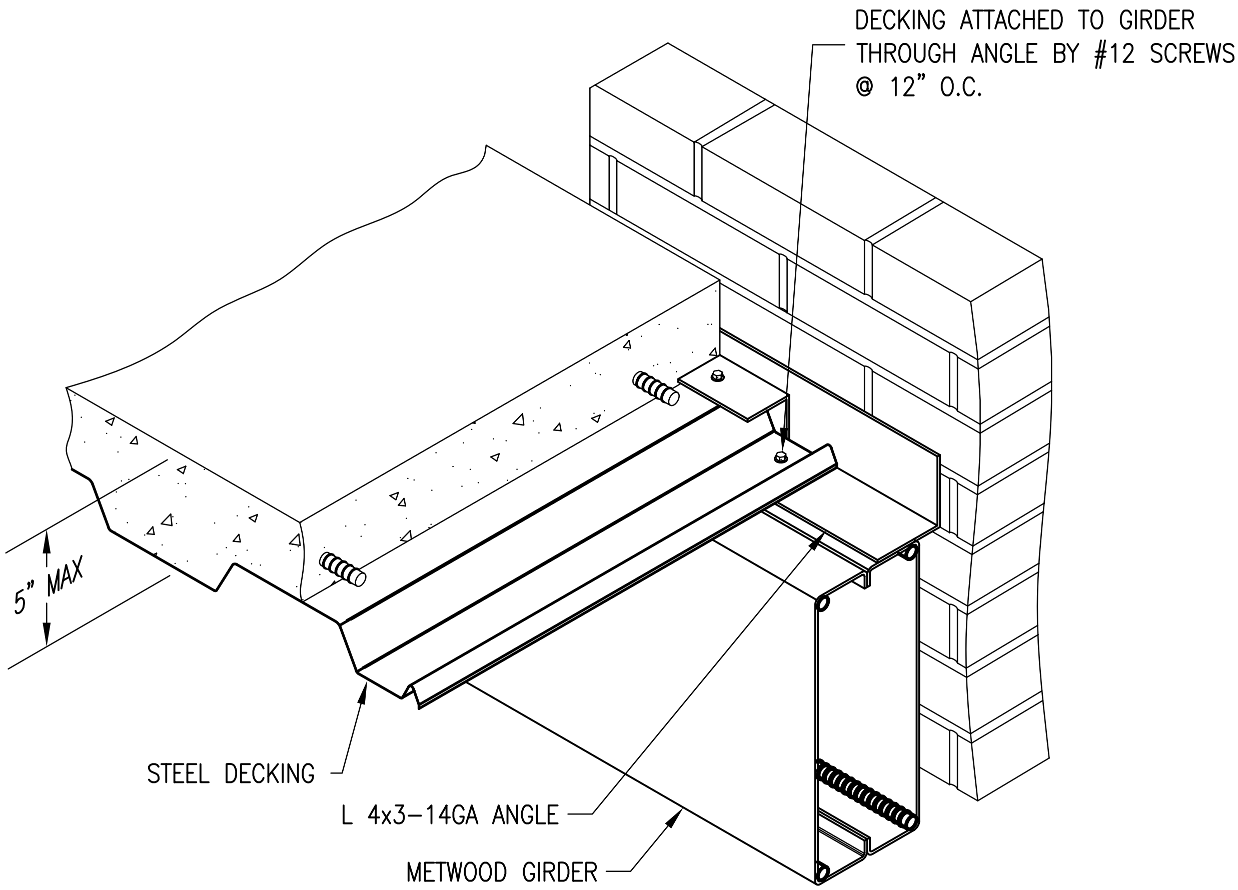
DECKING CONNECTIONS

CONCRETE

CMU

BRICK VENEER

WOOD FRAMED WALLS



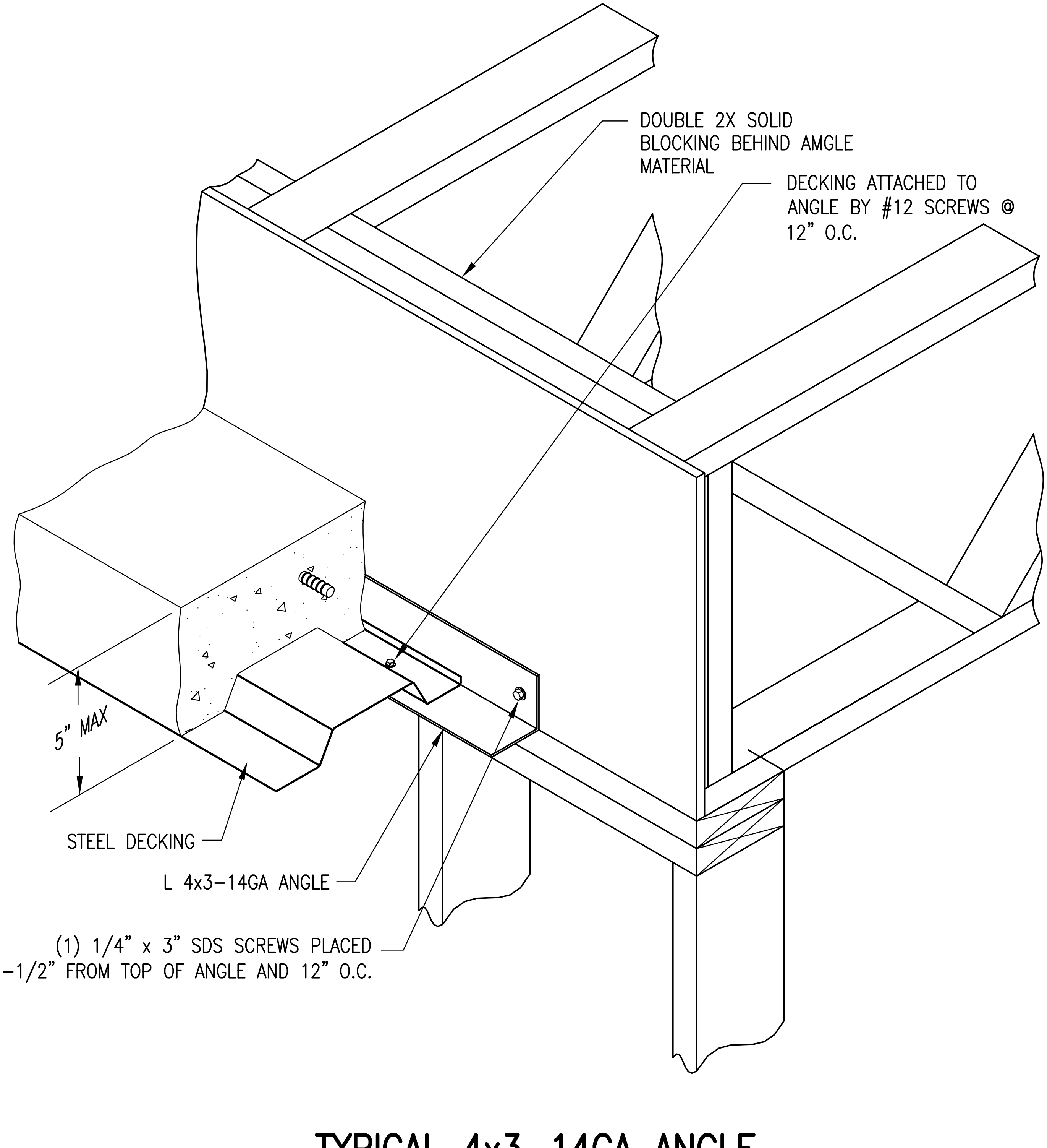
TYPICAL 4x3-14GA ANGLE TO BRICK VENEER

SCALE: 1-1/2" = 1'

METWOOD BUILDING SOLUTIONS
540 334 4294 Fax 540 334 4293
819 Naff Road Boones Mill, Virginia 24065

4"x3" ANGLE DECKING CONNECTION

DRAWN	DATE
RAH	12/8/08
CHECKED	SCALE
	AS NOTED
REV. DATE	SHEET
	1 OF 1



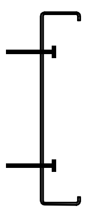
TYPICAL 4x3-14GA ANGLE TO WOOD FRAMING

SCALE: 1-1/2" = 1'

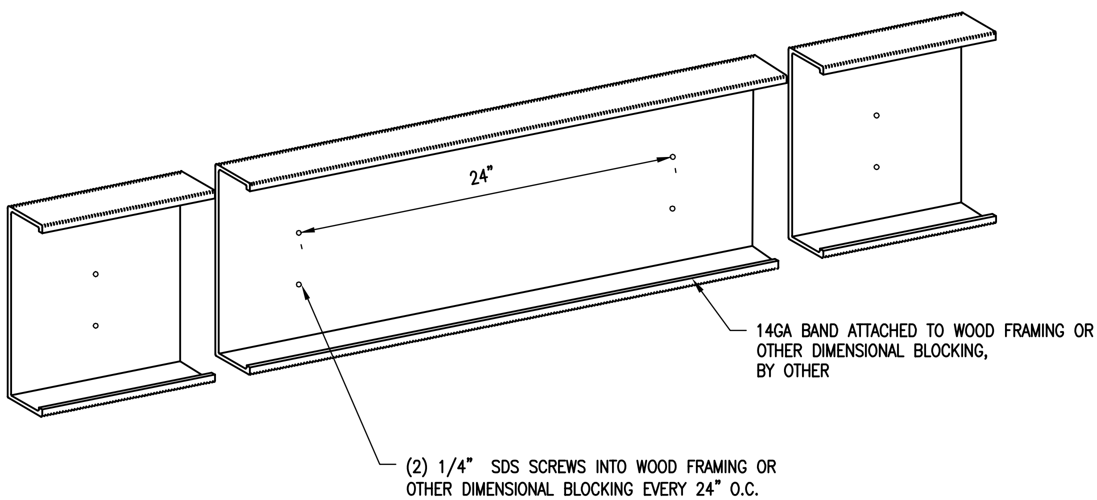
METWOOD
BUILDING SOLUTIONS
540 334 4294 Fax 540 334 4293
819 Naff Road Boones Mill, Virginia 24065

4"x3" ANGLE DECKING CONNECTION

DRAWN	DATE
RAH	12/8/08
CHECKED	SCALE
	AS NOTED
REV. DATE	SHEET
	1 OF 1



SIDE VIEW



METWOOD BAND CONNECTION
BAND TO WOOD FRAMING

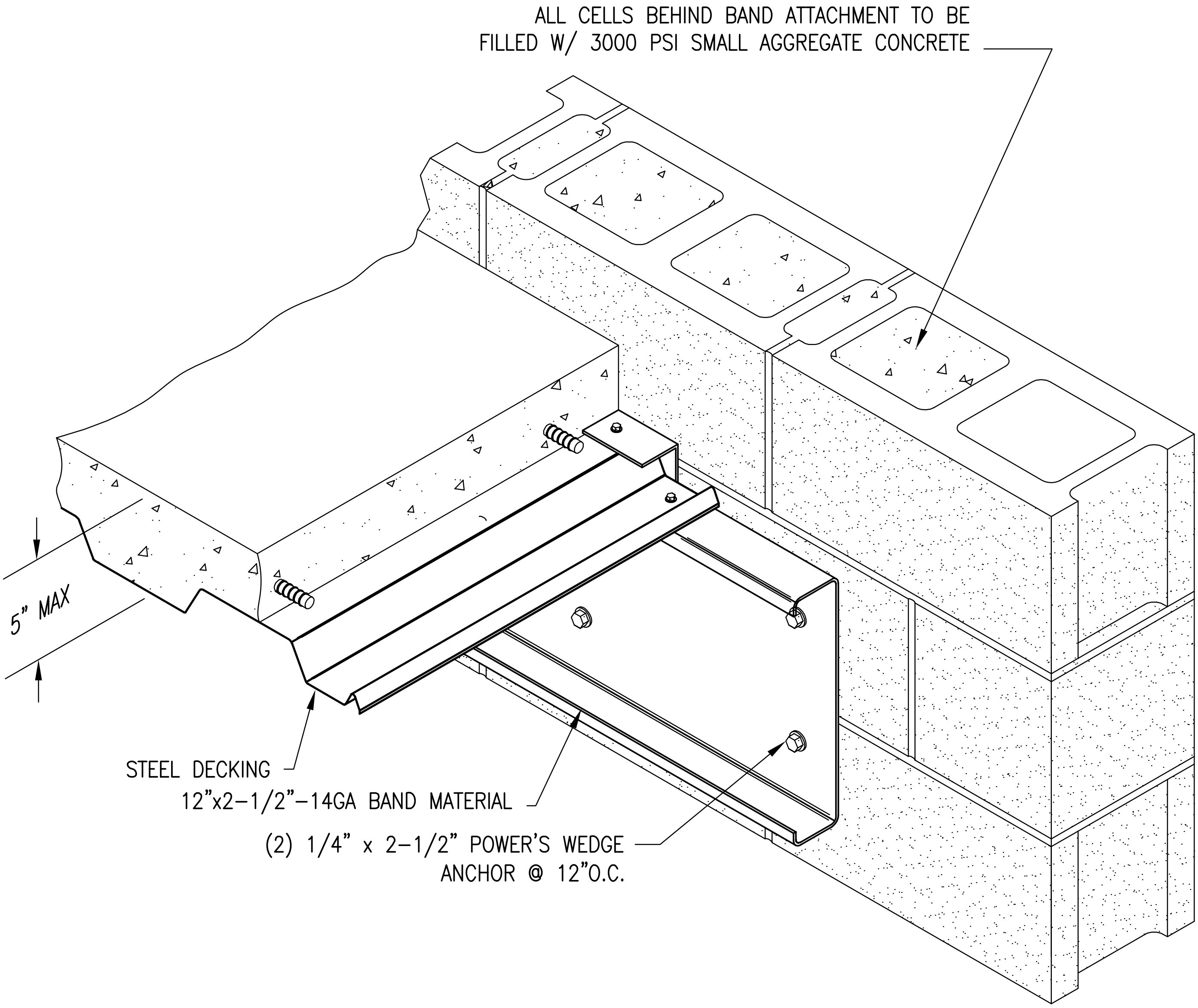
SCALE: 1" = 1'

METWOOD
BUILDING SOLUTIONS
540 334 4294 Fax 540 334 4293
819 Naff Road Boones Mill, Virginia 24065

BAND TO WOOD FRAMING

BAND CONNECTION

DRAWN	DATE
RAH	12/8/08
CHECKED	SCALE
	AS NOTED
REV. DATE	SHEET
	1 OF 1



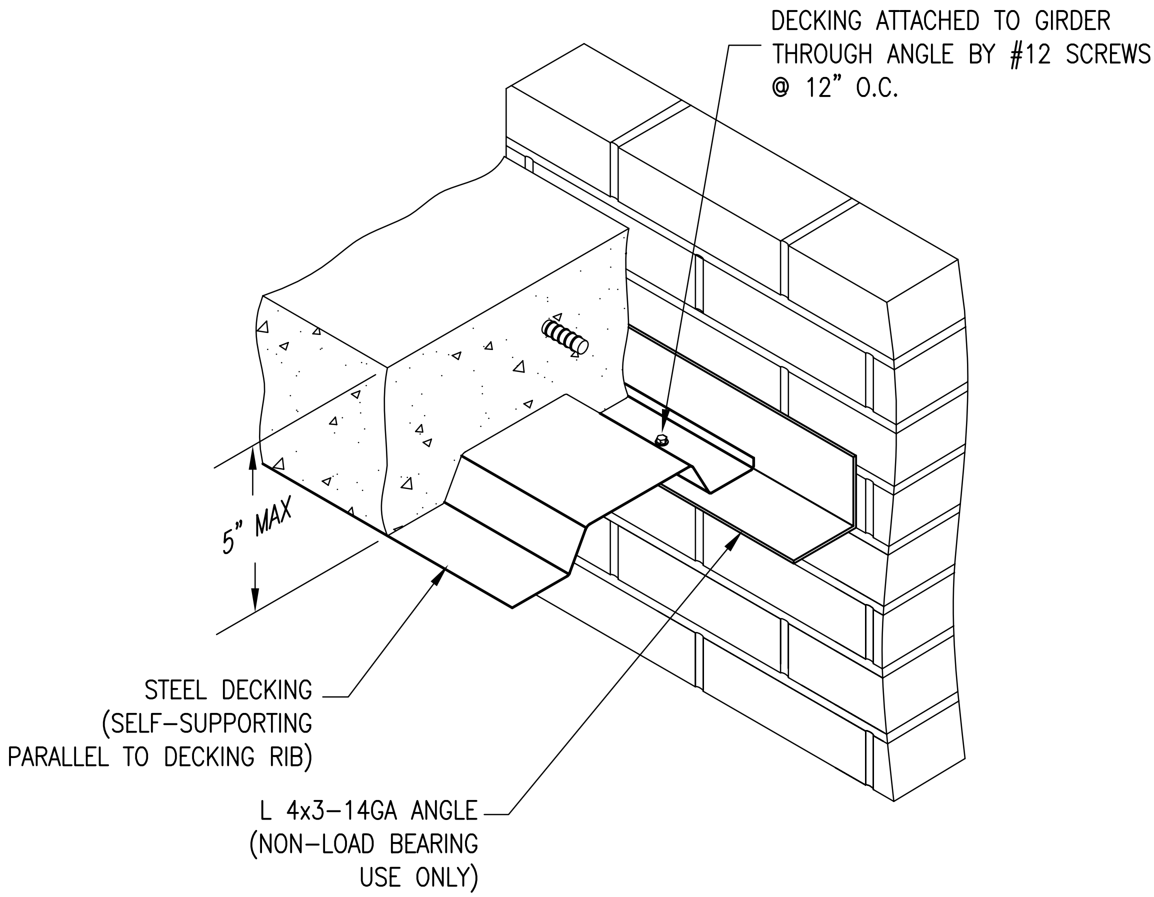
BAND TO CMU
BAND MATERIAL CONNECTION

SCALE: 1-1/2" = 1'

METWOOD
BUILDING SOLUTIONS
540 334 4294 Fax 540 334 4293
819 Naff Road Boones Mill, Virginia 24065

BAND TO CMU
DECKING CONNECTION

DRAWN	DATE
RAH	12/8/08
CHECKED	SCALE
	AS NOTED
REV. DATE	SHEET
	1 OF 1



TYPICAL 4x3-14GA ANGLE TO BRICK VENEER

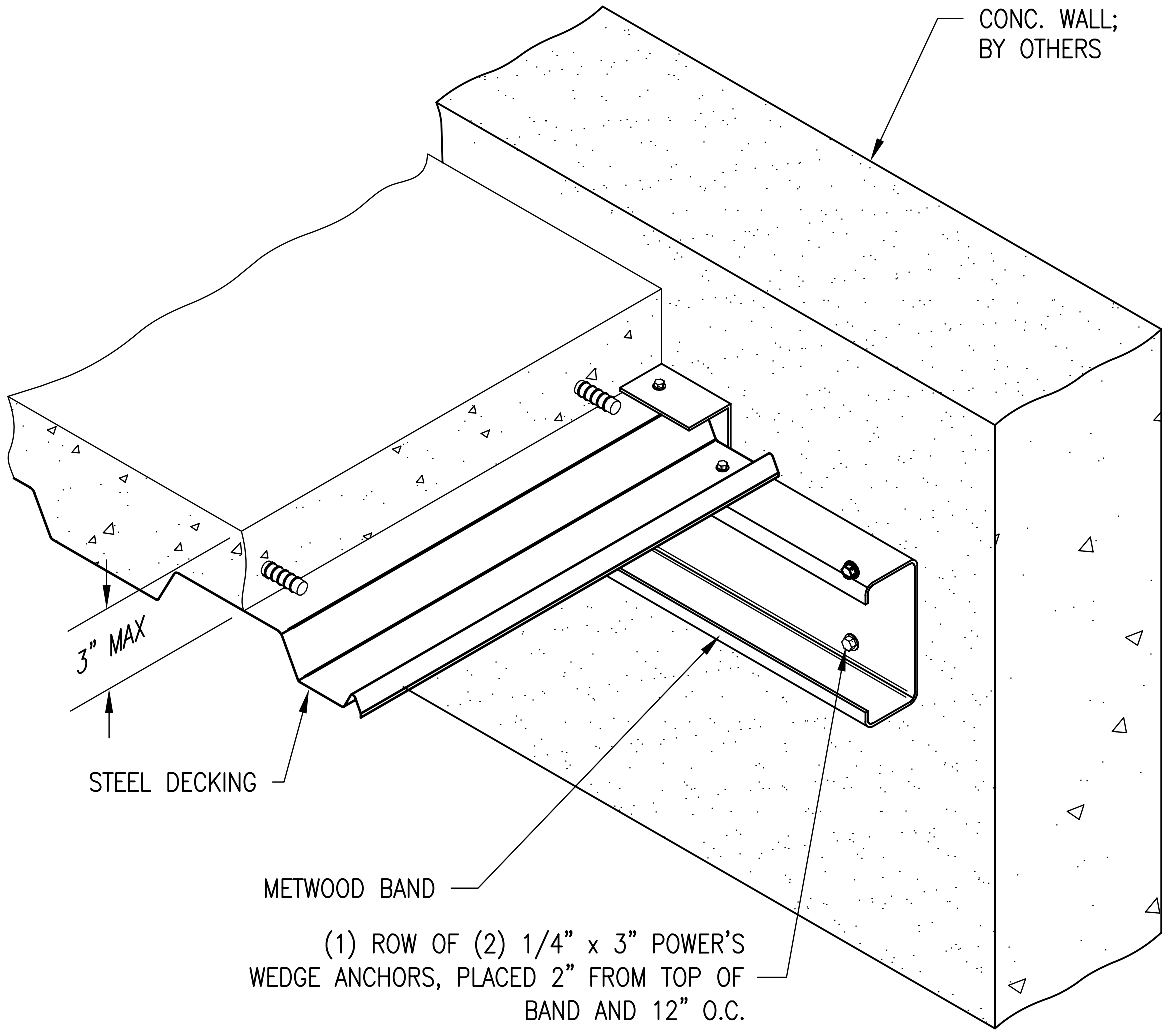
SCALE: 1-1/2" = 1'

METWOOD
BUILDING SOLUTIONS

540 334 4294 Fax 540 334 4293
819 Naff Road Boones Mill, Virginia 24065

4"x3" ANGLE DECKING CONNECTION

DRAWN	DATE
RAH	12/8/08
CHECKED	SCALE
	AS NOTED
REV. DATE	SHEET
	1 OF 1



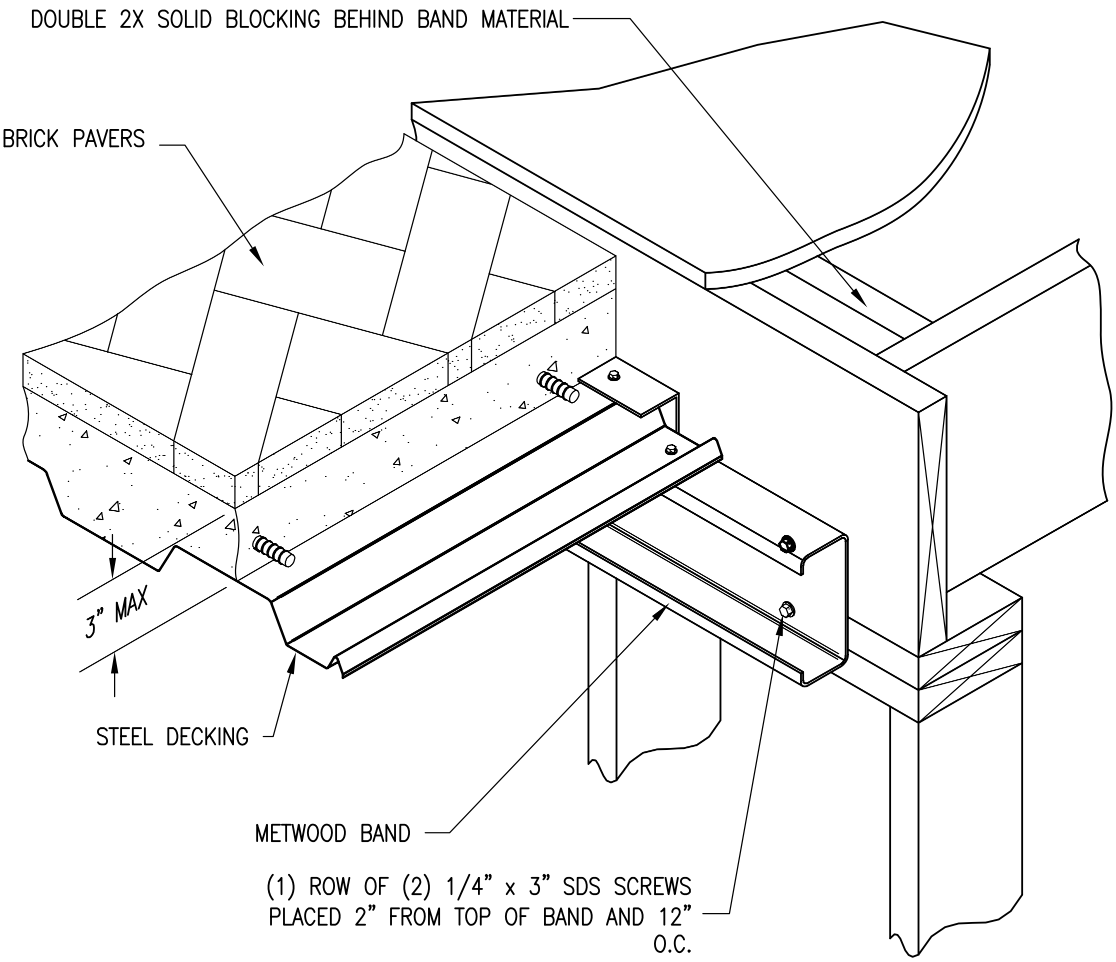
TYPICAL BAND MATERIAL TO CONC. WALL

SCALE: 1-1/2" = 1'

METWOOD
BUILDING SOLUTIONS
540 334 4294 Fax 540 334 4293
819 Naff Road Boones Mill, Virginia 24065

BAND TO CONCRETE DECKING CONNECTION

DRAWN	DATE
RAH	12/8/08
CHECKED	SCALE
	AS NOTED
REV. DATE	SHEET
	1 OF 1



TYPICAL BAND MATERIAL TO WOOD FRAMING

SCALE: 1-1/2" = 1'

METWOOD
BUILDING SOLUTIONS
540 334 4294 Fax 540 334 4293
819 Naff Road Boones Mill, Virginia 24065

BAND TO WOOD FRAMING DECKING CONNECTION

DRAWN	DATE
RAH	12/8/08
CHECKED	SCALE
	AS NOTED
REV. DATE	SHEET
	1 OF 1

METWOOD

DROP BEAMS
(POCKET DETAILS)

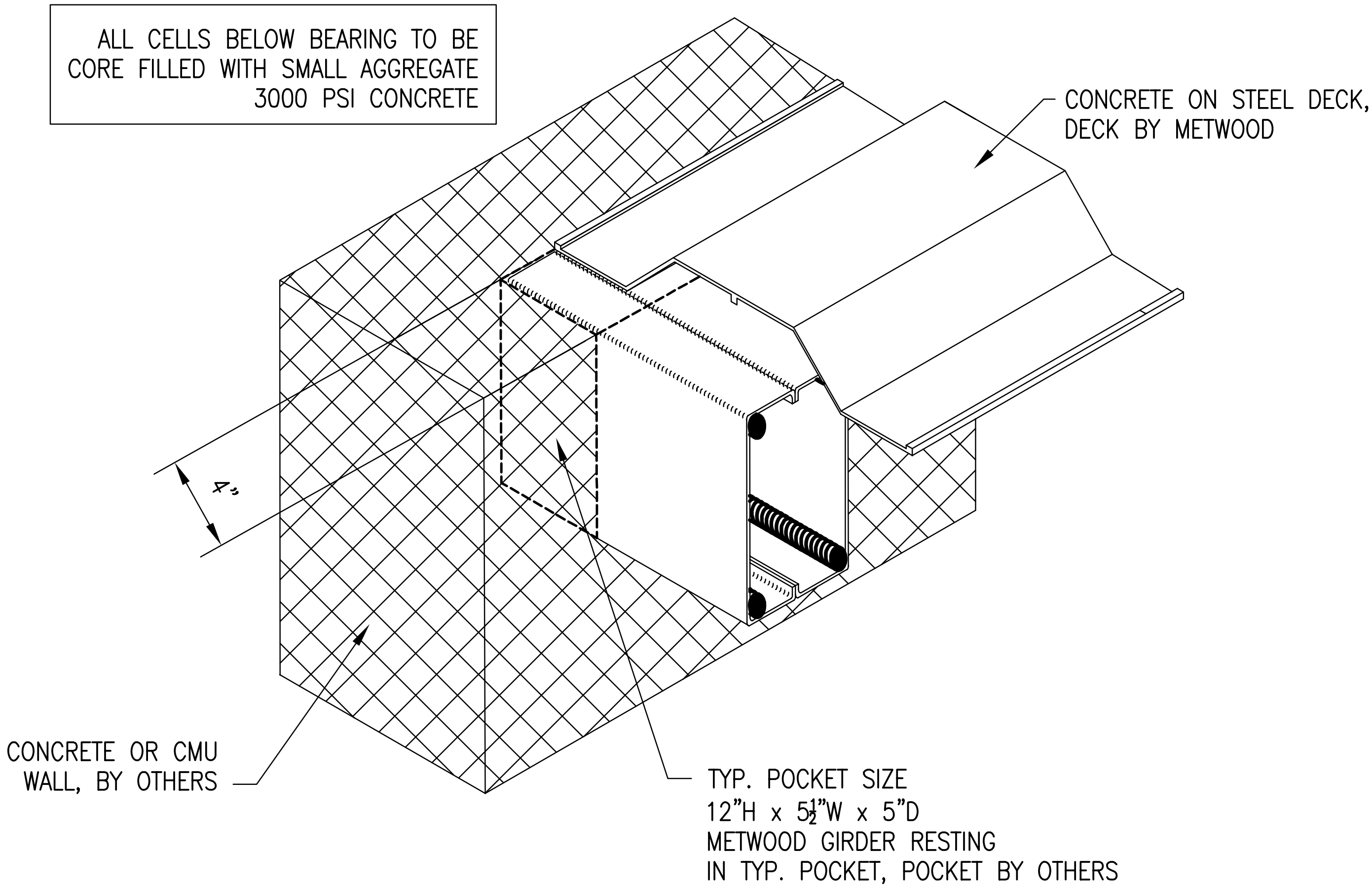
CONCRETE

CMU

I.C.F.

WOOD FRAMED WALLS

POCKETS & HANGERS



GIRDER TO CONCRETE OR CMU WALL
DROP GIRDER INTO A TYP. POCKET SIZE

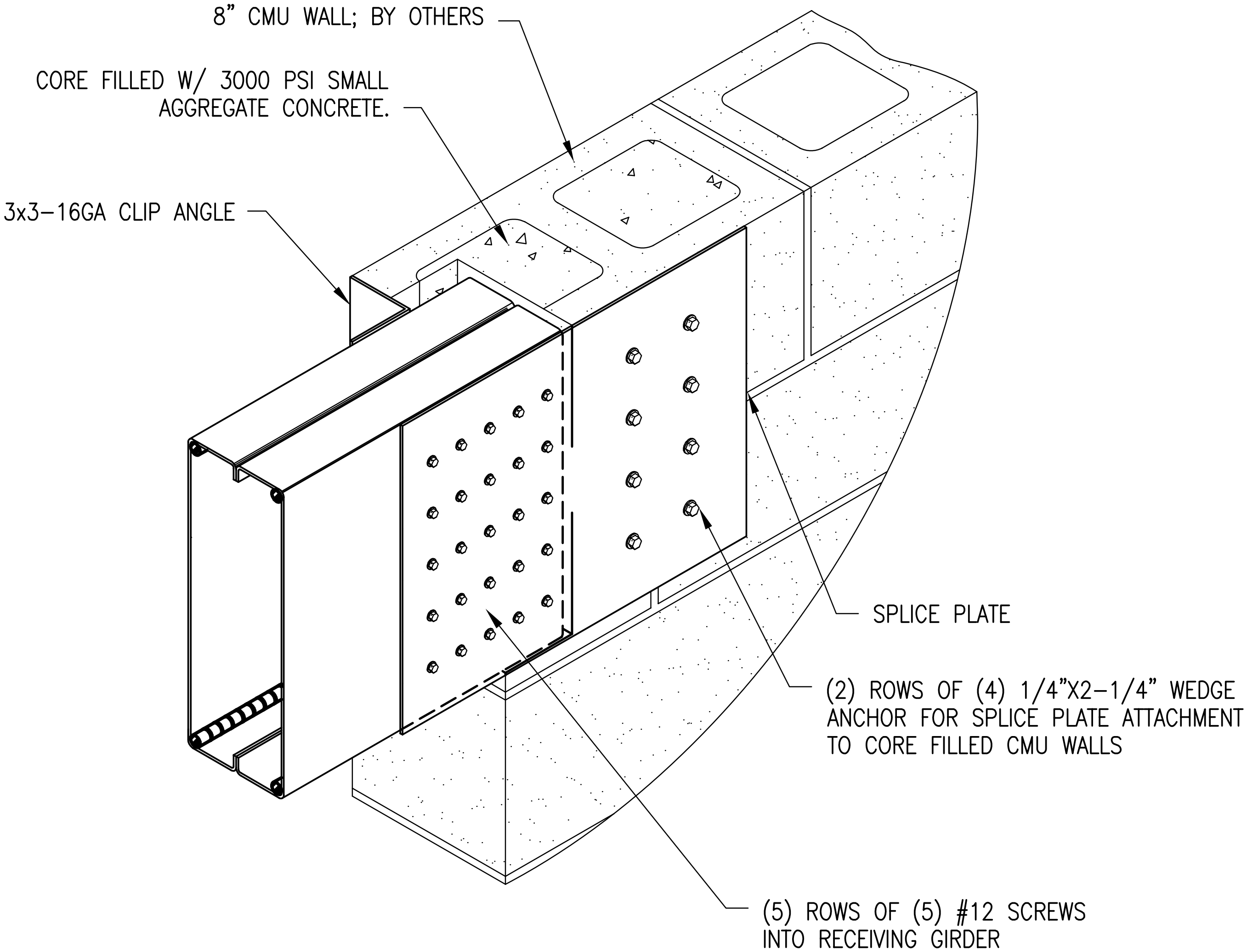
SCALE: 1-1/2" = 1'

METWOOD
BUILDING SOLUTIONS

540 334 4294 Fax 540 334 4293
819 Naff Road Boones Mill, Virginia 24065

DROP GIRDER IN CMU POCKET

DRAWN	DATE
RAH	12/5/08
CHECKED	SCALE
	AS NOTED
REVISION DATE	



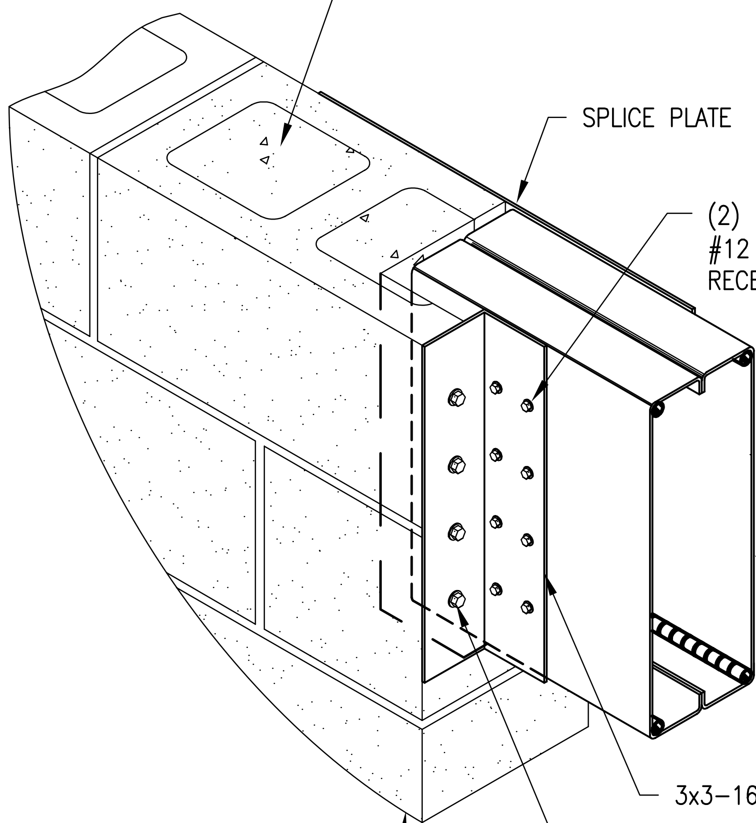
METWOOD GIRDER RESTING IN POCKET SPLICE PLATE AND CLIP ANGLE CONNECTION TO GIRDER TO WALL

SCALE: 1-1/2" = 1'

METWOOD
BUILDING SOLUTIONS
540 334 4294 Fax 540 334 4293
819 Naff Road Boones Mill, Virginia 24065

DROP GIRDER IN CMU POCKET

DRAWN	DATE
RAH	12/5/08
CHECKED	SCALE
	AS NOTED
REV. DATE	SHEET
	1 OF 2



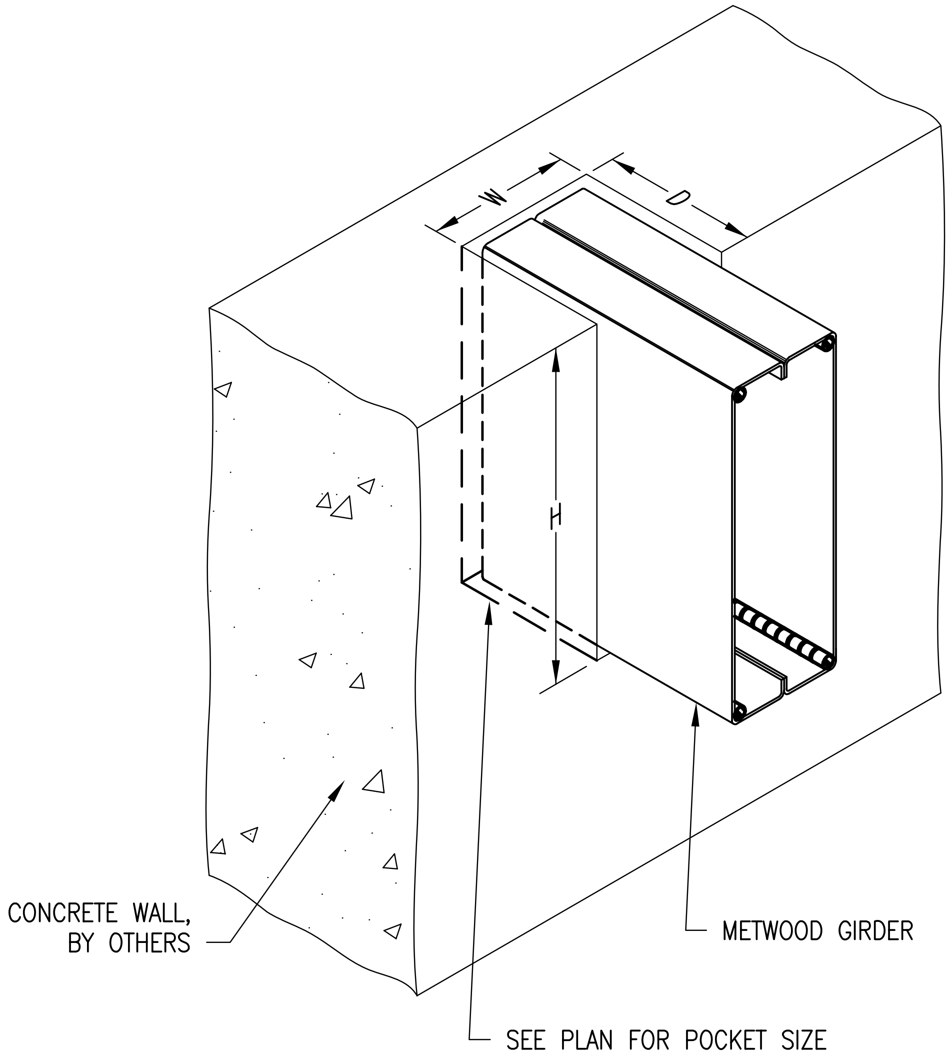
METWOOD GIRDER RESTING IN POCKET SPLICE PLATE AND CLIP ANGLE CONNECTION TO GIRDER TO WALL

SCALE: 1-1/2" = 1'

METWOOD BUILDING SOLUTIONS
540 334 4294 Fax 540 334 4293
819 Naff Road Boones Mill, Virginia 24065

DROP GIRDER IN CMU POCKET

DRAWN	DATE
RAH	12/5/08
CHECKED	SCALE
	AS NOTED
REV. DATE	SHEET
	2 OF 2



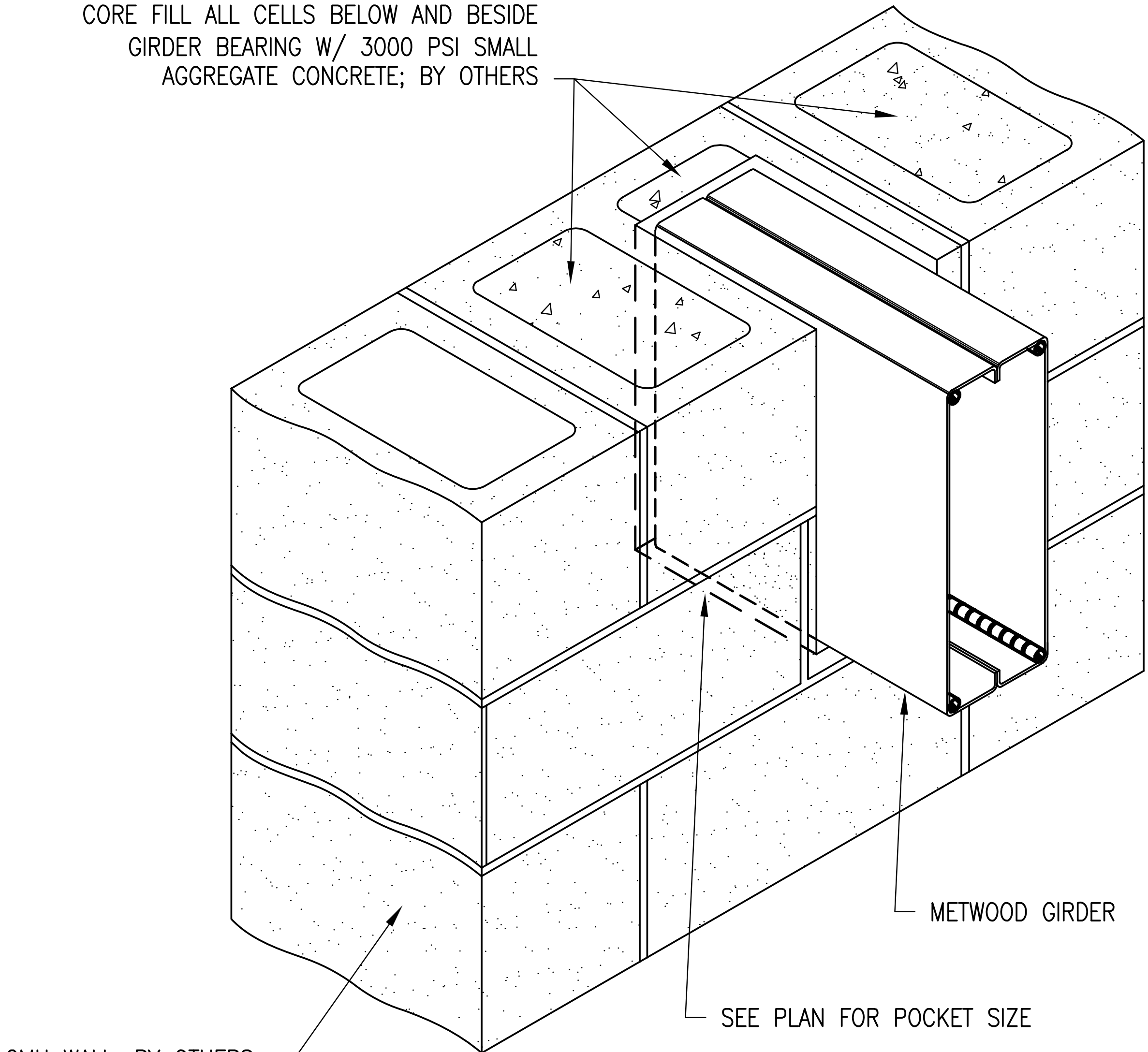
GIRDER TO CONCRETE OR CMU WALL
DROP GIRDER INTO A POCKET

SCALE: 1-1/2" = 1'

METWOOD
BUILDING SOLUTIONS
540 334 4294 Fax 540 334 4293
819 Naff Road Boones Mill, Virginia 24065

DROP GIRDER IN POCKET

DRAWN	DATE
RAH	12/5/08
CHECKED	SCALE
	AS NOTED
REV. DATE	SHEET
	1 OF 1



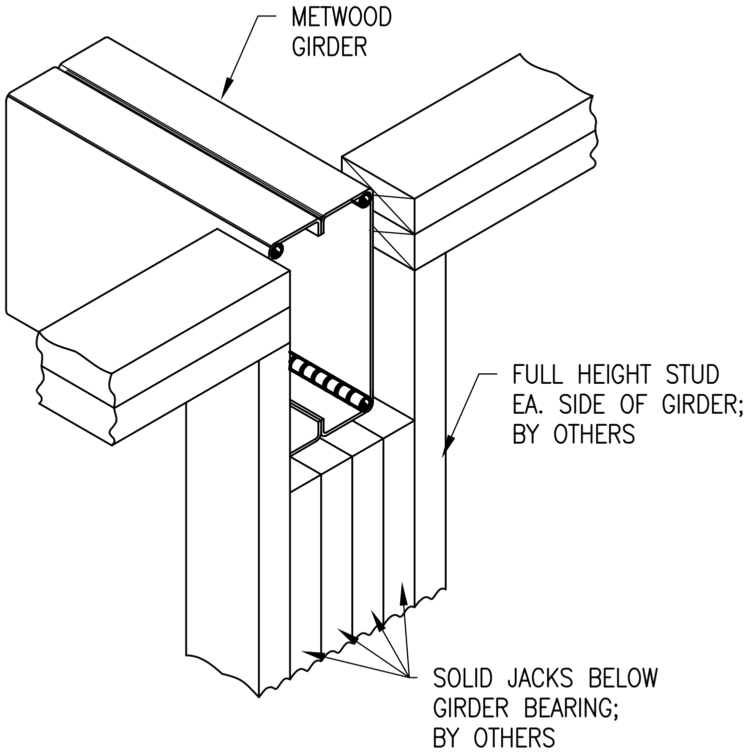
GIRDER TO CMU WALL
DROP GIRDER INTO A POCKET

SCALE: 1-1/2" = 1'

METWOOD
BUILDING SOLUTIONS
540 334 4294 Fax 540 334 4293
819 Naff Road Boones Mill, Virginia 24065

DROP GIRDER IN CMU POCKET

DRAWN	DATE
RAH	12/5/08
CHECKED	SCALE
	AS NOTED
REV. DATE	SHEET
	1 OF 1



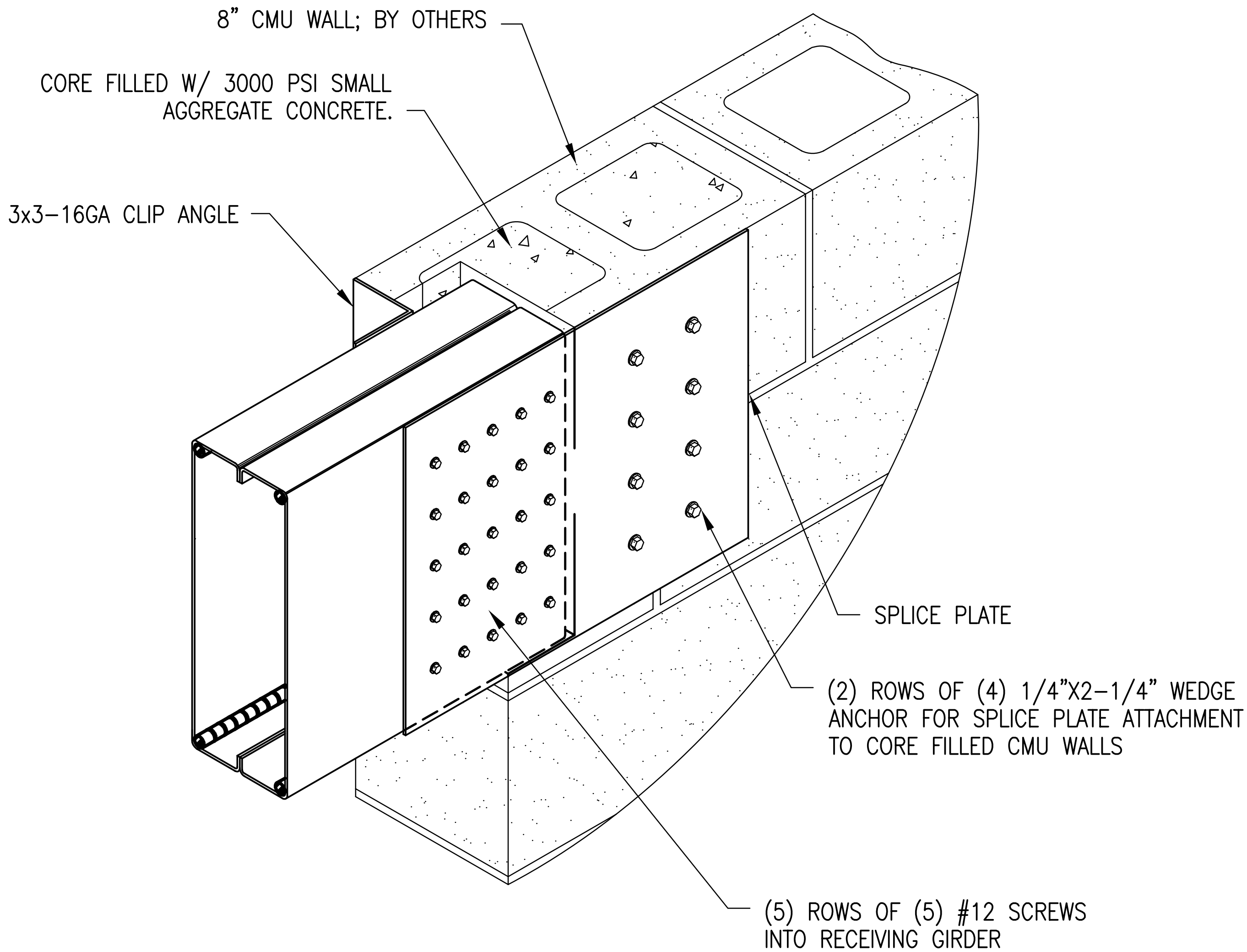
TYPICAL WOOD FRAME GIRDER POCKET

SCALE: 1-1/2" = 1'

METWOOD
BUILDING SOLUTIONS
540 334 4294 Fax 540 334 4293
819 Naff Road Boones Mill, Virginia 24065

GIRDER IN WOOD FRAMED POCKET

DRAWN	DATE
RAH	12/5/08
CHECKED	SCALE
	AS NOTED
REVISION DATE	



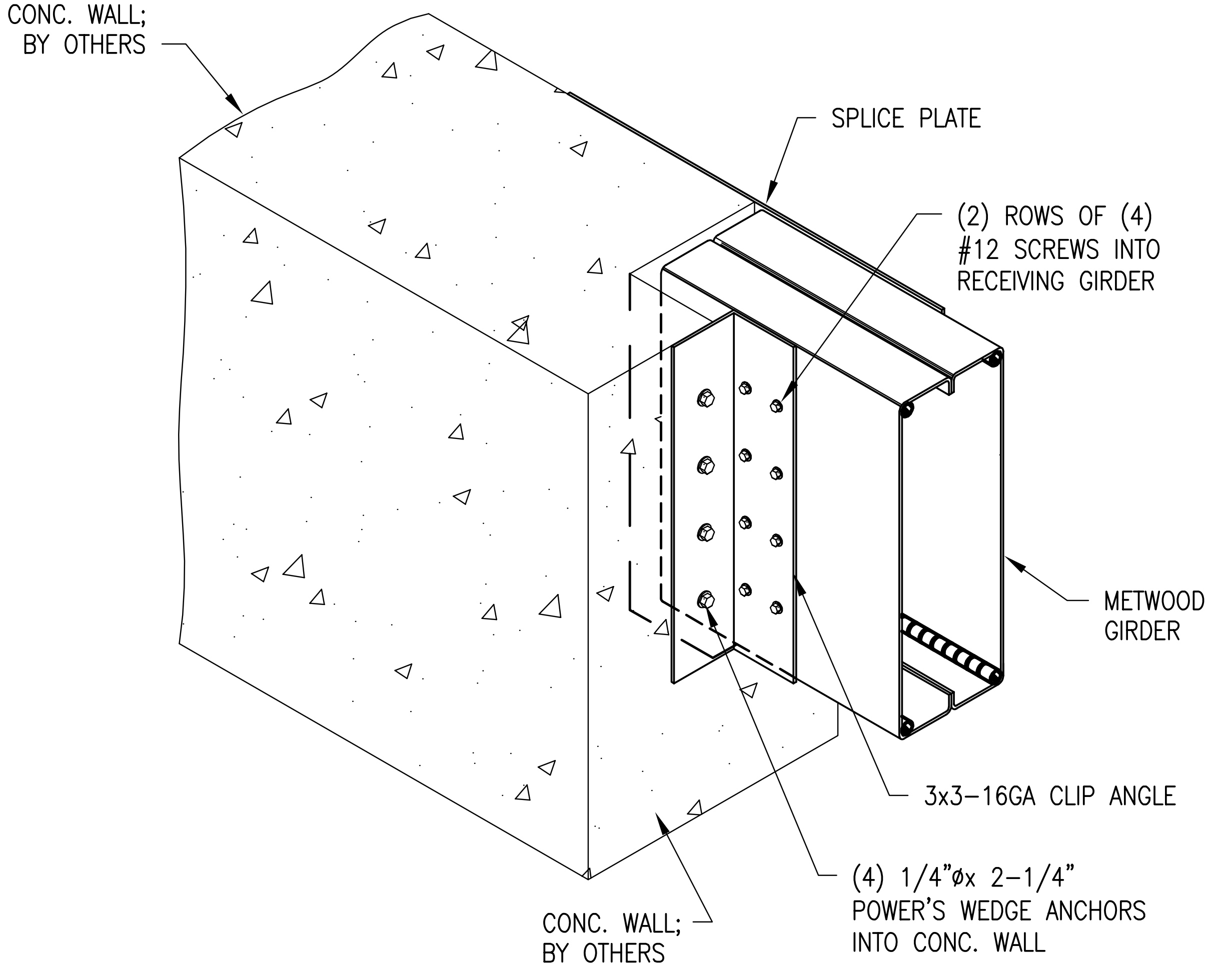
METWOOD GIRDER RESTING IN POCKET SPLICE PLATE AND CLIP ANGLE CONNECTION TO GIRDER TO WALL

SCALE: 1-1/2" = 1'

METWOOD BUILDING SOLUTIONS
540 334 4294 Fax 540 334 4293
819 Naff Road Boones Mill, Virginia 24065

DROP GIRDER IN CMU POCKET

DRAWN	DATE
RAH	12/5/08
CHECKED	SCALE
	AS NOTED
REV. DATE	SHEET
	1 OF 2



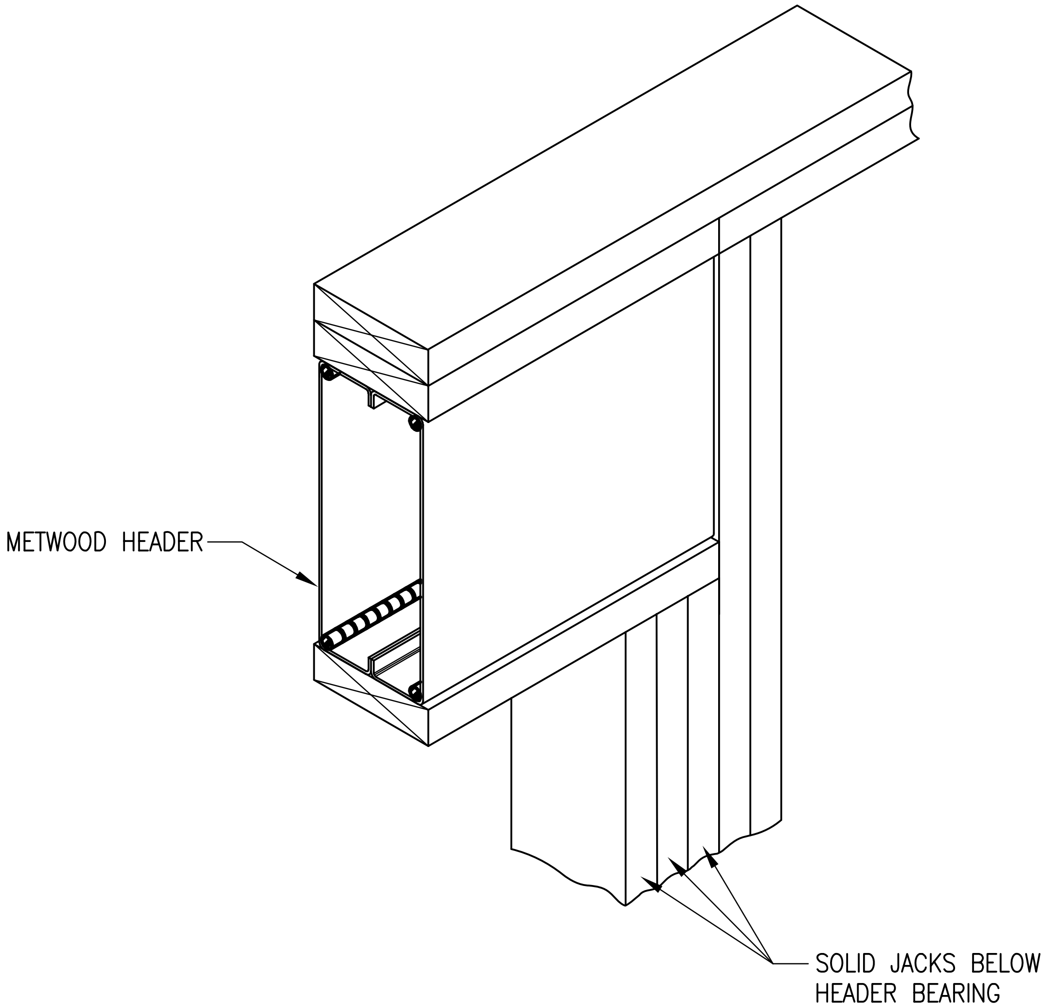
METWOOD GIRDER RESTING IN POCKET
SPLICE PLATE AND CLIP ANGLE
CONNECTION TO GIRDER TO WALL

SCALE: 1-1/2" = 1'

METWOOD
BUILDING SOLUTIONS
540 334 4294 Fax 540 334 4293
819 Naff Road Boones Mill, Virginia 24065

DROP GIRDER IN CONCRETE POCKET

DRAWN	DATE
RAH	12/5/08
CHECKED	SCALE
	AS NOTED
REV. DATE	SHEET
	2 OF 2



METWOOD GIRDER RESTING ON SOLID JACK STUDS

SCALE: 1-1/2" = 1'

METWOOD
BUILDING SOLUTIONS
540 334 4294 Fax 540 334 4293
819 Naff Road Boones Mill, Virginia 24065

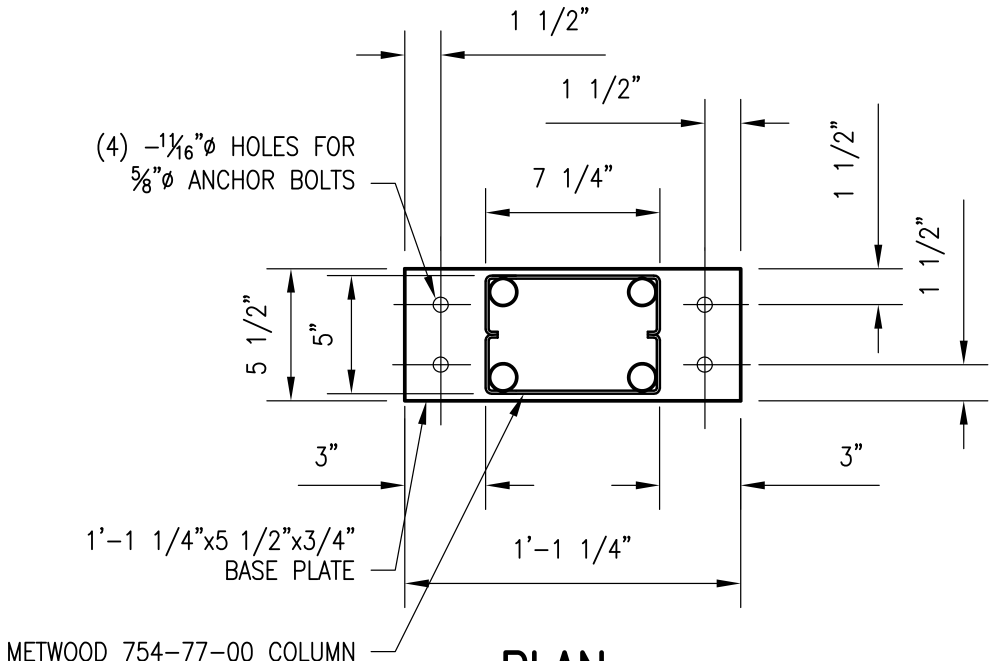
METWOOD GIRDER RESTING ON SOLID JACKS

DRAWN	DATE
RAH	12/8/08
CHECKED	SCALE
	AS NOTED
REV. DATE	SHEET
	1 OF 1

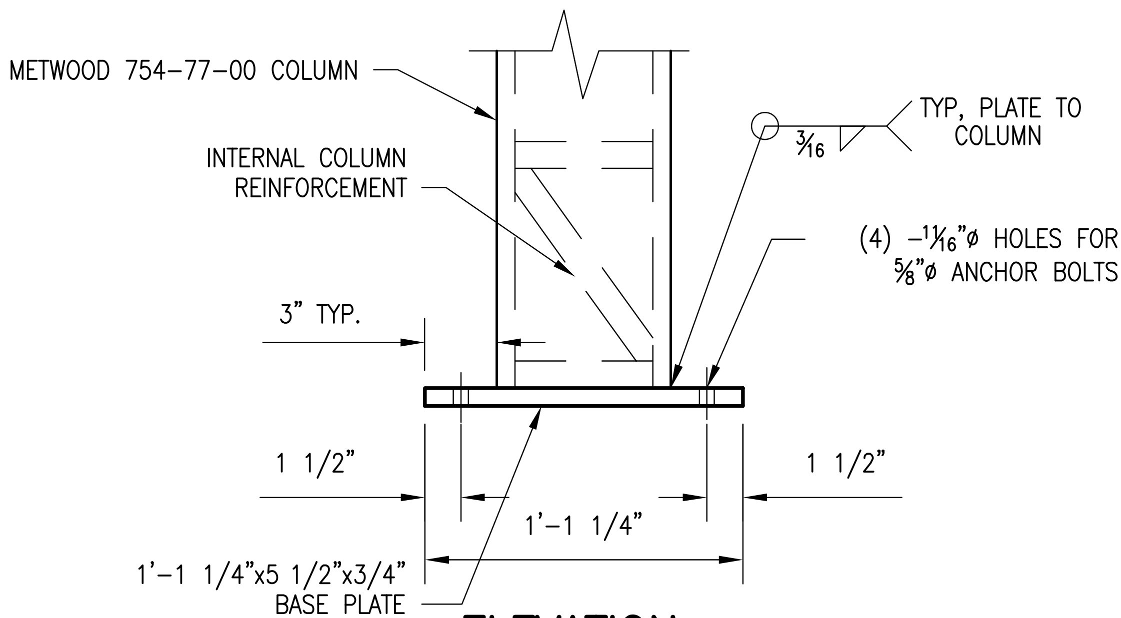
METWOOD

MOMENT FRAME

STANDARD DETAILS



PLAN



ELEVATION

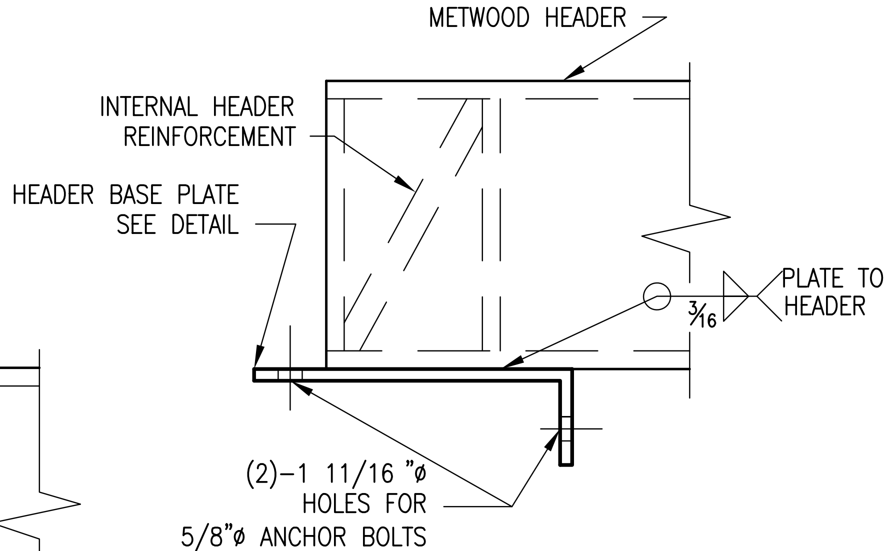
BASE PLATE DETAIL

SCALE: 1–1/2"= 1'

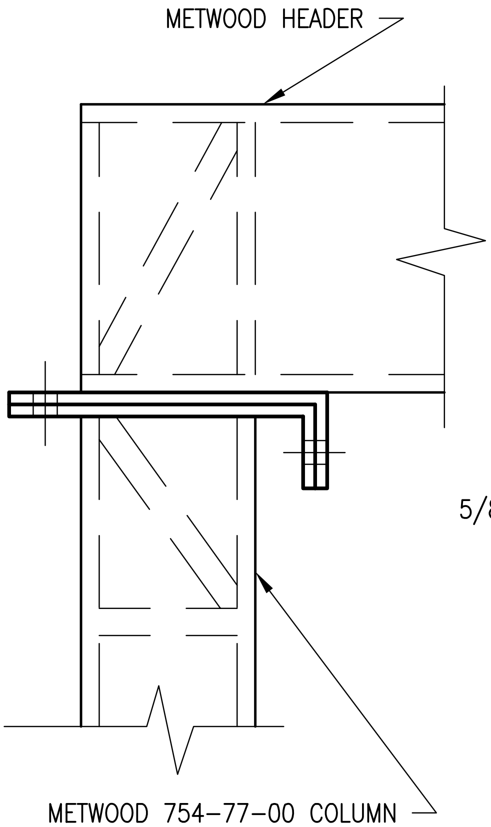
METWOOD
BUILDING SOLUTIONS
540 334 4294 Fax 540 334 4293
819 Naff Road Boones Mill, Virginia 24065

MOMENT FRAME BASE PLATE DETAIL

DRAWN	DATE
RAH	12/8/08
CHECKED	SCALE
	AS NOTED
REV. DATE	SHEET
	1 OF 1

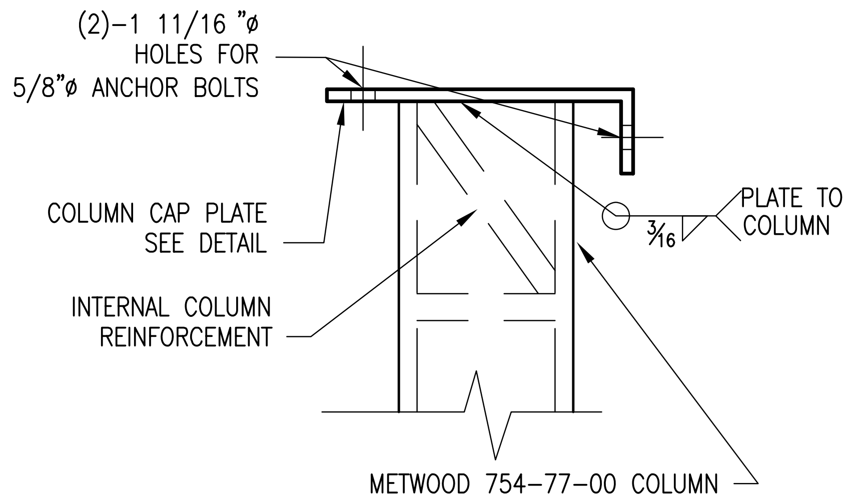


HEADER BASE DETAIL



COLUMN/HEADER CONNECTION DETAIL

SCALE: 1-1/2"= 1'

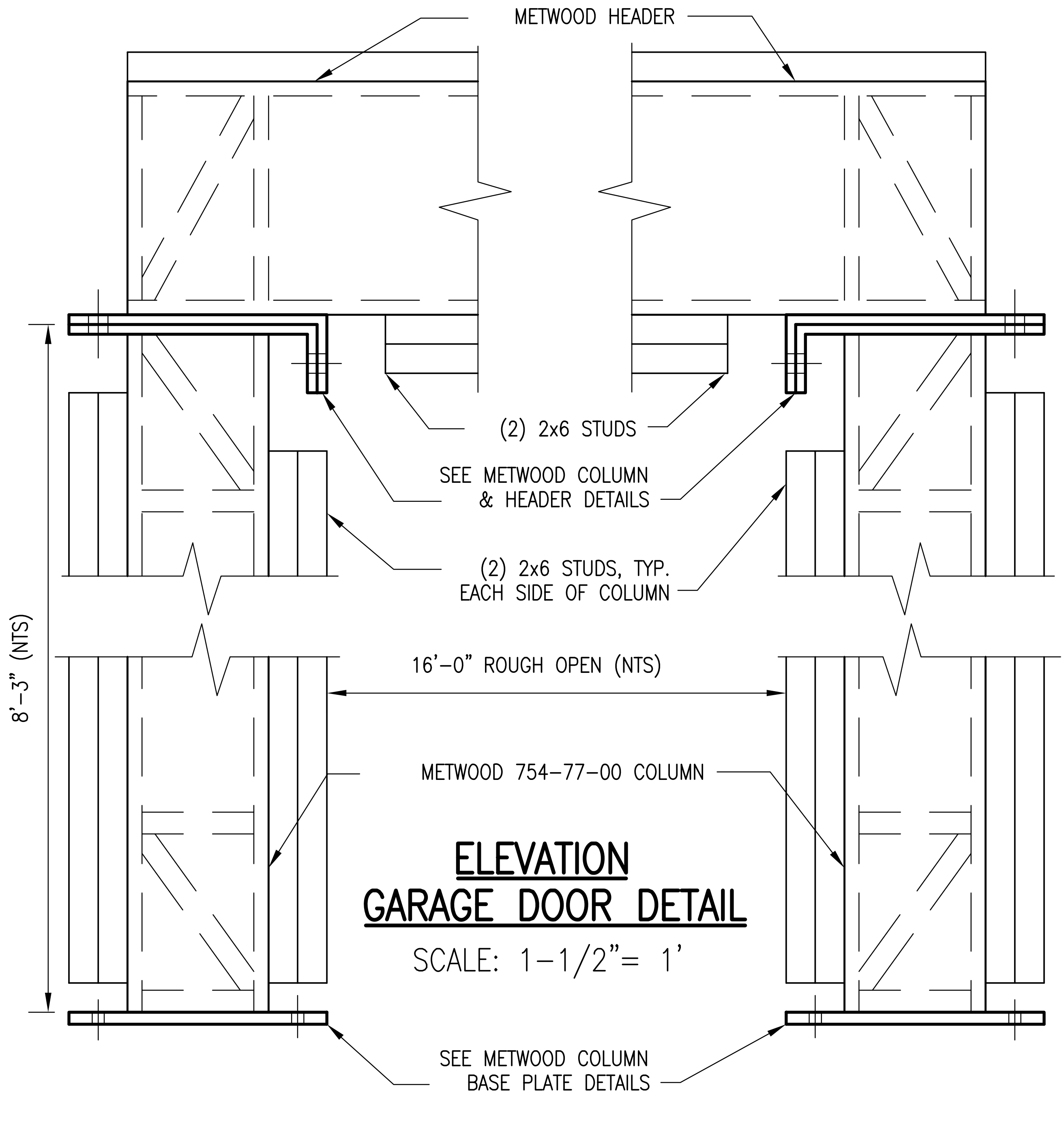


COLUMN CAP DETAIL

METWOOD
BUILDING SOLUTIONS
540 334 4294 Fax 540 334 4293
819 Naff Road Boones Mill, Virginia 24065

MOMENT FRAME
COLUMN/HEADER CONN.

DRAWN	DATE
RAH	12/8/08
CHECKED	SCALE
	AS NOTED
REV. DATE	SHEET
	1 OF 1



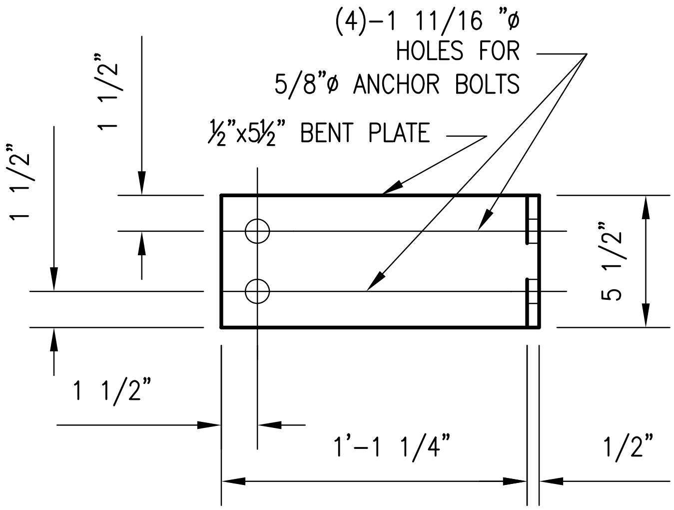
ELEVATION
GARAGE DOOR DETAIL

SCALE: 1-1/2"= 1'

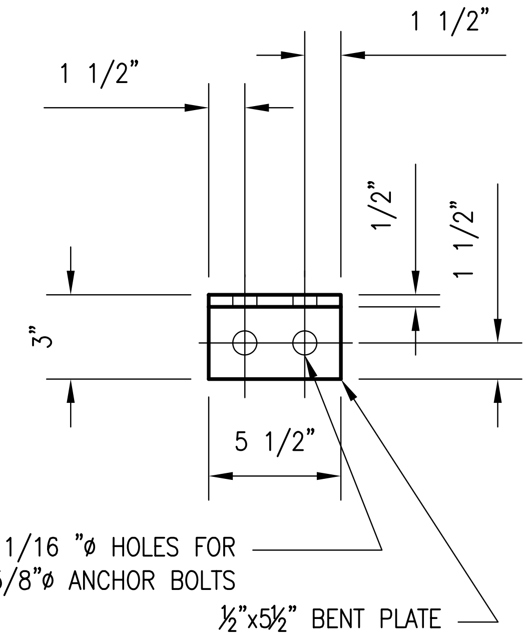
METWOOD
BUILDING SOLUTIONS
540 334 4294 Fax 540 334 4293
819 Naff Road Boones Mill, Virginia 24065

MOMENT FRAME
OVER ALL FRAME

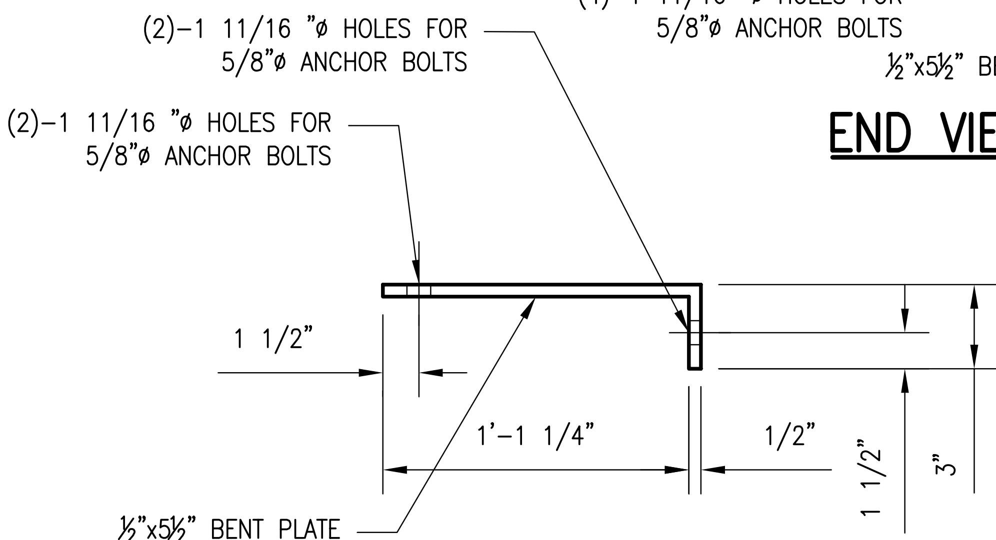
DRAWN	DATE
RAH	12/8/08
CHECKED	SCALE
	AS NOTED
REV. DATE	SHEET
	1 OF 1



PLAN



END VIEW



ELEVATION

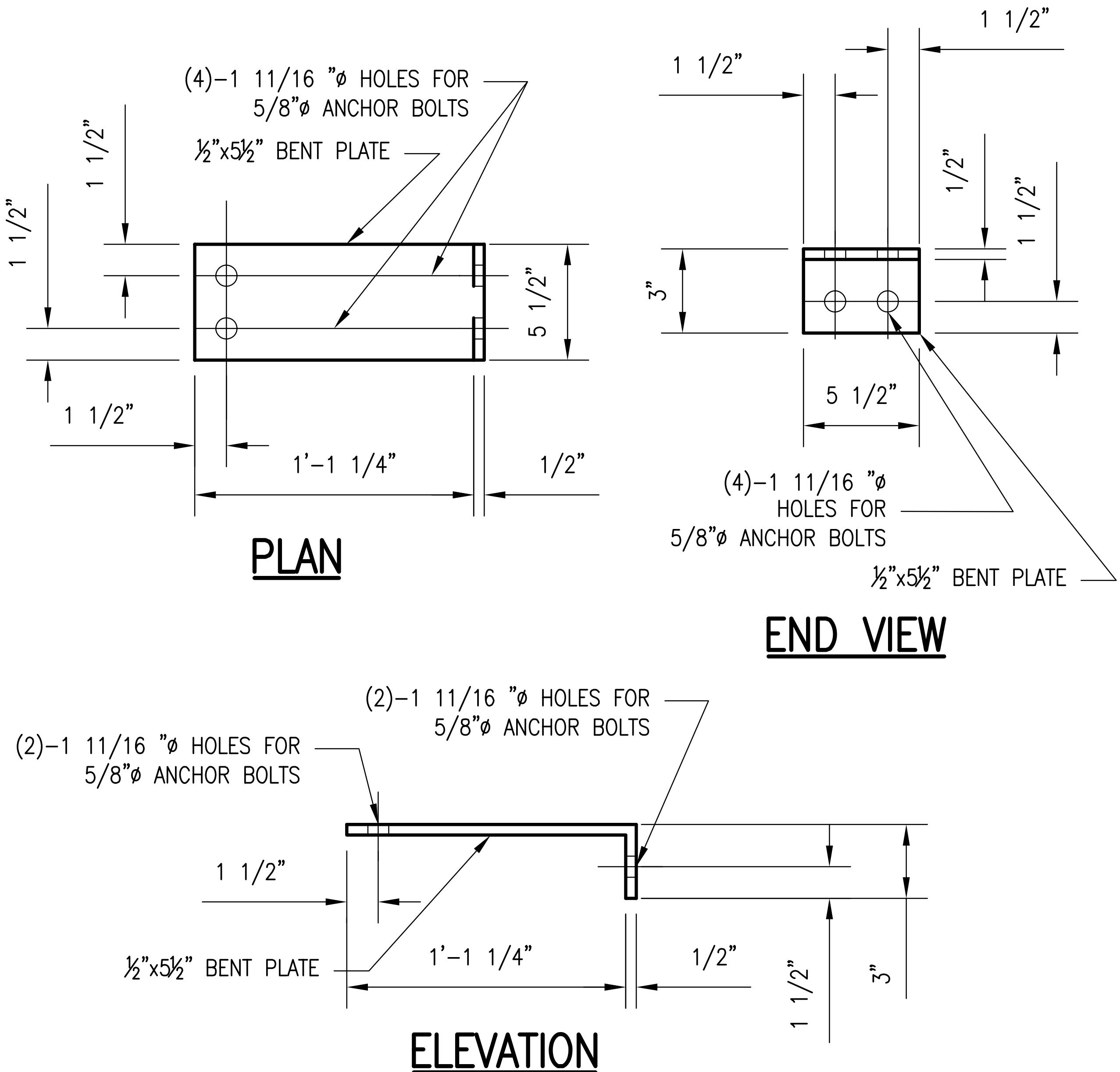
COLUMN CAP PLATE

SCALE: 1-1/2"= 1'

METWOOD
BUILDING SOLUTIONS
540 334 4294 Fax 540 334 4293
819 Naff Road Boones Mill, Virginia 24065

MOMENT FRAME
COLUMN CAP PLATE

DRAWN	DATE
RAH	12/8/08
CHECKED	SCALE
	AS NOTED
REV. DATE	SHEET
	1 OF 1



HEADER BASE PLATE

SCALE: 1–1/2"= 1'

METWOOD
BUILDING SOLUTIONS
540 334 4294 Fax 540 334 4293
819 Naff Road Boones Mill, Virginia 24065

MOMENT FRAME HEADER BASE PLATE

DRAWN	DATE
RAH	12/8/08
CHECKED	SCALE
	AS NOTED
REV. DATE	SHEET
	1 OF 1

METWOOD

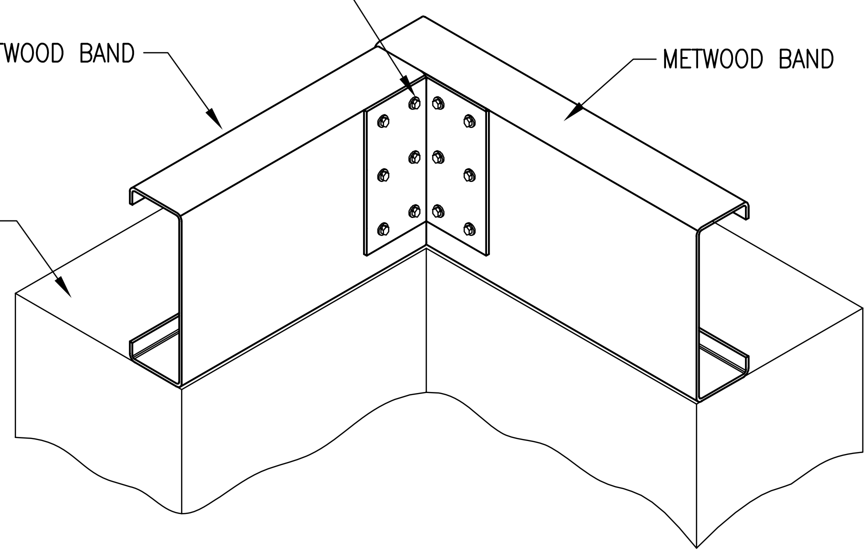
CLIP CONNECTIONS

GIRDER TO GIRDER

GIRDER TO BAND

CONCRETE

WOOD FRAMED WALLS



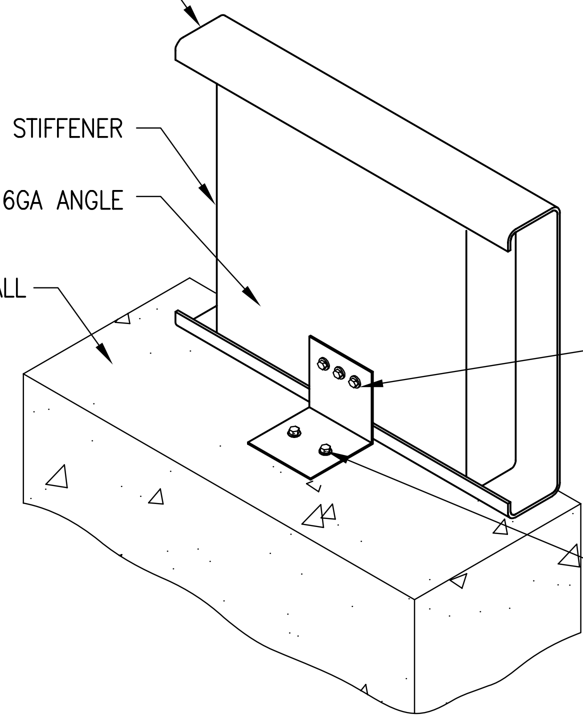
CLIP TYPE BAND CONNECTION
BAND TO BAND

SCALE: 1-1/2" = 1'

METWOOD
BUILDING SOLUTIONS
540 334 4294 Fax 540 334 4293
819 Naff Road Boones Mill, Virginia 24065

BAND TO BAND
CLIP CONNECTION

DRAWN	DATE
RAH	12/8/08
CHECKED	SCALE
	AS NOTED
REV. DATE	SHEET
	1 OF 1



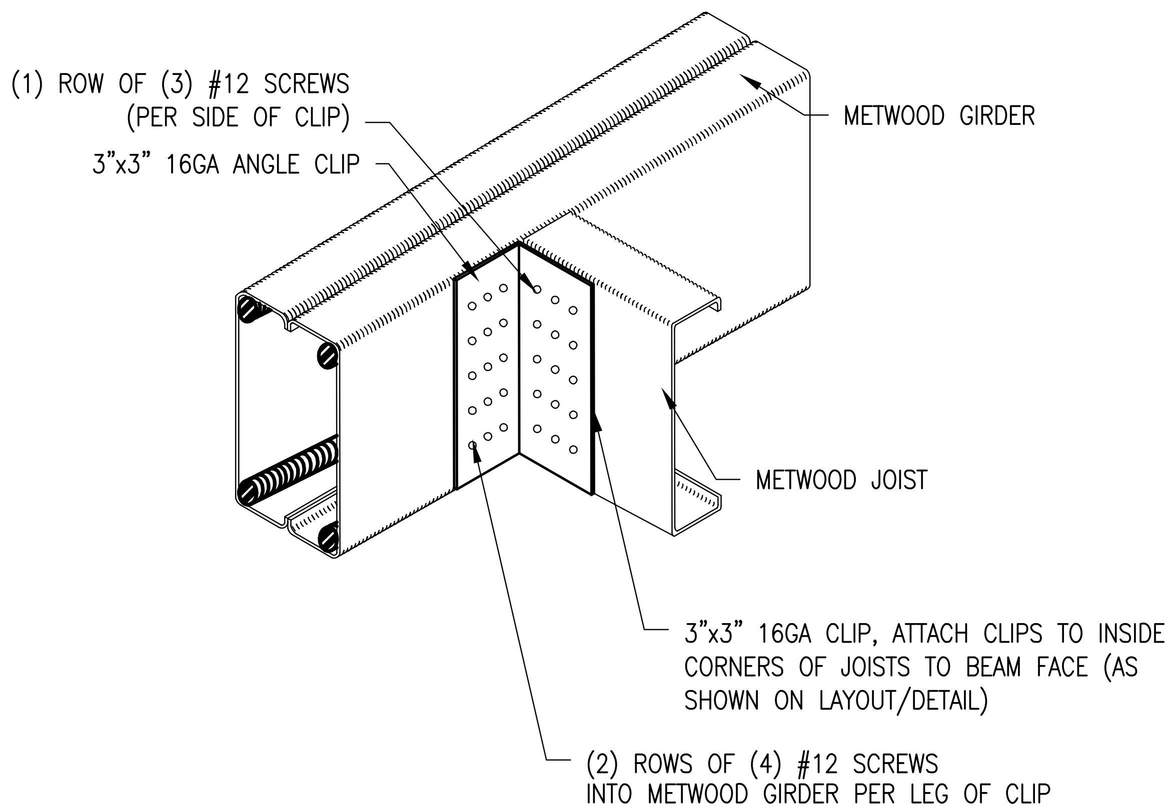
CLIP TYPE BAND CONNECTION
BAND TO CONC. WALL

SCALE: 1-1/2" = 1'

METWOOD
BUILDING SOLUTIONS
540 334 4294 Fax 540 334 4293
819 Naff Road Boones Mill, Virginia 24065

BAND TO CONCRETE CLIP CONNECTION

DRAWN	DATE
RAH	12/8/08
CHECKED	SCALE
	AS NOTED
REV. DATE	SHEET
	1 OF 1



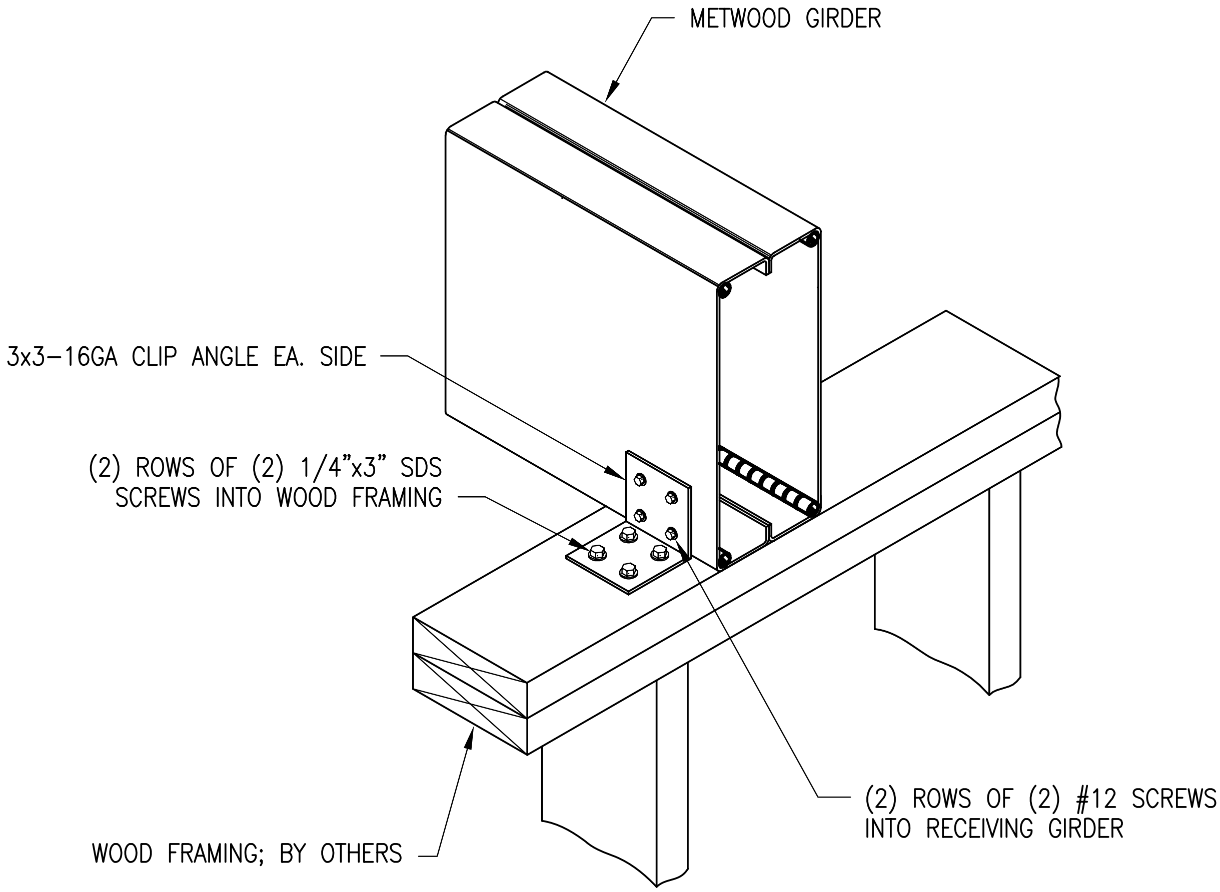
CLIP TYPE GIRDER CONNECTION BAND TO GIRDER

SCALE: 1-1/2" = 1'

METWOOD BUILDING SOLUTIONS
540 334 4294 Fax 540 334 4293
819 Naff Road Boones Mill, Virginia 24065

CLIP CONNECTION BAND TO GIRDER

DRAWN	DATE
RAH	12/5/08
CHECKED	SCALE
	AS NOTED
REV. DATE	SHEET
	1 OF 1



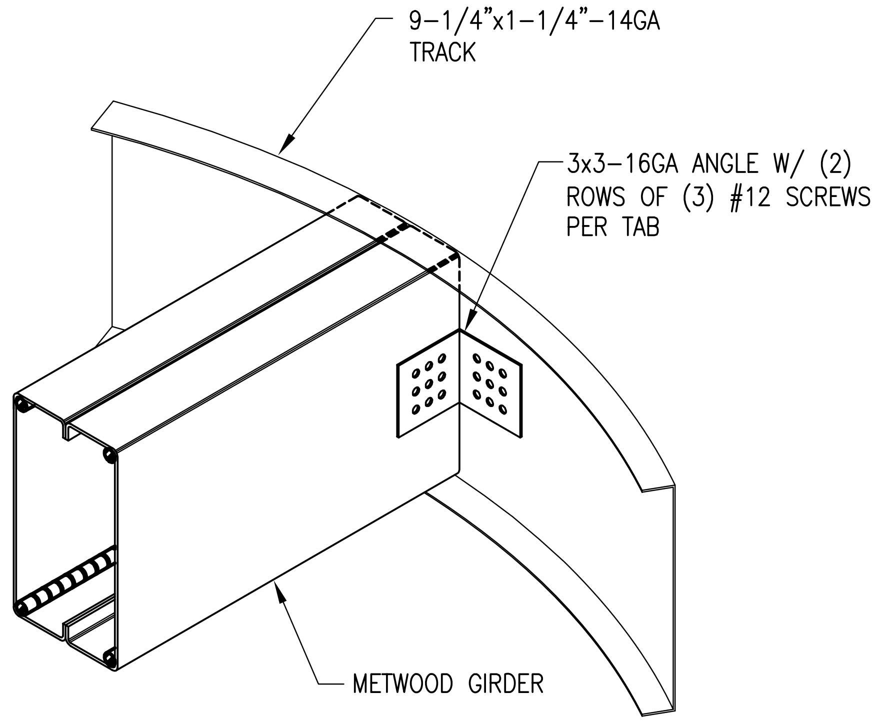
CLIP TYPE GIRDER CONNECTION
GIRDER TO WOOD FRAME WALL

SCALE: 1-1/2" = 1'

METWOOD
BUILDING SOLUTIONS
540 334 4294 Fax 540 334 4293
819 Naff Road Boones Mill, Virginia 24065

CLIP CONNECTION
GIRDER TO FRAMED WALL

DRAWN	DATE
RAH	12/5/08
CHECKED	SCALE
	AS NOTED
REV. DATE	SHEET
	1 OF 1



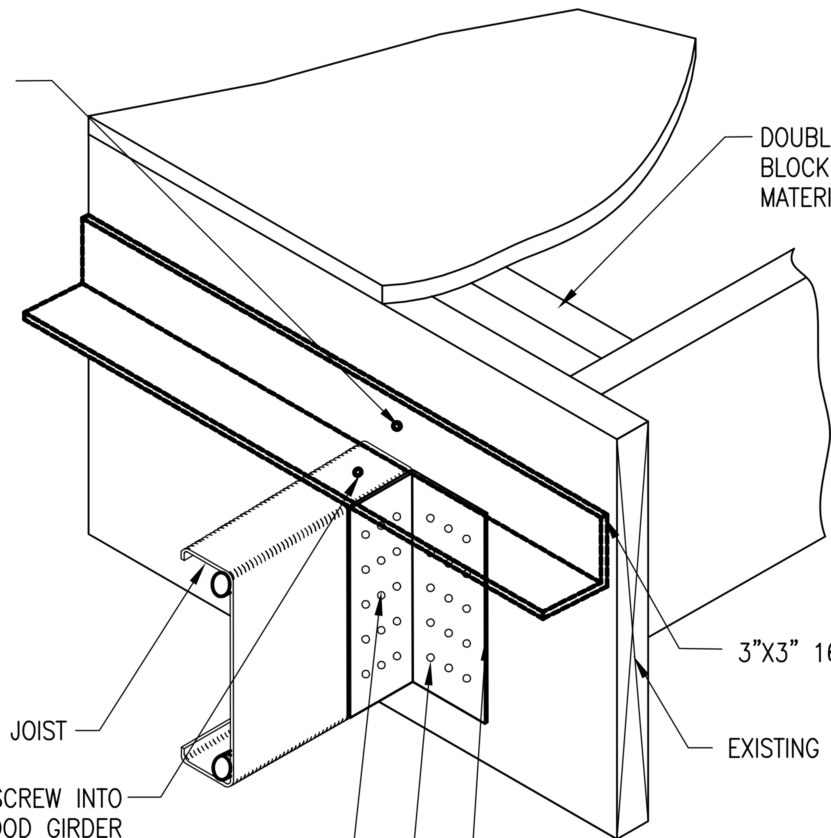
CLIP TYPE GIRDER CONNECTION
TRACK TO TO GIRDER

SCALE: 1-1/2" = 1'

METWOOD
BUILDING SOLUTIONS
540 334 4294 Fax 540 334 4293
819 Naff Road Boones Mill, Virginia 24065

GIRDER TO TRACK
CLIP CONNECTION

DRAWN	DATE
RAH	12/8/08
CHECKED	SCALE
	AS NOTED
REV. DATE	SHEET
	1 OF 1



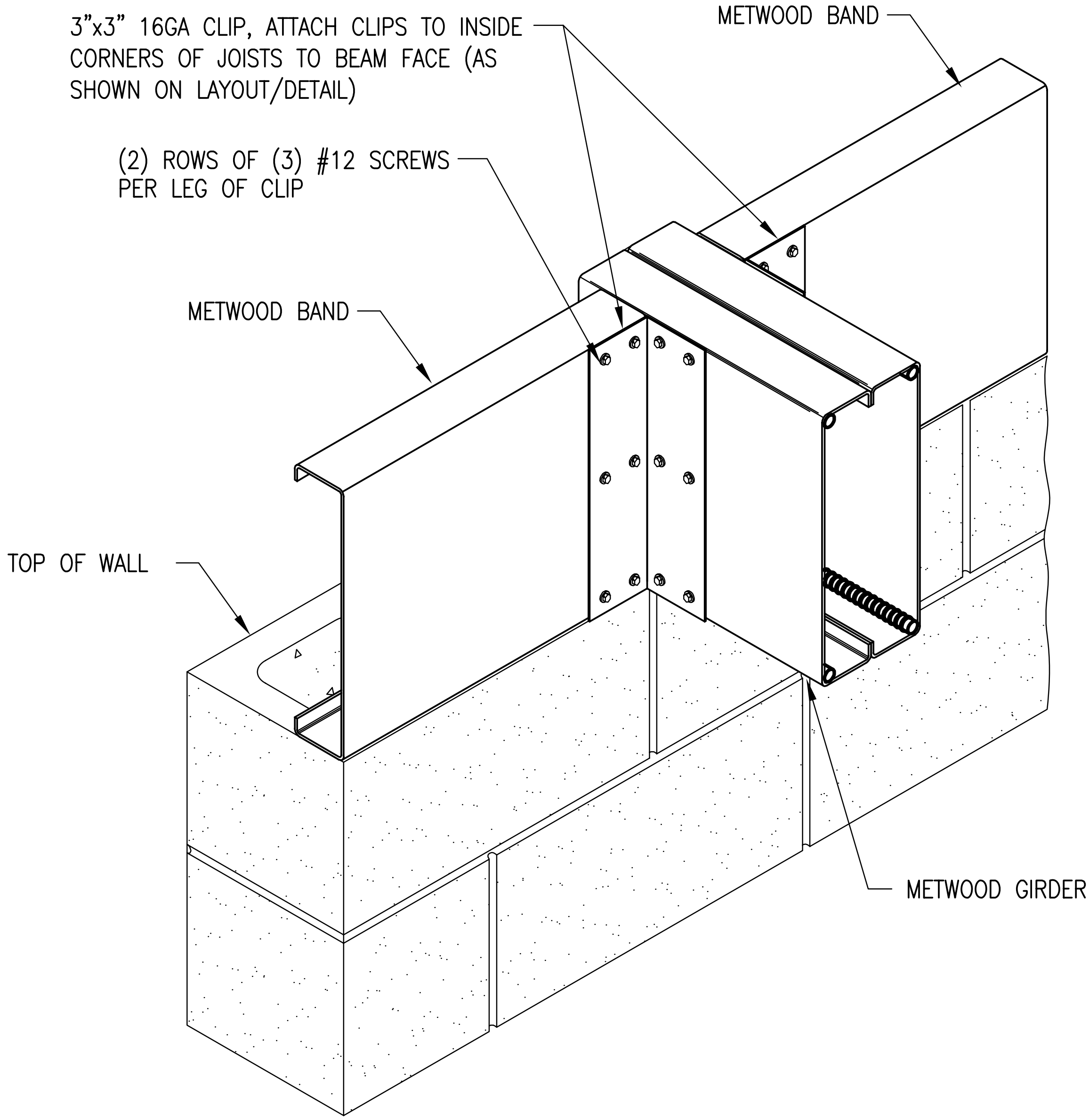
CLIP TYPE BAND CONNECTION BAND TO WOOD FRAME WALL

SCALE: 1-1/2" = 1'

METWOOD BUILDING SOLUTIONS
540 334 4294 Fax 540 334 4293
819 Naff Road Boones Mill, Virginia 24065

CLIP CONNECTION BAND TO FRAMED WALL

DRAWN	DATE
RAH	12/5/08
CHECKED	SCALE
	AS NOTED
REV. DATE	SHEET
	1 OF 1



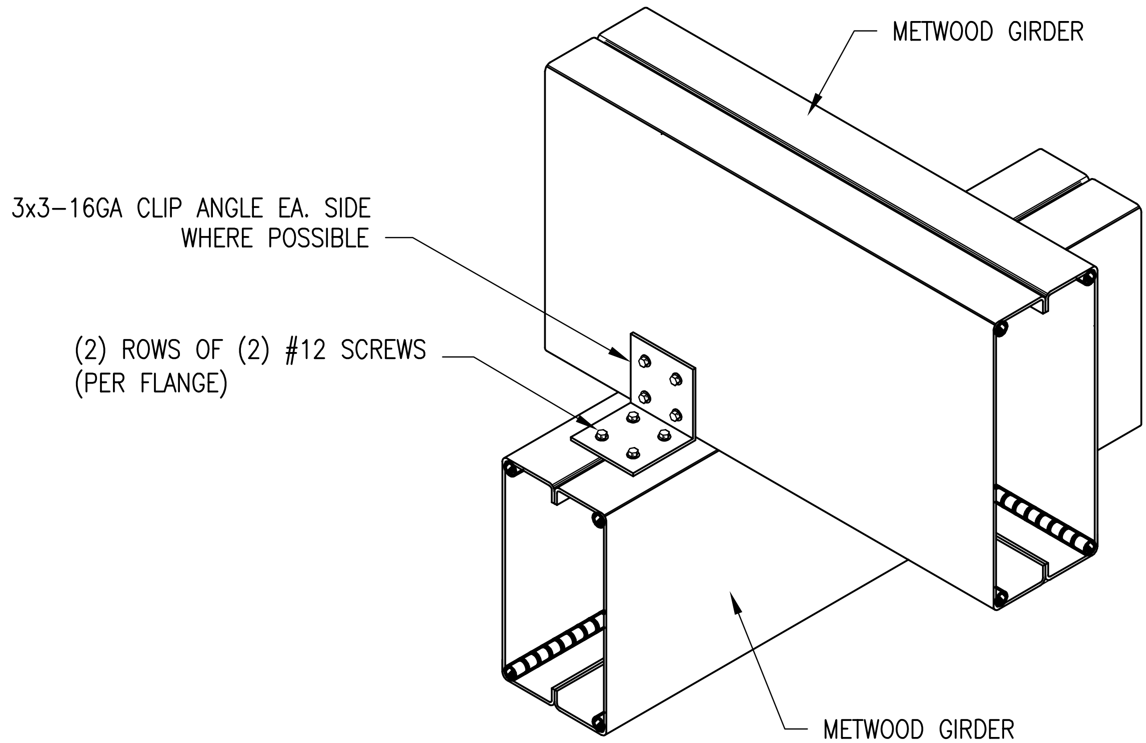
CLIP TYPE GIRDER CONNECTION
BAND TO GIRDER

SCALE: 1-1/2" = 1'

METWOOD
BUILDING SOLUTIONS
540 334 4294 Fax 540 334 4293
819 Naff Road Boones Mill, Virginia 24065

BAND TO GIRDER
BAND CONNECTION

DRAWN	DATE
RAH	12/8/08
CHECKED	SCALE
	AS NOTED
REV. DATE	SHEET
	1 OF 1



CLIP TYPE GIRDER CONNECTION
GIRDER TO GIRDER BELOW

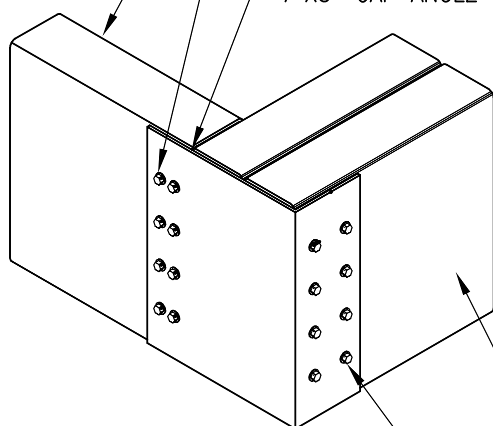
SCALE: 1-1/2" = 1'

METWOOD
BUILDING SOLUTIONS

540 334 4294 Fax 540 334 4293
819 Naff Road Boones Mill, Virginia 24065

CLIP CONNECTION
GIRDER TO GIRDER

DRAWN	DATE
RAH	12/5/08
CHECKED	SCALE
	AS NOTED
REV. DATE	SHEET
	1 OF 1



CLIP TYPE GIRDER CONNECTION JOIST TO TO GIRDER

SCALE: 1-1/2" = 1'

METWOOD
BUILDING SOLUTIONS
540 334 4294 Fax 540 334 4293
819 Naff Road Boones Mill, Virginia 24065

CLIP CONNNECTION GIRDER TO JOIST

DRAWN	DATE
RAH	12/5/08
CHECKED	SCALE
	AS NOTED
REV. DATE	SHEET
	1 OF 1

METWOOD

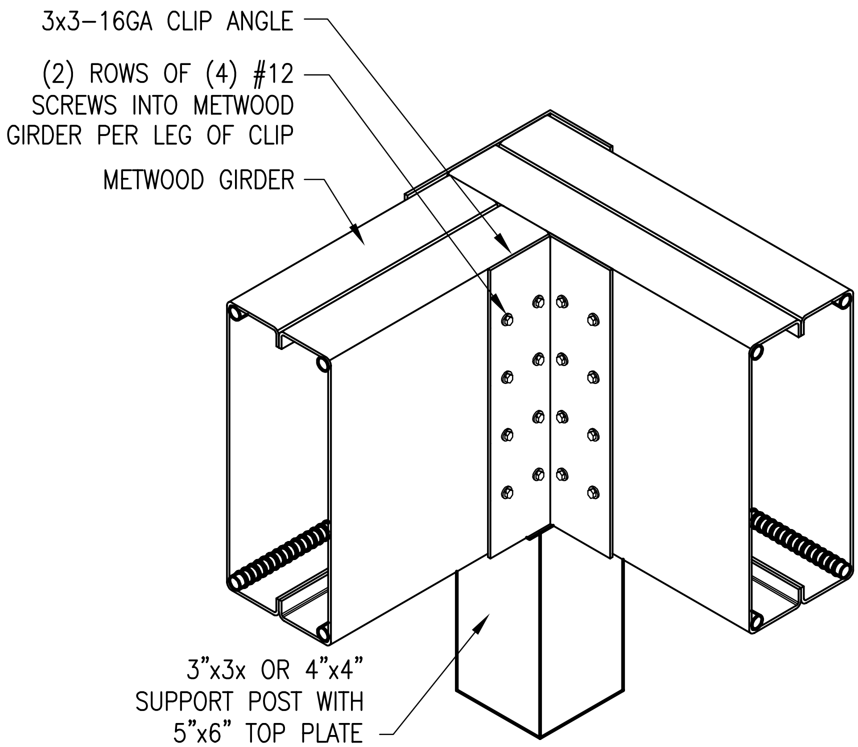
POST

FOUNDATION & BEARING

SPLICE PLATES

CAP ANGLES

CLIPS



INSIDE VIEW

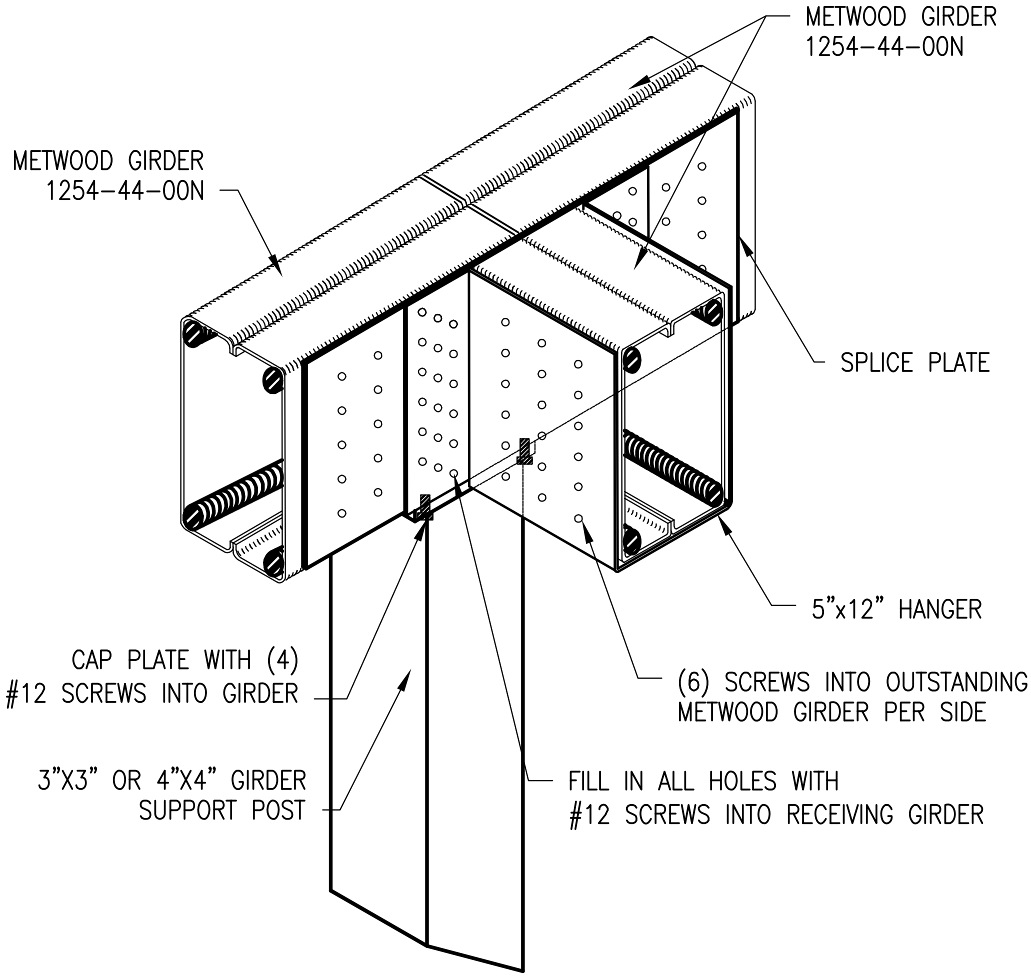
CAP ANGLE TYPE GIRDER CONNECTION GIRDER TO GIRDER ON POST

SCALE: 1-1/2" = 1'

METWOOD
BUILDING SOLUTIONS
540 334 4294 Fax 540 334 4293
819 Naff Road Boones Mill, Virginia 24065

GIRDER TO GIRDER RESTING ON POST

DRAWN	DATE
RAH	12/5/08
CHECKED	SCALE
	AS NOTED
REV. DATE	SHEET
	1 OF 2



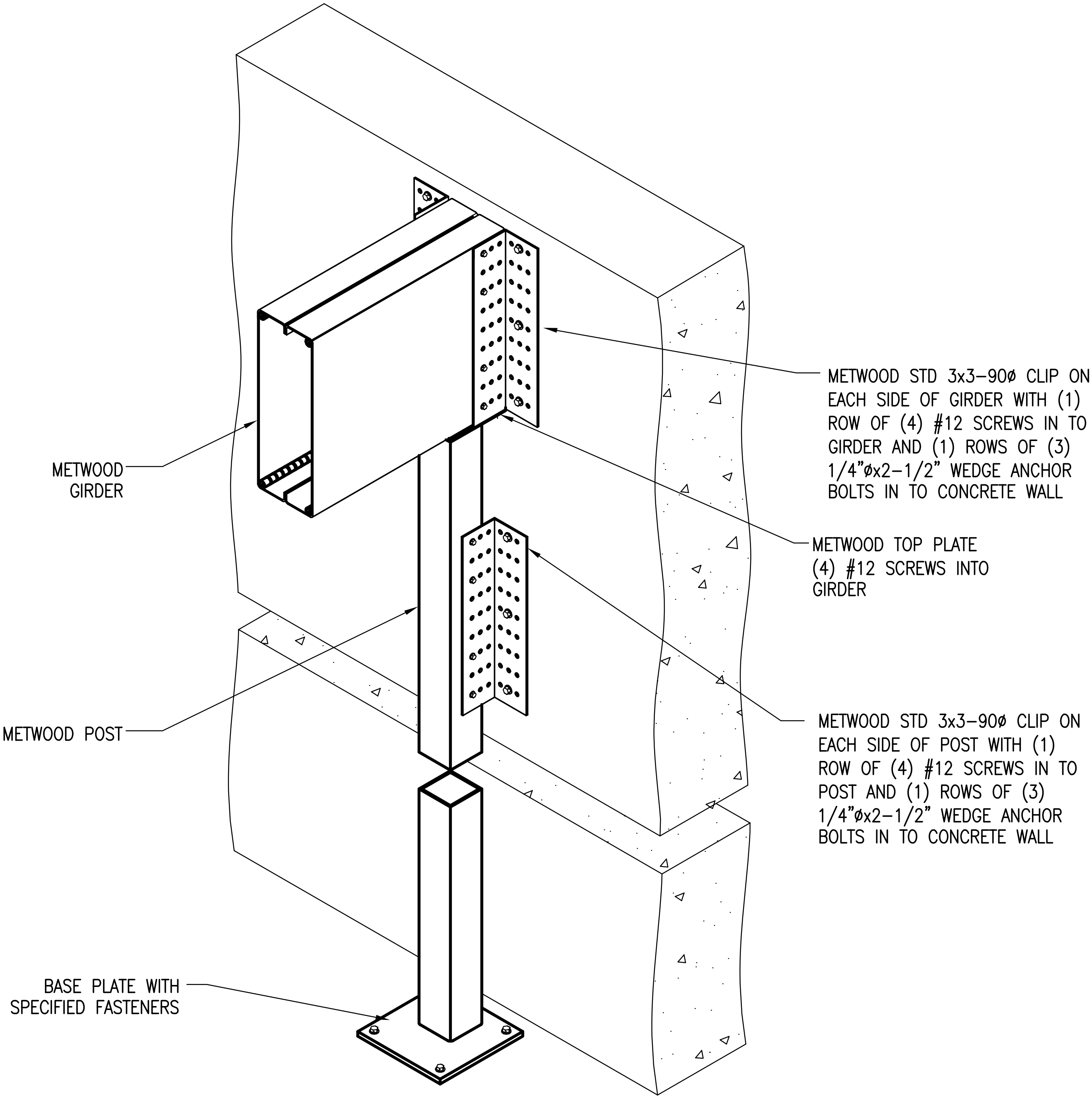
HANGER TYPE SPLICE PLATE GIRDER CONNECTION
GIRDER TO GIRDER OVER POST

SCALE: 1-1/2" = 1'

METWOOD
BUILDING SOLUTIONS
540 334 4294 Fax 540 334 4293
819 Naff Road Boones Mill, Virginia 24065

GIRDER TO GIRDER RESTING ON POST

DRAWN	DATE
RAH	12/5/08
CHECKED	SCALE
	AS NOTED
REV. DATE	SHEET
	1 OF 1



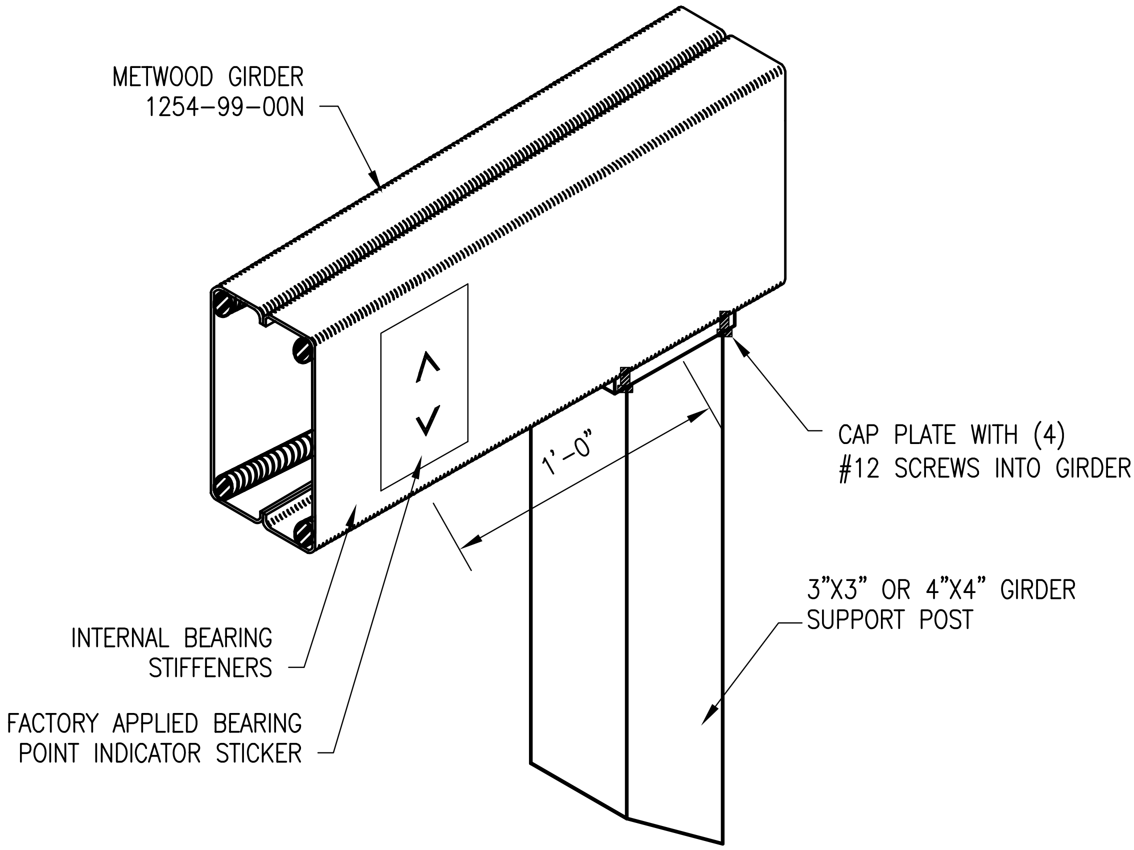
METWOOD GIRDER RESTING ON POST
CLIP ANGLE CONNECTION POST AND GIRDER TO WALL

SCALE: 1" = 1'

METWOOD
BUILDING SOLUTIONS
540 334 4294 Fax 540 334 4293
819 Naff Road Boones Mill, Virginia 24065

GIRDER TO POST CLIPS TO CONCRETE

DRAWN	DATE
RAH	12/5/08
CHECKED	SCALE
	AS NOTED
REV. DATE	SHEET
	1 OF 1



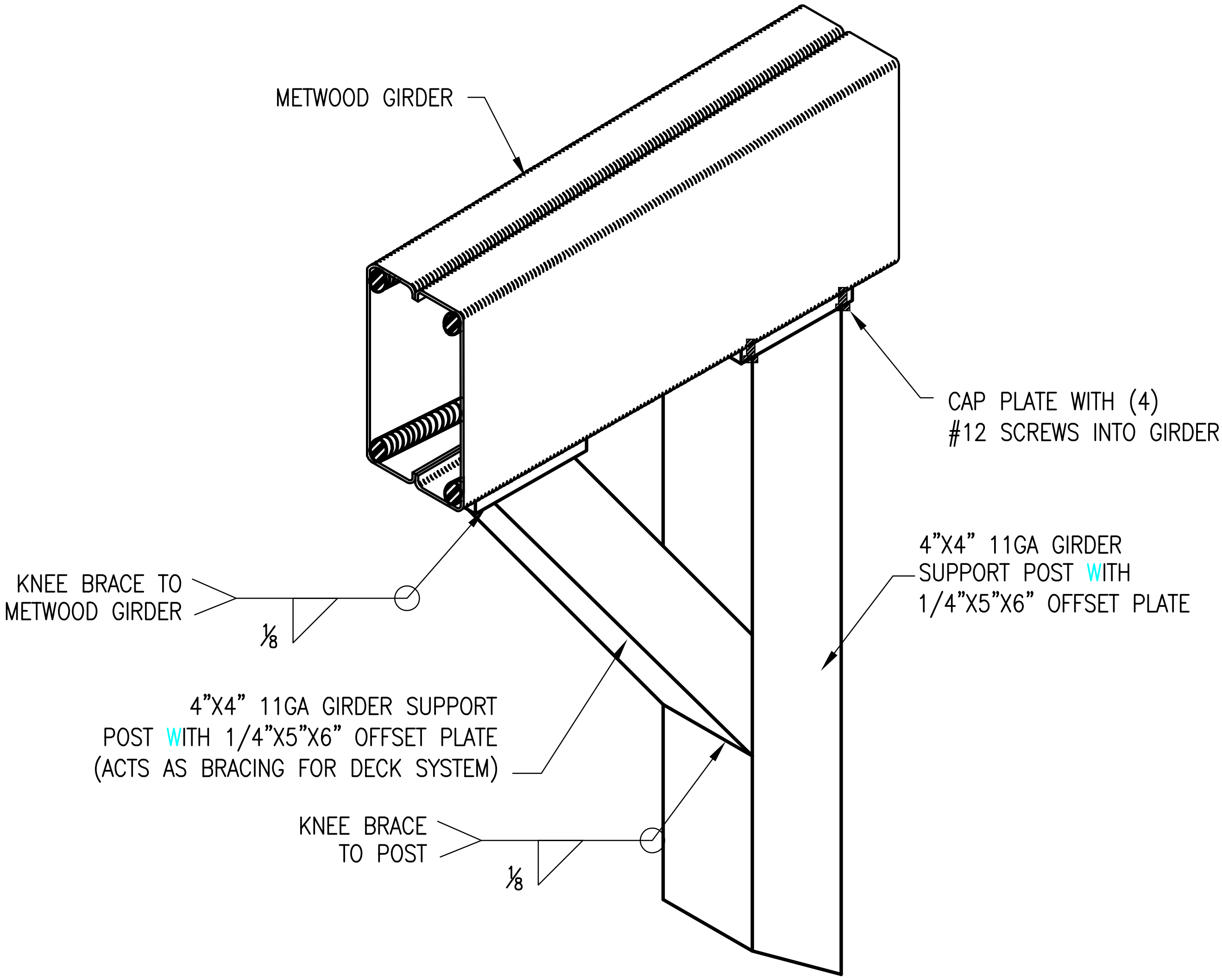
GIRDER-POST CONNECTION 3X3 & 4X4 POSTS

SCALE: 1-1/2" = 1'

METWOOD
BUILDING SOLUTIONS
540 334 4294 Fax 540 334 4293
819 Naff Road Boones Mill, Virginia 24065

GIRDER-POST CONNECTION

DRAWN	DATE
RAH	12/5/08
CHECKED	SCALE
	AS NOTED
REV. DATE	SHEET
	1 OF 1



GIRDER–POST CONNECTION
3X3 & 4X4 POSTS

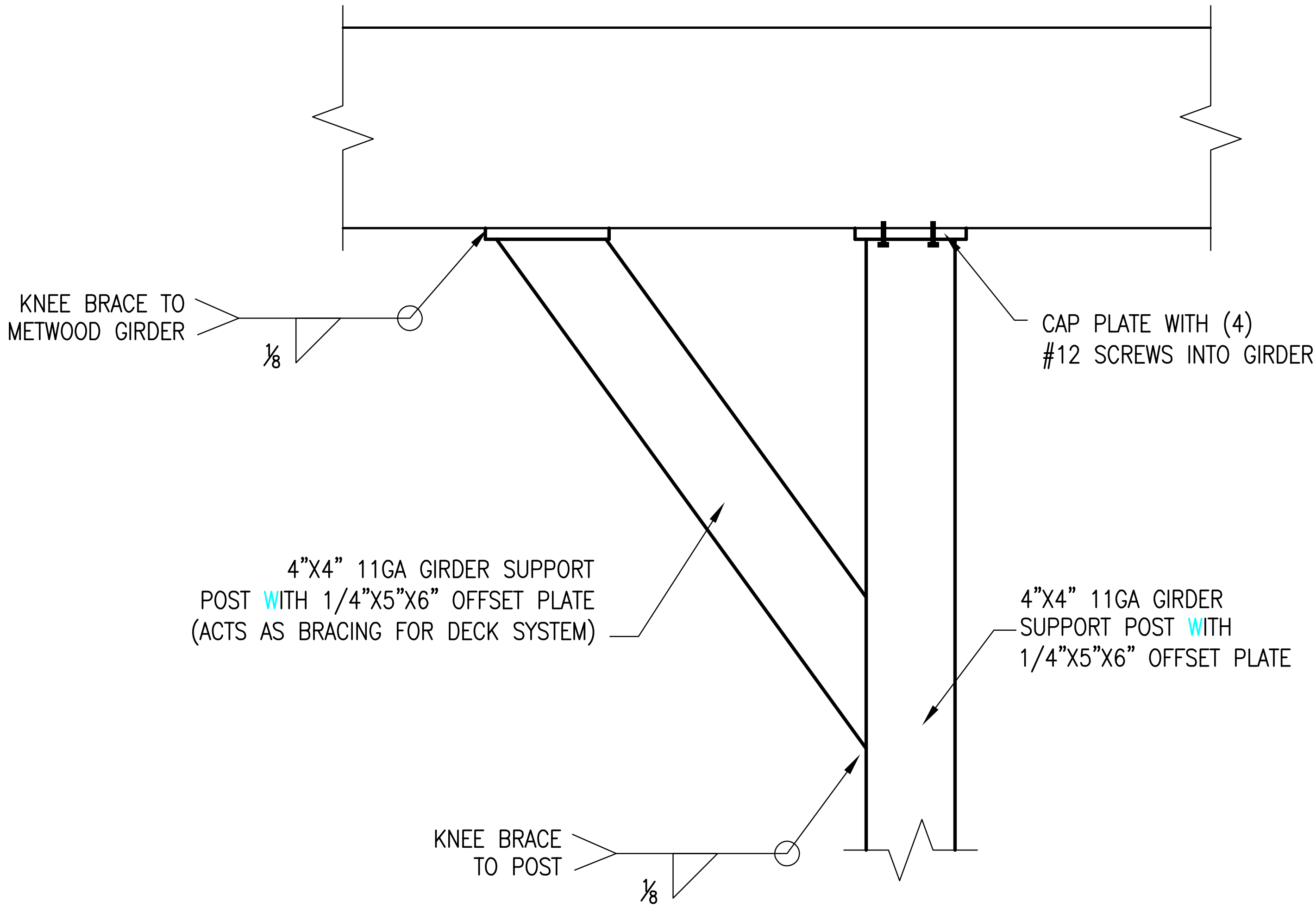
SCALE: 1-1/2" = 1'

METWOOD
BUILDING SOLUTIONS

540 334 4294 Fax 540 334 4293
819 Naff Road Boones Mill, Virginia 24065

POST WITH KNEE BRACE

DRAWN	DATE
RAH	12/5/08
CHECKED	SCALE
	AS NOTED
REV. DATE	SHEET
	1 OF 2



GIRDER–POST CONNECTION 3X3 & 4X4 POSTS

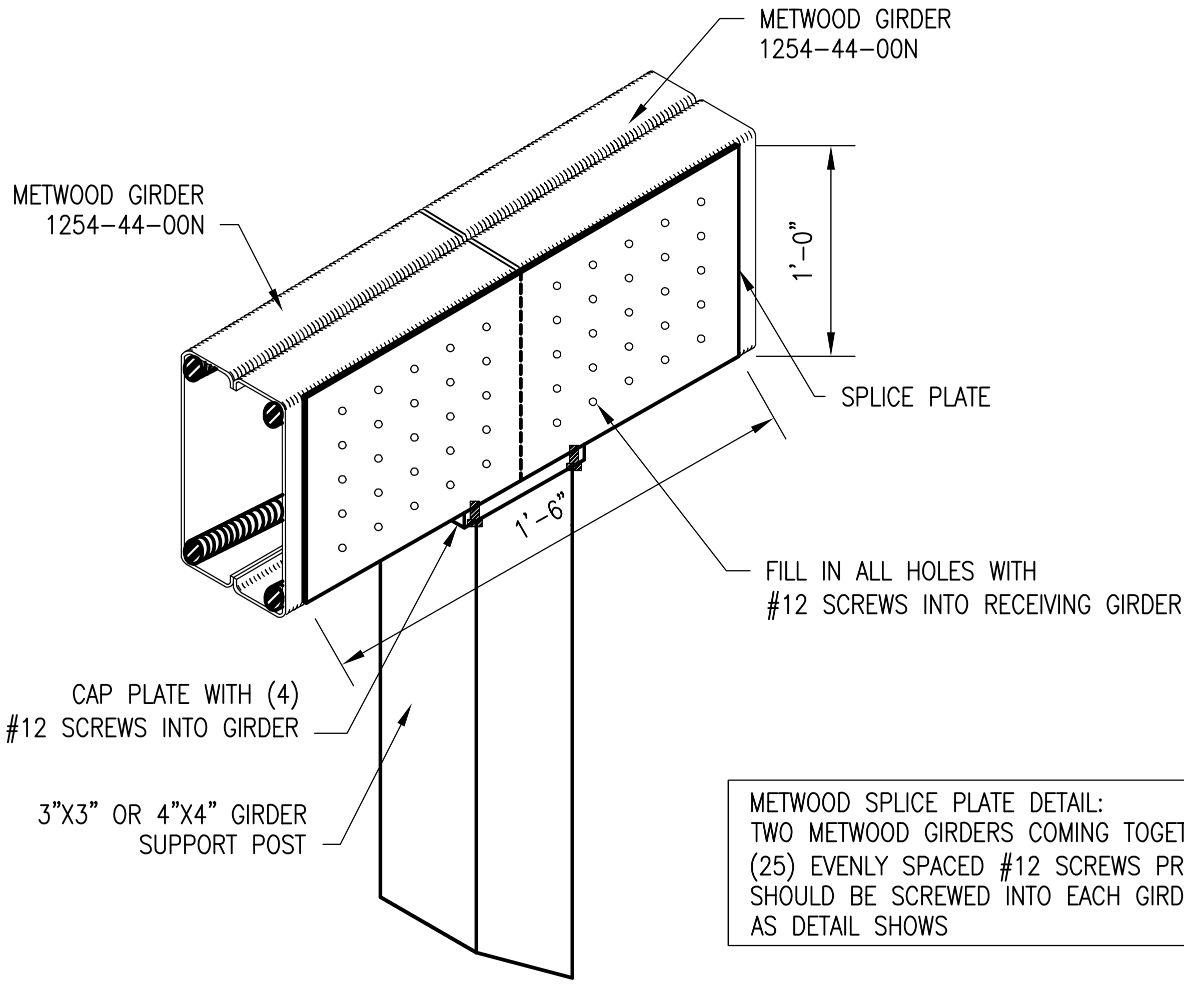
SCALE: 1-1/2" = 1'

METWOOD
BUILDING SOLUTIONS

540 334 4294 Fax 540 334 4293
819 Naff Road Boones Mill, Virginia 24065

POST WITH KNEE BRACE

DRAWN	DATE
RAH	12/5/08
CHECKED	SCALE
	AS NOTED
REV. DATE	SHEET
	2 OF 2



METWOOD SPLICE PLATE DETAIL:
TWO METWOOD GIRDERS COMING TOGETHER ON POST
(25) EVENLY SPACED #12 SCREWS PROVIDED
SHOULD BE SCREWED INTO EACH GIRDER PER SIDE
AS DETAIL SHOWS

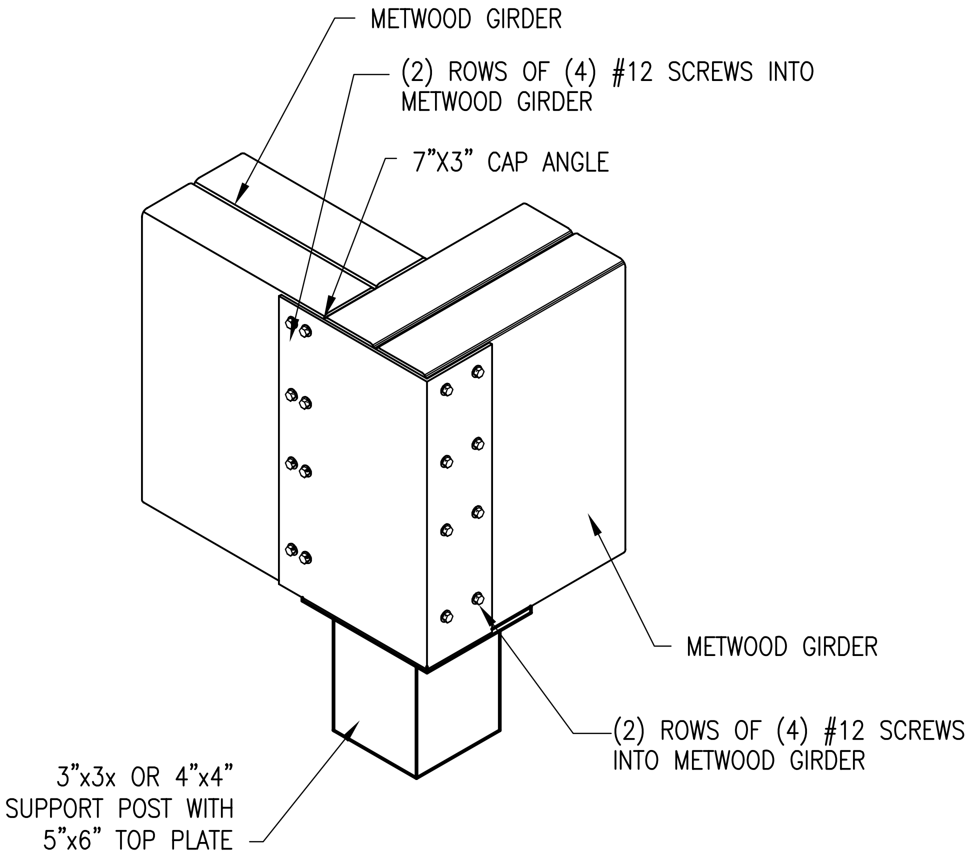
METWOOD GIRDER TO GIRDER SPLICE PLATE CONNECTION OVER POST

SCALE: 1-1/2" = 1'

METWOOD
BUILDING SOLUTIONS
540 334 4294 Fax 540 334 4293
819 Naff Road Boones Mill, Virginia 24065

POST
SPLICE PLATE CONN.

DRAWN	DATE
RAH	12/5/08
CHECKED	SCALE
	AS NOTED
REV. DATE	SHEET
	1 OF 1



OUTSIDE VIEW

NOTE:
TURN PLATE AND CAP ANGLE TO FIT CORNER CONFIGURATION SEE DRAWING FOR CORNER

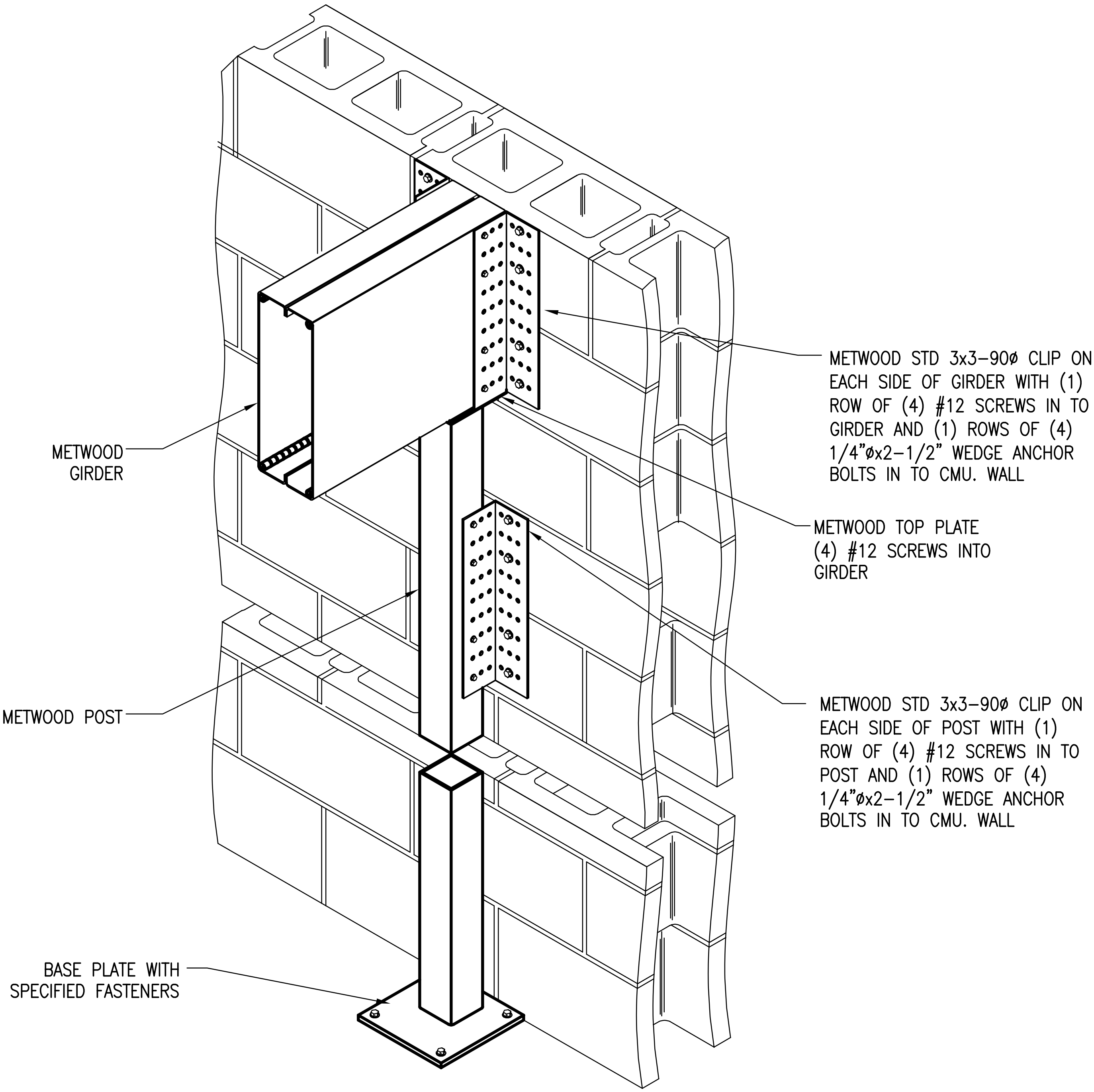
CAP ANGLE TYPE GIRDER CONNECTION GIRDER TO GIRDER ON POST

SCALE: 1-1/2" = 1'

METWOOD
BUILDING SOLUTIONS
540 334 4294 Fax 540 334 4293
819 Naff Road Boones Mill, Virginia 24065

GIRDER TO GIRDER RESTING ON POST

DRAWN	DATE
RAH	12/5/08
CHECKED	SCALE
	AS NOTED
REV. DATE	SHEET
	2 OF 2



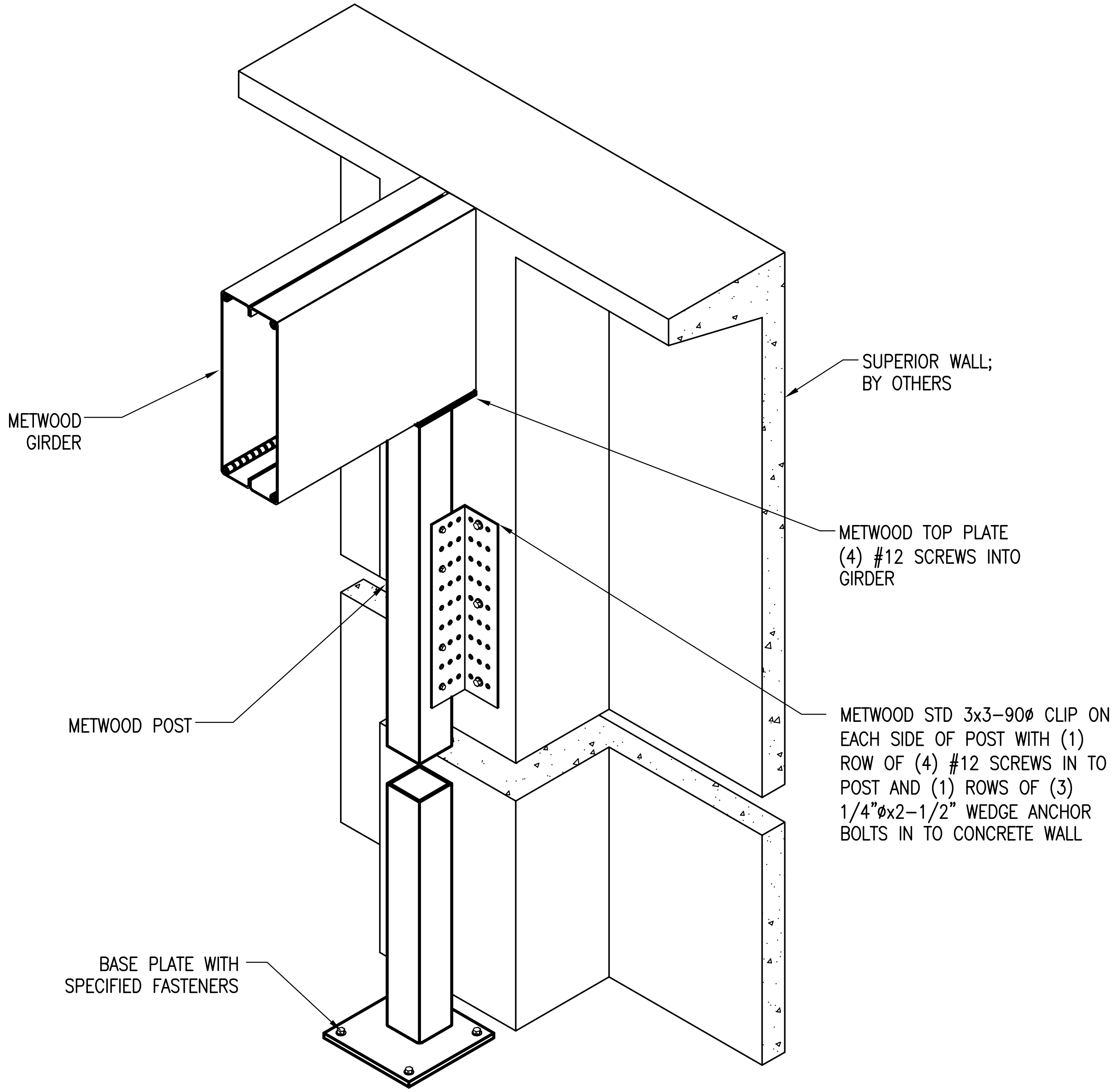
METWOOD GIRDER RESTING ON POST
CLIP ANGLE CONNECTION POST AND GIRDER TO WALL

SCALE: 1" = 1'

METWOOD
BUILDING SOLUTIONS
540 334 4294 Fax 540 334 4293
819 Naff Road Boones Mill, Virginia 24065

GIRDER TO POST CLIPS TO CMU

DRAWN	DATE
RAH	12/5/08
CHECKED	SCALE
	AS NOTED
REV. DATE	SHEET
	1 OF 1



METWOOD GIRDER RESTING ON POST
CLIP ANGLE CONNECTION POST TO SUPERIOR WALL

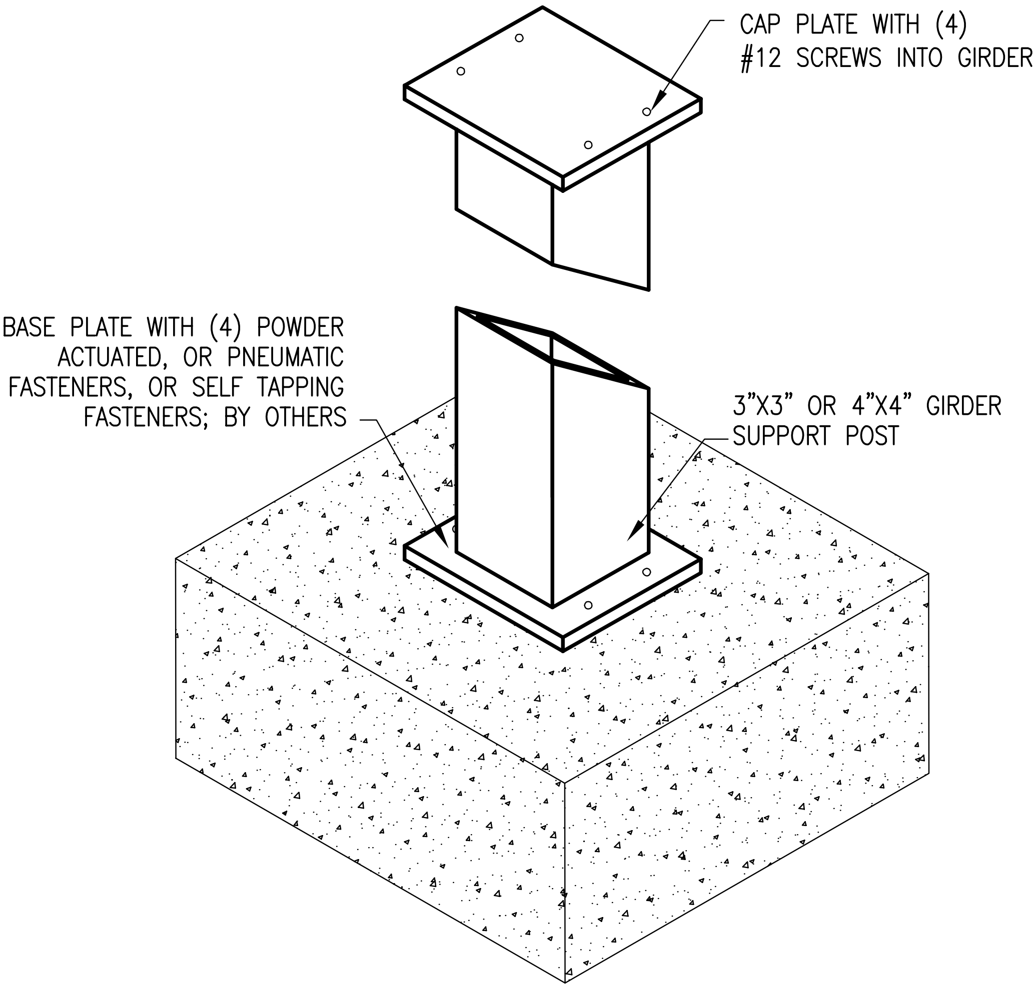
SCALE: 1" = 1'

METWOOD
BUILDING SOLUTIONS

540 334 4294 Fax 540 334 4293
819 Naff Road Boones Mill, Virginia 24065

GIRDER TO POST
CLIPS TO SUPERIOR WALL

DRAWN	DATE
RAH	12/5/08
CHECKED	SCALE
	AS NOTED
REV. DATE	SHEET
	1 OF 1



TYPICAL METWOOD POST FOUNDATION BEARING

SCALE: 1-1/2" = 1'

METWOOD
BUILDING SOLUTIONS
540 334 4294 Fax 540 334 4293
819 Naff Road Boones Mill, Virginia 24065

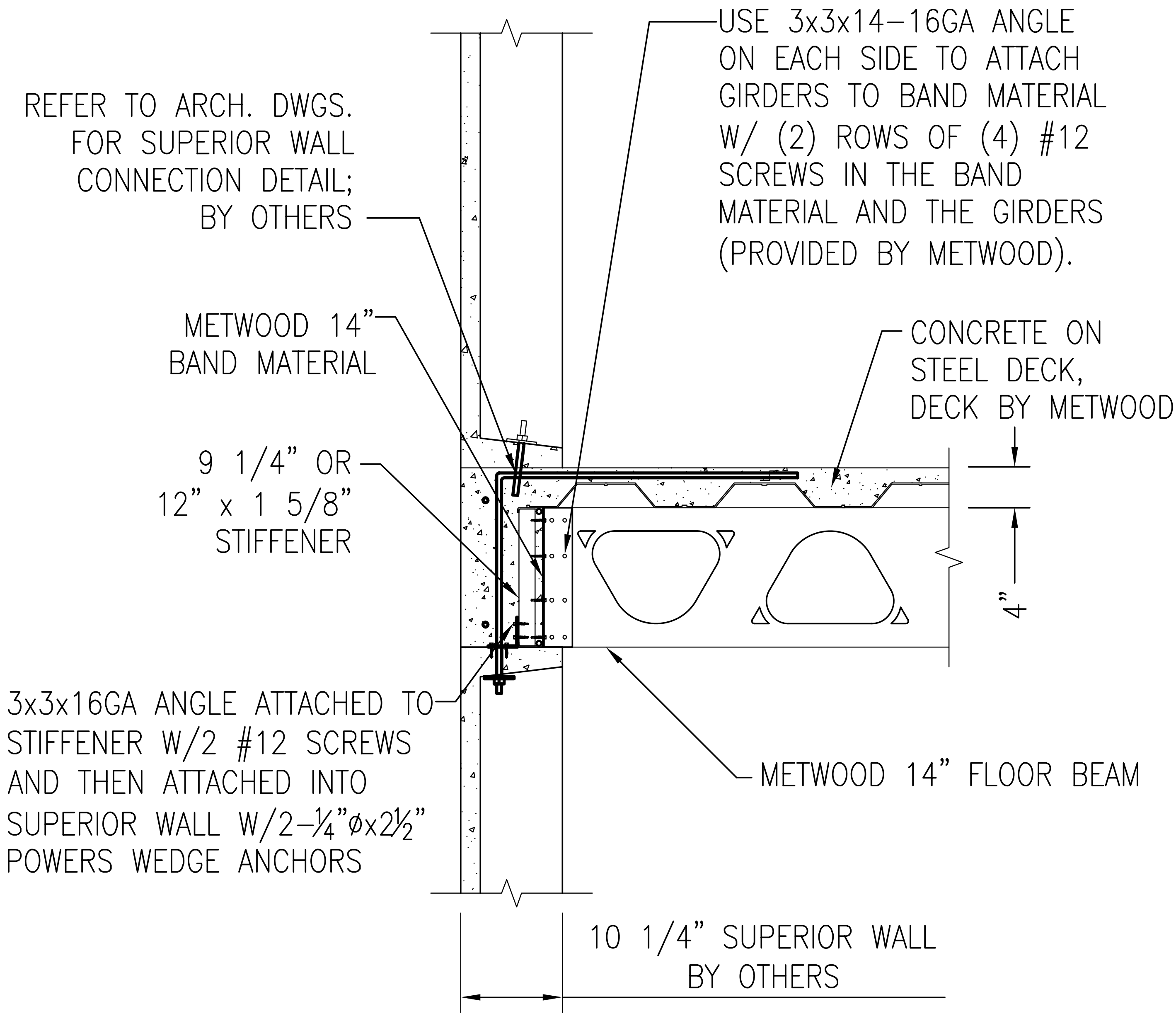
POST FOUNDATION

DRAWN	DATE
RAH	12/5/08
CHECKED	SCALE
	AS NOTED
REV. DATE	SHEET
	1 OF 1

METWOOD

SUPERIOR WALL CONNECTIONS

STANDARD DETAILS



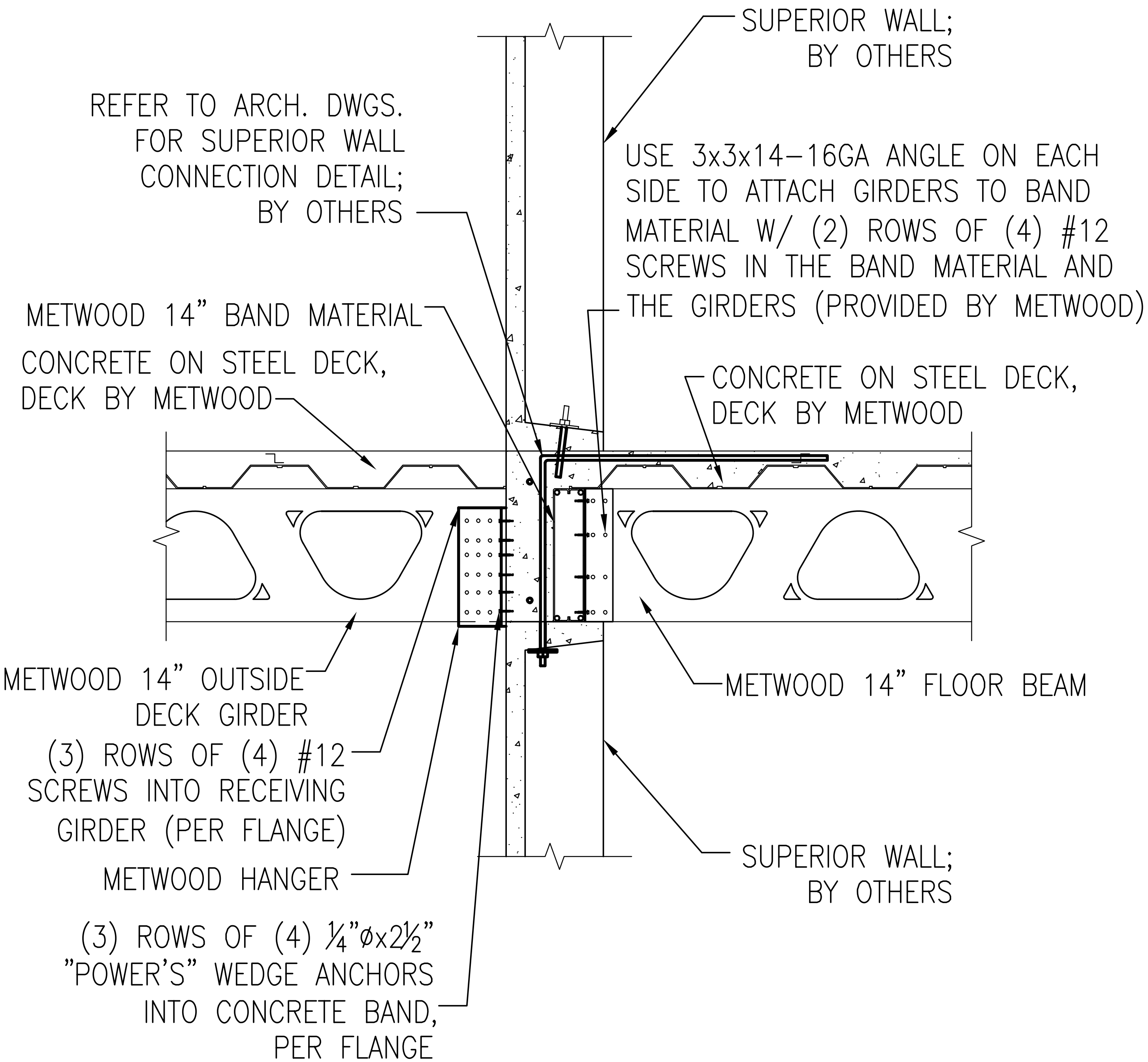
BAND BEAM TO GIRDER

SCALE: 3/4" = 1'–0"

METWOOD BUILDING SOLUTIONS
540 334 4294 Fax 540 334 4293
819 Naff Road Boones Mill, Virginia 24065

SUPERIOR WALL CONNECTIONS

DRAWN	DATE
RAH	12/8/08
CHECKED	SCALE
	AS NOTED
REV. DATE	SHEET
	1 OF 1



BAND BEAM TO GIRDER CONNECTION AT OUTSIDE DECKS

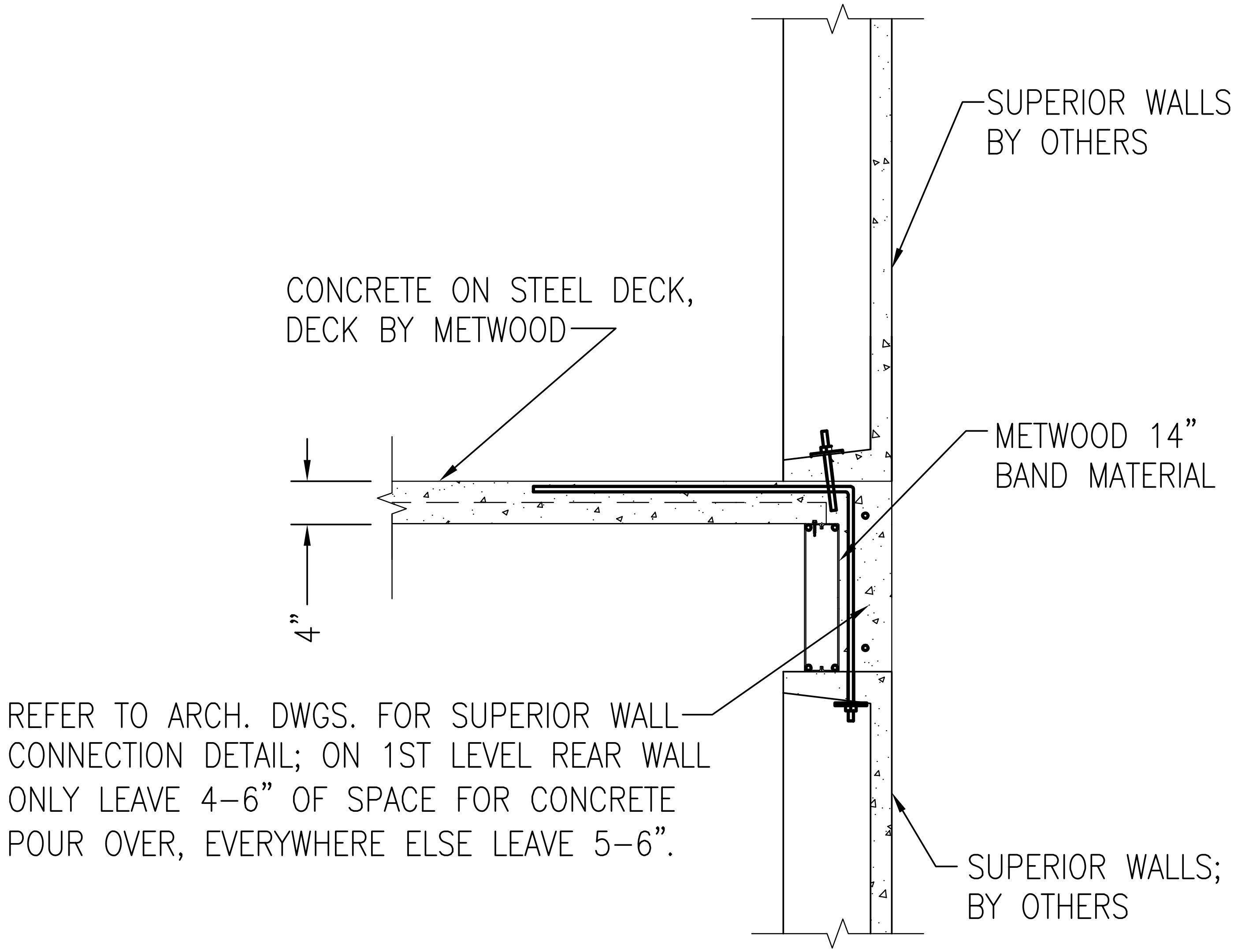
SCALE: 3/4" = 1'-0"

METWOOD
BUILDING SOLUTIONS

540 334 4294 Fax 540 334 4293
819 Naff Road Boones Mill, Virginia 24065

SUPERIOR WALL CONNECTIONS

DRAWN	DATE
RAH	12/8/08
CHECKED	SCALE
	AS NOTED
REV. DATE	SHEET
	1 OF 1



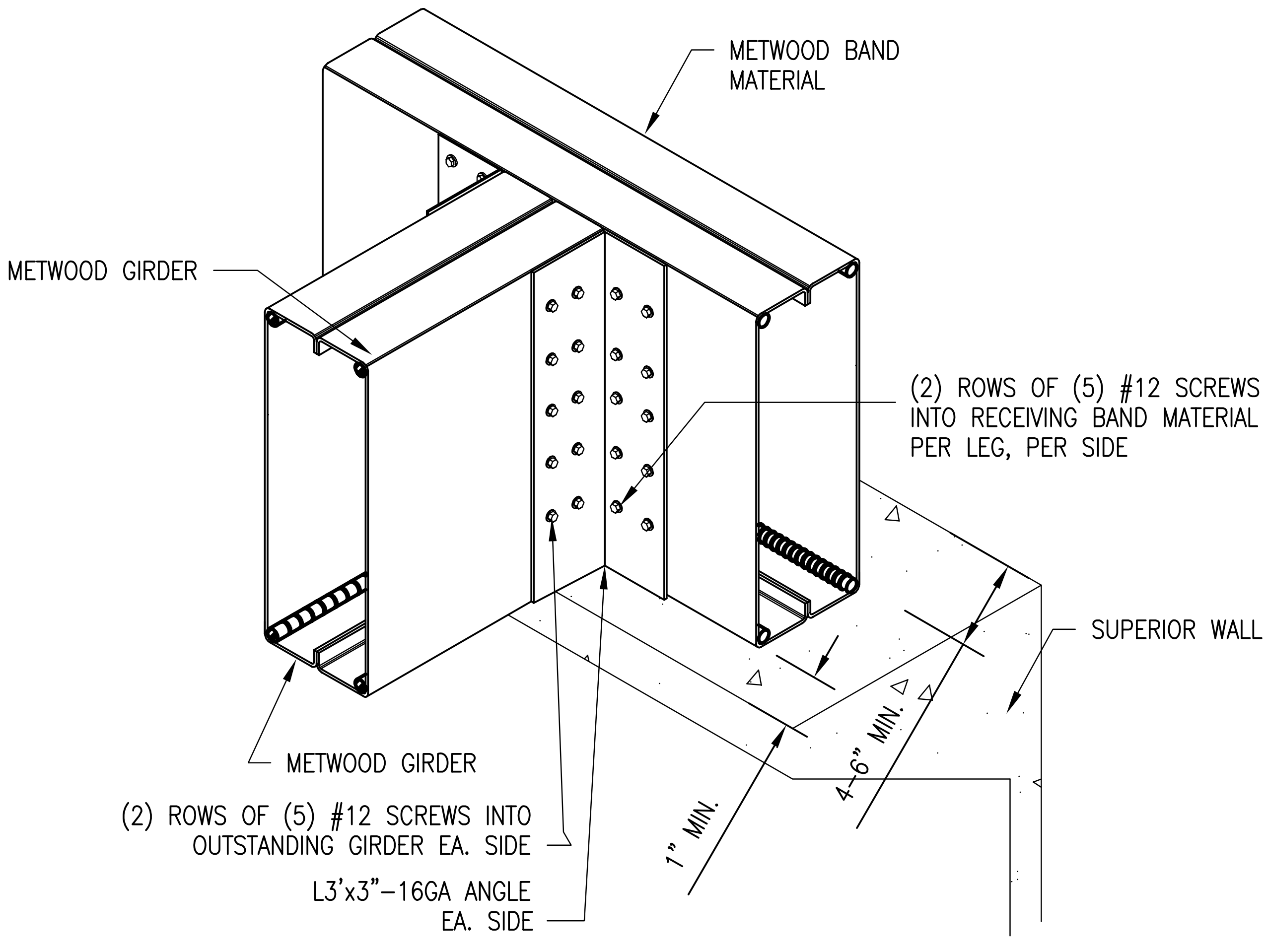
BAND BEAM TO GIRDER CONNECTION SIDE WALLS

SCALE: 3/4" = 1'-0"

METWOOD
BUILDING SOLUTIONS
540 334 4294 Fax 540 334 4293
819 Naff Road Boones Mill, Virginia 24065

SUPERIOR WALL CONNECTIONS

DRAWN	DATE
RAH	12/8/08
CHECKED	SCALE
	AS NOTED
REV. DATE	SHEET
	1 OF 1



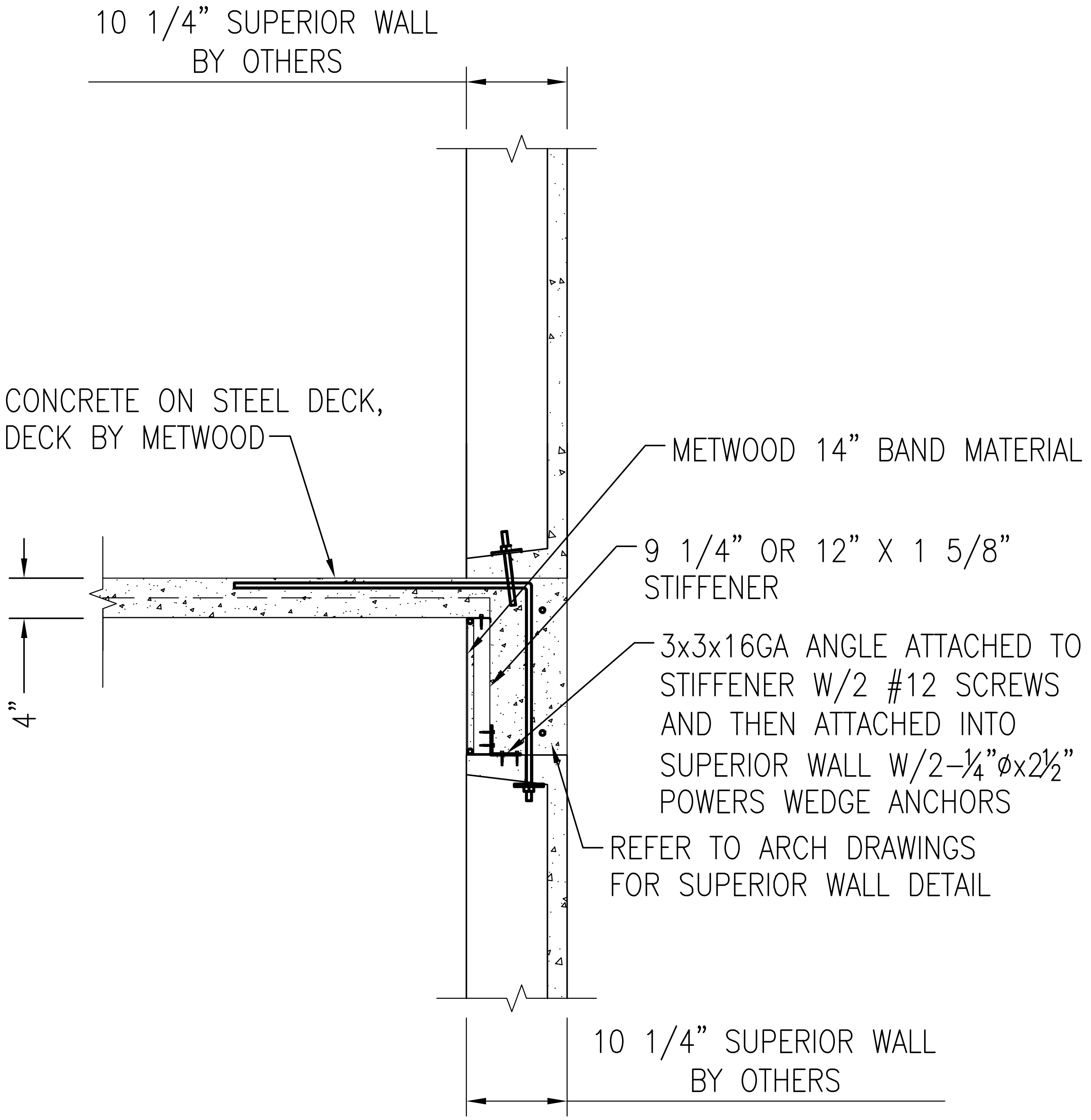
HANGER TYPE GIRDER CONNECTION GIRDER TO OUTSIDE BAND MATERIAL

SCALE: 1 1/2" = 1'-0"

METWOOD
BUILDING SOLUTIONS
540 334 4294 Fax 540 334 4293
819 Naff Road Boones Mill, Virginia 24065

SUPERIOR WALL CONNECTIONS

DRAWN	DATE
RAH	12/8/08
CHECKED	SCALE
	AS NOTED
REV. DATE	SHEET
	1 OF 1



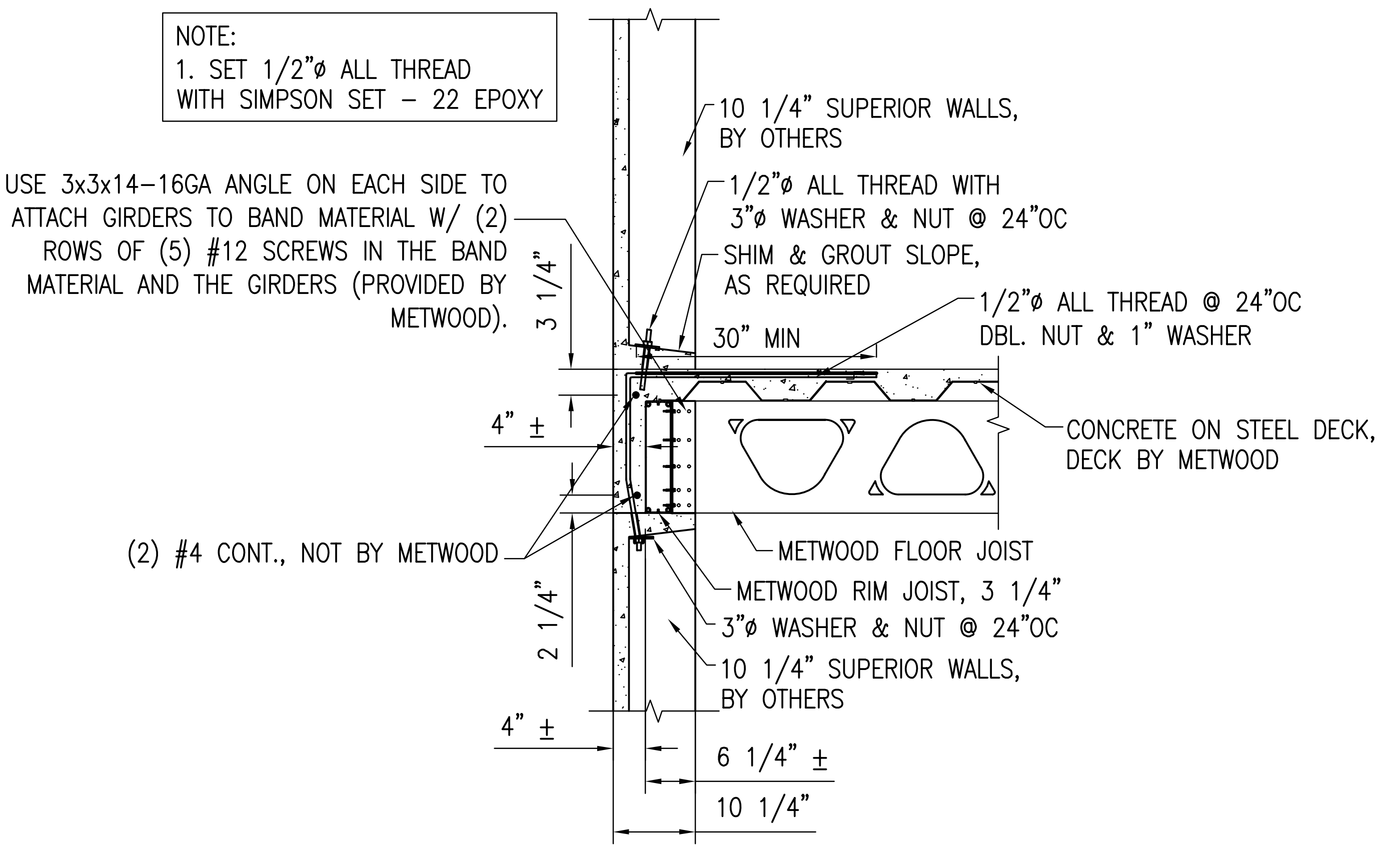
BAND BEAM CONNECTION

SCALE: 3/4" = 1'-0"

METWOOD
BUILDING SOLUTIONS
540 334 4294 Fax 540 334 4293
819 Naff Road Boones Mill, Virginia 24065

SUPERIOR WALL CONNECTIONS

DRAWN	DATE
RAH	12/8/08
CHECKED	SCALE
	AS NOTED
REV. DATE	SHEET
	1 OF 1



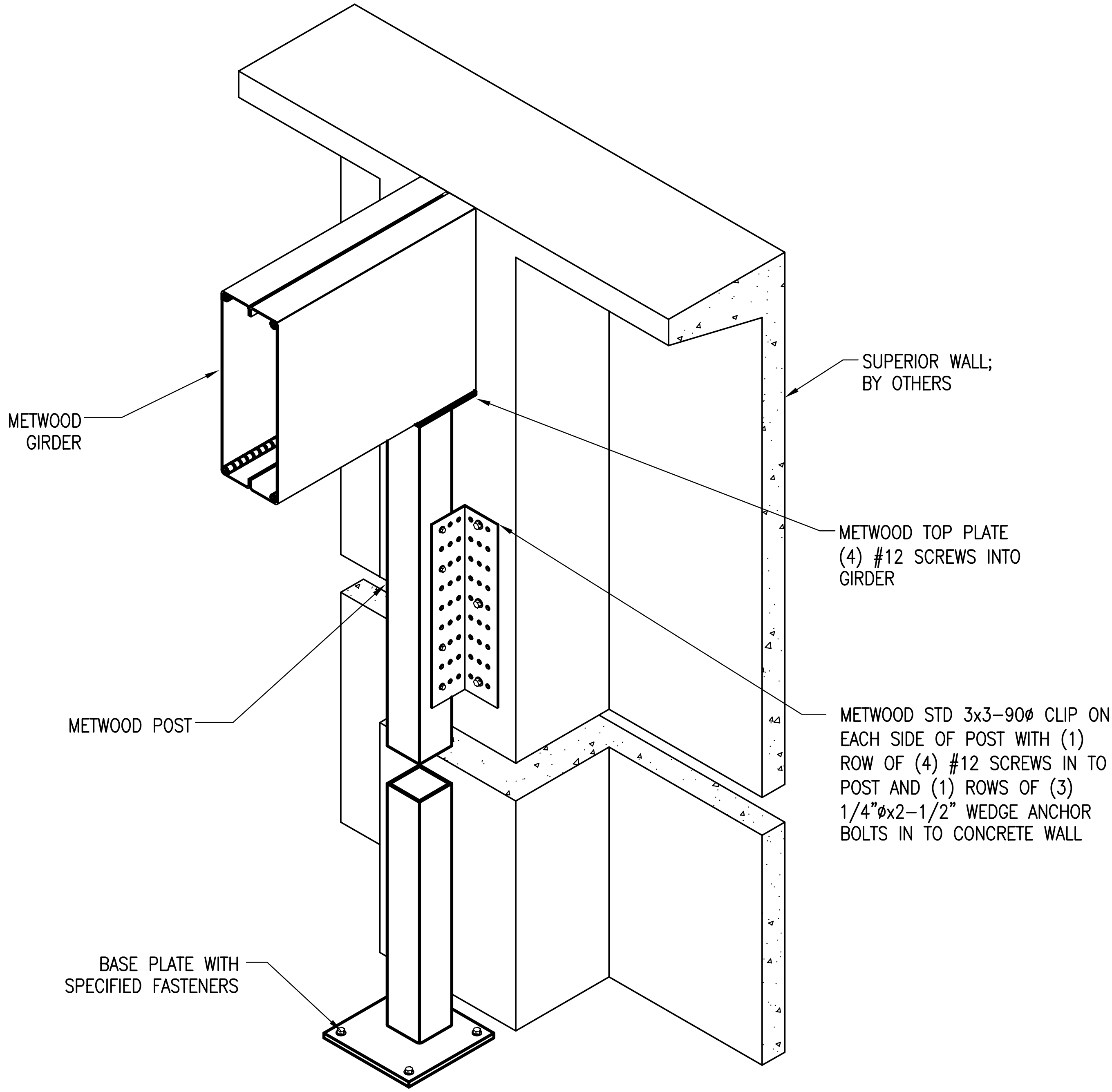
BAND BEAM TO GIRDER

SCALE ½" = 1'–0"

METWOOD
BUILDING SOLUTIONS
540 334 4294 Fax 540 334 4293
819 Naff Road Boones Mill, Virginia 24065

SUPERIOR WALL CONNECTIONS

DRAWN	DATE
RAH	12/8/08
CHECKED	SCALE
	AS NOTED
REV. DATE	SHEET
	1 OF 1



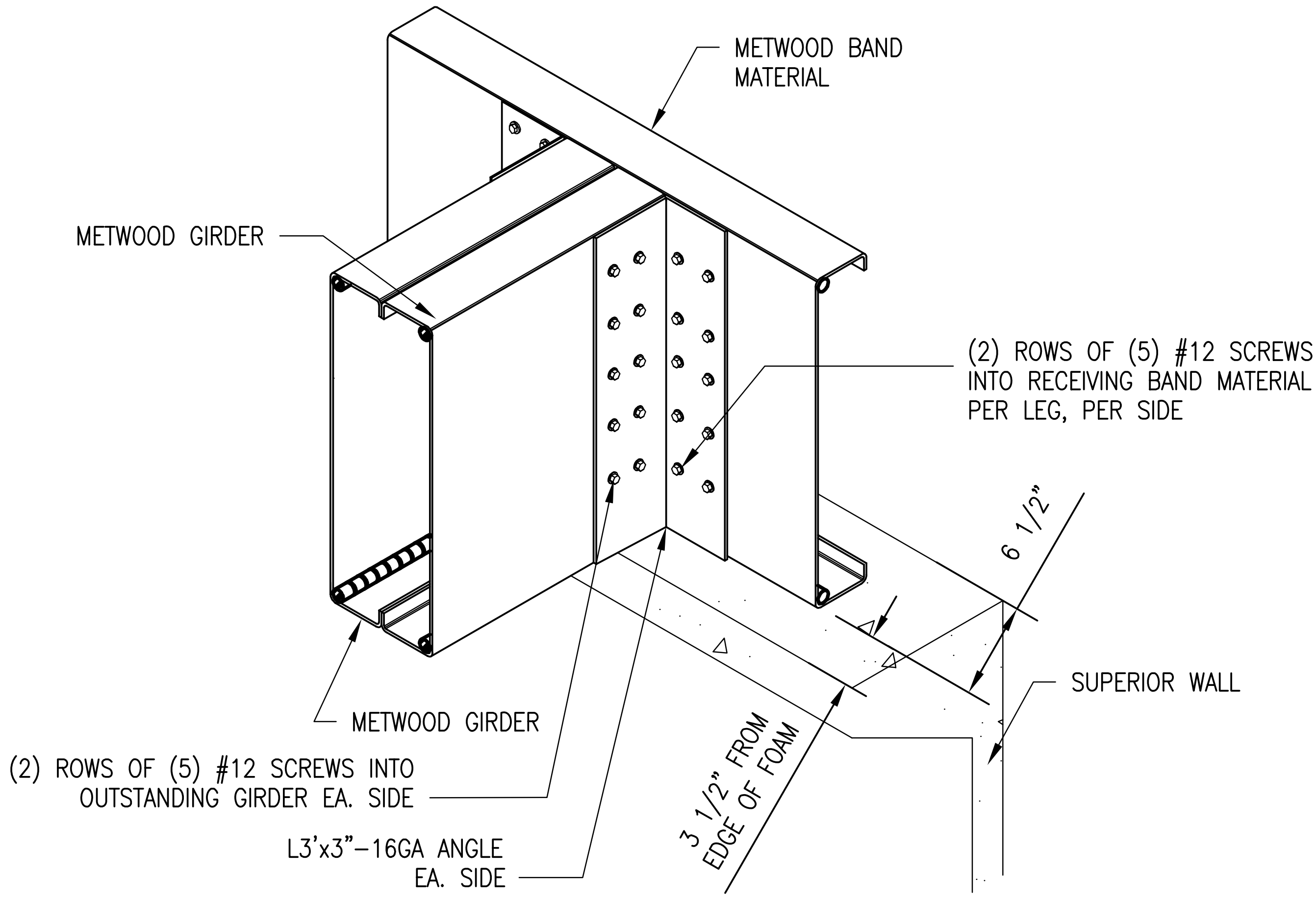
METWOOD GIRDER RESTING ON POST
CLIP ANGLE CONNECTION POST TO SUPERIOR WALL

SCALE: 1" = 1'

METWOOD
BUILDING SOLUTIONS
540 334 4294 Fax 540 334 4293
819 Naff Road Boones Mill, Virginia 24065

SUPERIOR WALL CONNECTIONS

DRAWN	DATE
RAH	12/5/08
CHECKED	SCALE
	AS NOTED
REV. DATE	SHEET
	1 OF 1



HANGER TYPE GIRDER CONNECTION GIRDER TO OUTSIDE BAND MATERIAL

SCALE: 1-1/2" = 1'-0"

METWOOD BUILDING SOLUTIONS
540 334 4294 Fax 540 334 4293
819 Naff Road Boones Mill, Virginia 24065

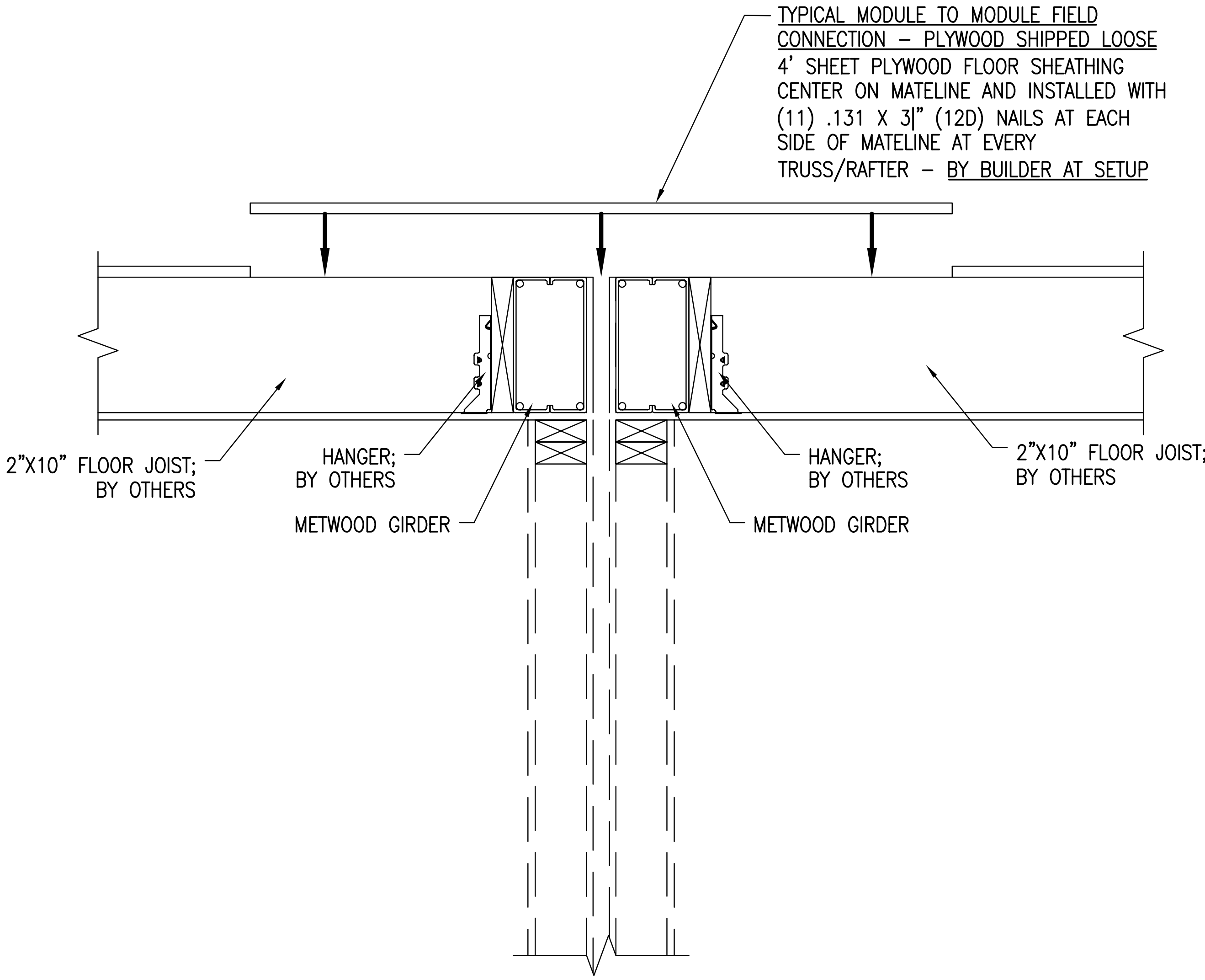
SUPERIOR WALL CONNECTIONS

DRAWN	DATE
RAH	12/8/08
CHECKED	SCALE
	AS NOTED
REV. DATE	SHEET
	1 OF 1

METWOOD

MODULAR UNIT CONNECTIONS

STANDARD DETAILS



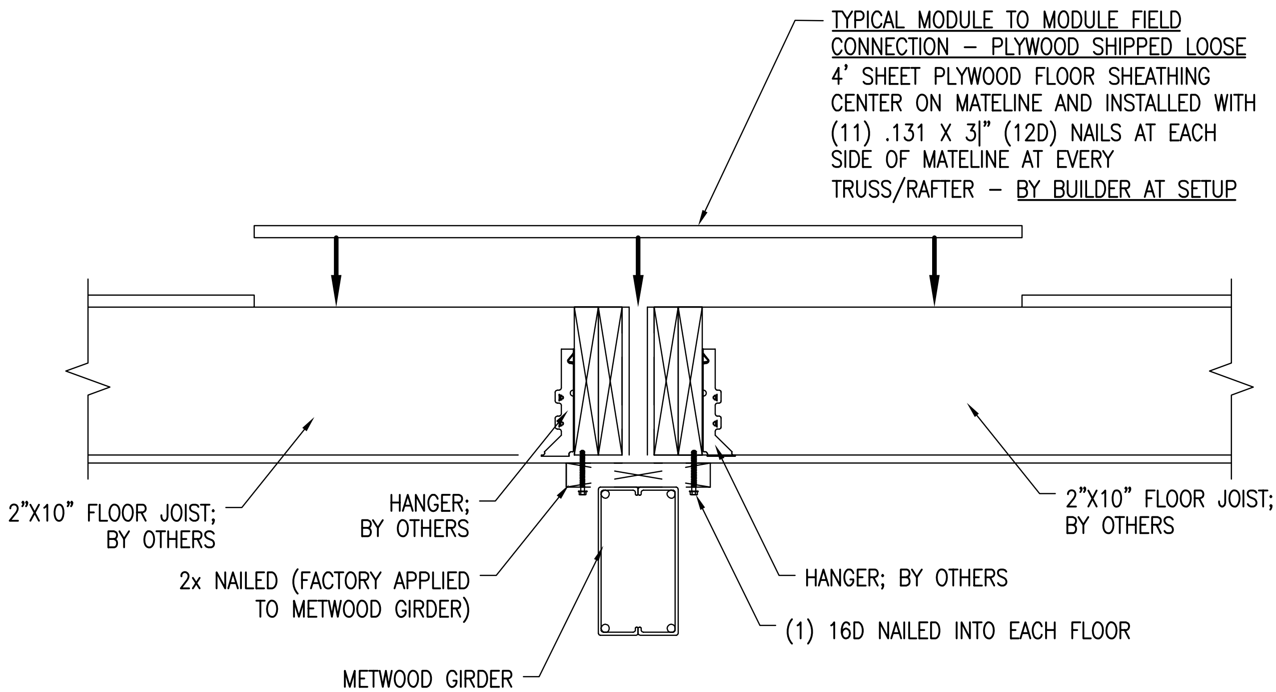
HANGER TYPE JOIST CONNECTION
JOIST TO GIRDER

SCALE: 1" = 1'

METWOOD
BUILDING SOLUTIONS
540 334 4294 Fax 540 334 4293
819 Naff Road Boones Mill, Virginia 24065

MODULAR
UNIT CONNECTION

DRAWN	DATE
RAH	12/8/08
CHECKED	SCALE
	AS NOTED
REV. DATE	SHEET
	1 OF 1

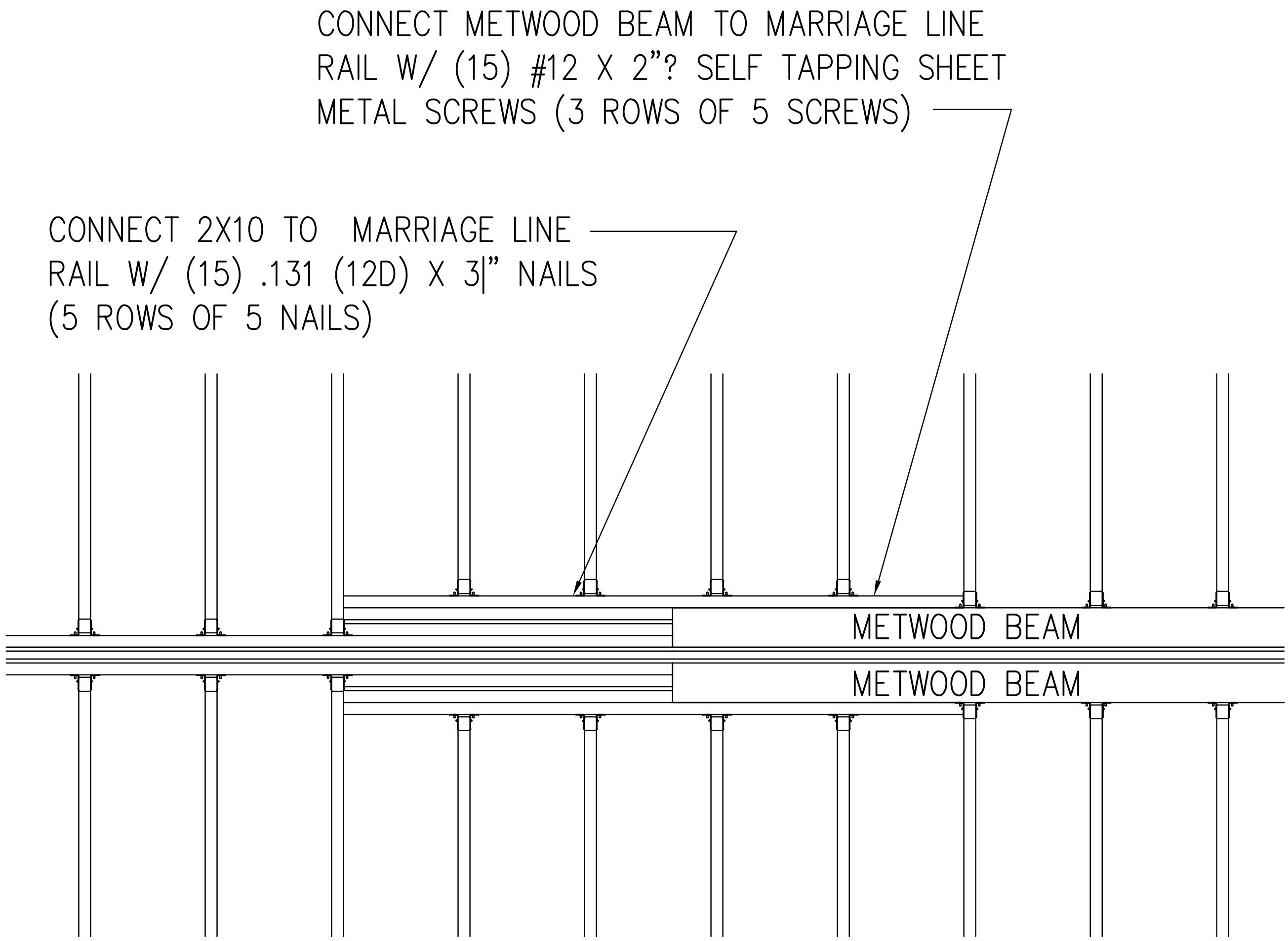


HANGER TYPE JOIST CONNECTION
JOIST TO GIRDER
SCALE: 1” = 1’

METWOOD
BUILDING SOLUTIONS
540 334 4294 Fax 540 334 4293
819 Naff Road Boones Mill, Virginia 24065

MODULAR UNIT CONNECTION

DRAWN	DATE
RAH	12/8/08
CHECKED	SCALE
	AS NOTED
REV. DATE	SHEET
	1 OF 1



HANGER TYPE JOIST CONNECTION
JOIST TO GIRDER

SCALE: 1/2" = 1'

METWOOD
BUILDING SOLUTIONS
540 334 4294 Fax 540 334 4293
819 Naff Road Boones Mill, Virginia 24065

MODULAR
UNIT CONNECTION

DRAWN	DATE
RAH	12/8/08
CHECKED	SCALE
	AS NOTED
REV. DATE	SHEET
	1 OF 1