Steel Framing Alliance™

FRAMEWORK

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Metal construction products for the residential market.

A FEW WORDS ABOUT STEEL

A Great Year Behind Us, A Better Year Ahead

By Larry Williams

This is the time of year when all of us look back on the previous 12 months to consider the challenges we've had to face and accomplishments we can celebrate. During 2004, the Steel Framing Alliance had plenty of both!

What's clear to see, however, is that we've made it through the year in good form and are now poised to leap into 2005 with programs and initiatives that are helping to make steel framing more competitive than ever. In the process, we are adding even more value to your membership in the Steel Framing Alliance.

Your organization: the Steel Framing Alliance

2004 was an important year for the Steel Framing Alliance. During the year, we returned to financial stability and made continued improvements to our ability to invest in market development programs and activities. Membership also increased, from 350 to more than 450, with individuals and companies representing every trade, profession and product-involved in the steel-framing industry. Also during the year the Steel Framing Alliance put in place – or made substantial progress toward completing programs that encourage the use of steel framing and mitigate or eliminate persistent barriers to the use of steel framing. Here are some of the highlights:

Big savings on builders risk insurance

In a year where material prices rose at a rapid rate, the SFA introduced a new program that can dramatically increase the competitive position of steel framing in comparison with alternative framing materials. Because steel will not burn, the SFA convinced insurance giant Zurich to re-classify rates for steel framed construction from "frame" to "non-combustible." This change can save builders as much as 75 percent on their premiums when they frame with steel.

The effect on the cost of construction can be dramatic. For a $10 million project framed with steel, the savings can be $60,000 or more.

Educational programs

One of the industry's biggest barriers is a knowledge deficit regarding steel at every stage of the construction process. During 2004, the SFA aggressively attacked this issue through seminars and programs directed at a wide variety of audiences, and established new training options that fill significant gaps in education resources.

- Building inspectors and plan-checkers: In 2004, SFA taught the basics of steel-framing design and inspection to more than 1,700 building officials, inspectors and plan checkers in nearly 75 jurisdictions and 22 metropolitan areas. In 2005, members and local Alliances will be enlisted to help focus the seminar schedule on locations where these presentations can and need to be delivered. A special "train the trainers" session is being scheduled to better equip members to assist in this effort.

- Engineers: SFA offered this group a day-long seminar titled, "Design of Wall Systems Using Cold-Formed Steel," and began to work with other regional and national engineering associations to make this curriculum available to their members. Starting in May 2005, an educational partnership between SFA and the Center for Cold-Formed Steel Structures will deliver seminars to architects, engineers and other design professionals in seven key cities across the United States.

- Architects: SFA is registered with AIA to provide seminars that offer architectural learning units. The Mid-Atlantic Steel Framing Alliance had a very active seminar outreach program to architects over the last two years. In 2005, architects will be able to download the same seminar materials from the SFA Web site to achieve the same credits through online studies.

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- Commercial framers and construction professionals: SFA and the Association of Wall and Ceiling Industries teamed up in 2004 to develop a comprehensive training program aimed at lead framers, superintendents, estimators and other construction professionals to meet the growing opportunity in load-bearing construction. This program will be available in the second half of 2005 as a multi-day class room seminar and in an electronic format to enable self-paced studies or on-the-job instruction.

- Next generation of framers: One of SFA's strongest training relationships is with Skills/USA, a non-profit organization that reaches 125,000 carpentry students in vocational education and technical schools in all 50 states and five territories. In addition, 1,700 new steel framers were trained at other locales last year. In 2005, SFA will develop a directory of schools where steel framing is available, as well as establish an on-line job bank to connect framers with firms and builders.

New Web site

Significant changes to www.steelframingalliance.com at the end of last year, executed by our own talented Rose Kuria, mean resources are available to members in a flash. First, the revamped site provides easier navigation and accessibility to the information and materials they need. Second, a revised pricing structure on those materials means members no longer pay for important publications they use all the time, including issue papers, case studies and how-to guides. (Bulk orders of these materials are also still available to members by phoning [202] 785-2022.)

In addition, the new site is the source for online training, directory of training facilities and ultimately a jobs connection service. While information about steel will still be available to the general public and industry at large, it is the exclusive Members Only page that will deliver the most valuable tools.

Research

SFA's Research Team, in conjunction with SFA's Technology Team, executed a number of studies and issued a number of research papers in 2004. Highlights of the team's work included an issue paper on steel with pressure-treated wood, the "Galvanized Steel Framing for Residential Buildings" report, and the "Directory of Steel-Framed Fire- and Sound-Rated Assemblies." Set for early 2005 distribution are additional studies that delve further into fire and sound ratings, corrosion and span-load tables. **(For additional details, see the Research column, which begins on page 31.)**

Work will also begin in 2005 in reinforcing holes in floor joists and hip roof rafter and ridge framing. Both studies, as with all of SFA research initiatives, are providing more tools for builders and designers, and developing cost-efficient, technically sound construction practices using steel.

Serving you

The reason the Steel Framing Alliance exists is to serve its members, who collectively benefit from a growing demand for cold-formed steel in both residential and commercial markets. We recognize the important role that our members play in guiding our activities, as well as their support for the programs that are produced as a result.

If you're a member: Thank you, and we look forward to hearing your ideas, needs and suggestion. If you're not a member of the Steel Framing Alliance, this is a great time to get on board.

2004 was a good year. 2005 will be even better!

Larry Williams is president of Steel Framing Alliance.

Alliance Honors Devoted Members

Six Alliance members were presented awards for their service to the Alliance at the Fall Forum gala event and membership meeting, hosted by Modern Trade Communications at METALCON.

The awards and their recipients were: Leadership Award: Greg Ralph, Dietrich Industries, and Don Moody, Nuconsteel; Service Award: Danny Feazell, Premium Steel Building Systems, and Nader Elhajj, NAHB Research Center; and President's Award: Art Linn, Simpson Strong-Tie Co.

In presenting the awards, President Larry Williams commended the members for their hard work and tireless dedication to the Alliance in the past, continuing efforts in the present and vision for the future. The awards and recognition program will become an annual event, and SFA members are encouraged to participate in the nomination process that will begin again in the summer of 2005.

Art Linn, left, accepts the President's Award from Larry Williams.

MHD

Steel Framing Alliance™

FRAMEWORK is produced by the Steel Framing Alliance

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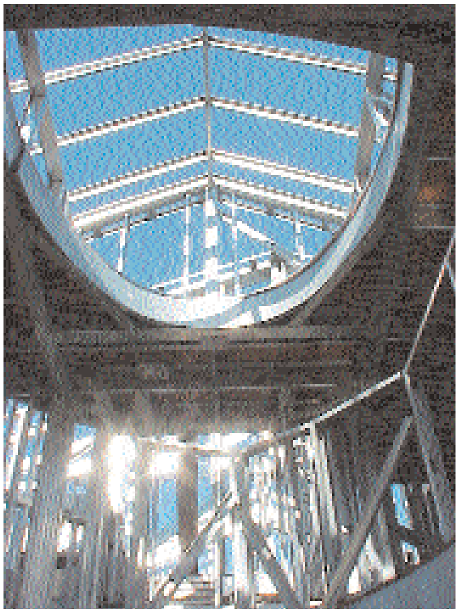

The United States Of Steel

Different Methods And Features Paint The Face Of Today's Steel-Framed Home

Two homes under construction couldn't be more different: opposite sides of the country, price points on each end of the spectrum, and building methods that range from factory assembly to hands-on. But these two homes have something in common: they both represent the cold-formed steel-framed home in the 21st century.

The first home is a 5,100-square-foot custom structure overlooking Newport Bay in one of the country's most affluent addresses: Balboa Island in Newport Beach, Calif. In an area where money is frequently no object, cost was the reason this homeowner selected steel over wood, the original material specified to frame the home.

Because water lies a mere 4 or 5 feet below the surface of the island, "monstrous footings" were needed support the "monstrous wood framing" of the home as originally engineered, says Don Wheeler, president of Wheeler Construction, the builder on the job.

By switching to steel, the job was able to use the post-tension slab instead of seven moment frames, saving the homeowner $200,000 between costs of the foundation, the red iron and the framing material itself. At the time the job was re-engineered and specified, in 2003, the lumber alone was $100,000 more than the steel.

Customized steel framing allowed for larger spans and more unique designs in this Newport Beach home.

Higher prices

Steel prices went up last year, but so did lumber, insists Wheeler, a 15-year veteran of steel framing who learned the craft as he went along. At the time all materials were purchased, cost savings totaled $180,000, still a formidable amount on a home that will cost $1.8 million dollars to construct and will be worth $4 million to $5 million.

"So he got something better and he saved money," says Wheeler.

Of course, that's all relative. In other parts of the country, people have a different definition of cost savings. One of these areas is Mundy Township, a community outside the storied rust-belt city of Flint, Mich., where steel newcomer Structured Panel Homes recently built its first 1,450-square-foot spec model in a new subdivision.

The completely panelized home, which will sell for about $160,000, is a few thousand dollars more than other spec homes in the development. But David Clink, project coordinator from Structured Panel Homes, says significantly lower gas bills—thanks to better insulation and construction—will offset the difference in just a few years.

The steel panels were assembled in a plant near Mio, Mich., and shipped to the job site, where they were put into place. The panels are comprised of polyboard, blown-foam insulation and a waterproof membrane over steel fram-

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ing. Connections are sealed with adhesive, supported with brackets and welded.

Higher value

Clink says people who have passed through the open model, including high-profile building officials from the Flint area, have been impressed by the home's solid construction and resistance to Michigan's elements. This solid construction at a low cost is what attracted company owner Janet Clink to the panelization process two years ago when she walked into the Steel Framing Alliance booth at the International Builders Show looking for a way to provide both affordable homes and careers for her grandchildren.

Steel panels skirt the state's required 28-day curing time for typical poured concrete foundations, in this case 9-foot-high basements, and they are more favorable for year-round construction, even in the winter. It takes about two days to install all the walls of a home that size.

By contrast, Wheeler says it's no secret in his area's building industry that his Balboa Island project is taking longer than it should. Still under construction after nearly a year, the home's completion has been at the mercy of an indecisive homeowner seemingly with time to burn.

Panelizing wasn't an option for this project, he says, because of its customized design, 24-foot spans and constant changes.

"Panelizers are working at one speed, and I'm working at another," Wheeler says. But custom framing has also allowed him to create innovations that he believes will end up on tract homes in the future, like hanging a joist from an I-beam, and the special staircase he designed on this Balboa home.

Old ways

While some of their work may be miles apart, Wheeler Construction and Structured Panel Homes share the identical frustrating and unfortunate situation of wood-framing competitors disparaging their work, and breaking through long-standing relationships between architects and structural engineers, both of whom are resistant to change.

"The architect has battled me through the whole thing," says Wheeler, noting that other projects on Balboa Island are being constructed more expensively with footings and wood even though a shining example of the cost-saving alternative sits right around the corner.

"Traditional framers are leery of us," says Clink. "It's like the guy with the horse and buggy watching the Model A going by. That horse and buggy isn't worth much anymore!"

MHD

Jobsite framing has allowed builders like Don Wheeler create a number of innovations that may be used by other framers down the road.

RESEARCH

SUPPORT FOR RESEARCH AND DEVELOPMENT INITIATIVES

BY JAY LARSON

THE STEEL FRAMING ALLIANCE'S CORE VALUE OF "MAINTAINING LEADERSHIP IN CONSTRUCTION TECHNOLOGY THROUGH INNOVATION" IS THE PRIMARY DRIVER BEHIND ITS RESEARCH AND DEVELOPMENT INITIATIVES.

In this endeavor, SFA collaborates with other organizations, including the American Iron and Steel Institute, Canadian Sheet Steel Building Institute, Center for Cold-Formed Steel Structures and NAHB Research Center. The Steel Framing Alliance also works through its Technology Team, which is open to all members of the Steel Framing Alliance, to eliminate technological barriers to the increased use of steel framing in residential, commercial and institutional construction.

The objectives of the Technology Team are to (1) engage the interests and resources of SFA membership to guide its research and development efforts and (2) provide a forum for its membership to share and discuss technology needs and solutions, both generic and proprietary. This is done through a variety of ways, including team meetings at the Spring Forum and Fall Forum. The Technology Team endeavors to continually identify and evaluate technological barriers to the use of steel framing, and to continually identify and prioritize potential solutions.

A number of projects have already been completed and final reports are available from SFA to members through its Web site, www.steelframingalliance.com.

ALMOST THERE

Nearing completion are projects to test steel floor assemblies and establish needed fire and sound ratings; study the effects of corrosion of galvanized fasteners on cold-formed steel-framing connections; develop a guide on fastener use in coastal areas; provide alternatives to the in-line framing requirement by adding details and span-load tables for new load-bearing top track options to the AISI Prescriptive Method; experimentally study the influence of the wall stud end gap on strength and serviceability and propose an acceptable tolerance for design; and create the documentation necessary to enable the expansion of the AISI Prescriptive Method for gable end walls.

The research and development activities by SFA will be strengthened in the immediate future with the initiation of several new projects.

ON THE HORIZON

Reinforcing Holes in Floor Joists is a continuation of work conducted at the McMaster University in Hamilton, Ontario, Canada, under the direction of Prof. Siva Sivakumaran, P.Eng. This project will address a need for research on the reinforcement of floor joists with large holes. The AISI Prescriptive Method provides floor joist member selection tables for a range of joist sizes. However, these tables do not apply to a floor joist with a hole larger than the standard perforation size (i.e., 2 ½ inches by 4 ½ inches).

Therefore, if a hole must be cut in a joist, an engineered design would be necessary. The objective of this proposed research project is to determine appropriate prescriptive methods for reinforcing holes such that the floor joist member selection tables would apply to hole diameters 3 inches less than the web depth. This is the maximum size hole that can be reinforced with the 1 ½-inch cold-rolled channel. Some experimental work has already been done at McMaster University that shows it is practical to reinforce a round hole and retain the full flexural capacity of the member. An example is shown in **Figure 1**. Additional work is needed to verify that the proposed reinforcement strategy works in other member sizes and stress states.

Hip Roof Rafter and Ridge Framing is a project that will formalize a design methodology that may be used to develop roof rafter span tables for the

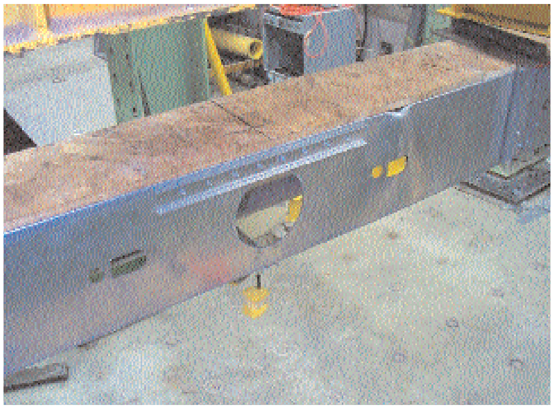

Figure 1: Hole reinforcement for flexure

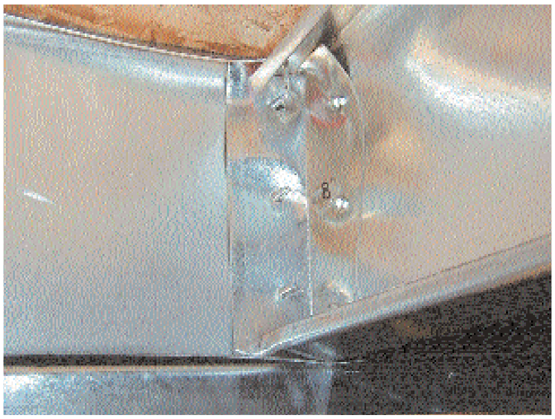

Figure 2: Web crippling of joist with 8-inch clip angle

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QUESTIONS ABOUT THE STEEL FRAMING ALLIANCE RESEARCH AND DEVELOPMENT ACTIVITIES CAN BE DIRECTED TO JAY LARSON OF THE STEEL FRAMING ALLIANCE RESEARCH TEAM AT JLARSON@STEEL.ORG.

AISI Prescriptive Method, investigate alternative framing concepts for the hip rafters and the ridge members, and carry out a test program to validate the design methodology for those members.

The traditional hip rafter or ridge member that is used when framing a cold-formed steel roof assembly has been a C-section nested in a track section. This framing concept requires that the end of each roof rafter be cut on a slope when connecting to the ridge and on a slope and a skew when framing into a hip. This is not a desirable framing concept because of the required labor to ensure accurate connections for the rafters to the hip or the ridge.

Thus, the focus of this project, under the direction of Dr. Roger LaBoube of the University of Missouri—Rolla and Dr. Sutton Stephens of Kansas State University, will be to define the design requirements for the roof rafter and to investigate alternative framing concepts for the rafters to the hip rafter and ridge that will eliminate the need for the sloped and skewed connection detail. Also, an alternative hip rafter when on a horizontal plane could be used as the roof ridge member and may offer the potential for panelizing the roof assemblies. Consideration will be given to extending the research findings to valley framing.

GOOD CLIPS

Clip Angle Bearing Stiffeners is a project that will develop design rules for cold-formed steel floor joists with clip angles used as bearing stiffeners. Stiffeners are commonly used in cold-formed steel construction to strengthen the floor joists at bearing locations. Extensive testing has been carried out on assemblies using stud and track sections as bearing stiffeners, and design provisions have been incorporated into the AISI North American Specification. However, clip angles are products that are used extensively in cold-formed steel construction and could also have an application as bearing stiffeners.

Preliminary tests on floor joist assemblies carried out at the University of Waterloo under the supervision of the Dr. Stephen Fox of CSSBI has shown that clip angles can develop significant capacity when used as bearing stiffeners. This earlier work tested a number of configurations, focusing on the effect of clip angle length and thickness. The photograph in Figure 2 shows the failure mode associated with these assemblies. Continuation of this work will involve a considerable amount of testing and the development of design expressions based on ultimate strength of the clip angle/joist/rim track assembly.

Results of this important work are expected to significantly impact design standards and codes, as well as design guides, training curriculum and seminars. Once completed, the reports from these projects will be available through the Steel Framing Alliance. Also look for articles in future editions of this Framework section of MHD.

Jay Larson is director, construction standards development, for American Iron and Steel Institute.

MHD

2004 EDITION OF COFS DESIGN STANDARDS INCLUDES NEW PUBLICATIONS AND LOWER PRICES

The industry's suite of the AISI design standards has gotten bigger and better with the addition of two new publications, the Lateral Design Standard and the Wall Stud Design Standard, as well as significant updates to existing publications. The new publications are accompanied by a revised pricing structure that reduces the cost of all publications in the library of standards by up to 50 percent.

SFA President Larry Williams says the lower prices are intended to strike a balance between the value of the information contained in the publications and the industry's interest in broad distribution and use of the standards. Additional discounts are available to members of the Steel Framing Alliance.

All of the publications can be ordered by calling the Steel Framing Alliance at (800) 79-STEEL, or by ordering from the online store at www.steelframingalliance.com. The 2001 editions will also continue to be available through the Steel Framing Alliance.

From The Forum

How Green Is Steel?

What is the recycled content of steel studs?

That depends on the method used to make it. There are two ways to make steel: via the basic oxygen furnace or the electric arc furnace, and both require old steel to make new.

The BOF process uses 25 percent to 35 percent old steel to make new. It produces products—such as automotive fenders, encasements of refrigerators and packaging like soup cans, 5-gallon pails, and 55-gallon drums—whose major required characteristic is drawability.

The EAF process uses virtually 100 percent old steel to make new. It produces products—such as structural beams, steel plates, and reinforcement bars, whose major required characteristic is strength. The sheet steel used for steel-stud framing comes primarily from the BOF; therefore the minimum recycled content of steel studs can be considered to be 25 percent.

Additional information on the post-consumer and post-industrial recycled content of steel, including actual percentages to use in green building program certification (such as LEED) visit the Steel Recycling Institute at **www.recycle-steel.org.**

For a concise summary of this information, as well as additional discussion on the recyclable nature of steel, see the issue paper on "Steel is Green: Recycled & Recyclable" at **www.steelframingalliance.com.**

What is LEED?

The LEED (Leadership in Energy and Environmental Design) Green Building Rating System is a voluntary standard that defines high-performance green buildings, which are healthier, more environmentally responsible and more profitable structures. LEED has been developed by the U.S. Green Building Council within the commercial and residential building industries through individualized systems, including:

- New Construction (LEED-NC)
- Existing Buildings (LEED-EB)
- Commercial Interiors (LEED-CI)

The LEED rating system encourages design and construction teams to register their project, and work to earn points toward certification. Out of a possible 69 points, projects must earn 26 points to become LEED Certified, and 52 points to reach the highest rating level, LEED Platinum. Additional information is available from the U.S. Green Building Council at www.usgbc.org.

How many LEED points can I get for using steel?

There are six primary categories in the LEED rating system. Category 4 is for Materials and Resources. Credits 4.1 and 4.2 are for recycled content: 5 percent or 10 percent, respectively. Due to the inherent recycled content of steel, using steel for both the framing and other structural elements can help a project receive points for these credits. The U.S. Green Building Council provides Letter Templates to help with the calculation of recycled content for all materials and products used in the structure. Note that even though the lowest post-consumer recycled content of steel is 23 percent and post-industrial recycled content is 7.3 percent, there must be a weighted average of all applicable materials used in the construction project. Therefore, the more steel you use, the easier it becomes to achieve these credits.

For these actual percentages of recycled content that can be used in the Letter Template, go to the Steel Recycling Institute's website, at www.recycle-steel.org to see "The Inherent Recycled Content of Today's Steel."

Two additional credit points may be available for regionally manufactured materials (credits 5.1 and 5.2 under Materials and Resources.) The requirement is to use a minimum of 20 percent of building materials and products that are manufactured regionally (within a radius of 500 miles.) In a special note within the LEED Rating System V2.1:

"Manufacturing refers to the final assembly of components into the building product that is furnished and installed by the tradesmen. For example, if the hardware comes from Dallas, Texas, the lumber from Vancouver, British Columbia, and the joist is assembled in Kent, Wash., then the location of the final assembly is Kent, Wash."

For steel framing, the manufacturing location is typically the rollforming plant, where the steel is slit from larger coils, and then rolled into stud, track and other framing materials. For some projects, these rolled shapes undergo further processing, when they are assembled into panels, trusses and components. Where this is the case, the fabricating plant where the panels or trusses are made is considered the manufacturing location. Note that job-site-fabricated panels do not qualify as a manufacturing location under this credit; the rollforming facility is considered the manufacturing location.

For credit 5.2, half of the regionally manufactured materials listed under credit 5.1 must also be extracted or recovered within 500 miles of a project site. This is a little more difficult to document with steel, but if the source recycling and steelmaking operations are nearby, this point may also be attainable using steel framing. Again, this is a weighted average of all materials submitted under 5.1, including steel and other locally manufactured materials.

Therefore, depending upon the location of the manufacturing facility and the amount of steel used in the project, steel can help construction projects earn multiple points under various credits within LEED 2.1.

Doesn't zinc used in the galvanization process need to be removed before the steel is recycled?

No, zinc does not have to be removed. It usually volatizes in the melt at 3,000 degrees Fahrenheit and is then captured in the baghouse that cleans the air off-gassed from the furnace. A process is typically used to remove the zinc from the baghouse dust and thus recover it for recycling into new use. One could remove zinc in advance with a process known as "de-zincing," but it is too expensive and thus not done.

It's clear steel is a green material, so when constructing a green building, make sure it's your first choice in framing materials!

Don Allen P.E., Steel Framing Alliance director of engineering development, and LEED 2.0 accredited professional

ASK YOUR QUESTION ON THE FORUM!
LOG ON AT
www.steelframingalliance.com.

Education

The R's Of Steel Floors

Rigid, Reliable And Ready For The Trades!

By Maribeth Rizzuto

The evolution of the use of steel for the framing of floors in residential and commercial construction continues to make significant progress. Dating back to the mid 1800s with expansion of the use of iron in buildings and the development of the first open web joist in 1926, steel floor joists today are being recognized as a viable framing system for a multitude of construction projects.

Contractors have the opportunity to choose from several types of systems for their projects. There are the standard "C" floor joist and track, proprietary floor joist systems, and open web floor trusses.

Some of the latest advancements in steel floor joists are the systems that have been developed by major steel-framing manufacturers. Like the standard "C" shape joist, they are rigid, reliable and fit into a track known as a rim track. Manufactured with openings much larger than the standard "C" for the purpose of running utilities and other mechanicals, they are ready for the trades!

The use of cold-formed steel floor framing has been approved in the International Building Code and the International Residential Code, sections 2210 and Section R505, respectively.

Today's article will explore the selection and installation of standard "C" steel floor joists and rim track.

A look at floors

First let's look at the floor joist span direction for a project. You have a few options:

Span direction is the orientation of the joists to the foundation. The joists can run from end wall to end wall or sidewall to sidewall.

Once the orientation has been determined it is on to selecting the layout of the joists. The selection includes continuous or single span joists.

Continuous joists are members that run from one side of the project to the other over multiple supports. They are also know as multiple span joists. Depending on transportation restrictions joists may be up to 40 feet long **(Figure A)**.

Single span joists are members that are supported only at their ends. They may be "lapped joists," which overlap at

Figure A: Continuous joists

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CONTINUED FROM PAGE 35

interior bearing points. They may also be "butt joists" where members terminate over an interior support in a rim track, and an adjacent floor joist system begins in another, back-to-back rim track. Although butt joists are not shown in the IRC, they are permitted with an approved design **(Figures B & C)**.

The ultimate selection will depend on the overall length of the joist to be used and will dictate the size of the corresponding rim track.

Now what about the size of the joist?

Fortunately, much of this work has been simplified through the publication of steel joist span tables in the Standard for Cold-Formed Steel Framing—Prescriptive Method for One- and Two-family Dwellings, the International Residential Code (Table 505.3.2), as well as the Product Technical Manual published by the Steel Stud Manufacturers Association. Steel-framing manufacturers also publish span charts for their proprietary floor systems. A concise summary of some of the above tabulated values, as well as how-to diagrams of floor installation, is available in the "Steel Floor Guide" from the Steel Framing Alliance.

> For more information about the Steel Stud Manufacturers Association, visit www.ssma.com.
> For span tables, click on "Technical Library," and then "Product Technical Information."

Because the floor supports both live and dead loads it is important to know the loads for the structure. The spans are calculated based on formulas that consider many different factors. Changing the thickness of the steel or the depth of the joist has a direct impact on the span length.

If you are planning on using in-line framing, begin with the roof rafter or truss layout. This is necessary to ensure that the axial loads are transferred from the rafter or trusses directly through the walls to the floor joists into the foundation. Alternatives are available if in-line framing is not being used and an engineer should be consulted.

Regardless of the layout selected pay close attention to floor openings and drains. The last thing you need to have is a drain falling directly above a joist.

Installing the Joists

Joists may be installed on top of foundation walls or over structural walls, or recessed into the foundation. Provisions are available for cantilevers, as well.

There is no need to compensate for crowns or bows as the steel joists will remain as straight and true as the day they arrive on your job site.

As noted in the November/December 2004 issue of *MHD*, the rim track can be installed above a wood sill plate and attached with steel plates **(Figure C)**. If installing directly on concrete you may be required to install some type of sill seal-

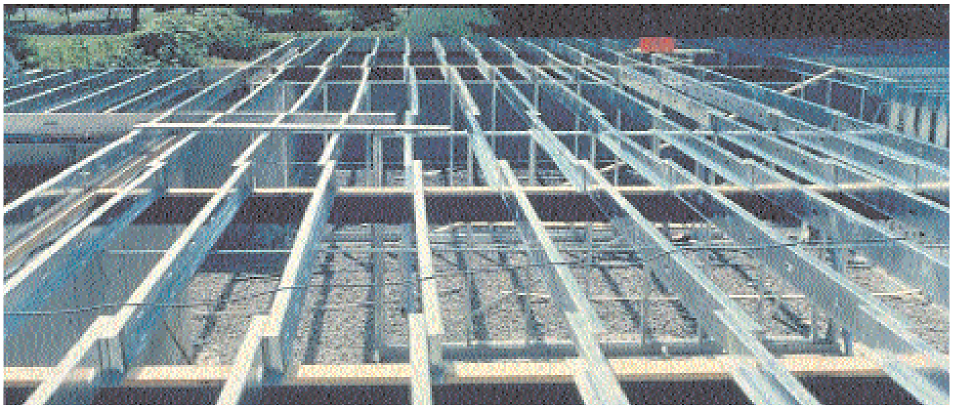

Figure B: Single span joists

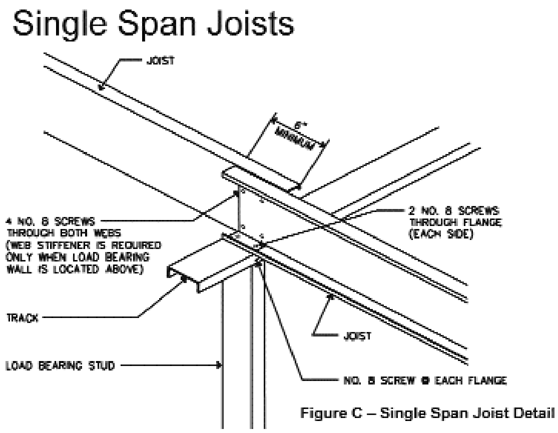

Figure C: Single span joist detail

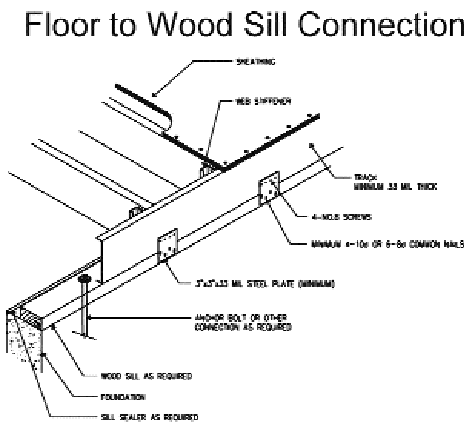

Figure D: Floor to wood sill

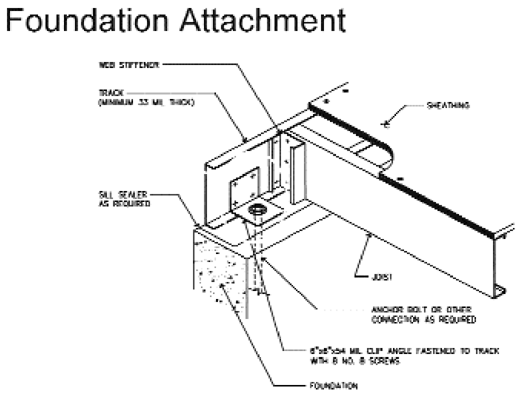

Figure E: Floor to foundation

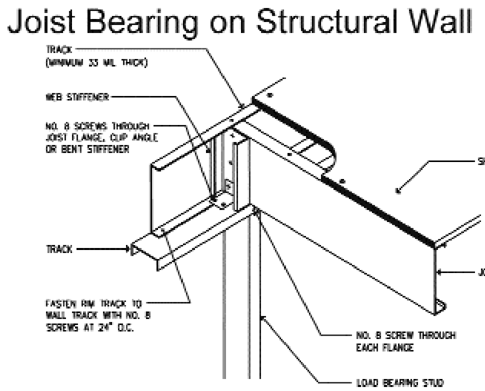

Figure F

er **(Figure D)**. Products like Integrity Gasket are available for this purpose. Installing a floor above a load bearing exterior wall will require the use of in-line framing unless some type of load distribution member is used **(Figure E)**. Details for the installation of cantilevers include connections to foundation walls, wood sills and exterior structural walls; the later is shown in **Figure F**.

Notice the use of bearing stiffeners in each of the details. The bearing stiffener, or web stiffener as it is sometimes called, prevents the web of the joist from crippling at each bearing point. It performs the same as a squash block in wood framing. Bearing stiffeners are a minimum 33-mil section of stud or a minimum 43-mil section of track that is the same depth of the joist minus 3/8 inch. See **Figure G** for further details. Many find that positioning the stiffener in the joist section prior to the joist installation easier. Another method is to install the stiffener on the web side of the joist at each bearing point. See the example in **Figure E**.

With the exception of spans 12 feet or less, all of the methods have requirements for bracing and blocking or bridging to prevent the joists from rolling over or twisting. Joists are braced with the attachment of subflooring material to the top flanges of the joists and blocked every 12 feet maximum with solid pieces of joist, stud or track material. Bridging is accomplished with continuous steel

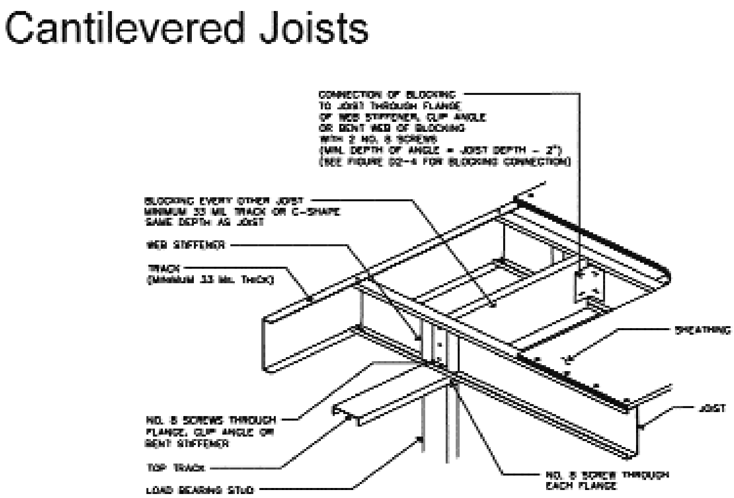

Figure G

strapping or cross bracing securing the bottom flanges of the joists. Pre-manufactured bracing products are available for this use as well.

So far we've covered the basics of floor framing. In the next issue we will take a look at details for bracing and blocking, preparing openings and we'll run through an example of a typical house and light commercial floor joist selection using the published span tables.

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TIPS

Leave a 1/8-inch gap between the end of the joist and web of the track to prevent steel from rubbing against steel.

Position the open side of the joists in the same direction.

Make sure pre-punched holes are lined up.