A Growing Market: Steel Stud Framing

Studies Show That Contractors Who Diversify Into Steel Stud Framing Are Moving Into a Constantly Growing Market—With Even Greater Growth Still Ahead

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Why should you-as a wall & ceiling contractor—consider the benefits of becoming an installer of cold-formed (light-gage) steel framing?

First—Do you have all the wall finishing business you can or want to handle? If your answer to this question is "no," then, perhaps steel stud framing installation may be a profit making complement to your wall finishing business.

Since you have to have a trailer at the job site staffed with supervision and liaison people for the general contractor anyway, why not dilute, as much as possible, that element of overhead, as well as the job overhead back at the office, by broadening the scope of your operations?

Have you ever had to have your finishing crew standing around waiting for the framers to complete a wall section?

Have you ever had problems with the scheduling of your finishing crew because of coordination problems with the general contractor's representatives haggling over change orders—or with utility installations—or with material supplier delays—or the many other job delays that occur on the job site?

Have your finishing crews been delayed with a bad framing job by another sub-contractor, like, improper bracing, stud misalignment, improper fastening—or worse, your crews applied finishing materials to such framing and the result was unacceptable?

What if your finishers could be readily trained to install studs as well as hang "sheet rock" or metal lath? Then, when your finishing crew ran into delays—largely unexpected delays—those crews could be shifted to framing tasks in another area of the project without time being lost. Also, your management then has control of the quality of the wall construction from "slab-to-slab."

Have you ever been under bid by a wall and ceiling contractor who bid on the wall finish and the framing and you could only bid on the finish?

Do you think there is any advantage to a builder when he can deal with one single sub-contractor for framing and finishing rather than dealing with two separate contractors? With all things being nearly equal, would he be likely to give the job to the single source? What would you do if you were "in his shoes"?

What do we mean by "light-gage or cold-formed steel framing"? Generally, we are talking about steel "C" shaped sections and channel "C" shaped sections cold-formed on a multi-stand rolling machine or press brake and cut to whatever length is desired. The raw material from which these shapes are formed is steel sheet stock either painted or galvanized generally varying in thickness from 25 ga. to 12 ga. depending on member strength required. The width (or depth) of the shape (or stud) is the back or ("web") width of the "C" shape and generally is the designation for the basic size of the stud. Thus, a 3-5/8" stud has a web width of 3-5/8" and corresponds to the 3-1/2" width of a "dressed" 2 x 4 wood stud. The flanges or legs of a metal stud are those surfaces at each end of, and perpendicular to, the stud web. They are generally the surfaces against which the wall covering panels are attached and they correspond to the 1-1/2" edges of the "dressed" 2 x 4. Many metal stud manufacturers produce studs with varying flange or leg widths. The "C" section leg widths, for the most part, are

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nominally sized at 1-1/4", 1-5/8", 2" and 2-1/2". Thus, it can be seen that the building designer can select a wide variety of stud strengths just by varying the gage of steel and the flange width of the stud while keeping the wall thickness unchanged. This makes framing considerably simpler than with wood. To increase load carry capabilities with wood studs, the designer has to add studs at 16" spacing or less. Often such capabilities can be achieved with just one metal stud by selecting the proper flange width and gage, and even increasing stud spacing to 24"—if type of finish will permit.

Corresponding to "head" and "floor" plates in wood stud construction, plain "U" channels variously called "track," "runner,' or "perimeter channels," are sized width-wise (or depth-wise) to receive the stud for which intended to mate. Thus, the stud is inserted into its track with the stud exterior depth dimension spanning the distance between the internal faces of the track. With the flanges of track legs and stud legs so lapped, the two members may be fastened together by driving self-drilling, self-tapping screws through the lapped portion of their legs on both sides of the members. Studs may also be fastened to track by welding-generally fillet welding the edge of the track leg where it crosses the face of the stud leg depending on connection design strength desired.

The studs are fastened to the top track just as to the bottom track. The bottom track is anchored to the floor structure by power fasteners shot through the track web into the floor generally on 16 in. to 24 in. centers but depending on lateral forces on the wall.

Editor's Note: *Construction specifications for nonload bearing interior partitions typically require that metal studs located adjacent to door and*

window frame, partition intersections, and at partition ends or corners be anchored to track by screws or by crimping at each stud and runner flange. Except for fire-rated construction, intermediate partition studs are not normally required to be anchored to track.

Whether metal stud framing is fastened together by screws or welding depends on metal gage thickness and contractor work force capabilities. For light gage members—20 gage and lighter—welding requires much more welder skill than 18 gage and heavier. Many contractors prefer screw fastening for all gages because of uniformity of connection and simplicity of tools. Yet, much of it depends on the specific nature of the contractor's organizational make-up—it can go either way.

Editor's Note: *In typical construction, fastening by welding or by screws is optional. For a few certain specific design details, welding is required to develop adequate joint strength. The project construction specifications should be consulted for exact fastening requirements.*

This, then, is how framing goes together. Nothing very complicated. Of course, framing for multi-storied structures subjected to axial (live and dead loads) and appreciable lateral loads may require secondary bracing of one kind or another and sheet metal gusset plates may be needed to strengthen connections but the basic function of joining lapped sheet metal remains the same simple repetitive feature for all construction by this method.

Assuming, for the moment, that there are operational advantages in the metal stud framing activity, our next question is, what about the market for metal stud framing? From where has it come? Is it growing? What type of projects on which is it used most? What finishes are typical for its use?

To get some feel for answers to these questions, we turned to a relatively recent survey of the framing market ordered by the Metal Lath/Steel Framing Association—a division of the National Association of Architectural Metal Manufacturers. The survey is largely based on the experiences of a small group of metal stud framing

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manufacturers but, nevertheless, prominent manufacturers of such products covering the nation and eastern Canada.

Based on these findings, we find that from 1981 through 1987, the market size for those companies reporting, grew 270%. It is interesting to note that these companies sold 3-1/2 times more stud footage of 22 gage material and lighter, than 20 gage and heavier.

A small spot survey of some six substantial Southeastern wall and ceiling contractors conducted by the writer in preparation for this article, were unanimous in their outlook for the growth of the market. All of them are experiencing increased business and all of them reported that they thought the rate of growth was also increasing. Some of this growth may be attributable to the relatively new exterior insulation system finishes, many jobs of which are supported by metal studs.

It was mentioned earlier in this article that from the ML/SFA survey, 3-1/2 times more stud footage of 22 gage and lighter was sold than heavier gaged materials. This suggests that tremendous opportunities for sales exist in the interior non-load bearing wall applications. From a consideration of Fig. 1 in this piece, one can obtain an estimate of metal stud usage by type of building occupancy. It can readily be seen that the largest usage of metal studs occurs in office buildings, hospitals, and schools. This seems to reinforce our supposition that metal studs are widely used for interior non-load bearing partitions.

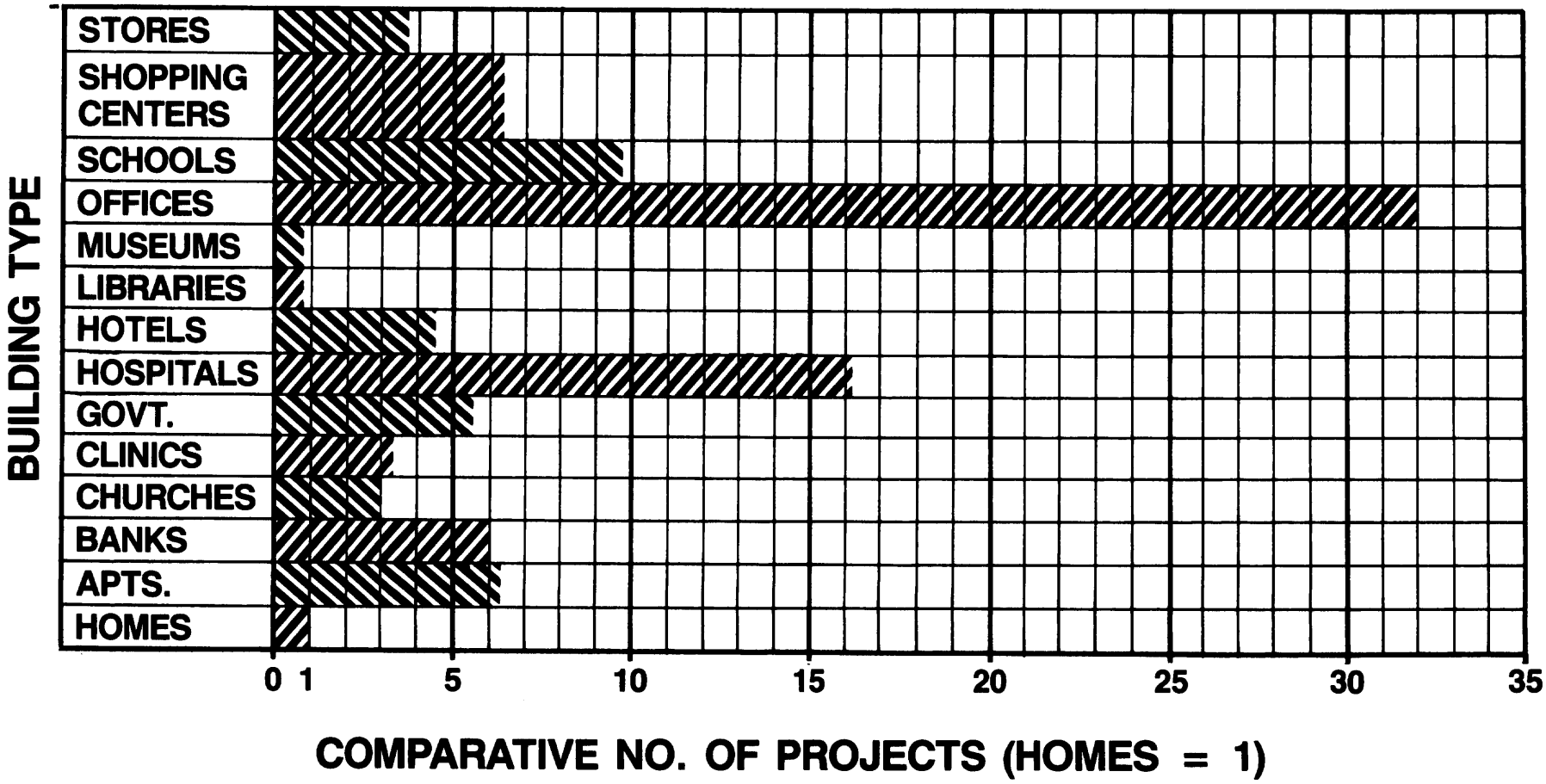
Perhaps it will be obvious to most readers that metal stud framing can be used for a wide variety of finishes including:

• Brick Veneer

Fig. 1

DISTRIBUTION OF COLD-FORMED METAL FRAMING JOBS BY TYPE OF OCCUPANCY

(RESULTS OF 1986 SURVEY)



- Ceramic Tile
- Concrete Masonry Units
- Glass Fibered Reinforced Concrete Panels
- Granite Panels
- Gypsum Plaster
- Gypsum Panels
- Lime Plaster
- Marblecrete
- Masonite & Other Hard Sheathing Boards
- Metal Lath/Portland Cement Plaster
- Metal Panels
- Prefinished Wood
- Synthetic Plaster (Exterior Insulated Plaster Systems)

Thus, one can readily recognize the adaptability of this type of construction.

As with any good building system, cold-formed metal framing requires responsible management directing efficient, quality conscious craftsmen. Building designers' specifications are to be closely observed and followed. In some facings, such as brick veneer, largely dependent on relatively thin connecting mortar coatings to resist flexural stressing and the deteriorating effects of weather, it is most important that strict adherence to designer specifications be "followed to the letter." Such attention to detail is in particular regard to deflection criteria, inter-wythe anchorage, fastener resistance to corrosion and wall cavity control of moisture collection.

Most of the prominent manufacturers of cold-formed metal framing publish instructive details, load specifications, and procedures to he followed in the installation of maintenance-free installations. This data has been compiled on the basis of much AISI (American Iron and Steel Institute) testing and analytical research theory. This data covers matters such as cross-sectional structural properties, (moments of inertia, section moduli, sectional area, allowable resistance moment, and other structural values) that are of interest to the applicator but are intended more for the designer. Again, this data generally also includes allowable loads for curtain walls, interior load-bearing, and combined lateral and axial load applications for various sizes and gages of members. While such data is intended primarily for the domain of the building designer, a knowledge of the applicator of this information acquired by exposure and experience can be of invaluable assistance to the building designer. He can experience confidence in knowing that his applicator is fully competent to bring his designs into physical being while discovering inconsistencies not perceivable from the drafting table. In addition to the above information, reputable framing manufacturers provide, on request, typical drawing details for most assemblies encountered in application or are able to provide sketches and advice for particular instances with in-house engineers or available consultants. Depending on the scale of this assistance, some manufcturers provide, for a charge, shop drawing capabilities when required, thus sparing the contractor of that in-house need. The Metal Lath/Steel Framing Association—a division of NAAMM also has technical information available covering such topics as prefabrication techniques, allowable fastener loadings, and specification formats. Ask for NAAMM Standard ML/SFA 540-87, "Lightweight Steel Framing Systems Manual" —3rd Edition.

Now what about cost for metal stud support of various wall finishes compared with other means of support?

Please see Fig. 2, "Wall Cost Comparisons," attached. This wall cost information was extracted from the 1988 Edition of Means "Square Foot Costs"—9th Edition. From this comparison of costs, we note that steel stud construction is certainly competitive with wood and masonry. Note the labor savings of metal studs over other types of support.

This fact is borne out in our spot survey of southeast wall contractors. When asked which support system they liked best and why, they unanimously responded with "Metal Studs" because jobs go quicker (less labor costs "by far") and less skilled craftsmen required.

Bear in mind, we have been only talking above about walls. Manufacturers provide rolled members that also suit floor, roof and truss construction. Joists for floors and roofs vary from 6 in. deep to 12 in. deep members with varying flange or leg widths with gages normally running from 16 ga. to 12 ga. material. Thus it is that steel framing is not confined to just walls, but can be sized for the whole building structure, if desired. Buildings up to 6 floors have been successfully built with these members. And don't think for a minute that cold-formed steel framing is a passing novelty of construction only worthy of the erection of superficial facades. No lesser authority than the American Iron and Steel Institute has developed, through testing programs and rigorous mathematical analysis, the design parameters by which the structural capabilities of cold-formed members will be determined and evaluated. Thus, when steel sheet of a certain composition and gage is cold-formed to a prescribed shape and such a member is applied to construction in a recognized manner, its load carrying capacity is quite precisely determinable without any equivocation, just as are the properties of hot-rolled structurals.

Here, then, is a building enclosure support that:

- is provided straight,
- is dimensionally stable,
- will not warp, dry out,
- can be chosen with varying strength capabilities for a given depth size,
- uniform in strength—not dependent on gradation variations in quality and species of wood,
- can be provided in relatively precise lengths from the manufacturer,
- will not burn,
- is much lighter in weight and hence,
- more design efficient,
- is resilient under stress,
- is easy to assemble,
- and will resist termites but will not rot.

Fig. 2

Wall Cost Comparisons

Data from Means' Sq. "Ft. Costs"—'88 Edition

Interior Drywall Partitions	Cost Per Sq. Ft. Mat'l.	Install	Total
1. Wood—2x4's @ 16" o.c/5/8" FRDW/both sides/no insul.	$ .99	$ 1.62	$ 2.61
2. Steel—3-5/8" stud @ 24" o.c./5/8" FRDW b/sides—no insul.	.92	1.62	2.54
3. Masonry—6" block-reg. wt./no plaster	1.09	2.94	4.03
4. Masonry—4" block-reg. wt./no plaster	1.02	2.74	3.76
Interior Plaster Partitions			
5. Wood—2x4's @ 24" o.c./3.4 lb-3/8" rib lath and 3-coat gypsum plaster—both sides	1.41	4.19	5.60
6. Same as above but 16" o.c. w/3.4 lb. dia. mesh lath	1.49	4.23	5.72
7. Steel—2-1/2" studs @ 16" o.c/3.4 lb. diam. mesh lath & 3-coat gypsum plaster—both sides	1.42	4.38	5.80
8. Same as above but 3-1/4" studs @ 24" o.c—3.4 lb.-3/8" r/l	1.45	4.34	5.79
Stucco Wall Exterior			
9. Wood—2x4's @ 18" o.c/7/8" stucco/gyp. sheathing—no inside finish/batt insulation	2.07	5.35	7.42
10. Steel—3-5/8" studs @ 24" o.c. (then same as above)	2.71	4.54	7.25
Exterior Brick Veneer			
11. Std. brick face/6" block backup; w/cavity-polystyrene Fill—no inside finish	3.96	9.80	13.78
12. Same as above but 8" block b/u & perlite fill	4.54	10.10	14.64
13. Solid brick wall—double 4" wythe-common bond & brick	2.66	7.20	9.80
14. Same as above but with standard brick	3.16	7.50	10.66
15. Brick face—3-5/8" metal stud backup @ 16" o.c. with no inside finish & running brick	4.89	7.85	12.74

Means' Reference Key

1 - on Pg. 302 - Assembly No. 1200
2 - on Pg. 303 - Assembly No. 5400
3 - on Pg. 299 - Assembly No. 1500
4 - on Pg. 299 - Assembly No. 1000
5 - on Pg. 308 - Assembly No. 6120
6 - on Pg. 306 - Assembly No. 6020
7 - on Pg. 305 - Assembly No. 2020
8 - on Pg. 305 - Assembly No. 2120
9 - on Pg. 285 - Assembly No. 2100
10 - on Pg. 285 - Assembly No. 2950
11 - on Pg. 278 - Assembly No. 1120
12 - on Pg. 278 - Assembly No. 1200
13 - on Pg. 271 - Assembly No. 1010
14 - on Pg. 271 - Assembly No. 1160
15 - on Pg. 275 - Assembly No. 5400

On top of all this, these members can be cut readily with a power hand saw fitted with an abrasive metal cut-off blade. Screw fastening only requires a variable-speed, adjustable clutch motor driver. A hand held power actuator for anchoring track to concrete or primary framing is useful. Thus, equipment investment is minimal

Surely, such attributes are worthy of your closer attention and consideration.