Steel Framing
Substantiation is Needed

The Foundation Participates Again in a Program to Reach the Architectural Community

By James J. Rose
and Walter F. Pruter

The main thrust of this article was originally written a decade ago by Jim Rose, then Manager of the Contracting Plasterers Association of Southern California. It has recently been reviewed, updated and expanded by Jim Rose conjointly with Walter F. Pruter. Their editorial notes and other new comments appear in italics.

In spite of having been popularly used to frame millions of square feet of interior partitions and exterior walls for over 30 years now, light gauge steel studs are still not manufactured to universal standards, nor is their installation covered with consistency by the current building codes.

Manufacturers compete not only by offering differing varieties of types, size and gauges of steel studs, but they also play games with the types of steel, the actual thickness of the steel, and the quality of the coatings.
What makes a thorough knowledge of steel framing so important for the contractor are the consequences of this lack of standardization.

Several major manufacturers have opted to discontinue production of steel studs. Among the reasons for their retreat from that segment of the market was an unwillingness to lower their standards in order to remain cost competitive. Foremost among these was Penmetal, Soule Steel, the Milcor Division of Inryco, Inc., and most recently, the U.S. Gypsum Company.

With the diversity of section designs, configurations, metal thicknesses, code approvals and availability of test data, a single, comprehensive and acceptable institutional reference specification is virtually impossible to develop.

Organizations particularly concerned with the quality of finished installations have taken some positive steps toward establishing more uniform standards for steel studs and their installation. These would include the American Institute of Architects, the Construction Specifications Institute, and the Metal Lath/Steel Framing Association. All of these organizations have attempted to tie some of the loose ends found in many steel stud specifications.

One of the best and most successful attempts to establish a nationally accepted standard was published a few years ago by the Metal Lath/Steel Framing Association of 600 S. Federal Street, Suite 400, Chicago, IL 60605.

This organization’s “Light Gauge Steel Framing Specifications” was prepared by leading manufacturers and should be a part of every wall and ceiling contractor’s technical library.

The entire specification was carried as a special insert in the December 1977 edition of Construction Dimensions Magazine. Copies of the specification are available from the ML/SFA.

As outstanding as this effort was, though, the wide range of nomenclatures for essentially the same item contributes a sense of uneasiness for the designer. The latter can never be absolutely certain without going to the manufacturer’s material specs on each item and/or checking carefully with a knowledgeable contractor.

Because of the disparity in the actual thickness (gauge) of steel furnished by different manufacturer it has been included that specifying thickness by decimal equivalent is safer and more accurate. For example:

Instead of 25 gauge specify minimum thickness .020”
Instead of 20 gauge specify minimum thickness .036”
Instead of 18 gauge specify minimum thickness .047”
Instead of 16 gauge specify minimum thickness .059”
Instead of 14 gauge specify minimum thickness .075”
Instead of 12 gauge specify minimum thickness .105”

Various Names

Discounting the metal gauge factor, the “C” or Cee stud is variously known as a channel stud, a drywall stud, a screw cee stud, a C-shaped section, as well as “L”, “S”, or “LS” series studs.

A designer or a contractor needs to refer to a picture or drawing of a section of the stud to be certain which stud is being discussed.

More knowledgeable structural engineers and architects will call out on the drawings the minimum allowable “I” (Moment of Interia) or “S” (Section Modulus) for studs used in certain situations. This enables the subcontractor to submit a section which will do the job most economically and still satisfy the engineering requirements.

What makes a thorough knowledge of steel framing so important for the contractor are the consequences of this lack of standardization. Without uniformity among the types of material and the systems, building codes are understandably sketchy as to light metal frames. It is not unusual that the only valuable information to be found in a typical code is a reference to wall heights and deflection.

Some manufacturers have made serious efforts to overcome these shortcomings. Most have individual approvals for their products, and there are those who have conducted more extensive, explicit research.

These research reports usually contain limiting spans for different sizes and types of studs. These spans have been substantiated by engineering analysis and should take precedence over the data found in brochures and advertising.

Unfortunately, manufacturers face the constant problem of getting their research reports distributed properly. In many cases where a distribution has been successful, the reports become detached or separated.
The subcontractor is going to have to fight the battles of this work.

from those approvals adopted into the building code books.

To many engineers and other designers, if it isn't in the code book it simply doesn't exist. This is where contractor knowledge is so essential.

In defense of the manufacturers’ problems, the problems and astronomical fees demanded by code bodies for obtaining building code product approvals for individual assembly components represent substantial barriers.

During the interim, too little is being accomplished so far as grouping and classifying fabricated items and components on congruent characteristics.

Faced with this scattering of knowledge in the market, designers want and need direction. They contend that they are not receiving this information or, in view of the difficulty in getting it, the industry is not growing as it could.

The gap in designer awareness of all the elements the industry possesses (such as variety of design) and answers to specific engineering problems and economies points to the need for a generic information source.

In this way, the information would be available at the moment of need—not before or after.

There is also a lack of uniformity as to which section of the job specification fight metal framing shall be placed. In the east or the south, it is common practice to put it in Section 5 (light iron), while on the west coast it goes into Section 9 (lathing). Where the spec is placed has a profound influence on the work jurisdiction . . . and on who bids it.

Jurisdictionally, steel stud framing is the work of lathers and drywall carpenters. There was a time when these trades belonged to separate unions, and lathers installed steel studs which were to be clad with lath and plaster on one or both sides. With the affiliation of the lathers with the Brotherhood of Carpenters International, the installation of steel stud framing may now be done by both. The apprentice schools of both trades teach stud erections and typically produce craftsmen who usually obtain their light gauge welding certificates. Certified welders are required by many code jurisdictions to do the installation of load bearing studs, and in some cases non-loadbearing studs in exterior walls.

Building department requirements are not the same in various parts of the country. In some areas heavy reliance is placed on approved laboratory tests certifying performance of the materials based on predetermined criteria. In other areas the level of test sophistication is backwoods.

There is an immediate need to develop a higher level of technical expertise both within the industry and by building officials.

But the trend in recent years is a heavy accent on engineering-oriented building officials. It is not unreasonable to expect this emphasis on test data to gradually sweep the entire country in time.
Price Peddling

Some manufacturers sell their products on the basis of price alone. Others market by graphics and engineering support. Contractors, in self-defense, are going to need a broader understanding of design criteria of the materials they assemble into a building.

In those locales where there is little, if any manufacturer provided engineering support, architects tend to use “cop-out” requirements which necessitate that the metal framing subcontractor provides complete shop drawings supported with engineering calculations to cover the steel stud construction. For the large, fully integrated subcontracting firm this presents no problem. The average to small contractor, however, is inclined to walk away from potential work where this requirement exists.

Until the time comes when there are universally accepted standards for light gauge steel stud framing as there are for wood framing masonry and concrete, the subcontractor is going to have to fight the battles of this work, hopefully with the support of marketing oriented manufacturers. Maybe the day will come when building codes include sections on light gauge steel stud framing, and everyone will be more comfortable with how it should be done.

What makes a thorough knowledge of steel framing so important for the contractor are the consequences of this lack of standardization.

Trade promotion representatives are frustrated by the test data gaps for even some time honored assemblies. This may hardly be the time to pressure manufacturers into an expanded testing program because most of them are busy right now filling orders. But if the industry doesn’t look ahead for days to come in product development and more especially for performance substantiation of those products, a lot of doors may suddenly close.

Light metal framing components are products of the space age. They lend themselves to shop fabrication, to energy conservation and to a host of other economies. But they require a more enlightened contractor to promote them on the basis of technical know-how. They also require a labor leader with some vision to see beyond today’s full employment.

And there will be a tomorrow—with or without us.