LIGHTWEIGHT STEEL FRAMING: Uptrend For Building Construction

When it comes to low-rise construction, use of steel is definitely on the increase

Lightweight steel framing is headed toward significant penetration of the market for low-rise construction.

One important reason: where the steel studs and joists form the complete structural framework and bear the entire load, buildings as tall as four or more stories are now possible. Furthermore, the framing—lighter than structural steel, but just as durable—has a versatility which is giving it a huge potential.

Ceilings, floors, partitions, flat and pitched roofs, and all types of walls (interior, exterior, curtain, spandrel, fascia and fire)—virtually every building element, load bearing and non-bearing, enjoys its benefits.

In addition, a wide variety of buildings are able to use the modern, high strength technique. Exemplifying that fact is this list of a few of the hundreds of structures which have already adopted light steel framing:


Still in Infancy

Although load bearing usage is still in its initial stages, with the inherent attributes that the method offers in low-rise construction, industry spokesmen expect this area to burgeon as new construction starts make a comeback. It has almost tailored advantages for the owner, architect and contractor.

• In a systematized approach to a building, lightweight steel framing is said to be competitive with any other framing method. The technique often provides significant in-place cost savings. Economies of no-waste materials and in construction time, insurance, building weight and other key factors give the system a considerable edge.

• A light steel-framed commercial or institutional building weighs significantly less than a masonry structure, economizing on foundation, footings and reinforcing.

• In most cases, the speed of erection and the earlier occupancy which results offer sufficient savings alone to warrant its use. With prefabrication and panelization, the steel framing is installed in large completed sections rather than stick by stick, greatly reducing enclosure time.

• Its non-combustible rating offers substantial and continuing fire

(Continued on Page 26)
STEEL FRAMING: (Continued from Page 24)

and insurance savings.

Who makes cold rolled steel structural framing? U.S. and Canadian producers include (partial list): Alabama Metal Industries, Birmingham; Angeles Metal Systems, Los Angeles; Bostwick Steel Lath, Niles, O.; Chicago Metallic, Chicago; Construction Metal Products, Chicago; Donn Products Ltd., Oakville, Ont.; Inryco (Milcor Div.), Milwaukee; Lightsteel-Gero Ltd., Montreal; Kaiser Steel, Oakland, Cal.; Keene, Vienna, W. Va.; Prior Coated Metals, Norristown, Pa.; Roll Forming Corp., Shelbyville, Ky.; Steelumber, Los Angeles; Wheeling Corrugating Div., Wheeling-Pittsburgh Steel Corp., Wheeling W. Va. The framing is sold either directly from the manufacturer or through distributors and building supply dealers.

Broad Assortment

The manufacturers produce the basic, uniform components of the steel framing system in a broad assortment of depths, lengths and thicknesses. There are steel floor joists and a variety of steel stud types to meet every wall condition, with individual members and their dimensions varying with the different producers.

The drywall stud is used for non-load-bearing interior partitions that have facings of wallboard or wood paneling. Another type is employed for nonbearing partitions faced with lath and plaster. There is a structural steel stud which finds its niche in both interior and exterior load-carrying walls, and in exterior curtain walls that have cementitious facings over metal lath.

The wide flange steel stud is used for a great variety of interior and exterior load-bearing and non-bearing walls. It’s a modification of the structural stud (same widths and lengths) with the flanges increased from .1” to 1-3/8” or 1-5/8”, to provide ample bearing and attachment area for butt joints of any sheet material.

The “C” stud has one of the highest load capacity-to-weight ratios of any building product, It is capable of providing the entire structural support for buildings up to four stories high. Its increased allowable loads and span lengths equal those which could be attained previously only by using double studs or hot rolled members of comparable depth.

A nailable stud has two rolled channel sections welded back to back, with nailing groove for attachment of collateral materials. It’s used in load-bearing walls where loads or accumulated loads are large.

The steel floor joist is a “C”-shaped section that can accommodate wood sub-flooring or concrete slab poured over a permanent steel form. A nailable joist has a rolled channel section and two angles welded to form an “I” section.

Includes Accessories

Besides these major components, the system includes compatible accessories: tracks (for stud attachment to floor or ceiling, sill and fascia, and for joint end closure); hangers; bridging; strapping, channels, angles, clips and screws.

All components are either prime painted or galvanized for corrosion resistance, engineered in sizes and configurations to provide design flexibility for the architect and, for the contractor, a structural frame to which surface materials can be nailed and/or screwed. Wider spacings, longer spans and greater heights are made possible through steel’s strength. Pre-punched openings in the studs speed installation of plumbing and electricals by permitting passage of horizontal runs of piping and wiring without cutting chases.

The system allows for almost unlimited surface treatments. Interiors can be drywall, plaster over metal or gypsum lath, ceramic tile, wood or steel paneling. For exteriors, the system is compatible (Continued on Page 63)
with cementitious membranes—textured stucco and exposed aggregate—and with such sheet materials as metal panels, textured plywood and brick or stone veneer. By facing steel stud walls with Portland cement over metal lath, the look of precast concrete can be achieved, at lower cost and in less than half the weight.

As a result of all these features, in the low-rise construction market the concept is being utilized for banks, hospitals, libraries, medical clinics, nursing homes, schools, shopping centers, other retail stores and small office buildings.

Beyond its vast potential . . . beyond its practical, quick-erection economics . . . perhaps the best way to appreciate its opportunities is to briefly review the installation procedures.

The operation starts, usually at the job site, as steel studs and joists are placed at convenient working height in an assembly fixture, which holds them in proper spacing and alignment. (Members are usually furnished already cut to required lengths to save field cutting.) For extra strength and rigidity, the components are then welded together to complete wall or floor sectional assemblies prior to erection.

Early Start

When there is insufficient space at the site, prefabrication is performed at the framing contractor’s shop. Work can start before the site is ready for the erection crews and can proceed in any kind of weather. Finished assemblies are delivered to the project when the foundations and ground floor slabs are completed.

Carrying the idea a step further, exterior walls frequently are panelized with sheathing or exterior facing materials pre-applied to the framing assemblies. Thus, a contractor can both frame and enclose the structure in one operation. Another important feature: the same framing system carries the inside wall surface as well as the outside.

As construction proceeds, prefabricated assemblies are placed onto each floor by hand crane, fork lift trucks or other hoisting equipment. Assemblies are complete, with all required accessories (bridging, diagonal wind bracing) in place and with door and window openings properly framed out.

The framing for a wall section in the required length is positioned, plumbed and attached as a unit, using either welding or screw attachments. Erection of steel on steel, before floors are poured, can save time by avoiding the delays occasioned in waiting for concrete pouring and curing. Once the structural frame is in position, if it hasn’t been pre-panelized it can be swiftly closed in, allowing inside work to proceed regardless of season or weather.

Steel-framed walls are often thinner than other types, permitting additional usable floor space. The wall cavity accommodates vapor barriers, insulation and mechanical services. When steel studs are used to frame interior walls, they are installed into steel channels at floor and ceiling and plumbed vertically. Wallboard is then put up with power-driven screws.

A variety of options are available for roof construction. Pitched roofs can employ steel framing as construction supports. For flat roofs, steel joists may be used with plywood sheathing and built-up roofing, or with ribbed decking and concrete fill. Long span steel roof decking is another alternative, with rigid insulation board and built-up materials or with concrete fill.

Whether for a building element or an entire low-rise structure, the durable, lightweight framing system—whose members won’t warp or swell—is engineered for optimum performance. Its growing use is proving that it provides the versatility, economy and installation efficiencies so vital in construction today.