Single Installation: Steel's Advantage

Old, Traditional Procedures Giving Way To Newer, More Economical Systems

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Steel stud construction as load bearing framing is more frequently being specified to provide support for buildings up to four stories high. The economy of this method of framing is based on accomplishing two procedures in one operation.

In a building constructed by conventional methods, the steel or concrete frame is erected as the first step. Then exterior wall back-up (frequently steel stud or concrete block) must be installed to furnish support and attachment for facings.

In contrast, load bearing steel stud framing provides both structural frame and facings back-up in a single installation procedure. This results in savings of materials, time and money. Faced with increasing need to reduce cost and construction time, builders are abandoning the old traditional procedures for more economical systems. Load bearing steel stud framing is becoming a popular system for low-rise residential, commercial and institutional building in many areas of the country today.

Although most frequently specified where non-combustible framing is desired or is required by code, it has also proven competitive with wood framing. Many motel, apartment and condominium projects have been framed in steel (even though combustible framing was permissible) because of improved quality, increased speed and reduced insurance costs.

Steel stud framed structures contain relatively thin walls, maximizing useable floor space within the building. Normally 3-5/a", 4" or 6" in size, each stud performs as a column with an axial capacity up to 8,000 lbs. depending on size and gage. In addition to carrying the axial loads from the floors or roof above, the studs also resist wind loads.

As stud framing is erected, it becomes both structure and attachment surface for interior and exterior finishing materials. Although the procedure is similar to erecting a wood framed building, installation of this high strength, non-combustible construction system might be described as erecting one-story buildings on top of each other. Facings attachment, and mechanical and utilities work begin immediately after the framing erectors complete each floor and move on to the next.

Steel stud construction makes maximum use of the inherent qualities and structural capabilities of a building product. It reduces cost through (1) speed of construction, by providing both primary and secondary framing, (2) reducing the number of trades required on the job, and (3) simplifying construction scheduling.

Construction Procedure

To achieve maximum benefits, load bearing steel stud wall framing must be prefabricated into panels in advance of erecting. Prefabrication permits more efficient use of labor and speeds construction after erection begins. Both the contractor and the owner benefit.

Panels are fabricated in a jig or fixture, either at the site or in the contractor's shop. The height of a panel is dictated by the floor-to-floor dimensions of the building. Panel length is determined by the layout and handling capability of the contractor. Because the cost in

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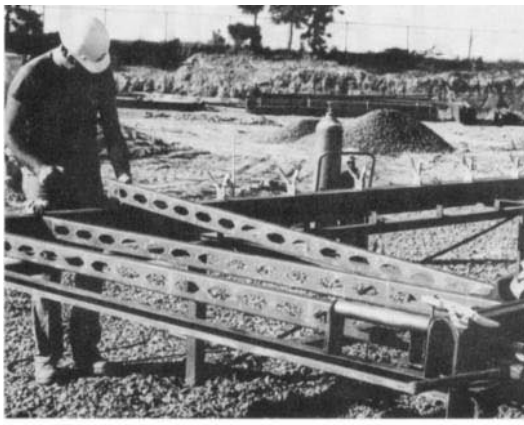
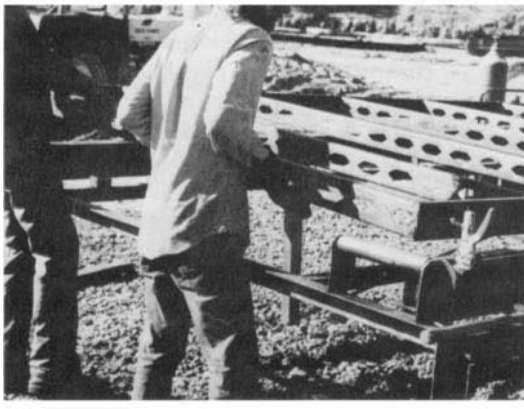


A typical fixture includes locators to properly position each stud in the panel.



Rollers at one end of the fixture permit easy removal of the completed panel by two men.

Each panel (above) is plumbed and temporarily braced. Below, the floor of roof framing is set on the load bearing stud frame wall.

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labor hours to erect a large panel is nearly the same as that required for a small panel, a length of 20 to 30 feet is desirable.

The fixture for fabrication contains the following:

1. A working surface elevation of about 30".
2. Locators for each stud at both top and bottom of the panel, which can be adjusted to accommodate a variety of panel types.
3. Provision for adjusting the distance between top and bottom tracks. It is absolutely necessary that studs be "seated" in both tracks to permit full bearing. A stud end which is not in contact with the track will not carry the axial load intended.
4. A method for removing panels after fabrication is completed. Rollers at one end of the fixture permit easy removal of large panels by two men.

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More sophisticated set-ups may include hydraulic or hoisting apparatus to handle the completed panels. The cost of a complete set-up will vary depending on the individual contractor's needs.

Easily Handled

Since complete framing weighs only one to one and a half pounds per square foot without facing, it can be handled with relative ease. Panels are transported to the building on a fork truck or trailer. All that is normally needed for erecting is a light duty hoist and crew of four men.

Each panel is easily positioned at a pre-marked location. After anchoring the bottom track, the panel is plumbed and temporarily braced. It's important that the bottom track be set on a level surface which provides full bearing for each stud. Irregularities in concrete elevation are corrected by grouting or setting steel shims below the panels at each stud location.

After wall panels are erected, plumbed, and temporarily braced, floor or roof framing is set. The type of framing is determined by span and loading requirements. Frequently, "C" shaped joists are specified for spans up to 20 feet. These joists are also prefabricated into panels so that erecting time on the building can be substantially reduced.

A light-weight, continuous ribbed steel decking is weld or screw attached to the joists. However, decking should not be placed below bearing walls, except when provision for load transfer has been provided.

After floor framing and decking have been completed, upper level wall framing is erected. In most cases, the studs are positioned directly over floor framing members. The entire building is completed, steel on steel, with concrete pumped onto floor decking later. This procedure requires advance planning and good field control to assure that upper level loads will be transferred directly through the floor system.

Occasionally, the building design or contractor's schedule may require that concrete be placed on upper level floors in advance of setting wall framing. Although desirable on some projects, this procedure requires additional construction time.

Because of steel's many advantages, there has been an increase in the use of the system for all types of low-rise construction. The outcome is an unlimited growth opportunity for contractors involved in steel stud construction. Results to-date support the contention that large scale use of steel framing in load bearing applications will be well established by the end of the 1970's.