Models and actual exteriors of three hospitals and a doctors' group building, all of which utilize lightweight steel framing, are illustrated here. From left are: Erie County Medical Center, Buffalo; Northwest Medical Arts Bldg., Arlington, Ill.; Eastwood General Hospital, El Paso, Texas; and the Duke Hospital North, Durham, N.C.

Medical Buildings Going to Steel

Its pulse of construction activity is steady. The vital signs are there, in new starts and completed buildings. And the prognosis for more medical structures is excellent.

That’s one way of reporting the current status and future prospects for light-weight steel framing in the construction of health care facilities—hospitals, clinics, nursing/retirement homes and doctor/dentist group offices.

The facts show an increasing number of medical-type projects using steel studs and joists. Low-rise units employ them to carry the entire structural load. In high-rise, they’re specified as framing for curtain walls.

Typical is the Ingham County Medical Care Facility, a 204-patient, $5.3 million nursing/retirement home in Okemos, Mich. Designed by the architectural firm of Stein, Hinkle, Dawe & Associates, and now under construction, it will encompass 100,000 square feet. Single-story, to make it easier for the residents to circulate between the administrative center core and nursing cores at each end, there are four patient wings off each nursing core.

According to architect Russell Hinkle, the load-bearing, light-weight steel framing system was chosen for reasons that are highly pertinent to the needs of medical structures. For example, Michigan (and most other states) has code requirements that call for non-combustible framing in hospitals and nursing homes, primarily because patients are often elderly and can be immobile. The steel members, in combination with proper facing materials, attain one- and two-hour tire ratings for load-bearing walls, and can go up to four-hour ratings in non-load-bearing applications.

Costs Less

Beyond the mandatory factor, the Lansing architectural firm recognized that for the type of construction it envisaged—brick exterior and wallboard interior—the in-place erection costs of a steel-framed structure are frequently 20 percent less than those of a similar concrete block wall building.

The architects opted for the steel framing for another and growingly-important reason. If offers the opportunity for substantial reduction in heating and cooling costs, due to the system’s inherent insulation possibilities. From exterior inward, wall construction of the Ingham County facility consists of 4” brick, 1/2” air space, 5/8” gypsum sheathing, 3-5/8” steel studs embodying 3-1/2” of fiberglass insulation. The total thickness of 9%” compares favorably with a typical concrete wall thickness of approximately 14”, with the components of the concrete wall allowing about double the loss of heat or conditioned air. Moreover, the space savings realized by the thinner walls of the long-term geriatric facility provided several hundred extra square feet of usable interior floor space.

The framing contractor was able to prefabricate the steel studs into 12’ high x 24’ long wall panels in a shop. Twenty-two such panels, the number needed for each wing of the building, were delivered to the site and erected each day.

A similar-purpose facility, the Anthony House, a 240-bed, $3.3 million nursing home now being built in St. Louis, is using the steel framing for its two-story, 54,000-square-foot patient wings and one-story, 30,000-square-foot center core. The new structure is an addi-

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Whether in Low-Rise or in High-Rise, steel studs and joists are finding increased use for a variety of reasons

This interior shot of the Northwest Medical Arts Building, Arlington, Ill., shows some of the design opportunities available with light steel framing systems, steel lath and cementitious facing. In this doctors' offices structure, the dramatic atrium is capped by a sloping skylight to create an attractive, pleasant atmosphere for patients.

These steel stud-and-track wall sections were used in the 50,000-square-foot Ellen Memorial Health Care Center, a $1.5 million nursing home in Honesdale, Pa. The project designer, Swendson Engineering, estimates that use of this framing rather than block construction resulted in a 25 percent savings on framing costs. Its success led Swendson and the contractor, Dorsan, Inc., to collaborate on a duplicate building, the Carpenter Care Center in Tunkhannock, Pa.
tion to the St. Anthony Medical Center campus, which already encompasses a 330-bed hospital, 80-bed alcoholic treatment facility and medical office building.

Architect William McMahon selected the steel members after an analysis of cost differentials between this system, masonry walls and hot rolled structural steel. He reasoned that even with a structural steel frame, studs would still be required for wall erection. By specifying heavier cold-formed steel studs, he obtained a load-bearing frame and, significantly, saved his client a total of $80,000 in construction of the framing system alone, besides gaining insulated walls and a two-hour fire rating. Exterior wall is white, split-faced concrete block with deep ribbing.

The Anthony House is slated to be using the most sophisticated life-support systems and the additional utilities required—oxygen, suction, extra water, electronics wiring in some patient rooms—will be accommodated without detracting from room floor space by installing the wiring and piping through pre-punched holes in the steel studs.

A big new project scheduled to use the lightweight framing for curtain walls is the $50 million, 616-bed Duke Hospital North, part of the Duke University Medical Center in Durham, N.C. The 750,000-square-foot, interstitial-type structure will include three triangular bed towers—eight, nine and ten floors high and 12' in height from floor to floor—and a five-story support facility, with each story 24' high from floor to floor.

The building will utilize poured-in-place concrete as the structural frame, with a lightweight steel-framed curtain wall designed to withstand wind velocities up to 68 pounds per square foot. To do this job, 4" steel studs of three different thicknesses (from .048" to .075") will be spaced from 8" to 16" on centers, depending upon wind pressure.

A unique wall fabricating and facing operation is being planned by the exterior framing contractor, R. B. Brunemann & Sons, Cincinnati, to make the 3,000 panels that will be required to enclose the building. Each panel will be fabricated on a specially-developed jig that is hydraulically-controlled and mounted on a 40-foot trailer to accommodate both in-plant and job site work. After welding all framing members into an individual wall panel unit, the jig will automatically eject it, to eliminate the need for hoisting equipment.

Fasten Sheathing

Metal lath and gypsum sheathing will then be fastened to the steel studs. In another innovative technique, the partially-faced panels will be completed in a newly-designed, 130-foot-long machine where the exterior finish, a modified concrete, will be automatically applied. The panels are then to be stored until the site is ready for the final stage of curtain wall erection.

A totally-different application of the framing is an integral part of the interstitial system being installed in half the area of the new Erie County Medical Center, Buffalo. This 852-bed, $130 million hospital will encompass 1.2 million square feet and is scheduled for completion shortly.

Designed in a collaboration between Foit, Maharan, Sloan & Schneider, Buffalo architects, and Syracuse Tank & Mfg., the concept involves 5-1/2" steel joists spaced on 4' centers. Placed transversely over the joists are steel deck members on 5-1/2" centers, which form the walking area and will support a load of 55 pounds per square foot. Sound is absorbed by a neoprene pad between the joists and deck. The joists that support the deck also hold the ceiling below by means of T-sections suspended from hanger wires.

Because the system's only permanent components are the joist-
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supporting saddles welded to the building's trusses, sections of the deck/ceiling are removable, creating 55-foot by 10-foot openings through which large pieces of equipment can be installed. The slit deck also meets fire underwriter and local codes requiring that an interstitial platform must have at least 50 percent free air.

One of the many already-completed framing projects is the Northwest Medical Arts Building, Arlington Heights, Ill., which provides quarters for more than 50 doctors, together with major support facilities. Designed by Harry Weese & Associates, Chicago architects, the four-story building uses a curtain wall system of 8-1/2" high by 17' long steel-framed panels.

The free-standing units, unsupported by floors, are attached by welds to steel plates embedded in the concrete slab. Weighing 50 percent less than typical precast concrete systems, the panels enabled substantial cost savings through a reduction in foundation and structural requirements.

Design Flexibility
This particular structure hints at the wide scope of design possibilities offered with steel stud systems and cementitious facing. In the building's interior, the major element is a landscaped atrium—where white cement plaster walls contrast with red paving brick—highlighted by graceful wall curves and capped by a sloping skylight.

In the 202-bed Eastwood General Hospital, El Paso, Texas, a unique exterior design feature is an "eyebrow" that extends out to accent horizontal lines of the four-story building. Walls are constructed of load-bearing steel studs, to which other studs were fastened in shaping the "eyebrow."

The three-building Washington Square retirement complex in Hinsdale, Ill., also utilized prefabricated steel studs. While construction had been scheduled to cover 12 months, actual time was eight months, due primarily to the fast erection possible with the framing system.

The cavity created by steel framing allows for continuous insulation of the walls. It was an important consideration to the Bella Vista, Arkansas nursing home, where state law requires this type of building to be heated at higher than normal residential temperatures.

It's even a fact that the trend is being exported. Small modular steel-framed buildings, designed for use as field hospitals and clinics, have been shipped to the Mideast and Alaska where they serve oil field and pipeline workers.

Thus, whether it serves purposes of architectural design . . . enhances building functions . . . or simplifies and shortens erection procedures . . . lightweight steel framing is capturing an increasing share of the health care facilities market.