

Multi-Story Residential Structures in Steel

University of Medicine and Dentistry of New Jersey, Newark, NJ

When officials at the University of Medicine and Dentistry of New Jersey (UMDNJ) in Newark developed a plan to add a new 9-story student residence on top of a 5-story expansion of an existing parking structure, speed of construction was critical. "We wanted to get the building up in less than two years, which is not easy to do," says Terry Pollin, UMDNJ's assistant VP of operations.

UMDNJ contracted with developer Devco, New Brunswick, NJ, which in turn negotiated a design-build contract with Joseph Jingoli & Son, Lawrenceville, NJ. With time of the essence, the team selected a structural steel framing system for the student residence portion of the project because of its rapid construction capabilities. "We knew we could get the project built within that two-year timeframe by using steel," says Pollin.

The project, which began in October 2004, beat the university's deadline, with completion of the project in August 2006, in time for the new school year.

The team also wanted to maximize the number of units in the residence, while maintaining 10-ft floor-to-floor heights and 9-ft ceiling heights. The use of the Girder-Slab composite steel and precast hollow-core slab structural system enabled the team to:

- Speed construction
- Maximize the number of units
- Maintain 9-ft ceiling heights
- Complete erection in cold weather

Girder-Slab. Developed specifically for use on multi-story residential construction, the Girder-Slab system is a patented, but non-proprietary, system comprised of an interior girder known as an open-web dissymmetric beam, or D-Beam, which supports precast, prestressed hollow-core slabs on its bottom flange. Upon grouting, the system develops composite action, enabling it to support residential live loads. In the UMDNJ project, because the residential structure contains no shear walls other than the stairwells, structural engineering firm Timothy Haahs & Associates, Blue Bell, Pa., designed an external brace-frame system to reduce sway.

Speed of construction. With both the structural steel and 10-in. hollow-core slabs fabricated off-site and transported to the jobsite, the composite system was erected quickly on-site. Erection of the structure began in September 2005 and was completed in 80 days. Furthering the pace of construction, a precast brick and granite panel cladding system was easily hung from the steel frame. "We're very happy with the structural system," says UMDNJ's Pollin. "We would absolutely use it on another project."

Maximize units and maintain ceiling heights. The Girder-Slab D-Beams were used as interior girders, with the webs and top flanges of the beams concealed within the plane of the slab, permitting the 10-ft floor-to-floor heights and 9-ft ceilings. A popcorn ceiling finish was



Photo: Kitchen and Associates

applied to the underside of the slabs. In all, the residence contains 232 units. "It's a good system," says Noli C. Alarcon, VP of engineering for Timothy Haahs. "We were able to make straight, 8-ft-wide corridors without soffits. It's interesting that we were able to achieve this without so much depth requirement. I don't know any other system that can do this."

The Girder-Slab system was a good fit for the project, says Fred Warner, former manager for construction services for architectural firm Kitchen & Associates, Collingswood, NJ. "It was the most cost-efficient system and it met our requirements for ceiling heights, which really opened up the spaces and made them seem larger."

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– Terry Pollin

Assistant VP of Operations
University of Medicine and Dentistry of New Jersey

Location: Newark, NJ

Client: University of Medicine and Dentistry of New Jersey

Completion date: August 2006

Number of buildings: 1

Number of stories: 9

Total square feet: 246,645

Number of units: 232

Architect: Kitchen and Associates

Structural engineer: Timothy Haas & Associates, Inc.

Construction manager: Joseph Jingoli & Sons, Inc.

Fabricator: Berlin Steel

Detailer: Berlin Steel

FILE UNDER: Dormitories

HIGHLIGHTS:

- Speed of completion
- Low floor-to-floor heights
- Cost effective

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