



NEW MILLENNIUM
BUILDING SYSTEMS
Building a better steel experience.



DESIGN IDEAS

February, 2017

A Healthy Dose of Composite Flooring

A major renovation of White Plains Hospital, a 123-year-old healthcare facility 25 miles north of Manhattan, took a fresh look at building design — floor by floor. The plans featured two floor systems, each alternating with the next, to answer the unique design objectives of the project — objectives that were structural, functional, and cost accountable.



Photo Credit: W&W Glass, LLC

Healthcare facilities present some of the most complex structural and architectural design challenges specific to patient care. White Plains Hospital underwent a campus-wide transformation, which included the construction of a six-story, 70,000 square-foot addition. The plans for the expanded cancer center called for different composite flooring systems on alternating floors to address specific needs of the all-new office/patient room floors and state-of-the-art operating room floors.

The operating room floors at Levels 3, 5, and 7 were comprised of steel girder and filler beams covered with standard composite floor deck topped with 5-1/4 inch regular weight concrete.

Then a Versa-Floor™ system consisting of 7.5 Deep-Dek® Composite topped with 5-3/8 inch concrete was used for the alternating office and patient room floors.

Because the Versa-Floor™ Deep-Dek® Composite system eliminated filler beams, it created an uninterrupted ceiling plane across the operating room floors. This helped maximize space planning in the likelihood of adding new or improved medical equipment. By alternating the standard composite slab system with the Deep-Dek® Composite system, a unique set of cost, performance, and space planning challenges was addressed.

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Wide, Open Floors

Vitaliy Degtyarev, PE, Design and Research Engineer for New Millennium, said, "The hospital wanted wide, open floors designed to accommodate unique serviceability requirements. Thirty-three-foot spans between beams, combined with overhangs as long as 14-feet, provided a unique design challenge. The composite slab approach also supported operating room equipment and an outboard curtain wall system, so controlling deflection was a critical function of the composite slab design."

The 14-foot cantilever was pointed toward the existing hospital. Setting the columns that far away helped minimize the disruption that foundation work would have on on-going hospital operations.

Vibration Analysis

GACE's Shira Kinzbrunner, the lead designer with the structural engineering firm consulting on the project, said, "Limiting deflection and controlling vibration were a challenge. We worked closely with New Millennium's engineers to resolve the vibration performance. It was an iterative process in which we identified problematic areas and selected the best upgrade with the least cost impact."

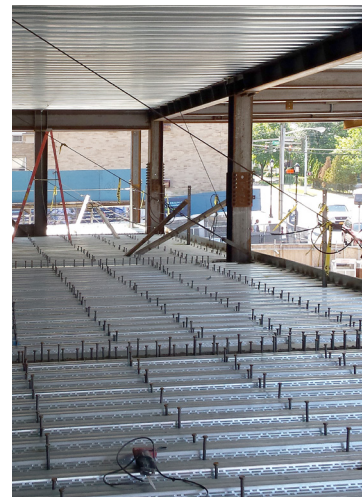
Additional Requirements

Electrical conduit was also placed over the deck prior to the concrete pour. Glass curtain-wall mullions generating 3,500-pound wind reactions, along with the wall's self-weight, were transferred to the slab's edge. The Deep-Dek® Composite solution resolved all of these issues, plus fire-resistance.

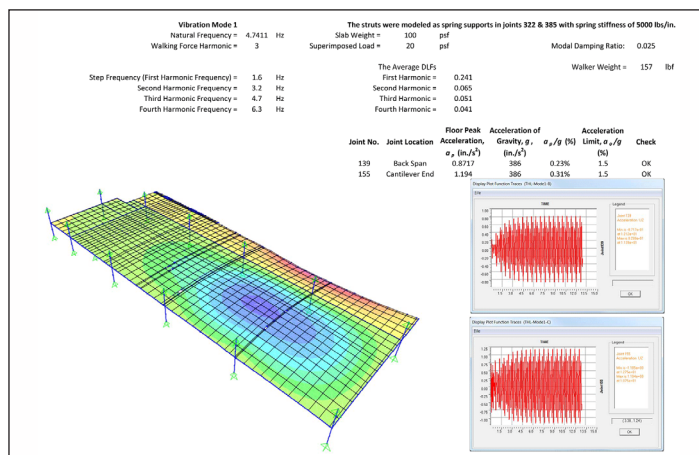
Alternating the flooring systems to meet the specific needs of each story demonstrates the versatility of New Millennium's product offerings as well as the early-stage collaboration that together help solve complex performance, cost, and space planning challenges. At the conclusion of this project, White Plains Hospital was named as one of Soliant Health's 20 Most Beautiful Hospitals in the U.S. in 2016.*



A 13-inch deep Versa-Floor™ Deep-Dek® Composite system addressed strength, openness, and vibration control challenges.



Two floor systems at work: A standard composite floor system supports operating room floors, while the floor above employs a Deep-Dek® Composite system whose underside created an uninterrupted ceiling plane above the operating rooms.



Iterative vibration studies helped uncover areas that needed reinforcement so that sensitive medical equipment and medical procedures would not be affected.



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