SSM ST. CLARE HEALTH CENTER: STRUCTURAL REDESIGN WITH REINFORCED
CONCRETE FLAT SLAB CONSTRUCTION CONSIDERING COST AND SCHEDULING
IMPLICATIONS

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SPRING 2015

A thesis
submitted in partial fulfillment
of the requirements
for baccalaureate degrees
in Architectural Engineering
with honors in Architectural Engineering

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Abstract

An alternative reinforced concrete structure was proposed and designed for SSM St. Clare Health Center’s new hospital facility in Fenton, Missouri. The original composite steel structure, with a lateral system consisting of special moment frames, special concentrically braced frames, and perforated special reinforced concrete shear walls, was altered to a flat slab and drop panel construction, with a lateral system of unperforated special reinforced concrete shear walls. An analysis of resulting construction and schedule implications demonstrated the feasibility of a flat slab to reduce cost and accelerate the construction timeline. The proposed structure was designated as government use and the site was redesigned to meet UFC Minimum Antiterrorism Standards for Buildings. A single degree of freedom blast load analysis verified the effectiveness of the redesigned landscape.
General Information

- Full Height: 90 feet
- Number of Stories: 6
- Size: 427,000 square feet
- Cost: $223.5 million
- Date of Construction: Sept. 2006 – March 2009
- Project Delivery Method: Integrated “Lean” Project Delivery

Project Team

- Owner: SSM Health Care, St. Louis
- Owner’s Program Manager: Hammes Company
- Architect of Record: HGA Architects and Engineers
- Associate Architect: Mackey Mitchel Associates
- Structural Engineers: HGA Architects and Engineers
- MEP Engineers: KJWW Engineering
- Construction Manager: Alberici Construction

Architecture

The hospital program contains a wide variety of medical use spaces, including 158 emergency supported inpatient beds, diagnostic and surgical services, administrative offices, dietary facilities, and pharmaceutical dispensaries. The floor plans were developed using Lean process principles classically used in manufacturing facilities.

Structural Systems

- Framing: Steel framing, composite deck and lightweight concrete over composite wide flange members
- Foundation: Slab on grade, drilled concrete column piers connected by grade beams
- Lateral: Various systems including special moment frames (SMF), special concentrically braced frames (SCBF), special reinforced concrete shear walls (SRCSW), and ordinary concentrically braced frames (OCBF)

Mechanical Systems

Fan coil units in each patient room fed by central boiler and chiller system for heating and cooling. VAV dedicated outside air for ventilation.

Lighting and Electrical Systems

Electrical system supported by back up generators designed to power the entire hospital for at least 90 minutes. Lighting controls include ultrasonic ceiling sensors and infrared wall switch sensors for energy savings.

Construction

Noise control procedures were specified to mitigate problems with surrounding residents. Smoking was prohibited on the site to comply with hospital policies and avoid contaminating the patient rooms.

Photos compliments of HGA Architects and Engineers