



ArcelorMittal

steel design

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The economical benefits and effectiveness of using steel as a building material in institutional construction has long been recognized in North America and has now gained the attention of contractors in Saudi Arabia. A composite system (steel and concrete) was the choice over the conventional concrete construction method for slabs and beams. Steel plays a significant role in the design and construction for the fifteen storey, 16,258m² (175,000 sq. ft.) building.

Steel ComSlab system adds value to project in Saudi Arabia



The building is one of eight being built to accommodate nursing staff at the King Fahad Medical City. The structure, which includes a rooftop skylight, was originally designed in concrete, but after a value-added proposal was presented by Bailey Metal Products, ComSlab panels and cold formed steel sections replaced the conventional concrete system for slabs and beams. The vertical columns remained as reinforced concrete.

Aus Ahmad, Regional Technical Specialist at Bailey, explains that after a preliminary project study and full review of the building's original structural design, Bailey presented a detailed design introducing the ComSlab composite flooring system with cold formed steel beams as an alternative to reinforced concrete conventional slab and conventional beam forming. "We delivered a complete set of drawings for final review and approval and then, at the end of November 2009, received the order to proceed with the ComSlab flooring system to be used not only for this project, but for other KSA Ministry of Health future projects."

Bailey designed and built a mock-up at their Mississauga, Ontario location. "Our inside sales and production teams did a great job of making this difficult task happen smoothly. In less than three months, we produced and shipped a total of sixteen containers to the other side of the world," emphasizes Ahmad. "On May 11, 2010 the first floor slab was poured and it was a success." A Bailey crew was on-site to provide training and supervise the installation.

Commenting on the advantages of the ComSlab flooring system (utilizing cold formed steel sections) over conventional concrete slab, Aus Ahmad says, "In a conventional construction method the beams carrying the slab weight are usually formed out of plywood. Concrete is then poured and finally the temporary plywood form is removed. After finishing the beams, the same process is to be repeated for the slab.

The fire rating required by the Ministry of Health was one hour for this structure, but using the ComSlab Cold Formed Steel System, Bailey was able to submit a fire rating of up to 2 hours. The acoustical rating for the floors submitted by Bailey was STC57.



"In the new system, the beams are constructed out of several cold formed steel sections and inverted ComSlab deck, the slab and beams are poured in one single concrete pour. Forms of steel beams, inverted ComSlab deck stay in place permanently. Two steps are eliminated and, most importantly, material and time are saved."

ComSlab cold formed steel deck was used as the composite flooring system for all the levels. LSF sections (heavy gauge studs/tracks and special sections and clips) were used to form the concrete beams. Most of the bearing beams were formed out of ComSlab inverted deck. A number of non-load bearing studs were used in the beams where applicable.

The ComSlab panels consisted of .91mm and 1.22 mm (.036" and .048") galvanized steel with spans from 4.9m to 6.1m (16ft to 20 ft). The ComSlab floor deck used .91mm (.036") steel for 12,430.6m² (133,802 sq.ft.) and 1.22mm (.048") for the remaining 3,590.8m² (38,651 sq. ft.)





Summarizing the benefits gained in using steel for the project, Aus Ahmed says, "The cost savings is about 35-45% of the cost of reinforced rebar, concrete and shoring, in addition to the savings in labour and forming which I estimate to be approximately \$250,000 to \$350,000."

DESIGN AND CONSTRUCTION TEAM

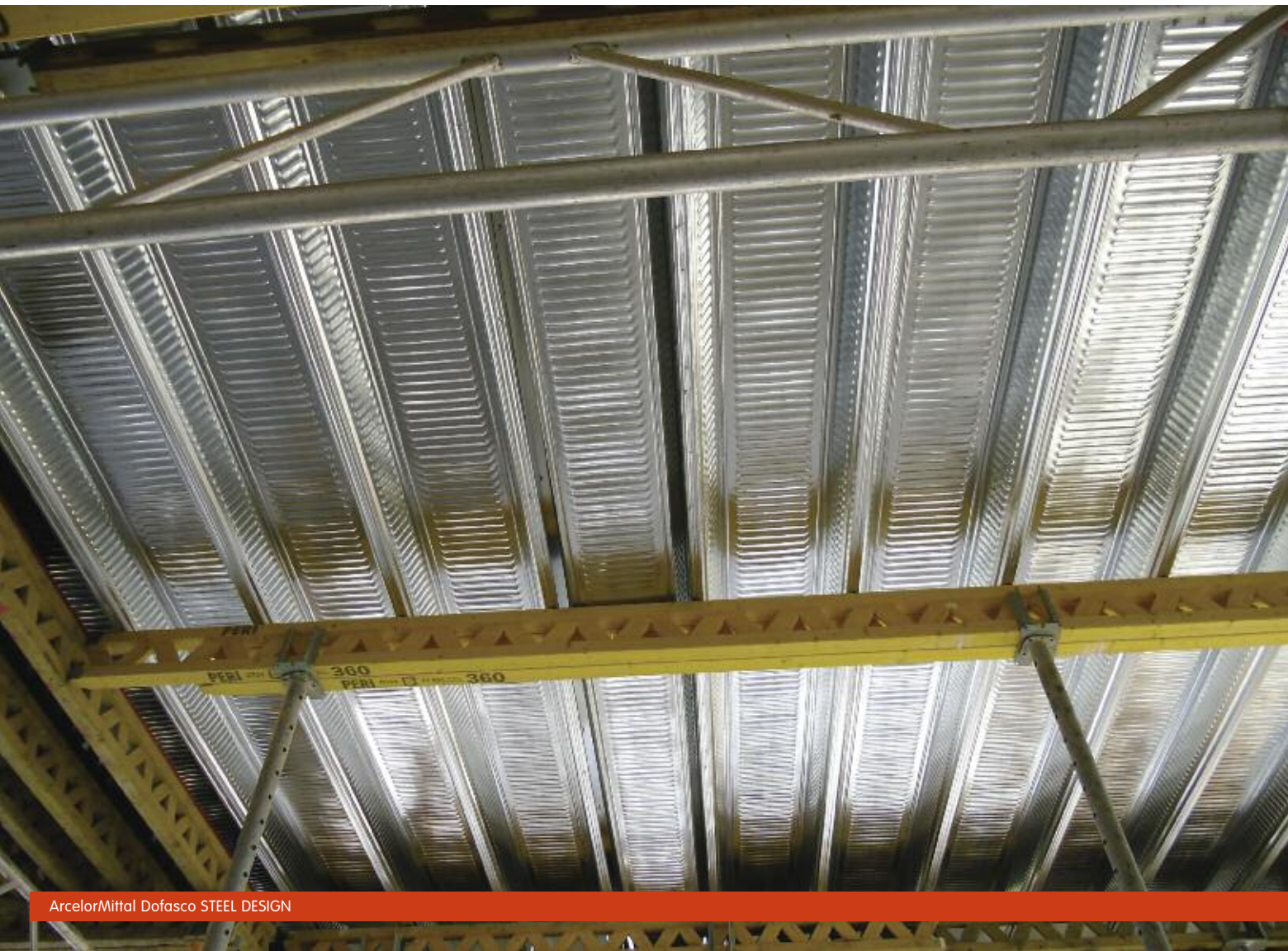
CLIENT: Kingdom of Saudi Arabia, Ministry of Health, King Fahad Medical City

GENERAL CONTRACTOR: Bin Dayel for Industrial and Contracting

ENGINEERING: Consulting Engineering Group – KSA

STEEL DECK & BEAM: ComSlab System by Bailey Metal Products Ltd. 1-800-668-2154

Converted ComSlab deck – bearing beams consisted of 3,352.8m (11,000 lin ft.) of 1.22mm (.048") steel. There were 54,000 lbs. (24.5 mt) of ComSlab accessories.





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