Fast Steel Cores

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Work is nearly complete on the tallest building in the UK to make use of Corefast—a new and faster method of constructing cores with steel.

CONSTRUCTION OF THE CORE OFTEN SETS THE PACE OF CONSTRUCTION FOR A STEEL-FRAMED BUILDING. What if you could erect a steel-based core up to six times faster than a typical reinforced concrete core? Corus's Corefast system can make it happen.

The Corefast system uses Corus's Bi-Steel panels to form the enclosure walls for stair and elevator shafts. Each Bi-Steel panel is made up of two steel plates spaced 200 mm (about 8 in.) apart, which are connected by a series of welded steel bars spaced at 300 mm (about 12 in.) centers. Once erected, the gap between the inner and outer plates is pumped full of concrete.

Corefast was developed using these panels to provide an extremely strong and durable structural core that is quick to erect and allows buildings to be constructed as complete steel structures. In addition, the walls of the core can be reduced in thickness by up to half of that of a concrete core of equivalent strength. (Interestingly, Bi-Steel panels were originally designed and used for industries where blast resistance was required.)

The all-steel core system also eliminates the challenges of concrete cores: aligning embedments and compensating for differential shortening. Each module is prefabricated and shipped to the site with all holes drilled—and nuts already in place—to ensure quick and efficient assembly.

The Birmingham 1 project, a residence hall for university students, is the tallest building so far to make use of Corefast in the UK. Located on a busy intersection of the A38 Bristol Road—the main route into Birmingham—the building will house more than 600 university students, as well as a luxury leisure suite and an internet cafe.

The focal point of this new development, constructed by Ocon Construction, is an

The Birmingham 1 project features an 18-story residential tower with a steel core.

Bi-Steel panels are fabricated off-site and assembled section-by-section to form a steel core. When all segments are erected, concrete is placed between the inner and outer steel plates.

Core panels for the Birmingham 1 project were fabricated to precisely accommodate the building's horizontal curve.

18-story glass- and zinc-clad tower with a core constructed with Corefast. The entire project uses 1,455 tons of steel.Construction began on-site in January 2006 and is scheduled to open this August, just in time for the new university term. Using Corefast to create the central core of the tower was recommended by Henry Smith, the steelwork contractor, as the steel system uses Corus's Bi-Steel panels and allows for very rapid core construction.

Using this system, Ocon was able to save six weeks on an 86-week construction program. Construction Director for Ocon Construction's Midlands Division Steve Dando says, "Although we are a fairly new company, we were not afraid to take on this innovative way of constructing building cores."

The first phase of constructing the core on-site involved the erection of ten, 15-m-high (49 ft) modules that created the first four floors. Each piece, weighing about 9 tons each, was delivered to the site, upended, lifted into position, then lowered onto starter bars from the foundation. As each module was put into place, it was bolted onto the previous module and ready for the next. Prefabricated stairs were lifted into the core along with other appropriate internal work being carried out during the erection process. Construction of the core for the first four stories of the tower was completed in just five days.

Business development manager of Corus Bi-Steel, Roger Fisher, comments, "Erecting the Corefast modules is just like putting together pieces of Meccano. It is a simple, flat pack that is delivered to the site and then pieced together."

Once the lower floors of the core were in place, the surrounding steelwork began, simply being bolted onto the panels of the core. Before being lifted into place, all of the handrails and safety barriers were attached on the ground to ensure health and safety risks were kept to a minimum. The modules of the core also provided a "built-in" edge protection and safety barrier.

When all of the steelwork was completed, the gap between the two plates of each module was then filled with concrete to allow the core to reach its full strength. After completion of the lower floors, the next ten Corefast modules, each weighing 4.5 to 5.5 tons, were lifted into place and bolted to the previous modules below, extending the building two stories at a time. The steel core was erected at a rate of one floor per day.

A total of 1,706 m^2 (18,360 sq. ft) of Bi-Steel panels were used to complete the core, which had to be carefully designed to splay at the correct angles to accommodate the architectural curve of the tower. The final Corefast section was installed late last year.

"Using Corefast maximizes off-site manufacture," says Gerard Kitching, managing director of Henry Smith. "It cuts down on site construction time, and more importantly it reduces health and safety risks involved with this sort of project, such as working at height." MSC

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