

ICD BROOKFIELD PLACE DUBAI

INTRODUCING THE WORLD'S LARGEST CAPACITY TOWER CRANE TO THE UAE

AT A GLANCE

CLIENT	MULTIPLEX AND SSANGYONG (MSS) JOINT VENTURE
PROJECT	ICD BROOKFIELD PLACE
LOCATION	DUBAI, UNITED ARAB EMIRATES
SECTOR	CONSTRUCTION
DATE	2017-2019
CRANES	1 X M2480D, 1 X M860DX

When the Multiplex and Ssangyong (MSS) joint venture partners were awarded the main contract to construct ICD Brookfield Place (ICDBP) in Dubai, they turned to Marr Contracting for a heavy lifting solution that would become a first for the world's 'crane capital'.

Designed by internationally renowned architects, Foster + Partners, the 282-metre, 54-storey skyscraper's unique design was challenging from a construction point-of-view. But with a history of working together on iconic projects in Australia for more than 30 years, Multiplex and Marr knew that the best solution required a different way of thinking about craneage for the UAE's construction sector.

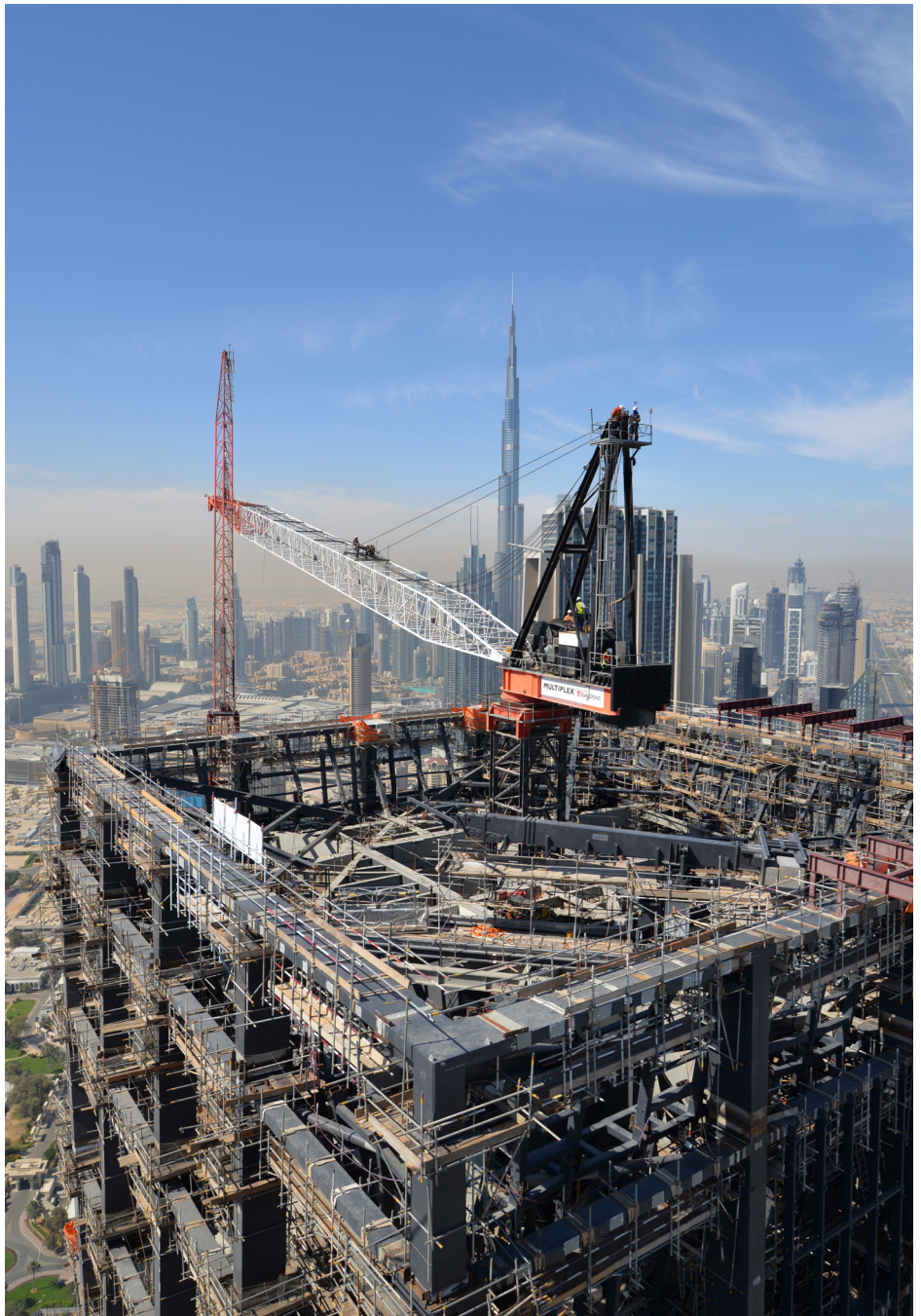
THE CHALLENGE

Located in the heart of Dubai's financial district, the project came with significant challenges including:

- A complex architectural design featuring complicated steel elements;
- The need for a craneage solution that could support MSS' construction methodology, which was based around heavy steel elements;
- A congested, landlocked site with restricted access and limited space; and
- An ambitious construction program.

Construction of the building's distinctive five-storey-high entrance atrium – consisting of five complex steel A-frame nodes weighing up to 85 tonnes – was critical to the construction program.

As the landlocked nature of the site meant that there was no space to employ crawler cranes for the installation of the A-frames nodes, the other 'traditional' approach would have been to build the structures in smaller pieces using locally available tower cranes. However, onsite fabrication of the nodes would have created increased safety risks, additional scope and temporary works that would have severely impacted the program. This meant that the ability to lift large, heavy steel components was critical to the construction schedule.





MARR'S SOLUTION

Multiplex engaged us early in the project and numerous iterations of crane models and sizes were considered during the extensive project planning stage. The original scheme proposed using four smaller M1280D cranes in four locations which would be relocated around the site to lift the structural elements in smaller pieces and weld in-situ.

After meeting with the construction team from Multiplex and their contracted structural steel fabrication supplier, Eversendai, Marr presented an alternative methodology using only two cranes that would be a first for Dubai's construction sector.

Marr's solution – using a bespoke 96-tonne capacity M860DX and 330-tonne capacity M2480D heavy lift luffer (HLL) – provided an integrated solution that took into account the heavy lifting requirements from the ground up to the highest point of the building 290-metres above street level.

The M2480D was used to drive construction at the lower levels and install heavy structural steel elements from two locations outside the building's footprint. This allowed each part of the A-Frame

to be welded in a controlled factory environment, delivered to the construction zone and lifted directly into place in a single lift.

In another first for Dubai's construction sector, Marr mobilised its unique three-beam climbing system which allowed the M860DX to be placed in the building's high-rise lift core. The M860DX supported the installation, relocation and removal of the M2480D and assisted the installation of steel sections at the top of the building. It also served as the high-speed heavy lift crane for the construction of the entire building, especially after the M2480D had been removed.

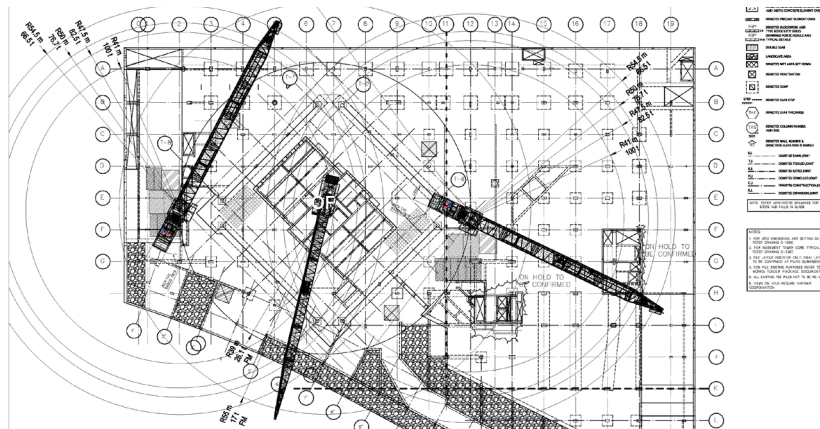
THE RESULT

ICD Brookfield Place was completed ahead of schedule. Marr's solution using fewer, larger capacity tower cranes delivered benefits to the project including:

- Improved safety – fewer lifts, without the need for detailed welding in-situ;
- Quality – detailed welding carried out in a controlled factory environment offered weld quality assurance;
- Reduced complexity - less cranes and lower lifting count, and a crane solution aligned to the construction methodology;
- Time - with the M2480D being set up in only two locations, the time required to set up and shift numerous smaller cranes was eliminated. Use of Marr's three-beam climbing system also allowed the climb cycle to be completed within 2-3 hours instead of 2-3 days using the traditional method of internal climbing;
- Productivity – operable in wind speeds of 20m/ second in high winds, our cranes delivered a 99.99% availability rating across the life of the project; and
- Cost – no requirement for expensive temporary works.



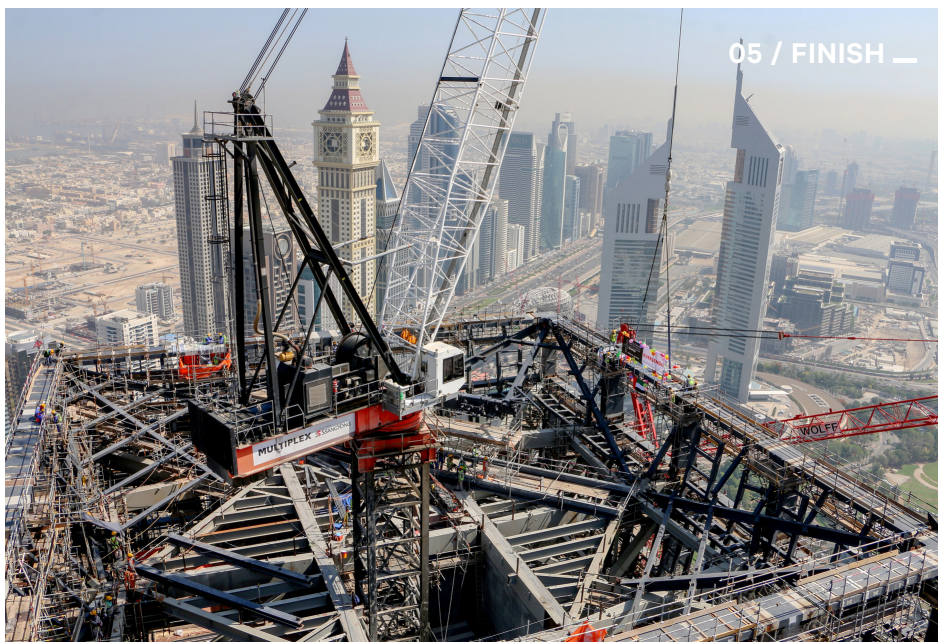
Located in Dubai's busy financial district, the ICD Brookfield Place site was landlocked and congested with limited space to use a hammerhead or crawler crane. Multiplex needed a crane solution that would support their planned construction methodology which was based around the heavy steel elements that featured in the building's unique architectural design.



After engaging Marr's team early at the project planning stage, Multiplex undertook an extensive engineering and design process which explored numerous iterations of crane models and sizes before deciding on the final solution using one of Marr's 330-tonne capacity M2480D heavy lift luffing tower cranes and a 96-tonne capacity M860DX installed in the building's lift core.



The M2480D was configured to 110-tonne capacity on a single line, with a 55-metre boom radius and 76-metre free stand height – allowing it to lift large sections of the building's A-Frame weighing up to 86T in a single lift.



Using Marr's unique three-beam climbing system, the M860DX was installed in the building's high-rise lift core where it was able to install, relocate and remove the M2480D. It also assisted the installation of steel sections at the top of the building and served as the high-speed heavy lifting crane after the M2480D was removed.



[THE CRANE] HAS DE-RISKED THE PROJECT A LOT. FOR EXAMPLE, IMPLEMENTING AN ELEMENT [SUCH AS THE NODES] PIECE-BY-PIECE WOULD INVOLVE A LOT OF TEMPORARY WORKS. THE MANUFACTURING OF THESE NODES COULD HAVE TAKEN WEEKS OR MONTHS [...] IF WE HAD TO DO THAT ON SITE, SO THE TIME BENEFIT IS [SIGNIFICANT]¹



¹Construction Week Middle East, November 2017