

HAY POINT

A CRANAGE SOLUTION BUILT OUT AT SEA

AT A GLANCE

CLIENT	MCCONNELL DOWELL GEOSEA JOINT VENTURE
PROJECT	HAY POINT COAL TERMINAL EXPANSION 3
LOCATION	QUEENSLAND, AUSTRALIA
SECTOR	MINING
DATE	2011 – 2015

CRANES	4 X M2480D, 1 X M1280D 1 X M40R
ENGINEERS	8
INSTALLATION CREW	4
MAINTENANCE CREW	2

When we say we love a challenge and no job is too big for us, we mean it. But installing six tower cranes over moving waters two kilometres out to sea in a cyclone-prone part of the Australian coast really put Marr's team to the test.

Located approximately 40 kilometres south of Mackay in Queensland, Australia, the Hay Point Coal Terminal (HPCT) is part of one of the largest coal export ports in the world – the Port of Hay Point.

Owned by BHP Billiton Mitsubishi Alliance (BMA) under lease from the Queensland State Government, the HPCT services the Bowen Basin coal mines in central Queensland via an integrated rail-port network.

In 2011, BMA made the decision to expand the HPCT through Stage 3 of the Hay Point Coal Terminal Expansion Project (HPX3) in order to support the company's growth strategy and meet the increased throughput capacity demands from approximately 44 million tonnes per annum (Mtpa) to 55 Mtpa. The AU\$2.5 billion project included vast earthworks, reclamation, new on- and offshore structures and mechanical system fit-outs.

After working with McConnell Dowell on a previous expansion project for Rio Tinto at Cape Lambert in Western Australia, McConnell Dowell contacted us to assist with the development of their crange strategy and overall construction methodology for the marine works and their project bid.

Subsequently BMA awarded the contract for the project's marine works to joint venture partners, McConnell Dowell and GeoSea JV (MDGS JV), and Marr Contracting was awarded a contract to supply five heavy lift tower cranes.

THE CHALLENGE

The brief for this project posed some exciting challenges that needed considered engineered solutions. Our engineering solutions needed to take into account:

- The location – the installation site was two kilometres off the coast, which posed the challenge of how to get the cranes out to sea;
- The installation – working in open seas presented construction and access issues, particularly in terms of safety for the crew;
- Lifting capacity – operational challenges associated with lifting on moving water;
- Wharf restrictions – the job required high capacity cranes, but the space to operate in was confined and the load capacity on temporary and permanent structures was limited; and
- Cyclone proofing – our design solution needed to be able to withstand cyclones and include a simple procedure to safeguard the cranes and the construction site when a cyclone warning was issued. The procedure needed to have as little impact as possible on the construction program, both pre and post a cyclone event.

We needed to design a complete new travelling system to fit on the existing narrow track system which accounted for the increased loadings generated by the narrow track.

OUR SOLUTION

The first step in developing a complete engineering process for the job was to design a new travel system that fitted onto the existing temporary and permanent rail system designs.

Starting from the top of the rail structure and working upwards, we designed and built a power travel bogie system that married up with a power travel cruciform base and allowed the cranes to work at full capacity at an eight metre rail width.

With the travel system designed, we looked at constructability of the entire system taking into account the fact that the cranes need to be constructed over water. We used 3D computer modeling to simulate construction of the cranes, identified areas of concern where there were access issues and engineered practical solutions to allow a safe installation environment.

We engaged directly with MDGS JV to get an understanding of their construction methodology and the roles our cranes would play in the delivery of the project. We understood the need for the cranes to lift heavy loads from floating vessels in open seas, and we needed to ensure that the cranes could meet the needs of the client. To overcome these challenges, we partnered with our crane manufacturer, Favelle Favco, to develop specific load charts in accordance with the offshore crane codes, prevailing sea state conditions and the client's requirements.

The first M2480D was installed on the Santa Fe jack up barge (JUB) owned by McConnell Dowell. The tiny M40R was also installed on the Santa Fe as a support crane to assist with the restocking of supplies. The M2480D on the Santa Fe was then used to install the initial piles for the first of the wharf traveling M2480Ds. The first wharf travelling M2480D was then used to install the second and third M2480D as wharf travelling cranes. A static M1280D was installed on a piled base to construct the Transfer Tower at the end of the new Trestle that was also being constructed from the land out to the new load out wharf structure.

THE RESULT

The end result was five individual design applications to meet the overall demands of building the new wharf structure. The construction of the project itself proved to be extremely difficult and the construction team faced never ending challenges in an extremely difficult environment. The crange solutions gave MDGS JV the ability to reduce the challenges associated with crange on the project and drive productivity.

During the life of the project the crange solution weathered the storm of at least three major cyclones without incident or lost time caused by damage to the cranes. And all the cranes were successfully installed and operated and removed with no LTIs.

The project was a game changer for us and definitely a project of a lifetime.

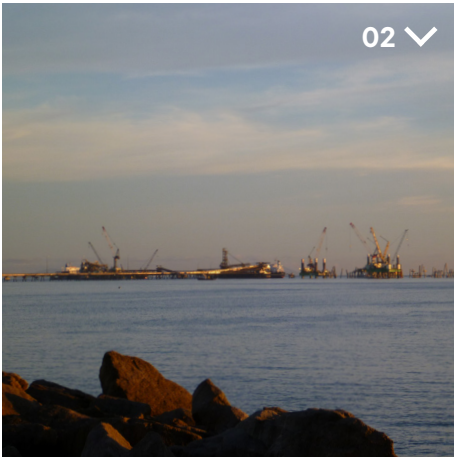


01 / START ✓



Located approximately 40 km south of Mackay in Queensland, Australia, the Hay Point Coal Terminal (HPCT) is part of one of the largest coal export ports in the world – the Port of Hay Point.

02 ✓



In 2011 the owners, BHP Billiton Mitsubishi Alliance (BMA), made the decision to expand the HPCT to meet the company's growth targets. The contract for marine works on the AU\$2.5 billion HPX3 Project was awarded to joint venture partners, McConnell Dowell and GeoSea.

03 ✓



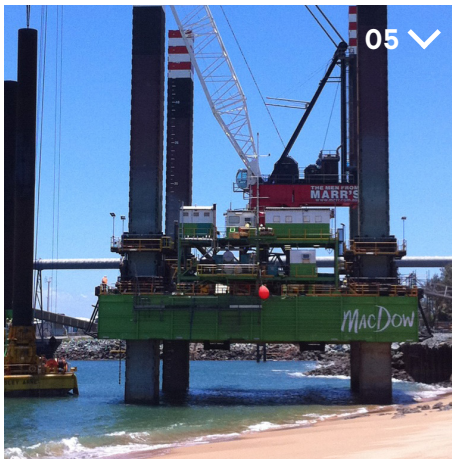
Marr was contracted by McDonnell Dowell to develop a complex crange system for building a cyclone-proof structure and ongoing support infrastructure in open waters 2km out to sea.

04 ✓



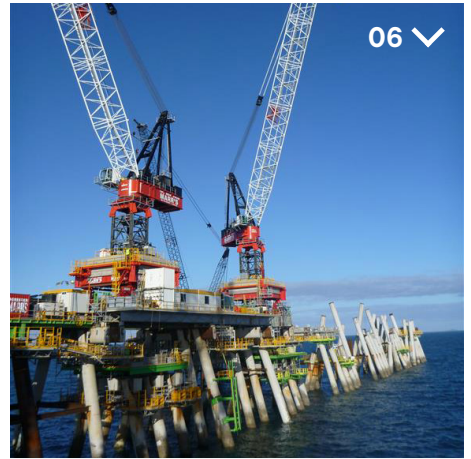
The first step in addressing the challenge of how to transport and build the tower cranes at sea was to design a complete travel system that fitted onto the existing temporary and permanent rail systems. We designed and built a power travel bogie system that married up with a power travel cruciform base and allowed the cranes to be loaded on top of it.

05 ✓



Using Sante Fe jack-up barges (JUB) as movable work platforms, we set up the first M2480D crane on the JUB and towed it from Mackay Harbour to the construction site to build the first of the M2480D travelling wharf cranes. The first M2480D wharf crane was subsequently used to install the second and third M2480D travelling wharf cranes.

06 ✓



The M2480D on the Santa Fe was also used to install the M1280D on an isolated piled base solution that was subsequently used to build the Transfer Station at the connection point between the new Trestle and the new Wharf Structure.

07 / FINISH —



The end result was five individual design applications to meet the overall demands of building the structure and ongoing support infrastructure. During the life of the project the crange solution has weathered the storm of at least three major cyclones without incident or lost time caused by damage to the cranes.