HEAT EXCHANGE VESSEL DECONSTRUCTION

AN INNOVATIVE CRANEAGE SOLUTION FOR A LEADING COPPER SMELTING PLANT

AT A GLANCE

CLIENT	UNDISCLOSED
PROJECT	HEAT EXCHANGE VESSEL DECONSTRUCTION
LOCATION	SOUTHEAST ASIA
SECTOR	MINING
DATE	JULY – OCTOBER 2019

CRANES	1 X M2480D
ENGINEERS	2
INSTALLATION CREW	6
OPERATIONAL CREW	2
MAINTENANCE CREW	1

Established in 1983, our client is a leading processor and exporter of refined copper and precious metal by-products including gold and silver. It's strategic position in the Pacific Rim allows access to copper concentrate supplies from around the world as well as refined copper markets in China, Korea, Taiwan, Vietnam, Thailand, Malaysia, Indonesia and Japan.

When the plant decided it needed to replace decommissioned heat exchange vessels in 2018, they contacted us for a heavy lift cranage solution.

THE CHALLENGE

It goes without saying that heavy lifting over a live refinery is a delicate task at the best of times.

Our client maintains high standards of compliance in terms of environment protection, safety practices and community relations, so avoiding any potential safety hazards was paramount. It was also necessary to keep the shutdown duration to a minimum to reduce disruption to daily production targets.

The project also came with the additional challenges of working within a limited space and the need to complete the operation within the short window of time allowed during a scheduled shutdown at the plant.

The big question was how quickly and safely can we turn this around with as little disruption to operations as possible?

OUR SOLUTION

When we first met with our client's project team, the planned approach was to use a 600-tonne crawler crane with a super lift attachment to dismantle and remove the old heat exchange vessels. This traditional solution would have required demolishing part of the plant and shutting down critical production, adding time and cost to the shutdown.

Working closely with our client's engineers and project team, Marr's team designed a cranage solution adapted from the new technology we developed for a similar project at one of Australia's largest oil refineries.

Employing the Marr Crane Mat System and one of our M2480D Heavy Lift Luffing (HLL) tower cranes to dismantle the structures in large manageable pieces, our approach minimised the risks associated with working at height with limited space on the ground.

Using the Marr Crane Mat System, an installation crew deployed from Australia were able to stand the crane on an above-ground static base off the existing roadway and avoid a forest of in-ground services without the need for additional ground works.

The M2480D was installed on a 10x10-metre static base. With a 55-metre boom and a 125-meter hook height, the crane was rigged to have a capacity of more than 280 tonnes, allowing for the required safety factor on the engineered weights we were to lift.

The large lift capacity of the M2480D allowed the heat exchange vessels, weighing up to 180 tonnes, to be removed in a single lift. The structures were then moved to the roadside for removal by road transport and new replacement vessels installed – all within the scheduled 12-week shutdown.

THE RESULT

Our solution allowed the refinery to return to production earlier than originally planned. The project was completed without incident and at a substantial cost benefit over the traditional demolition process using a large crawler crane that was initially planned.

With less lifting and a quicker deconstruction program, the overall risk on the project and to plant operations was reduced.

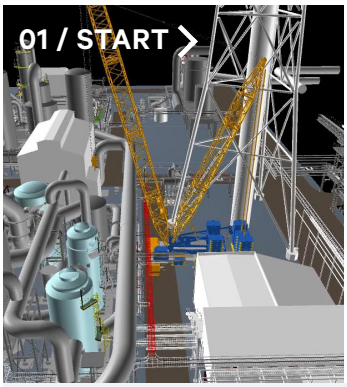
The methodology used on this project can be adapted for any large-scale operation where there is limited space to work at the interface of other working fronts, and a similar need to avoid non-scheduled shutdowns of operations.

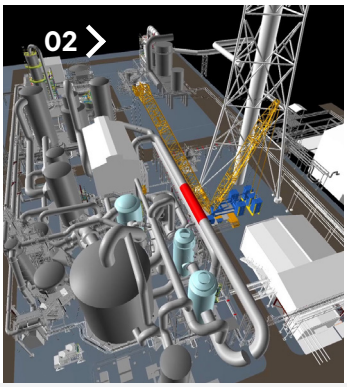
THE LARGE LIFT CAPACITY OF THE M2480D ALLOWED THE HEAT EXCHANGE VESSELS, WEIGHING UP TO 180 TONNES, TO BE REMOVED IN A SINGLE LIFT.

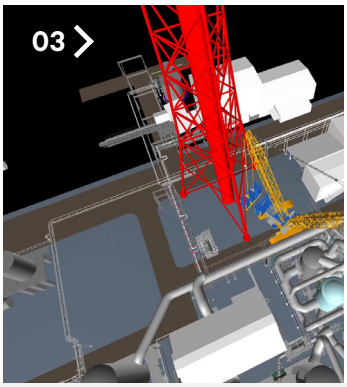
THIS PROJECT REQUIRED LIFTING SOME VERY HEAVY VESSELS IN A CONFINED SPACE WITH A FOOTPRINT OF ONLY APPROXIMATELY 10 METRES.

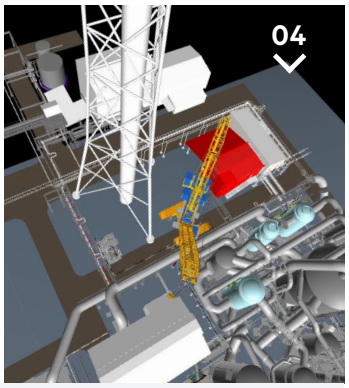
THERE WAS NO WAY TO FIT A CRAWLER CRANE IN SUCH A CONFINED SPACE, SO OUR SOLUTION WAS TO PUT A 10-METRE STATIC BASE AND ONE OF OUR HEAVY LIFT TOWER CRANES IN TO DO THE JOB.

GORDON MARR,
TECHNICAL & PRODUCT DEVELOPMENT DIRECTOR,
MARR CONTRACTING

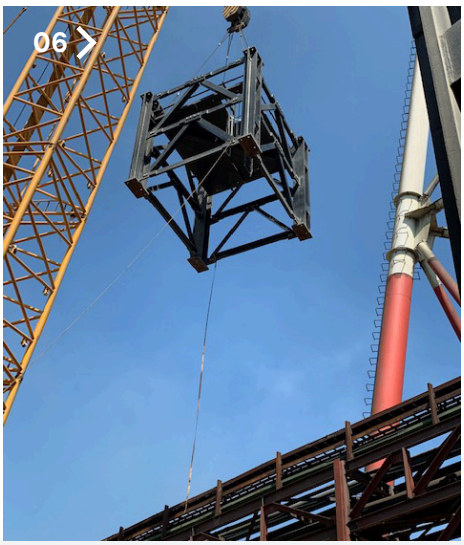


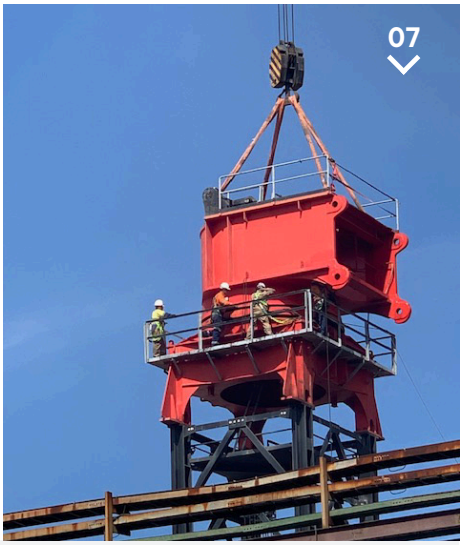




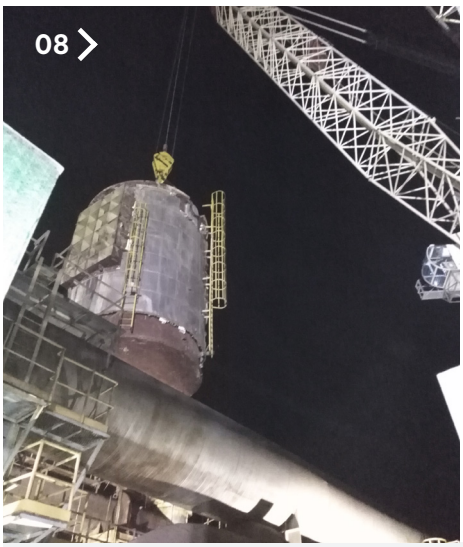


The original crane methodology proposed using a 600-tonne crawler crane with a super lift attachment which would have required demolishing part of the plant and shutting down critical production. The project proposed a number of challenges including working to a scheduled shutdown program in a congested site with restricted space and significant underground services. The areas highlighted in red above indicate structures that would have had to be demolished for the 600-tonne crawler crane to operate, subsequently ruling the original methodology out as a viable option.





Using the Marr Crane Mat System, one of our M2480D HLL tower cranes could be installed on an above ground 10x10m static base off the existing roadway in an area inaccessible to traditional craneage solutions.



The heavy lifting capacity of M2480D HLL – rigged to have a capacity of more than 280 tonnes – allowed the decommissioned vessels to be removed in a single lift and moved to the roadside for removal by road transport.

After the old vessels were removed, new replacement vessels were installed using the same crane configuration.

> WITH LESS LIFTING AND A QUICKER DECONSTRUCTION PROGRAM, THE OVERALL RISK ON THE PROJECT AND TO PLANT OPERATIONS WAS REDUCED.
>
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The last replacement vessel was installed with the 12-week scheduled shutdown resulting in the project being completed with less lifting, reduced risk to plant operations and a substantial cost benefit over the original planned methodology.