1915ÇANAKKALE BRIDGE

AN INNOVATIVE CRANAGE SOLUTION FOR THE WORLD'S LONGEST SPAN SUSPENSION BRIDGE

AT A GLANCE

CLIENTS	DL E&C–LIMAK–SK ECOPLANT–YAPI MERKEZI JOINT VENTURE (DLSY JV)
PROJECT	1915ÇANAKKALE BRIDGE
LOCATION	TURKEY
SECTOR	TRANSPORT INFRASTRUCTURE
DATE	2019 – 2021

WHAT IT TOOK

CRANES	2 X M2480D
ENGINEERS	4
ON SITE SUPERVIORS	2
ON SITE OPERATION CREW	21

Opened in March 2022, Turkey's 1915Canakkale Bridge took its place as the world's longest span suspension bridge.

At a length of 4.6 kilometres with a central span of more than 2 kilometres, supported by 318-metre-high towers, the bridge connects Gelibolu (Gallipoli) on the European side of the Çanakkale Strait (Dardenelles) with Lapseki on the Asian side.

In 2018 the DLSY JV partners – including DL E&C (formerly Daelim, Korea), Limak (Turkey), SK ecoplant (formerly SK E&C, Korea) and Yapi Merkezi (Turkey) – awarded the craneage contract to Marr Contracting International after a competitive tender process including some of the world's leading craneage companies.

By November 2020, DLSY JV had completed construction of the bridge towers ahead of schedule.

For Marr's team it was the project of a lifetime and one that could change the future of how bridges and other large-scale construction projects of this nature can be delivered.

THE CHALLENGE

On a project of this scale, the engineering feats are staggering – and so were the heavy lifting requirements which included:

– 8 x 160-tonne lifts
– 36 x 150-tonne+ lifts
– 208 x 100-tonne+ lifts

DLSY JV had a clear idea about how they wanted to build the project, but they needed a craneage partner who could think outside the box to bring that vision to life. Impressed by our track record in designing and delivering large-scale lifting solutions on similarly challenging projects in Australia and around the world, DLSY JV challenged us to develop a craneage solution that would:

– decrease the construction time and associated risk;
– reduce project costs, and
– improve safety on the project.

The project also came with the additional technical challenges of working in a high wind area, over water and in an earthquake zone. And of course, the COVID-19 pandemic created a new set of challenges that none of us could have predicted.

OUR SOLUTION

Through working directly and collaboratively with DLSY JV's project team on the front-end engineering design, Marr's team of engineers were able to develop a craneage methodology using two of our 330-tonne capacity M2480D Heavy Lift Luffing (HLL) cranes that met all the requirements of the project.

The M2480D HLL's capacity allowed heavier modularised sections of the bridge towers to be fabricated in a controlled environment offsite before being delivered to the worksite by barge for installation instead of the more traditional approach of lifting smaller components one-by-one and then welding on-site.

"DLSY JV knew what they wanted, and they were also open to a non-traditional heavy lifting solution. As experts in construction, they respected our expertise in heavy lifting and together we have been able to construct the tower stage of the project in record time. I think for us to get involved so early in the design of a solution to suit what DLSY JV was trying to achieve was really the key to the success of this project," said Marr's Managing Director, Simon Marr.

THE RESULT

On 18 March 2022, the 1915Çanakkale Bridge opened more than 12 months ahead of schedule. By modularising the structure into larger, heavier sections our solution reduced the number of lifts and the overall construction schedule, with less site-based activities and a higher level of on-site safety.

The unparalleled lifting capacity of our M2480D HLL cranes was a game changer for the project with two 'world firsts' during construction of the bridge towers including:

– a 2000-tonne capacity Tak4 floating heavy barge crane lifting the 600-tonne assembled M2480D from the dry dock to the worksite 1km in the middle of the Çanakkale Strait; and

– the heaviest (155 tonnes) at height (318 metres) craneage lift during the installation of the upper cross beam (UCB).

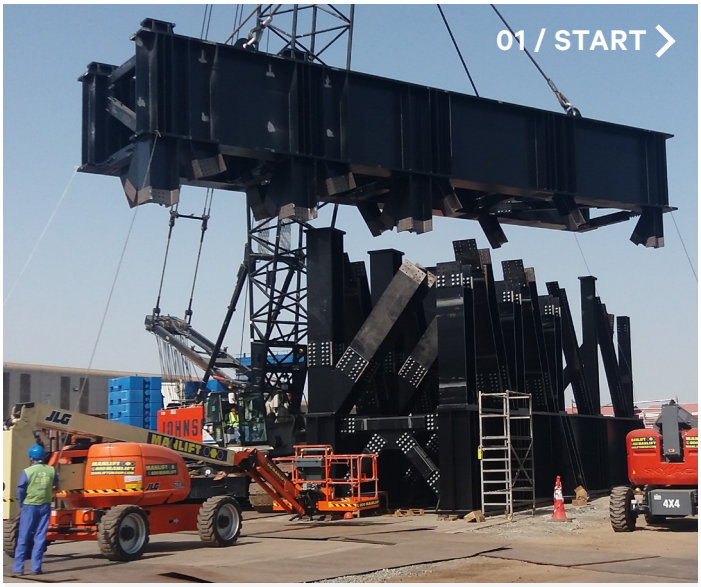
Working at 24/7 availability, both M2480Ds worked at an average utilisation rate of 20 hours per day.

"Managing a 24/7 operation with an ambitious construction programme in the middle of a pandemic has been a challenge, but one that we have solved with the right combination of craneage, people and teamwork," said Marr's Technical & Product Development Director, Gordon Marr.

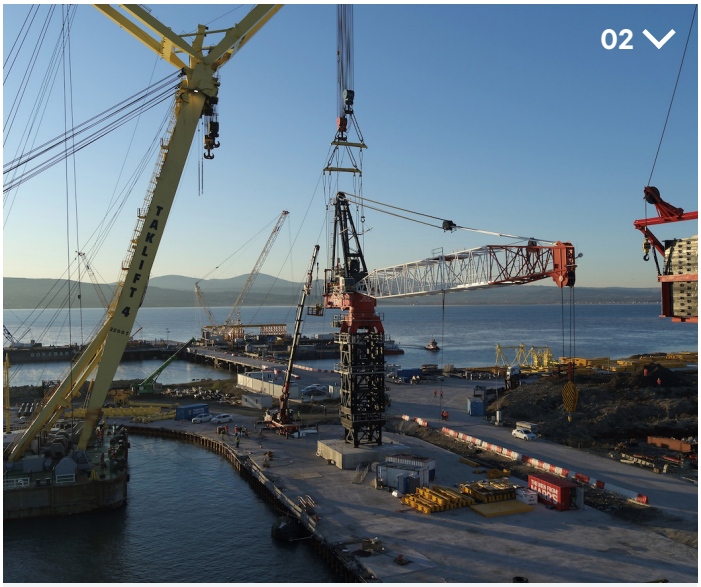
Our approach to this project will also potentially change the way our industry looks at how bridges and other large-scale projects can be built. Marr's team is using the same way of thinking to challenge methodology on the construction of other projects including metro train stations and other major public infrastructure projects, data centres, large commercial construction, energy construction and working refineries both at home in Australia and around the world.

> Marr's team have a reputation for technical competence and innovative thinking in developing strategies for heavy lifting on projects of this scale, but what has impressed us most is their collaborative approach to finding a solution that suited our construction methodology and programme, and then delivering it.

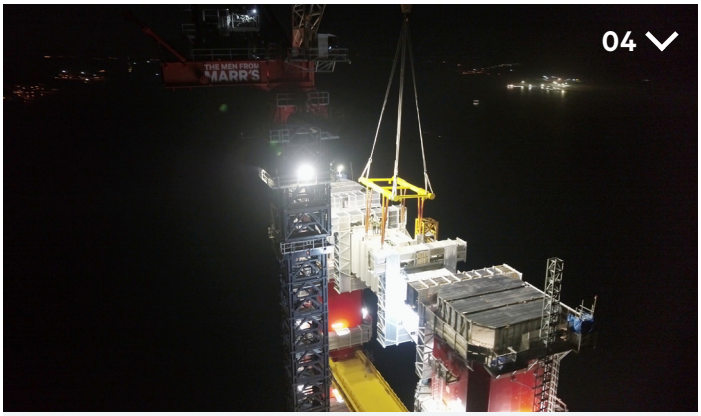
ALPER ALEMDAROGLU
DEPUTY PROJECT MANAGER,
DLSY JV



APRIL – JUNE 2019: After two of our M2480D Heavy Lift Luffing cranes were shipped from Australia to Turkey via Singapore, our engineers from Australia, the UK and Middle East worked together to fabricate specialised equipment for the project in our Middle Eastern fabrication facility.

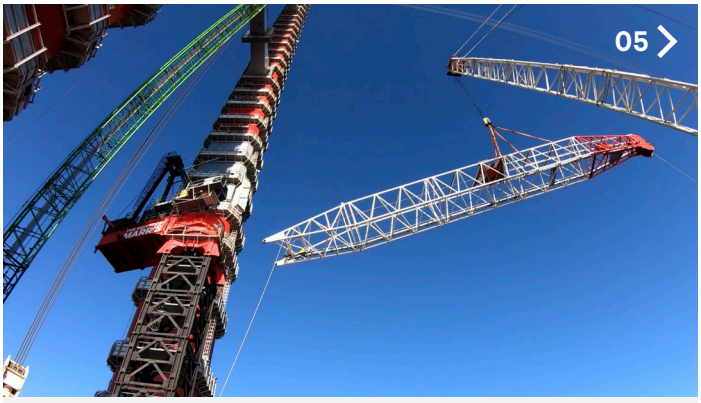


APRIL – JUNE 2019: Our first milestone on the project was to assemble both cranes on purpose-built quayside foundations. This included building the 300-tonne grillages in preparation for lifting the M2480Ds from the quayside and installing them at the bridge work front.



JUNE 2020: After climbing the cranes to their final height of 328 metres, the next major milestone was the installation of the upper cross beam (UCB). With the M2480D positioned 328 metres above the water, it took approximately 30 minutes (and a lot of planning) to lift the 155-tonne section into position – creating a new world record for the heaviest lift (155 tonnes) at height (318 metres).

NOVEMBER 2019: Using a 2,200-tonne capacity Taklift 4 floating heavy barge crane, the cranes – each weighing 600 tonnes – were lifted from the quayside and transported to the worksites a kilometre off-shore on the Çanakkale Strait. It was the first of two world-first engineering feats on the project.



JULY - AUGUST 2020: After successfully completing the construction of the bridge towers, the M2480D HLLs were climbed down the completed bridge towers and safely recovered.

18 MARCH 2022: The 1915Çanakkale Bridge was officially opened more than 12 months ahead of schedule in a ceremony attended by Turkish President Recep Tayyip Erdoğan.