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KALAMIA SUGAR MILL STACKS DEMOLITION

DEC 2024 - APRIL 2025
EDMS
$2.8 M (AUD)

Wilmar Sugar Australia is Australia's largest raw sugar producer and eighth largest global producer. Created from the sugar division of CSR, the company was acquired in 2010 by Asia's leading listed agribusiness, Singapore headquartered Wilmar International. Located in Ayr, the mill operates alongside other major sugar mills in the Burdekin region in North Queensland. Engaged as a subcontractor by project manager EDMS, DEMEX undertook a technically challenging demolition of two industrial boiler stacks, 74 and 65 metres high.

The client's scope of work included very specific requirements associated with protection of operational facilities in proximity to the stacks. Stack 1 directly abutted the recently constructed boiler house and required removal of fan ducting between the two structures, a distance of just one metre. The boiler house was to incur zero damage despite its proximity to the work area. Stack 5 was located some distance from the boiler house and was only to be demolished if Stack 1 was removed in sufficient time to allow construction of a replacement stack before the next season's crush. DEMEX successfully met this critical milestone.

Delivery timing was a key project driver. This meant it was necessary to commence work immediately following the seasonal sugar crush to complete the demolition works and construction of a new stack within the shutdown period. This would ensure impacts to operations could be minimised and allow the new stack's construction to be completed.

At tender, the client presented its own demolition methodology based on completing saw cuts in sections, which would then be crane lifted from the stack. Excessive deterioration of the stack, particularly the internal brick wall, meant this methodology was identified as unsafe. DEMEX innovated a solution incorporating clever engineering design and robotic technology allowing the project to be completed safely, ahead of schedule, and to the client's satisfaction.

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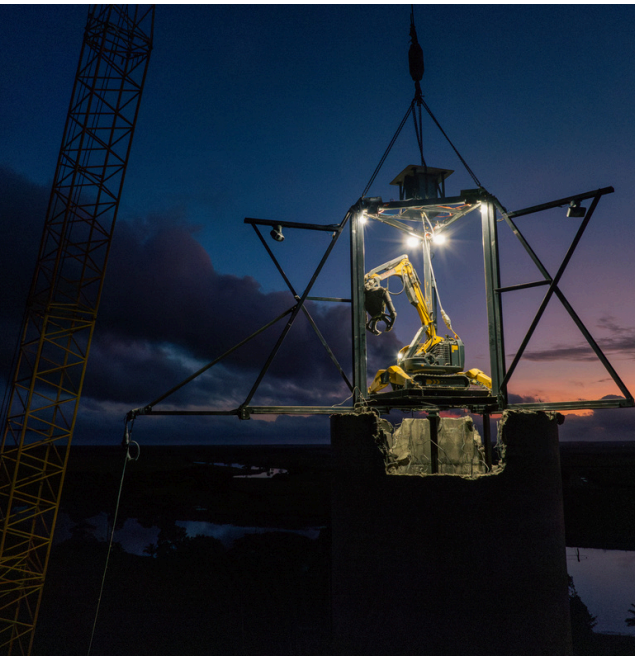

CHALLENGES & SOLUTIONS

- **Proximity of stacks to operational facilities –** One stack abutted an operational facility. To ensure the requirement for zero damage was met, a scaffolding deck was designed and constructed to protect the boiler house.

- **Available timeframe for delivery –** A key driver of this project was the available timeframe for delivery, dictated by the new stack construction program. DEMEX completed meticulous planning, ensuring multiple spares, including an additional Brokk robot and adequate supplies were available to prevent any delays.

- **Equipment selection –** Equipment selection for this project was a major factor in formulating the methodology. Restrictions on the size of the work zone meant conventional demolition equipment, such as high reach excavators or explosives, could not be used. DEMEX deployed the Brokk 200 demolition robot, a powerful 2.1 tonne machine that was remotely controlled by operators located on the ground and away from the work zone. The robot was positioned on a custom engineered and fabricated platform crane lifted into position. The platform was then suspended marginally above the stack, preventing the structure from taking the full weight of the deck and robot, and eliminating the risk of excessive movement from wind.

- **Operator challenges** – Experienced operators were selected for the works. Apart from technical capability, both the robot operators and crane operators needed a calm demeanour, ability to work under pressure, and strong communication skills. Without these factors, the risk of error greatly increased. The operators relied on each other to communicate movements and adjustments; a challenge made more difficult by being located a considerable distance from the work zone. This meant operators did not have the same ability to 'sense' pressure and vibration as occurs with conventional demolition equipment. A strong bond between the entire project team allowed the works to be executed smoothly, both day and night.

- **Adverse weather events, heat and humidity** – Project delivery was impacted by extreme seasonal wet weather, including cyclones, flooding, summer heat, and high levels of humidity. At one point, site access was cut off for three days due to flooding. The team managed around the weather events and heat to deliver ahead of schedule.

- **Working at heights –** With the two stacks reaching 74 and 65 metres respectively, there were many work health and safety considerations to factor into the approach. At these heights not only could wind impact the robot and platform stability, there was also the issue of worker protection when workers were required to inspect and measure the stack's internal diameter to allow adjustments to the platform to be made.