



# KALAMIA SUGAR MILL BOILER STACKS

DEC 2024 - APRIL 2025

EDMS

\$2.8 M



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, 72 and 60 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 (72 metres) directly abutted the newly constructed boiler house and required removal of fan ducting between the two structures, a distance of just one metre. The recently constructed boiler house was to incur zero damage despite its proximity to work area. Stack 5 (60 metres) was located some distance from the boiler house and was only to be demolished if Stack 1 was removed in line with the tight schedule.

Delivery timing was also a project driver. This meant it was necessary to commence work immediately following the seasonal sugar crush to complete the demolition works and construction of new stacks within the following three month shutdown period. This would ensure impacts to operations could be minimised and allow construction of the replacement stack to be completed before the next crushing season at the end of 2025.

At tender, the client released 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. Identifying the need for innovation, the team devised a solution incorporating clever engineering design and robotic technology. Adopting an innovative methodology, the project was completed safely, ahead of schedule, and to the client's satisfaction.

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## CHALLENGES & SOLUTIONS

- Proximity of stacks to operational facilities** – Although works were conducted during a shutdown period following the sugar crush, the site remained operational during works. Notably, one of the stacks abutted site operational facilities (the boiler house) and it was a requirement of the project that no damage be caused to the structure. To address this issue, a scaffolding deck was designed and constructed, ensuring the boiler house was protected.
- Available timeframe for delivery** – A key driver of this project was the available timeframe for delivery, which was dictated by the need for construction of a replacement stack to be completed by the commencement of the next sugar crush in three months. The project was delivered over a period that included the end of year holiday period. Recognising this could halt progress, DEMEX undertook meticulous planning that ensured multiple spares, including an additional Brokk robot, as well as adequate supplies were available to prevent any delays. This proved to be fortuitous, given the extreme weather events, which occurred during the project
- 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 two 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, which was 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.
- Waste management** – The work zone's proximity to operating facilities meant that the usual practice of stockpiling and load out of waste could not be undertaken. This presented challenges for how waste could be progressively moved away from the stack to allow demolition works to continue unimpeded.
- Operator challenges** – Experienced operators were selected for the works. Apart from technical capability, both the robot 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. Depth perception was also a challenge, particularly during nightworks. Consequently, 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 due to flooding. The team managed around the weather events and heat to deliver on time.
- Working at heights** – With the two stacks reaching 72 and 60 metres respectively, there were many work health and safety considerations to factor into the approach. At these heights not only was wind a factor impacting 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.