

ENGINEERING ON ROTTNEST – 9

Engineering, the art or science of making practical application of scientific principles, has existed since ancient times, when inventions such as the *pulley*, *lever* and *wheel* were devised. On Rottneest Island there are numerous examples of engineering ingenuity and skill, including innovative timber roof structures, Kingstown Barracks, the military railway, Bickley and Oliver Hill Batteries, Wadjemup Lighthouse and infrastructure such as roads, water supply, power and communication systems. The *Engineering on Rottneest* articles review engineering exploits that have contributed to the heritage and livelihood of the Island—enabling the undertaking of numerous day-to-day activities, often taken for granted.

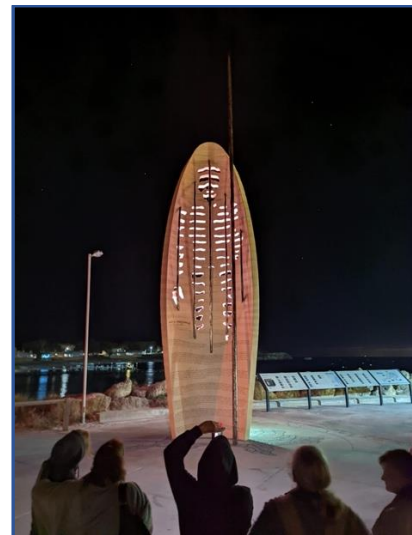


Entry Statement Sculpture: *Koora-Yeye-Boordawan-Kalyakoorl*

Introduction

The *Koora-Yeye-Boordawan-Kalyakoorl* sculpture was designed by Western Australian artists Sharyn Egan and Jahne Rees with significant input from the Whadjuk-Noongar people. *Koora-Yeye-Boordawan-Kalyakoorl* translates to “Past-Present-Future-Forever”. The striking entry statement sculpture welcomes visitors to Rottneest Island and educates them about the heritage of Wadjemup, communicating both the traditional spiritual journey to the after-life from West End and the historic use of the Island as a prison for Aboriginal males.

Standing at a height of nine metres the sculpture features pre-cast limestone aggregate concrete and aluminium, and matches the colours and form of the beachside setting.



The intent of the Rottneest Island Authority (RIA) in commissioning the sculpture was to create an iconic monument, of national significance, for its local, national and international visitors. The entry statement sculpture formed part of a \$17.2 million programme of works funded by both the State and Federal Governments to revitalise Rottneest Island. As such, the sculpture serves as an emblematic change, reflective of the improvement of the economic standing of the Island and its facilities as a tourist destination.

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The core accomplishment of artists Egan and Rees is that their design successfully provides many layers of social meaning in a single unified form ... a striking and poignant structure that is perfectly sympathetic to its surroundings ... fostering reconciliation of the Indigenous and broader community. In terms of the improvement of the quality of life for Western Australians the bridging of knowledge and customs from ancient times to the present is invaluable ... reclaiming Rottneest Island from a poorly acknowledged dark past while pointing towards a brighter future for all.

Engineering Details

More than 85% of the population of Australia live within 50 kilometres of the ocean. Many of our coastal structures suffer from corrosion due to rusting of the steel reinforcement within concrete. This is commonly called “concrete cancer” and it causes widespread cracking and structural damage.

The climate and coastal attributes of Rottneest Island include exposure to strong winds and salt spray. The RIA design brief for the entry statement sculpture required that it to be low maintenance, durable, corrosion resistant and aesthetically sympathetic to its surroundings.

The solution adopted by Airey Taylor Consulting engineers and scientists to use custom shaped glass-fibre reinforced polymer rods in place of steel reinforced rods met these requirements. Glass-fibre reinforced rods will not rust or lead to cracking, as would steel reinforced rods in the same setting.



The use of custom shaped glass-fibre reinforced polymer rods meant that the 200 millimetre thick and curved artistic form of the main “shield”, using low-strength 25 MPa limestone aggregate concrete, could be inscribed following casting by the artists.¹

Glass-fibre reinforced polymer rods were used in the base and mount of the sculpture. The complete absence of steel, and the character of glass-fibre reinforced polymer rods, meant that the requirements of the RIA for durability, corrosion resistance and low maintenance were exceeded, while also satisfying the desire of the artists to create a monument that is testament to the endurance of the Whadjuk-Noongar people.

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The whale/bars and spear are made from hand wrought aluminium, which also resists corrosion. The foundation of the sculpture represents the constellation of the Emu in the sky overhead ... known to all local Indigenous people.

Further engineering innovation included the design of temporary post-tensioning to protect the long span and curved shape of the perforated limestone aggregated concrete “shield” during transit. The sculpture was successfully installed on Rottnest Island without significant cracking after transport from the mainland.



The engineering innovations used in the entry statement sculpture were significant enough for Airey Taylor Consulting’s project to be selected as a finalist for “Best Project in the Engineers Australia (WA) Excellence Awards of 2022”, and for the sculpture to be selected as a winner of the coveted “Innovation and Technology Award for 2023”, among an excellent field of finalists.

Ian and Mia from the RVGA Heritage Team

Rottnest Voluntary Guides Association

¹ MPa is an abbreviation for Mega-Pascal, a specification for the compressive strength of limestone.