SUPERIOR LINES OF DEFENCE FOR OUR COASTLINES

ABLE TO WITHSTAND EXTREME WEATHER EVENTS IS ONE REASON PRECAST CONCETE IS A GOOD MATERIAL TO USE ALONG AUSTRALIA'S COASTLINE.

The impact of rising sea levels is significant. It is causing coastline erosion, which is impacting not only the integrity of coastal structures, but precious marine life as well.

The protection of marine life and coastal communities requires a solution that must be able to withstand extreme weather events and the harsh marine environment. Durability is the key. Precast concrete, a strong, long lasting and durable material, is the necessary solution to provide a long-term fix to this ever-growing concern. It is helping to address the decline in marine life populations that has come about due to a fall in the volume of marine habitats and to protect the large population that lives on Australia's coastline.

Structures such as artificial reefs and concrete walls are based on a proven track record, offering engineering resilience, constancy and predictability.

Artificial reefs not only aid in reducing wave heights, providing a strong line of defence for coastal communities; they also provide food, shelter, protection, and spawning areas for hundreds of fish species and other marine organisms.

In Geographe Bay, a trial of two artificial reefs has been underway since 2014. It entails a scientific monitoring program that is observing the reefs' ecological development. It is providing researchers and State Government agencies with the opportunity to study the benefits of artificial reefs and the chance to develop protocols for installing artificial reefs at other locations. National Precast member, MJB Industries, manufactured and transported 60 ten-tonne, three metre-high precast concrete modules for the two reefs. Located at Bunbury Port and Port Geographe, the reefs comprise 30 modules each, involving six clusters of five modules that have been positioned over an area of 200 sqm and at a depth of 15-30 metres.

The modules have been designed for Geographe Bay's current, waves, and sediment conditions. They are transforming areas of low-marine biodiversity into an ecological hub by providing complex environments. Through this, the modules are promoting the growth of rich ecosystems that support diverse fish populations. Before the reefs were deployed, fewer than 10 fish species were documented at the predominately sandy sites. However, since the project's completion in April 2014, more than 40 fish species have been recorded at the artificial reefs, including all three targeted species of pink snapper, Samson fish, and silver trevally. The modules are now covered with a range of thriving macroalgae, sponges, bryozoans, and ascidians.

The precast concrete sea wall is designed to protect shoreline erosion.

SECOND LINE DEFENCE

On the other side of the country in South Australia, Adelaide's coastal suburb West Beach is experiencing shoreline erosion, and it's affecting the local community.

According to the City of Charles Sturt Operations Engineer, Mark Chittleborough, environmental impact in recent years has damaged the structural integrity of the existing West Beach Coastal Seawall.

Constructed in 1973, the original sea wall was built with the purpose of protecting nearby assets including car parks, the West Beach Surf Life Saving Club (WBSLSC), domestic properties, public amenities and tourist areas. Storms in 2015 and 2016 caused the wall to slump in some areas, posing a safety threat. The city engaged engineers Kellogg Brown Root to design a rock wall that would improve the durability of the shoreline during such events.

Integral to the design is a series of precast L-walls manufactured by National Precast member Rocla. The L-walls measured 2000mm by 2800mm and have a 50-year design life to comply with AS 4997-2005 Guidelines for the Design of Maritime Structures. Locally supplied from the precaster's Edinburgh factory, the elements were selected to enhance the structural integrity of the design.

Chosen for its longevity and strength as well as its inherent mass, the L-walls are well placed to provide impact resistance against strong currents and storms. The council was confident that the high quality precast would withstand the chloride-induced corrosion from the aggressive marine environment. Cost and efficiency of construction were other considerations. Precast proved to be more cost competitive than an in-situ alternative, and its offsite manufacture and just-in-time delivery meant that erection and installation was efficient and simple.

Once complete, Mr. Chittleborough says the project will ensure that the rock wall will withstand storm events and projected sea level rise. "It will act as a barrier and protector for the Surf Club, the Coast Path, road, car park and homes along Seaview Road for the design life of the wall." ■