PROJECT SHEET

Coal Export Dock

2020

ABOUT THIS PROJECT:

Market Segments:
Marine Structures

Owner:
Drummond LTD.

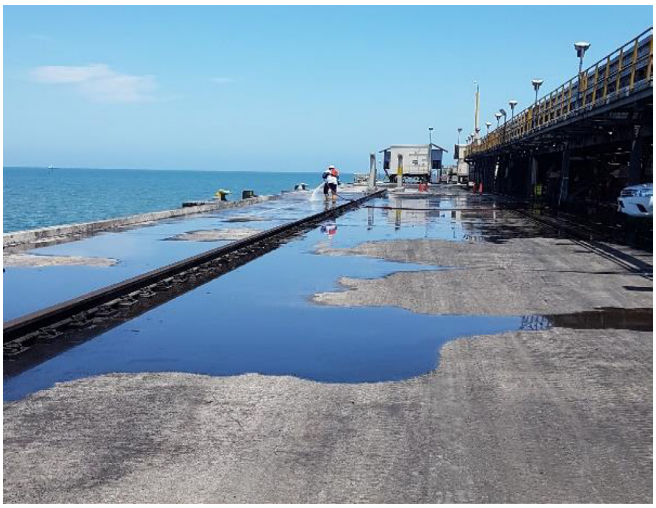
Products Used:
Xypex Concentrate
Xypex Patch'n Plug
Xypex Megamix II

Location:
Ciénaga, Magdalena, Colombia

Waterproofing:
CIP SA - Ingeniería para el Concreto

The Coal Export Dock of Drummond Ltd. in Ciénaga, Magdalena, Colombia, is a remarkable structure extending 4,000 meters into the Caribbean Sea. Designed to enhance coal export efficiency while protecting the marine environment, the dock can accommodate up to four ships simultaneously—two on each side—each capable of carrying 200,000 tons of coal.

This modern facility replaced previous loading methods, which involved smaller boats prone to capsizing, thereby eliminating the risk of coal spills into the sea.



Despite its robust construction, the dock faced challenges common to marine concrete structures: continuous exposure to sea breezes and seawater, which accelerates chloride-induced corrosion of the reinforcing steel within the concrete. Additionally, the dock's fenders—massive 3 m x 3 m x 3 m concrete blocks—sustained damage from repeated collisions with docking ships.

Cracks and fractures developed, creating infiltration and pathways for brackish water to infiltrate the concrete, potentially compromising structural integrity and reducing the dock's service life.

To address these critical issues, CIP SA - Ingeniería para el Concreto was commissioned to provide a comprehensive repair, protection, and waterproofing solution. After careful evaluation, they selected a suite of Xypex crystalline products for their benefits in marine environments.

Xypex's effectiveness in marine environments is enhanced by its resistance to chemical attacks from substances commonly found in seawater. The Crystalline Technology not only prevents water ingress but also imparts self-healing properties to the concrete. If new micro-cracks form in the future, the presence of moisture reactivates the crystalline growth to heal them automatically. This permanent, integral waterproofing and self-healing process enhances the concrete's durability and extends the structure's service life, making it an ideal solution for marine structures like the Coal Export Dock.

For the rapid repair of cracks and fractures, Xypex Patch'n Plug was used. This fast-setting, non-shrink repair mortar is ideal for stopping active water leaks. Its quick-setting properties allowed for immediate restoration of structural integrity, preventing further water ingress and chloride penetration.

To resurface deteriorated concrete areas, Xypex Megamix II was applied. This high-performance repair mortar has been specifically formulated to produce superior bond, low shrinkage, improved chemical resistance, and high strength, making it particularly suited for industrial and marine applications.

Finally, Xypex Concentrate, a cementitious surface-applied waterproofing product, known for its versatility on both positive and negative side applications and for not requiring a dry surface, was applied as a slurry coat. This product is designed to allow the deep penetration of the Xypex active ingredients into the concrete matrix, ensuring permanent protection that becomes an integral part of the concrete rather than just a surface barrier.

CIP SA - Ingeniería para el Concreto ensured optimal application by training and supervising the work crew, making sure that the Xypex products were applied according to specifications. This meticulous approach not only preserved the dock's functionality but also aligned with environmental protection standards by safeguarding the surrounding marine ecosystem.

The dock now boasts improved resistance to the harsh marine environment, significantly reducing maintenance costs and minimizing operational downtimes associated with future repairs. By selecting the Xypex advanced waterproofing solutions, Drummond Ltd. secured the Coal Export Dock's role as a vital asset in Colombia's economy for years to come.