

## A Global Material Solution for a Global Stability Problem

Family owned Rukert Terminals prides itself as a cornerstone of the Baltimore Ports system. When their forty-five year old sheet pile bulkhead began moving away from land and demonstrating signs of global stability failure, they recognized their relieving platform was in grave danger. Rukert was looking beyond a temporary “band aid” fix and in search of a long term solution that could address the immediate structural issues and meet deeper draft requirements for future marine demands.



Pipe-AZ installation template



Plan view: wall profile



48" OD Spiralweld Pipe

### ► Problem

In Baltimore Harbor, Rukert Terminals owns and operates a sheet pile bulkhead structure. An existing pier sitting on the bulkhead was founded on wooden piling. Horizontal restraint to the vertical piling was provided by additional wooden piling driven on a batter. A low water relieving platform on the waterside of the bulkhead was also founded on wooden piles. After 45 years of service, the wooden piling under the relieving platform began sliding away from the land. This caused the pier to rotate towards the water causing the battered piles to fail. With the entire structure breaking away from the land, it was time for remedial action.

### ► Solution

Moffat & Nichol engineers took the opportunity to solve the existing wall problem and, at the same time, upgrade the port structure to meet the demands of future vessel requirements.

Moffatt & Nichol designers specified a high modulus combined wall system. Although a light to mid range sheet pile section would have sufficed for the intermediate panels, the engineers were committed to the systems long term durability. Thus, the sheet pile web and flange thickness had to be equivalent to the modular pile section.

### ► Result

As a foundation solutions provider, Skyline Steel had been working with the project designers and contractor providing alternate material options. Although king pile systems were considered, volatile pricing and availability played a major role in the final decision. In the end, Moffatt & Nichol chose to specify a Pipe-AZ combi-wall. Skyline delivered 48" x 0.750" spiralweld pipe direct from our luka, MS plant. The AZ sheets and connectors came from Luxembourg. Lastly, McLean Contracting fabricated the connectors directly

onto the pipe for speed of installation in the field. The connectors were 59' C-9 type installed on pipe spliced to give a final length of 90'. The pipe was also coated by McLean Contracting. No other vendor could deliver the technical guidance, material systems and fabrication like Skyline Steel.

### ► Project Details

#### Material:

2,500 NT of 48" x 0.750" wall spiralweld pipe in 90' lengths with fabricated Z pile connectors  
850 NT of AZ-36 sheet piles at 60' lengths  
2500 NT of HP 14 x 89 partially coated CTE

#### Owner:

Rukert Terminals

#### Marine Contractor:

McLean Contracting Co.

#### Engineer:

Moffatt & Nichol