

# Smart Engineering

## Unusual heavy lift calls for clever solution using a high performance synthetic sling

A large copper smelter in North America was undergoing a program of modernization, which required the removal of a cylindrical heat exchanger weighing 110 tons.

Barnhart was contracted to lift the 50' tall and 12' wide unit. The company's engineering team found the structure in a heavily degraded condition and knew that a specialist solution was necessary for it to be safely removed and transported for recycling and scrap.

Cortland was selected for its extensive knowledge and experience of working with high performance materials and specifically its capabilities of developing customized reinforced lifting slings.

### The Challenge

The heat exchanger had been in place for more than 15 years and over that time had deteriorated to a condition where it was beyond use and at risk of collapse if not removed with great care. It was also built into a congested area of the plant making the use of traditional cranes impossible.

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The heat exchanger during vertical lift, showing red basket frame and sling to support the aging structure.

### Project

Remove 50ft tall, 110 ton, heavily degraded heat exchanger unit in a congested area of plant

### Company

Barnhart

### Location

North America

### Technologies used

Plasma® 12x12 endless loop grommet sling

### Features

- Grommet Sling, 14' (4.3 m), encased in SX Chafe Guard
- 3" / 72 mm Dia
- 214,000 lbs VRC

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**David McMullen, Project Manager, Barnhart**

Cortland is a global designer, manufacturer, and supplier of technologically advanced ropes, slings, and strength members. Collaborating with customers, our team uses its experience in high performance materials and market knowledge to transform ideas into proven products.  
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Initial investigations by Barnhart and Cortland found that the unit's original harness points could not be used due to age and metal fatigue. The team also decided that it would have to be carefully maneuvered from a vertical to a horizontal position and moved to an area where a traditional crane could complete the lift.

Smart engineering was therefore required to lift and rotate the vessel.

### The Solution

The project team decided that wire rope would almost certainly damage its fragile shell, so a unique rigging package was devised by Cortland using high-performance synthetic products to support the structure. This removed stress from the unit and securely cradled it during movement.

Cortland designed and supplied a Plasma® 12x12 endless loop grommet sling for the critical lift with a vertical rating capacity (VRC) of 214,000 lbs on a 4.5" pin. This is the world's strongest rope for its weight, compared to steel alternatives, and is extremely durable. The 3" (72 mm) diameter, 14' (4.3 m) sling had loops on both ends, which connected to a basket frame to firmly support the heat exchanger.

The entire sling was reinforced with Cortland's high resistance sling protection, SX Chafe Guard, a braided tubular structure that covers the rope and is proven to provide 100% protection against high levels of friction and cuts.

This was vital as the aging structure had exposed metal parts which could have caused fraying on alternative, less protected ropes.

Barnhart employed its heavy-duty sliding systems to move the unit into a safe area where its 600 ton capacity Terex Hydro crane could perform the final lift.

### The Results

Once mobilized to the location, preparations and lifting took two days, with the Barnhart and Cortland teams working closely together to share expertise. The decision was made to use a lightweight yet strong synthetic sling with chafe protection.

The Plasma sling proved to be the best choice for the unusually complex lift, performing successfully to take the strain off the unit itself and providing the adaptability needed for the rotation.

Following the lift, David McMullen, Project Manager, Barnhart, said: "We were impressed with Cortland's rigging solution from the outset of this unusual project. The team was meticulous in its preparations and the product supplied ensured a successful end result, dovetailing well with the Barnhart lifting equipment."

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