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IN CO-OPERATION WITH CEMENT DISTRIBUTION CONSULTANTS

NEW SHIPUNLOADER FOR PORTLAND OREGON TERMINAL GLACIER NORTH WEST

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Glacier Northwest Portland
Ship Unloader Upgrade

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Glacier Northwest Portland Ship Unloader Upgrade

In the second quarter of 2002 Fuller Bulk Handling received an order from Glacier Northwest for a new ship unloader for their Portland Oregon cement terminal. This paper will discuss the history of their current unloader, and the advantages they will gain with their new unloader.

The Current Portland Vacuum Unloader

In 1985 the first vacuum ship unloader was placed into operation at the LoneStar (now Glacier) Northwest cement terminal in Portland Oregon USA. Now, nearly 20 years and several million tons of cement later, this first of it's kind ship unloader is being moved to a less active terminal and being replaced with the new generation of vacuum ship unloaders. This report will outline why the change is being made, and provide a few details regarding the design improvements that have been made during the last 20 years.

This unloader was the first of its kind for unloading ocean-going ships by using vacuum technology. Glaciers "patient" operators made the machine perform well, and they have made many improvements to the Unloader over the 15 years of operation in Portland. They now average around 180 MTPH through the ship.

Changes In Cement Demand and Transportation = New Challenges

The 1990's economic boom created a need for increased cement imports to the USA. Combined with the decrease in Asian demand, this resulted in increased foreign cement available for import into the hungry US market. The higher import volumes required higher capacity utilization for existing terminals. The increased terminal annual throughput meant that improvements needed to be made. One of the choices was to increase unloading rates. It also required that the unloading equipment be more durable / dependable.

The Solution: Upgrade The Unloading System

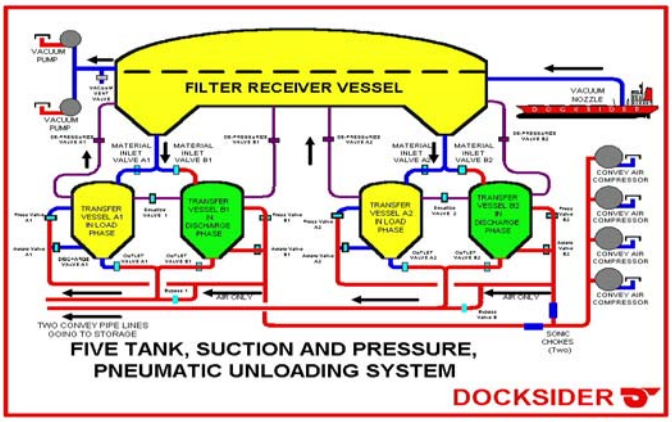
The solution that was chosen was to increase capacity of the unloading system. There are many benefits of this solution, but some of the most important are:

- Lowers freight cost due to fewer lay days required
- Reduce labor expenses
- Allow for additional growth
- Implements new technology
- Improves energy efficiency
- Improves ease of operation
- Reduces maintenance requirements

The methods that are applied to achieve these benefits are described in the remainder of this paper. Combining these innovations and improvements will make this unloader the most advanced vacuum unloading system in use to date.

Increased Capacity

The new unloader has a design capacity of 400 MTPH. This helped to make the decision to use a two-line, five-tank pneumatic system design. This system configuration was chosen for several reasons. The first reason was vacuum efficiency. The five-tank design uses a filter receiver that will give 99% effective use of the vacuum system. The second and most critical reason for using the five-tank design was the two existing 12” convey lines. The five-tank system gives the most efficient split of the conveying stream into the two pipelines.



Five Tank Flow Diagram

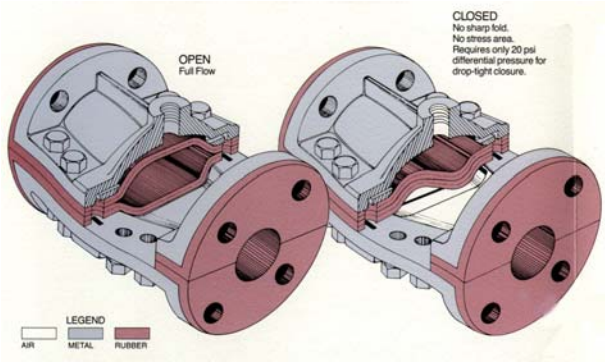
New** Technology / Product Innovations

**New During The Last 15 Years

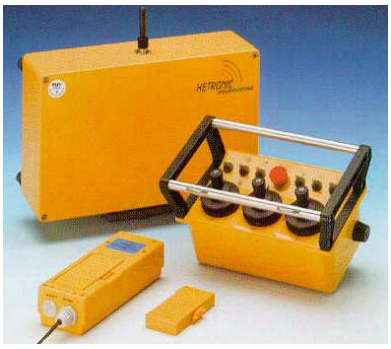
Perhaps the most significant advancement is the energy efficiency improvements that are a key factor in the design of the new generation of unloaders. The Fullerator low profile dense phase pressure conveying system accomplishes the pressure discharge efficiency improvements. The pressure convey system takes 25% added horsepower to get 100% more unloading capacity. Why is the aeration system so important? It controls and helps to maximize the flow of cement out of the transfer vessels into the convey line. What happens if it is not set up correctly? The tanks will not discharge continuously & efficiently also; the tanks will normally not discharge completely, which will hurt the cycle efficiency to the system.

Another of the new advancements in technology has been the use of the rotary agitation nozzle at the inlet of the vacuum system. The rotary nozzle was first developed to help reduce the stresses on the vacuum arm. One of the side benefits of the agitation was that it fluidizes the cement to prepare it for vacuum pickup. The agitation is also helpful in loosening packed cement after days at sea during transport to the US.

The unloader will be equipped with a self-propelled rubber tire mounted transporter. This configuration eliminates the need for a separate prime mover and allows for easy movement of the unloader both on and off of the dock. This helps to reduce the capital cost of installing the unloader by not requiring rails or the associated sub-structure to be installed on the dock. The unit is powered by several hydraulic motors. The steering is also hydraulic, thus making it power steering. The entire unloader is controlled by the use of a single radio controlled joystick that the operator can carry to the best possible location to achieve maximum visibility. The unloading system is designed with two independent vacuum arms, one on each dock. The mobile unloading platform will move as needed between those two docks. When in place, the unloading platform will then connect to the vacuum arm.



The current Glacier unloader was the first to have success using pinch valves. They retrofit their current unloader with a new style valve in the early 90's. Pinch valves on the pressure discharge offer "OPEN" flow discharge – with no restriction, and no DISC to wear out. The new unloader will also be equipped with this same valve system on the cement conveying lines.



The Glacier unloader will be operated with radio control pendant boxes to manipulate the vacuum arms. Theses systems have proven to be both dependable and lightweight. Additionally there is no cable to get caught in the many potential hazards around a ship unloading operation. This arrangement also allows the operator maneuverability, along with uninterrupted service as a result of the long battery life.

24 / 7 Modem / high-speed Internet service monitoring capability.

Remote Communications Help! In Use Since 1992

This is just one part of our advanced control system. The remote communications system provides diagnostics capabilities for the terminal. This helps to improve the comfort level of the operators and take away the “black box” syndrome that sometimes intimidates personnel. The system is Internet, and E-mail ready, and can also be equipped with a real time camera. All the operator has to do is plug in the cable, and call the FLSmidth technicians to let them know that the remote connection is ready.

Summary

The new technically advanced unloader is scheduled for delivery in December of 2002. It will be fully tested prior to its arrival at the site. It is expected to be unloading its first ship in January 2003.