Project-Report

Salt bunker for ship unloading

* Our Task

After the wooden bunker at Nobian had reached the end of its service life, we were commissioned to redesign and replace the wooden bunker. This included the development of a new ship unloading bunker with a discharge belt conveyor as well as the associated steel structure. The bunker located at the Mittelland Kanal is loaded by a crane grab. To minimize corrosion caused by the aggressive conveyed material, salt, the steel components were given a special coating. The main focus of the project was on optimizing the bunker structure, extending the conveying route, and improving accessibility for maintenance and cleaning work.

Technical details:

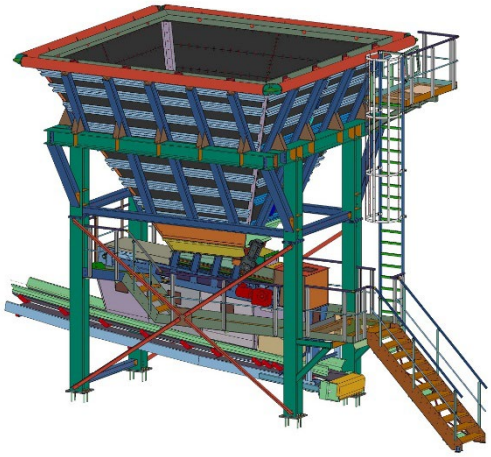
Concept and Engineering:

- Development of a new ship unloading bunker with discharge belt conveyor
- Use of a crane grab for feeding the bunker
- Visualization of conveyor routing and bunker dimensions

3D- Scan and Environmental Information:

- Execution of a 3D scan to capture the surrounding conditions
- Important environmental information:
  - Extended existing walkway with VHV belt conveyor
  - Existing rail tracks to the left and right of the salt bunker
- Key Features:
  - Reuse of a proven VHV paddle shaft developed for the previous belt conveyor
  - Extension of the discharge belt conveyor at the return station by approx. 1,250 mm to improve accessibility for belt vulcanization
  - Extension of the return discharge of the existing belt conveyor by approx. 6,000 mm to ensure smooth material flow and for cleaning purposes
  - Use of components made of Stainless Steel type 1.4571 (AISI 316Ti / V4A) for bunker supports and plates
  - Use of components made of Stainless Steel type 1.4571 (AISI 316Ti / V4A) for the belt conveyor
  - Lining of the bunker with Polyethylene 1000 (PE1000) instead of solid wood
  - Walkways made of Stainless Steel type 1.4571 (AISI 316Ti / V4A) and walking surfaces covered with GFRP for improved accessibility; addition of a fixed access ladder

* Our solution



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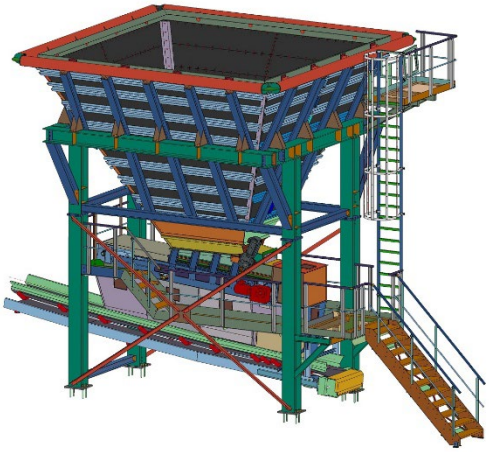
Project-Report

The project for the redesign and replacement of the salt bunker went through several key phases, resulting in a significant improvement in the bunker's structure and functionality. Initially, a detailed concept for the new ship unloading bunker with discharge belt conveyor was developed. This included the planning of the steel structure as well as the routing of the belt conveyors and the dimensions of the bunker to ensure an optimized overall structure. The customer was involved throughout all development stages, allowing operational experience and requested improvements to be incorporated.
Subsequently, VHV carried out a comprehensive 3D scan that provided precise information about the existing environmental conditions, such as the extended walkway with the VHV belt conveyor and the rail tracks adjacent to the salt bunker. The resulting point cloud was integrated into the CAD drawings, and the new components such as the bunker, discharge conveyor, and belt conveyor extension were modeled accordingly.



The implementation included several key modifications aimed at increasing the efficiency and functionality of the salt bunker. These measures included extending the belt conveyor in the area of the return station, as well as modifying the return station itself to improve accessibility for maintenance, belt vulcanization and cleaning.
In addition, more corrosion-resistant materials such as 1.4571 (AISI 316Ti / V4A) were used for the steel structures, including the bunker plates and supports, as well as the belt conveyor. The bunker lining was upgraded from solid wood to Polyethylene 1000 (PE1000) to improve durability and facilitate maintenance.
Furthermore, accessible walkways were created using 1.4571 (AISI 316Ti / V4A) and fitted with GRP (glass-fiber-reinforced plastic) walking surfaces to facilitate inspections, maintenance work, and cleaning. An additional fixed access ladder was installed to improve access to the uppermost bunker platform, which previously had only been accessible by means of a mobile elevating work platform.

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