Logistics, KRÖGER Grab Technology

Minimised Material Loss: State-of-the-Art Grab Technology for Logistics Customers

A leading logistics service provider in North Rhine-Westphalia faced the challenge of transferring fine crystalline sand from inland vessels to trucks efficiently and without burdening the port infrastructure. A particular problem was sand escaping through the upper openings of conventional grabs, causing contamination of the quay, increased cleaning effort, and potential corrosion. At the same time, the gripping force needed to be increased to minimise material loss without affecting operational workflows. Protecting the infrastructure from mechanical stress was also essential. METZEN analysed these complex requirements precisely and developed a bespoke solution in close coordination with the customer: an innovative specialised grab that ensures shell tightness, meets environmental standards, and reduces maintenance costs. The result is a reliable, cost-effective, and sustainable handling process – perfectly tailored to the site-specific requirements.

Challenge

Handling fine crystalline sand presented multiple technical and operational challenges:

- **Minimising Material Loss:** Grab shells had to close completely under high pressure to prevent losses during transfer.
- **Improving Particle Tightness:** Fine sand required a special design to prevent escape even under load.
- **Optimising Mechanics:** Increased closing forces could not compromise operational safety or ease of handling.
- **Protecting Infrastructure:** Contamination and damage to quay and rails had to be permanently avoided to prevent operational interruptions.

Solution

METZEN developed a fully enclosed grab shell construction to prevent sand from escaping through the upper openings. The redesign required an increase in closing force, achieved through optimised mechanics and an additional cable guide.

- **Structural Modifications:** Complete closure of grab shells to prevent material escape.
- **Mechanical Optimisation:** Adjustment of closing forces to ensure reliable tightness even under high pressure.
- **Extensive Testing:** Trials with various materials, including water and fine sand, to ensure quality.
- **Sustainable Solution:** Improved tightness while protecting port infrastructure and maintaining cost efficiency.

Result

The developed grab solution was precisely tailored to the complex requirements of handling fine bulk materials. The focus was on efficient, clean, and safe material handling – without compromising functionality or infrastructure compatibility. The outcome impresses with technical precision, high environmental standards, and measurable customer benefit:

- **Efficient Material Handling:** The fully enclosed grab reduces material losses to almost zero.
- **Optimised Operation:** Mechanical adjustments ensure reliable function without limitations.
- **Environmental Protection:** Minimized contamination of the port protects infrastructure in the long term.
- **Customer Satisfaction:** A bespoke solution that sets new standards in grab technology and meets all customer requirements.

Highlights

- **Maximum Tightness:** Grab shells with fully enclosed design prevent material loss.
- **Efficient Problem Solving:** Innovative approaches reduce sand loss even under high pressure.
- **Operational Safety:** Protection of port infrastructure by preventing sand deposits.
- **Optimised Closing Forces:** Mechanic adjustments ensure safe and complete closure.

Contact

Klaus Reichel
Senior Engineer Materials

klaus.reichel@metzen.org

M +49 171 361 61 14
T +49 2838 3772

KRÖGER
a METZEN brand
Steinheide 1-9
47665 Sonsbeck