From challenge to conquest

by Fitzwilliam Scott

One of Nemag's customers, SMT Shipping, has achieved significant transhipment advancements, particularly in West Africa on *TSV Conakry Pearl*. This region presents a unique challenge due to its shallow shores, extending 10 to 20 meters in depth for up to 10 miles. To be profitable, you will have to ship your cargo on colossal ore carriers. These capesize vessels can export up to 200,000 tonnes. However, these fully loaded enormous ships, 18 meters in depth, cannot approach the shore. The traditional solutions, like constructing extensive jetties or dredging long channels, are economically unviable. This is where SMT Shipping's expertise comes into play.

The company owns and operates vessels with a unique combination of high-loading capacities and shallow drafts. "This allows us to transport a significant amount of cargo from the terminal, usually located on a river in West Africa, to the open sea. We then use large cranes to transfer the cargo to Capesize vessels, also known as Newcastlemax bulk carriers. For rapid and voluminous transfers, a highly efficient grab is essential," explains Marc Smeets, Technical Project Manager at SMT Shipping. With revenue calculated per tonne, the challenge is clear: "We need to optimize the continuous cargo transfer process to maximize our profit."

The challenge: different cargo needs a different grab

Originally, SMT's vessels in West Africa transferred bauxite. When the market for it collapsed, SMT was compelled to shift to iron ore transfer for a client in Sierra Leone. This transition posed challenges because of the different specific gravities of bauxite and iron ore. The former is lighter than the latter, respectively around 1.6 vs 2.5 tonnes per cubic meter. Therefore, each material asks for a unique type of grab that maximizes efficiency without compromising the safety and integrity of the crane system.

Although they purchased a specialized bauxite scissors grab from Nemag, the differing weight characteristics of iron ore presented issues with crane overloading, impacting the time of each unloading cycle – a vital factor in their revenue model calculated on a per-tonne basis. Smeets explains that SMT now had three different grabs at their disposal; yet, none of them were ideally suited for the specific characteristics of the iron ore they were now transferring. "We had one too-small clamshell grab, a too-big bauxite clamshell grab, and the big bauxite scissor grab from Nemag." It sounds like a luxurious position to have three grabs available. "Our technical management wasn't so eager because we already had three expensive grabs on board. But I was fully convinced that we needed a new grab – since they all didn't enable optimal productivity."

The solution: faster = better

Facing a challenge with their grab selection for iron ore transhipment, SMT Shipping began exploring the best possible grab solution. They had already experienced Nemag's craftsmanship with their scissors grab purchase.

"Martine, an account manager at Nemag, already told us about the NemaX grab," Smeets recalls. "So we returned to Nemag, where she shared a pretty promising presentation. We could also see and experience the NemaX in operation at a steel manufacturer in IJmuiden near Nemag. This live demonstration was very convenient and showed firsthand how satisfied everybody was." He furthers, "In addition, she calculated and presented data comparing the cycle times of various grabs, revealing that the NemaX showed a remarkable productivity improvement of 14% and 19% compared to the clamshell and scissors grabs with similar specifications. This gave us valuable insights into the performance difference and a clearer view of the total cost of ownership. These numbers also convinced the commercial manager to give this investment a try."

The NemaX grab stood out because of its efficiency. Traditional clamshell grabs require a significant amount of wire to be pulled in and out, taking valuable time with each cycle. In contrast, the NemaX grab uses a fraction of the wire length compared to standard grabs. With SMT's small clamshell grab, the wire length is 13 meters compared to the 8.7 meters of the NemaX grab. "Saving seconds on each cycle doesn't seem much until you calculate the impact on an annual basis," Smeets notes.

Although the productivity looked promising, he still had to convince his boss. "Our owner always thought Nemag was a bit like the Mercedes or Ferrari of grab builders – the highest quality but overpriced when you only need to get from A to B." Yet, he later discovered that the price difference between Nemag and its major competitors wasn't all that significant. This ended his long-standing perception when he learned that Nemag's prices are reasonably in line with the market. "High-skilled operators combined with the technical advantage of NemaX meant our overall efficiency would significantly improve. Recognizing the potential of the NemaX grab, as it is also co-developed with the Delft University of Technology, we decided to invest in it," Smeets says. Comparing its productivity with other grabs in the Sierra Leone use case, NemaX emerged as superior thanks to its speed. This only reaffirmed the notion that faster transfer times result in higher profits.

Photos: Nemag

The result: productivity up 25%, three-month ROI, easier & safer maintenance

Following the integration of the NemaX grab into SMT Shipping's operations, the company witnessed an increase in productivity that simply couldn't go unnoticed. The crew had to get used to the new grab in the first weeks. But after their first month, the handling rate went from 1,000 to 1,250 tonnes per hour. The NemaX Grab boosted productivity by a quarter compared to the previous Nemag scissor grab, which wasn't optimally suited for iron ore.

The fitting grab for the right job in this continuous transhipment process was an excellent decision – despite the other three available grabs at the ship. The stark improvement in performance resulted in an exceptional return on investment period of less than three months. "This NemaX grab paid itself back more than four times in its first year," Smeets tells us.

Furthermore, the NemaX grab demonstrated superior safety and maintenance features. Breakdowns are annoying, tedious, and expensive if you're on a ship in West Africa. With fewer moving parts than the traditional clamshell grab, SMT Shipping experienced zero breakdowns after transferring six million tonnes in the first year. Maintenance was also more straightforward. Technicians needed to climb up to service a clamshell grab, but the NemaX's design allows for easy access from the ground. The grab eliminates the risks associated with working at heights, especially on a moving vessel at open sea. Also, unlike a clamshell grab with eight sheaves and the same number of hinges, the NemaX grab only has two sheaves and one hinge. Fewer moving parts and easier access contribute to faster and more efficient maintenance processes.

From purchase to partnership

After seeing the success of the NemaX grab, SMT was eager to keep improving. If you continuously rotate through a 180-degree cycle in the open sea, it results in some accidental sideway collisions now and then. The skilled crew, mainly of Polish workers, welded some modifications. These enhanced the grab's strength with no downtime of the grab leaving the vessel.

Another challenge is West Africa's seasonal climate. The wet season, stretching from May to October, alters the iron ore's properties and affects the grab's penetration ability. The rain in the wet season makes iron ore a bit heavier but also more lubricant and thus easier to penetrate. In the dry season, the ore is harder to penetrate and requires a heavier grab for the best performance. However, a heavier grab designed for dry material underperforms in handling wet ore due to its extra weight. So, consistent efficiency levels are a challenge to sustain and usually turn into a compromise.

After the success of the NemaX grab, Smeets was interested in buying another grab to further increase their productivity. Open to innovation and custom improvements, Nemag also included the custom SMT-adjustments in the new grab that is currently being delivered after a successful factory acceptance test. Additionally, it has a unique feature to add or remove weight in the grab's tubing. By changing its gravitational force, this hybrid solution can handle both wet and dry ore equally well. The second grab allows for more flexibility and functions as a productivity insurance for when the current NemaX grab needs large or unforeseen maintenance.

What appeared to be 'just' a grab-buy in the first place transformed into a partnership between SMT Shipping and Nemag. The two have opened the doors for future projects to tackle the unique challenges of open sea operations and ensure optimal performance and durability of grabs. ■

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