

NEW FASTER LIGHTER STRONGER

The new nemaX[®] grab for iron ore, >10% higher productivity than all comparable clamshell grabs, far stronger and the lowest maintenance costs ever.



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3 / 4 ACCELERATE YOUR TRANSSHIPMENT

NEMAG HANDLES YOUR BULK

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The transshipment of dry bulk material is a crucial factor throughout the entire transshipment chain. Transshipment is the shipment of goods or dry bulk cargo to an intermediate destination, then to another destination. One possible reason for transshipment is to combine small shipments into one large shipment (consolidation) and/or to divide the large shipment at the other end (deconsolidation). High-performance transshipment usually takes place at onshore or offshore transport hubs. This whitepaper deals with high-performance offshore transshipment situations and highlights the merits of the newly developed nemaX four rope grab for transshipment situations at sea.

Trends and challenges

Apart from management issues on board, seaborne operations face the following challenges:

- Operational: How do I avoid congestion and demurrage costs of ingoing and outgoing vessels due to slippage in ETA & ETD, availability of the installation due to bad sea state and other meteorological conditions?
- Technical: How do I keep my installation going at open sea under severe conditions and without too much technical support?
- Financial: As the handling rates are under pressure due to overcapacity in the dry bulk market, how do I increase efficiency and lower costs per tonne of transshipment?

Equipment at transhippers

Many high-performance marine transshipment hubs are equipped with four rope (grab) slewing cranes.

The reason for choosing four rope cranes is significantly higher efficiency compared to, for instance, slow-moving, single line derrick cranes equipped with slow-operating remote controlled or electro/hydraulic grabs.

In most cases, these four rope cranes are standardized to a high degree with specific speeds and accelerations, depending on the make and type. Within these constraints, the productivity of any transshipment crane depends entirely on the productivity of the grab.

Any grab, regardless of type or brand, will have a given deadweight and payload. The general idea is that the lower the grab's deadweight, the higher the payload and the higher the productivity. Right? Or is there more to it? The grab's opening and close time should also be considered.

Productivity = payload x cycles per hour

The number of cycles per hour is the result of the hoisting and slewing time of the crane plus the opening and closing time of the grab. Given the speed of the crane winches, the closing time depends on the grab's closing cable withdrawal length. As slewing cranes can only start to slew after the grab is fully closed and lifted out of the cargo, the opening and closing time of the grab is an important factor in the entire productivity. Especially at small slewing angles (which operators prefer to have in order to achieve the shortest possible cycle time), the speed of the grab has a dominant impact.



Let's zero in on nemaX!

Through exhaustive computer simulations, Nemag has succeeded in developing a new generation of grabs for the handling of iron ore: the nemaX grab.

The nemaX has a 15% lower deadweight compared to similar clamshell grabs, as well as a 20% shorter cable closing length. The result is a higher payload, a significantly shorter cycle time and at least 10% higher productivity for the entire transhipper.



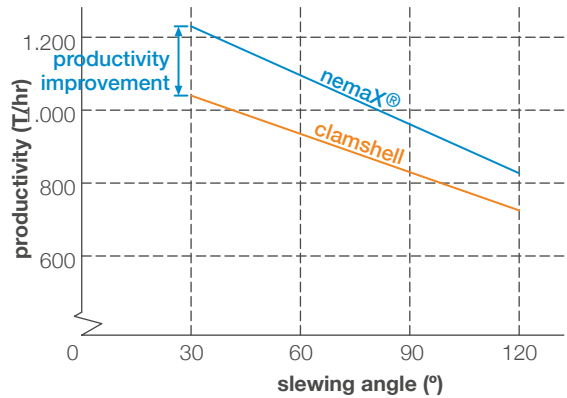
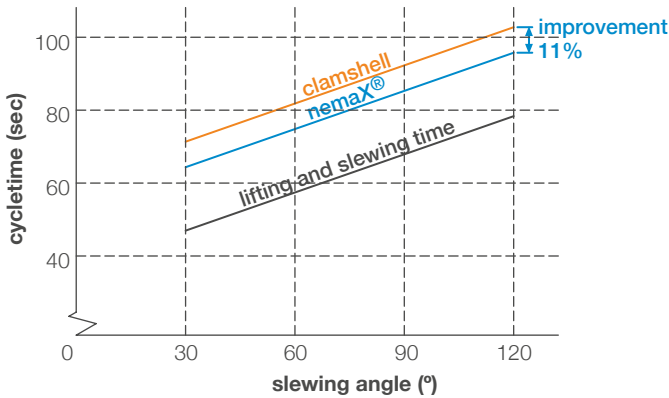
In order to understand the consequences in daily practice, please have a look at the business case below, which refers to a well-known brand of maritime cranes. The table compares a nemaX with a typical

lightweight Clamshell grab that is often used for this type of crane.

The result is clearly to the advantage of nemaX, which has up to 17% higher productivity due to a lower deadweight

and a faster opening and closing time. The advantage will lead to even higher productivity increases in case of higher SWL cranes. Want to know more? Please contact Nemag.

	Slewing Crane 30T + Clamshell Grab	Slewing Crane 30T + nemaX® Grab	Improvement
Grab weight (tonne)	9,3	8,1	
Payload per cycle (tonne)	20,7	21,9	+ 6%
Grab closing rope length (m)	10,7	6,2	
Lifting and slewing time @ 30° slew (sec)	47	47	
Opening and closing time of grab (sec)	24,4	17,4	
Total cycle time (sec)	71,4	64,4	+ 11%
Turnover / hour (tonne)	1.044	1.224	+ 17%



More advantages of the nemaX grab:

1. Increased productivity in the intermediate and clean-up phase

In addition to increased productivity in the free-digging phase due to lower weight and faster closing and opening times, the nemaX extends the free-digging rate past the intermediate phase and reduces the clean-up phase thanks to a 30% larger footprint and horizontal digging path. As a result, the nemaX helps save on expensive and time-consuming trimming equipment.

2. Improved dynamic behaviour at floating transshipment

A typical floating transshipment crane deals with a pendulum motion of the pontoon & crane. This is the result of:

1. Crane sway due to shifting centres of gravity caused by changing weights (empty grab/full grab) combined with changing outreach of the crane
2. Sea state and swell

Even a ballasted/stabilised pontoon will have significant relative movement, causing relative movement between the grab and the bulk during digging. This will lead to harmful peak loads in the crane and productivity losses. Experience with a 45-tonne SWL floating crane (Lemniscate type) in the Netherlands has shown that the extremely short closing length of

nemaX makes the grab so fast that it can easily follow the pendulum of the floating crane. This significantly reduces load peaks on the crane. This has the following advantages:

- Lower load impact on ropes
- Lower load impact on opening/closing and hoist winches & gear box
- Lower load impact on slewing ring bearing
- Lower fatigue stress on the general structure of the crane
- Significantly quieter operation for the crane driver

Due to the fast closing of the nemaX, unloading is less dependent on the dynamics of the floating crane and on the sea state.

3. Less maintenance

A nemaX requires less maintenance compared to a clamshell grab thanks to 70% fewer moving parts, the long lifespan of the closing cable and only one pivot point, compared to the six pivot points on a clamshell.

Conclusion

While the impact of some of these factors may vary, one thing is perfectly clear: nemaX will accelerate your unloading performance with your existing installation by at least 10% and lower the cost per

tonne in bulk handled. It will also extend the lifespan and reliability of your crane and reduce your maintenance costs. NemaX is now available for handling all kinds of iron ores and minerals. NemaX will be available for handling coal and other light density materials by the end of 2018.

For more information, visit our website and subscribe to our newsletters and publications.

About Nemaq

Nemaq, a family business founded 94 years ago, is the preferred partner for the handling of dry bulk materials and enjoys a strong reputation worldwide. Nemaq provides a wide range of grabs and various types of quick-release links and rope-pear sockets. Whether it's handling coal and iron ore or loading and unloading wheat, scrap materials, minerals, biomass or other bulk goods, Nemaq always offers an optimal and reliable solution. The aim is to reduce handling costs per tonne of dry bulk materials transferred for steel plants, power stations, OEMs and commercial terminal operators. Innovation, customer support and a highly intensive after-sales service are of paramount importance to both Nemaq and its customers. A global network of specialised representatives supported by Nemaq specialists is ready to assist customers worldwide.

This whitepaper is the fourth part of a series about nemaX®.

Want to know more?

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