

# Meeting the highest demands

Managing Director of SMB International, Dipl.-Ing. Andreas Heckel, describes how his Quickborn, Germany-based company has built a full-fledged ship loading system for bags in the port of the Polish city of Gdansk



**B**y developing a fully integrated solution, the internationally experienced company has proven once again that technically advanced automation and flexibility make the difference.

Time is money – this is hardly ever more apparent than when transporting goods by water. The faster a ship can be loaded, the shorter the lay time and the more cost-effective the overall transport. But the safety of the transported commodities during loading also plays an important role: the less likely the goods will be damaged, the lower the insurance costs. Last but not least, loading must be carried out with optimum utilization of the available cargo space. Reliable ship loading systems are therefore time and cost-saving solutions as they ensure optimum and efficient loading of vessels. In Poland's largest port and important gateway to Scandinavia, a new

facility was built in 2021 at which vessels with particularly high deadweight can dock. The declared objective was to enable the handling of up to 300,000 tonnes of sugar a year. Polish sugar producer Krajowa Spółka Cukrowa, known as Polski Cukier for short, supplies 40 percent of the sugar produced in Poland and also exports it. In Gdansk, the company faced the challenge of loading its commodity in 2,400 bags per hour. The vessels to be loaded have a stowage from 4,000dwt to 35,000dwt.

German company SMB International is a specialist for loading systems, conveyor technology and material handling and has been developing customized ship and barge loading systems for more than 25 years. The company has implemented numerous loading systems for customers in Asia, North Africa, South America and Europe. It uses a proven two-stage production process: "First, the loading systems are designed directly at our headquarters in Quickborn near Hamburg," explained Andreas Wolf, project manager at SMB International. "Here, all mechanical and electronic modules are individually developed and produced according to the requirements. They provide the basis for the customized implementation of projects and their subsequent installation on site." SMB also has many years of experience in the upgrading and expanding of existing facilities and capacities. So this was far from being the first major international project for the experienced engineers, but every task brings its own challenges.



### PROPER CARGO HANDLING

In view of the different commodities and their types of transport, three basic loading facilities have evolved: one for bulk goods, one for bags and one for the combined loading of bulk goods and bags. Their design is similar in that a continuous conveyor anchored on the quay or mounted on rails has a boom that can rotate over the cargo hatch. What is different is the structure or conveyor unit that is immersed in the ship's belly: for bulk materials, this can be a downpipe or cascades arranged one above the other. If only bags are loaded as in this case, a spiral chute is used via which the bags slide by gravity into the depth of the hatch by means of gravity. If both loading options are needed, a loading system combining a cascade chute and a spiral chute will be used. A loading head is attached to the end of the spiral chute. It carries a telescopic conveyor with two extension options and permits to position the bags with centimetre precision up to the far corner of the cargo hold.

In Gdansk, SMB International has implemented a mobile ship loading system on existing rails. It is steel cable guided and controlled by winch drives. The bags, which are filled automatically in the adjacent building, are transported by conveyor belts one by one – like beads on a string – onto the roof. SMB's system starts where a deflection from the feed belt, the jetty, to the boom of the loader is necessary. The bags reach the top of the boom and hence the spiral chute via belt systems and chutes. To accommodate all vessel widths up to 35,000dwt, the cleverly designed spiral chute can be moved 10m on the boom by means of a lantern gear drive. The outreach can be further increased by the telescopic conveyor belts, which are attached to the bottom of the spiral chute, the loading head, and may measure up to 8.5m in length. The possibility to extend the spiral chute 2.6m in a spiral is another strong point of the facility. In combination with the swivelling loading head, the continuous conveyor can thus reach all storage locations in all directions (360°) of the cargo hold. To ensure that the spiral chute always remains in a vertical position – even when the boom is raised or lowered – a hydraulic cylinder activated via sensors carries out a compensation movement. This ensures that the bags are transported by gravity into the ship's belly at all times. "SMB's scope of delivery includes the assembly of all subassemblies and electrical components, a control cabinet container with control devices and elements as well as a software for all movements that are triggered manually via a radio remote control," said Andreas Wolf. The conveyors are controlled in such a way that the loading works automatically. This is supported by manual operation of a radio remote control which permits to move the loader on the rails, to move the boom up and down, to control the telescopic movement of the spiral chute as well as the rotation and telescopic movement of the loading head and to start and stop the conveyors belts. The boom is raised and lowered by a winch and multiple hitched cable. When not in use, it is pivoted into a storm lock in the upper position at 68°.

### FLEXIBILITY AND SAFETY

Ship loaders are always individually designed to their future requirements and tasks. These may be



systems for vessels from 5,000dwt to 120,000dwt with a loading capacity of up to 2,500t/hr. Depending on the requirements, the systems are designed for stationary or mobile use on rails. "We base each of our systems on the specific requirements of the customer to create a customized solution," said Andreas Wolf. "Many systems handle up to 1,500t/hr, but a much higher throughput is also possible." Thanks to a high degree of automation, the loading process can take place at any time of day or night and the commodities are always protected when conveyed from the warehouse to the ship. When developing the system for Gdansk, great importance was also attached to safety, while at the same time optimizing performance and flexibility. "The flexibility of conventional ship loaders is often limited. Our designs make it possible to integrate the loading process into the logistics concept of the port," emphasized Andreas Wolf. To ensure the conveying process from the warehouse to the hatch or the ship's belly, ship loaders are assembled on site in close cooperation with the customer. "The systems have to be adapted to the local conditions, not the other way round," explained Andreas Wolf. "If the precisely coordinated designs then also work perfectly together in practice, you can complete the job with the good feeling of having implemented the highest-quality solution, which is also the most efficient one for the customer."

### COUNTDOWN FOR THE TEST RUN

The test loading of the sugar bags in Gdansk took place in February 2021. SMB's ship loading systems have proven their performance over many years. Long-term cost-efficient operation is another obvious goal for the engineers. Lower handling and operating costs as well as shorter port calls allow customers to make optimum use of waterways. SMB meets the special material requirements of bulk goods transport by using high-quality components and relying on the highest quality standards already during production. The result are high-performance conveying solutions designed for smooth long-term operation using a minimum of energy ■