IBAU HAMBURG

Marine Terminals, Ship Loaders and Unloaders,
Cement Tanker, Equipment for Power Plants,
Special Applications

Ship Unloaders
When IBAU HAMBURG was established as an engineering company in 1975, its core-activity area was the Silo and Materials Handling Technology. Innovative products and technologies such as the IBAU Central Cone Silo have radically changed the storing of bulk material. IBAU HAMBURG’s first harbour terminals were built in the mid 80s. In order to offer a complete range of material handling equipment, at the beginning of the 90s IBAU HAMBURG developed a ship unloader. Since then our company is one of the most important suppliers of ship unloaders for the cement industry.

In addition, we took advantage from the decision of developing mechanical ship unloaders that work applying the screw conveyor principle and whose energy consumption is only 0.4 to 0.5 kWh/t of cement. Thus, if compared to the vacuum systems, 60 to 65 % of energy for the cement unloading is saved.

According to the size of the ship and the terminal conditions, the following ship unloaders can be used:

- up to 5000 dwt and 400 t/h unloading capacity,
- up to 15000 dwt and 400 t/h unloading capacity,
- over 15000 dwt and 800 t/h unloading capacity.

Self-supporting constructions are used for the capacity class up to 15000 dwt. Supporting structures are needed for ship unloaders of the 20000 dwt class with 20 m long unloading arms. The weight of ship unloaders installed on trailers is about 30 t, while bigger ship unloaders for Handymax-ships weigh several hundred tons.

Ship unloaders in general
Road mobile ship unloaders of the 5000 dwt class

Mobile ship unloaders installed on trailers need to have a maximized manoeuvrability and it is required that they are ready for operation in 30 minutes starting from the transportation position. An IBAU HAMBURG ship unloader needs only 20 minutes for this process and manages it without support and relevant bolt-fastenings or a hoisting winch. The needed conveying height is very favourable: only 4 m above sea-level. So it is ensured that the horizontal screw is in a horizontal position or inclined forward for more than 80 % of the unloading procedure time, thus using less energy for the conveying and causing only very few wear.

The conveying capacity for the 5000 dwt class developed by IBAU HAMBURG is actually a „rated capacity“ of 400 t/h, that is, more than 30 % of the normal capacity of other ship unloaders. This corresponds to the maximum capacity of pneumatic ship unloaders in the mobile part. These values could be reached due to the optimization of the construction as well as the improvement of the applied technology.

Ship unloaders of the 5000 dwt class do not always need to be road-mobile. For example, for the port authorities of Bamberg, Germany, IBAU HAMBURG had to integrate in a very narrow space of the existing structures a ship unloader. Moreover, the ship unloader both needed to be rotating and to be suitable for being folded up for the parking position. The ship unloader can feed either a belt conveyor for a near-by cement terminal or a rail-loading installation.
Road mobile ship unloader

Information

Details of a ship unloader

Loading chute with dust filter

Easy handling with hydraulic cylinders

Inlet feeder in material

Function of inlet feeder

Road mobile ship unloader in transport position
Road mobile ship unloader

- Road mobile unloader at Jubail harbour, Saudi Arabia
- Stationary ship unloader at Bamberg harbour, Germany
- Road mobile ship unloader with pneumatic conveying unit for Caledonian Slag Cement, Scotland
Road mobile pneumatic conveying system

Road mobile pneumatic conveying unit in transport position

Road mobile pneumatic conveying system during transport

Pneumatic conveying system at Lübeck harbour, Germany
Port mobile ship unloaders of the 15000 dwt class

Because of their size, ship unloaders of the 15000 dwt class are not road-mobile. Nonetheless, in a harbour terminal ship unloaders need to be mobile, for example so that they can be moved into the parking position. The 15000 dwt class applies the same material-transportation principle as the smaller ship unloaders, i.e. the screw conveyor system.

The ship unloader has a platform which hosts a ball bearing slewing rim for each moving main and secondary arm, powerful transport and loading installations, as well as necessary secondary aggregates such as the control system, drives, hydraulic and dust filters for an independent activity. Because of the high bending strains and shocks of the mobile ship unloader, the screw bearing is very important. That is why horizontal and vertical screws of IBAU ship unloaders consist of decoupled parts, which are connected by an intermediate bearing. The bearing are cladded and continually lubricated.

The quantity of unloaded material is determined by the joint action of the material inlet feeder and the horizontal screw. While the speed of the material pick-up is 0-20 l/min, the vertical screw conveyor works constantly at a 500 l/min speed. The speed of the inlet feeder is determined by the required power of the vertical screw conveyor. With such a control system there cannot be any blockage and the conveying process is generally very regular and close to the set unloading capacity value.
Port mobile ship unloader

Port mobile ship unloader for Colacem, Savona, Italy

Support jacks

Easy operation via remote control

Unloading layer by layer
High capacity ship unloaders of the 60000 dwt class

In order to meet the requirements of the 15000 to 60000 dwt ship unloader, IBAU HAMBURG has developed a modulare type construction as well as a new concept which takes over the high quality of the former models and at the same time has several improvements that are superior to those existing on the market.

With a weight of about 240 tons, the new ship unloader belongs to the lightweight-constructon class, whereas IBAU HAMBURG has managed to maintain its efficiency, reliability and stability, thus establishing a new standard.

The ship unloader has been designed to be port mobile and to have a conveying capacity of 800 t/h – rated capacity. The energy requirement for the unloading and the cement transport is less than 0.5 kWh, thus setting a new standard. The mechanical screw conveyors and the fluidslide principle have been combined for the material transport. The material pick-up from the cargo holds is ensured by a vertical screw conveyor with a diameter of 500 mm and a counter-rotating inlet feeder. The further transport is made through the horizontal screw conveyor with a diameter of 700 mm and the connected fluidslide transport which also allows a parallel truck loading.

With the 19.5 m long vertical and the 23 m long horizontal screws it would possible to unload even ships of the Panamax-Class.

When designing the high-capacity ship unloader not only the technical parameters were important but also a low weight load on the quay, improved stability and strength as well as an excellent ease of maintenance and servicibility, which implements a high reliability and availability.
High capacity ship unloader on wheels for Dangote Cement, Nigeria
High capacity ship unloader

Ship unloader at Singapore harbour for National Cement

Unloader on rails at Lagos harbour

Feeding a belt conveyor via airslide system
High capacity ship unloader