Ship Loading Solutions

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Abstract

Market dynamics can cause a necessary import to become a profitable export, or a staple exported product may need raw materials to be imported in a time of shortage.

A good example is the soya bean industry in Brazil, where oil extraction plants sited adjacent to ship terminals receive home grown soya bean by truck or rail and after extraction load the oil and the meal onto ships for export. Sometimes however, because of the market situation, imported soya bean from abroad can be cheaper then the inland product, especially if draw back operation is used in order to avoid taxes. In this case a dockside system capable of unloading vessels as well as loading is required.

Again, in the flour mill business in Indonesia, the imported wheat is unloaded and the by-product of bran pellets is loaded for export. To meet these fluctuating requirements it is essential that ship loading equipment be adaptable and flexible.

Various solutions for shiploading can be used, the choice dictated by economic factors such as the annual quantity to be loaded, whether the owner of the berth will install fixed equipment or provide portable machinery for temporary handling contracts.

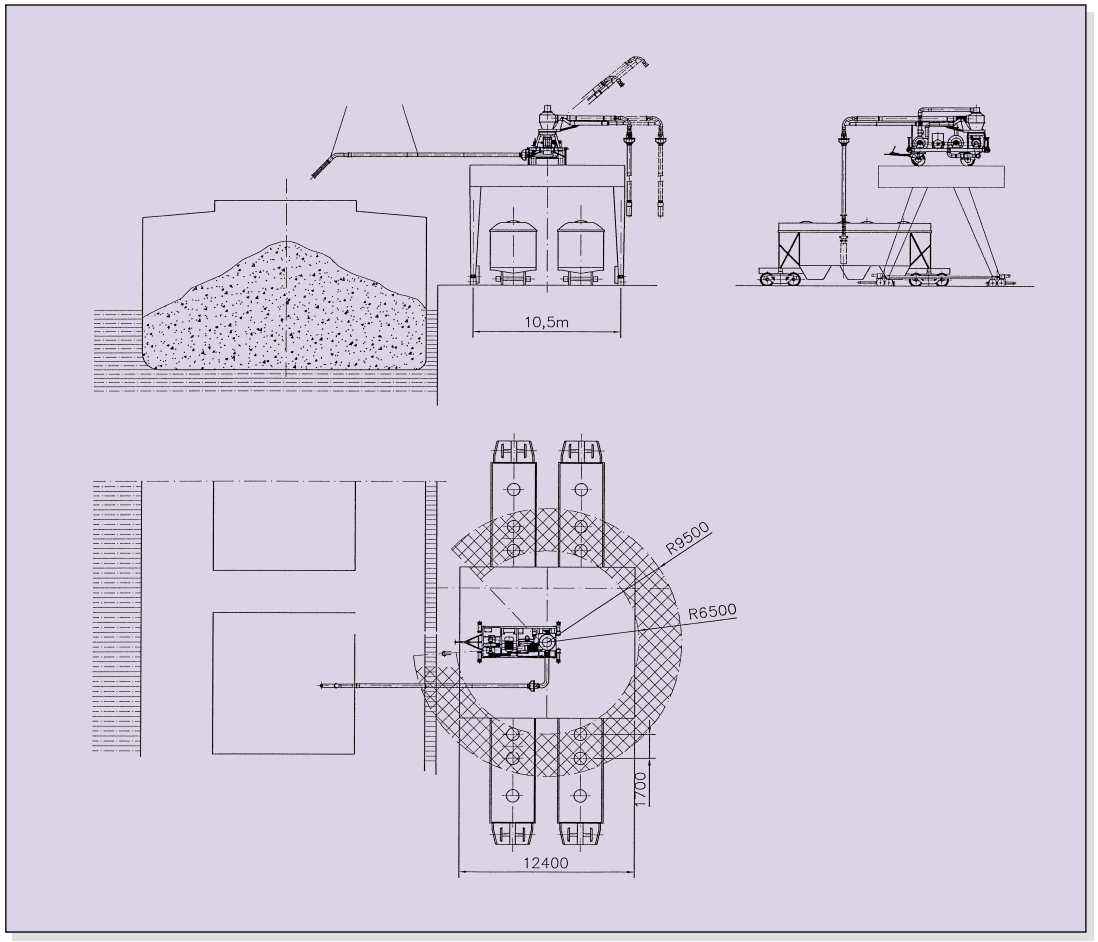


Figure 1
A temporary export installation loading a ship

Figure 2
A swivelling arm shiploader

TYPICAL SOLUTIONS

1. A temporary export installation being used in Russia.
The import terminal is now required to export products because of the increase of inland production and the advantages of the export trade. The terminals are not equipped to export products and the operators have a temporary permission to use portable equipment.

GSD type mobile pneumatic conveyors unload the rail wagons and blow the product into the ship's holds. In this case the mobile units are mounted on the existing structure of an old crane. These mobile unloaders can be powered by diesel engine or by electric motors if electricity is accessible. The average capacity per unit is around 120 metric tonnes per hour (mt/h), limited by the the clean up time for the wagons. The movement of the booms easily reaches the wagon hatches and the blowing pipe can be moved to act as a trimmer for the better loading of the vessel.

2. A specialised export terminal from Romania.
A terminal depends on the available space that can be used and one solution for smaller areas is shown here.

An 800 mt/h swivelling shiploader with kick in, kick out movements to completely cover the ship's hatches, has defined positions for operating along the quay. The feeding conveyor is not at one end but feeds 2 conveyors on the quay. The time it takes to connect to each point is compensated by the longer loading time using the slewing movement to reach all parts of the hatch. The quay conveyor is in the lower position and the material reaches the boom height via a bucket elevator.

3. A specialised export terminal in Brazil.
This is a high volume terminal for soya meal with available space to use a travelling tripper car to continuously feed the shiploader.

A 1,500 mt/h shiploader for Panamax ships has a telescopic shuttle loading belt to reach all hatch positions. This shiploader type is less expensive because of the design but requires extra length of the quay to allow for the tripper car conveyor length. The combination of travelling and the telescopic movement of the loading boom brings the material to all parts of the hatch. A rotating chute attached to the telescopic loading pipe helps to fill the hatch corners.

4. A specialised export terminal in Brazil for larger vessels.
Also a high volume terminal for soya meal with available space to use a travelling tripper car to continuously feed the shiploader.

Figure 3
1,500 mt/h shiploader with telescopic shuttle loading belt

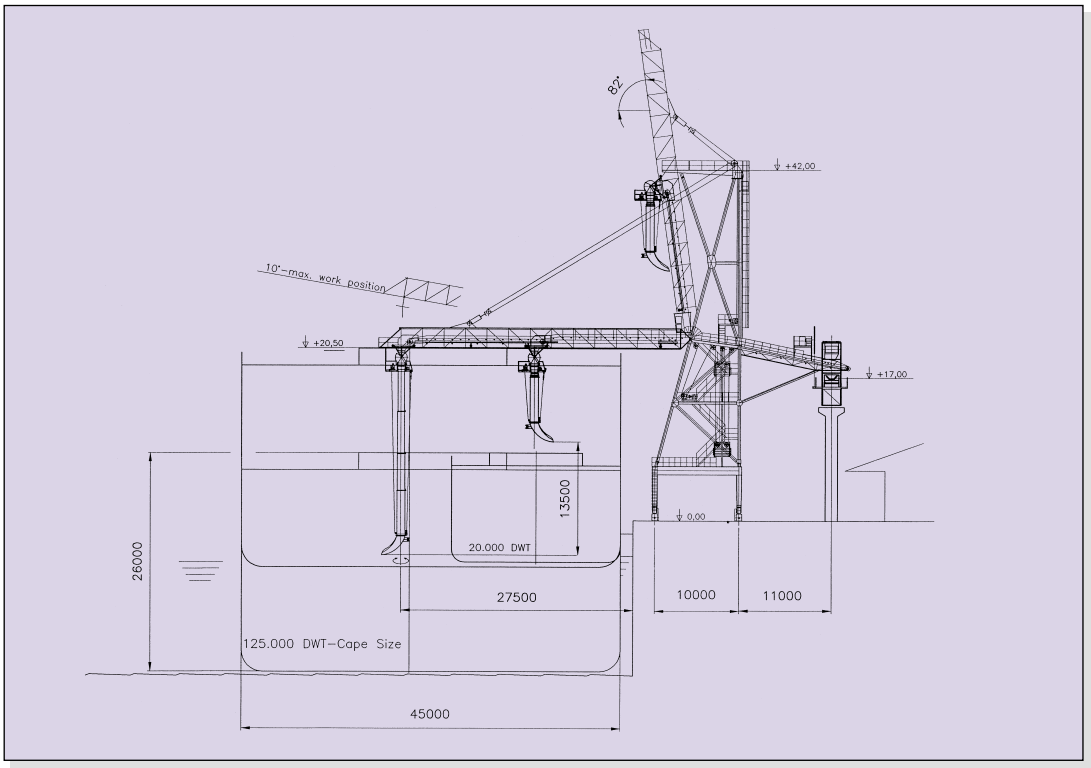
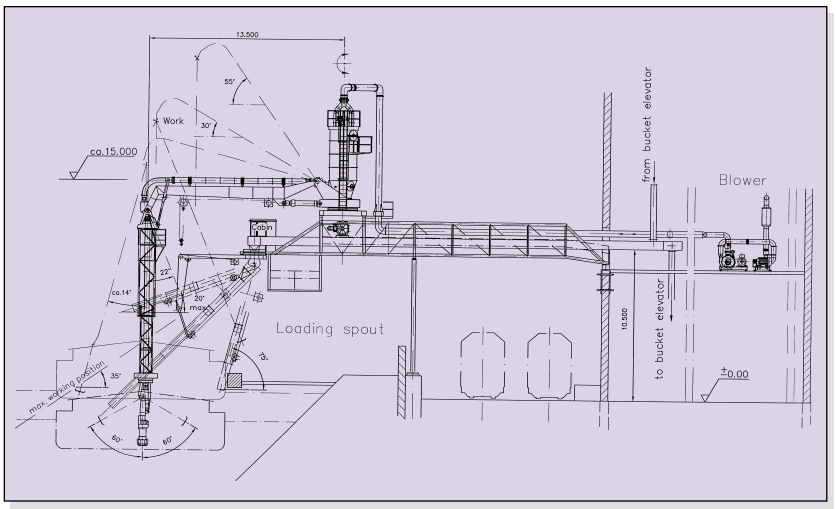


Figure 4
2, 000 mt/h shiploader

Figure 5 (below top)
Fixed installation combine unloader – loader

Figure 6 (below bottom)
Small fixed installation shiploader

Of similar design to 3 above, but with the telescopic belt extended, this shiploader has 2,000 mt/h capacity and is able to loads Post Panamax ships up to 125,000 dwt.



5. Combined Shipunloader – Shiploader.

A fixed installation from Austria. Combined machines are very useful and can be arranged in many layouts similar to the one shown.

For unloading and loading of a feed mill a stationary unloader with a digging nozzle together with a loading spout is an excellent solution in all respects. The digging device should be strong enough not only to cut the material but also to force it to the nozzle. This allows a continuous throughput of material, not just making holes in the compacted material. The capacity in this case is 150 cubic metres (m^3) determined by the existing conveyor system of the feed mill.

The loading system has the same capacity as the unloading system and consists of a slewing, luffing – lowering and telescopic movement. Both systems are controlled from the same control cabin.

6. Fixed shiploaders in Germany.

Two examples of small ship loading installations at feed mills.

7. Combined Shipunloader – Shiploader mobile Combiport at Trinidad.

This machine is fitted with environment protection systems in order to avoid pollution. The pneumatic unloading system has a filter, with de-dusting filters at the material transition points for the unloading operation. A dust suppression system at the loading spout with a self regulating material column prevents the air moving the dust around. Two level indicators in a logic connection with a flap valve makes the material flow slowly and

Figure 7
Medium fixed installlation shiploader

Figure 8
Mobile Combiport

Figure 9
Combined shipunloader-shiploader tower

constantly without carrying over the air. The travelling, slewing and telescopic chute movements cover the whole hatch area. But while using dust suppression loading systems, vessel trimming must be carefully monitored because the material cannot be thrown to fill the hatch corners.

8. Combined shipunloader – shiploader tower in Indonesia

Like the Combiport, this tower offers the unloading and loading operation in the same equipment.

Equipment used at the Bogasari Flour Mill in Indonesia is illustrated. The mill complex has the capacity to process 10,000 tonnes of wheat daily. The unloading system delivers wheat to the Mill complex and the loading system is to export the bran pellet by-product. The unloading tower has 2 unloading booms with 500 mt/h capacity each. The tower is equipped with a 7 ton x 20 metre crane that is used for general cargo, the positioning of front loaders into the hatch and maintenance. The 400 mt/h loading system has a bucket elevator to bring the material from the tripper car of the quay belt to the boom height. The horizontal and vertical telescopic movements of the loading boom, together with the travelling ability covers the whole hatch area. A slewing spoon is at the bottom of the vertical telescopic chute in order better to trim the material in the ships hold.

ABOUT NEUERO

NEUERO started in pneumatic grain conveying 60 years ago with the manufacture of small agricultural machines. Since then the company has delivered equipment in the 20mt/h to 1000mt/h range to many installations round the world. Neuero has two companies with sales, engineering, manufacturing and service facilities in Germany and the US.

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