



Two lines of Tripler C-Frame Tipplers, operating at 60 wagons unloaded per hour (all photos/graphics © SCHADE)

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SCHADE Lagertechnik's Innovation Generates Success in Russian Ports

Since SCHADE Lagertechnik GmbH (AUMUND Group) opened the specialized Rail Wagon Unloading office in Bristol, UK, in 2010, the Russian ports and terminal market has become increasingly important for the company. The supply of two rail wagon tipplers for two separate new cement plants (Slantsy and Podgorenskii)

in 2009, by AUMUND Fördertechnik GmbH, Germany, laid the basis for the success in Russia. During this time, several more customers have relied on the expertise and high-end products of SCHADE Lagertechnik. The company has sold wagon tippler systems to three separate export terminals with equipment

varying from a single side-tipping tippler with feeders to unload iron ore pellets at approximately 1,500 tph to two separate systems, each capable of unloading coal from three wagons simultaneously at unloading rates of up to approximately 4,400 tph.

Three successful projects and more to come

The first project for a major coal, iron ore, sulfur and fertilizer terminal being constructed on the Black Sea coast of Russia comprises five separate rail wagon unloading systems: two separate wagon tippler systems each unloading coal and iron ore at around 4,400 tph by tipping three wagons simultaneously, one side tipping (or pivot frame) wagon tippler system unloading sulfur at a rate of 22 wagons per hour (1,500 tph) and two separate bottom-dump facilities for unloading various types of fertilizer at 1,500 tph each.

The second project was realized at a major coal export terminal being constructed in the Vladivostok region of Far East Russia, where SCHADE will supply two separate wagon tippler systems, each capable of unloading two rail wagons simultaneously at a rate of 54 wagons per hour (3,800 tph).

The final project is for an iron ore export terminal located in the Ust Luga area of Leningrad Oblast of Russia. For this project the client selected a lower material handling rate of around 1,500 tph, using a side-tipping (or pivot frame) tippler with integral twin feeders and a shallow foundation construction depth (see photo 1).

And the success continues: SCHADE has recently been awarded the contract to supply a rotary tippler to a major aluminum company for their new facility in the Irkutsk region of Russia.

Technical innovations add value to customer operations

Innovation, novel designs and providing the clients with technical solutions that add significant value to their operations is what enables this success on the Russian market.

To achieve the required annual throughput of the customer, SCHADE developed a very large wagon tippler design, capable of unloading three wagons at the same time and at a rate of 20 cycles or 60 wagons unloaded per hour. This allowed the client to achieve his required annual throughput using these two triple unloading systems instead of three tandem tippler systems as originally planned, resulting in significant cost savings for the project. While such triple tipplers have been used in the Chinese coal export market for many years, this is the first time the principle has been implemented in the Russian market. Here the rail wagons, unlike the Chinese, need to be uncoupled from the train for the tipping process. Consequently these are the first such triple tipplers operating in Russia.

To reduce the amount of land needed by port operators to install the wagon unloading systems, the SCHADE tippler systems are often supplied with a traverser (or transborder) system. This allows the wagons to be shifted laterally to an exit track running alongside the main incoming track after they have been unloaded in the tippler. This system removes the need for the more traditional track loop (usually around the stockyard) and significantly reduces the land acreage needed. Once again for the first time in Russia, these traversers had to be designed in a way that they could carry three wagons simultaneously and thus work with the triple tippler system (see photo 2).

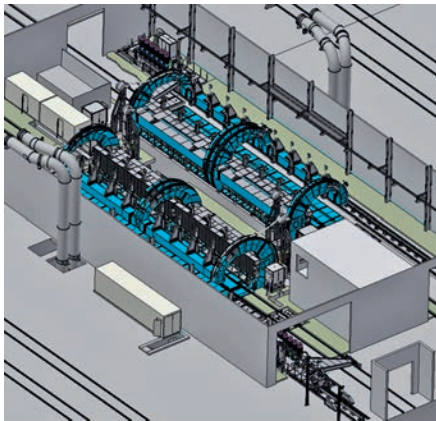


Photo 2: Triple Wagon Traverser/Transborder, operating at 20 cycles (60 wagons) per hour



Photo 1: High lift side tipping or 'Pivot Frame' Tippler with shallow foundations (example)

For other clients concerned about the structural strength of long tandem tippler, SCHADE proposed a solution where the tippler systems are equipped with 2x separate single cages, working together to create the required tandem design. These independent tipplers work together to provide the tandem unloading capacity required. By keeping the tippler structure shorter, SCHADE greatly reduced the bending forces within the main structural components, increasing the design life of the tipplers (see graphic 1).



Graphic 1: 3D view of twin cage Tandem Tippler systems

Catering to very special needs

There are even more special features developed to cater to the needs of the diverse customer requirements. In many applications, for example, the tipplers are required to be installed in coastal or port locations where underground water levels are close to the surface. In such an environment, construction of underground foundations can be difficult and expensive. For such a project, SCHADE supplied a side-tipping tippler (or Pivot Frame Tippler) with a higher centerline of rotation.

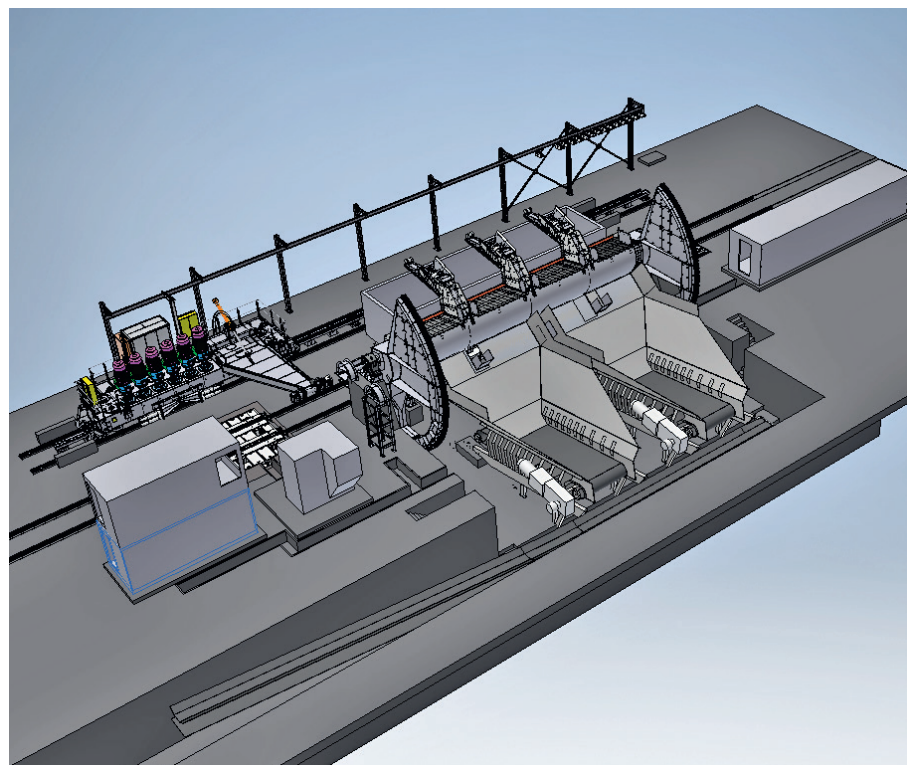
The effect is that the wagon is lifted higher, thereby reducing the depth of foundation that had to be constructed. For this application SCHADE was able to reduce the depth of the foundations for approximately from ten meters deep to two meters deep and the client benefitted from significant costs savings (see graphic 2).

Customers facing the challenge of handling materials that are susceptible to degradation or damage due to the handling process (e.g. iron ore pellets, briquettes or similar) when they are unloaded, also benefitted from innovative solutions by SCHADE. To avoid such damage to the material, SCHADE adapted the side tipping design, reduced the tipping angle and introduced a “sliding plate” which allows the material to slide from the inverted wagon into the receiving hopper, rather than “free-falling”. In this way, the handling process can be made softer and the material is less likely to be damaged. Of course, this is a tangible value for customers as the loss of material is reduced significantly.

Marshaling and shunting the loaded wagons to the tippler can also be complex and costly for port operators. By increasing the length of the train (or rake) of loaded wagons, the amount of shunting can be reduced. For such applications, SCHADE has equipped the wagon charger systems with additional installed power and the capability to pull trains of loaded wagons

of up to around 75 wagons long. For other applications, this capacity has even been increased to around 150 wagons. This not only reduces the amount of shunting needed, but also significantly increases the efficiency of unloading by reducing the unproductive time between trains of wagons.

For another project, a client in the cement business was looking for multiple methods of receiving the material. This included traditional box-style wagons for unloading in the tippler, bottom-dump wagons and road-going tipping trucks. For this application, SCHADE was able to design and supply a tippler system capable of handling and unloading all three types of material intake. This was achieved by enabling the road-going trucks to unload into the rail hopper underneath the Tippler and by handling loaded bottom discharge wagons through the tippler, across the traverser and into a bottom dump hopper along-side the tippler. This allowed all three unloading types to be accommodated with the material being removed on a common conveyor system.



Graphic 2: 3D view of side tipping tippler showing twin feeders and shallow foundations

The benefits of being involved right from the start

Even if these innovations and developments all catered to very different needs and requirements, they all have the same lessons in common: An early involvement in the project planning and layout of SCHADE enables the experts in wagon unloading technologies to add significant value to the project and help client reduce investment costs. So SCHADE should always work with clients and their technical consultants early on to help develop the plant layout and the most economical solution.

The innovative ideas of SCHADE help reduce the client’s investment, for instance though shallow foundations, higher throughputs with reduced number of systems etc., and SCHADE can provide clients and technical consultants with various options detailing the advantages and disadvantages of each.

The experts of SCHADE are there to assist the client in calculating annual tonnages as hourly throughput and therefore help decide what type of Unloading System is required. The company can help develop flow diagrams of the material handling process. SCHADE helps to develop overall plant or port layouts beyond the tippler area, for instance size and shape of stockyards, covered or uncovered, accounting for the amount of material to be stored etc.

SCHADE also works with other specialized contractors to integrate additional and peripheral equipment such as lump breakers or dust control systems.

**At a glance:
SCHADE’s scope of supply for Rail Wagon Unloading Systems**

■ Wagon Unloading Systems

- offered from receipt of the train of full wagons to unloading onto the take-away conveyor (to stockyard), and marshaling the train of empty wagons for removal by locomotive.

■ Scope can include (using the process flow):

1. Tippler entry wheel grippers (wagon holding device)
2. Wagon Charger (or Positioner), track spine bar and cable festoon
3. Wagon tippler complete c/w on-board Wagon holding device
4. Wagon tippler exit wheel grippers (wagon holding device)
5. Traverser (transborder) entry wheel grippers (wagon holding device) or (if preferred) wagon retarder (brake)
6. Traverser (transborder), track, drive rack and cable festoon
7. Wagon ejector, track, drive rack and cable festoon
8. Traverser (transborder) exit wheel gripper(s) (wagon holding device)
9. Complete integrated system control (PLC) for automatic operation and operator’s control desk
10. Complete integrated electrical power systems including Variable Speed Drives (VSD), MCC panels, Incoming panels etc.

■ The scope of supply can also include the necessary underground equipment:

11. Travelling lump breakers for frozen or amalgamated material
12. Hopper grid
13. Steel hopper(s) with liners and (if required) heaters
14. Hopper Extract Feeders (different options available)
15. Discharge chute from feeders to the Take-away conveyor

■ Third Party Systems

- can also be supplied (e.g. water spray dust suppression or Air Filtration Dust Extraction, Air aspiration systems)

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