



Case Study

No Harm to the Environment - Pipe Conveyor ensures dust-free Transportation of Ore Concentrates

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Transportadora Callao S.A., the logistics operator of a special cargo terminal in the port of Callao, Peru, relies on a Beumer Group pipe conveyor for the transportation of zinc, copper and lead concentrates of different mining companies from the warehouse to the terminal.

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Beumer Group supplied and installed a pipe conveyor with a centre distance of 3195 m. (Pictures: ©Beumer Group GmbH & Co. KG)

Transportadora Callao S.A., the logistics operator of a special cargo terminal in the port of Callao/Peru, relies on a Beumer Group pipe conveyor for the transportation of zinc, copper and lead concentrates from different mining companies from the warehouse to the terminal. With its ability to navigate curves in three dimensions, the conveyor can be optimally adapted to its transport route of approx. 3000 m. What is even more important: the conveying system prevents the concentrates from getting in contact with the environment and ensures dust-free transport to the ship's holds. Beumer Group was responsible for engineering and supply of the complete conveying system, including the steel structure, as

well as for supervision of the system installation and comissioning. Callao is located directly on the Pacific Ocean. With 877 000 inhabitants, it is one of the largest cities of Peru, with the largest airport in the country and one of the most important fishing and commercial ports in South America. A modern ship loading terminal for ore concentrates was built in this port and it is operated by Transportadora Callao S.A.



View from the pier: the last section of the pipe conveyor runs along the sea to the transfer tower.

About 75 % of the imports and exports of Peru, one of the most important mining countries world-wide, are handled in Callao. In order to satisfy the increasing

demand for these valuable materials, the Peruvian government decided to expand the port. Besides additional storehouses, the plans also foresaw the largest, most modern ship loading terminal in the country. Peru also wanted to change the way the raw materials were transported to the ship loading areas. Before the construction of the special terminal, trucks were used to transport the concentrates from the warehouses to the terminal. "Since Transportadora Callao started its operation, they could reduce the number of truck transports by 130 000 per year," explains Victor Sam, CEO at Transportadora Callao S.A. The company, a consortium comprising five enterprises from the mining and port industries (manufacturers and warehouse logistics operators), obtained a license from the state of Peru for building and operating the necessary infrastructure.

Pipe Conveyor: dust-free Conveying

The mines, situated in central Peru, deliver their concentrates to warehouses located approx. 3 km away from the port. Transport from the warehouses to the port required a fully enclosed solution to prevent particle emission into the atmosphere. Transportadora Callao opted for the Beumer Group pipe conveyor. The direct contact person and project partner was Helmut Wolf from Beumer Group Austria GmbH: "Together with the responsible persons from the customer, we developed a solution that is perfectly adapted to the routing and the ambient conditions."



At the pipe conveyor loading point, a magnet separator removes tramp metal from the ore concentrate.

Due to its enclosed transport, the pipe conveyor not only protects the environment against harmful impacts during the transport of the lead concentrate, it also allows conveying over long distances and navigation through tight curve radii. Due to its ability to navigate curves, this belt conveyor requires a lot less or no transfer towers at all, depending on its length and the available

curve radii. This results in substantial cost savings for the customer, and allows Beumer Group to easily customise the system to the individual routing. Durable conveyor belts guaranteeing tensile strength are used. The engineers use different dimensioning programs to determine the ideal belt design. They use them to calculate tractive forces and forces that arise during acceleration and deceleration and also to determine possible curve radii. Beumer Group provides tailor-made feasibility studies for each project. Another advantage is the reduced noise emission that the system provides. This is ensured by special idlers, as well as low-noise bearings and selecting the right conveying speed. "This improves the quality of the employees' day-to-day work environment," says Beumer engineer Wolf. Victor Sams adds that the "noise measurements along the pipe conveyor resulted in values that are consistently far below the permitted limit values."

Conveying Capacity: 2300 tph



Just a short distance downstream from the loading point the pipe conveyor crosses the refinery area, where it had to be equipped with a fire-proof housing.

Beumer Group supplied and installed a pipe conveyor with a centre distance of 3195 m. "Due to the system design and the required system capacity, we designed it with a diameter of 400 mm," explains Helmut Wolf. "The conveyor transports 2300 tph at a speed of 4.5 m/s and is driven by three motors with a capacity of 650 kW each. We equipped the system with filters, strippers, a dedusting unit and a control system." Beumer Group was responsible for engineering and automation, and supplied the steel structure and the necessary components. The site managers supervised the installation and put the system into operation. The process is practically free of faults and, above all, safe: trucks or trains transport the mining commodities from the mines to the ore storages, from where they are transported to the open access station. Here, the concentrates are received by a feeding 43 m belt conveyor that transfers it to the pipe conveyor at a height of 6 m. A dedusting unit ensures that no material is emitted during this process. "We equipped the feeding belt conveyor with a metal detector and an electric magnet," explains Helmut Wolf. "This prevents damage of the downstream Pipe Conveyor by metal parts." At the end of the route, the conveying system runs along the seaside in the naval port of Callao to the transfer tower. Here, the belt opens automatically. It transfers the material to another belt conveyor that conveys the ore to the ship loading system. Victor Sam: "This modern system, in operation now for 17 months, caused a significant increase in speed by 500 % for loading concentrates and reduced the ship's waiting time until loading by more than 80 %. These advantages lead to savings for the exporters and improve the competitiveness of the country's mining industry."

Trouble-free Integration, Challenges mastered



The pipe conveyor passes the naval port of Callao: this is the last curve section before the transfer tower towards the port terminal.

"A big challenge for us was integrating the pipe conveyor into the existing environment," says Helmut Wolf. The Beumer system is the connection between the individual belt conveyors from various manufacturers. "When managing the project we had to meet several official requirements," reports Helmut Wolf. The project represents a concession by the state of Peru given to Transportadora Callao S.A., who commissioned Odebrecht Perú Ingeniería y Construcción with the execution, and Buenaventura Ingenieros S.A. with the supervision. Odebrecht commissioned Beumer Group with the design of the entire line section onshore. The onshore section starts at the "Open Access", where the concentrate is transferred from the warehouses. The pipe conveyor then passes a refinery and a military area. "That was the specified routing that we had to observe," explains Helmut Wolf. In the area of the refinery, the systems had to additionally be

equipped with fire-proof covers. Due to this impressive engineering work, Transportadora Callao is now able to handle ships for bulk products of up to 60 000 DWT without obstructing the work in the other terminals of the Callao port.



The pipe conveyor ends at the transfer tower, where the material is transferred to the ship loading system.

World-wide connected and brought to one Point

Beumer Group has bundled its comprehensive expertise spanning various industries and established different Centers of Competence in order to offer optimal support of their single-source solutions for companies like Odebrecht and Transportadora Callao. The pipe conveyor segment is one such Center of Competence. This center is responsible for sales and project management worldwide. It collects and prepares the know-how of each regional group company and passes it on to the group company's global experts, such as Helmut Wolf and his team. "Beumer's technical team has proven its professionalism and stand-by duty, during construction and operation, and after 1.5 years in operation and more than 4 million tons of transported concentrates, we can attest that the set goals have been reached," explains Victor Sam. Beumer Group's extensive Customer Support ensures a high level of system availability after commissioning.

Transportadora Callao just signed a teleservice contract with Beumer Group, so that Beumer specialists can eliminate possible malfunctions in the system. If necessary, the Beumer Group service staff will go to Callao in order to make the necessary adjustments and prevent malfunctions and machine breakdowns, which would lead to long downtimes.

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