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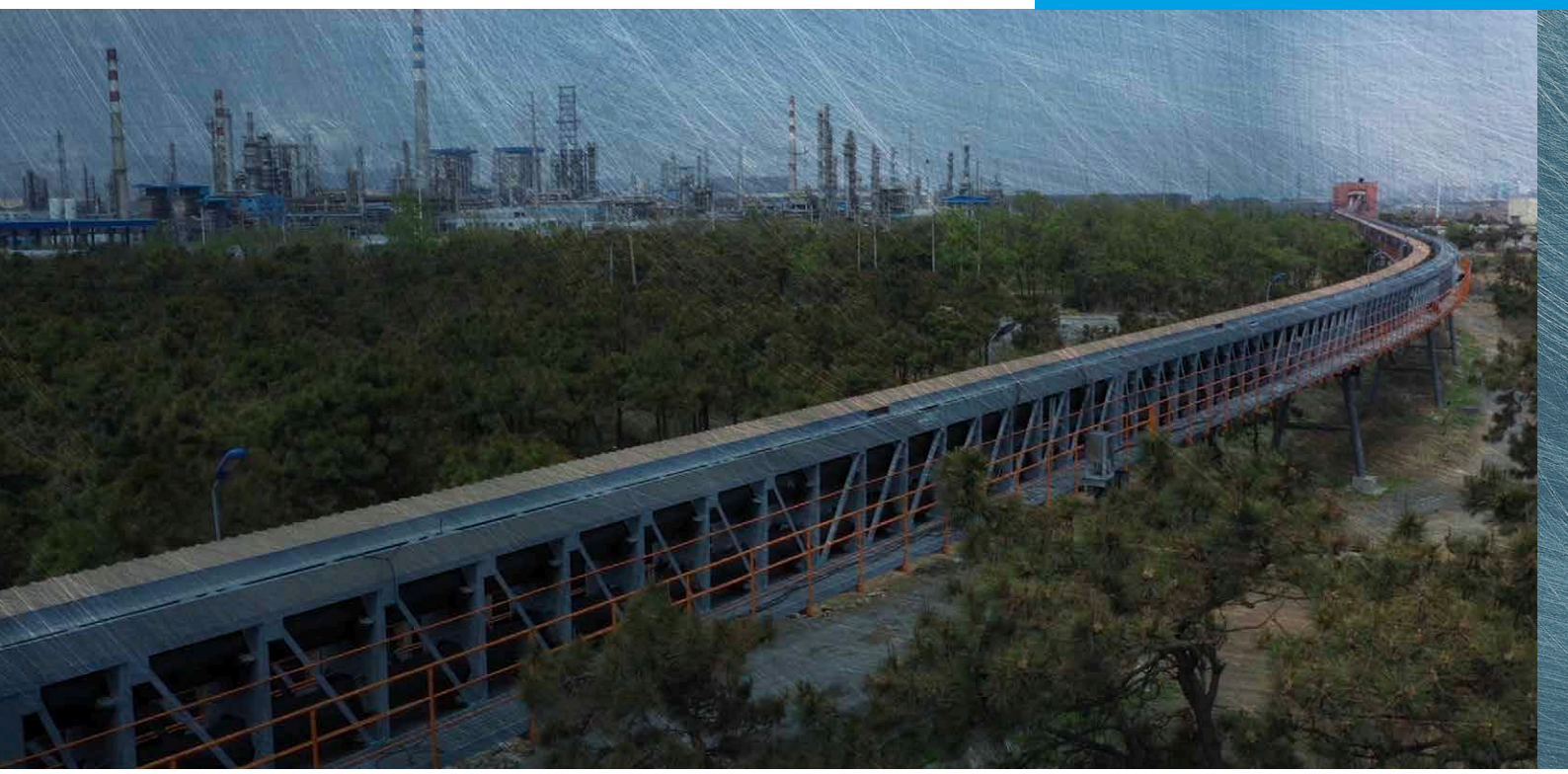
BEST PRACTICE



EFFICIENT AND RELIABLE TRANSPORT OF IRON ORE FROM A PORT TO A STEEL WORKS USING PIPE CONVEYORS

THE CHALLENGE:

What is the best way to transport large quantities of iron ore from a port to a steel works? This was the question posed by the Chinese steel manufacturer Shandong Steel Group & Rizhao Steel Group. Both companies require iron ore for their fabrication processes. At that time, both companies already operated a closed pipe conveyor with the intention to prevent emissions of dust and spilling of the material.

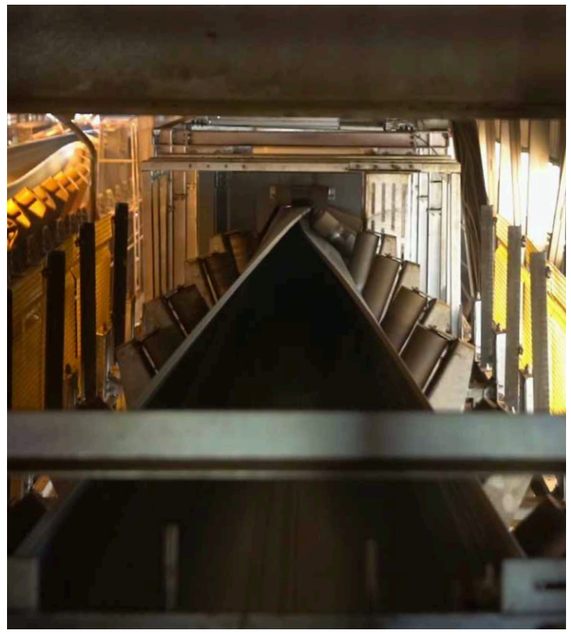
The conveyor routing was designed in a way that it had to cross public roads and residential areas. However, the system was no longer able to handle the needed volume.

The management contacted BEUMER to design a new conveyor system that would be able to transport a significant higher volume of material.

CUSTOMER PROFILE:

- Customer: Shandong Steel Group & Rizhao Steel Group
- Province/region: Shandong/East China
- Bulk material to be transported: iron ore
- Requirements: high conveying capacity, environmentally safe, dust-free, and low-energy transport

PIPE CONVEYOR:
AN ENVIRONMENTALLY AND ECONOMICALLY FRIENDLY SOLUTION



For the steel manufacturer, the conveyor system will pay for itself in a brief time. In close cooperation with the customer, BEUMER worked out a solution that was perfectly tailored to the existing system.

The abbreviations stand for PC = Pipe Conveyor, Section 2A and 3A.

THE APPROACH:

The Shandong Harbour Engineering Group consulted the BEUMER Group, which carried out an economic assessment and demonstrated that a conveyor system would pay off. The assessment included the following:

- feasibility studie
- an investment calculation
- project schedules
- a cost-benefit analysis

AN OPTIMAL SOLUTION:

A cost comparison between belt conveyors, truck transport and rail transport must consider a variety of factors. Examples:

- the transport costs per metric ton
- the volume of material to be moved within a set period
- the investment sums
- the tax depreciation plan
- the costs for design, delivery, mechanical installation, and electrical installation, plus construction

For this project the 500 mm diameter Pipe Conveyor had to be installed on an existing supporting steel structure,on which the customer was already operating another Pipe Conveyor system to transport Iron Ore. Consequently, during the design of the Pipe Conveyor, the existing steel structure and fixed route had to be considered. Given the brownfield environment and the tight project schedule, the project was a challenging, yet remarkable and interesting at the same time.

In the end, all project requirements were met by the BEUMER execution team, and a high-end Pipe Conveyor system was delivered to a very satisfied customer.

The BEUMER Group evaluated each of these transport options and determined the steel manufacturer's total costs per metric ton over a set period. The results showed that a conveyor system would pay for itself in truly brief time. In close cooperation with the customer, BEUMER worked out a solution that was perfectly tailored to the existing conveyor system and supported it. Consisting of two pipe conveyors connected in series, it required building only a single transfer tower. This significantly reduced the installation time and, especially, the material costs. After transfer of material at the starting point it required only one new drive unit for the next belt conveyor.

Liu Qiang, Executive Director, and General Manager of the Shandong Steel Group & Rizhao Steel Group.

"The two pipe conveyors are extremely efficient, and with this additional capacity we are ideally prepared for the future."

Lukas Paul, Head of Ports & Terminals, BEUMER Group.

"Our solution ensures environmentally safe, dust-free and low-energy transport of the material from the port to the steel works. We were able to commission the system only four months after the start of installation. The entire project was completed in just eight months."

SUMMARY

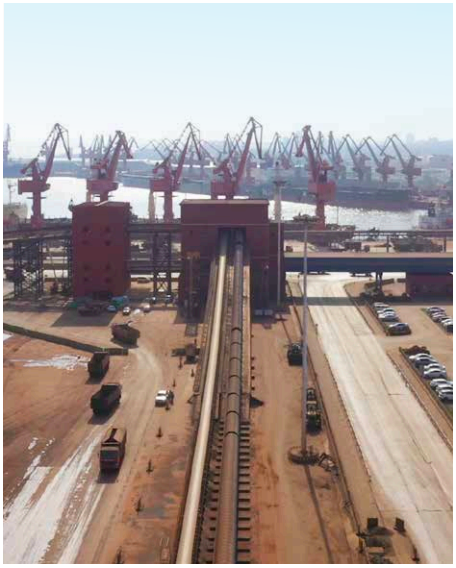
The BEUMER Group oversaw the entire project. In only four months it installed the conveyor system, designed the processes, built the steel structures, and fitted the mechanical systems.

The used pipe conveyors delivered the following performance:

- a total conveying length of approx. 6.6 kilometers
- a conveying capacity of 5,000 metric tons per hour
- a speed of 5.15 meters per second

PIPE CONVEYOR – OPTIMALLY COORDINATED CONVEYING SOLUTION

Although the initial investment for a conveyor system can be remarkably high, operators can benefit from low operating costs, depending on the application.



Pipe Conveyors allow reliable transportation of goods, with protection from environmental influences.

PROFILE OF THE BEUMER SOLUTION:

- Product(s) used: Pipe conveyers
- Number of products: one conveyor system, consisting of two pipe conveyors
- Special characteristics:
  - Total length: almost 6.6 kilometers
  - Diameter: 500 millimeters
  - Speed: 5.15 meters per seconds
  - Conveying capacity: up to 5,500 metric tons per hour

DURATION OF THE PROJECT/IMPLEMENTATION:

- Installation began in September 2018, and the system was commissioned in January 2019. The project was completed in eight months.

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