Anwenderbericht

Aalborg Portland A/S relies on the Pipe Conveyor of BEUMER Group

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An economically convincing alternative The manufacture of cement is particularly energy intensive. For an economical and sustainable operation, Aalborg Portland A/S therefore relies on alternative fuels and raw materials, in its Denmark lead plant, to ignite the calciner and the main burner. BEUMER Group supports the manufacturer with its AFR systems segment (alternative fuels and raw materials) and develops individual single-source solutions in order to efficiently convey, store and feed the differently composed materials. The core of these systems is represented by innovative Pipe Conveyors: The enclosed conveying systems ensure an environmentally safe, dust-free and low-energy transport of fuels and raw materials.

Aalborg Portland is a subsidiary of the Italian cement group **Cementir S.p.A.** This group of companies is one of the largest and leading manufacturers and exporters of this material world-wide. In addition to the main plant in Aalborg, Denmark, it has further production plants in China, Egypt, Malaysia, Italy, Turkey and the United States of America as well as numerous sales offices.

Fig. 1: BEUMER Group supplied a single-source system to Aalborg Portland to feed the calciner and the main burner with alternative fuels and raw materials. The main component is given by the Pipe Conveyors. They are fed via screw conveyors.

Secondary fuels instead of primary ones The production of cement has always been one of the most energy-intensive operations. In order to avoid expensive primary fuels such as carbon, gas and oil, and to produce in more economic and sustainable way, **Aalborg Portland** has relied on alternative fuels

for the incineration process in the calciner for several years."*In 2014 we decided to optimise and enlarge the existing system*", says ***Ole Strøm Hansen***, project manager of **Aalborg Portland**. Until then the manufacturer transported the fuels to both calciners through long pneumatic conveying lines. However, the producer did not have an initially positive experience, as pneumatic conveying lines are extremely maintenance-intensive and also susceptible to breakdown. "*In addition, we intended to increase the capacity of the existing conveying line to 20 tons per hour per calcinator*", explained ***Hansen***.

Fig. 2: The feeding station of the Pipe Conveyor to the calciner: at this regard, a take-up device has been installed at the rear.

With the new concept, the Residue Derived Fuel (RDF) is transported for the calciner and the Solid Recovered Fuel (SRF) to the main burner. The solution is to

transport the alternative fuels from the storehouse to the rotary kiln area as well as the gravimetric feed of both the calciner and the main burner.

Fig. 3: The two Pipe Conveyors: BEUMER Group realises different system solutions for the various bulk materials.

The decision was made to reduce the length of the pneumatic conveying line and to replace the remaining line by a mechanical transport system, but the manufacturer also wanted to install a completely new conveying line for the main burner feeding, with a capacity of up to ten tons per hour. "*We evaluated*

different variants of mechanical transport systems", remembers ***Hansen***. Finally, the Danish company opted for a single-source solution of **BEUMER Group** based on the innovative Pipe Conveyor technology.

Fig. 4: The Pipe Conveyor conveys the material directly to the rotary kiln. Curves can be easily realised during construction.

Ideal solution for each case In order to support producers of cement in the alternative fuels and raw materials field, **BEUMER Group** has set up a complete business segment dedicated to AFR systems. "*Our know-how and our tailor-made systems permit us to offer an optimum support to our customers*", says ***Tomas Hrala***, project manager at **BEUMER Group**. "*We have many years of good experience and we always consider customers' specifications*". With this capability, the system provider is able to supply and install the whole chain from the acceptance and unloading of the delivery vehicle, up to the storing, conveying and feeding process of the solid alternative fuels for the specific user. The customer receives everything from one source, thus having a unique contact.

Fig. 5: The penthouse is underneath the discharge station of the Pipe Conveyor of the calciner. The intermediate hopper with the activator and the two double discharge screw conveyors are positioned here.

Pipe Conveyor as hub and pivot"*Due to the different grain sizes and the various compositions of these alternative fuels, it was necessary to develop an individual system solution for each line*", explained ***Tomas Hrala***. To enable the

transport of the pre-processed fuels from the storehouse to the calciner and to the main burner, **BEUMER Group** supplied and installed respectively one Pipe Conveyor as the heart of these systems as well as the accompanying equipments. "This conveying technology is not only eco-friendly and requires low maintenance", describes Hrala. "Its enclosed type of construction protects the environment safely from material falling down and emissions. Another advantage is the lack of dust development on the running line". Due to its ability to navigate curves, considerably less transfer towers are required compared to other belt conveyors, allowing for a substantial cost savings to the customer. **BEUMER Group** can customise each system to the individual routing.

Fig. 6: The weigh belt feeder with the rotary vane feeder including a blower conveys the material to the main burner through the pipes in a pneumatic way. (Picture credits: BEUMER Group GmbH & Co. KG)

Efficient single-source system The delivery of the oven-ready material is carried out in moving-floor trailers. The alternative fuels are unloaded and stored at the receiving station. Both lines receive the material/items transported by the moving floors modernised by **BEUMER Group** from the existing storehouse. All transport systems supplied and the accompanying equipments are intertwined to ensure steady fuel feeding. The Pipe Conveyor of the calciner has a diameter of 350 millimetres, a length of 135 metres and can transport up to 50 tons per hour to an intermediate hopper with a volume of 35 cubic metres. This hopper is equipped with an activator and two double discharge screw conveyors, and distributes the material in two feeding and pneumatic conveying lines to both calciners. The two new pneumatic conveying lines to the calciner with rotary vane feeders and blowers were completely dimensioned and supplied by BEUMER Group."*However, during the constructive dimensioning of this system we were faced with a particular challenge*", remembers ***Tomas Hrala***, project manager of **BEUMER**. The buildings in which the calciners are placed include an additional part called penthouse. It supports, among others, the discharge station of the Pipe Conveyor, the intermediate hopper with the two double discharge screw conveyors and also both weigh belt feeders with the pneumatic conveying system. "*From a static viewpoint, the penthouse had to be calculated trying to not exceed the available load application in the existing building*", explains ***Hrala***. "*At the same time, the subjacent requested throughway for plant vehicles had to be ensured.*"The heart of the line for the main burner is a Pipe Conveyor with a diameter of 200 mm and a length of 201 metres. It achieves a conveying capacity of twelve tons per hour and is equipped with a spillage scraper conveyor for minimising the cleaning, as well as a dedusting filter. The fuel feed of the moving floor in the storehouse to the Pipe Conveyor is carried out by a screw conveyor. The feeding system in the main burner building includes an intermediate hopper with a volume of ten cubic metres, also with activator and double discharge screw conveyor and a weigh belt feeder. In addition, there is a pneumatic conveying line with blower and rotary vane feeder."*We are very pleased with both single-source systems*", ***Ole Strøm Hansen*** of **Aalborg Portland** sums up. "*The transport systems and the accompanying equipments are intertwined to ensure steady fuel feeding.*" *Tomas Hrala continues, emphasising* ***BEUMER Group****'s role: "We could again demonstrate that we have substantial competence with regard to the handling of alternative fuels in the cement industry and that we can support our customers efficiently.*"***About BEUMER Group:****The* ***BEUMER Group*** *is an international leader in the manufacture of intralogistics systems for conveying, loading, palletising, packaging, sortation, and distribution. With 4,000 employees worldwide, the* ***BEUMER Group*** *has annual sales of about EUR 750 million. The* ***BEUMER Group*** *and its subsidiaries and sales agencies provide their customers*

with high-quality system solutions and an extensive customer support network around the globe and across a wide range of industries, including bulk materials and piece goods, food/non-food, construction, mail order, post, and airport baggage handling.