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Arabian Cement: Calciner line upgrade for alternative fuels

One Source

Arabian Cement realizes big savings with FLSmidth Pfister® dosing technology

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The red rotor weighfeeder Pfister® TRW-S/D is designed to dose up to 12 t/h of alternative fuels at Arabian Cement.

Altering existing production setups is always a special challenge for any engineer. At Arabian Cement Company in north-eastern Egypt FLSmidth dosing specialists integrated a multifuel feeding line with rotor weighfeeder Pfister® TRW/S-D as the core technology. Imported energy carriers can now be replaced at an increasing rate by low-cost locally available alternative fuels such as biomass, tire chips or sewage sludge.

Arabian Cement (ACC) is a leading cement company located in the Governorate of Suez, in north-eastern Egypt. Up to five million tons of high quality cement leave ACC every year in support of the local market. In addition, high quality concrete products are provided by Andalus Ready Mix Concrete, an ACC subsidiary. ACC is listed on the Egyptian Stock Exchange and recently expanded operations to Brazil.

Two production lines are running at the heart of the main plant in Egypt. One of them was set up in 2011 by FLSmidth A/S and subsequently equipped with an alternative fuel installation by FLSmidth in 2013. Replacing imported coal or gas with widely available, cheap energy carriers such as sewage sludge or plastic waste made perfect economical sense. Space limitations within the production line sent FLSmidth engineers to the think tank. Their smart solution: a balcony-type addition to the calciner tower holding a rotor weighfeeder Pfister® TRW-S/D setup.

"ACC is already using 12 percent alternative fuels in 2015", explains Adel Ezzat.
"The entire system is fully automated and includes primary storage and shredder system, magnetic separation, transportation to the intermediate storage area, a discharge system from intermediate storage, a gravimetric dosing system and an injection system into the kiln precalciner", explains Adel Ezzat, Alternative Fuel Manager at Arabian Cement. In the ACC installation in Egypt, alternative fuels can substitute up to 30 percent of conventional fuels, mainly imported coal. "Starting with a seven-percent substitution rate in 2013, ACC is already using 12 percent alternative fuels in 2015, with similar annual increases planned in the coming years", Adel Ezzat elaborates.
Where there is great flexibility in materials available, production machinery must follow suit. The rotor weighfeeder Pfister® TRW-S/D is designed for a broad variety of alternative fuel installations and reliably performs pneumatic material feeding to kiln burners or mechanical material transport into calciner inlets.
The challenge with alternative fuels: they never come in a completely homogenous masses. Like, for example, in an Irish cement plant which fires RDF with wood waste to the calciner. These wood particles vary considerably in size but are still accurately dosed and passed on by rotor weigh-

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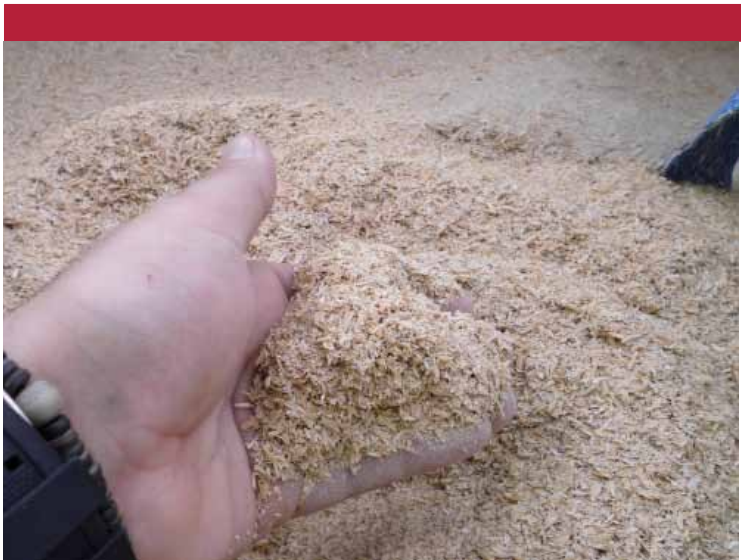
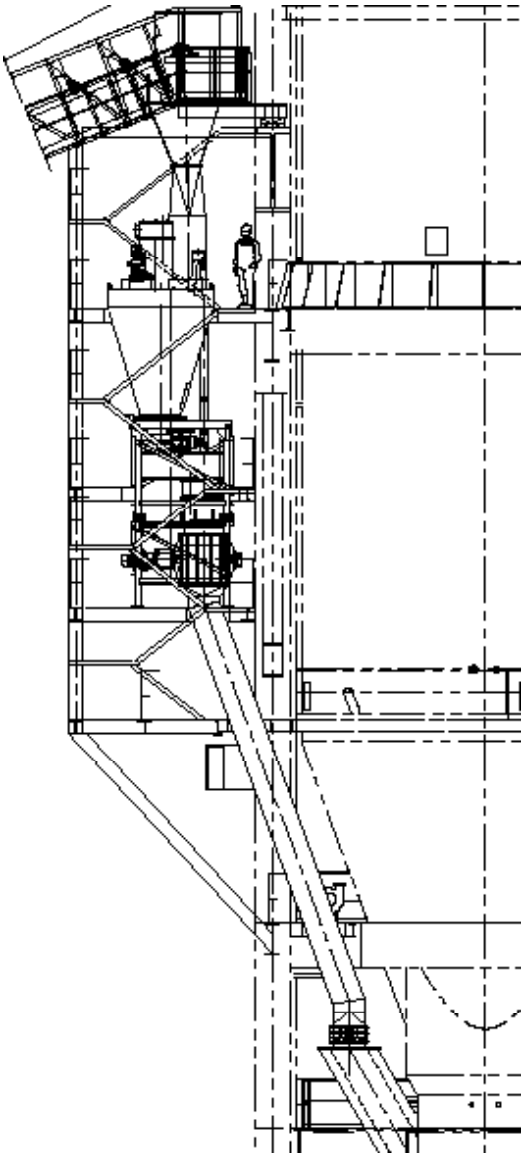


Pulverized rice husk is one of the alternative fuels dosed at Arabian Cement in Egypt

Rotor weighfeeder Pfister® TRW-S/D meets all requirements

feeder Pfister® TRW-S/D. Experience shows that hardly any alternative bulk material is delivered without any foreign bodies included. Plus, in some cases, the plants pre-preparation of the material might fail. This is why FLSmidth Pfister is elaborately testing all different kinds of alternative fuels as well as different sizes and bulk densities at their own test stands. Those tests showed that the elaborate design of the rotor weighfeeder Pfister® TRW-S/D prevents blockages even when unexpected foreign bodies are included in the material. The biggest foreign body at the test stand was even 300 x 300 x 10 mm in size. Tire-shreddings with steel wiring, long corn straw, even liquid-filled plastic bottles in the material mixes did not effect the weighfeeders performance. Smart design and experience in the field make Pfister® weighfeeders sturdy and reliable additions in the production lines of cement and lime manufacturers around the globe. So a convincing asset of rotor weighfeeder Pfister® TRW-S/D is that it is able to dose varying secondary fuels in a wide density range (70 kg/m3 – 700 kg/m3) as well as weight range (1:10) with one and the same system. Virtually each and every alternative fuel bulk material can be employed without any rebuilding of the weighfeeder. Its simple, no-nonsense design with no unnecessary frills makes rotor weighfeeder Pfister® TRW-S/D a sturdy workhorse with low maintenance and high reliability. With the help of a special stirrer the material is loosened and falls out of the pre hopper, without any compression, into the rotor chambers.
The weighing and dosing principle of all Pfister rotor weighfeeders is the same: By means of a weighing axis the material weight is gravimetrically determined before material discharge, providing for a highly accurate and consistent mass stream to the pyro process.



Due to space limitations at the existing plant FLSmidth engineers designed a balcony-type addition to the calciner tower holding the rotor weighfeeder Pfister® TRW-S/D setup for dosing alternative fuels

An example for the state-of-the-art technology used in the alternative fuel installation with rotor weighfeeder Pfister® TRW-S/D at Arabian Cement is a special rotary valve. Foreign objects in the material, causing blockages in other systems, are tolerated by the FLSmidth Pfister® system that is equipped with a flexible sealing lip. Multiplying the internal chambers with the rounds per minute, the valve "packs" the fuel material in 75 small batches for steady fuel distribution to the calciner. Other providers use double pendulum flaps creating no more than eight batches.
A suction effect within the valve is barred by design: Therefore this rotary valve has no leakage air, only the air inside the chambers will pass the valve. Therefore this sealing principle will be used for the pneumatic and mechanical transport of secondary fuels. The valve compensates the air pressure between the system and the material feed piping.

Its outstanding reliability and long service life combined with high dosing accuracy and easy maintenance made rotor weighfeeder Pfister® TRW-S/D the perfect choice for Arabian Cement. At the Egypt plant, the combination of fossil energy carriers such as coal, petroleum, gas, plus the mixture

of alternative fuels consisting of dried sewage sludge, tire chips, plastics and packing materials now reduces energy costs considerably. The big plus: positive effects on the incineration and therefore cement production quality since rotor weighfeeder Pfister® TRW-S/D creates an absolutely reliable flow of material, tolerating various material sizes and impurities.

Fuel selection as a crucial aspect

When it comes to properly feeding the great variety of alternative fuel materials into the burner, rotor weighfeeder Pfister® TRW-S/D has proven its efficiency in more than 240 implementations worldwide. In 44 countries plant management chose the FLSmidth Pfister® multifuel dosing concept for reliable and flexible low-maintenance operations.
The greatest challenge in dosing alternative fuels is their diversity. Particle size, density and water content are never the same. Refuse-derived fuels (RDF) are fluffy, fibrous or compressible, biomass or sewage sludge may contain additional moisture. Not only in the start-up phase FLSmidth Pfister experts in alternative fuels are assisting customers setting up the material demand profile for their respective suppliers and make sure that materials and technical set-up are a smooth match.

Summary: Now future-oriented with Pfister technology

ACC can now use various locally available fuels to cut overall energy costs and minimize its dependency on the expensive import of energy carriers. The company can react to market changes and purchase the fuels which are available at surplus while, at the same time, help to protect the environment. "Materials which would otherwise end up in landfills are being put to economically intelligent use", FLSmidth Pfister project manager and Area Sales Manager Hassan Jrady wraps up ACCs win-win situation created by Pfister® technology and knowledge.

Technical data alternative fuel dosing rotor weighfeeder Pfister® TRW-S/D installation at Arabian Cement/Egypt:

Alternative fuels:	Mixture of dried sewage sludge (DSS) and municipal solid waste (MSW) like plastics, rubber, packing material
Mass flow:	up to 12t/h
MSW grain size 2D:	98 wt.% < 50 x 50 mm, 100 wt % < 150 x 150 mm
Bulk density:	0.1 – 0.6 t/m³
Water content:	max. 25 %
DSS grain size:	up to 10 x 10 x 10 mm
Bulk density:	0.5 – 0.7 t/m³
Water content:	max. 12 %

FLSmidth Pfister GmbH: Decades of dosing experience

Stable and accurate dosing of secondary fuels is one of the key elements required to produce clinker profitably and efficiently. With its multi-fuel rotor weighfeeder Pfister® TRW-S/D concept, FLSmidth Pfister is offering a future oriented technology that is able to dose up to 25 tph. With more than 240 installations worldwide, customers of FLSmidth Pfister are feeding many million tpa of secondary fuels.

FLSmidth Pfister GmbH does not only supply the single dosing machines. FLSmidth Pfister's know-how includes the complete setup and surrounding of the installation like silo engineering, intermediate material transport and safety equipment. That ensures that customers get all engineering from one experience partner and one single source.

See here how rotor weighfeeder Pfister® TRW-S/D works!

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