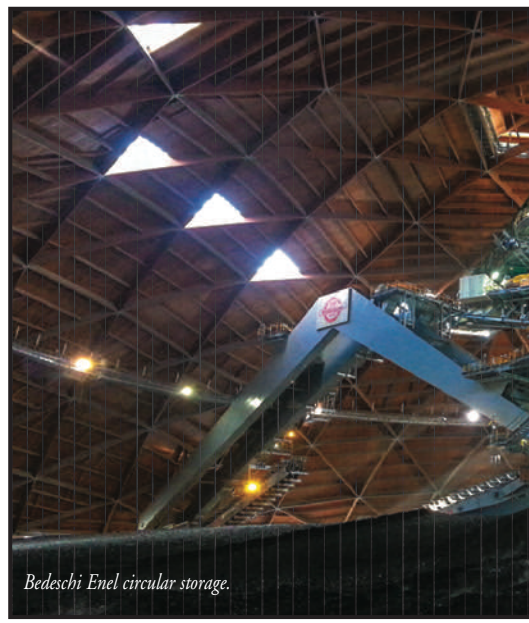
Going round in circles

Bedeschi CSR for DAL in Uzbekistan.



Bedeschi Enel circular storage.

Much has been written about stackers and reclaimers but the circular stacker reclaimer is perhaps an unsung hero when we talk about the transportation and storage of bulk material. World Port Development reports...

Transporting moist, plastic and sticky material can be a challenge but with a wide variety of tailor-made solutions any type of bulk material including coal, clay, iron ore, limestone, fertiliser, clinker, cereals amongst others, project execution can be optimised for transport and storage. In this article we talk to Italy-based Bedeschi about one of their customised solutions, the Circular Stacker Reclaimer. The company produce two types of circular stackers and reclaimers:

☛ *Circular storage to store raw material*
☛ *Circular storage to store and pre-blend raw material*

Circular Storage

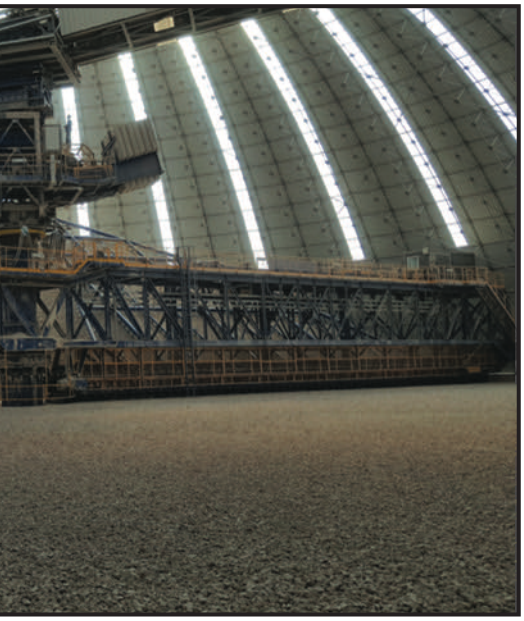
To make these machines as effective as possible they work by taking the material from the side of the stockpile. They are used for handling different materials such as coal, limestone, gypsum, and fertilisers with a low percentage of humidity. In this case, the reclaimer is equipped with a scraper boom. When used for handling clay or marlstone, which are moist and sticky, the boom is provided with self cleaning buckets. The use of these circular storages is particularly interesting since they can stock and handle high volumes of material without occupying space.

Circular storage for pre-blending

For pre-blending, these machines work by taking the material from the front of the stockpile. They are used and installed in those processes where different materials are mixed and the chemical components of the product obtained need to be as homogenous as possible, as in the case of cement production, for example. In comparison with longitudinal storages, the circular storages for pre-blending have the following advantages:

☛ *They optimise the space occupied on the ground;*
☛ *They are completely automatic, controlled by CCR;*
☛ *They guarantee a constant homogenisation avoiding the effect of the tail of the stockpile.*

The plant storage often consists of:
☛ *A central feeding hopper which is installed on the top of the column and is fed by the belt conveyor coming from the upstream plant. Considering that the hopper is rotating with the stacker boom it is connected to the upper support structure of the incoming belt conveyor by a slewing ring.*
☛ *The stacker is also installed on the top of the column and connected to it by a slewing ring which allows the stacker rotation.*
☛ *A central column made of a thick steel pipe fixed to the foundations. The brackets for the running of the reclaimer wheels are applied to the column.*
☛ *The reclaimer runs on external rails and rotates around the column.*
☛ *The reclaimer rails are matched with the diameter requested by the storage dimensions and they are fixed to civil works by relevant fixing accessories.*



☛ *The chute under the column conveys the reclaimed material to the downstream conveyor; normally it is concrete lined with steel plates.*
☛ *The complete electrical equipment for power and automation of machines.*

Effectively, the circular storage operations consists of two functions:

1) Stacking
The stacker is fed through the hopper installed on the top of the column by the incoming belt conveyor. The stacker has two movements: rotation around the column and lifting and lowering by hydraulic piston. The stacking automatic cycle is done along one prefixed rotation angle according to the continuous cone shell mode. During the automatic cycle the PLC programme coordinates the rotation alternatively in two directions and the lifting/lowering, to allow the boom to follow the inclination of the end part of the pile avoiding dust raising.

2) Reclaiming
The reclaimer conveys the material to the chute under the column - it is fed material by the reclaimer scraper blades by moving the rake. In addition, the reclaimer runs on circular rails in only one direction and the reclaiming automatic cycle is independent from stacking. An anti-collision PLC programme protects the stacker and reclaimer from risks of crashing by means of limit switches.

The total stored volume is divided into 3 parts:
☛ *One part with the maximum pile height and total pile section available; the reclaimer works on this part and can assure the nominal capacity.*
☛ *One part necessary for stacker during the pile filling; it corresponds to the end part of the pile.*
☛ *One safety part between the beginning of part 2 and the beginning of part 1; the purpose of this area is to prevent collision between stacker and reclaimer.*

Orders

In 2018 Bedeschi was awarded the supply of equipment for the new YD Cement Plant in Ankara, Turkey. The machine, designed for the storage of limestone and clay, has a stacking capacity of 1300t/h and reclaiming capacity of 650t/h. The dome will be fabricated from sheet steel and welded profiles to assure high strength and will have a pile external diameter of 89m providing a storage volume of 47,000 tonnes. Bedeschi will supply the turn-key installation from design to the final commissioning phase. The equipment will be delivered by summer 2020.

In November 2019, another integrated cement plant project, for their client Dincer Cimento in Vezirhan in Bilecik Province, Turkey, was completed. The circular storage plant with an external diameter of 79m was designed for pre-blending. Here a pile with crushed material (with very fluctuating features) was blended in order to have the output with the most possible constant features. This was made possible by a stacking capacity of 1000t/h and a reclaiming capacity of 550t/h. Total storage volume of the plant was 39,000 tonnes.

According to a spokesperson for Bedeschi, the production of circular storages remains a good strategy for the company. The company is able to design a wide range of equipment capable of handling bulk material with very different characteristics and has done so for many years. In July 2018, it delivered a circular storage system for limestone and clay to their client DAL in Almalyk, Uzbekistan. The stacking capacity is 1000t/h and the reclaiming capacity 650t/h, for a total storage volume of 47.000 tonnes. The pile external diameter is 83.5m.

In 2016, Bedeschi was awarded the contract for the complete supply of all the raw material crushing units, transporting and storage machines for handling coal and limestone at the Tan Thang cement plant in Nghe An province, Vietnam. The plant with a cement production capacity of 10.000 Mt/day, included the new handling system from Bedeschi that is in full operation from 2019. Bedeschi has not only supplied the complete handling equipment, but has also conceived and designed the overall layout of the storages for raw materials and coal.

The civil works and the full engineering of the handling system are included in Bedeschi scope of supply. Thanks to the long experience in the country and to the long lasting relationship with the local supply chain, Bedeschi has sub-contracted local companies for carrying out manufacturing activities or local constructions under the direct quality control and process supervision of Bedeschi managers and site engineers.

The circular storage dome has a total storage of 47,000 tonnes with a pile external diameter of 89m. Stacking capacity if 1300t/h while the reclaiming capacity was 650t/h. The company covered each step of the project - from the basic design phase to the assembly, installation, start up and any need after commissioning. WPD