



The Fully Automated Cement Horizontal Storage (FACHS) has been conceived with the intention of storing large amount of cement on horizontal warehouses. This innovative system allows the use of existing warehouses and enclosures on ports and cement plants, avoiding the expensive construction of either vertical concrete or steel silos. The operation of the FACHS, from the stacking of cement up to the reclaiming and dispatching of the product is completely automatic, requiring a minimum of personnel to operate the facility. All the equipment employed for the operation of the FACHS is customized, and it can be easily adapted to any specific site condition. The dimensions and capacity of all the main FACHS' components depend on the available space, dimensions of the existing building, the required amount of product to be stored, and the required dispatch capacity.

Among the main characteristics of the FACHS the following are mentioned:

- A standard warehouse building is used, with a minimal modifications or civil works.
- The FACHS has been designed combining technologies of several equipment manufacturers from different applications. Introducing two new components: The "U" Cement Reclaimer and the Cascade Cement Distribution Arrangement
- Low Material storage height.
- Stacking and reclaiming of product is fully automatic.
- Easy to install and easy to dismantle, requiring a minimum time to put in operation.
- Design to efficiently store large capacities of cement.
- It can be used to store several dusty products other than cement.
- Stacking of product may be performed either pneumatically, mechanically or a combination of both systems.
- The FACHS allows the handling of multiple cement qualities inside the same building.
- Eliminate the dangerous operation of front loaders inside the flat storage.
- The system is designed to handle capacities up to 300 tph for receiving and dispatching cement.
- The construction of horizontal warehouses normally does not required pilling.

The FACHS is ideal for import marine terminals, in combination with a pneumatic of mechanical shipunloader, and with either a pneumatic screw pump or blow pump.

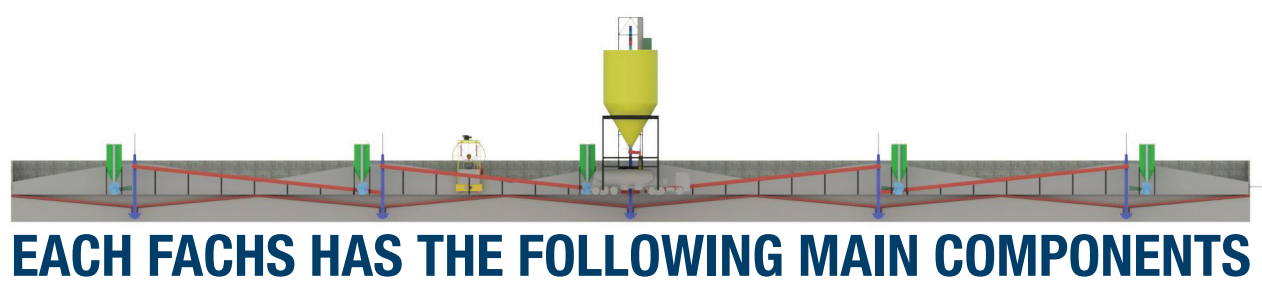
The FACHS can be easily installed and dismantled. The pneumatic conveying pipe to stack the cement inside the FACHS may be fixed or removable. Further, the required civil works for the operation of the FACHS are relatively simple. Concrete retaining walls may be prefabricated, which may be removed whenever it is needed. After finishing the usage of a FACHS, all the major equipment may be easily dismantled and moved to a new location.

RECLAIMING SYSTEM

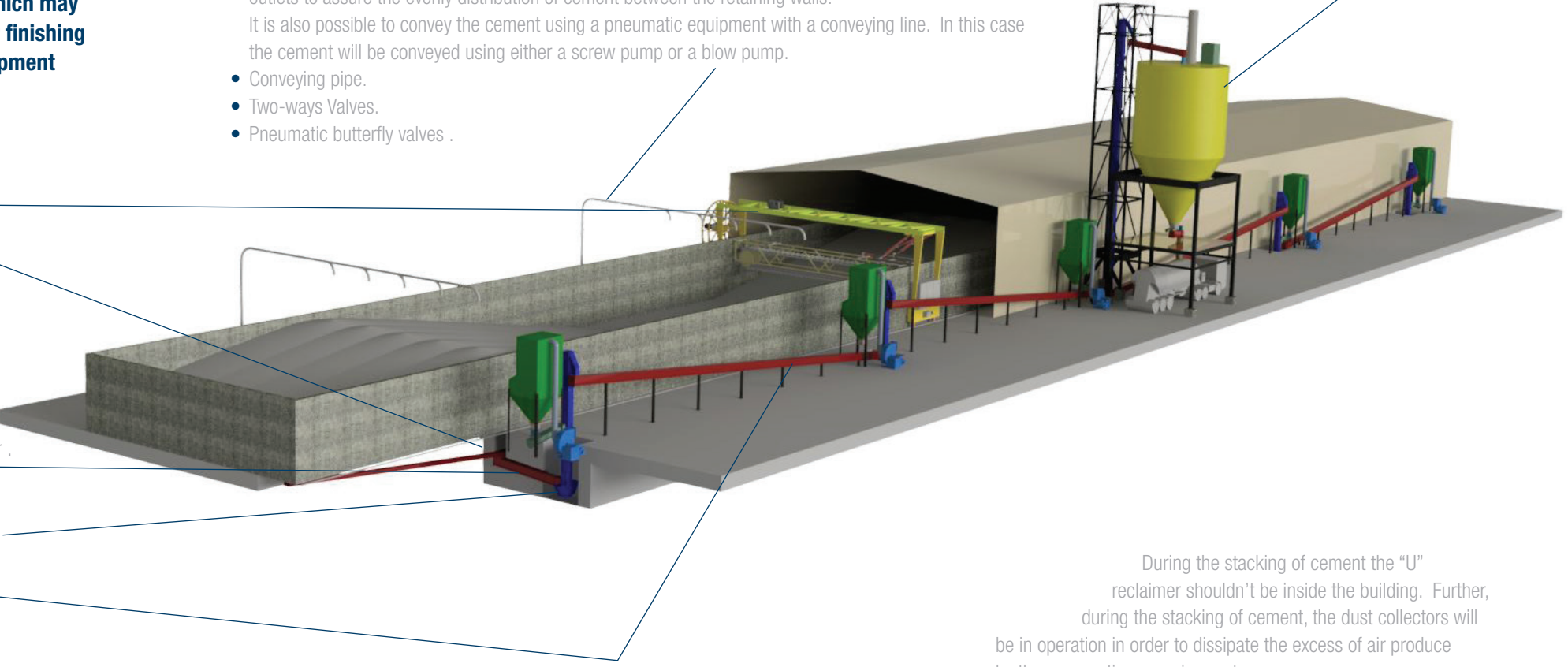
- Cement "U" reclaimer.
- Open aeroslides, including steel support structure, aeration. Pipe, one manual ball valve for each 3 m aeroslide section, and two pneumatic butterfly valves for each sector.
- Two aeration blowers for aeration of open aeroslides.
- Transition enclosed aeroslides from open aeroslide to screw conveyor or bucket elevator .
- Slide gates.
- On-off flow and manual flow control gate.
- Vertical screw conveyors or bucket elevators.
- Enclosed aeroslide to convey cement from each sector to the dispatch system.
- Aeration fans for enclosed aeroslides.

STACKING EQUIPMENT

- Pneumatic equipment (either screw pump or blow pump). Stacking of cement may be performed either pneumatically, mechanically or a combination of both systems. The mechanical system may comprise of a belt conveyor with a tripper car supported directly from the top of the building. The cement may be also stored using a net of aeroslides positioned along the stockyard with several outlets to assure the evenly distribution of cement between the retaining walls. It is also possible to convey the cement using a pneumatic equipment with a conveying line. In this case the cement will be conveyed using either a screw pump or a blow pump.
- Conveying pipe.
- Two-ways Valves.
- Pneumatic butterfly valves .



EACH FACHS HAS THE FOLLOWING MAIN COMPONENTS



During the stacking of cement the "U" reclaimer shouldn't be inside the building. Further, during the stacking of cement, the dust collectors will be in operation in order to dissipate the excess of air produce by the pneumatic conveying system. The FACHS is suitable to efficiently handle any of the following materials: Cement, Fly Ash, Slag and Gypsum among other products.

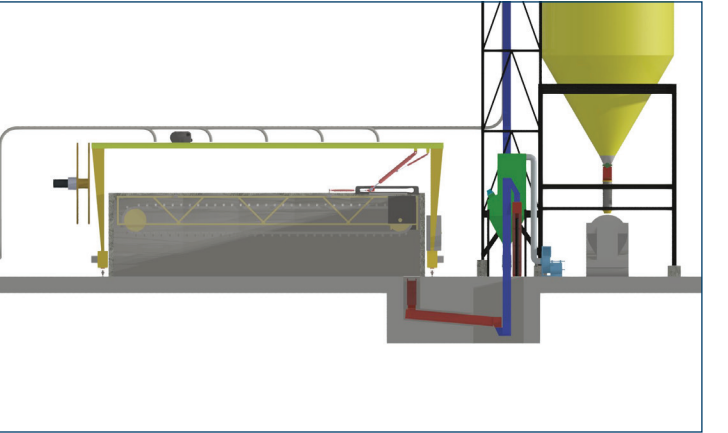
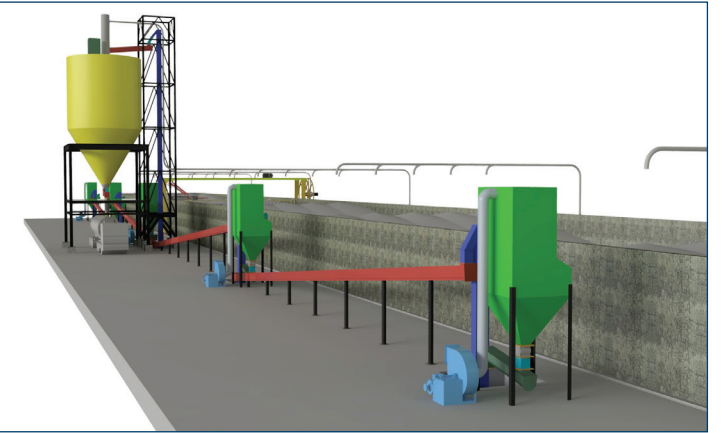
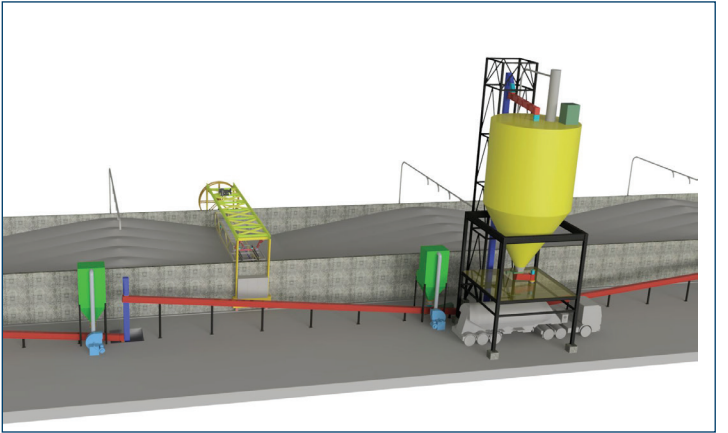
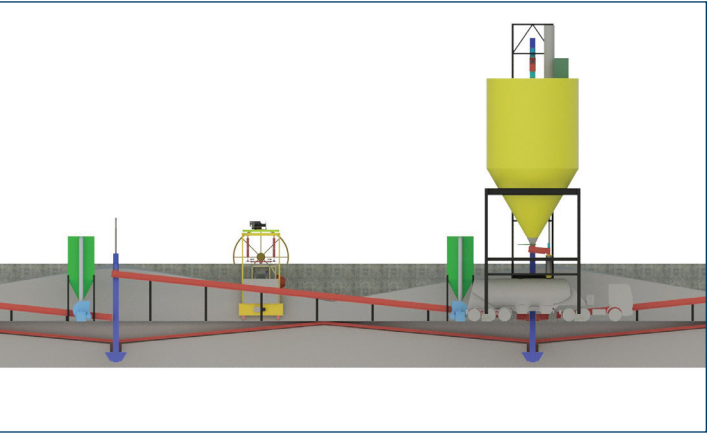
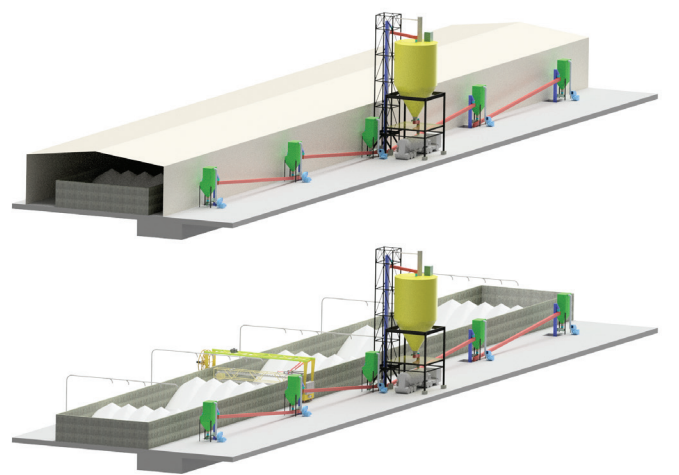
DISPATCH SYSTEM

- Cement Hopper with the following accessories: aeration bottom with aeration pipe and blower, safety valve, dust collector, level indicators (high and high-high), safety valves, inspection hatch, buffer box to connect pneumatic conveying line, loading cells, steel support structure, access ladder and handrails. The capacity of the cement hopper may vary depending on the dispatch requirements.
- Silo slide gate.
- Aeroslide slide gate, flow control gate for regulation and flow control gate on-off and enclosed aeroslide.
- Loading spout.

Eventually the dispatch system may include the installation of a packing unit. The dispatch system may be supplied totally mobile. Dispatch of cement may be performed directly to trucks wwithout passing through the surge bin.

ANCILLARY EQUIPMENT AND CONTROL SYSTEM

- Service compressor, including air compressed pipe.
- MCC and HMI control system.
- Bag house (s), including de-dusting pipe (s), return screw conveyor (s) and rotary valve (s).



The FACHS has been designed based on the following premises:

a) FLEXIBILITY
The FACHS is easily expandable to store and handle larger amounts and multiple types of cement.

b) SHORT RETURN ON INVESTMENT AND LOW OPERATION COST
The FACHS makes optimal use of existing infrastructure. A minimum personnel is required to operate a FACHS.

c) SHORT REALIZATION TIME
It is possible to use brownfield sites with existing (partial) permits. It is possible to use an existing warehouse or storage facility.

The FACHS is an option to automatically store, reclaim and dispatch large amount of cement or cementitious materials, using horizontal warehouses.

The FACHS allows to reclaim the cement from the storage area without the dangerous practice of using an operator inside a front loader.

The FACHS substantially reduces the number of aeration pads inside a flat storage to perform the reclaiming of cement, and consequently the energy consumption.

FACHS introduces two new concepts to reclaim cement inside the well-known flat storage system: THE "U" CEMENT RECLAIMER AND THE CASCADE CEMENT DISTRIBUTION ARRANGEMENT.

These two new components, together with the traditional pneumatic conveying system for stacking cement, the open aeration pads to reclaim the cement from a flat warehouse, and the typical dispatch system, has been integrated to create an efficient Fully Automated Cement Horizontal Storage to handle large quantities of cement.