

Charging Solids from Different Source Containers:

Providing Flexibility and Efficiency for a Multi-Purpose Process

Overview

De Dietrich Process Systems was asked to help develop a solution to issues a customer had with charging solids into their reactor; namely, the existing conveying system did not consistently meet their process requirements and they needed to convey solids from FIBCs (bulk bags) and smaller sacks. In response, DDPS provided a complete pneumatic conveying system that addressed both these issues and more.

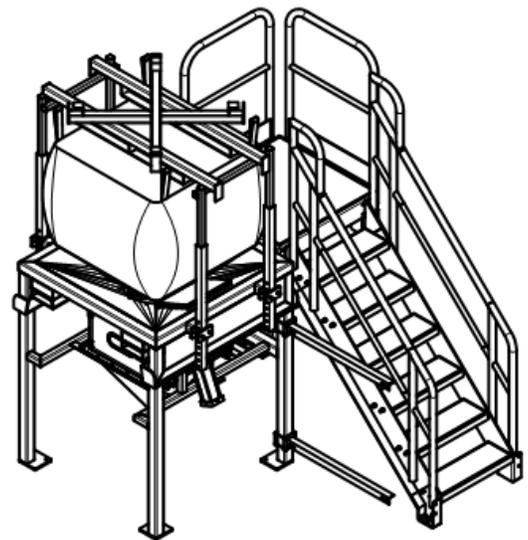
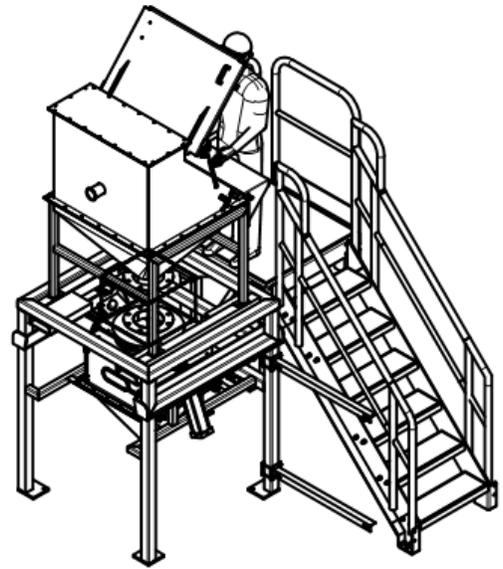
About

This customer is a leading global supplier of specialty chemicals who offer innovative and environmentally compatible solutions to coating manufacturers, paint and plastics processors, the printing and packaging industries, the cosmetics sector and the electrical and electronics industry. Their product range includes additives, specialty coatings and adhesives, pigments, sealants and resins and varnishes.

Challenges

There were several hurdles that needed to be overcome to ensure a successful project.

- The existing bulk bag unloading system had minimal containment which allowed large amounts of airborne dust during discharge of material.
- Their existing in-line solids injection system experienced persistent clogging in the transfer line, which resulted in significant downtime, lost product and having to manually charge solids through the reactor manway.
- The new system was to be installed on the same floor as the reactor, which severely restricted available headroom.
- The system needed to be able to handle both FIBC super sacks and small bags.



3D drawings of DDPS Powder Handling Solution featuring interchangeable upper modules to accommodate discharge from different source containers.

Solution

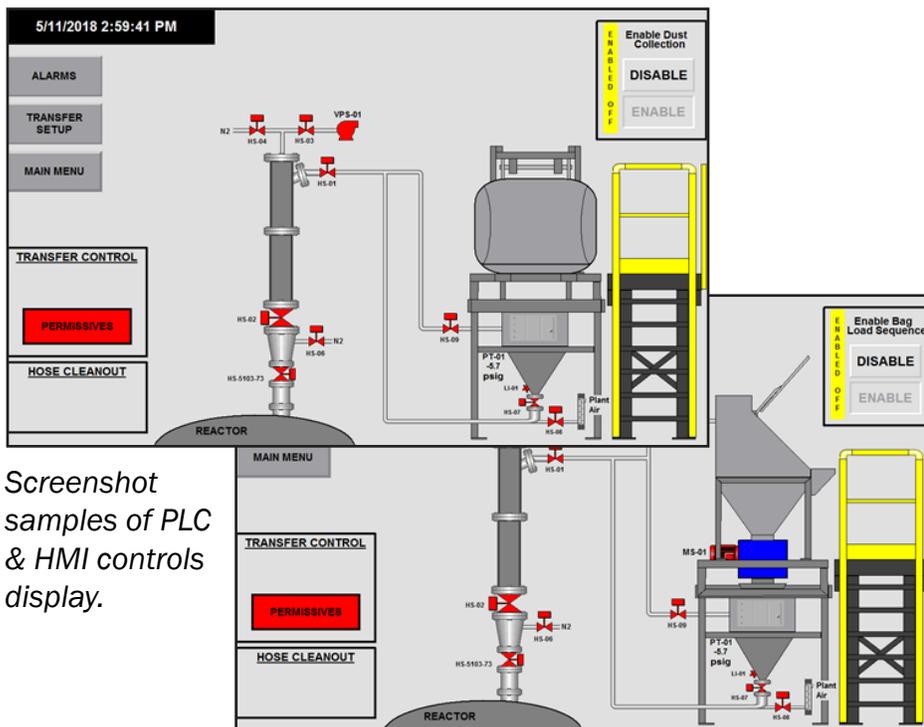
DDPS proposed a system with two (2) interchangeable upper modules that could be mounted on a common base frame; one module was for discharging bulk bags and the second was for emptying small bags. The modules could be quickly removed and exchanged by use of a fork truck. Due to the headroom limitations, the bulk bags had to be loaded onto their upper module prior to being placed on the bottom frame. The bottom frame included a common discharge hopper with fluidizing gas controls which fed a DDPS Powder Pump system. This dense-phase, pneumatic conveying system then transferred the discharged solids into the reactor in a safe, contained manner.

Results

Operator exposure to fugitive dust from the solids charging operation was significantly reduced due to a new containment chamber for sealing bulk bag outlet spouts and proper ventilation at the bag dump station. Ergonomics and safety of charging material from small bags was improved by providing a platform that allowed bags to be safely handled and emptied without opening the reactor manway. Finally, the Powder Pump transfer system's reliability resulted in reduced batch times by eliminating line plugging.



Dual modules: small bag discharge (top) and bulk bag (FIBC) discharge (bottom)



Screenshot samples of PLC & HMI controls display.