SCA Packaging are world leaders in speciality, promotional and point-of-sale packaging solutions. From their Co. Durham based facility in the UK they provide quality packaging solutions to a range of blue chip companies and others, where Nescafe, Carlsberg, Coca Cola, Cadbury, Lever Faberge and Patak's Foods are found numbered among them.

In the process of manufacturing sheet laminated corrugated cardboard, as well as the finished promotional or point-of-sale products, the glue, which is made from starch, is common only to the manufacture of the corrugated board. This is an aspect of the production line that required a radical make-over in terms of addressing the matter of dust escape and an improved mix and mixing time.

Originally, during production an operative would scale a 5itta gantry to access a store of 25kg bags of starch. Ten bags, representing a complete mix, would be individually lifted, cut open and manually dumped into a 1500 litre capacity mixer containing 850 litres of previously heated water. The concern for dust escape was mostly met by the installation of an extractor system but only added to their environmental concerns because dust was vented through the factory perimeter wall into the atmosphere. Some tolerable levels of dust also escaped into the factory environment. Further, while the process of dumping the starch took no more than several minutes the total time was about 40 minutes, accounting for the twenty minutes or so ‘monitoring time’ required to ensure the mix was being suitably blended; a problem caused through the haphazard manner of manual dumping. Production volume was not an issue. About seven weekly mixes - processing up to 1.75 tonnes (70x25kgs) of raw material is the requirement for present needs.

SCA Packaging then approached bulk solids handling specialists Flexicon (Europe) Ltd to address these problems and after due consultation Flexicon validated a system in their own test laboratory in Herne Bay, Kent prior to manufacture and commissioning.

The system comprised:
- Bulk bag dump station with integral dust collector.
- Model T-36 hopper with mounted bag support tray.
- Model 1450 flat spiral conveyor.
- 1.5kW geared drive assembly and discharge transition.
- Control panel.

Since the system’s installation at the back end of 2004, a single operative still manually handles the same 10 x 25kg bags per batch but now accesses them from ground level, a procedure to be further improved by the installation of a scissor lift enabling the operative to capture bags at waist level. The system is activated by a single Start/Stop button on the control panel. For additional safety, bags are split and dumped from the hopper bag support tray into the 250litre capacity receiving hopper via a 50mm dia mesh screen that prevents unwanted foreign objects such as paper fragments from entering the process.

Mounted above the hopper is the Integral Dust Collection System housing two spun bond polyester filter cartridges each with a performance rating of 99.99% collection efficiency for materials with a particle size of 5 microns or greater. All starch residues on the filters’ 10kg m² surface area are purged and returned to the hopper system at the end of the cycle, eliminating the need to expel dust into the open atmosphere and virtually eliminating dust escape to the factory environment. A gas spring assisted access door allows quick, safe and simple filter renewal on changeover.

The handling and flow characteristics of starch are not ideally suited to this process as it prone to bridge, rat-hole, pack, smear, cake etc. With a 550kg/m³ bulk density (packed), starch is at best, semi free-flowing. Therefore, to assist in the smooth and consistent, gravity-fed transfer of raw material from hopper to screw conveyor an electric vibrator and rotary agitator are employed on the hopper wall and in the base of the hopper respectively. In addition, a low level sensor in the base of the hopper alerts the operator the status of product level.

The self-centring, flat screw then conveys material through 45° along the 3mtr long, 114mm dia UHMWPE tube to be gravity fed via the discharge transition directly into the central flow column of the mixer. This steady, uninterrupted flow of starch assures an excellent and consistent mix for each batch in far greater time and without the need of human intervention as before, the operative need only return within twenty minutes to check that the process is complete. At the appropriate time the completed mix is pumped to a holding tank from where it will be heat treated during the final process of ‘gelling’.

The new procedure also presents the opportunity to reduce the transfer distance from the mixer to a holding tank from an 100mtrs to 5mtrs minimising any increase in viscosity caused through heat loss in transfer.

The gain in process time, the elimination of dust vented to the atmosphere, the improved safety objectives during the handling procedure and a costantly high quality mix were essential to the success of the system.

The Flexicon dump bag station, filter and conveyor system met them all.

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