ENGINEERING CJW PROCESS SYSTEMS

C J Waterhouse Co Ltd

MATERIALS HANDLING ▼ WEIGHING SYSTEMS ▼ PROCESS SOLUTIONS
PLANT CONTROL ▼ BESPOKE MACHINERY ▼ AUTOMATION

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Bespoke Machine Solution

Refractories

The Problem

C J Waterhouse Company was initially approached by a UK refractory company to solve a specific materials handling problem that they have experienced for many years. The problem was related to the handling and dispersion of a Zirconia / Graphite blended material. This material has a very high bulk density of over 2500Kg/m3 and readily compacts under its own weight due to the blend consisting of a variety of particle sizes. The downstream process requires that this material be delivered to the mould station in small batches of approximately 2Kg as a fine, well blended material.

Previous methods for completing this process involved; FIBC discharging, sieving, re-blending and dosing. This process was carried out by a series of individual standard machines which is time consuming, costly and ine ective.

With their experience in bespoke machine design, C J Waterhouse co was commissioned to produce a machine to overcome and simplify the existing process.

The Solution

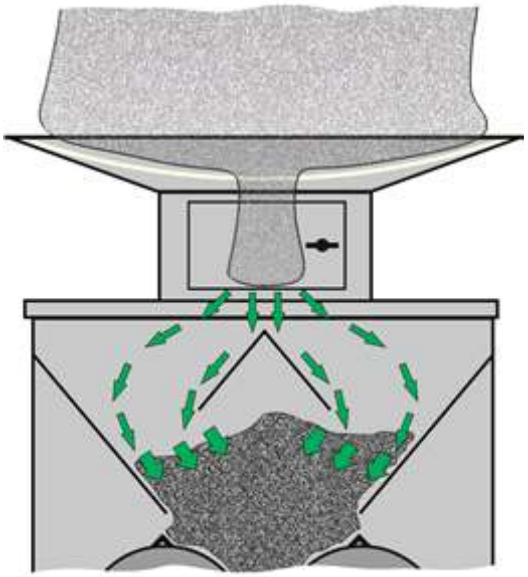
Following careful analysis of the clients production problems and material handling / processing issues a preliminary concept design was developed. The principle of the concept was to incorporate the currently used processes and combine them into a single machine that would discharge a bulk bag of the material and dispense it as a lump free fine powder into the downstream mould.

FIBC Discharging
Material Sieving
Material Blending
Material Dosing

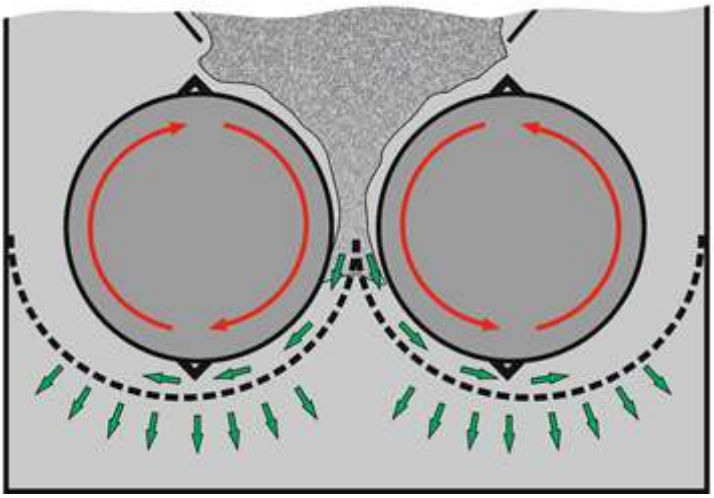
} **Bespoke Solution**

Material Discharging

This section is generally the same as our standard powder bulk bag discharge station with the addition of a number of internal deflector plates to provide a specific material flow pattern and reduce pressure loading on the machine section below.
A central inverted 'V' and two angled diverter plates on each side channel material towards the centre of the chamber and create two voids towards the outer edge.
This material flow pattern is created to deliver material to the required point of the downstream machine component whilst alleviating pressure and therefore reducing potential material compaction.



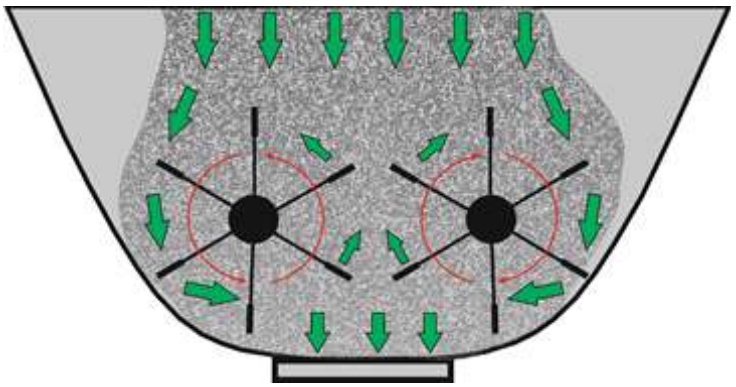
Material Sieving



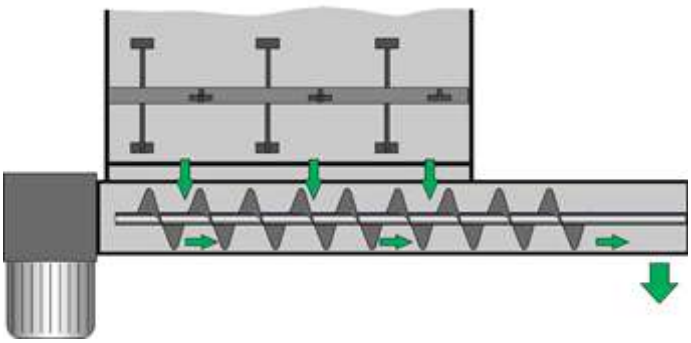
As vibratory sieving can separate particle sizes and cause blockages, especially with compacted materials, C J Waterhouse company looked to design an integrated solution incorporating a mechanical sieving operation.
The process is performed using two counter rotating drums with scraper paddles and a pair or removable curved sieve plates. These drums occupy the majority of the chamber and therefore only allow a small amount of material to the screen plates. As the drums rotate the scrappers collect material from the centre of the chamber and sweep it over the face of the screen plate.

Material Blending

This section resides beneath the sieve plates and acts to re-homogenise the material to eliminate any potential particle separation that may occur during the sieving process.
Two counter rotating shafts with blending fingers gently mix the material continuously. In addition to this blending action the fingers also promote the flow of material to the downstream feeder and eliminate bridging within the compartment cavity.



Material Dosing



The final section of the machine is a 'U' trough screw feeder which delivers the sieved and blended material to the downstream process at a continuous rate. The feeder incorporates a mesh screen at the discharge point for safety reasons and is manually operated via local push button activation.via push button operation.