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 Silica Handling System

System Overview

C J Waterhouse company were contracted to develop a bespoke materials handling system to provide automated intake, size reduction, transfer and bagging of Silica into FIBC's. The system is to be utilised for specific product campaigns only and must therefore be mobile to permit removal from the main line when not in use.

The system comprises of a number of component machines mounted upon two mobile frameworks which together form an integrated turn-key system. When in position the machines interlock together to provide a continuous operation but can be easily pulled apart and relocated for storage.

Frame One

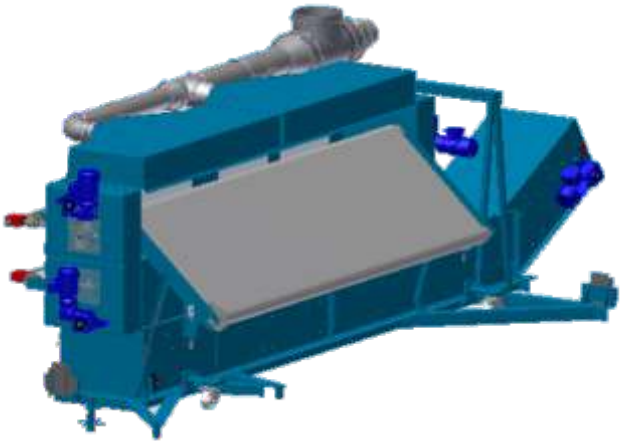
In-feed conveyor
Nip roller system
Shear roller system
Transfer conveyor

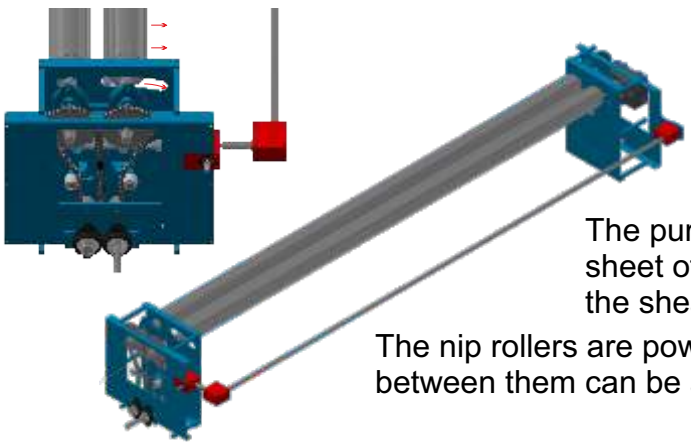
Frame Two

Elevating conveyor
Reversing conveyor
FIBC filling stations
Automation panel

In-feed Conveyor

The in-feed conveyor comprises of a variable speed, metal belted, inclined conveyor which accepts a 3000mm wide stream of silica matting from the clients existing oven and delivers it into the top of the downstream nip roller system. The conveyor height and angle can be manually adjusted to ensure its close integration with the existing oven exit conveyor.





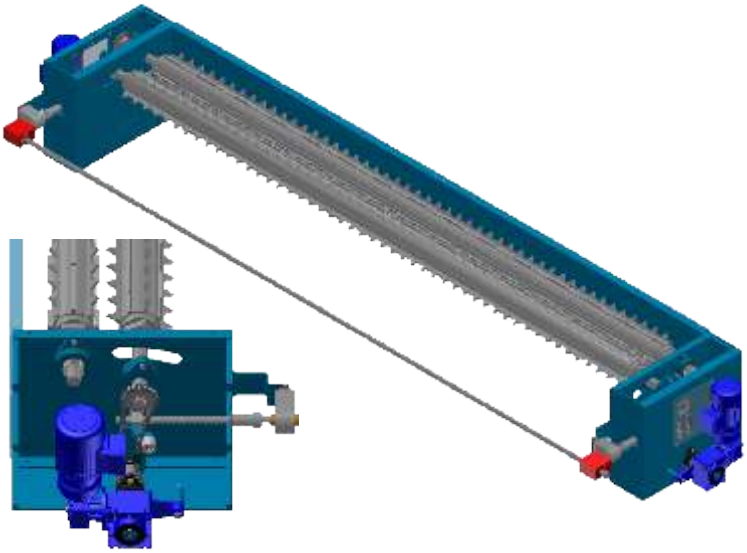
Nip Roller System

The nip roller arrangement is located at the top of the machine and comprises of a pair of counter-rotating rollers with integral horizontal fingers.

The purpose of this machine section is to draw the material sheet off the inclined conveyor and feed it downwards to wards the shearing system locate below.

The nip rollers are powered via a single variable speed drive and the distance between them can be adjusted to suit the material thickness being processed.

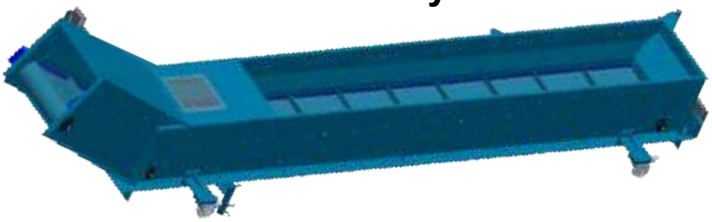
Shear Roller System



The shear roller arrangement is located directly below the nip rollers and is designed to tear apart the continuous blanket of silica fibre into manageable pieces. The system comprises of a pair of counter-rotating rollers which incorporate intermeshing teeth. The rollers are have a Tungsten Carbide coating to increase lifespan and the spacing between them can be manually adjusted to suit material depth.

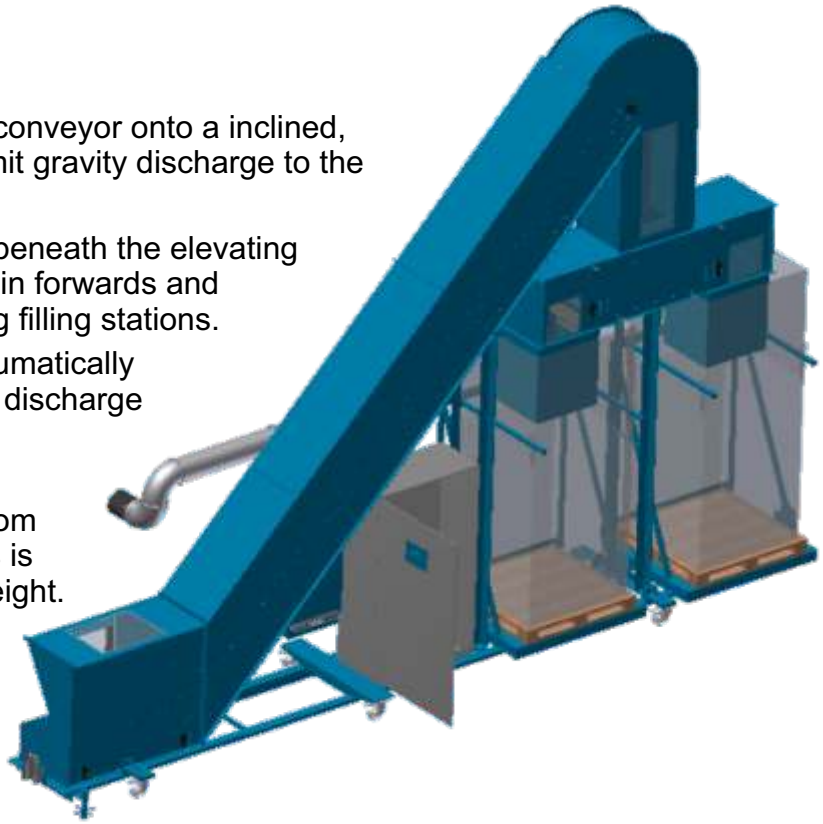
The shear rollers are powered via independent variable speed drives to allow them to operate at different speeds to optimise shearing performance.

Transfer Conveyor



The transfer conveyor resides below the shear roller system and comprises of a fully enclosed flighted belt conveyor which moves the chopped material to the downstream elevating conveyor.

Material Delivery & Bulk Bag Filling



The chopped material is fed from the transfer conveyor onto a inclined, flighted belt conveyor which elevates it to permit gravity discharge to the bulk bag filling stations.

A horizontal belt conveyor is located centrally beneath the elevating conveyor outlet. This conveyor operates both in forwards and reverse to dose material to one of two bulk bag filling stations.

The horizontal conveyor incorporates two pneumatically operated flap gates to close off the left or right discharge routes when not in use.

Material is dosed from the horizontal conveyor directly into bulk bags which are suspended from the FIBC filling station. Filling of the bulk bags is done automatically to the pre-specified bag weight.

Upon completion of the weighment the horizontal conveyor switches direction and automated filling of the second bag commences.

Control

The control system is provided via Allen Bradley hardware which incorporates a Compact Logix PLC and door mounted Panel View HMI. This system provides automatic and manual operation of the machinery and interfaces with the plant wide control system to relate machine data and weight information to the plant SAP system.
As the machinery is mobile all connections are made via plug and socket interfaces with a permanent connection panel.