Aerobelt installs shuttle conveyor at Australian Paper

Aerobelt Australia has installed a new reversible shuttle conveyor at Australian Paperís Morwell facility. The system can rapidly move between nine digesters in 20 seconds.

At Australian Paper's facility at Morwell in Victoria, the company uses woodchips as an ingredient in the paper manufacturing process.

In part of the process, woodchips are conveyed from a ground-based stockpile into an existing roller conveyor system that feeds a roller based tripper conveyor. The tripper system then feeds the woodchip into digesters for processing.

Chemicals are added and heat in the form of steam cooks the chips to break down the lignins that hold the woodchips' fibres together. After around 90 minutes the process is complete and the pulp is pumped out as slurry for the next stage of the paper manufacturing process.

At the Morwell site there were nine digesters in the batch digester feed system that had to be fed in this way. However, the existing woodchip delivery rate was poor, hindered by an old shuttle system and low processing speed.

Aerobelt was asked to tender for a system to replace the tripper conveyor and provide an increased throughput of 400 cubic metres per hour of woodchip, ranging from a density of 0.145 to 0.227 tonnes per cubic metres of woodchip.

As part of the specification Aerobelt's system would have to accelerate, travel and stop between any of the nine digesters in 20 seconds, with the latter figure the maximum time allowed to achieve the desired digester throughput.

Although Australian Paper was the customer, the consultancy firm evaluating the tender submissions was a company called KSH Solutions Inc of Canada.

Part of the original tender layout drawings indicated three large screw conveyors were required to fill the bins due to the location of the digesters at the site. Aerobelt submitted a design of an 800mm-wide reversible shuttle conveyor that had the capability to ensure all nine digesters could be filled, and in a random order as dictated by the process.

"As part of our design layouts we positioned the shuttle conveyor centrally between all the bins to remove the use of the screw conveyors," said Steve Kutassy, general manager, Aerobelt.

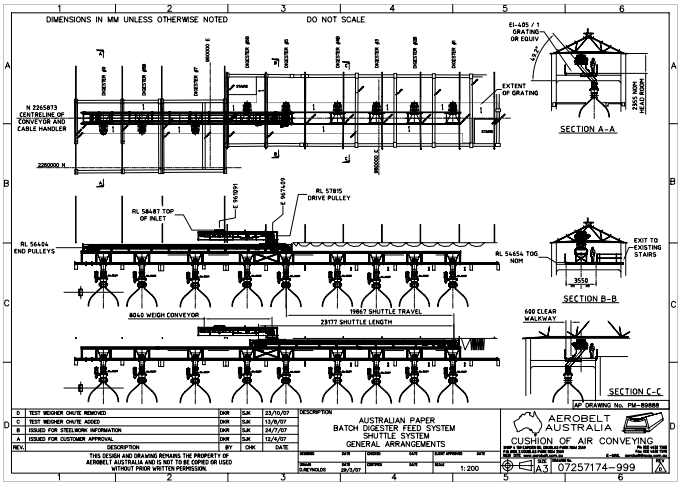
To meet specifications the conveyor design length was critical. In addition, the location of the feed point from above was important, as were the power cables and haulage drive power supply requirements.

To meet these exacting requirements, power was supplied to the system through an automatic cable take-up process.

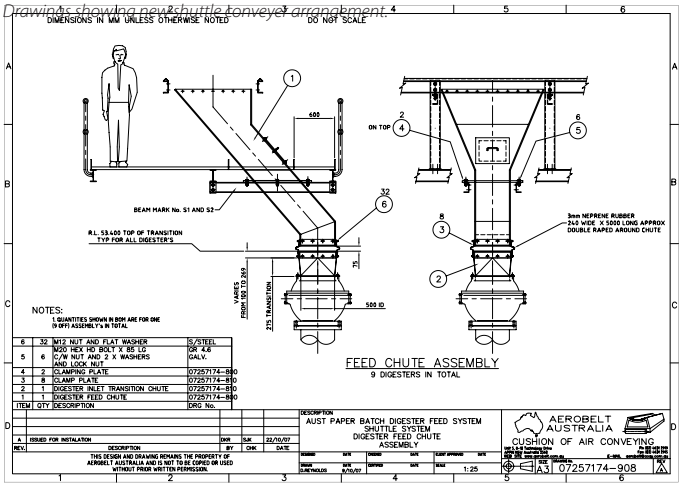
Initially, Aerobelt's intention was to use the existing wooden floor and fit the new conveyor on to it. However, it soon became apparent that this was not suitable and Aerobelt tendered for an option to supply a complete new steel floor, a variation adopted by Australian Paper.

Aerobelt also expressed concern as to the location of the feeder conveyor above, with a material fall of around eight metres set to damage the air film on the shuttle system.

As Australian Paper needed to weigh woodchips to establish a feed rate, Aerobelt quoted on a short roller conveyor, incorporating a belt weigher, an option adopted by Australian Paper.



Drawing is showing new shuttle conveyor arrangement.



(above and below) Australian Paper's old shuttle system at the Morwell plant.

Off-site equipment build up.

This has the ability to establish the throughput of woodchips in the system, incorporates an impact section and is positioned above the shuttle system.

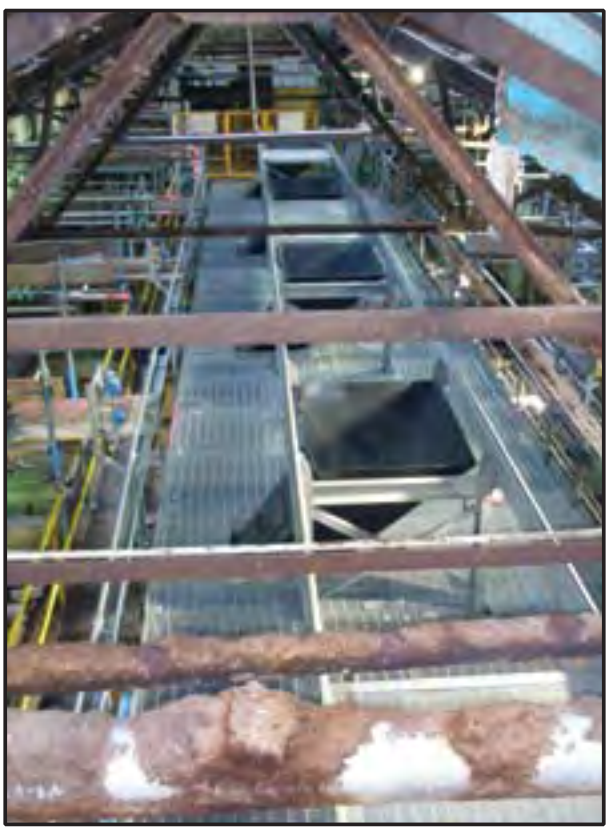
To control the reversible movement of the shuttle, Aerobelt designed a haulage system that moves the conveyor backwards and forwards to the desired positions. The design incorporates a positioning system or shaft encoder to monitor the precise location of the shuttle conveyor, allowing it to stop over any one of the digesters needing filled.

As a secondary back-up, limit switches are also used to ensure the correct positions are achieved as, with hourly tonnages of 60 to 95 tonnes, it is vital to ensure that woodchips end up in the digesters and not on the floor.

The power supply is on a monorail system hanging from the roof that allows the cables to extend to the maximum position of 19.8 metres and also retract to a closed position of 1.64 metres.

Due to the corrosive nature of the papermaking process the conveyor had to be all stainless steel 304, with the digester feed chutes made from HDPE.

These allow woodchips to flow in to the digesters, even though the offset nature of the shuttle conveyor and digesters mean they are not in line.



In situ.

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As a safety feature for operators, Australian Paper would not allow access to the shuttle area due to the possible automatic reversing action of the conveyor and shuttle. In effect, the whole floor had to be inaccessible while the system was in operation.

In practice, gate access is provided to the floor, but, if opened without authorisation, the control system is alerted and the conveyor does not move until reset.

Prior to actual site installation the whole system was built up on the ground, a measure designed to minimise paper production downtime. Next, parts of the plant's walls had to be removed to enable large sections of equipment to be lifted into position and installed in the elevated location in the roof system.

According to Aerobelt the installation and commissioning proceeded to plan, with the new shuttle system running smoothly since mid-2008.

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