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A flour mill has operated on the site occupied by the Walk Mill, on the River Gowy in northern England, since the 13th Century. The contemporary facility produces white and wholemeal flours using a mixture of modern and traditional equipment.

Walk Mill uses a timeless technique to make flour, grinding the grain between two flat millstones driven by a large water wheel. The wheel is powered by a stream diverted from an adjacent river.

The wheel works through gears to grind wheat into flour for making bread. Kason’s Centri-Sifter centrifugal sifter recovers the white and wholemeal flours produced.

Wheat is harvested from the adjacent fields, dried to reduce the moisture content and cleaned to remove chaff. It is then taken to the mill in a sealed trailer and loaded into a hopper on the first floor.

The hopper has a capacity of 2,000kg, which is enough to meet the mill’s needs for four to six days, depending on the rotation speed of the water wheel.

From the floor hopper the wheat is moved by an auger conveyor to a smaller feed or transit hopper of 50kg capacity, located above the millstones. The grains fall from the bottom of the feed hopper to the millstones, where they are ground into flour.

Walk Mill uses two burr stones, made of hard, dense French granite. The stones are positioned horizontally, one above the other. The lower stone, called a bedder, is fixed while the upper one (the runner stone) rotates.

Wheat from the hopper falls into a hole in the centre of the upper stone and gradually moves to the periphery of the stones via shallow grooves in the stones. The tiny gap between the stones is adjusted to produce white or whole meal flour, the latter being more coarse because it contains bran.

Both the stone rotation and the feed rate from the hopper are governed and synchronised by a shaft that is geared to the water wheel. The bottom end of the shaft is attached to the runner stone and carries the weight of the stone as well as rotates it.

Grain trickles from the hopper along a vibrating wooden trough, called a shoe. The vibration is imparted by a forged metal device, called a damsel which is attached to the upper end of the shaft. The damsel, incidentally, was retrieved from the earlier mill.

Walk Mill part owner, Ben Jones explained ‘It’s self-
regulating. If the water flow increases, the feeding and milling operations increase at the same rate. A shaft rotation rate of about 40rpm yields the best quality of flour and the relatively slow, gentle and cool process avoids overheating of the flour, he explained. This preserves good parts of the grain: protein, oils, vitamins, sugars, starches and bran.

As the flour leaves the periphery of the millstones it is swept by a blade attached to the upper stone and falls into a 12.5kg transit hopper. An auger transfers the product to a spout that feeds the Centri-Sifter screener, which separates the desired flour from the rest of the material. The model GOB-SS machine has a sifting area of 1,103cm². It is driven by a 1.5kW motor and can process up to 700kg per hour, well beyond the mill’s capacity of 80kg per hour.

The screener is a compact centrifugal machine, with a cylindrical sifting chamber that contains a cylindrical screen of nylon mesh. Flour is fed pneumatically into a vertical feed inlet at one end of the unit, then redirected by a feed screw into the chamber, which is oriented horizontally.

Rotating helical paddles within the chamber continuously propel the flour against the screen and the centrifugal force accelerates the particles through the screen openings. The rotating paddles, which make no contact with the screen, also break up soft, agglomerated material. The separated flour is directed to a chute, from which it drops directly into a 25kg sack for shipping. When the sack is full the auger is stopped until a new sack is in place.

Walk Mill uses two screen sizes: 38 mesh (500 µm) for white flour and 12 mesh (1,500 µm) for the coarser whole meal flour. Jones said “Typically we produce white flour for four days, because we sell more of it, and wheat flour for one day.”

In the case of the finer, white flour the product passes through the screen for bagging, as explained above. Coarser, waste material is retained by the screen and moves along the chamber to the far end, where it is recovered through a second discharge spout. In the case of bran, fine waste material is ejected through the screen, while the bran is retained and collected from the second outlet. All the waste is bagged and used for feeding pigs.

The company found the centrifugal sifter through an Internet search and bought it after seeing a demonstration at Kason’s facility in Stoke-on-Trent, England.

Caroline Jones, Ben’s daughter, is a baker. She said “The screener achieves a very good separation, with no wasted product, and the quality of the flour is excellent. The machine is very easy to operate and there is no problem with screen clogging. We occasionally dust it down, but basically it cleans itself.”

Walk Mill serves two markets. The 25kg sacks are shipped to upscale restaurants and hotels that make their own bread. For the retail market, flour is delivered in 1.5kg bags that are filled by hand from the larger sacks.

Kason is distributed in Australasia by DTD Engineering of Thuringowa in NSW.

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