

The innovative use of modern materials

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Extending flute/corrugation life and enabling chills to be refurbished up to 15 times, modern metallurgical developments have widened the miller's range of options extensively. Inevitably, they have also complicated the selection process, requiring large amounts of relevant technical and other data to be assembled and analysed. This can be a time-consuming task, without the benefit of long-term experience in process and equipment development, such as that which Satake Europe has built up over the past century.

Roll chill alternatives

As the largest roll manufacturer in the UK, Satake offers a portfolio of three different types featuring new materials available from suppliers based around the world.

Satake Europe specialises in manufacture using one of three key materials for the roll body:

Standard rolls - Chilled iron, centrifugally cast and dynamically balanced for greater precision, providing a consistent uni-form hardness,

C12 rolls - High chrome alloy, giving an average life twice that of a standard cast iron roll, resulting in reduced mill downtime for roll changing

'Self matting' rolls - With a material composition formulated to maintain a heavier frosted finish for special reduction applications

Whatever the material - and chilled cast iron rolls remain the traditional choice for much break and reduction work - the outer surface of fluted/corrugated rolls must be resistant to abrasive

wear in order to retain the required profile. The surface must be hard but not brittle, to avoid chipping, and it is important that the roll chill can be machined with conventional tools, avoiding unnecessary cost when end of life arrives and re-fluting. Smooth rolls require an outer surface that can be "frosted", creating a matt or non-glazed surface which will effectively grip the product and be resistant to abrasive wear.

Quality and safety

The quality of the grinding and fluting processes, whether being carried out on a new roll or during refurbishment, determines the performance of the roll and, thus, the quality of the end product.

Attention to quality and safety issues has contributed to Satake Europe's claim that its Bredbury facility is a 'Centre of Excellence'. An integral part of each refurbishment is the careful inspection of each roll or roll pack module before any work can begin. This exercise is followed by the compilation of a complete inspection report, detailing the findings, recommendations for action required and associated costs.

In Satake Europe's experience, one in ten rolls sent for re-fluting displays defects which could have a fundamental effect on mill performance and safety - such as a damaged spindle, less than the recommended chill diameter, or chill quality which could affect reduction performance. All of these would be identified and reported on, supported by relevant data compiled using a combination of engineering skills and high-tech instrumentation. Many of the defects can be rectified, and Satake Europe offers the full range of remedial operations, including re-gudgeoning, reducing the need for such defective rolls to be scrapped. Along with roll refurbishment, end bearing replacement is also requested by many customers.

Once the completed report has been e-mailed or faxed to the customer and work instructions agreed, rolls are ground until a



smooth, parallel surface is obtained. Re-fluting, using tungsten carbide fluting bits, restores the profile to the exact specification required for the client's application.

The number and profile of the flutes, relevant to the application of the roll, have been developed over many years and are specified to high levels of accuracy. Satake Europe offers a standard range of more than 100 different flute profiles, with bespoke arrangements available.

Smooth rolls are ground with either a taper or camber to a tolerance of four microns over a diameter of 250 mm. The frosted finish, necessary to ensure immediate grip when the rolls go into grind, is achieved by blasting highly abrasive particles at the surface using automated shot blast equipment. Before dispatch final inspection takes place and, in some cases, roll balancing. This ensures the shortest possible interval between delivery, installation and regaining full production in the mill.

Satake Europe offers a standard roll refurbishment turnaround of three weeks plus an emergency shorter turn around service if required.

To ensure that refurbished rolls arrive back at a client's mill

in the same precision-ground condition as when they left the fluting cell, Satake Europe has devised a special pallet design.

On completion, the rolls are coated with rust-preventing food-safe oil, covered in rust-preventative paper and sealed in a protective plastic sleeve before being mounted on the pallet, accompanied by documentation detailing destination, flute specifications and a unique roll number. This ensures complete traceability for each individual roll and enables a statistical history to be maintained which can prove invaluable when monitoring mill throughput.

The centre, from which the company offers a full range of customer services, backed by global facilities for state-of-the-art research, development and manufacture, includes a demonstration area, parts warehouse and a workshop. The roll production facility incorporating custom-built machinery, laid out in a cellular style and standing on 12-feet deep foundations to eliminate vibration transfer, provides the capability to produce 250 new rolls and refurbish 2,000 rolls per year for customers in Europe, the Middle East and Africa.