

## WASHERS MASS-PRODUCED SIX TIMES FASTER

There can be few people with more experience in washer manufacture than Iqbal Bahia, technical director of SFS Intec, which has installed two Bruderer high-speed presses for producing rubber-bonded washers for the construction industry at up to 1,000 strokes per minute (spm). Mr Bahia has travelled the world reviewing best practice and found that all other factories were producing washers, even simple types, at 150 to 160 spm maximum.



Key to achieving such a large increase in manufacturing speed at SFS Intec's Leeds factory has been to supplement conventional production, based on presses punching washers out of sheets, by installing a high-speed press fed from 400 metre long, 190 mm wide coil. Not only is production rate increased six-fold but downtime is also cut by 40 per cent, as occasional coil change is far less time-consuming than feeding individual sheets. Furthermore, guillotining has been eliminated and scrap rate is 10 per cent lower.

Fasteners have been made on the Leeds site for over 100 years but in 1997, the Swiss-owned group embarked on a £6m investment programme to rebuild the factory, install new production equipment and improve logistics. The initiative was in anticipation of creating

world centres for producing specific components, each of which would sell to world markets, with a view to reducing manufacturing costs.

Largely completed in 2003, the re-organisation had the highly desirable effect of evening out seasonal variations in demand from the construction industry, which is frantically busy in the summer months, yet still often demands daily deliveries to avoid holding stocks. The UK was tasked with bonded washer manufacture, fasteners being transferred to the French plant, while the other five factories in Switzerland, Italy, Germany, the Czech Republic and the USA specialise in different components.

The changes meant that production of washers at Leeds rose immediately to half a billion per annum to meet demand from the Scandinavian and European markets as well as the UK. To provide the extra capacity, a 60 tonnes force Bruderer BSTA 600 press capable of operating at 600 spm was installed to develop the new high-speed production process and then to work alongside three conventional presses over two shifts.

As high-speed stamping of washers had never been done before, Mr Bahia took particular care in researching the process. He visited a reference site – the Birmingham mint – to see other Bruderer presses blanking and coining Euros at 700 spm. He remembers standing there in awe watching this happen, thinking that if the machines can produce coins at high speed, they could certainly produce washers. So he set about sourcing the nec-

essary EPDM (ethylene propylene diene monomer) synthetic rubber-coated coil and developing the necessary carbide tooling.

In 2003, the decision was taken that the US operation, which had been buying washers from outside the group, would from 2005 start to source them from Leeds, which will double production to one billion per year. This necessitated installing in the autumn of 2004 an even faster, 80 tonnes force Bruderer BSTA 800 press capable of 1,000 spm, at a cost of £500,000. So productive is the new facility that the other high-speed press is not needed for volume manufacture and is kept purely for process development.



Further high-speed presses will be installed as necessary as other markets start taking washers directly from Leeds in the coming years, including emerging European countries, the Middle East, India, China and the Far East. Eventual annual production volumes could easily top two billion.

SFS Intec washers form part of high-specification roof fasteners used in such prestigious projects as the recently completed Wales Millennium Centre on Cardiff Bay waterfront, and Heathrow Terminal 5 currently in build. Outside diameter (OD) of the washers, which are

made from 1 mm thick stainless steel, galvanised steel or aluminium coil is from 10 to 32 mm and a washer of any given OD can be supplied in four versions with different inside diameters (ID).



Further variation is introduced by different thicknesses and shore hardnesses of EPDM, which provides the weather seal. Tapered punches are used to stamp out the washers, as both the OD and ID of the rubber are smaller than that of the metal. Overall there are thousands of varieties and each is manufactured in batches ranging from 10,000 to five million. General dimensional accuracy and flatness is  $\pm 0.1$  mm but can be tighter, and full SPC checks are carried out

every 15 minutes using an on-line vision system.

As some runs are relatively short to satisfy customers' just-in-time requirements, it is important to minimise changeover time, which is around 15 minutes for a repeat job or 40 minutes if a new design of washer has to be programmed at the B-Control system on the press. This compares favourably with three hours needed by older presses, which required rollers and cams to be adjusted manually. Now, it is a simple matter to input key parameters such as ram stroke, coil pitch and punching speed, and the press automatically adjusts itself using built-in servo drives – and memorises the parameters for the next time that tool is used.



Other SFS Intec products produced on the Bruderer BSTA 800 press are 1 mm thick, Aluzinc steel plates that join flat roof panels. Produced in six varieties from 76 to 178 mm wide coil, they are installed on a construction site using a power hand tool through which they have to be fed automatically. Overall height and flatness therefore have to be within 0.02 mm and any burrs must be less than 50 microns, otherwise they would tear the felt lining of the panels. Progression stamping tools have been made for the Bruderer press to produce these components at speeds of 200 to 250 spm, annual output being in excess of 20 million per year.

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