

Precision manufacture of railway wheels

Schuler forging technology successful on the job



- High precision forging
- For all shapes and sizes
- Fully automated process
- Maximum flexibility

MH 10,000 pre-forming press

MH 5,000 dishing press

Railway infrastructures are growing around the world. There is strong growth in the number of wheel sets needed to cope with the rise in rail transport – particularly as railway wheels are subject to high wear. The Spanish railway vehicle manufacturer **Contrucciones Y Auxiliar de Ferrocarriles (CAF)** was quick to react to this trend and has replaced its wheel manufacturing equipment with new and more powerful forging presses from Schuler. At CAF's facility in Beasain, Spain, the fully automated and highly modern production process relies on a new 10,000-ton pre-forming press as well as on a 5,000-ton dishing press.

High loads, tight bends, strong acceleration and emergency braking – railway wheels have to cope with extreme levels of stress. Dr. Walter Osen, Head of the Solid Forming Business Unit at Schuler SMG in Waghäusel, explains: "The wheels have to withstand permanently high loads while transmitting tremendous forces onto the rails. Uneven wear and tear, caused primarily by braking, means that the wheels must be regularly reworked to become perfectly round again. In addition to the usual wear from operation, this reworking significantly shortens the wheel's service life.



PUT IT INTO MOTION – FORGING WITH SCHULER

For the pre-forming of railway wheels CAF relies on a new 10,000-ton press. Nearly all shapes and sizes of railway wheels can be pre-formed on this machine. The power and high press force become apparent from its impressive statistics: the main cylinder has a diameter of around three meters. The respective hydraulic system contains 30,000 liters of hydraulic oil to help the cylinder do its work. The whole system requires four megawatts of power. Lubrication and cooling ensure the process goes as smoothly as possible. Three manipulators cool and lubricate the dies before, during and after the forming process. The process is capable of producing railway wheels with a maximum diameter of around one-and-a-half meters and a weight of over one metric ton. “The line is designed in such a way that a preformed wheel leaves the line every 60 seconds,” states Dr. Walter Osen.

“Thanks to the new 10,000-ton press, the pre-form can be sized much more precisely and there is thus less rolling work required in the downstream wheel rolling machine. This significantly reduces the line’s cycle time,” says Mikel Mendoza, the project manager responsible for wheel production at CAF.

DISHING PRESS CLOSES GAP IN PRODUCTION PROCESS

“We have replaced an old 2,500-ton press with a new 5,000-ton-strong press from Schuler SMG,” says Dr. Walter Osen. The addition means that the entire forging line can now be run fully automatically. The increased press force also allows lower tolerances for the forged part. As a result, the customer profits from considerable weight savings.

The capability of the line becomes apparent from a first look at the production process. Several steps of railway wheel production can now be completed with a single stroke of the slide. The press simultaneously flanges the rolled wheel, calibrates it to size and punches the hub. “In this context, dishing means forming the inner wheel disk from a symmetrical to an asymmetrical shape. At the same time, the wheel’s hub is axially offset. On the old press, this process and the required piercing still had to be



done in two steps. With the new press, both are completed in a fully automatic process,” explains Dr. Walter Osen. The machine boasts an integrated piercing cylinder for the piercing process. Its punch pierces through the wheels with a force of 1,000 metric tons. Once the dishing and piercing operations are completed, a hydraulic ejector in the bed pushes the wheel out of the die and lifts it to a precisely programmable transfer height for the unloading robot.

DIFFERENT WHEEL FORMATS – SAME HIGH QUALITY

The Schuler dishing press installed at CAF boasts a large number of dies. After all, the line is used to manufacture a wide range of different wheel variants – for trolley cars, local transport trains, freight and high-speed trains. As a consequence, the diameter of the wheels forged on the dishing press range from approx. 600 millimeters to 1,400 millimeters. “Whichever wheel variant is produced – CAF always benefits from the performance of its new manufacturing solution,” stresses Dr. Walter Osen. This is not only due to the production step which is saved. The much higher press force of the new Schuler line and optimized die concept developed together with Schuler lead to an overall increase in part quality. More efficient production on the one hand, higher part quality on the other: “CAF is now ideally prepared for the expected production growth in railway wheels and for the future ahead,” states Dr. Walter Osen.

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