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To metal & metal forming

Keeping Up the Pressure at German Aluminium Plant



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Three of three massive aluminium extrusion presses, at Alcoa in Hannover, now depend on variable speed drives from Control Techniques and, as well as dramatically increasing production time availability, increasing throughput by 10% and decreasing maintenance costs, the installations have cut energy consumption by a huge 40%, saving thousands of kilowatt hours of energy every year!

These two biggest extrusion lines, both using the indirect extrusion process accept billets of aluminium alloy at around 265mm and 412mm diameter and lengths between 400 and 1350mm, pre-heated to between 300 and 550°C. These billets are then extruded through two high pressure extruding presses at 56 MN and 33 MN respectively. Both extruders are hydraulically-powered, with the oil pressure being generated by pumps controlled by Control Techniques AC drives. →



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The big press line was upgraded in 1998, a big project requiring the installation of 12 off 132 kW Unidrives (for 12 pumps), to produce the required maximum pressure of 315 Bar. In January this year, the 33 MN line was similarly upgraded with variable speed drives, this time the drives chosen were six 160 kW Unidrive SPM modular drives, producing an oil pressure of 250 Bar.

The operation runs around the clock, 365 days a year and so the latest installation was carried out with the line in full operation.

“In both cases, the savings are considerable,” explains Herr Stefan Heine, who has responsibility for technical operations and purchasing at the Alcoa plant.

“The original hydraulic plant was designed to give the required thrust with additional oil being sent through a bypass – so effectively the pumps were running at full speed all the time. Now Control Techniques variable speed drives integrate with the hydraulic controller using Profibus and give exactly the required power at every stage of the operation. Not only does this save some 40% of the power, but also gives better control, giving improved quality of extrusions. But this is just part of the story. Because the plant (the valves, pumps, pipes and seals) are less stressed, equipment is less susceptible

to breakdown and I believe that our throughput has increased by around 10% because of reduced downtime. The oil lasts longer too – a not inconsiderable saving when you consider that the machine incorporates some 15,000 litres of oil and 6,000 litres passes through the system during each extrusion (this is then cleaned and returned).”

The savings run to thousands per year and have given Alcoa a payback of less than 18 months.

The 38 MN extrusion press produces some 800-900 tonnes of aluminium extrusions per month, in a wide range of profiles including stars and tube down to less than 10-mm with wall thicknesses down to 2-mm. Single extrusions can be as long as 45-metres in length and the fastest extrusion rate is 15-metres per minute.

Each billet is ultra-sonic tested and carefully heated to a point just below its ‘plastic’ state, this depending on the exact composition of the alloy, so that, during the high pressure extrusion process, the pressure takes the material up to the required plastic state, but no further, in order to maintain the structural integrity of the material. Every extrusion is stretched, cut-to-size, ‘aged’ in an aging Furness, then tested for hardness, tensile strength and conductivity as well as passing through three-co-ordinate measurement testing before being passed for delivery.

The Alcoa plant is now using 100% of Control Techniques drives – including conveyors, fans, pumps, pullers, cut-to-length machines, run-out tables and many more.

“We particularly like the new modular Unidrive SPM drives”, comments Herr Heine. “They are extremely compact and easily fitted into our plant room. We like the Unidrive SP range generally and routinely use SmartCards to speed up the setting of parameters when we install a new drive. Most of the drives in our plant are connected by Profibus to the factory management system. Over the 12 years that we have used Control Techniques drives, we have found them to be extremely stable and reliable and we get excellent service from the Drive Centre in Hennef.”

KEY BENEFITS

- THROUGHPUT INCREASED BY 10%
- 40% ENERGY SAVING
- REDUCED MAINTENANCE COSTS
- IMPROVED CONTROL & QUALITY
- EXCELLENT RELIABILITY & SERVICE



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