Lasco Umformtechnik GmbH, a prestigious manufacturer of mass forming and sheet presswork equipment based in Germany, is always focused on improving its processes and technologies. One such technological milestone is the servo technology used in a recently delivered deep drawing press with a force of 800 tons for up to 40 strokes per minute. This offers huge benefits from a technical point of view and also in terms of energy consumption. “Among other things, our new servo technology enables operators to achieve appreciable energy savings,” reports Harald Barnickel, head of Lasco’s electrical engineering department.

Servo technology delivers outstanding results

Servomotors that are flange-mounted directly onto the hydraulic pump form the heart of the solution. The power control of the drive is controlled by a Sinamics S120 frequency converter, while the Simotion D445 controller is responsible for the overall control of the axis path, speed, and position. “Initial operating data have indicated that this servo technology delivers outstanding results in many respects – with regard to both energy consumption and technology,” confirms the electrical engineer. The deep drawing press is to be used to manufacture seat rails for motor vehicles in six consecutive stations. For this, pressing force and stroke speed needed to be adapted to an individual movement profile. The pressing force can be adjusted at the servomotor by means of the torque. The plunger speed, however, is controlled via the motor speed and therefore via the flow rate of the pump. Thanks to this technique, valve technology savings of up to 40 percent are possible in the press.

Energy savings and system continuity

The use of servo technology also results in a significant improvement in the energy balance. “It was previously necessary to use large cooling systems for the oil, but much smaller units can be used with the servo technology,” says Barnickel. The associated improvement in efficiency, which the press manufacturer considers to be well into double figures, is reflected by massive savings in electricity costs compared to the older machines. An added advantage is that energy can be recovered during decompression of the hydraulic fluid. “The opposite would be true of other concepts, where there would even be additional heat losses,” explains Barnickel.

According to Barnickel, an additional plus point is the system consistency offered by the Siemens solutions. For example, the Simotics M-1PH8 servomotor, available as a synchronous or asynchronous motor, is automatically identified by the frequency control.
The choice of motors depends upon the application, that is to say, the required dynamics. “Ultimately, this new drive concept for hydraulic presses, which is based on an electric servo-pump control, results in a significant overall improvement,” says Barnickel. “In addition to the possible energy savings already mentioned, we also have a great advantage over straight valve controls thanks to the incredibly precise controllability.”

**Integrated safety**

Lasco chose the fail-safe Simatic S7-319 F 3PN/DP to control the entire plant. “It offers us the freedom to implement all the safety technology without a lot of additional expenditure,” explains Barnickel. The fail-safe signals are read via Simatic ET 200S distributed I/O stations and relayed to the control via Profisafe. It is an elegant overall solution, says Barnickel: “It enables us to achieve clear structures in the machine.” For example, there are normally two monitored valves that provide for the security of the press plunger during set-up. The new solution is now more refined: the reduced speed (Safety Limited Speed: SLS) and, among other things, safe stop (Safe Stop 1: SS1) are monitored via the Sinamics S120 fail-safe frequency converter.

**Convincing overall concept**

The development of the new servo technology for large hydraulic presses, as based on the Simotion motion controller at Lasco Umformtechnik GmbH, has already aroused a great deal of interest among users, even after such a short time. Thanks to the standard concept consisting of the Simotics M-1PH8 servomotor, Sinamics S120 frequency converter, and Simotion D445 motion control unit, there has been a significant improvement in dynamics, precision, and energy consumption. “And all because we dared to opt for electric servo-pump control in the hydraulic press as opposed to valve technology,” declares Barnickel.

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The electric servo-pump control in the Lasco press uses significantly less energy than traditional valve controls.