

# Seneca Systems' Valve Applications Provide Efficiency, Higher Speeds

■ By Sean Insalaco

**L**umber manufacturer Seneca Systems of Eugene, Ore. has replaced air cylinders with servo-proportional valves in its new log merchandiser, which sends 60 ft. logs to a scanning system. Additional servo-proportional valves are used to accurately position logs for three-dimensional scanning and also for positioning cutting devices. Seneca uses Moog Industrial's D660 Series proportional valves in both applications.

Machine speed and maintenance savings are two reasons Seneca uses the valves, says Ed Komori, chief engineer for Seneca Systems. In the log merchandiser, "We're using logs up to 60 ft. We're scanning the whole log and optimizing it. Before, we were pre-bucking or cutting to length before we got to the scanner," he says.

Fifty proportional valves control deceleration and acceleration on the merchandiser. This saves on maintenance "because it's softer on the components," Komori says. "We're looking at higher speeds. You have to have proportional and servo controls to make the machinery maintainable."

The need for speed is the result of declining timber quality over the past two decades and an ongoing trend toward smaller size. One of Seneca's two sawmills was designed 20 years ago to accommodate those older trees, which had an average diameter of 24 in. Today, average diameter is 15 in.

"To keep production levels at the same rate, you speed up the sawing machinery to compensate," Komoro says. "You also have to get the most lumber from every log; that's where the positioning and scanning system comes in." Seneca's scanning system, a proprietary company design, uses a laser camera to create a three-dimensional image of each log, accurate to .020 of an inch. The resulting log surface and shape data goes to an optimizing computer, which establishes the highest-value cutting solution for the log based on the value of the finished lumber. The Moog valves position and hold the log in the scanning zone and also control the servo actuators, which activate the cutting devices. The system uses 60 axes, with one valve per axis.

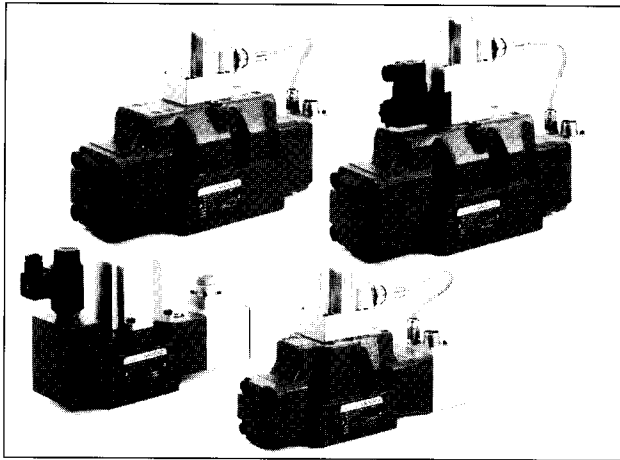
"Quality of the finished product is based directly on accurate positioning throughout the sawmill. We get a very consistent product going out the back

door," Komori says. "We try to get more lumber, more solid wood, out of a given log. If you have inaccurate positioning, it is sacrificed into sawdust and chips."

Aided by the merchandising system's efficiency, Seneca's two-mill facility produced 280MMBF in 1997.

Komori says the mill uses Moog valves exclusively because of the company's service and reputation. "We've tried other brands of servo valves but prefer Moog overall. They are a stable supplier, and we've used their valves for 20 years now."

The D660 Series valves employ proprietary Moog ServoJet technology, mak-



Moog D660 Series valves

ing the valve more contamination-resistant, reducing power consumption and improving frequency response for quicker, more accurate positioning. The valves also feature higher flow capacity and faster step response. These characteristics mean higher machine throughput, less downtime and improved repeatability.

The ServoJet design features more than 90% pilot stage internal leakage flow recovery for low energy consumption; 500 Hz frequency response in the pilot stage; high-pressure recovery of the ServoJet stage (more than 80%  $\Delta p$  at 100% command signal) for improved spool position repeatability; plus low pilot pressure threshold of 215 PSI and 200 $\mu$ m nominal filter fineness.

Moog D660 Series valves include reduced spool drive area for improved dynamic response and reduced pilot fluid flow; 8-400 GPM flow rates at 150 PSI drop; hydraulic and electronic fail-safe options; with ISO 4401 size 5-10 configurations available.

Moog's marketing approach stresses that good filtration systems are necessary for peak performance. "Some companies that put servo valves into sawmills aren't

accustomed to including the necessary degree of filtration," Komori says. "You see a lot of failures because it's a dirty environment. Moog doesn't sell it like other people do—saying that (a valve) is going to pass bigger contaminants."

Proper filtration systems are responsible for keeping sawmills running at peak efficiency while reducing maintenance costs. Moog recommends mills maintain, at minimum, ISO 14/11 cleanliness levels on all hydraulic systems. This level enables equipment to be used continuously for at least 9,000-10,000 hours (approximately 15 months of "round-the-clock" usage). The next level of filtration, ISO 13/10, enables the user to further extend intervals between service to more than 30,000 hours.

To achieve the minimum ISO 14/11 rating, Moog recommends a scheme consisting of five filters: off-line, pressure-line, return line, air vent and make-up oil transfer.

- The off-line, or kidney-loop filter, requires a recirculation pump and a three micron filter. The pump and filter should be sized to circulate the volume of fluid in the reservoir at least four to six times per hour. This loop removes most of the contamination from the system.

- The second filter, for the pressure line, is a 15 micron non-bypassing point of usage filter in the high-pressure line. This filter acts as a "last chance" filter to catch any contamination generated by a deteriorating pump.

- The third filter, in the return line, is a three micron filter. This filter removes any contamination that was introduced into the system from the device that actuates the load.

- The fourth filter, on the air vent for the reservoir, prevents the introduction of airborne particulates during reservoir level changes. Moog recommends using a three micron filter on the air vent.

- The last filter, on the transfer cart, prevents the introduction of contaminants in new oil. New oil is not clean oil and should be filtered to three micron before putting it in the sump.

This combination of innovative machine design, high performance valves and rigorous filtration and maintenance have helped boost Seneca's throughput dramatically and reduced associated operating costs. This positively impacts the lumber manufacturer both at the top line and the bottom line in higher volume and better margins. **TP**

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