Challenge: Increase sawmill performance, safety and reliability.

Solution: AVENTICS aluminum ISO cylinders with "Ideal Cushioning" Technology

Ideal Cushioning, combined with the lighter weight and relatively lower cost of aluminum pneumatic cylinders (compared to steel construction) enables Baxley to supply highly competitive trimmers that accelerate lumber processing while reducing excess piston movement and bounce.

"We’ve used AVENTICS aluminum cylinders with Ideal Cushioning technology in our trimmers and sorters for several years, and we’ve found them to be superior to other cylinders on the market," Green said.

Reliability in demanding sawmill environments

In the past, heavy-duty steel pneumatic cylinders were preferred for lumber production machinery; many mill operators felt that the speed of equipment like planar mill trimmers and sawmill trimmers, combined with harsh conditions, required steel cylinders, said Jim Apel, AVENTICS district sales manager. More recently, that preference has changed.

"Sawmills are always striving to produce more lugs per minute. Working with companies like Baxley, we’ve shown that our medium-duty TRB ISO 15552 aluminum cylinders using Ideal Cushioning technology allows them to do that," he said. "In fact, our cylinders allow the trimmers to actuate faster than they did with steel cylinders and they last longer."

Pneumatics technology continues to be a valuable player in many types of industrial automation applications. When OEMs need reliable components, a compact design and low-maintenance technology to actuate machinery, pneumatics can be trusted to deliver steadfast and long-lasting operation even in very difficult and "dirty" environments.

Modern sawmills are perfect examples for this type of application. Mill operators seek the highest throughput rates possible, with machine downtimes kept to a minimum – and that requires heavy-duty machines with components engineered for durable, repeatable performance.

Baxley Equipment Company, a division of Timber Automation, LLC of Hot Springs, AR, is a leading supplier of sawmill technology to the North American lumber industry, providing a broad range of products and complete systems such as trimmers, sorters, stackers, feeders and edgers. According to Tommy Green, chief engineer at Baxley, the AVENTICS aluminum pneumatic cylinders Baxley specifies for its equipment deliver the performance their systems need.

Ideal Cushioning adjustments are made with a standard screwdriver (as shown on this PRA type pneumatic cylinder) so that the...
Faster & More Productive Sawmill Trimmers

Baxley uses AVENTICS TRB ISO 15552 cylinders with Ideal Cushioning technology on two key types of equipment: high-speed sawmill trimmers, and sorter systems.

In the sawmill trimmer, Baxley uses the AVENTICS cylinders in both 100 mm and 125 mm sizes with various stroke lengths. The cylinders actuate the saws that trim boards in lugs to the desired length. Standard trimmers have between nine and eleven saws, controlled by a machine PLC. The saws are spaced approximately two feet apart; two saws drop down in tandem between boards in lugs – one cutting the forward or “zero” end, the other cutting the board at the desired standard length, ranging from 6 to 24 feet.

The AVENTICS medium duty TRB aluminum cylinders with Ideal Cushioning technology allow the trimmers to actuate faster than they did with steel cylinders and they last longer.

The throughput rate ranges from 120 to 200 lugs per minute, and Baxley has engineered its latest generation trimmers to operate with very tight intervals between each board – 26 inches from the trailing edge of one board to the next. This means that the cycle time for the saws to drop, cut and retract is ultra-tight – 120 milliseconds or less is the usual cycle time.

Each cylinder is paired with an AVENTICS Series 581 ISO directional control valve with integral flow controls. The 581 ISO valve is one of AVENTICS fastest valves, with Teflon™-encapsulated O-rings that allow it to resist friction and keep up with the trimmer’s throughput rates.

“...just can’t go that fast – the cylinders wouldn’t hold up. With the AVENTICS cylinders and Ideal Cushioning we can do that, with almost no downtime related to cylinder failure,” Green says.

The trimmer uses AVENTICS Series 581 ISO directional control valves with integral flow controls. This is one of AVENTICS’ fastest valves, with Teflon™-encapsulated O-rings.

Ideal Cushioning Improves Cylinder Efficiency

AVENTICS developed Ideal Cushioning to significantly improve the efficiency of pneumatic cylinders and lengthen their operating life.

It’s a method of decelerating the pneumatic piston as it reaches the end of its stroke inside the cylinder. Essentially, there is no end-of-stroke bounce or end-cap slamming, a main source of cylinder wear, slowness and noise. To achieve Ideal Cushioning, the cylinders used must physically have superior cushioning capability (like the TRB cylinders).

With Ideal Cushioning, the piston velocity is at its maximum speed throughout the entire stroke sequence. Its velocity is exactly zero by the time it reaches the end cap. By reducing the piston velocity to zero at the end of travel, the cylinder incurs less stress. Vibration in the host structure is reduced and the total cycle time is improved, sometimes boosting machine speed by as much as 30%.

According to Green, Ideal Cushioning, combined with the lighter weight and relatively lower cost of aluminum cylinders (compared to steel construction) enables Baxley to supply highly competitive trimmers that accelerate lumber processing while reducing excess piston movement and bounce. In addition, less wear on the cylinders reduces the amount of maintenance and cost needed for replacement parts.

Sorter Systems Help Maximize Mill Productivity

Baxley provides similar operational advantages in its sorter systems, which also use AVENTICS cylinders and valves. These high-speed, large-scale systems automatically sort thousands of finished boards into stacks or packages for warehousing and shipping.

A Baxley sorter can have from 15 up to 100 bays. Conveyor chains push finished, trimmed wood boards through the sorter. When a specific size board reaches the corresponding bay in the sorter, a “tipple” actuated by an AVENTICS TRB cylinder opens the space to drop the board onto the bay. It then closes, allowing the next board in line to pass through the sorter to reach the correct bay.

“Actuation time is even more critical and faster on the sorter,” Green said. “We typically need to open and close the tipple in about 90 milliseconds.” Each bay in the sorter has one pneumatic cylinder, so on their largest machines there can be up to 100 pneumatic cylinders. On the sorters, each cylinder is paired with an AVENTICS Series 740 directional control valve with integrated flow controls. These lightweight valves can be installed close to the cylinder, rather than on it, eliminating the need to add flow control to the cylinder and keeping weight to a minimum.
“We use AVENTICS cylinders on the sorter for the same reason we use them on the trimmers: reliability and speed,” said Green. “We’ve had really good experience with them, and I know there are Baxley machines in mills that have been running for several years without cylinder failure.”

**User Friendly Cylinder Set-up Tools**

AVENTICS provides a range of tools to help companies like Baxley select the right cylinder for a given application and then easily set the cycle time and cushioning to reach the “ideal” state. Calculating the amount of cushioning needed is a straightforward process. The AVENTICS velocity time meter (VTM), allows precise monitoring of the piston speed and cycle times, eliminating any guesswork used to set the cushioning.

The VTM is attached to the outside of the cylinder tube and enables the true velocity of the piston to be determined quickly and easily; adjustments are made with a standard screwdriver so the piston stops right at the end cap with zero speed.

According to Green, Baxley typically sets the trimmer cushioning using these tools before the trimmer is shipped to the customer’s mill. For the sorters, Baxley provides an on-site service to ensure proper cushioning setup.

**Pneumatics offers Competitive Advantage**

Green said that both the speed and reliability provided by the AVENTICS products gives Baxley a competitive edge with mill operators who need maximum throughput and minimum downtime.

For additional information on how to use “Ideal Cushioning,” visit: www.aventics.com/us/IdealCushioning