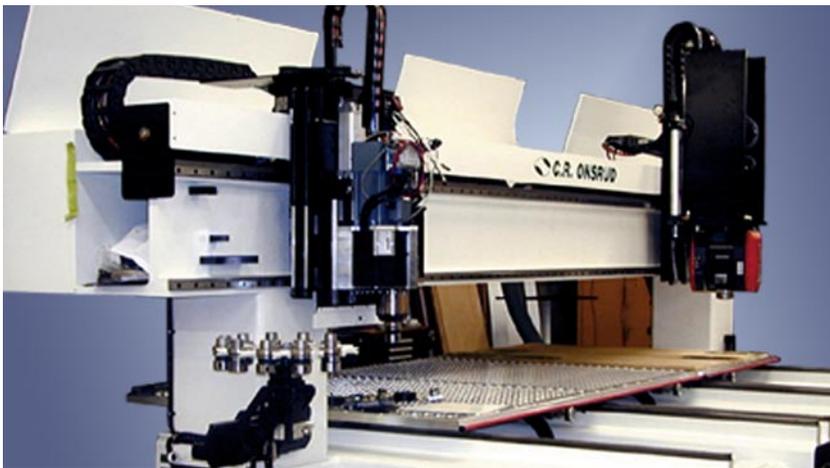


Drive & Control profile

Driving the World's Fastest Router



Fast, accurate linear motion allows Onsrud to create routers for industry-leading productivity.

C.R. Onsrud prides itself on designing and building the world's best CNC routers. For four generations, the family-owned business in Troutman, North Carolina, has set the standard in the woodworking industry for advanced routers for faster machining, higher productivity, and greater flexibility.

Making the best means using the best ingredients. "We make the best-designed, best-built, best-supported machines on the market," says John Onsrud, executive vice president of Onsrud and one of three brothers

running the company. Bold words, but Onsrud backs them with the quiet confidence of someone who believes the proof is in the performance, not the hype. "We make a premium piece of equipment with top-shelf components. We even say the names of our suppliers in our marketing literature because we're proud of what we put in our machines."

Among the suppliers is Bosch Rexroth, who provides Ball Rail® linear guides and ball screws for the company's Super Duty line of CNC routers. The rails are used to

Challenge

Provide linear guides and ball screws that meet demanding requirements for Onsrud's Super-Duty CNC router line.

Bosch Rexroth Solution

- Ball Rail® linear guides and ball screws

Benefits

- 6-meter length guides match users' expanded work area requirements
- Ball Rail guides provide very rigid, smooth, extremely flat running surfaces, even with high loads
- Ball screws rated at 150,000 Dn, twice the operational performance of competitive screws
- Faster router head acceleration/deceleration supports increased throughput and productivity
- Routing accuracies of 0.001 inch possible—typically much tighter than required

move the table holding the work pieces in the X direction. The routing head moves in the Y direction along a Rexroth ball screw. The routers actually contain two work areas, so that an operator can load one area while the router works in the other area.

“We’ve been a Bosch Rexroth customer since 1997,” says John. “We tried a variety of competitors, but have more or less standardized on Rexroth Ball Rails and ball screws.” For the Super Duty lines, Onsrud uses a size 30 Ball Rail and 40-mm-diameter ball screw.

Of the various reasons for choosing Rexroth rails and balls screws, two stand out.

First is the fast availability of the rails and screws in 6-meter lengths. Most suppliers stock only 4-meter lengths and require long lead times for anything longer. Bosch Rexroth stocks longer lengths. And as woodworking customers require larger work areas, the machines they use also get larger. Getting rails in longer lengths allows Onsrud to avoid having to use two rails joined by a butt joint. “It’s hard to talk to a customer about a butt-joint rail. So the single piece we get from Rexroth is important,” notes John.

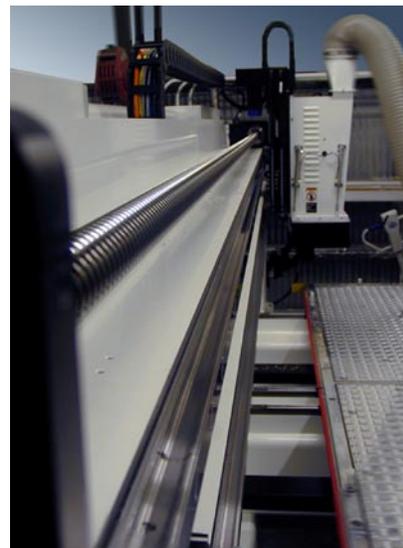
Second, the Rexroth rails also give Onsrud a clear benefit in machine assembly. The worktable must be perfectly flat. But no matter how carefully the table is made, a small bit of unevenness will exist.

The standard procedure was to shim the table to achieve the required flatness—a process that could take up to 8 hours per machine. Shimming is required not only to ensure a flat surface, but also to allow the rails to run smoothly. If the rail flexes to the table, stress is added so that the table does not run smoothly. In addition, the servo motors are stressed by a heavier load caused by increased friction between rail and runner block. The result is greater wear and tear on components and reduced reliability.

The Rexroth Ball Rail is designed for fast, smooth running, even with high loads. The high rigidity required by Onsrud is in all four directions. The runner blocks contain four sets of rollers that provide an optimized recirculation pattern for light smooth running. Using two sets of balls on either side also promotes smoothness while maintaining stiffness.

Because Onsrud makes very fast routers, the ability of the ball screw to turn fast to move the router head is obviously important. The routing head can weigh up to 1000 pounds and is mounted to the side of the screw-driven Ball Rail assembly. It runs at speeds of up to 4700 inches per minute over an unsupported screw length of 6000 mm.

In speed testing, Rexroth Ball Rail Systems were clearly superior, Onsrud engineers discovered. “As we design faster and faster machines, we found competitive linear actuators experienced ball



The routing head moves along the x-axis, driven by a Rexroth ball screw.

skid and increased noise,” says John Onsrud. “The Rexroth products give consistent, quiet performance” An important consideration in helping customers increase productivity is the faster acceleration and deceleration Onsrud can achieve with the Rexroth system compared to their experience with other systems.

The Rexroth ball screws have a Dn rating of 150,000, nearly twice that of competitive screws in the same class. Dn rating is related to the speed at which a given diameter screw can turn: a higher rating means faster turning. The rating is partly determined by how efficiently and smoothly the balls in the runner block recirculate and partly by how well machined the ball screw itself is.

The stiffness of the rail, the quality of the ball screw, and the lack of butt joints leads to less tangible benefits of the Rexroth product. They run smoothly and quietly—the sound of quality in the machine.

Both the profiled rail and the ball screws offer the extreme precision required in routing applications. Accuracies of 0.001 inch are

obtainable—typically much tighter than required.

Tom Onsrud says that when the company standardized on Rexroth Ball Rails and ball screws “we upped the quality considerably.” And for C.R. Onsrud quality begets quality. Or as John Onsrud says, “You don’t stay in business as long as we have by making short-sighted decisions.”

Rexroth
Bosch Group