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Taking the weight off ergonomic, productivity issues

Elkhart County in north-central Indiana is a part of heartland America where horse-drawn Amish buggies share the road with not only automobiles, but also with an astounding number of recreational vehicles. Called "The RV Capital of the World," Elkhart County has 107 manufacturers producing half the recreational vehicles sold in America.

With that level of competition, Newmar Corp. in Nappanee, IN is always looking for a little extra competitive horsepower. They found it in on their assembly line in a way that balanced its diverse manufacturing operation and ergonomic challenges through the use of air casters. The system uses compressed air to support the weight of the vehicles as they flow through the production process.

Recreation vehicles manufactured by Newmar are able to be pushed around the company's Elkhart, IN facility through the use of air casters. The system allows higher productivity, lowers injury risk through improved ergonomics and creates more flexibility in a customized workflow.

In the 1990s, Newmar undertook a major plant expansion on the company's 168-acre site. The expansion enhanced assembly capacity, but also created a workplace that made tasks more comfortable for their employees. The 112,000 square foot assembly line addition was fully air-conditioned. With the environment improved, maintenance supervisor Paul Troyer searched for a better way to move vehicles through the assembly system with less effort, less manpower, greater flexibility and greater cost effectiveness.

Unlike typical automobile assembly lines, Newmar's system needed to handle as many as 16 significantly diverse models of varying weight, size and configuration through the assembly process in an on-demand process called "indexing."

Beyond the assembly labor, the process required as many as 14 workers leaving their stations to shove and pull heavy chassis on castered carts to their next assigned spot in the process.

"We wanted to make work easier for our employees," Troyer said. He found his solution when one of Newmar's vendors told him how a large client of theirs moved weighty manufactured home modules through their plant. Troyer made an immediate visit and discovered that the manufacturer was using air casters instead of their industry's usual roller systems.

The steel air-cushion pallet that Newmar first considered took as many as four men to move when not connected. That got Newmar to ultimately purchase an aluminum pallet that could be handled by a single person. Connected to an air source, the air casters are lifted by and glide on a frictionless cushion of air, allowing users to move huge loads with little physical effort. "The air compressor gets tired, not the people," Troyer said.

A bare chassis coming into the assembly line consists only of frame, motor, drivelines, tires and steering wheel, but it gains weight as it goes along and all the items comprising a complex motor home as added – from a baggage storage "basement," framework for the chassis' front and rear ends, a main wood floor, ceramics, linoleum, carpet and more. At the end of the line, a completed vehicle may weigh anywhere between 27,000 and 45,000 pounds.

Prefabricated chassis frames are mounted on the pallets with an air caster on each corner enabling only four workers to easily move even Newmar's largest model, the 45-foot King Aire motor coach that weighs in at 45,000 pounds.

"If things are set up properly it's really that easy," said John Massenberg, president and CEO of Seattle-based AeroGo, which installed the system at Newmar. "With this, they're able to align (the RVs) sideways instead of end to end. That's important for something like this, particularly when you're talking about vehicles customized for a particular customer."

The use of air casters instead of rollers has some interesting applications for manufacturers with heavy or awkward equipment. "There's a couple of ranges," said Massenberg. "At the high end, you're talking about 200 to 400 tons. Most of the power distribution transformers weight that much. If you have to move them into an area to test them, you can't have anything on rails or anything that would conduct electricity.

"On the low end, you're looking at moving loads of maybe 1,000 pounds, but something where you need to

precisely align something. On wheels, that may be difficult to do. For lower weights, wheels are a really good solution. If you're just moving it around, it's hard to beat wheels."

Besides the sheer weight of the RVs themselves, there are two other issues that weighed on the choice of air casters. "Ergonomics tends to be more of a driver," said Massenberg. "It's not always burly guys working in manufacturing any more. Companies look more closely at the liability costs. You could be looking at paying $50,000 for pulling a back out.

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>
> *Paul Troyer, maintenance supervisor*

"In the RV and modular home business, it's become more of a standard way to move product," he added. "Even though the modular home market is down along with the rest of the housing market, the adoption is still way up."

For Newmar's employees, productivity is another key issue. Line workers are paid on a completed product basis. The more they can produce during the plant's daily single shift, the more take-home earnings they receive. Making it easier to keep the line moving with less labor (each unit spends about 30 to 40 minutes at a station) contributes to hiking each employee's individual income, and also frees up workers from having to stop what they were doing to help move other units as they did in the past. The company estimates that air casters reduced assembly line labor costs by some 8,000 hours per year. PE

Guide for improving workplace ergonomics

In its handbook, *Ergonomics Guidelines for Manual Material Handling*, The Centers for Disease Control recommends a two-pronged approach to improving ergonomics in the workplace.

First, employers should observe workers to see how tasks are performed, how many people are required to perform the tasks and what kind of repetition is involved.

The following guidelines for improvement are recommended:

- Alternate heavy tasks with light tasks
- Provide variety in jobs to eliminate or reduce repetition (i.e., overuse of the same muscle groups)
- Adjust work schedules, work pace or work practices
- Provide recovery time (e.g., short rest breaks)
- Modify work practices so that workers perform work within their power zone (i.e., above the knees, below the shoulders and close to the body)
- Rotate workers through jobs that use different muscles, body parts or postures.

The full brochure can be found at www.cdc.gov/niosh.