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Applications Engineering Program

Roll Offs USA in Durant

When Roll Offs USA decided to expand its frac tank line, company president Danny Hankey took the opportunity to make some much-needed changes. He wanted to increase productivity, but his top priority was to improve the working conditions for his welders.

"They had to lay two hundred feet of bead over their heads," said Hankey. "And they had to do it while standing on ten-foot ladders and scaffolding."

Roll Offs manufactures storage units and components for the waste equipment industry, and is based in Durant. The company's frac tanks are used for fluid storage. The oil and gas industry uses frac tanks to store fluids and sludges; farmers use them during the growing season to store materials like fertilizer and weed killer; and airports use them to store deicer and other fluids.

To address the safety and ergonomic issues with Roll Offs' frac tank production process, Hankey knew exactly where to turn for help. He had been working with Kay Watson, a Manufacturing Extension Agent for the Oklahoma Manufacturing Alliance, for several years.

"I've worked with Roll Offs on a variety of projects to help improve efficiencies and productivity, from Lean Manufacturing and process improvement projects to ISO certification and supervisory and safety training," she said. "I start by identifying what tools and training the manufacturer needs."

Once she identifies those needs, Watson works hard to introduce company leaders to the appropriate service providers.

"I don't know how Kay does it," said Hankey. "She is really in the loop and has connections to great resources."

One resource is Shea Pilgreen. He is one of several OSU Applications Engineers located throughout the state. The group assists small and medium-sized manufacturers on short-term engineering projects. Pilgreen had been working with Hankey in developing a layout for Roll Offs' production system. It was during this project that they began discussing making changes to the company's frac tank line.

The demand for frac tanks was growing, but Roll Offs' production capacity was small. When Hankey was approached with an order for a few hundred frac tanks he realized it was time to expand production.



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Danny Hankey, president of Roll Offs USA, with Shea Pilgreen, an OSU Applications Engineer. Pilgreen recently designed a rotator system to simplify welding on the company's giant frac tanks.



“They showed me a rotator they had designed for another component,” Pilgreen said. “I tried to upsize their design, but the amount of weight and physical size of the frac tanks did not make this a plausible solution.”

Roll Offs’ frac tanks are forty-five feet long, eight-feet wide, and weigh 23,000 pounds. Increasing the number of safety components and designing a rotator that was the optimal size and weight for equipment this large was vital.

According to Pilgreen, the project posed significant engineering hurdles. “There were no three-dimensional models available,” he said. “Because of that, we could not determine the center of gravity.”

The center of gravity is critical when designing equipment to pick up and rotate

when there is significant weight on the front and rear lifts.

“The center of gravity and pickup point change depending on whether the roof is on or off the frac tank,” said Pilgreen. “Not knowing the center of gravity also made it difficult to determine the amount of torque required to rotate the tanks.”

Despite these challenges, Pilgreen was able to engineer a solution in four months.

The final design consists

of two masts that extend and retract to engage the front and back of the unit. The tank is then lifted via hydraulics and fully rotated by a single operator. Welders no longer have to stand on ladders and scaffolding inside and outside of the tank; the seams come down to them. “The tank is now upside down and at waist height,” Pilgreen said. “This allows the welder to work in a safer, more comfortable position.”

Developing a rotator for the frac tank line has enabled Roll Offs to achieve its goals of creating a safer work environment and increasing productivity.

“The rotator has eliminated the need for overhead welding and saved seven to eight man hours per tank as a result,” said Hankey. “And now that we can flip the tank, we’re able to perform the work three times faster.”

Hankey credits the Oklahoma Manufacturing Alliance and the OSU Applications Engineering program for the project’s success.

“I told them what we needed. Shea designed the entire thing and helped us put it together,” he said. “They are very easy to work with. Everything worked out great, and I have no complaints.”

According to Pilgreen and Watson, designing a rotator for the frac tanks originated with Hankey’s vision.

“Danny has very good ideas on how to make production at Roll Offs more efficient,” said Watson. “It really is a feat of engineering.”

