Changing the

Niamh Marriott talked to **Hendrik Sanders** about the future demand for crawler cranes.

Sarens' Senior Research and Development Engineer Hendrik Sanders spoke to *International Cranes & Specialized Transport* about the future demand for crawler cranes. Sarens Group, based in Wolvertem, Belgium, and with a significant presence in North America and around the world, continues to innovate with its ever-increasing lifting capabilities and transport operations. Progressively heavier loads are needing to be lifted, and crane OEMs must adapt and produce ever-larger models to meet these huge project demands.

In 2023, Sarens took delivery of the first unit of Liebherr's 2,500-metric-ton LR 12500-1.0. Sarens named its new crawler crane *Straffen Hendrik*, after Sanders.

Rostock in Germany was the first place the LR 12500-1.0 was put to work for Sarens' client Van Oord. The crane lifted 50 monopile foundations for offshore wind turbines.

Sanders has worked for Sarens for more than 34 years, and for most of that time in the realm of lattice boom crawler cranes. With his vast knowledge of these cranes, Sanders serves as a link between Sarens and crane manufacturers.

"I work with the manufacturers on achieving what our newest cranes need," he said. "Crane manufacturers don't usually design a crane for just one client, and they want their cranes to have global appeal, but I try and help demonstrate what we want and what is possible to create together."

THE AUTHOR

Niamh Marriott is deputy editor of *International Cranes and Specialized Transport*. This article an excerpt from an article she wrote earlier in 2024.

HOW DO CRAWLER CRANES COMPARE WITH OTHER CRANE TYPES, SPECIFICALLY ATS?

It's what you're using it for, it's job specific. As an example, for rigging our bigger cranes, one or more assistant cranes are needed. If the rigging of a large crane takes 14 days, it really is an advantage to have a small crawler crane as the rigging goes faster compared to a telescopic crane, because you don't have to set it up, and it's easy to move. With a crawler crane, it takes only a few minutes and you're ready to lift at the other end of the site.

Most of the time it's not a technical question but a commercial one. It's cost. For the mobilization cost of a crawler crane is more expensive than a telescopic crane. With Sarens, we have lots of branches worldwide so depending on where the jobsite is, there will be different options available for the work, and the decision of whether to use a crawler or a telescopic crane can differ between countries and sites.

WHAT IS THE BIGGEST CHALLENGE WITH SAFETY WHEN IT COMES TO LATTICE BOOM CRAWLER CRANES?

The biggest challenge in terms of safety is working at height. In the last 10 years, manufacturers have made real progress on this. With increasing wind turbine erection demand, where cranes have to be moved often, there is a lot more working at height, but luckily the safety culture was already in place from refinery and petrochemical jobs. That industry was the first to have full time safety officers on sites, and they have continued to lead in setting safety standards.

There's also been developments to ensure that workers have safety training before they can enter the site. [Safety training] is more standardized, and if there is a specific requirement on a particular jobsite, an informational video can show special points of attention for that site. Even wind turbine companies have full-time safety officers on site, and workers have to complete an induction before commencing work.

Rigging a crane safely has also been addressed. Crane companies and manufacturers alike take responsibility for safety during rigging of the cranes.

> "It's about predicting future demand precisely, so you have something the industry needs."
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> **HENDRIK SANDERS, Senior Research and Development Engineer, Sarens**

game

Sarens named its Liebherr LR 12500-1.0 crawler crane "Straffen Hendrik," after its long-term employee Hendrik Sanders. PHOTO: SAREN

A modern crane nowadays is equipped with all sorts of systems to ensure safe rigging, such as access platforms, lifelines, anchor points, safety nets, etcetera.

Now the issue is with cranes that have an older design, you need to retrofit these fall arrest systems. In many cases, retrofit can be done, but it's easier to incorporate safety systems into the design from the beginning. It's also less expensive.

WITH LARGER WIND TURBINES, LARGER CRANES ARE REQUIRED. IS IT BECOMING MORE DIFFICULT TO TRANSPORT CRAWLER CRANES TO THESE SITES?

It is different for different countries, but I think most crane manufactures follow the rule of 60 tons of component weight as the maximum for international transport. It depends on the size of the crane. For smaller lattice boom crawlers, 60 tons of body weight is too much. You want to stay as low as possible with the body weight.

It's always an advantage to have crane components as light as reasonably possible, for transport. With most of the cranes, let's say in the 600-ton class, the A-frame, including the derricking winch, can be removed. By doing that, most of the crane bodies can stay within the limit of 60 tons. When you have to move the bigger cranes, you have split them and divide the superstructure from the carrier with a quick connection at the slewing ring. But sometimes quick connections are a bit more intricate than others. It's better to keep the slew ring attached to the carbody and have a four-pin connection or something similar to install the superstructure on top.

WHAT IS THE LATEST CRAWLER CRANE TECHNOLOGY THAT YOU'RE EXCITED ABOUT?

I'm always interested in bigger crawler cranes. For say 15 years or so, a 600-ton machine was a big crawler crane. Then it moved up to the 750 to 800-ton class. But now we are looking at the 1,000-ton class to become a common crane class. This has been driven by the wind turbine industry.

More and more, smaller crane companies [are adding] relatively big crawler cranes to their fleets. And it is all to do with the increasing heights of wind turbines. For the moment, the maximum hub height in Europe is about 180 meters. But this is not the standard yet. There are already some wind farms with turbines with 165 meters of hub height. But the expectation is that this will go up.

Maybe 15 years ago, we thought the total limit would be 200 meters for tip heights, because of air traffic regulations. Now there doesn't seem to be a strict limit for the height of towers. We have seen that the higher you put the wind turbine, the greater its efficiency. It's quite expensive to get turbines up to such great heights.

Moving from a 600-ton crawler to a 1,000-ton crawler to install a turbine creates a significant price increase, and also there's less availability. I think at the moment there's only about 100 or so units. But we're seeing a surge in popularity of 800-ton machines. Liebherr's LR 1800-1.0 is [the new flagship in this class]. I think it's become available to the market at exactly the right time. Liebherr keeps links and communication with wind turbine manufacturers so that they can get the most relevant information firsthand for crane development and future needs.

The 750 to 800-ton class is the current class for wind turbine erection, but I do think it could move up to the 1,000-ton class. There are prototypes of turbines that suggest this could be the future, but it's difficult to predict. There's always the never-ending discussion about the increasing weight of nacelles, and if they could be lifted in one piece. You can look a few years ahead, but not much further.

Tadano is also working on a new larger capacity crawler crane for the wind turbine business, and they need to get availability to market at the right time. It's about predicting future demand precisely, so you have something the industry needs in terms of capacity but not overshoot it. With lattice boom crawler cranes for wind turbine erection, the stability of the boom is very important for any crane design. Turbines are installed in windy areas, logically, but wind can pose an additional challenge. You need a boom system on the crane that is resistant to wind from any direction, particularly from the side. With longer booms, the more difficult it is to take the sideways forces.

In the beginning, companies tried to stay with transport dimensions of 3.5 meters width, as beyond that, it's difficult to get road permits for transportation. Taking the boom width from 3 to 3.5 meters helped improve stability when dealing with sideways wind. But that was just the first step, and companies realized that was not sufficient to deal with new heights.

Liebherr came up with their parallel boom, the power boom. They took two standard booms and put them side by side, and they were able to lift loads higher. The wider boom doesn't increase the crane capacity as such but you can lift the same loads to larger heights, which was exactly what the wind industry wanted. It was a great solution but the next challenge was that a parallel boom is not material efficient. The weight of the boom compared to its capacity for stiffness, this weight stiffness ratio is not ideal. It's better to design a new, lighter boom that has more stiffness.

These wider booms have to be more stiff, but also they need to be collapsible, because you can't transport a boom that is 6 or 8 meters wide. So, transport is important but so is the speed of assembly. Liebherr and Tadano have worked out intricate solutions to this.

Sarens bought the first LR 12500-1.0 from Liebherr, and the design of the boom is so interesting. It's the first crane with a T-shaped superstructure with a wide 7.5 meter boom that starts right from the bottom. Liebherr calls the new boom construction the High Performance Boom. We are convinced that this will be a game changer. ■