SGGs: SEW-EURODRIVE's modular girth gear offering

Bruce Farthing from the business development department of SEW-EURODRIVE talks about the company's unique Segmented Girth Gear (SGG) range of offerings for the mining, cement, steel and pulp and paper industries.

"I sit in the business development department, focusing on the project side where we develop customised engineering solutions. The department consists of several mechanical engineers, a few mechatronics guys and we've recently taken on an electrical engineer. These days we have to have electrical engineers who understand the mechanical side and/or mechanical engineers with electrical/electronic knowledge, and everyone has to be comfortable with software," says SEW-EURODRIVE project engineer, Bruce Farthing.

"Our Segmented Girth Gear (SGG) offering is a typical engineered solution. Each one will be custom designed to suit the specific drive application in terms of loading, speed and operating temperature of the mill, for example," he tells *MechChem Africa*.

"The unique aspect of our SGGs is that they are manufactured as separate segments, typically 10 segments per girth gear. But this depends on the mill diameter, so we use fewer segments for smaller diameters. This offers massive advantages, most notably for transportation and onsite installation, because the segments can be much more easily handled until they arrive onsite and easily put together at the mill," he continues.

As well as the logistics advantages, though, he says that this approach also offers spares functionality. "If you break a tooth on a traditional girth gear, the whole ring has to be scrapped and the time scales for getting a replacement can be problematic. On a segmented gear, you only need to replace the section with the broken tooth, which can be much more

quickly manufactured and shipped directly to site. Each of the 10 or so segments for SEW-EURODRIVE's SGGs are separately cast from austempered ductile iron (ADI), which has high strength and good ductility and toughness, by virtue of an isothermal heat treatment process that optimises the material's grain structure.

The manufacture of each individual segment of a large open girth gear relies on precision machining so that, once all the segments are connected together in a ring, the pinion and the large open gear wheel mesh perfectly. Traditional open gears are manufactured from two or four castings, which are assembled into a ring and then machined using a very large and expensive gear grinding machine. After machining, the gear wheel is again split into its segments for heat treatment, finishing and shipping. But these segments are still huge.

"The total solution allows us to ship and deliver a whole SGG system to site in a standard container, while also simplifying the assembly requirements onsite. The modular design includes locating dowel pins and sockets on each segment so the pieces can be perfectly aligned and bolted together onsite," he adds.

SEW-EURODRIVE offers two mounting options for its girth gears: flange plates for use where the mill is operated under normal ambient conditions, and tangent or spring plates where the mill and kilns are operated at elevated temperatures. "Our flange mounts connect directly onto the outside of the mill and are ideal for ball and SAG mills used in hard rock mining, and for the scrubbers mills use for washing in the diamond industry. The flange can be bolted directly onto the mill drum, which will not expand or contract much when in use," Farthing explains. "But for rotating kilns in the cement and steel industries and pulp dryers in the paper industry, for example, the drum diameter expands with heat, so a more flexible mounting option is required. Here we offer tangent-plate mounting, which uses hinged and sprung plates to be welded to the drum. This enables the drum to expand and contract without transferring stress to the gear ring," he adds.

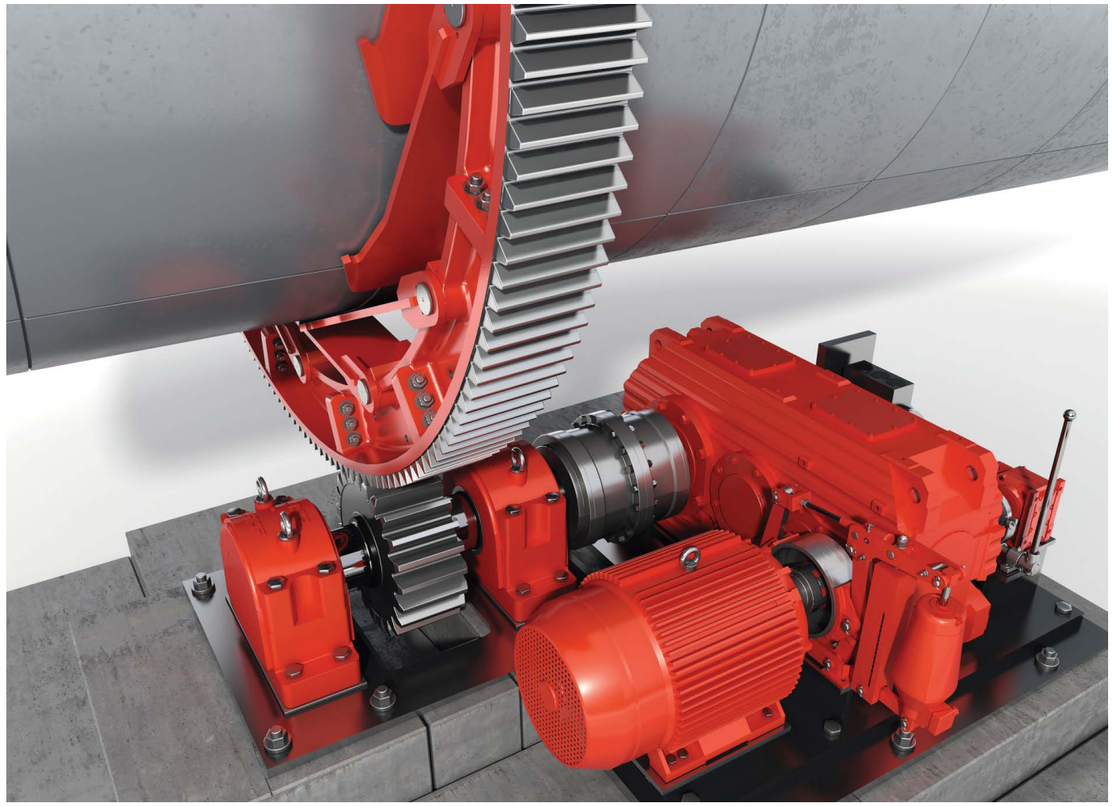
As well as the SGG, SEW-EURODRIVE can engineer a complete drive package to rotate mills, kilns or dryers at the speeds required. "We tend to prefer our robust new X.e series gearboxes for driving girth gear systems, which are part of our standard range to be assembled in South Africa from now on. We can supply X.e series boxes in bevel helical and parallel arrangements and we can also include cooling systems, brakes and barring drives, depending on client needs and preferences," Farthing notes.

A barring drive, he explains, is used to slowly turn the mill for inspection and maintenance purposes. "We tend to use our small K-series gearbox for barring, with an overrunning clutch so the drive disengages when the main drive is activated," he informs *MechChem Africa*, adding that while SEW-EURDRIVE doesn't make couplings or the plumber blocks directly, "we do source them so we can install as a complete solution. We always use premium bearings with semi-flexible couplings to allow for minor misalignment, but we do full laser alignment during installation and commissioning of systems," he adds.

"Instead of having to use special transportation vehicles to transport a five and a half metre girth gear as a single segment or two half segments, our SGG solution allows the whole drive solution to be shipped in one or two standard containers. A recent girth gear arrived from our factories overseas in a container and we simply took that container off the ship, put it on a truck and sent it directly to the mine.

"Our flexible modular and segmented girth gear concept has simplified manufacturing, transport and assembly. Not only do we deliver the SGG, however, we also provide the entire drive package, with an optimal industrial gear unit, drive pinions, base frame, the casing and any other options a client might need.

"We consult extensively with our clients so that our design engineers, the installers and the client's plant operators can collectively come up with effective, economical and reliable solutions," Farthing concludes. ❑



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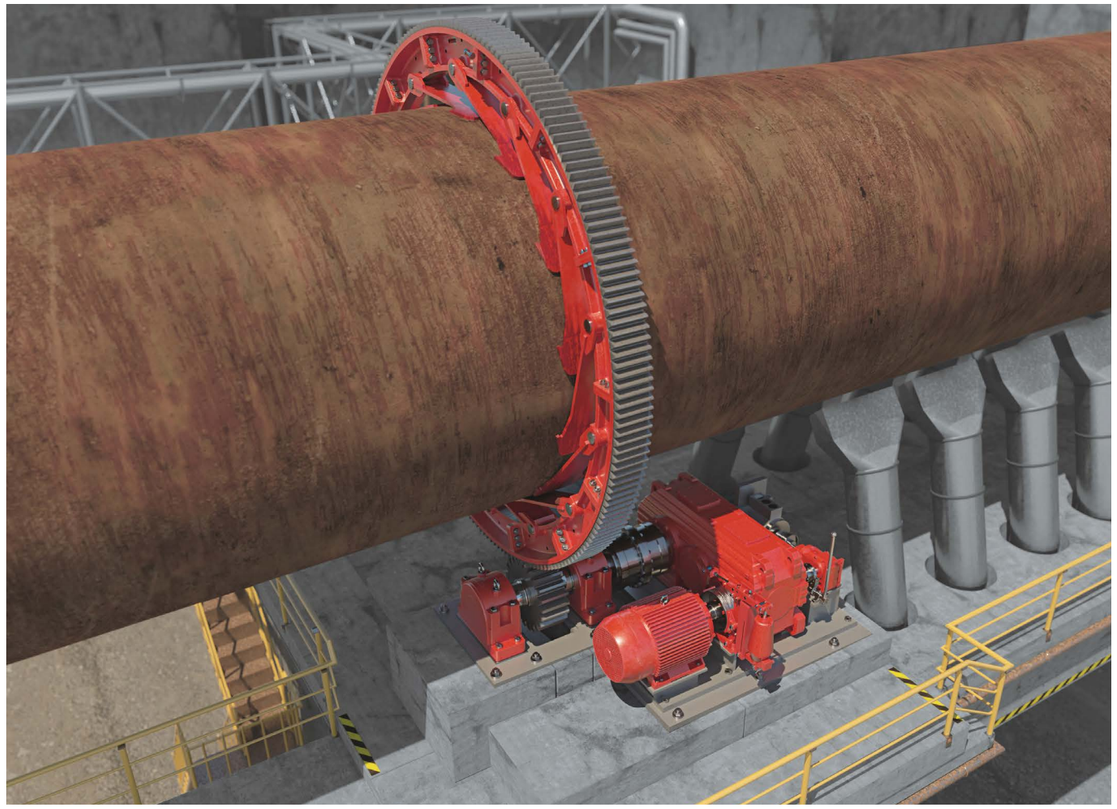

SEW-EURODRIVE offers segmented girth gear options for the mining, cement, steel and pulp and paper industries.