¡Rápido!

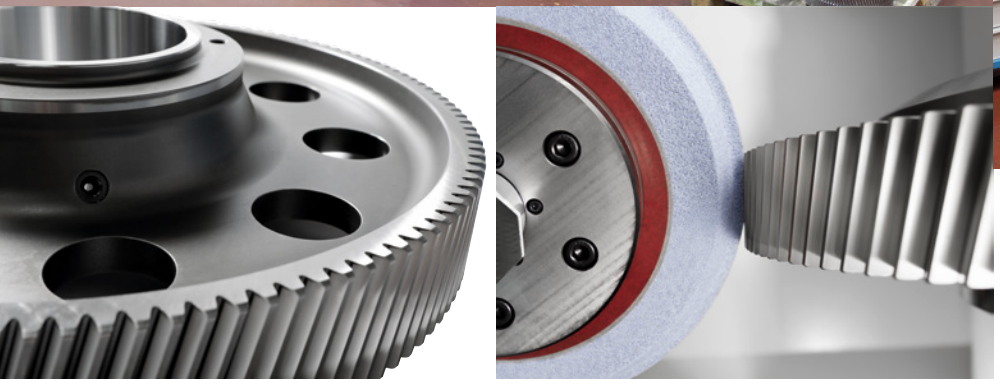
With many of its precision gears produced in small lot sizes, Spanish gear producer Engranajes Juaristi S.L. depends on Gleason machines for exceptional speed and flexibility.

Xavier Vallsmadella, Regional Sales Manager, Gleason Sales Spain

Zarautz, Spain, might seem an unlikely place for a precision gear manufacturer. This beautiful coastal town in the heart of the Basque region is known for its beaches and considered among the top surfing destinations in the world. Surprisingly, the relaxed holiday atmosphere and laid-back surfer 'vibe' turn out to be highly conducive to the production of gears. It is here that you will find Engranajes Juaristi, a renowned gear producer, owned and operated for over 65 years by the Juaristi family. The company specializes in the production of high-precision external and internal gears up to 1,200 mm in diameter, as well as worm gear sets, spline shafts, and other transmission components for everything from wind turbines to tractors, machine tools to trains. Significantly, 30 percent of the many thousands of gears produced by Engranajes Juaristi annually are in lot sizes of just one, and the average lot size is just seven parts. It's a bold strategy that attracts business and gives them a competitive edge. It also requires machines that can deliver faster cycle times and more flexibility.

Doing More with Less

Over the course of the last two decades, Engranajes Juaristi has phased in a new generation of highly productive Gleason hobbing, shaping, and profile grinding machines, for which one of the company owners, Inigo Juaristi, general technical manager, and his son Jokin Juaristi, sales manager, take credit for much of their company's success. For example, two Gleason P400 hobbing machines and one P600/800 hobbing machine have replaced more than six older manual hobbing machines, eliminating countless hours of costly downtime once required for part changeover. "When any of the manual machines needed to be set up for a new part type, it usually tied up the machine operator for hours, thus bringing all the machines to a costly stand-



The two P400 hobbing machines and the P600/800 hobbing machine eliminate countless hours of costly downtime.

Gleason P600/800ES mid-size gear shaping machines with electronic helical guide for maximum flexibility.

still," explains Jokin Juaristi. "With the Gleason machines, this costly bottleneck is all but eliminated. Fewer machines are producing more parts faster, with less changeover time part to part."

Additionally, these hobbing machines are designed with highly accessible, ergonomically designed work areas with large operating doors to aid in manual part loading. The operator's task is further simplified with current Siemens controls and operator-friendly Gleason hobbing software, including support and service functions.

The machines are ideally suited as well to accommodate the widest possible range of workpiece types and sizes and have extended ranges for workpiece diameters and shaft lengths: axial slide travels of 600 mm on the P400 machines, and 1,000 mm on the P600/800 machine, for shaft applications.

The company also says that the machines have operated with exceptional reliability and minimal maintenance over the years. Robust guideways are standard, and the use of proven, reliable direct-drive work spindles or double worm gear table drives delivers the desired high precision cutting results.

New Business Shapes Up

It's not surprising, given Engranajes Juaristi's breadth of products, that shaping is a key capability. For internal gears and those that can't be hobbed efficiently, the company uses two Gleason P600/800ES gear shaping machines. Both machines feature an electronic helical guide–an additional CNC rotary axis–to replace the mechanical helical guides required in the older generation of shaping machines that these machines replace. In the past, the cutting of a new helical gear first required the expensive and time-consuming production of a mechanical guide used to produce the necessary helix by superimposing a rotary motion on the cutting stroke. Then, there was additional time needed to change guides for a new part. Now, changeover on the Gleason machines is done in minutes, via dialog-guided input on the Siemens CNC. All gear cutting, tooling, and part parameters, including the helix angle to be shaped, are entered, and the controller calculates all the necessary machine data and settings automatically. The machines are considerably more productive as well, featuring a backlash-free direct drive for the cutter spindle to deliver flexibility and operating ranges much greater than the previous conventional

Gear shaping tools designed and manufactured by Gleason.

Easy data input with Gleason hobbing software.

shaping machines. An extended stroke length using Gleason's optional shuttle shaping feature accommodates face widths of approximately 400 mm–well beyond what was previously possible. Finally, one of the machines is equipped with a B-axis, which enables an inclination of the column under CNC to produce tapered parts and improve quality when shaping parts made from high-strength steels.

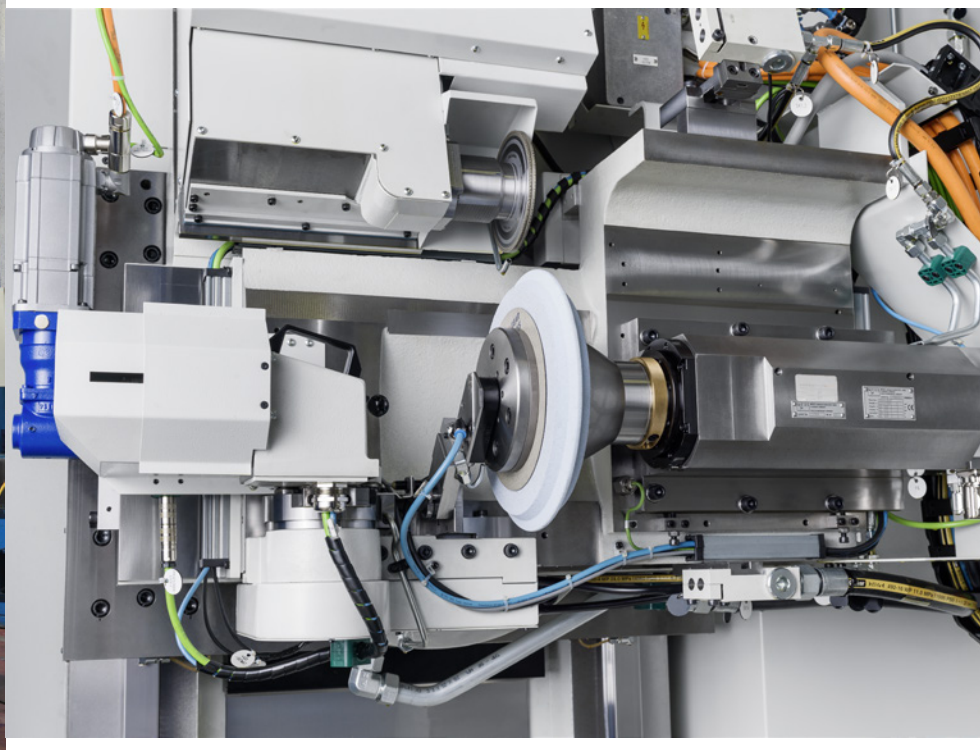
"The added capacity and faster changeover have opened the door to many new gear shaping opportunities, and jobs we couldn't have taken on with the older shapers," says Inigo Juaristi. "For example, we now use the machine with B-axis to produce an important cone-shaped part for a farm equipment application. This would not have been possible before."

Faster Finishing

Strong winds off the shores of Zarautz are good news for surfers, and for Spain's burgeoning windpower industry, which now ranks as the fifth largest by capacity in the world, and second in Europe behind Germany. Wind is Spain's largest and fastest-growing source of electricity. Engranajes Juaristi is keeping pace with this growth, and gears for wind turbines now represent 15 percent of its annual shipments. These gears are characterized by their high-quality requirements, thus enabling them to run smoothly, quietly, and with great reliability in even the harshest conditions.

Engranajes Juaristi uses two Gleason P600/800G Profile Grinding Machines to perform the critical hard finishing operations on external gears. One of the two machines has an extended axial travel of 1,000 mm, enabling the production of several important shaft-type parts for wind turbine gearboxes, such as sun shafts and high-speed pinions.

A one-piece machine bed with excellent stiffness and dampening is the foundation for these machines' high accuracy requirements. Excellent accessibility to the work area of the machine is achieved by doors that open wider and a counter support placed in the corner of the machine.



Gleason provides complete tooling solutions including grinding wheels and dressing tools.

Most importantly, the use of Gleason's proven HSK external grinding head guarantees maximum flexibility and, thanks to the HSK quick-change system, allows the use of different grinding wheel spindles for dressable and non-dressable CBN grinding wheels in a diameter range of 40–350 mm. This has enabled Engranajes Juaristi to take advantage of the latest developments in ceramic grinding wheels that, in just the last few years, have made dramatic reductions in finish profile grinding cycle times.

"It's a testament to the Gleason machines' design," says Jokin Juaristi. "The machines allow us to keep up with tooling innovations that make us more competitive. While we're just doing external gear grinding with these machines, we're now considering adding an internal gear grinding capability. These machines are easily adaptable." An internal grinding device can be added without removing the external grinding spindle. As a result, the machines can be configured to finish-grind a wide range of internal and external gears, as well as worms of all common types.

The machines also include integrated on-board gear measurement and the latest smart dressing technology, which reduces costly, time-consuming dressing time for initial or re-profiling of a grinding wheel. The innovative software function ensures that dressing only takes place on the necessary grinding wheel areas, thus saving time.

Localized Service and Support

Localized Gleason support has played an important role in helping Engranajes Juaristi transition its gear manufacturing from "mechanical to modern."

"It's gratifying to work with a company where ownership is so open to the possibilities of our new technologies," says Xavi Vallsmadella, regional sales manager, Gleason Sales Spain, who has supported Engranajes Juaristi throughout its 20-year modernization journey. "It's an example of how a small company, with the right technologies, can do big things."

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