

The Perfect Time for Power Skiving

Italian gear manufacturer Metalcastello's investment in new Gleason Power Skiving technology gives the company a strong competitive edge as the world's industries gear up for the post-pandemic.

Giulio Santantonio, Sales Manager, Gleason Sales (Italy)

For a global industrial powerhouse like CIE Automotive, challenging times also mean new opportunity. With its recent acquisition of Somaschini, CIE Automotive's gear production combines Somaschini's two gear production plants in Italy and one in Indiana with Metalcastello S.p.a. in Bologna, Italy and a gear division based in India. Automotive, industrial vehicle, agricultural, and off-road vehicle manufacturers all stand to benefit from the global reach and synergies that will result — and the new technologies that Metalcastello in particular can offer.

A Perfect Time for Power Skiving

Metalcastello is a highly respected manufacturer of heavy-duty transmission gears and shafts used in earth-moving machines, tractors, and industrial vehicles operating on every continent. The company's investment in three new Gleason 600PS Power Skiving Machines has given it capacity to spare for the production of critically important internal ring gears, some as large as 550 mm in diameter, used in the planetary gear systems of many of these transmissions — while simultaneously improving quality from DIN 9 to DIN 7.



There was nothing wrong with the traditional shaping process or the Gleason shaping machines that the company previously used to produce these gears — unless of course you want to machine at speeds four to five times faster. When Gleason demonstrated that the Power Skiving process for this application could achieve remarkable gains in productivity and quality, Metalcastello saw the potential.

Seeing is believing, and Metalcastello managers came away firm believers in the Gleason Power Skiving process after Gleason conducted trial machining at its facility in Ludwigsburg, Germany. There, a Gleason 600PS was used to machine almost 100 3.5 module, 350 mm diameter, 78-tooth ring gears made of hard 40CrMo4 material — actual customer parts that were being produced on Metalcastello's existing Gleason gear shaping machines. Additionally, the deburring required on the ring gear's lower face — a separate operation typically done off-line — was instead performed during the trial machining by the same cutter used for Power Skiving and thus requiring no additional work-piece changeover time. For this operation, Gleason grinds the backside of the cutter with the required contour of the workpiece to eliminate the burr.

Ultimately, the 100-part demonstration produced some impressive results: the 5.20 minute cycle time for complete machining was some four



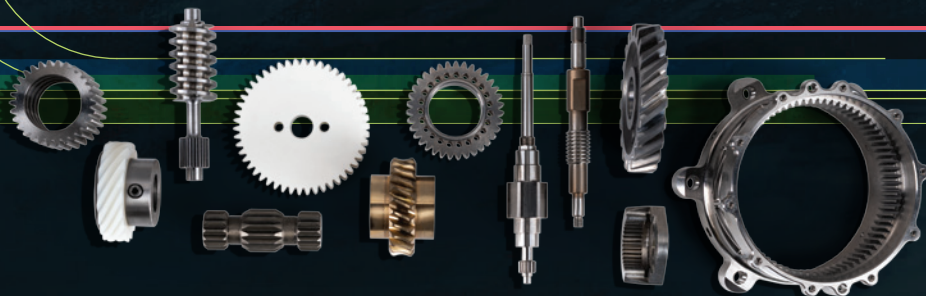
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to five times faster than shaping, and profile, lead and division quality were measured at a highly desirable DIN 7, two classes better than what was being achieved by shaping. Additionally, it was determined that a cutter made with G70 high speed steel and using an advanced AlCroNite® Pro (AlCrN) coating produced the best results vs. a G50 cutter. Some 50 parts were completed (3,675 m/tooth) with the tool before the end of its useful life and the need for re-sharpening/re-coating.

Today, Metalcastello is reaping the productivity and quality



Planetary gear systems with ring gears as large as 650 mm in diameter are a Metalcastello specialty. Gleason Power Skiving has greatly increased capacity for the production of these important components, also offering the potential for an economical fine finishing capability with Hard Power Skiving.

benefits demonstrated at Gleason with an installation of three Gleason 600PS Power Skiving Machines. While the Gleason shaping machines used previously are still producing parts, Metalcastello now relies heavily on the PS machines to do most if not all of the gears for these important planetary gear systems for transmissions. Cycle time improvements were as demonstrated, and quality levels have been even a class or two better than what was achieved in Ludwigsburg.

Non-productive time is reduced as well with automated workpiece load/unload. The Gleason automation consists of a 2-station ring loader and 12-station revolving magazine. Both are easily adaptable to handle potentially hundreds of different part numbers with minimal changeover.

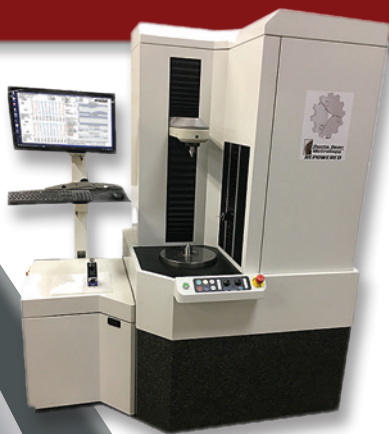
The Gleason PS system at Metalcastello also includes the Gleason 160CPS Cutter Positioning System, which helps optimize the setting of the Power Skiving cutters, but also can be used to analyze cutter wear through an integrated microscope and PC. It also comes equipped with an RFID reader, which allows for the reading of important data from an RFID chip found in the Gleason Power Skiving cutters.

Finishing with Hard Power Skiving.

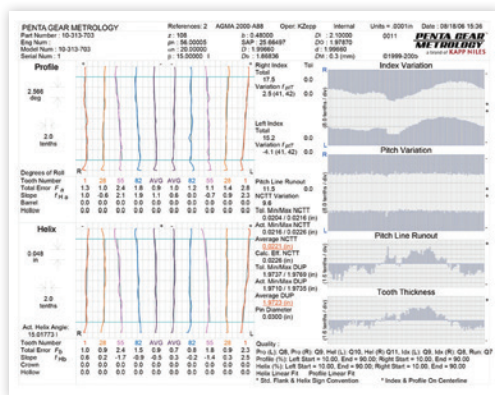
While in the past the quality requirements for most, if not all, of these ring gears did not call for a finishing operation after heat treat, Metalcastello is now also using these PS machines to perform Hard Power Skiving—an economical hard finishing alternative to finish grinding. These machines were easily adapted to perform Hard Power Skiving so Metalcastello could begin

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realizing fine finishing benefits without additional investment in grinding machines. They are inherently extremely rigid platforms and, with the addition of stock dividing sensor and the use of carbide cutting tools designed for the task, can deliver quality and surface finish levels to meet many fine finishing requirements.

Metalcastello is indeed an example of how local Gleason sales support, combined with the Power Skiving process experts in Ludwigsburg, can partner with innovative companies like Metalcastello to successfully achieve the enormous productivity and quality benefits of this exciting technology. The timing, as they say, is perfect. ⚙️

About Metalcastello

Headquartered in Castel di Casio, Italy near Bologna, Metalcastello S.p.a. is a world leader in the production of gears for mechanical transmissions found in earth-moving equipment, farm tractors, industrial vehicles and naval applications.

The company is part of the CIE Automotive Gears Division of CIE Automotive Ltd., a major industrial group among the top 100 suppliers competing globally in the components and assemblies sector. For more information, visit: www.metalcastello.com.

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