

Quick-Change Spline Rolling Racks

OFFER NUMEROUS BENEFITS

U.S. Gear Tools Inc. of Swannanoa, NC has developed the R/C Rack System, a quick-change tooling alternative for spline rolling machines. The system saves time, simplifies logistics and has the potential to significantly increase tool life, says Mike Callesen, director of spline rolling products.

The R/C Rack System consists of two pieces: a durable carriage that is installed into a standard spline rolling machine, and a replaceable, one-use rack insert. The two pieces align with a simple cam-lock system that requires only a standard hex-wrench to turn each of five actuators.

Installing the carriage is similar to installing a standard spline rolling rack, Callesen says, except that the R/C carriage is just over half the weight of a standard rack, making it much easier to manage. But the real advantage of the R/C system, he says, is the quick changeover.

A typical tool change with old-style tooling was measured in hours, Callesen says, whereas the R/C system requires less than 10 minutes. "Once you've got the carriage set in the machine and you've run good parts, changing the insert is a piece of cake."

Another important benefit of the quick-change system is greatly simplified logistics, Callesen says. When a standard rack tool's performance diminishes, it can be restored by regrinding as many as five times. But this means the machine has to



be stopped and the tool removed, packaged up and shipped back to the tooling supplier—a time-consuming and expensive process. Also, it requires the spline manufacturer to keep at least three spares of each type on hand and manage the inventory, knowing which racks are in machines, which are in inventory and which are out for regrinding. In an automotive scale operation—possibly with hundreds of rack tools—tool inventory management is no small task.

The R/C System's inserts, however, are designed to be discarded after they reach the end of their useful life. The carriage stays in the machine and a new insert is installed in just minutes. Although Callesen still recommends that manufacturers order their spline rolling racks in sets of three, they only have to keep track of what's installed in a machine or on the shelf. They no longer have to

worry about what's being resharpened or in transit.

Also, the R/C rack inserts weigh significantly less than a full spline rolling rack, so they can generally be shipped via standard FedEx or UPS. Also overseas customers don't have to worry about how they'll get their used racks resharpened and the difficulties of shipping pieces back and forth across borders. New inserts can easily be shipped overseas.

Although the R/C Rack System was first introduced at IMTS 2012, U.S. Gear Tools has spent the past two years refining the system. They have worked very closely in conjunction with a major Tier One automotive supplier and produced more than a quarter million parts using the tools, Callesen says. This testing process has allowed U.S. Gear Tools to make sure the tool performed as expected and that its installation and use were as user-friendly as possible.

Most importantly, however, the testing and development also revealed that the new design seems to provide a significant boost in tool life over conventional tools. In fact, for this automotive application, tool life was approximately double what the manufacturer previously experienced using standard spline rolling racks.

Of course, Callesen is quick to point out that not every application should expect double the tool life. However, because of the volume of parts run, the company is confident that most applications will see appreciable tool life benefits. "The design of the tool enhances





the tool life,” Callesen says, explaining that instead of one rigid body, as in a traditional spline rolling rack, the two-piece design of the R/C system allows the tool the tiniest bit of flexibility. This flexibility is the secret to reduced tool wear, but it has absolutely no effect on the produced parts’ quality, Callesen says.

Officially, the tools went on sale in the beginning of 2014. Racks are currently available only in 24” lengths, which is the predominant size required worldwide for automotive splines. According to Callesen, the company has completed its design for 13” “thread rack” tools, and these should be available by summer, with 48” racks by the end of 2014 and 36” racks in 2015. All tools are designed to fit in a standard spline rolling machine with no modifications required.

Although the R/C Rack System tools cost more than standard rack tools, the value they offer is well worth the difference, Callesen says. When compared with traditional tools, which can be resharpened and re-used several times, the cost of the R/C tools is about 30% higher. However, this considers the direct tooling costs only, Callesen says, and ignores the indirect costs of machine downtime, tool inventory management and shipping tooling back and forth for regrinding. Considering all of that, the total cost of ownership for the R/C Rack System can be significantly less than for standard tooling. And when you add in the promise of significantly increased tool life, the value of the R/C system becomes much more readily apparent.

The tools have been well received so far, Callesen says. Many customers are

enthusiastic about the concept and are interested in learning more. U.S. Gear Tools is encouraging any spline manufacturers to give the new tooling a test on at least one of their lines. The company is confident that the results will prove themselves.

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EMAG/Koepfer COLLABORATE ON HOBBING MACHINE

Drivers are already used to the sixth gear – and the development continues. There are plans afoot for an automatic gearbox for a 9-gear transmission system. The reason is obvious, since it allows the car to be driven at optimal speeds for longer intervals and that saves fuel. Together with the continuing pressure to optimize, high volume gear production must become faster and cheaper. The EMAG Group has demonstrated their solution: the VLC 200 H Vertical Hobbing Machine that adds a new dimension to productivity levels.

The VLC 200 H vertical hobber is the first Koepfer machine based on the new modular standards of EMAG, bearing the name of the new standard machine platform that represents a new generation of machine tools for use in a range of greatly varying applications. This “modular approach” is of great advantage when it comes to establishing a highly efficient production system for the transmission industry, as it allows for the individual processes used in the soft machining of a gear, from turning of the raw part to hobbing and deburring, to be combined with perfection and without any great outlay for automation. “The machines are easy to interlink, as they are perfectly coordinated and work at the same transfer height,” explains Jörg Lohmann of Koepfer.

The machine features high-performance drives offering top main spindle and hobbing speeds. Gears of a maximum diameter of 200 mm and module 4 can be dry-milled at greatly shortened cycle times. Removal of the hot chips generated by the process is of no concern on vertical machines, as they fall unhindered into the chip conveyor below. The typical EMAG pick-up design principle also minimizes idle times. The main spindle removes the raw-part from the conveyor belt, transfers it to the tailstock – where it is firmly supported during machining by a tailstock flange – and removes it from the machining area after



completion of the hobbing cycle. This integrated automation concept with short travels not only makes for efficient speeds, but also guarantees a high degree of machine availability.

The VLC 200 H includes a vibration-resistant polymer concrete Mineralit machine base. An optional measuring probe can be integrated into the machining area and used for either positioning tasks or the measuring of finish-machined components. “It even allows us to carry out adjustments in the machining process. In fact, the whole machine provides added value with its integrated production process quality control,” Lohmann states.

Designed on the basis of a modular platform, production planners have a choice where this automated high-efficiency package is to be integrat-



ed into a manufacturing system.. They can choose directional component flow, recirculating automation or the “chaku-chaku” principle. A processing concept, meticulously planned by EMAG experts, ensures the lowest cycle times: after turning of the raw parts on an EMAG VL 2 the gear cutting process is carried out on the VLC 200 H, with the final deburring and single-sided chamfering process following on the VLC 100 D. All these machines are designed on the “modular standard” basis from EMAG. The gearing is generated in a single cut and followed only by chamfering, in comparison to alternative production solutions that rely on a second cut after chamfering. Cycle times for the machining of gears will drop dramatically with modular EMAG solutions and Koepfer technology.

Lohmann considers the market opportunities for the VLC 200 H from Koepfer as positive: “When it comes to optimizing large-volume gear production or developing processes, we offer a highly efficient solution with integrated automation that can be configured a number of different ways. It should signal a new, interesting approach to production planners.”

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Sumitomo Electric Carbide Inc.'s new WGX Wave Mill Series, used for all face milling applications, features excellent surface finish and eliminates burrs due to a unique insert chip-breaker design. The WGX body and insert combination yields improved run-out accuracy. Additional WGX benefits include lower cutting force due to its high rake angle and optimized edge treatment for long tool life with new Super ZX and Super FF coatings. In addition to the WGX Milling Series, Sumitomo Electric Carbide Inc. announces the



release of ACM200 and ACM300 insert grades for exotic and stainless steel material milling. The ACM200, which is

Gleason

INTRODUCES 300GMS AT CONTROL 2014

Gleason will introduce its latest Analytical Gear Inspection System, the 300GMS at Control '14, taking place May 6-9 in Stuttgart. The 300GMS enables faster complete inspection of automotive, aerospace and other smaller gears, as well as gear cutting tools and non-gear parts including a new surface finish inspection solution. Fully integrated wiring of the surface finish hardware reduces the challenges of external cabling associated with similar products. Probe integration of the surface finish function eliminates the variation seen on manual units performing a similar task.

The 300GMS is equipped with an ergonomic operator workstation and an optional Advanced Operator Interface for remote diagnostics and control - both making a significant contribution to increasing operator efficiency at every stage of the inspection process. The Advanced Operator Interface provides the operator with a number of powerful tools, including environmental monitoring to record temperature and humidity as well as video telephony, note pad and voice mail mes-

saging capability, Gleason Connect for enhanced remote diagnostic support, creation of standard work instructions, online training tools, multi-lingual communication and more.

Further highlights of the 300GMS are:

- Gear inspection for module 0.2 and higher
- 3-D-graphical tooth contact analysis
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For more information:
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www.sumicarbide.com

1000GMS Analytical Gear Inspection System as well – it will be presented at the Gleason booth (#3308 in Hall 3).

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PTG/Holroyd

PRODUCES LARGE HELICAL PROFILE MILLING MACHINE

Holroyd manufactured one of the world's biggest high precision screw rotors for a major gas compression project in the Far East using its EX Series model. The process necessitated the manufacture of 816 mm diameter rotors as matched pairs, with a finished dimensional tolerance between the male and female forms maintained to tens of

microns across the intermeshing profile surfaces.

On behalf of a major Chinese compressor manufacturer, the company then produced one of the largest helical profile milling machines ever constructed. The machine in question, an 8EX model, is now in daily use, dry pre-machining



then finishing outside screw compressors for the gas processing industry.

What made this particular project so remarkable, however, was the sheer scale of the technology involved. Weighing in at an incredible eight tonnes plus, each of the stainless steel rotors produced required a machine capable of handling diameters of up to 850 mm and material lengths of up to 4.5 m. Not surprisingly, the project presented a number of major challenges for which Holroyd called on its well-known and considerable ability to develop ingenious engineering solutions

High efficiency production

Always aiming to raise the benchmark for precision, Holroyd appreciates only too well that a key aspect of high efficiency rotor production is the accurate pre-machining of the rotor profile form. Whilst generally referred to as the 'rough milling operation', this process is actually the precise milling of the rotor profile in preparation for subsequent finishing. This is because any inaccuracies in this process can easily affect the accuracy of the finishing stage.



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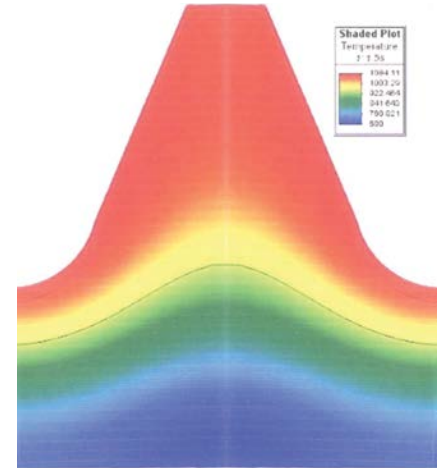
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