

Peter Kozma of Liebherr-America, Inc.

Peter Kozma, executive vice president of Liebherr-America, Inc., talks with us about Liebherr and its partners in the Sigma Pool.

GT: Since three out of the four members of the Sigma Pool manufacture at least some similar products, how do they keep from cannibalizing one another's sales?

PK: Because Sigma Pool-member technologies are actually complementary rather than competitive. Each specializes in a different aspect of gear manufacturing, which we define according to gear type and process.

Liebherr offers hobbing and grinding machines, Lorenz covers the shaping process and Klingelberg and Oerlikon manufacture different types of spiral bevel gear manufacturing and testing equipment. Because all of the partners' machine tools are designed for gear manufacturing, the Sigma Pool's expertise is concentrated in a single field. We can give our customers objective recommendations based on workpiece, process, required geometry and quality.

Far from hurting individual company sales, Sigma Pool synergy supports even greater participation in the gear manufacturing field.

GT: We have been told that gear grinding is becoming more and more popular in the U.S. Companies that in the past would never have used ground gears—for example, Harley-Davidson—are now adopting them for the sake of noise reduction and quality improvement. Do you see gear grinding becoming a "growth" part of the industry?



Peter Kozma, executive vice president.

PK: There is definitely a growing demand for higher quality gearing. We are noticing growth in three major areas—automotive, commercial or industrial applications and production technology. In vehicles, people have become aware that excessive noise and quality are related; higher quality gears lead to reduced noise emission and increased passenger comfort. In the commercial-industrial area, there is a recognized demand for ground gears to increase performance and economy. Advances in production technology have required grinding from solid and near-net forging for economical gear development and production.

GT: Why has grinding gears been more popular in Europe than in the U.S.? Why has this technology been slower to arrive here?

PK: Because of Europe's astronomical fuel costs and its strict environmental laws, fuel efficiency has long been a more urgent concern in Europe than in

the United States. Therefore, rather than controlling noise through the usual method of insulating the transmission, which adds weight and increases fuel consumption, European manufacturers have sought methods such as grinding to eliminate gear inaccuracies that are the source of operating noise.

GT: As gear grinding becomes more popular, do you see a push on the part of grinding machine customers to demand "open architecture," so that grinding wheels from one company can be used on the machines from another?

PK: Aside from cost issues, manufacturers are always trying to avoid bottlenecks and maintain flexibility. Specifically for CBN grinding wheels, we have already anticipated a demand for interchangeability among different types of machines and have responded to customers' needs.

GT: Liebherr has been very successful with its launch of a dry hobbing machine. What are the possibilities for a similar advance in dry grinding? Is this technically feasible?

PK: Every new technology introduced over the past few decades appeared at one time to be technically impossible, so I would not doubt the feasibility of dry grinding. Currently, we are aware of attempts to develop dry grinding methods using dressable grinding tools. The challenge of dry grinding *hardened* materials is much more difficult because the process itself can cause significant changes in material properties.

GT: According to your literature, one

of Liebherr's most successful products in the recent past has been its gantry robot. Why and how did Liebherr get into materials handling?

PK: In the 1970s, many of our customers began to ask us to automate part flow between our gear-cutting machines. As the demand grew to include linking our machine tools with the preceding and subsequent operations, Liebherr extended its periphery of

machine-integrated buffers and loading units to include more comprehensive and intelligent systems. From our earliest blue steel conveyors to today's range of gantry robots, rail cars, palletizers and storage systems, we have concentrated on giving customers the degree of flexibility they really need.

From the beginning, Liebherr has been a system integrator working with other manufacturers' machine tools.

Through experience, we have developed an uncommon expertise in electrical interface and physical layout, both of which must be optimized in a reliable and efficient automation system.

GT: Has the declining value of the dollar made it more difficult for European-owned companies to compete in the U.S.? Has it hurt your business? Would this be a good time for U.S. gear manufacturing companies, which suffered badly in the 80s, to try to rebound on the global market?

PK: Certainly the declining dollar has made competition more difficult for European companies, but Liebherr and Klingelberg both have been global competitors for many years and continually take steps to minimize the effect of currency fluctuation. The recent recession in the United States helped our long-term prospects by making us find

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There is a growing demand for ground gears in three areas — automotive, commercial and industrial applications and production technology.

ways to reduce customers' total investments without limiting functionality or quality. These tools—smarter manufacturing and money management—are standing us in good stead, and we continue to compete successfully despite the dollar's weakness.

With the advent of global sourcing, it is increasingly important for companies to have a global view of competition. The present currency situation makes it easier for U.S. firms to establish operations and sell their products overseas.

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GT: There's a lot of talk in the industry about the development of the technology to grind gears from the solid. Is the Sigma Pool working on technology in this area?

PK: Yes, we are exploring this technology and working to stretch its current economic and technical limitations. Our Sigma Pool partner Oerlikon has been experimenting with different wheel compositions and coolant formulas. We have seen very positive results, and we are optimistic that this technology will prove effective.

GT: Both Klingelberg and Oerlikon have gear measuring and testing product lines. Are there any new developments in this area? What are customers demanding now in terms of measuring and testing equipment?

PK: Oerlikon manufactures test machines that specialize in structure-borne noise analysis and single flank testing of complete spiral bevel and hypoid gear sets. The prevailing demand is for the testing of gear sets under simulated operational conditions.

Alternately, Klingelberg manufactures analytical CNC inspection machines for precision measuring of all parallel axis and bevel gear tooth geometries as well as associated cutting tools. Our customers are requesting networking for statistical process control, complete inspection of all workpiece dimensions with a compensation option for eccentric workpiece clamping, customized software packages and faster inspection cycles. We are also seeing more interest in closed-loop systems that network between the inspection machine and the bevel gear generating and grinding machines for the calculation of corrective machine settings.

GT: One of the selling points of Sigma Pool is the synergy it can bring to solving gear manufacturing problems. In one of the news releases issued at IMTS, a project was mentioned where Liebherr and Oerlikon worked together to develop an automated system for lapping spiral bevel gears. Can you tell us more about this project?

PK: This system uses a CNC Liebherr gantry loader to automate a number of CNC Oerlikon lapping machines. Our challenge was to find an economical solution for automatically loading spiral bevel gear lapping machines—using automation for the first time to load pinion and gear sets of different sizes and ratios directly into a machine fixture. The Sigma Pool system achieved its goal of providing a system that reduces

cycle time, increases production and, ultimately, makes a positive contribution to our customers' profitability. ☉

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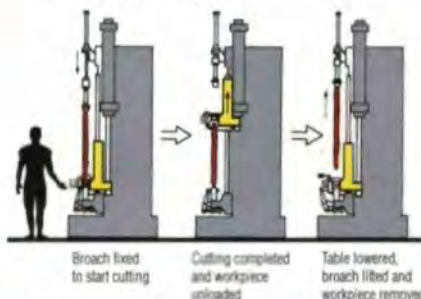
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