

THE LATEST GEAR GENERATION

Interview with **Jan Klingenberg**

This is the first of a new series of *Gear Technology* profiles of individuals you should know in the gear industry.



Q Tell us a little bit about the history of Klingenberg. When was Klingenberg originally founded? When and why did the company get involved in the gear industry?

A Klingenberg was founded in 1863—originally as a metal trading company. We have been located in Hückeswagen, Germany since 1916. Having started with the production of tools and machine knives in 1908, the company moved to Hückeswagen and eventually became involved with gearing technology. Consequently, in the 1920s we started designing and producing machines for bevel gear manufacturing based on the palloid system.

Q Please describe how Heinrich Schicht invented Klingenberg gearing and the challenges he originally faced with his invention.

A Heinrich Schicht converted the basic principle of hobbing from cylindrical gears to spiral bevel gears. Instead of a cylindrical hob used for cylindrical gears, he applied a conical hob for bevel gears. His idea remains the basis for all further developments in this industry. The patent for his idea was applied for in 1921. It allowed the company to grow and go global from that point on.

Q For historical perspective, please describe the significance of the Klingenberg cyclo-palloid tooth form and its development; i.e., why was it developed, how does it fit in the overall scheme of spiral bevel gear production, and, historically, how has it competed with other tooth forms?

A First of all, cyclo-palloid is a widely used, universal gearing principle. The cutting tool is not specifically designed for a dedicated gear set. Rather, it is applicable for any ratio in a defined module range. This makes cyclo-palloid profitable and thus competitive, especially when the customer has small batch sizes and a high variety of gear designs.

Q From a gear design perspective, cyclo-palloid always creates parallel tooth heights. This is important to mention since there are other gearing systems that apply a tapered tooth height. The lengthwise shape of the teeth, combined with the optimal tool diameter, provide the best conditions for maximum strength of a cyclo-palloid gear.

A One important feature of cyclo-palloid is the hard finishing option. The machine executing the soft cutting operation is able to perform a hard cutting process called “HPG skiving”—result-

ing in very geometrically precise gears to meet the highest quality demands.

Q What were the significant technology contributions of Oerlikon, and how does that technology fit with today’s operations?

A Klingenberg has always been very strong in the market of universal applications in industrial gear boxes. But decades ago, on the other hand, Oerlikon introduced the face hobbing principle to produce gears for automotive applications. This latter process provided significantly higher productivity, but every individual design required a dedicated tool.

Oerlikon has been the market leader in lapping technology from the beginning of the 1990s. Since bevel gears for industrial gear boxes are mainly ground or skived, Klingenberg did not initially have enough expertise in the area of high-volume products and lapping. But, by combining Oerlikon’s market knowhow and Klingenberg’s experience in CNC machine design, the group became a full-service supplier for bevel gear manufacturing in the automotive industry.

Q: What are the keys to success for a family-run business (now in its seventh generation) operating on a global scale?

A: There are some valuable, inherent advantages to being a family-run business. Time, for example, is one key factor: we take our time—in both marketing new developments and patiently striving for continuity—even in tough periods. On the other hand, our independence allows us to make quick decisions, even concerning strategic matters. Another factor that must not be underestimated is our commitment to our local community and our heritage—important values that contribute to our staff's identification with the company.

Q: How has the gear industry evolved since you took over as CEO in 2004?

A: With regard to the markets in general, what stands out is the increasing quality demands for gears, especially in the automotive industry. For us as a company in particular, it is the transition from machine tool supplier to solutions provider for technology partnerships. Application support along the entire process chain is what customers demand today.

Q: Why was the recent acquisition of Höfler important for Klingelberg?

A: Put simply, it was the logical completion of Klingelberg's product range, adding cutting and grinding machines for cylindrical gears—both in terms of application areas and customer industries served. The addition of Höfler Maschinenbau allows us to significantly advance in reaching our strategic goal of being able to

provide all gear technologies as a one-stop shop.

Q: What synergies have been achieved in the takeover of Höfler?

A: Of course we benefit from certain technological expertise, and the complementary product range of the two partners. Höfler's strong R&D focus is a major asset to our company.

Q: What regions of the world are showing the most promise for growth in gear manufacturing, and why?

A: One main factor that drives demand in the industry is, of course, the growth of the automotive sector in certain countries such as Russia, India, China and Brazil. This is nothing unique to gear manufacturing, of course, as it applies to several other industries as well.

Q: What innovations, changes or trends do you see in the coming years that will impact the world-

wide gear manufacturing community?

A: The development of electric drives vs. combustion engines in automotive engineering will have a growing impact on our industry, for sure. Other than that, efficiency, noise reduction, unit costs and stable manufacturing processes will be the focus of development work—both for us and our customers.

Q: What are your goals for the Klingelberg group over the next five years? Can you discuss your expansion plans in Germany? Do you have plans to expand manufacturing outside of Germany?

A: Certainly one important step is relocating our site in Hückeswagen to new, nearby facilities; this will take place gradually during the next decade. In general, we will keep striving to deliver product innovations, just as we have been doing in the past or at an even higher level.



Q How have your customers' demands changed in recent years?

A What sticks out is the ever-growing demand for more efficiency in production. For this reason we introduced our trademarked 2 E efficiency label. The label stands both for high-performance and energy-efficient machines. In this context we are an active member of the sustainability initiative, Blue Competence (*Ed.'s Note: The Blue Competence machine tools initiative increases awareness and knowledge of sustainability and raises the energy efficiency bar in the European machine tools industry. The initiative offers a common platform to European machine tool companies and coordinates efforts for the development of energy and resource-efficient solutions*). Another important factor is making our machines easy to operate while providing ever more com-

plex technologies. With our customers being globally active, they need to rely on reproducible quality worldwide — no matter who operates the machine. Easy operation of our machines minimizes costly human errors and, in the final analysis, reduces costs per unit.

Q What is Klingelberg doing to accommodate those demands?

A We listen to the markets and develop our solutions accordingly. This is, in our view, the only viable way to develop products that help customers reduce cost-per-unit and at the same time provide high quality — certainly two of their main goals.

Q How has your North American distribution, sales and service organization changed over the last several years?

A We have established new sales capacities and have expanded our network through Höfler based on their already strong presence in the USA.

Q Describe the importance of Klingelberg's unique gear manufacturing capabilities. (Specifically, regarding delivery time; quality; price; materials; new-application designs, etc.)

A Customer satisfaction is the result of the optimal interplay between factors such as delivery time and reliability, quality of materials and service, and pricing. We are convinced that cheap "solutions" go against this interplay and thus against customer satisfaction. Furthermore, our team of innovative engineers lays the groundwork for refined solutions and new developments.

Q Given your reputation for recruiting and retaining skilled workers, do you have any concerns in that regard?

A In this context we find two trends especially important: first, we cooperate closely with local and regional schools and universities; second, we continuously invest in internal training and further education to strengthen our staff. This is something that will be of growing importance in our market, so we are well-prepared for future developments.

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