

Only the best...

Touring Some of Germany's Finest Gear Companies

BY HAGEN H. HOFMANN

During the 2006 AGMA Annual Meeting Roland Ramberg, President of The Gear Works, Seattle, and an AGMA Board member, asked me if I could organize information or a trade tour through Germany's best and most representative gear companies.

We planned that the tour should take place in April 2007 following the German Hannover exhibition, at which AGMA was represented. We had plenty of time to select and send inquiries to German companies to see if they were willing to welcome the AGMA and its representatives to become familiar with the companies and to encourage future business cooperation.

Since I know the international gear industry, especially the companies in Germany, I accepted and selected a representative number of companies, covering the marine, industrial, wind power, gear motors, construction- and heavy vehicle gearings industries.

Almost all of the inquired companies responded positively upon my request and assured high-ranking receptions, shop tours and informative discussions.

The following companies were selected and visited:

Renk AG, in Rheine
Flender AG, in Bocholt
Winergy AG, in Voerde
Eickhoff GmbH, in Bochum
Wolfgang Preinfalk GmbH, in Sulzbach
SEW Eurodrive GmbH, in Graben-Neudorf
Liebherr GmbH, in Biberach
ZF Friedrichshafen AG, in Friedrichshafen

Renk

Renk impressed us with the high volume production of marine gears, large industrial and special design gearboxes. While their parent company in Augsburg is mainly active in defense gear work, Rheine represents the civil or commercial part of the business. Renk had just undergone a major internal reorganization after they had moved into newly built production halls. New foundations in preparation announced the arrival of more new gear cutting and gear grinding equipment for up to four meters in capacity. Renk is preparing for a further dramatic growth of their business as the marine industry is expanding and Renk is one of its major suppliers. They have almost stopped making wind power gears for capacity reasons. Almost all their gears are carburized hardened and then ground to precision.

Flender

Acquired by Siemens AG in 2005, Flender predicts a further dramatic growth in the wind power business and, therefore, continues to invest in gear production equip-

ment. Several foundations wait to be equipped with machines during the next month. Interesting to learn was that their next grinders have dual functions which means, not only do they grind teeth but also the bore while the gear is still in position on its fixture. Fifty percent of their business is wind power gears of which the biggest deliver 5 MW. We saw several of these huge gears in production. In particular those planetary gears are impressive. Flender is probably Germany's biggest large gear plant. Their all renovated buildings are packed with



Renk AG, in Rheine

the most modern gear and other machines; hardly one is older than 8 years. Flender is also very active in China and India where they have now also begun to manufacture wind power gears.



Winergy AG, in Voerde

Winergy

Winergy is part of the Flender group of companies, and is located in Voerde near the Flender Bocholt plant. The plant was commissioned in the year 2000; all bigger Flender gear units are assembled here.

Winergy is the supplier of complete drive systems for wind turbines, including gear units, couplings, generators and inverters. According to Winergy, every second wind turbine worldwide is delivered from here. The breathtaking, top of the line, huge former vessel plant houses seven test stands of which the biggest has a capacity of 14 MW just being installed. Several thousand gear units and generators were delivered in 2005, for a total capacity of about 6,000 MW, representing a total sales amount of about € 525 million. A two-digit increase is expected for the current year. In addition to manufacturing gears for their own assembly lines, Winergy is also one of the biggest buyers of open gearing from all over Europe.

Eickhoff

Established in 1864 as a foundry for mining equipment, the company grew to become a leading supplier of the mining industry. One can still feel the pride and wealth of this turn-of-the-century company as you enter their main building. We were shown the biggest ever built shearer loader with a weight of 150 tons and two loading drums each having a 1000 kW motor, which was headed for delivery to China. As a result of the declining mining business in Europe, Eickhoff had to undergo a major structural change. In the middle of the 1990s, the privately owned company decided to invest in the upcoming wind power industry. With about 600 new gear units and about 250 rebuilt ones per year, Eickhoff now is one of the larger manufacturers supplying to worldwide customers. Five test benches for up to 5 MW are available; their biggest gear units have a capacity of 3.6 MW. One of Eickhoff's traditional activities is their foundry for parts up to ten tons in weight—a great advantage in times when castings are hard to come by. Eickhoff has just recently decided to build another gear production plant outside Bochum.



Wolfgang Preinfalk GmbH, in Sulzbach

Wolfgang Preinfalk

The "youngest" company on our tour and yet, most attractive to see for many of the group. As a medium size business, many of our group discovered similar challenges compared with their own survival strategies. Mr. Preinfalk founded his company in 1976 to supply the mining industry with transmission spare parts and other mechanical elements. Located in the Saarland, one of Germany's mining centers, his business grew rapidly until the downsizing of mining began. Besides his tradition-



Eickhoff GmbH, in Bochum

al business he started to become a supplier of loose gears and invested heavily into gear cutting and grinding equipment. He added a remarkable heat treatment plant and testing facilities and is now one of Germany's first addresses for gears to the wind power industry. W. Preinfalk is building a new facility where he wants to unite all his activities under one roof.



Haines and Nowlin

SEW
Eurodrive
International market leader in drive engineering providing gear motors, frequency inverters,

industrial gear units, control electronics. Under the motto people want solutions not products, SEW offers a wide variety of drive technology for all kinds of applications. The family-owned company employs 11,000 people worldwide, with sales in 2006 of 1.5 billion.

SEW has 11 manufacturing plants in Germany, France, USA, China, Brazil and Finland. From there all parts are shipped to 58 assembly plants worldwide. The large volume of parts has allowed SEW to streamline their production to the absolute optimum.

Nowhere during our trip we were able to see manufacturing cells run by teams of operators fully self contained and responsible for their products and machines. Operators are encouraged to continuously optimize the manufacturing process; the result is presented on information boards throughout the plant (Kaizen). To further optimize the manufacturing process and to reduce intra-company traffic, even the heat treatment plant is in the middle of production. You could not feel heat or see dirt - the facility was absolutely clean. SEW was the first plant I ever saw where the machine operators pack their products in boxes, ready for shipment. Privately owned, the social responsibility of the owners is visible everywhere. Employee lounges are nicely decorated, the canteen looks

more like a conference centre serving three course menus to the people. Jobs at SEW are highly appreciated and this is what SEW wants and needs - well educated technical staff.

Liebherr
The Liebherr group is the typical example for a WWII post war success story. It is said that Hans Liebherr, a building contractor in 1948, needed a crane which was not available after the war.

He decided to build one by himself. Obviously it was so well designed, everybody wanted one and this is how it all started. Today, Liebherr is one of Germany's biggest and most successful industrial groups, active in many fields. Still privately owned, Liebherr employs 24,000 people, total sales about € 5 billion in 2006. Active in many industrial fields like construction machinery, all kinds of cranes, supplies to the aircraft industry, machine tools, Liebherr needs gears of all kinds and sizes. We visited their impressive Biberach gear plant and saw gear machines of all dimensions. Some of them are especially built for their specific needs and not available in the market. With the large number of cranes built, their rope drum production was remarkable. Most impressive to all of us, however, was to see Liebherr's slewing ring (geared bearing) production. Twenty thousand are built here per year in sizes from 1.2 to 5.6 meters, mostly for crane and wind tower

applications. Huge machines are necessary to machine these parts. Their failure rate is said to be zero percent. Once mounted in a wind tower they better not.

ZF
Another superlative on our trip. Welcomed in their large R+D centre, we were given a detailed insight in all of ZF activities. With 120 production facilities worldwide, €12 billion in sales and 56,000 employees, the company is most probably the biggest manufacturer of automobile drive technology of all sizes, including for special military vehicles. The R+D centre, employing more than 600 specialized engineers, does mainly research work in vehicle simulation behavior, noise excitation and optimization, FEM optimization and general design. We were invited for a tour through their truck gear production. With a production target of about 30,000 gears a day or about 1 million gear boxes per year, one can imagine that these numbers can only be achieved



on the bus



an evening dinner



bus, heading to the next stop

profitably with the latest state of the art technology.

ZF especially stressed the fact, that they have reduced the number of "non productive" staff to an absolute minimum, to a very lean production. There is one foreman for the whole building, all the workers at the machines are hooked up with a central production control system and run their production cells autonomous. "We can only hire the best educated; there are no jobs for the untrained." Their training centre, a factory of its own, is nearby.

Summary

We were especially impressed about the educational programs that all companies practiced. Five to seven percent of the total number of employees are apprentices over a period of three to three and a half years. In addition the companies provide practical training for students in cooperation with the universities. Apprentices spend 50 percent of their time in business schools, the rest of the time in the companies, learning the practical side of the business. Should a company not have its own training workshop, they share this part of the education with other companies.

Also very remarkable was the high degree of automation of the mostly modern machines. If at all possible, one worker runs two to three machines, they are educated to operate checking machines, the measuring results are computerized

and statistical quality controls are made. At the same time the condition of tools and the machine quality itself are monitored. Operators change their tools by themselves; all necessary material is available at the machines.

This avoids the otherwise necessary support personnel reducing unnecessary cost. Machines are running without stop, 24 hours daily. Producing in cells has generally gained acceptance. The operators organize their work as if each team is a factory of its own. One cell usually contains all necessary machines and tooling. The operators organize their holidays or days off internally.

They are encouraged to continuously optimize their working process, with trained staff assisting. The results of their improvements are published and documented on information boards, "before, after." This, we were told, "is only possible with highly motivated and trained staff." And in my opinion, they are generally better paid compared to those "normal" machine operators. Interestingly, the labor unions are all for the system because it saves jobs on the long run. Modern machines and well-trained staff have lead to very lean company structures. "We have more Indians and less chiefs again."

Having invested a tremendous amount of money in training and machinery, wages play only a secondary role in the calculations of the companies. As a global bidder, Germany's only chance in competing with new economies is to offer top quality at reasonable prices and to start operations in "the lions den." And it all starts with educating people — continuously. □

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Thank you!
Vielen Dank!

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