

The Outlook for Gear Manufacturing

A EUROPEAN PERSPECTIVE

Hagen H. Hofmann



Hagen Hofmann, president of Höfler GmbH, the German manufacturer of gear grinding machines, presents his views on global trade, competition and the future of the gear industry.



In the coming years, we will be faced with increased competition from all over the world. Modern, fast communication systems will increase the pace even more. Global trade invites nations with hungry people to participate in the market, and they are willing to work for any price. Because we are not able to compete with these wages and other price-reducing factors, we must find solutions to maintain our market share and even to increase it, although it would sometimes be better if we changed our traditional businesses completely and became more specialized.

Global Trade

Global trade does not always work in our interest. We cannot depend on the loyalty of our regular customers anymore,

who in many cases seek cheaper suppliers on the Internet and purchase gears in online auctions. All of a sudden, many of us are in a situation we had never even thought of.

But it's not the first time something like this has happened. From my own experience, I would like to tell you how my company reacted in a similar situation and what we did to solve the problem.

Höfler has manufactured gear grinding machines since 1966. With the exception of minor improvements, the first design was sold worldwide from 1966 until 1981 almost unchanged. For 15 years, the machines had the same grinding time, the same achievable accuracy, and the same complicated setup. We weren't the only ones who did it like that; it was no

different at our competitors. We all slept innocent, with no reason to bother about improvements and higher performance. We all had our customers and market shares, almost without competition.

The bitter wake up came, absolutely unexpected, when the Iron Curtain got holes in it. The Berlin Wall collapsed and communism lost its power over Eastern Europe. Almost everything changed overnight.

The Eastern Bloc stopped buying machines. Germany lost more than 30% of its machine tool export markets. Many companies went broke or out of business, including famous names. Our main East German competitor was all of a sudden a Western company, which received tremendous government support to



restructure and to invest.

And yet, this threat was exactly what the company needed to wake up—to stand up and fight for survival—for the first time in our history.

And it was not only us. Our longtime

customers called and asked if we could help them, because they were not able to compete against companies from Poland, Czechoslovakia and East Germany selling in their traditional markets.

Those eastern companies had the same

slow machines, but their operating costs were low, with wages being a fraction of ours. The challenge for us was to survive together with our longtime customers.

Many gear grinding machines were installed in companies all over the former Eastern Bloc. Those companies were seeking work because their markets, mostly Russian, were gone, too. They had the advantages of cheap labor, machines that were long written off, and governments helping their clientele to accept orders below cost.

There was only one way for us to survive: Develop faster and less expensive machines—machines our customers would buy in order to stay in business.

We had to redesign our complete manufacturing program and to build completely new and different machines, without compromise, in the shortest possible time. Those machines had to be less expensive to buy, yet run faster and more economically than all the machines we had ever built before.

From the beginning, it was evident that we had to design everything differently from those expensive machines that were already available on the market. We used mineral cast material for the heavy machine parts instead of cast iron, which made us independent from steel prices and lowered machining cost, besides other technical advantages.

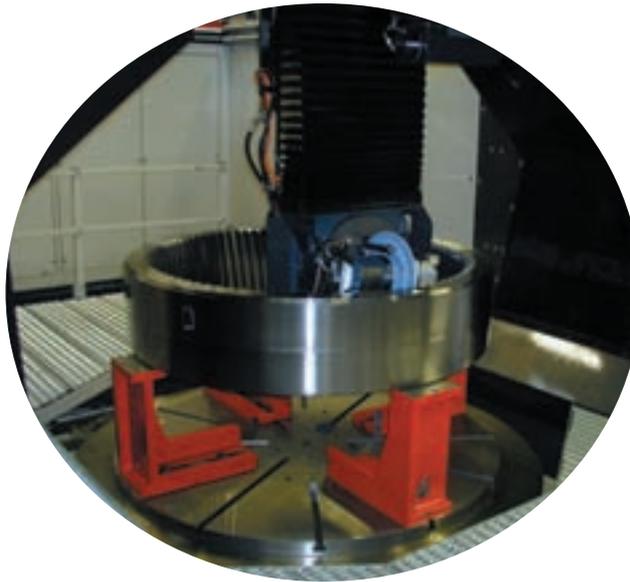
We replaced the expensive worm and worm gear drives in machine tables with much better and more accurate direct drives. We standardized components to use them in many different machine sizes, and so on.

Believe it or not, today, a 48" grinder costs about half what it cost only three to four years ago. And it is a lot better and more universal-to-use machine.

With these new machines being more than five times faster, labor cost all of a sudden was no longer an issue. Our customers were back in business.

The problems for our customers were solved, but only for those who invested in new equipment. All others continue to compete with their slow, outdated equipment, battling rising labor costs—in my opinion, without a future. These machines might earn the salaries of the operators but will not contribute a single dollar for new equipment.

In the meantime, the equipment that former Eastern Bloc competitors brought into the market is now more than 15 years old and ready to be replaced, if the funding is available. Mostly, it is not.



Their wages are rising faster than ours. Soon, the difference will be insignificant. The danger is over.

But many of us now are concerned with new foreign competitors, not just in our own backyards, but around the world.

China: Opportunity and Threat

I have visited China and Korea on a regular basis since 1974—30 years—on average three times a year. After my first visits to China, I was largely convinced, especially with its communist regime, that China would need a long, long time to become an industrialized nation, being too far behind to keep up with our technology. I've had to change my mind in the last three to five years. One can witness almost daily how fast things happen.

Last year, I visited a brand new company built and getting ready to compete with the biggest German gearmotor manufacturer. A 140,000-square-foot manufacturing building under one roof was waiting to be furnished with modern machine tools. Some of them had already arrived and were being installed. The office building was extremely representative, made from granite and marble, and it was equipped with modern furniture and electronic communicating systems. Once fully operative, the company will employ more than 500

workers, with a minimum of research and development, marketing and labor costs.

The company pays wages amounting to \$160–\$180 per month, which is roughly \$1 per hour. This is about one-twentieth of what we have to pay our workers in Germany even before all the social and tax costs.

With one-twentieth of the cost per worker, guess who will make more money, the original or the Chinese copy?

This is hard to beat. The original has only one choice if it wants to stay in business in Asia: Go there and start a business, too, which the company did.

Because of their expected limited quality, those copied motor drives will—in the beginning—probably be sold in Asia only.

They surely won't come to Europe. But they ruin the market in Asia for the original. A well-known company, with an already existing export market, may want to live with this competition or go into the lion's cage as well, to beat the competition with their best weapon—the wages. And indeed, fact is, more and more companies go to Asia to produce there, to participate in the incredibly fast growing market. And there is nothing wrong with it. Our automobile companies, for instance, have done the same for a long time already without selling one car fewer made in their homelands.

But who of us can go to China?

The answer is very, very few.

And we cannot produce gears in China and tell our German customers they are made in Germany.

We cannot buy open gearing there and only put them together here. What if those gears are not of the expected quality? Would you want to discuss warranty questions in Mandarin with your Chinese supplier, over thousands of miles?

Would you like to go to court with a Chinese company in case they delivered substandard gears? How about liability?

Would you want to check thoroughly the gears you receive and maybe have to rework them? Your calculated profit would be gone.

No, this is no solution for us.

I am strongly convinced that Chinese companies start looking for business in their own neighborhood, in Asia. This market is much bigger than we expected, and it's developing extremely fast. They will try to enter our markets only if the quality of their products is comparable with ours.

If this happens, we've done something wrong.

If we continue to struggle month after month to work for the paycheck only, instead of planning ahead, and to line up and strengthen our corporations to meet new competitors, we will have the same problem I had with my company 15 years ago. I woke up surrounded by enemies, and it was almost too late. The day they knock on our door and ask to come in will come sooner than we expect, so get prepared.

But couldn't that happen at home as well, with our next-door competitor?

European Perspective?

Although I don't believe Europeans have different strategies than Americans—we all want to survive and prosper—I do believe there is a remarkable difference between our industry in Europe, especially Germany, and the gear industry in the U.S.

We live much closer together. If you think you know all the German companies, you start learning about the Italian, Spanish, British and others. Every year, more nations join the European Community with all the advantages this huge market has to offer. And they all compete against each other. We communicate in so many different languages that we need to be very flexible. Try to sell a Frenchman a gear using the English language. Not only does he not understand, he simply does not want to understand. You have to talk to him in French. We export and import all the time and know foreign currencies as a

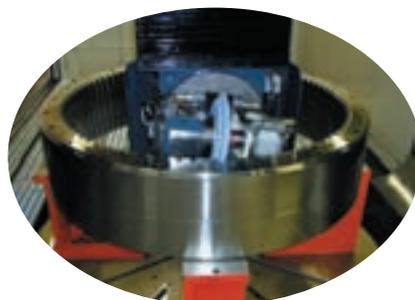
very normal thing. I, for instance, live 10 miles from France and 120 miles from Switzerland.

We go to other countries for shopping, even for lunch and dinner. I grew up calculating exchange rates.

I believe Europeans have an advantage over the average American when it comes to international trade. If you are living so close to each other, you cannot survive not knowing your neighbor, not knowing your competitor. Knowing what he does is of substantial importance. But you do not want to copy; you want to differentiate, develop your own profile. You constantly have to be more inventive and you have to sell it harder with very good and proven facts. It is simply a matter of survival.



In this very competitive environment, profit margins are thin, unless you have something new to offer. Inventions, however, come seldom in the gear industry. We can state that gears have already been invented, just like the fork, knife or spoon. Everybody can make gears—if we speak about the normal gear. But, if we all use the same equipment, pay



comparable wages, taxes, etc., and pay the same prices for steel, bearings and castings, where is the difference between one and the other company? Why do some do very well and others not?

There must be a difference. Or do some have better sales guys? I doubt it. It has to have something to do with the methods we use to make these gears and the grade of specialization some companies have developed.

Specialization

During the last 10–15 years, I have noticed in Germany a very strong trend towards specialization.

All the bigger companies reduced the number of their product lines and their activities. As an example, there is a big gear manufacturer where you once could order a single gear or a tailor-made gearbox. No longer. The organization has become so specialized, it cannot handle small orders anymore. By the time you would get a quote, a smaller company would already have shipped the product, and time is money.

Instead, the company now concentrates on making large numbers of wind power gearboxes in all sizes, especially big ones. Because this business is highly fluctuating, only 50% of the company's gears are made in-house. The rest is subcontracted, but only to those who can cope with the specs—and these are tight. In doing so, the company keeps its own equipment loaded over three shifts, and the risk of fluctuation is with the small suppliers, who can handle fluctuations much better.

These wind power gearboxes become bigger and bigger. Small companies cannot jump on this business because of the high investment cost for big production machines. Internal gear cutters and grinders, machining centers for planetary gear housings, test stands and so on are just too much for a smaller company. Today, the wind power manufacturers are highly specialized; they are a closed society. You will find this trend all over. Specialization warrants the optimum use of the equipment and perfects the product.

Wind Power

Often declared dead, wind power is as alive as ever. Being the second biggest steel consumer after the automobile industry, wind power has created numerous new jobs in all areas. The German gear industry, like no other, invested very early in the research and development of this technology. Fortunately the companies were able to start with small units in the beginning, gradually increasing the size to ever-higher kilowatt output. Five years ago, a 650-kilowatt unit was standard. Today we are building gearboxes for up to 5 megawatts of power. Internal, helical planetary ring gears with 100" in diameter are in sight.

Often erected close to housing areas, wind towers, which can be more than 300' high, have to run quietly and reliably. Correspondingly, the requirements for these gearboxes are high. Every manufacturer advertises his product with the argument of having quiet running gears. His secret is the know-how to get there. But one property they all have in common: The normal, unmodified gear tooth is history. Totally new tooth geometries were developed and optimized in practical tests. And good for us machine tool builders; they cannot be produced on old machines. Sub-suppliers to the wind power industry are accepted only if they have the know-how to grind all kinds of modifications without distortion. Also, after grinding, the gears must be nitral etched for tooth burning—100%.

The Need for Education

For this very demanding new technology, we must realize how important it is to educate people on topics like gear noise, tooth load, surface finish and lubrication, just to name a few. And in this point I believe there is another difference between Europe—especially Germany—and the United States.

By tradition, German technical universities educate a high number of

graduated mechanical engineers in a very practical way.

The industry offers apprentice training over a period of 3.5 years, normally for approximately 5% of the total



number employed. This training might be complemented by further education up to various grades, including access to university studies. University and apprenticeship are cost-free to the student. The apprentice even gets a remarkable monthly payment. Unfortunately, it's still not enough.

The Outlook for Gear Manufacturing

In my opinion, there will always be gears—at least for a long, long time.

We will continue to increase their efficiency and life and try to produce perfect gear reducers needing as little maintenance as possible. Some gear applications will certainly be substituted by electrical or other alternative drives. Other applications will come into being (example: wind power).

The future of our gear industry, whether in Europe or the United States, also depends on our ability to comply with the ever-growing requirements and to accept new technologies. This won't be cheap. In fact, it will be almost impossible for the smaller companies. Education and science are prerequisite for our success. Furthermore, it will be necessary for companies to position themselves to use their best know-how, to specialize and find a niche where each one can run a

profitable business.

This could be as a specialist in large series production or as a repair business with close customer contact. It does not matter what we do as long as we specialize instead of trying to dance at every party.

In any case, we need to be prepared for meeting new competitors. The good news is, new markets are also offering new opportunities for us. Three billion people who one day want to live like we do have all kinds of needs and desires. Great things can be achieved in the building of power plants and transport systems, the providing of health care and supplying of water. However, they will be able to pay for it only if they are allowed to sell their services to us. **Headline:**

Global trade. In the beginning they pay for it with cheap labor, with manpower. Later on they will want to supply cheap mass products, including, possibly, gears.

Therefore many of our companies must get prepared for this new situation, and, if necessary, must change their manufacturing programs.

We cannot resist this pressure. We cannot withstand the attraction of low-cost products for a long time. Changes don't come easy. They are like big ships: You turn the steering wheel and nothing happens. The ship goes on straight. Only slowly will it change its direction. Therefore, if we accept what's happening, let's turn the wheel early enough to avoid any collision that could ruin our industry. 

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