U.S. Gear Industry: Doing Well, but Challenges Await

By Jack McGuinn, Senior Editor

If you are like most navigators of the printed page, the first thing you read in this final 2013 issue of *Gear Technology* was our State of the Gear Industry Survey. And who would blame you? It's not *Sabermetrics,* but once you've read it you'll have a pretty clear snapshot of last year and a peek into the next.

But if you also like to get a little closer to the bone about things, what follows are the collected opinions of five well-regarded people in the gear industry speaking to a number of issues with relevance. Our group — our "Gang of Five," let's say — includes: Joe T. Franklin, president of the American Gear Manufacturers Association; David Goodfellow, CEO of Star SU LLC; Rod Kleiss, president of Kleiss Gears; Dr. Suren Rao, longtime managing director of the Gear Research Institute; and Fred Young, CEO of Forest City Gear.

All of the above — in one capacity or another — have over the years seen quite a bit of what there is to see in the gear industry — not least of which the Great Recession, which began in 2007/2008 — and is only recently losing its grip on the economy. They've met payrolls, trained tomorrow's engineers, transcended customer expectations or directed a trade association through times good and bad. And while "Gang of Five" may at first blush remind you of a truly Red, socialistic state, is there a more patriotic, interconnected, collegial industry in these United States than the gear industry? Just one Gear Expo experience — as exhibitor or attendee — answers that question.

We start the discussion with asking the group to assign the gear industry a letter grade for 2013, excepting their own company or association performance. The open-ended question elicited some interesting reactions. Rod Kleiss gets things rolling:

"I can only speak of the plastic gear industry, and I would grade ourselves at a solid D. We as an industry are barely succeeding at bringing plastic-molded gears to their full capability in the marketplace. Hearsay and innuendo rule the day in plastic transmission application. There is very little fundamental research with legitimate scientific design of experiments."

As AGMA president, Joe Franklin does here one of the things he's paid to do: turn lemons into lemonade. And, as well — avoid doling out letter grades. But as he candidly notes here, the numbers for 2013 started well but soon went pear-shaped.

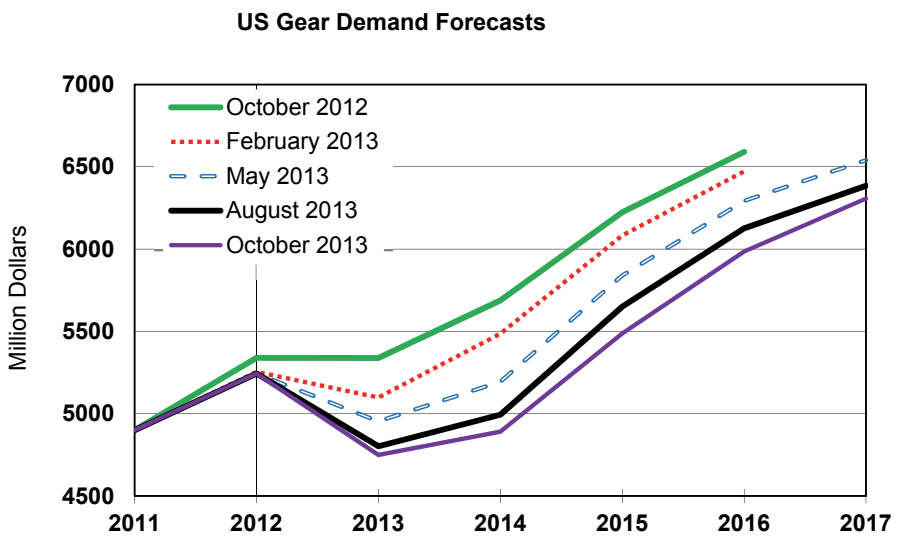
"The year 2013 began with a nice burst of energy in the industry and a forecast for modest growth over the excellent growth we saw in 2012. Unfortunately, as the year progressed we saw the overall macro economy slowed to the point that growth in the power transmission sector was revised to a loss.

"As you can see from the graph provided by AGMA's economic counsel, IHS Global Insight, from the baseline forecast in October 2012, each successive report has been more negative than the one before. Finally, this past October, (IHS's) forecast had been revised downward more than $500 million."

Here comes the lemonade.

"Fortunately, the U.S. industry is extremely resilient and well-pointed with the cyclicality that comes with being a capital goods manufacturer. So if we consider the forces within control of the companies, I would give them a high grade for being able to manage unexpected change this year, and in most years since 2008."

One who would certainly agree with Franklin's "high grade" rating is Fred Young, who gives 2013 a B+. "Some work is returning to the United States because we are regaining a better reputation for quality and reliability. At least some, if not many, U.S. gear producers have upgraded their equipment, increased inspection, and improved lead times." And David Goodfellow, adds that "While the automotive industry performed well, business was substantially down in other industries such as Wind Energy due to huge reductions of outsourcing from the OEMs. With the exception of automotive, the U.S. gear industry struggled. Grade B."



(Source: proprietary report for AGMA by IHS Global Insight)

Also bringing down the grade curve for 2013 with another solid D is Suren Rao of the Gear Research Institute. Some reading his response may think the man sounds bitter. In truth, he is angry — many would say with good reason. "(I assign) the letter grade D," says Rao. "The gear industry appears to be busy and prosperous. However, in spite of the "greying" of their workforce, their desire for educating their next generation of gear engineers—by supporting entities like the Gear Research Institute—appears to be non-existent. Yet I get a few phone calls a month from total strangers enquiring if I can recommend graduating engineers to potential, gear-related, job openings in their organizations. Ultimately, I think (the gear industry) will pay a heavy price for their reluctance to expend resources now for future human resources."

And then there's wind — or the lack of it. What once offered so much promise say, five or six years ago, seems to be losing its headwind. Wind energy is not exactly dead in the water — that would be offshore wind energy — but it is definitely slowing. And we can't keep blaming it on the never-ending political food fight over the energy tax credit, although had there been adult supervision in Washington early on, the wind picture might look decidedly different. No, blame it now on fracking, a mining process that enables much easier — and supposedly greener — access to an abundance of shale rock and the natural gas it contains. And, as mentioned — offshore wind energy continues to be a nonstarter. Witness the Cape Wind project on Cape Cod: planning begun back in *2009* and the project is still fending off opposition litigation while trying to secure financing — from a European bank, no less (Barclays).

Rao agrees wind energy is in a somewhat fallow state here — but for different reasons.

"It appears that the push in Europe for 'green' energy may be backfiring with extremely high electricity costs. Also, stories of how the bird population is being decimated by wind turbines are cropping up. With cheap natural gas (here) for the foreseeable future, my take would be that wind energy and offshore wind energy may not have a bright future in the USA."

Franklin is not optimistic over wind's future either.

"While it's impossible for me to predict the long-term future for the wind turbine industry in the United States, I believe several factors beyond this sector's control will make expansive growth quite difficult. The adoption of new technologies (fracking etc.) is allowing the production of large quantities of natural gas at very low prices. We're already seeing growth in the establishment of companies that use natural gas, for example chemical manufacturers, and those who can convert equipment to use natural gas.

"I do think there will be places where wind power is the correct answer to the problem but because of alternative sources of energy and the lack of an economic subsidy, I doubt it will be "as aggressive as many thought it would be a few years back."

Goodfellow points out that "Wind energy has dropped globally and has been hit especially hard in North America. The lack of subsidies limits the potential for growth in the U.S."

In our survey, more than 63% of respondents said their companies were experiencing a shortage of skilled labor. We asked our group what government's role should be in providing technical training for youngsters and oldsters.

"We need to partner with universities for fundamental research,which will also help us to find and train the next generation of plastics engineers," says Kleiss. "The government must help in making our universities accessible to young driven students to study engineering without incurring exorbitant debt."

"I don't believe the government alone will or could produce the skilled engineers and craftsmen this industry needs," Franklin declares. "Solving the issue of attracting talent into our industry rests first with the companies in the industry working in conjunction with schools and local, state and federal governments.

"I think we demonstrated over the past few years that no one has "the answer," and the more I talk with executives in the industry, the more I'm coming to believe that we are not asking the same question. All companies certainly don't have the same needs.

"For more than two decades, AGMA has worked to build education programs for our existing employees and others who want to come into the industry. Our staff, the AGMA Foundation and the AGMA Education Committee, work collaboratively to provide resources and funding to encourage educational institutions to teach more gearing-oriented courses.

"Working closely with professionals in the industry, we have developed a large array of education courses, seminars and workshops to help bring existing workers up to speed in a variety of technologies and manufacturing skills.

"Fortunately we have a number of newer instructors who will be bringing courses online in 2014 and we have demanding members who challenge our committees and staff to continue improving the quality and breadth of the material we teach.

"One of the most recent tools that has been created by the industry and is available on the AGMA website is a 'skills assessment tool' that allows companies in our industry to assess each worker's abilities against a standard that the company sets and then to identify and obtain resources to help their workers learn the material to master the topics they need to know to meet the requirements of the company."

Young declares, "It is absolutely critical and vital to develop a new generation of skilled workers. Currently, this issue is an impediment to our company's growth." Rao is of the opinion that "the government should stay out of it but the private sector should focus on the long term. This would have to include developing their future employees."

As we happen to have an article in this very issue on magnetic gearing, it's appropriate to ask these folks what impact they think gearless motor drives, gearboxes, etc., will have on the industry.

"For most of the applications that AGMA's members are involved in, gear-

less motors will not be a significant threat — at least not in the near term," says Franklin. "Gearless drives have different characteristics than gear drives, and therefore have a natural constituency. However, the reality is gearless drives come with their own issues, their own requirements, and a cost that far exceeds what most users are willing to pay."

For Young, gearless is a non-starter: "We have not noticed any substantial penetration with gearless motors." Goodfellow, ditto: "The wind energy sector continues the push for gearless systems. I have so far not heard it impacting the gear industry."

For Rao, there's a good backstory — and perhaps a rosy future — for gears.

"Gearless systems have made a significant impact in the marine gear business, but we may have partially come full circle. Let me explain. This industry sector has, in the last decade, made the push to 'all-electric' drives. While a substantial segment of this industry sector — especially the civilian side — has transitioned successfully to 'all electric' — the military side may be having second thoughts. Development of 'all electric' drive systems for the duty cycle a Navy combatant may encounter, within the space and weight constraints of a Navy platform, has been more difficult and more expensive than first imagined. Further, with the strategic scarcity of 'rare earths' for permanent magnet motors, I believe the Navy may be back to considering geared systems for marine propulsion. This would be good for the gear business."

One last topic before we close: customer expectations — perhaps the two most dreaded words in a manufacturer's lexicon. And then, of course, the manufacturer must *exceeeeed* those expectations — assuming they are even realistic. It must be quite the tap dance when a customer is demanding something that is — in this physical world, at any rate — impossible to do, and the manufacturer must somehow break the news to him gently. How does that work without losing the sale, if not the customer?

"There is a degree of tough love that must be part of any customer relation, but in the science of plastic gears, with so many unknowns, I think it is most valuable to share our insights and our uncertainties," says Kleiss. "We may know what won't work, but quite often we can't really say what just might work. The challenge is to maximize the cost-effectiveness of that search, which is really an exciting challenge."

From a trade association's perspective:

"Customers of our industry's products — gearing and mechanical power transmission — are quite different from someone who walks into a retail store, looks at four items that are essentially the same differentiated by clever packaging, price and possibly some of the ingredients," Franklin explains. "Our members and others producers in the industry predominantly respond to requests for custom products that require skilled engineering and precise manufacturing.

"All manufactures value their customers; however, at times customer demands may outweigh the business advantage of keeping them. It is important for manufacturers to convince their key customers that they are in fact offering a competitive price and a competitive product. (Assuming they are.)

"One way to help customers understand the value that you bring to their products is to make sure that (the customer's) engineers are involved in the process and are able to see the value that your staff and manufacturing brings not only to your component but to the final product.

"Of course closer relationships ultimately result in better partnerships and better solutions to common problems. However, some customers have discovered it is possible to go too far, to demand too much, to push too hard and to end up with few or no high-quality suppliers.

"Good manufacturers understand that demanding customers make them better. Demanding customers force the manufacturers to keep their technology up-to-date, to keep their staff educated and well-trained, and to in turn seek the best from their suppliers. Engagement of the full supply chain helps ensure that the final product will better serve all of us."

For Rao, it might be even tougher. His "customers" are actually clients; i.e., usually corporation types with almost boss-like project authority. "It is hard to avoid the 'customer is always right' situation, even in the contract research business. We always encounter unrealistic time and cost situations with our customers. However, any 'hard-nosed' push back would result in a loss of business. Working with the sponsor and providing absolute transparency in both expenditures and technical progress always appears to resolve the situation."

At Forest City Gear, "Many of us are adopting lean manufacturing and updating our equipment to meet the demands of cheaper and faster," says Young. "We do continually point out that a lengthy supply chain — India, China, Europe — could put them out of business if it fails. We remind them of the threat of piracy by companies with fewer scruples. We also remind them that cheaper and faster does not include payment in 90 – 250 days."

Goodfellow might consider a cranky customer as just another opportunity. "In the marketplace today, customers have outsourced capability they have traditionally had in-house to support product and engineering. We see an opportunity to supply these services as an added value proposition at a reasonable cost."

We end with affording those in the group interested in making some final comments.

Kleiss: "I love working with plastic molded technology because it is truly an infant science with unexplored possibilities. For many years my company struggled just to make the slightest headway in this new world. We have enough traction now that good engineers are agreeing to try designs and parts in applications we think promising. The questions above are really quite pertinent. For us to be successful in the long run, we will need the next generation of engineers. We will also need more fundamental research that should be within the framework of an interconnected university system. We need to keep truly open channels of communication with our customers so that we all learn the proper lessons and succeed with knowledge rather than dumb luck."

Young: "Most customers have no way to inspect the gears and splines they purchase and accept them if they are functional and meet the size they can document. Unfortunately, this may not satisfy the quality, longevity and advanced technology that will keep them competitive in global competition.

"We recommend that everyone verify that what they purchase actually meets all of their specifications even if they have to send it to an independent service for verification. We find many gears and splines may function but not meet the quality. As an example, I believe a majority of the splines manufactured here would not meet ANSI standards for involute profile lead and index variation. Most manufacturers use composite gages which accept deviant parts. This is a dangerous shortcut that is harmful in the long the run."

And from Suren Rao: who knew?

"I cannot vouch that this is happening, but I have anecdotally observed, in the last few years, a very disturbing trend in the U.S. automotive gear industry. The 'Big Three' shed a lot of gear engineers during the last downturn (2008). However, when they came back, instead of refilling their ranks they have decided to seek gear design and manufacturing process expertise from Europe. While the manufacturing plants in the U.S. are churning out transmissions, these are being increasingly designed in Europe and even the processing is being duplicated from the Europeans. If this is true, it is a very troubling scenario for the U.S. gear industry, especially for the U.S.-based suppliers of process technology, gear manufacturing tooling, and other hardware. I wish the U.S. automotive industry would reconsider this approach."

And the very last word goes to Mr. Kleiss:

"It's always a challenge, isn't it?"

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