

Looming Large

What Will the Big Gear Market Offer in 2016 and Beyond?

Matthew Jaster, Senior Editor

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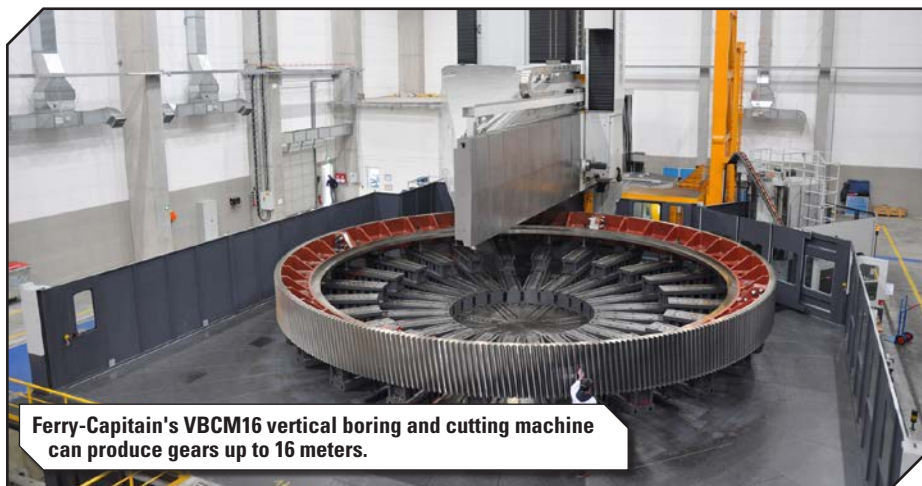
Let's talk about large gears. Not the size or scope or inspection process (we've covered all of these things here: www.geartechnology.com/subjects/big+gears/), but the forecast and market potential in areas that utilize these massive components. We'll examine key industry segments like energy and mining and tap IHS Economics for a forecast for 2016 and 2017 (spoiler alert: it's not great). Additionally, we'll discuss some of the critical factors influencing global big gear manufacturers Ferry-Capitain and Hofmann Engineering.

Ferry-Capitain Enhances Materials for Mining and Cement Applications

Ferry-Capitain Industries, LLC provides sales support and representation in North America for European manufacturers Ferry-Capitain and CMD. The company is able to offer packages (girth gears, drive pinions, couplings and speed reducers) for kilns, grinding mills and other custom applications. *Gear Technology* recently interviewed Christian Duquenne, vice president of sales and marketing at Ferry-Capitain, to discuss the current trends in the big gear market.

GT: What will be the greatest challenges regarding large gear manufacturing in 2016?

FC: From a commercial perspective, an expected continued low level of new project work is likely to result in continued pricing pressure. Within this context, an emphasis on replacement project work is in order. From a technical perspective, the trend to increase installed power on grinding mills in the mining industry is expected to continue. Whereas a few years ago a 7,000 kW per pinion power requirement was considered "high," we are seeing more inquiries for per-pinion installed power in the range of 9,000-10,000 kW, some of which have materialized into orders. The key in meeting this particular challenge is the development of materials having the requisite mechanical properties that exceed those available just a few years ago, which can allow us to maintain a practical dimensional envelope—in terms of face width and web width—for the large gears.



Ferry-Capitain's VBCM16 vertical boring and cutting machine can produce gears up to 16 meters.

GT: Will your company be investing in new equipment and new technologies in the next 12 months?

FC: We have made significant investments during the past several years in major gear machining equipment to improve capability and capacity. Since the commissioning in 2013 of our VBCM16 vertical boring and cutting machine that can produce gears with very high accuracy to 16 m (52.5 ft.) diameter, we have added complementary equipment for the turning and cutting of a smaller range of gear sizes. We are now turning our attention to upgrading some QC-related equipment for large gears, in particular the fixturing for performing roll checks, as this is a critical verification step to ensure that the tooth forms measured in the factory will translate to proper contact and power transmission in the field.

GT: What key industries will be the focal point for your organization moving forward?

FC: The mining and cement industries have been, and will continue

to be, the focal point for our open gearing production for many years. We have seen a few "specialty" applications requiring large diameter gears during the past several years, but these are relatively few in number.

GT: Any new opportunities in rebuilds?

FC: With a decrease of new project work in our target industries during the past few years, the percentage of replacement gearing has increased proportionally. What used to be about a 60 (new): 40 (replacement) split, is now almost reversed and closer to 40 (new): 60 (replacement), although at a lower level of overall activity. We expect this to be maintained through 2016 and possibly into 2017.

GT: How is your service and support team evolving in the large gear market?

FC: While the majority of the emphasis has been in providing installation and commissioning supervision services, we have become more involved in providing field

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The trend in the large gears is to increase installed power on grinding mills in the mining industry.

measurement services for the replacement of older equipment for which the original design information may not be readily available. This type of work requires a different skill set than for installation supervision, and we are increasing our existing capabilities in this area.

GT: What bottlenecks are you seeing in the large gear market and how are these bottlenecks affecting your business?

FC: Whether this can be termed a bottleneck or not, there has been a lag in acceptance of new material grades and some inconsistency in gear rating standard specification by some customers. We are hopeful that the recently published *AGMA 6014-B15 (Gear Power Rating for Cylindrical Shell and Trunnion Supported Equipment)*, the latest revision to which Ferry-Capitan was a key contributor, will serve to alleviate some of these inconsistencies and will serve as the “standard” for many years to come. One other issue that may be considered a bottleneck is the time taken by some customers to execute orders for replacement gearing, sometimes waiting until their existing gearing has deteriorated to a critical state. The end result is expedited deliveries and typically higher cost to the end-user.

GT: What are the significant challenges regarding materials for large gear manufacturing?

FC: With a constant progression in installed mill power in the mining industry over the past decade, we have been able to follow this trend through the development of

cast steel and ductile iron grades having improved material properties. With our proprietary FerryNod ductile iron material grades, we are able to guarantee a minimum hardness of 340 BHN (higher hardness = higher power). We can also guarantee the same minimum 340 BHN hardness for our cast alloy steel material, and may soon increase this to 350 BHN. As grinding mill power increases, not only does material hardness have to increase, but so does the gear tooth size, and thus the outer rim thickness (which is typically 5x module). By using cast gear blanks produced in our foundry facilities, the availability of high hardness rim material having a thickness in excess of 200 mm is not an issue for us.

For more information:

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What Economic Rebound?

The word “rebound” seems to pop up, disappear and then reappear without rhyme or reason. You’ve heard all the doom and gloom lately (China is shutting down, Latin America is bottoming out and the U.S. stock market had a very bad January) But what does it all mean? It means that a significant economic rebound in manufacturing isn’t happening any time soon, according to Tom Runiewicz, senior principal economist at IHS Economics, US and World Industry Service.

“By my numbers, a lot of people in the industrial sector are starting to change their 2016 and 2017 forecasts,” he said. “Overall, many analysts may end up

downgrading their forecasts across the board. It’s not a happy situation right now and when you look at areas like heavy industry (mining, agriculture and construction machinery); there are not a lot of reasons to be optimistic.”

Runiewicz believes three factors are contributing to this. “A strong U.S. dollar, a collapsing energy market and an inventory build-up that needs to be corrected sooner rather than later,” he said. “The United States has a real niche in the global market, especially when you’re talking about big industrial equipment. Unfortunately, heavy industrial sectors are still getting hit really hard.”

This economic uncertainty leaves manufacturers at a crossroad of sorts. Many won’t be making significant machine investments until things start picking up. “You’re going to see a lot of manufacturers simply trying to keep their heads above water if they’re working in areas like mining, agriculture and construction machinery. U.S. manufacturers in these areas won’t invest in new equipment and technologies until they see a stronger demand for new products from their customers,” Runiewicz added. “It’s also going to be a struggle to hold on to gear market shares right here in our own backyard as countries like Germany, Italy and China continue to send gears over to North America.”

But like any market analysis, it’s not all doom and gloom. Some specific segments are starting to gain a little bit of traction. “Areas like wind, cement, pharmaceuticals are picking up and automotive and aerospace are still doing quite well. There are opportunities if you’re paying close attention to certain markets.”

He expects energy and gas prices to start turning around this year “It’s going to be slow going but we’ll start seeing more activity in energy by the end of 2016.”

But overall, we won’t see anything remarkably close to an economic rebound in the foreseeable future. “Manufacturing grew slightly in 2014 (2.8 percent), a little less in 2015 (2.3 percent) and I’m forecasting only a 1.5 percent growth this year,” Runiewicz added. “I still may drop that number to one percent before all is said and done.”

For more information:

IHS Global
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www.ihs.com

Market Watch: Wind Energy

With the multi-year extension of the wind energy Production Tax Credit (PTC) and Investment Tax Credit (ITC), Congress recently secured stability for 73,000 American wind industry workers across all 50 states and private investors helping to grow American wind power, according to the AWEA.

"We're going to keep this American wind power success story going," said Tom Kiernan, CEO of the American Wind Energy Association (AWEA) in a recent press release. "With predictable policies now in place, we will continue advancing wind turbine technology, driving down our costs and passing the savings on to American families and businesses in all corners of the country. We look forward to building a future with more affordable, reliable, clean wind energy."

The rules will allow wind projects to qualify so long as they start construction before the end of the period. Industry leaders and others reacted to the news favorably, saying the multi-year extension supplies their companies with a level of predictability needed to keep U.S. factories open while adding new wind projects to the pipeline:

"Having PTCs for five years will allow us to make more supply commitments and build more projects, creating more jobs. It also allows us to work with the turbine vendors to lower the cost of our projects and minimize the economic impact of phasing down of the credits," said Mike

Garland, CEO of Pattern Energy and chairman of the board for AWEA.

"The PTC has encouraged tremendous investment in wind energy, helping to reduce the cost of wind power while simultaneously creating a new American industry. This extension will bolster the continued growth of domestic wind energy and the jobs this growing industry supports, allowing our factories to plan for the future as we continue to deliver innovation that drives down the cost of wind power," said

Jacob Andersen, CEO, Siemens Onshore Americas in a recent statement.

The performance-based PTC has helped to more than quadruple wind power in the U.S. since 2008 — up from 16,702 megawatts (MW) installed at the start of 2008 to 69,470 MW by the third quarter of 2015. This is enough power to supply over 18 million American homes. The PTC has helped spur innovation in wind turbine technology, causing wind's costs to fall 66 percent in just six years. The multi-year predictability will



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help continue that trend and break the repeated boom-bust cycles the U.S. wind energy industry has weathered through two decades of uncertain tax policies.

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Market Watch: Mining

Investor pressure in the mining sector is substantial and unlikely to ease in coming months as the focus remains on protecting returns and financial strength rather than gearing-up for higher commodity prices. The longer the mining sector remains stuck in stalemate, the greater the effect on the pipeline flow of both greenfield and brownfield projects and the greater the implications for market balances and metal prices in the coming years, this according to Bruce Always, base metals mining manager at GFMS team at Thomson Reuters.

In the company's annual GFMS Base Metals Review and Outlook (October 2015), one statistic jumped out over all others: The top ten miners have a combined market value just over \$280 billion, which is roughly half of what it was 12 months earlier. What a difference one year makes. Rock bottom is an understatement. Currently, economists are beginning to look at potential turning points. In terms of recovery, 2016 appears to be a year where nickel is finally moving in the right direction and question marks will remain regarding aluminum, lead and zinc. All in all, it will be a few more years before anyone involved in mining or mining machinery has anything to get excited about.

For more information:
Thomson Reuters
Phone: (646) 223-4000
www.thomsonreuters.com

Hofmann Engineering Looks to Reduce Manufacturing Costs and Lead Times

Hofmann Engineering (HE) has provided specialist engineering in Australia since 1969. The company serves a broad spectrum of industries for steel gearing including cement, fertilizer, iron-ore, copper and any process where grinding mill comminution is employed. Hofmann acquired the Falk Australia facility in Newcastle. This 5,000 square meter facility manufactures components up to 14 meters. Holger Fritz, product manager mill gearing and Stephen Hooper, mill gearing engineer, recently discussed big gears with *Gear Technology*.

GT: What will be the greatest challenges regarding large gear manufacturing in 2016?

HE: 2016 is sure to be a very challenging year for large gears including retaining market share and remaining a viable business unit while new mining projects are few and far between.

GT: Will your company be investing in new equipment and new technologies in the next 12 months?

HE: The major difference in our investment strategy compared to the boom years is that, while there is an overcapacity for the manufacturing of large gears, we will look at innovations that

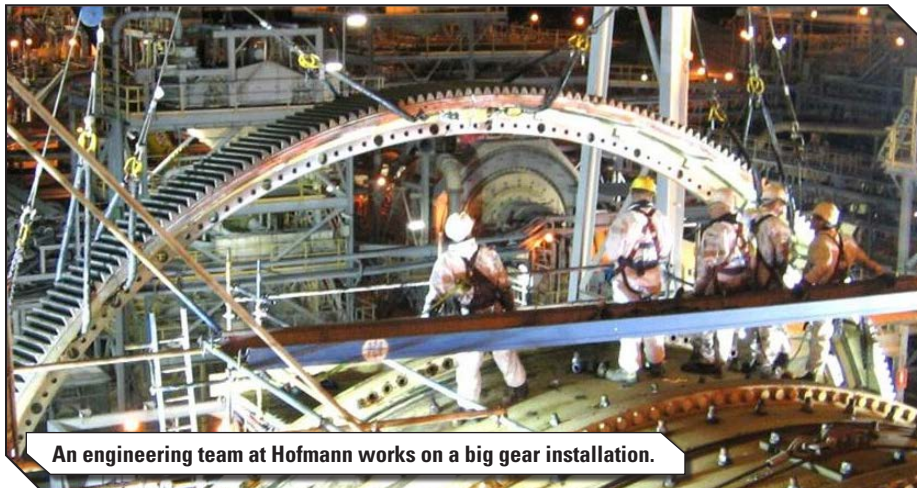


The top ten miners have a combined market value of \$280 billion, roughly half of what it was 12 months ago, according to Thomson Reuters.

reduce manufacturing cost and lead time. We recently designed, built and installed more flexible tooling for the large gear cutting machines that drastically reduces set up time and allows us to go from large diameter gears to much smaller gears with minimum effort. Hofmann Engineering will also continue to invest time and effort in cutting tools. Last year, we tested the most advanced cutting inserts with great results in terms of cycle time reduction for our roughing process. When cutting times are fairly long, as is the case with large diameter gears, any percentage reduction in cycle time results in a significant savings. Additionally, in the site service area, we have purchased a number of portable CMM measuring machines as well as invested in the latest scanning technology to accurately measure large components, in-situ, with minimum disruption to the operation.

GT: What key industries will be the focal point for your organization moving forward?

HE: Hofmann forged steel gearing has always done well in precious metals like gold, where high power and reliability are critical to the application and any unscheduled downtime results in the loss of thousands of ounces. One of the most interesting trends from 2014 and 2015 is the move in orders destined for the aftermarket. Mill gearing orders for 2012-2013 at Hofmann were about 33 percent new projects and 67 percent aftermarket. In 2014-2015, new project orders declined to nine percent and aftermarket orders climbed to 91 percent. This illustrates how important the aftermarket for open gearing has become



An engineering team at Hofmann works on a big gear installation.

since the end of the mining boom, and we believe 2016 is likely to remain the same.

GT: Any new opportunities in rebuilds?

HE: We have seen a few rebuilds come back to the factory, but this is only a small proportion of the total while the overwhelming majority of orders in 2015 were for new gears and pinions. Hofmann does offer an in-situ gear refurbishment that has been popular in 2015. This process involves creating a good contact pattern between a worn gear and a new precision ground pinion by slowly restoring the gear tooth without removing the gear from the mill.

GT: What bottlenecks are you seeing in the large gear market and how are these bottlenecks affecting your business?

HE: Cash, cash, cash. From the mine operators to the OEMs, everybody is trying to conserve cash, and the reasons are obvious. Commodities prices continue to slide, putting pressure on all aspects of mining and processing, particularly new projects.

GT: What are the significant challenges regarding materials for large gear manufacturing?

HE: There are several issues facing the materials that large gear manufacturers utilize. The trend for higher power mills will continue, and this will inevitably place higher demands on the gear material in terms of strength, hardness and toughness. On the other hand, in the aftermarket, the design of the gear sets cannot be altered, and if a mill operator has no desire to increase power, then offering higher hardness and strength is not necessarily an advantage, especially if it comes at a higher cost. A key factor here is selecting material that meets customer requirements, is available on short lead times and allows ease of manufacture so that the benefits can be passed on to our customers.

GT: How is your customer base



changing in this volatile market today?

HE: The technical requirements of our customers have not changed significantly, but the price sensitivity has changed dramatically. Customers are demanding the lowest price to the highest quality levels in the best possible lead times and they are in a strong position to negotiate. ⚙️

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