

# Sourcing Gears and Gear-Related Products? Check Your TCO

## Total Cost of Ownership Shows that Reshoring Can Be Good for the Gear Industry

Harry Moser

Reshoring offers an opportunity for increased domestic gear production. Reshoring is growing at a steady pace in most industries, and is particularly strong in the gear intensive industries such as automotive, aerospace and construction equipment (Table 1). This article provides background on the overall trend and tools for the gear buyer and the gear producer to make the offshore vs. domestic decision. The same logic and tools apply to all countries. Many companies are adopting a localization strategy, producing locally most of what is consumed in each country or region. So, for international readers, the recent U.S. experience is a model that can be adopted locally.

The Reshoring Initiative presented to the AGMA and ABMA Annual Meeting on May 1, 2015, and administered a poll asking attendees: "In the past 3 years have you or your customers relocated jobs back to North America?" Fifty-four percent of attendees replied "Yes." We have not seen such a high response in any other of the hundreds of industry groups we have addressed. The positive response is highly relevant to the Initiative's primary goal: to eliminate the U.S. manufactured goods trade deficit of \$500 to \$600 billion/year.

AGMA provided a spreadsheet prepared by IHS Economics from data supplied by AGMA, the U.S. Census Bureau and U.S. government foreign trade data. We concluded that in 2014 domestic gear production, excluding automotive gears, equaled about 70% of the domestic consumption of gears. Balancing the U.S. trade deficit in gears would increase domestic gear production by approximately 50%.

Table 1 Reshored Jobs and Company Numbers by Industry		
INDUSTRY	JOB	COMPANIES
Transportation Equipment	13823	33
Electrical Equipment, Appliances, Components	9240	58
Computer/Electronic Products	3483	25
Machinery	2860	20
Apparel/Textiles	2154	46
Fabricated Metal Products	1721	39
Food	1628	9
Wood Products	1028	18
Medical Equipment	738	17
Hobbies	723	29
Construction	577	4
Plastic/Rubber Products	470	16
Castings	57	8
Non-Metallic Mineral Products	12	1
Primary Metal Products	0	5
Chemicals & Energy	0	1 each
Other: Agriculture, Environmental, Tools, Research & Services, Home & Kitchen, Office	1016	24

Source: Reshoring Initiative Library published case studies as of 12/31/14

### Background and Drivers of the Trend

In 2014 more than 60,000 manufacturing jobs were brought to the United States by reshoring and foreign direct investment (FDI) combined, representing a 400 percent increase since the height of the offshoring trend around 2003, and the first net positive job number in decades (Table 2).

Overall there are three main drivers of the reshoring trend. First are rising offshore wage rates. Second is an increased recognition of the previously ignored costs, risks and strategic impacts of offshoring. This recognition is enabled by the use of the refined metrics of total cost of ownership (TCO) to quantify these factors. Third is a reduction of costs through sustainable strategies such

as design for manufacturability, innovation, automation and lean.

Using TCO is the first step a company should take when evaluating sourcing options. TCO is defined as the total of all relevant costs associated with making or sourcing a product domestically or offshore. TCO includes current period costs and best estimates of relevant future costs, risks and strategic impacts. TCO analysis helps companies objectively quantify, forecast and minimize total cost. It takes into account transportation costs, travel expense and time, carrying cost of inventory, warranty, IP loss, impact on product innovation, and many other factors such as those associated with the risk of supply chain shocks or disruptions caused by natural disasters, political unrest and dock slow-

Table 2 The Bleeding Has Stopped			
Manufacturing Jobs/Year			
	2003	2014	% Change
New Offshoring	~150,000*	30,000- 50,000*	-70%
New Reshoring & FDI	12,000*	60,000**	+ 400%
Net Jobs Gained	~140,000	~+10,000	N/A

\* Estimated \*\* Calculated

# DO YOU REALLY KNOW

The Hardinge Grinding Group consists of six brands of products offering you the following grinding solutions:

- Universal OD / ID
- Production OD / ID
- Surface, Profile & Creep feed
- CNC Jig

KELLENBERGER



HAUSER



USACH



JONES & SHIPMAN



TSCHUDIN



VOUMARD



**HARDINGE GRINDING GROUP**

KELLENBERGER • JONES & SHIPMAN  
HAUSER • TSCHUDIN • USACH • VOUMARD



**POWERFUL CONNECTIONS**  
OCTOBER 20-22, 2015 DETROIT, MI COBO CENTER

**STOP BY BOOTH # 2317**

[www.HardingeGrindingGroup.com](http://www.HardingeGrindingGroup.com) • 800-843-8801



downs. It also helps to forecast the future impact of wage and currency changes.

Much of companies' efforts to deal with complex global supply chains is eliminated or drastically reduced by reshoring. Longer-term forecasting, monitoring of suppliers and regulatory compliance offshore is found to be waste when measured against the use of proven, local suppliers.

The not-for-profit Reshoring Initiative offers the free TCO Estimator, available on [reshorennow.org](http://reshorennow.org). The initiative offers many resources to help companies make sourcing decisions (Table 3). Reshoring tools can also be used by gear salesmen to convince customers of the benefit of sourcing domestically, especially for custom gears.

Below are some examples of gear makers who have chosen U.S. production or sourcing over offshore.

- Bison Gear and Engineering Corp. moved production of electric motors and gears from China to St. Charles, IL, creating 10 jobs.
  - Reasons: Cost, quality, lead time and lean manufacturing
- Pequea Machine Inc. brought produc-

**Table 3 Resources available to readers**

- Calculate TCO with the Total Cost of Ownership Estimator, a free online tool to help evaluate sourcing alternatives and to make a case when selling against offshore competitors ([www.reshorennow.org/tco-estimator/](http://www.reshorennow.org/tco-estimator/)).
- Watch an in-depth webinar on reshoring and TCO ([www.youtube.com/watch?v=uAh7FBZu2xA](http://www.youtube.com/watch?v=uAh7FBZu2xA)).
- Visit our Reshoring Library ([www.reshorennow.org/library/](http://www.reshorennow.org/library/)), which contains 2,400+ linked articles on reshoring. Data from these articles can be accessed and sorted through the advanced search function.
- Have a story to tell? Submit your reshoring success story on our Case Studies feature ([www.reshorennow.org/case-studies/](http://www.reshorennow.org/case-studies/)). All valid cases will be posted, and we will send the submitter a *Manufacturing is Cool* T-shirt -Made in USA of U.S. cotton.
- Use our Economic Development Program to strengthen your region by replacing imports with local production (<http://reshorennow.blogspot.com/2014/12/reshoring-initiatives-economic.html>).
- See our Blog for recommendations on skilled workforce development in your area (<http://reshorennow.blogspot.com/2014/02/the-reshoring-initiative-offers-skilled.html>).
- We also track reshoring and nearshoring in Mexico and Canada and cooperate with many other countries in their efforts to be more self-sufficient.

tion from China to the U.S., bringing contract work to Buck Co. (PA foundry) and Circle Gear (IL machine shop), and creating up to 20 new future jobs (Ref. 1).

- Reasons: Quality (25% of gear boxes from China failed due to substandard metals used); equivalent price (cost was about \$900 to produce gearboxes in the United States, and between \$800-\$900 in China); Total cost

- ZF Group, a Supplier for Chrysler, brought production from Germany to Gray Court, SC and Detroit, bringing 1,650 jobs in South Carolina, and

some additional jobs in Michigan. ZF originally began building gearboxes for wind turbines in Gainesville, GA with a \$98 million investment, adding 250 jobs.

- Reasons: Time to market, proximity to market

- Metem Corp., which makes gas turbines and aerospace industry products, is expanding its Parsippany, NJ plant over plants in Pennsylvania and Hungary. Metem's CEO on the company's growth: "One of the great things about gas turbines is that the U.S. really has a leadership position in that technology. We are seeing our custom-

## No Money for Capital Equipment Purchases? NO PROBLEM! Let Pentagear REPOWER your Gear Inspection Machines Today!



The advertisement features a man in a light blue shirt and tie, gesturing with his hands. In the center, there are three interlocking gears above the word "REPOWERED" and a small Pentagear logo. To the right is a blue brain. A large blue arrow curves from the man to the brain. Below the man is the text "Same Basic Body..." and below the brain is "New Smarter Brain!". At the bottom, it says "We Put The Smart Stuff Inside!".

### REPOWERED BY Pentagear

- Analytical Inspection Machine
- Roll Testers
- Single Flank
- DOB Inspection Gauges
- Deburr Machines



6161 Webster St. Dayton, OH  
Tel: 937-660-8182 Sales@Pentagear.com  
Fax: 937-660-4521 [www.gearinspection.com](http://www.gearinspection.com)

# THINK INSIDE THE BOX... AND YOU'LL SEE ALL **WE** CAN DO!



**GMTA** brings a wide variety of high quality machine tools for component production, plus laser welding technology, robotics, advanced automation, and tooling to your door, backed by application engineering, onsite commissioning, local service and after-sale support. We're not all things to all people, but we're getting closer, every day.

What this means to your production is actually quite simple...a single source, with all its advantages, those productive and those financial, who can solve your output and workflow challenges, because they've seen and solved similar ones for many companies like yours.

Whether your end product requires multiple machining steps, laser welding, pre- and post-cleaning, robotic materials handling, special part articulation or other functional operations, look to a leading integrator of machining systems for the automotive, off-highway, energy and heavy equipment sectors. You only need to remember four letters... **GMTA**.

**Call Scott Knoy  
today for all  
the details.**

**734-973-7800**

See our  
machines  
in action!





ers bring turbine manufacturing back to the U.S. from other parts of the world.”

- Reasons: Highly skilled workers, access to universities, advanced manufacturing

## Conclusion

The Reshoring Initiative publishes data (Ref. 3) annually to show that the current trend in manufacturing for the United States market is to source domestically. With 3–4 million manufacturing jobs still offshore, we see huge potential for even more growth and hope this data will motivate more companies to reevaluate their sourcing and site selection decisions. Making better-informed decisions through the use of TCO and gaining a competitive advantage through sustainable strategies will enable U.S. companies to locate more manufacturing closer to home and strengthen the U.S. economy.

We would like to build on the reshoring momentum achieved at the AGMA meeting. We have outlined (Table 3) our tools and programs that you can use. The best way to accelerate the trend is

to document and promote the successful cases. Therefore, we especially encourage you to report the cases where you reshored, where you directly replaced an imported gear source or where your customer brought back product assembly and sourced gears from you. Reports can be made on our Case Studies feature. The resulting PDFs will be posted on the Reshoring Initiative website, and you can post on your site. Case submitters also receive a *Manufacturing is Cool* T-shirt, made in the USA of U.S. cotton.

## References

1. [www.themadeinamericamovement.com/uncategorized/pequea-machine-joins-the-reshoring-movement-reshores-part-production-for-better-quality/](http://www.themadeinamericamovement.com/uncategorized/pequea-machine-joins-the-reshoring-movement-reshores-part-production-for-better-quality/).
2. [www.njbiz.com/article/20130130/NJBIZ01/130139989/Manufacturers-expansion-in-Parsippany-expected-to-create-jobs-CEO-says](http://www.njbiz.com/article/20130130/NJBIZ01/130139989/Manufacturers-expansion-in-Parsippany-expected-to-create-jobs-CEO-says).
3. [www.reshorennow.org/content/pdf/2014\\_Data\\_Summary.pdf](http://www.reshorennow.org/content/pdf/2014_Data_Summary.pdf).

**Harry Moser** founded the Reshoring Initiative to bring manufacturing jobs back to the United States after working for GF AgieCharmilles, starting as President in 1985 and retiring at the end of 2010 as Chairman Emeritus. Previously he worked for Disamatic U.S. for six years. Largely due to the success of the Reshoring Initiative, Harry was inducted into the Industry Week Manufacturing Hall of Fame 2010 and was named Quality Magazine's Quality Professional of the Year for 2012. Moser participated actively in President Obama's January 2012 Insourcing Forum at the White House, won the January 2013 The Economist debate on outsourcing and offshoring, and received the Manufacturing Leadership Council's Industry Advocacy Award in 2014. He received a bachelor's degree in mechanical engineering and a master's degree in engineering from MIT in 1967, and he earned an MBA from the University of Chicago in 1981.



For Related Articles Search

sourcing

at [www.geartechnology.com](http://www.geartechnology.com)

# EXCEL-LENCE AT WORK

## EXCEL CNC RETROFITS – SMART MOVE!

**Your best investment.** We're now restoring outdated gear machines to like-new condition – and saving our customers thousands of dollars vs. a new machine purchase. With our exceptional engineering and in-house machining and grinding capabilities, EXCEL is the 'perfect fit' for CNC retrofits.

*Circa '80s shaper and hobber recently retrofit with powerful new FANUC CNC for a major aerospace manufacturer.*



**Ready to Excel? Contact:**



**A DIVISION OF EXCEL GEAR**

**815.270.1004 / [www.excelgear.com](http://www.excelgear.com)**