

# Pacific Rim Gives Stiff Competition To U.S. Gear Producers

Joe Arvin

**T**his past fall, I had the opportunity to travel to Japan, Korea, Taiwan, and Singapore to witness first-hand the status of the power transmission and machine tool industries in these areas. Points of interest included equipment, material handling, computerization, wage and tax structures, inventory controls, and workforce attitude.

On this year's tour, I was accompanied by 24 other gear industry managers, government personnel, and people affiliated with the INFAC program. During our 17-day trip, we visited several manufacturers of loose gears, power transmission components, and machine tools, and gear training and research institutes.

## Their Facilities

This trip was my third visit to the Orient. In view of what I had seen on my last visit in 1985, industry in these areas has experienced vigorous growth and has instituted massive reinvestment. We continually saw facilities equipped with the latest CNC equipment. Many companies were reporting sales

that have doubled or even tripled in the last ten years.

For example, when I first visited the Kohara Gear Industry Company of Japan nine years ago, their facility and equipment could best be described as modest. On this trip, I found that they have doubled in size and have recently added a second location. They are now equipped with the latest machine tools and are doing CBN and diamond grinding of spur gears. They also have a Gleason Phoenix cutter and grinder on order. For any gear company to double its size in nine years is remarkable.

Another example of the growth rate of Pacific Rim manufacturers is Okubo Gear Company, also of Japan. Okubo has tripled in size since 1979 and now has a total land package of 13.8 acres with 5.9 acres of buildings combined in two locations. Considering the scarcity and high cost of land in Japan, the extent of their growth and reinvestment is quite evident.

A final example of the industrial growth in these areas is Tong Il, a Korean manufacturer of power transmis-



## VIEWPOINT

sion components and machine tools. In 1985, Tong Il was operating as a producer of transmissions and axles for automotive applications, and they were also just beginning to expand their product to include machine tools. With sales of \$60 million, they were projecting 1990 sales of \$253 million. Actual sales for last year were \$430 million. They had underestimated sales by \$177 million. We saw hundreds of Tong Il machines throughout Korea and Taiwan.

In terms of technology, the facilities we saw were as good or better than those of most gear companies in the U.S. They are no longer operating with just a few pieces of high precision equipment. In addition, the majority of the companies reported that substantial percentages of their annual sales were be-

ing allocated to research and development.

The remarkable growth of these companies was not the only change we saw. Other, more subtle changes were taking place as well.

While the participative approach made famous by Asian management in the 70s and 80s is still in use, there is less reliance on it now. The changing attitudes of the Asian workforce - which I will address later - may account for this change.

In the majority of the plants

## Joe Arvin

*is the President of Arrow Gear Co., Downers Grove, IL. Over the last nine years he has conducted industry informational tours to gear manufacturing countries around the world.*

we visited, we saw extensive use of automated machine loading and material handling. We also saw that in most cases, operators were running several machines at one time.

While their equipment, technology, and (in most cases) housekeeping were quite impressive, we did see much less concern for operator safety than most of us are used to. In some plants we saw operators lifting heavy objects and people working around machines without safety glasses. In one plant we even saw operators wearing sandals in a work area with chips on the floor.

Throughout the 1980s, American industry was presented with numerous articles, books, and seminars which extolled the virtues of JIT (Just In Time) manufacturing. During our plant tours, we were able to see JIT in its "truest form". We saw thousands of finished goods waiting for shipment - not quite the 2-1/2 hour inventory we had heard so much about.

#### **Their People**

To better explain the characteristics of the Asian workforce, let me first mention the order in which the countries that we visited rank in terms of industrial development. First is Japan, followed in descending order by Korea, Taiwan, and Singapore. Wages in these countries are directly proportional to their status in this hierarchy. Hourly wages in Japan are \$13-14; in Korea, \$7-8; in Taiwan, \$4-5; and in

Singapore, \$3-3.50. These countries experience an average unemployment rate of only 2%.

An interesting note on wages is that on my last visit to Korea in 1985, the average hourly wage was around \$4-5. The current average of \$7-8 is a substantial increase in just five years - a clear indicator of vigorous growth.

The work ethic of the Asian workforce remains very interesting. Traditionally, Asian workers have a sense of duty to their company. Peer pressure to achieve peak productivity and avoid being a "disgrace" to the company is intense. This level of dedication seemed apparent in the plants we visited. In more than one instance, we saw operators running from machine to machine. But this ethic may be changing.

Each of our technical visits would end in a question and answer session with company personnel. During these sessions, we asked this particular question: "Of the following, what do you feel is your number one problem?"

- Lack of sufficient capital;
- Personnel problems;
- Adequate engineering support to produce quality products that would be competitive in the world market."

Surprisingly each company's response was the same. "Personnel problems" were their number one concern.

After further explanation, it appeared that employees are starting to refuse overtime and prefer a 40-hour work week. One can specu-

late that this is because workers are starting to accumulate more disposable income, and they want more free time to spend it. Some managers also told us that their workers are becoming more "belligerent". Some of us felt that it was not necessarily belligerence, but rather that their workers were becoming more "westernized". Perhaps this is an inevitable side-effect of their industrial growth.

#### **Training**

As in earlier trips, I was impressed with the amount of training being done at these facilities. Training is just

ties - Philips Government Training Centre and Precision Engineering Institute (PEI). While PEI is larger than Philips, both facilities operate for the same purpose - to train young people in precision engineering and machining skills.

Both facilities offer two-year programs. In the first year, students learn basic machining techniques. In the second year, their studies involve computerized machining (CAD-CAM), where they acquire classroom and hands-on experience in the operation and programming of CNC machine tools. Their

## **VIEWPOINT**

**Asian workers are becoming more Westernized, sometimes refusing overtime and preferring a 40-hour work week. Some of their managers see these changing attitudes as "belligerent," when they may simply stem from the desire for more leisure time in which to spend increased income.**

another accepted aspect of the Asian worker's job; and judging by the accelerated move into computerized industrialization, this commitment to training is essential.

Governments in the Pacific Rim, particularly in developing countries like Taiwan and Singapore, are actively involved in supporting industrial training.

While in Singapore, we visited two government sponsored training facili-

ties - Philips Government Training Centre and Precision Engineering Institute (PEI). While PEI is larger than Philips, both facilities operate for the same purpose - to train young people in precision engineering and machining skills. Both facilities offer two-year programs. In the first year, students learn basic machining techniques. In the second year, their studies involve computerized machining (CAD-CAM), where they acquire classroom and hands-on experience in the operation and programming of CNC machine tools. Their course of study also encompasses a full range of manufacturing processes. These facilities are equipped with state-of-the-art equipment. At PEI, we estimated approximately \$25 million in equipment on the shop floor - the vast majority of which was brand new.

Graduates from these programs are sent into the workforce with high levels of skill, yet they will earn only modest salaries. After

graduation, PEI students can expect to earn \$330 per month. After five years of on-the-job training, they can progress to \$720 per month.

I'm sure that any U.S. gear company would love for someone to come looking for a job and say, "I know how to program my own machine. I know how to operate turning, milling, drilling and grinding equipment. I understand tempering and rehardening and their major causes, and on top of that, I'll work for \$3 per hour."

The fact is that the Pacific Rim's posture as a competitive force will continue to increase largely because it is so far ahead of the U.S. in the implementation of training.

And why doesn't the U.S. gear industry train its workforce to this extent? Speaking for Arrow Gear, the reason we do not is that our domestic competitors don't. Adding the cost of this extensive training to our product would result in an uncompetitive price. Yet, a trained workforce is essential in meeting the increasing precision requirements of our industry.

This no-win scenario has been a source of great concern in the gear industry for some time, although I believe we are finding a solution to this dilemma in the INFAC Program.

The INFAC Program, which stands for Instrumented Factory, is a government-sponsored program aimed at providing assistance with its training and research needs to the U.S. gear industry. Lo-

cated at the Illinois Institute of Technology in Chicago, INFAC will offer formal training programs in gear technology. In addition, the facility will contain of a state-of-the-art machining shop where new processes can be studied and students can obtain hands-on experience.

I believe the benefits we stand to gain from this program will be essential in competing with the highly trained workforce and the high precision capabilities of Pacific Rim manufacturers.

#### In Conclusion

This visit renewed my concerns for the competitive ability of Asian manufacturers. Their massive reinvestment, technology, and trained workforce make them a formidable threat.

However, it's not too late for the U.S. gear industry. With a commitment to ongoing improvement and growth, cooperation, and plain hard work, we can succeed. But each of us has to do our best!

For anyone interested in additional information on the findings of this tour, a videotape of the trip's highlights will soon be available. Consisting of both video of our plant visits and comments from tour participants, this program will provide a detailed and interesting insight into Asian manufacturing. For more information on ordering, contact the office of Dr. Maurice Howes, Director of INFAC at (312) 567-4200. ■

## COMPLETE GEAR MANUFACTURING SERVICES

### Preferred Quality Supplier to Eight Major Corporations

- Spur and Helical Gears
- 1" to 16" O.D.
- Shafts up to 18"
- CNC Inspection of Gears and Splines
- Machine only or Complete
- Broaching
- CMM Inspection Capability
- Gear Grinding Ability
- 5 Pcs./100,000 Pcs. per month
- Assemblies or Loose Gears
- Crown Hob or Shave
- Precision Machining and Gear Blanking
- Precision Shafts and Splines
- Gerotors
- Shaper Cutting

Call today to discuss your specifications.



REEF-BAKER CORPORATION

50903 E. Russell Schmidt Blvd. Mt. Clemens, MI 48045  
(313) 949-2520 Fax: (313) 949-3481  
CIRCLE A-8 on READER REPLY CARD

### AGMA FALL TECHNICAL MEETING 1991



October 23 — 25, 1991  
Detroit, Michigan

For more information contact:

**AGMA Headquarters**  
1500 King Street, Suite 201  
Alexandria, VA 22314  
Ph: 703/684-0211  
Fax: 703/684-0242



CIRCLE A-38 on READER REPLY CARD