



Help Wanted: Gear Company Seeks Perfect Machinist

Joseph Arvin, President, Arrow Gear Company

Sales are up and it's time to hire some additional gear manufacturing personnel. Let's see—what qualities are we looking for in the ideal candidates?

First of all, the ideal candidates should be very knowledgeable in every aspect of gear geometry and have a well-rounded understanding of all the involved metalworking disciplines. They should be able to read operation drawings and blueprints. And, in addition to good communication skills, they will need to have a solid command of shop math.

That's not all! They must be able to utilize a full range of gaging equipment and be experienced in setting up a wide variety of the machine tools on our shop floor. Of course, they'll need to have machine tool programming experience. And once they get the job running, they must be able to monitor their quality through the use of SPC methods. Finally, let's not forget their demonstrated ability to consistently maintain our targeted production rates. Yes, that's the person we're looking for!

Unfortunately, I wouldn't really expect a person who meets these qualifications to come to our personnel office looking for a job.

Finding skilled people is a genuine challenge facing the gear manufacturing industry. Based on the degree of advanced technology, rigid quality standards and global competition, we in the industry have a desperate need for finding new personnel that possess advanced skills and qualifications. But as we've learned at my company, these people are simply not available.

Why is this? Working in today's gear manufacturing environment certainly pays well and involves some very impressive technology. Perhaps the reason can best be illustrated by a high school career night that my company attended a couple of years ago.

Out of hundreds of students at the event, only two showed up to our presentation on career opportunities in manufacturing. Notably, just down the hall, there was standing room only in the presentation on computer-related careers.

I would bet that if tomorrow we ran a job ad for a highly experienced IT person, capable of advanced database programming, administering all aspects of our network, e-mail system and website, we'd be flooded with resumes.

So, it would appear that in preparation for a career, young people are definitely not looking at the manufacturing industry as a desirable option.

Several years ago, while on a technical tour of Singapore, I visited a manufacturing training institute that was quite impressive. The government-funded facility was training young people in all aspects of machining, including programming. Upon completion of the program, these young people entered the job market with all the skills of the perfect machinist that I described earlier. I remember at the time thinking, "How on earth are we going to compete with that?"

As someone who is looking for qualified recruits, it would be a dream come true if this type of comprehensive program existed in the United States. I would certainly be on hand at the program's graduation ceremony recruiting graduates to come and work for

my company.

Now, this is not to say that there are not high-quality vocational programs here in the United States. In fact, the American Gear Manufacturers Association (AGMA) sponsors a number of gear manufacturing training initiatives that are providing positive results. One of these efforts is located here in Chicago at Daley College—a program that we have used in the past. Also, the AGMA-affiliated Gear Consulting Group runs an on-site gear school operated by Geoff Ashcroft and Ron Greene. In addition to these programs, a number of machine tool companies, educational institutes and other organizations in our industry offer seminars and classes to provide a valuable training supplement to our collective workforce. However, the comprehensive gear-related training that would develop a Top "A" machinist is simply not available.

Logically, one would ask, "Why isn't there a program in the U.S. like the one in Singapore?" The answer is MONEY! AGMA simply does not have the resources to provide comprehensive training on the scale that our industry requires. In Singapore, the training was funded by the government, while here the AGMA's efforts are supported by volunteers and the financial contributions of its membership. In view of the fierce competition in today's global gear market, and narrow profit margins, obtaining sufficient funding from AGMA's membership is simply not feasible.

If I were to suggest to the AGMA a course of action for meeting the comprehensive training needs of the gear industry, it would be to make every attempt to lobby the

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government for the type of training program I witnessed in Singapore. Government spending on the skills of this necessary workforce would be a very wise investment in our country and have far-reaching returns. In addition to the economic benefit of skilled workers, strengthening of a domestic defense-critical industry,

like gearing, reduces U.S. dependence on foreign suppliers. Not to mention that this would help slow the continued deterioration of our manufacturing industrial base, while strengthening our defense preparedness.

So where does this leave us? The answer lies within our individual companies. Based on current conditions, if we are going to

have highly skilled manufacturing people, we must provide that training and develop these people on the job.

At Arrow Gear, where I have worked for over 30 years, we have always realized the necessity for highly trained personnel. One of our strategies to meet this need was the production of an extensive video-based training program. In the early '80s, just as industrial video production equipment was becoming available, our CEO, James J. Cervinka, saw the value of using video as a tool for internal training. Our video training library has now been in use for more than 20 years and includes programs covering a wide range of subjects—from safety and gearing concepts to machine setup and operation. And while this program has been instrumental in retaining our collective expertise and providing orientation, there still remains a need for traditional classroom training, coupled strongly with hands-on experiential learning.

A number of years ago, Arrow implemented a training program of this type. First we selected 24 recruits from 70–80 candidates. These trainees went through a fairly comprehensive curriculum of subjects including general machining, gearing concepts, blueprint reading and shop math. The results of this on-site training initiative were disheartening, yet very interesting.

Four students left the program before completing the training—citing that they really didn't feel that manufacturing was what they wanted to be doing. Another four did not pass—leaving sixteen who graduated. However, within 90 days of graduation, eight of the trainees left the company—some to other companies and some to pursue college educations.

In retrospect, our decision to provide the training was not at fault, but rather the selection criteria for the trainees. We wanted to find the A+ students, so we used conventional I.Q. testing to screen the applicants. However, based on our experience, I.Q. testing and grades alone were not necessarily a good indicator of who could develop into a qualified

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machinist. Additional variables such as mechanical aptitude and special interests of the individual should have been taken into account. For example, an interest in auto mechanics or woodworking would have been a good indication of the recruit's potential as a machinist.

More recently, we worked with Northern Illinois University, who conducted training for nearly all of our production personnel. It was interesting that pre-evaluation determined that 50% of those employees assessed were in need of various types of skill improvement. As a result, training was conducted on English (as a second language), blueprint reading and shop math.


As far as its impact on productivity, there has been a 15% increase in shop output. Obviously, this improvement is tied to the combination of many other factors, but I'm confident that training had a significant impact on this increase.

We feel that the training was very successful and has led to further plans for this type of formal training program.

"Currently at Arrow, our Human Resources Manager—Mary Ann Cervinka—is developing another training program in which trainees will split their work day between the classroom and the shop floor. In addition, the trainees will be cycled through numerous departments in the shop. It is anticipated that this broad exposure will provide insight into which machining discipline the trainees are best suited for."

In today's gear manufacturing environment, the responsibility to provide training rests squarely on the shoulders of the employer. But this is not to say that financial assistance is not available. For companies looking to provide training to their workers, a number of state programs through local universities are in place. State government has heard our pleas for assistance over the years, and they are fully in agreement that ongoing training is essential to the success of the manufacturing sector and our local economy.

In conclusion, until perfectly experienced candidates start showing up at your door, gear

industry managers will have to ensure that training is available, and it must be a top priority. Training is an essential component to remain competitive in the global market that exists today. And that's not going to be changing anytime in the near future. 

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