

Manufacturers Want a New Type of Worker

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The crisis is finally upon us. A report from the Manufacturing Institute estimates that 25 percent (2.7 million of 11 million) of workers in manufacturing are now 55 to 65 years old. The retirement of baby boomers is well underway and will accelerate in coming years. These are the experienced workers who have accumulated the most skills and will be difficult to replace.

Another problem is that there are 2.4 million manufacturing workers who have been laid off since 2007, but companies say they don't want these workers — they want people with advanced skills. A recent survey of 1,123 manufacturers shows that these companies cannot fill up to 600,000 skilled positions today.

The third problem is where will these people with advanced skills come from? More specifically, who will create the training programs to teach workers the advanced skills, and where will the money come from?

What Does Advanced Skills Mean?_ [1]

Tom Friedman says companies are looking for “people who not only have the critical-thinking skills to do the value-adding jobs that technology can't, but also people who can invent, adapt and reinvent their jobs every day.”

Perry Sainati, the CEO of Belden Universal — a manufacturer of universal joints — says “Today's lean manufacturing companies are looking for skilled workers who think like engineers, and who bring to the job each day a broad knowledge of product design and product development.”

MotoKo Rich, in a *New York Times* article, describes advanced skills as operating and maintaining computerized machinery, reading complex blueprints, and

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demonstrating higher machine proficiency.

The Mosaic Company, a fertilizer manufacturer with 7,000 employees, identified two job types that are needed in the future: The first category is a journeyman mechanic who can do pipe fitting, iron working, sheet metal, welding and rigging, whereas the second category is called an electrical instrumentation and automation specialist (EIA) who handles electrical components, instrumentation, programmable logic controllers (PLCs), and computer-controlled machines and systems.

I think these last two descriptions are fairly typical of what is needed in many manufacturing industries in terms of advanced skills. It suggests a new type of worker will be needed with skills that range from a 14-week course to train a CNC operator on the low end to a worker with multiple skill sets, like a journeyman, on the high end.

To have problem-solving skills or to be able to think like an engineer will require advanced training that begins with classroom training in science, reading and math, perhaps from a community college.

The community college can also teach courses on PLCs, programming, hydraulics and pneumatics. But, in my opinion, the rest of the skills needed to become a highly skilled worker who can work anywhere in the plant must be taught on the job and in some kind of apprentice program sponsored by the manufacturing companies themselves.

To make this article more specific and build a framework for conclusions, I would like to suggest my own opinion of what is meant by advanced skills with two different examples.

1.) Comprehensive Apprenticeship Programs — The National Institute for Metalworking Skills (NIMS) Competency-Based Apprenticeship System brings national standards and third-party objective assessments to the nation's metalworking industry. To become a NIMS-certified machinist, toolmaker, CNC setup programmer or a certified journey worker, the apprentice must earn 12 NIMS credentials in demonstrating satisfactory performance in 28 core or required competencies.

A good example of this kind of training is Penn United, a midsize manufacturer in Cabot, PA. The company was the first manufacturer in the United States to be certified by NIMS. In response to the need to train people with advanced skills, it built a 17,000-square-foot training center called the Learning Institute for the Growth of High Technology (LIGHT).

The training center contains three classrooms and four labs, and offers 25 courses for its own and other companies' employees. The company is also convinced that to manufacture world-class products, apprentice training is required, so it offers four kinds of apprentice training: toolmaker (five years), precision machinist (four years), press technician (three years) and quality-assurance technician (three years).

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Another example is Blum Inc. of Stanley, NC, which produces lift systems, concealed hinges and drawer runner systems for cabinets. Its program is called Apprenticeship 2000, and it guarantees the worker a job at graduation. The factory is heavily automated in a 450,000-square-foot facility, and the employees must operate, maintain and repair the equipment, as well as build dyes.

The apprentices receive both classroom and hands-on work skill training. The training programs can take up to 8,000 hours. They offer the employees paths for tool and die makers, electronic technicians, CNC machinists, machine technicians, mold/plastics technicians and welding fabricators. Upon completion of the training, the workers receive an associate's degree in manufacturing technology and a journeyman certification from the North Carolina Department of Labor.

The program to train the Mosaic Company's journeyman mechanics and electrical specialists is a two-year accelerated apprenticeship course. Students take classes two days a week and have on-the-job skill training the remainder of the week, while drawing a salary. The graduates receive 31 credits towards an Associate's Degree and a certification as a production technician

2.) Apprentice Training that Needs to Be Designed — There is a growing need to develop apprentice training for people who can repair, operate, troubleshoot and service automated production machines in the modern manufacturing plant, as well as the service people from the OEMs that provide services to the companies that own automated lines.

The apprentice program for this kind of job needs to teach people how mechanical things work (sprockets, chains, belts, etc.); pneumatics and hydraulics; to utilize troubleshooting methodologies; to read and understand electrical prints; to understand many PLC models; to troubleshoot ladder logic programming without direction; to add/change programming; to be familiar with human-machine interfaces, in addition to variable-frequency drive (VFD) controls, Device Net, Control Net and Ethernet.

How Can the Government Help?

In explaining the America Works Act, representatives Halvorson, Minnick, Kratovil and Bright make the point that advanced skill training must be industry driven. They say, "When employers tell us what skills are needed to excel in a manufacturing workplace, we should listen and make sure these are taught in our job training programs."

In the past, the Labor Department funded training for manufacturers with the Workforce Investment Act and the High-Growth Job-Training Initiative. These two programs were funded to the tune of about \$7 billion dollars per year.

An investigation of each program showed that little money was used for advanced manufacturing skill training as described in this article. Contrary to what the three government representatives have advised, it does not appear government is really listening to the manufacturers and training is still not industry driven.

Government has also proposed some new training initiatives:

1. America Works Act — this act is supposed to be driven by skills that are recognized by industry, and designed to provide the student with a certification that is portable. This act should modernize other federal training programs, such as the Workforce Investment Act (WIA), the Perkins Vocation and Technical Education Act, and the Trade Adjustment Assistance Act.
2. Innovate America Act — this is an education bill that aims at doubling the number of high school graduates who major in science and math.
3. Skills for America's Future — this is part of President Obama's Economic Recovery Act, which is designed to create better training in high schools, and to convince young men and women that working in manufacturing is a good career. The act also creates partnerships between industry and community colleges.

At this point, these programs have not been funded by Congress, but the biggest flaw of them is that none of the programs specifically identify the advanced skills that industry says it needs. President Obama has set a goal of having an additional 5 million community college degrees and certificates by 2020.

1. There are some real obstacles for implementing advanced training and creating the new advanced skill workers that everybody needs:
2. To create this new type of skilled worker (that everybody wants) and replace the baby boomers, it will take a different kind of training program based on some variation of the apprentice model.
3. There are no shortcuts to apprentice-type training, and manufacturers will have to invest in training that will take hundreds, if not thousands of hours.
4. New employees will want pay increases as they progress and complete the various skill categories.
5. Advanced training is going to require a long-term commitment to the newly hired employee and possibly a guaranteed job at the completion of the training.

What Is the Answer?

We are at a pivotal moment in manufacturing, and for America to stay innovative and competitive in the future, it is going to require a new type of skilled worker and

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advanced training.

1. *Small & Midsize Manufacturers* — Penn United, Mosaic and Blum Inc. have made the commitment to advanced training, but this isn't enough. Although they are numerous, they do not have the resources to solve the whole problem.
2. *Government* — Historically, government training initiatives have always favored education programs, short-duration training and simply getting people back to work. Government training programs have always been just about jobs (not advanced-skill jobs), because for politicians, creating any kind of job is the goal. I am skeptical that government will finance advanced training beyond giving community colleges money for two-year degrees.
3. *Multi-National Manufacturers* — The key players, who are absolutely pivotal in whether we train enough highly skilled workers, in this game are the Fortune 500 publicly traded manufacturers who have approximately 55 percent or 6,325,000 manufacturing workers. Many of these large companies have been reducing labor costs and training costs for decades. Since 1990, the National Association of Manufacturers and the Manufacturing Institute, who represent the giant companies, have sponsored four different skill surveys, which have revealed that we are facing a severe shortage of skilled workers and that they must expand their training budgets to solve the issue.

I see no evidence that a large number of the publicly held manufacturers are going to make the investment in long-term (apprentice-type) training, or make the necessary long-term employment commitments to their employees to create the highly skilled workers needed. But training the newly skilled workers of the future cannot be accomplished without the giant companies.

The fact is, highly skilled baby boomers are retiring every day and the skilled-worker shortage continues to get worse. There is a current shortage of 600,000 highly skilled workers, but within 10 years, we will need more than 2 million skilled workers.

I think this issue is going to be a true test of whether the giant manufacturers are going to invest in America's future, or will just continue to do more surveys affirming that we desperately need the new skilled workers of the future. One way or another, American manufacturing is now in a jam and it is time to bite the training bullet.

Michael P. Collins is the author of the book Saving American Manufacturing. You can find more related articles on his website via www.mpcmgt.com [2].

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