

WORK-BASED LEARNING IN

ACTION



THE INDUSTRIAL MANUFACTURING TECHNICIAN APPRENTICESHIP

The Industrial Manufacturing Technician Apprenticeship helps entry-level workers in manufacturing quickly enhance their skills and advance with their current employer. Because of changing manufacturing technologies, entry-level work requires higher skills than ever, and employers struggle to recruit and retain highly-skilled entry level workers. The IMT program is a new type of Registered Apprenticeship that meets this employer need.



JOBS FOR THE FUTURE

BY GERI SCOTT | JULY 2016

QUICK FACTS IMT APPRENTICESHIP

CREDENTIAL

Journey worker credential; Certified Production Technician certificate; college credit toward an associate's degree

POPULATION

Entry-level workers in manufacturing

OUTCOMES

164 registered apprentices to date

26 registered apprentices have achieved journey worker status

Average earnings are \$21.24 an hour for unionized apprenticeships and \$16.32 for non-union apprentices

Implemented in Wisconsin, Michigan, Minnesota, Pennsylvania, Kentucky, Indiana, Ohio, and Chicago, Illinois

FUNDING

U.S. Department of Labor H-1B and American Apprenticeship Initiative grants, employers, diversified local matching funds

KEY PARTNERS

Jobs for the Future

AFL-CIO Working for America Institute

Industrial Unions, including International Association of Machinists, United Steelworkers of America, United Auto Workers, Bakery, Confectionary, Tobacco Workers and Grain Millers, and International Brotherhood of Electrical Workers.

Intermediaries including Wisconsin Regional Training Partnership, Michigan Human Resources Development Institute, Minnesota Regional Training Partnership, Labor Institute for Training, Chicago Labor Federation Worker Assistance Center, and Keystone Development Partnership

Manufacturing Skill Standards Council (MSSC)

Community Colleges

A growing number of manufacturing firms

ABOUT THE PROGRAM

The IMT Apprenticeship fills a major gap in the professional development and career pathway of entry-level production workers—the largest manufacturing job category—in diverse manufacturing sub-sectors. Although the manufacturing industry has a long tradition of using apprenticeship to train workers for highly skilled occupations such as industrial maintenance mechanics and pattern makers, little formal training was deemed necessary for workers in entry-level production positions. In recent years, as manufacturers have incorporated lean manufacturing, statistical process control, and computer numerical control (CNC) processing into entry-level manufacturing jobs, the skill requirements of entry-level jobs have increased. Not only have manufacturing employers found it difficult to recruit and retain qualified production workers, they have also had difficulty finding candidates within their current workforce who are qualified to train for high-skilled occupations. The IMT Apprenticeship addresses both of these challenges.

Registered apprenticeship is an “Earn and Learn” approach to building worker skills. The IMT registered apprenticeship provides 3,000 hours of structured technical instruction comprised of 2,736 hours of on-the-job training from an experienced mentor assigned by the employer and 264 hours of related technical instruction. All IMT apprentices are employees of a sponsoring company, earning wages, benefits, and seniority while they learn new skills. Many workers with more than 10 years of experience in production jobs are receiving their first training and opportunity for skill development through the IMT Apprenticeship.

The IMT Apprenticeship is unique because it is:

- A stackable apprenticeship that is a foundation for multiple career pathways
- Easily adapted for different manufacturing contexts, different size companies, and different types of manufacturing schedules (first-, second-, and third-shift workers)
- A type of “hybrid internship”—it integrates traditional time-based learning and competency-based education, which allows workers to progress at their own pace

The IMT Apprenticeship benefits both employers and workers: It creates a highly skilled talent pipeline, upskilling entry-level workers so their skills match the requirements of technically challenging entry-level jobs and preparing them for further training. And it helps workers gain needed skills to advance in their careers without quitting work to go back to school.

Key Features

- Apprentices are enrolled in training that leads to industry-recognized credentials as well as college academic credits.
- Apprentices are regular, full-time employees and earn regular wages while they complete training.
- Employers pay wages for the duration of the training.
- Workers receive wage increases upon completion of the apprenticeship.
- The IMT Apprenticeship is adaptable to production work in a range of industries/ manufacturing contexts such as machine shops, plastics extrusion, and food processing.
- Labor management intermediaries help employers and unions with all aspects of IMT implementation.

Supporting Implementation of the Apprenticeship

The Next Gen IMT Apprenticeship Initiative, funded by the American Apprenticeship Initiative grant, offers a unique approach to supporting employers and workers. Labor management intermediaries—nonprofit workforce service providers that have strong links to both unions and employers—help companies navigate the process of becoming registered apprenticeship sponsors and coordinate with community colleges and other training providers to deliver the related technical instruction component of the apprenticeship at a convenient time and location.

Creating the IMT: Collaboration Between Unions and Manufacturers

The model was developed by a consortium of employers and unions to address skill gaps in their production workforces and build competencies that are in demand in the workplace.

The consortium includes John Deere; Ocean Spray; Pure Power; GE Medical Systems; United Steelworkers; the International Association of Machinists and Aerospace Workers; Sheet Metal Workers International Association; International Brotherhood of Electrical Workers; United Auto Workers; and The Bakery, Confectionery, Tobacco Workers and Grain Millers International Union. The program has been validated through a rigorous review by the US Department of Labor's Office of Apprenticeship, as well as by state apprenticeship agencies in Kentucky, Minnesota, Ohio, Pennsylvania, and Wisconsin.

Structured Learning

In order to obtain the IMT registered apprenticeship completion credential, apprentices must successfully complete courses in industrial math, industrial communications, manufacturing technology systems and processes, industrial blueprint reading, OSHA 010, and First Aid/CPR. Apprentices also master on-the-job competencies in safety, equipment operation, measurement and inspection, product quality, continuous improvement, inventory and material processes, routine equipment maintenance, and production equipment setup.

Flexibility

One of the key features of the IMT Apprenticeship is its flexibility. It is easily adaptable to production work in foundries, machine shops, plastics extrusion, precision medical instrumentation, and food processing, and has been implemented by firms in all of these sectors. The on-the-job learning curriculum reserves a block of time for customization to a particular employer's systems. The IMT Apprenticeship is also accessible to both small and large employers, and it can accommodate training for workers on second and third shifts.

As a hybrid apprenticeship, the IMT integrates features of both traditional time-based training and competency-based education. Workers can receive credit for prior learning, and the on-the-job learning curriculum provides a range of training hours for each set of skills so that workers may accelerate through material that they learn quickly, or spend more time mastering competencies that are particularly challenging, without jeopardizing their standing in the apprenticeship.

The related technical instruction allows workers and their employers to choose either two semesters of manufacturing technology courses taught by a community college or the four modules of the MSSC Certified Production Technician curriculum, or a combination of the two. Each MSSC module is equivalent to 40 hours of related technical instruction, and two modules may be substituted for a semester of manufacturing technology courses. Related technical instruction may be delivered in a classroom, through distance learning, or in online learning formats.



A NEW WAY TO UPGRADE MANUFACTURING PRODUCTION WORKER SKILLS

Entry-level occupations in manufacturing have historically been considered unskilled jobs for which little or no training is necessary. As a consequence, employers have experienced high turnover among new-hires, and incumbent workers have had limited opportunity to gain the skills needed for career advancement.

The IMT Apprenticeship improves the knowledge and technical skills of manufacturing production workers, increasing their productivity and problem-solving skills, as well as their understanding of the overall manufacturing process, quality assurance practices, and basic equipment maintenance. Employers who have implemented the IMT Apprenticeship report improved productivity, improved job retention, reduced scrap and waste, and less equipment downtime for maintenance. Companies have also reported improved customer satisfaction with timely shipments and product quality.

The IMT Apprenticeship also prepares entry-level workers to be trained for very high-skilled technical manufacturing occupations such as maintenance mechanics or CNC machinists, often with advanced standing, promoting career advancement for workers and helping to address severe skills shortages for employers.

Seven Principles of Effective Work-Based Learning

JFF has identified seven principles that support low-skilled youth and adults seeking to enter and advance in careers. Together, these principles encourage the design of work-based learning models that increase access to work-based learning, provide participants with key training and work experience, and help employers meet their needs for a skilled workforce.

Each of the case studies in the Work-Based Learning in Action series highlights a program that is an innovative example of one or more of the principles at work.

Effective work-based learning programs should:



Support entry and advancement in a career track



Reward skill development



Provide meaningful job tasks that build career skills and knowledge



Support college entry, persistence, and completion



Offer compensation



Provide comprehensive student supports



Identify target skills and how gains will be validated



Support Entry and Advancement in Careers

The IMT Apprenticeship fills a gap in the career ladder for entry-level manufacturing production workers by providing foundational postsecondary skills in an “Earn and Learn” format. Incumbent workers, many of whom have 10 or more years’ experience in the same production jobs, may have significant barriers to pursuing traditional approaches to technical training. Family obligations make attending community college difficult, and rusty academic skills often make it difficult to qualify for technology education programs or very high-skilled apprenticeships. The IMT Apprenticeship uses contextualized curricula to teach industrial math and communications, preparing apprentices to master manufacturing technology curriculum. Related instruction builds upon and enhances applied skills development in the on-the-job learning component of the apprenticeship.

The IMT Apprenticeship has immediate value to workers and serves as a stepping stone to further career advancement. All aspects of the IMT Apprenticeship are aligned with the introductory portions of higher-skilled apprenticeships, as well as with manufacturing technology associate degree programs of study. Workers who have completed the IMT Apprenticeship have been promoted to supervisory positions and many have been accepted into maintenance-technician, pattern-maker, and other 10,000-hour apprenticeships.



Provide Meaningful Job Tasks

Under the supervision of a training mentor, IMT apprentices are assigned tasks that build their skills and competencies in the full range of the production work cycle within their firm. Employers are motivated to assign apprentices to meaningful job tasks that support their learning because they need flexible, multi-skilled workers who can reliably fulfill work orders. Employers who have participated in the IMT Apprenticeship have reported a range of benefits, from reduced equipment downtime to improved achievement of customer deadlines, as a result of better worker skills.



Identify Target Skills and How Gains Will Be Validated

On-the-job learning for the IMT Apprenticeship is delivered in accordance with a carefully prescribed training plan. This plan, called the Job Book, spells out detailed competency levels for skills including equipment set up and operations, safety, routine equipment maintenance, use of mechanical tools and testing equipment, inventory and material processes, measurements, and continuous improvement and quality practices. Each apprentice is assigned an experienced, skilled mentor who demonstrates new skills, observes and provides feedback on the apprentice’s performance of the skills, and signs off on the date when the apprentice demonstrates mastery of each skill. When the employer determines that the apprentice has mastered all of the skills and competencies in the Job Book, the state or federal apprenticeship agency reviews the documentation before awarding the completion credential.



Reward Skills Development

IMT apprentices earn up to 24 academic credits for the 264 hours of related technical instruction. Upon successful completion of the 3,000-hour curriculum, apprentices receive a nationally recognized credential, often referred to as the Journey Worker credential, from the U.S. Department of Labor’s Office of Apprenticeship, or the relevant state apprenticeship agency. Apprentices also prepare for and take the MSSC’s safety, manufacturing processes, maintenance awareness, and measurements and quality national exams, through which they earn the industry-recognized credential for Certified Production Technicians.



ROLE OF EMPLOYERS

Employers are central to the development of the IMT Apprenticeship and support workers through the learning process. Employers sponsor the apprenticeship, selecting employees for training and adjusting individuals' work schedules to accommodate their completion of the full 3,000-hour curriculum. Employers also verify to the state or federal apprenticeship agency that apprentices have mastered all skills and competencies in the curriculum and have earned the nationally transferable completion credential.

Employers also may customize the on-the-job learning to their specific sector and work product. They analyze skills and competencies they need, and integrate them into the curriculum approved by the state or federal apprenticeship agency to assure that the training meets national standards.



Offer Compensation for the Work

IMT apprentices are full-time employees of manufacturing companies that have selected them for training. They earn regular wages while they complete their on-the-job learning. Many employers also pay the college tuition for the related technical instruction. Some employers also provide paid release time while apprentices attend the related technical instruction.

In addition, each employer signs an agreement with each apprentice and the state or federal apprenticeship agency promising that upon completion of the apprenticeship, apprentices will receive a specified wage increase. This wage increase is negotiated within each company's compensation structure, but is usually in the range of 20 percent of the apprentice's starting wage.

LESSONS LEARNED AND KEYS TO REPLICATING THE MODEL

There are several challenges that have been and continue to be addressed to help expand and enhance the IMT Apprenticeship:

Limited Awareness of Apprenticeship

There are fewer than 500,000 apprentices in the United States, in comparison to more than 23 million college students, and approximately 90 percent of all apprenticeships are in the building and construction trades. Few manufacturing employers understand how apprenticeship works to build worker skills, and many are wary of government oversight of their company's training. At the same time, much of the public workforce development system has limited knowledge about apprenticeship, and so it is generally not prepared to help employers implement new apprenticeship programs. The Next Gen IMT initiative has developed brochures, videos, and other materials that labor management intermediaries use to enhance employers' and the workforce development system's knowledge about apprenticeship.

IMT Apprenticeship's Focus on Entry-Level Occupations

Entry-level production workers comprise more than 50 percent of the total manufacturing workforce in the United States. Yet employers are primarily focused on their need for highly skilled technical workers, such as maintenance mechanics or pattern makers, rather than on building the skills of their entry-level workforce. In many cases, training managers or plant managers consider entry-level production jobs to be unskilled and not in need of training, in spite of difficulty recruiting and retaining these workers. Next Gen IMT intermediaries are building the case that trained production workers save money and become the pipeline for the higher-skilled occupations that employers are focused on.

Cost

The related technical instruction component of the IMT Apprenticeship may cost up to \$4,000 per person in college tuition, books, and training supplies. At this time, there is no dedicated public funding stream to help employers and apprentices defray these costs. While some manufacturing firms provide employee tuition reimbursement funds, many smaller employers do not have a budget for worker training. As employment in the manufacturing sector shrank over the last three decades, training funds were removed from many collective bargaining agreements. Next Gen IMT intermediaries have been assembling diversified funding portfolios from philanthropy, industry associations, and workforce development boards to help defray these costs. With the help of the AFL-CIO, the Next Gen IMT initiative is also working with unions to help reintroduce training funds into collective bargaining negotiations.

Impact on Production Schedules

One of the first issues that employers raise when approached about the IMT Apprenticeship is their concern that the training will interfere with production schedules. This is where the flexibility of the IMT model is critical: on-the-job learning takes place within the company, using company equipment, and following company protocols. Employers soon find that improved worker competencies improve productivity. Flexibility in the delivery of the related instruction is also important: with help from a labor management intermediary, courses may be taught at the company or scheduled during lunch breaks or at the end of shifts to minimize apprentices' time away from the production line. The labor management intermediary may also help form a cohort of apprentices from multiple companies in an area, so that no one company has to enroll a group of apprentices sufficient to fill a class at one time.

ADDITIONAL RESOURCES

Watch a video about the IMT Apprenticeship <https://www.youtube.com/watch?v=cY5dyi0jDuM>

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