

**America's ability to compete on the global playing field of manufacturing rests in her ability to create and retain future generations of Skilled Trades workers.**

**2015**

# Help Wanted: Skilled Trades Manufacturing



A White Paper produced on behalf of current and future Skilled Trades workers in American manufacturing industries  
By the  
United Automobile, Aerospace and Agricultural implement Workers of America-UAW International Skilled Trades Department

## **White Paper**

**America's ability to compete on the global playing field of manufacturing rests in her ability to create and retain future generations of Skilled Trades workers.**

### **Executive summary.**

Within the following pages, we will briefly look into the historical context of apprenticeship and how it has been a benefit to society. The introduction also contains information of how the United Automobile, Aerospace and Agricultural Implement Workers of America-UAW's Skilled Trades Department may serve as a resource to begin the development and registration process for new and renewal of existing but obsolete registered apprenticeship programs.

We will look at what "Registered Apprenticeship" is; the basic requirements as outlined by the U.S. Department of Labor Office of Apprenticeship and State Apprenticeship Council (SAC) agencies that will serve as a framework for your program.

A short definition is provided in Section III that explains the fundamental differences between Manufacturing Trade Apprentice Programs and the more familiar programs that are sponsored by the Construction and Building trades.

The impending National and Global Shortage of Skilled Labor are reviewed in Section IV. The section contains validated statistical information that included the most effected trade groups as well as age demographic information by industry sector.

An outline of the training that should be considered for the proper investment of training time and resources that is required for the Manufacturing Skilled Trades Technician. Also included in Section V is a normal progression for the attainment of skills.

Section VI covers the expected Return of Investment (ROI) and examines areas of concern such as the time frame for expected completion, proficiency level and abilities of the graduate apprentice. Ultimately explaining for the employer when an expected benefit can be realized by the investment made in the training program.

Tools and options that might be considered for retaining the apprentice once he/she has completed the course of training and become Journeyman.

Conclusion-now is the opportune time to begin the process of training new skilled trades personnel that will benefit your company's bottom line and your ability to bargain collectively

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## **White Paper**

America's ability to compete on the global playing field of manufacturing rests in her ability to create and retain future generations of Skilled Trades workers.

### **I. Introduction**

Manufacturing Skilled trades workers are in short supply, and those that are available for hire are averaging fifty (50) years of age or older. The Skilled Trades Labor Coordinator for General Motors Corporation, is quoted at the Chicago Manufacturer's Roundtable in June of 2014 that "...a full 55% of GM's Skilled Trades Workforce is eligible to retire today..." at the same time General Motors is also at its lowest point in history for apprentices that are registered and on course learning a skilled trade. Many studies are available from multiple sources, which are trying to place a variety of political or institutional fault for the current condition of the manufacturing skilled trades' workforce in the United States. Many of these studies were sounding the alarm prior to, and during the recent economic downturn. Many of them will be referenced in the text that follows. Regardless of which institutions, corporations, or societal stigmas are responsible for the current and immediate future skilled worker shortage, we must come to terms with how to address the issue; if we as a country wish to remain a viable location in which companies will choose to manufacture products that are of the quality and quantity demanded by their customers.

On average, throughout the history of our institution, the UAW's International Skilled Trades Department, assists companies with UAW membership towards the goal of development and registration of new and/or renewal of six (6) to eight (8) apprenticeship-training programs on an annual basis. Beginning in the second quarter of 2012 the UAW's Skilled Trade Department has been working with an unprecedented increase in volume in the development and registration of new and/or renewal of obsolete Apprenticeship Training programs throughout manufacturing locations in the United States. The Department works closely at the local level, joining local union leadership and manufacturing facility Human Resource managers towards a common

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goal of securing their future ability to produce quality products through the training and development of their skilled trade's workforce. It should be noted, that the development and sponsorship of a jointly administered, registered apprenticeship-training program is rarely the first choice of Human Resource managers. Most H.R. managers would prefer hiring trained and qualified skilled trades personnel from a pool of available and trained candidates as the need arises. This option is not available

United Automobile, Aerospace and Agricultural implement Workers of America-UAW International Skilled Trades Department assists represented locations to begin the conversation with local union and management personnel to outline the Federal and/or State requirements that must be observed during the administration of a registered apprentice program. The department works through the Federal Department of Labor-Office of Apprenticeship (US,DOL-OA) as well as with the twenty-nine (29) State level Apprenticeship Councils (SAC's) for the development and registration of new Apprentice Training Programs. The department will also assist each location to collaborate with Related/Classroom training providers in conjunction with local union and management partners to develop the relationships and documentation that are necessary for the registration of a successful training program.

A knowledgeable, dedicated and able skilled trade's workforce is paramount to the successful operation of manufacturing industries in the United States. A lack of emphasis, resources and social stigmas have led us to a tipping point in our ability, or impending future inability, to produce products that meet ever increasing demands and customer requirements. Mike Rowe (2011), of Discovery Channel's "Dirty Jobs" authored the most concise and direct conclusion of why the skilled trades labor shortage in the U.S. is quickly becoming a desperate situation for many employers.

*In general, we're surprised that high unemployment can exist at the same time as a skilled labor shortage. We shouldn't be. We've pretty much guaranteed it.*

*In high schools, the vocational arts have all but vanished. We've elevated the importance of "higher education" to such a lofty perch, that all other forms of knowledge are now labeled "alternative." Millions of parents and kids see*

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*apprenticeships and on-the-job-training opportunities as “vocational consolation prizes,” best suited for those not cut out for a four-year degree. And still, we talk about millions of “shovel ready” jobs for a society that doesn’t encourage people to pick up a shovel.*

*-Mike Rowe*

*Testimony to the Senate Commerce Committee-May 2011*

The registered apprenticeship model has been around for hundreds, if not thousands of years, the approach as proven to be effective in its ability to provide competent skilled workers, has low cost of implementation and a return on investment that begins before the apprentice graduates from training.

## **II. What is Registered Apprenticeship?**

Registered Apprenticeship programs meet the skilled trades’ workforce needs of American industry, training millions of qualified individuals for lifelong careers since the passage of the Fitzgerald act of 1937. Registered Apprenticeship helps to mobilize America's workforce with structured, on-the-job learning and classroom training in traditional industries such as construction and manufacturing. The Apprenticeship model of training new skilled workers is also quickly proving to be an effective method of training in new and emerging industries such as health care, information technology, green-energy, telecommunications and more.

The traditional hours based approach of apprentice training for a majority of manufacturing skilled trades occupations consists of not less than 8,000 hours of On the Job Learning (OJL) supplement by not less than 576 contact hours if Related Technical Instruction (RTI) or 144 hours per year of in classroom training during the apprentices’ training experience. Assuming a forty (40) hour workweek, the apprentice will normally complete the program in approximately four years. In a majority of manufacturing apprenticeships, the apprentice is required to attend related technical courses on his/her own time. Many recently developed programs have well exceeded the 8,576 hours of required training due to the technical requirements that have evolved in many manufacturing trades’ occupations.

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A local Joint Apprentice Committee (JAC) is necessary in shops that are working under a Collective Bargaining Agreement (CBA), and will predetermine many of the aspects of the training program. Template 'Standards' are available through the U.S. Department of Labor-Office of Apprenticeship, as well as State Apprentice Council (SAC) State agencies where appropriate, and the UAW's Skilled Trades Department are available to assist the local JAC with the formulation of their program. The UAW, as well as most other labor organizations, have personnel and resources available to assist the local JAC's with everything that is required for the registration of their local apprenticeship program. This would include assisting the local parties with establishing relationships with Federal and State agencies and local Related Technical Instruction providers that will be required for the implementation of a successful program.

Apprentices indentured into registered programs, are paid by their employer on a clearly defined progressively increasing wage scale as they gain in experience and ability. Because of the four years that it normally takes to complete a training program, apprenticeship has been known as 'the other four year degree' for quite some time. More recently, 'earn as you learn' has become the tag line of choice in order to keep apprenticeship from appearing as if it were some form of alternative learning for the less academically adept.

It is important to keep in mind that all aspects of every registered apprentice training program will fall under the regulatory guidelines set forth in Federal Regulations 29 CFR 29 and 29 CFR 30. SAC States may have additional requirements that must also be observed where applicable.

### **III. What are 'Manufacturing Apprenticeships' and what makes them different than other apprenticeship programs?**

Apprentice Training programs in the manufacturing trades share many similarities with their counterparts from other industry backgrounds, but there are also many aspects of that are very, different. For the purposes of clarification in this document, apprenticeship programs will be discussed as two major areas, and will be referred to as *manufacturing trades* and *construction trades*. A majority of both the manufacturing and construction

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trades' apprenticeship programs follow the 8,000 hours of OJL and 576 Hours of RTI format. Newer to the apprenticeship training system are the competency based and hybrid-style apprenticeship programs that have allowed deviation from the hours based approach. At this point, few manufacturing or construction trades training locations have chosen to abandon the proven traditional 8,000-hour approach in favor of the competency or hybrid models due to the proven effectiveness and a familiar ease of administration associated with traditional models.

Manufacturing Skilled Trades apprentices are most often selected for their programs from a pool of current production or operations workers within the facility, this is one of the fundamental differences between the manufacturing trades and the construction trades apprentice programs. Simply put, manufacturing locations tend to indenture new apprentices from within. There are two primary reasons for this. One is that the employer's and the JAC's already have a good idea of how the apprentice may perform. Will he/she be on time every day? Does the individual appear to be interested in learning, and do they already possess the right technical aptitude to be successful in training? This also appears to be true in both union and non-union manufacturing facilities where an apprentice program likely not jointly sponsored or under the care of a manufacturing association.

During the course of training, the employer intends on making a significant investment of money and resources in the apprentices' training program; it would only appear logical to invest in an individual that would realize the best return on the investment. Already knowing the work habits of potential apprentices is a major factor for employers and JAC's are making the final selection of who would make the best possible candidates for their program. This can be a disappointment for those individuals that may have invested their own time, money and energy in learning skilled trades work practices through their local technical training institutions prior to being hired as a production worker by the manufacturer, and are not immediately selected for apprenticeship. Most manufacturing skilled tradespersons will find that they will likely have to work as a production assembler or general laborer, for a significant period of time, before they are afforded an opportunity to apply and test for a skilled trades

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apprenticeship program. Even then, there is no guarantee that they will be accepted into a program as opportunities are few and the level of competition for skilled trades' apprenticeship program positions is stiff. On the contrary, many construction trades apprentices are considered through referrals from outside sources, or by a signatory contractor, and majorities of workers on large construction projects are considered skilled, with fewer unskilled positions are available. If a candidate can successfully complete the testing and selection procedures he/she will often begin their related training through a labor organization or contractors association before being assigned to a contractor for their on the job training requirements of their training experience.

The other significant difference between the 'manufacturing trades' and 'construction trades', is the method in which Related Technical Instruction (RTI) is delivered for the Apprentice. Many of the larger construction trades' labor organizations or building contractor's associations have established training centers and institutions that provide the necessary related classroom training (RTI) for their course of apprentices. The I.B.E.W., Operating Engineers, United Association (UA) and the Associated General Contractors (AGC) among others, have facilities and certified instructors dedicated to the training of their journeymen and apprentices. A majority of RTI takes place 'in-house' for the construction trades' apprentice. Whereas, the manufacturing trades often rely on local community colleges and technical training institutions to provide the required classroom instruction. The apprentices in construction trades programs may have defined sessions where the signatory contractor may allow the apprentice to be away from the job site in order to attend related instruction courses at the training facility. Related training courses may also be offered in the evenings, weekends or during seasonal relaxation periods for the construction trades apprentice. Conversely, the manufacturing trades apprentice can expect to follow the local RTI provider's course scheduling. Related classroom courses for the manufacturing apprentice are scheduled with local training providers during times when the apprentice is not expected to be in the work facility. Shift start and stop times are often adjusted to accommodate the availability of required classes through the related training providers. Because the manufacturing trades are less affected by seasonal conditions and hours of available daylight their apprentices can expect a more stratified approach in their training

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schedule. Regardless of the delivery method or location, all related training instructors are required by the DOL-Office of Apprenticeship to be certified to teach the course work that is being delivered. The related training must be relevant to the trade classification that is being studied, and there must be sufficient information made available for the Department of Labor-Office of Apprenticeship and/or State Agencies testifying that the necessary learning has been achieved for the apprentice in his/her respective trade.

A third, but inconsequential, difference in manufacturing skilled trades' apprenticeships programs provides a significant reason for requiring the use of outside-related training providers is the sheer number of skilled occupations that may exist in a given facility. Many contractors association's and construction union's train to a specific core industry application, such as electrical, carpentry, or heavy equipment operation. In the manufacturing setting, many skilled crafts may utilize some RTI courses across many classifications. However, the economies of scale cannot be attained through the numbers of apprentices that are often being trained in very specialized areas of a given manufacturing classification. In most manufacturing locations, apprentices are indentured in smaller numbers, and will likely require very specialized training that must be customized to their locations. This situation makes in-house RTI training for such small numbers of tradespersons an inefficient and costly investment even for the largest employers. The current list of UAW apprenticeable trade classifications range from traditional Blacksmith's that work in museum settings to a constantly changing environment for Experimental Product Engineering Layout and Assembly Technicians that perform custom prototype and pre-production work on automobiles, aircraft, agricultural equipment and defense systems in tightly controlled laboratory environments. The UAW-International Skilled Trades Advisory Committee (ISTAC) has also held discussion on the development of non-traditional apprenticeship programs and how the application of the apprentice-training model might be utilized to assist members and employers in other areas of service and industry

#### **IV. Manufacturing industries are experiencing a global shortage of Skilled Tradespersons and Qualified Technicians**

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For those that do not work in a manufacturing or construction trades setting the current and impending shortage of skilled crafts persons may come as a surprise. For those outside of the industries it is common knowledge that skilled trades' positions are generally paid high-wages and enjoy fringe benefits that many of their white-collar counterparts may not even enjoy. For those that do work in the skilled trades' setting the impending shortage of skilled tradespersons comes as no great surprise at all.

The recent global economic situation is one of the main contributing factors. The economic downturn in the United States has had a particularly profound effect. Not simply because companies have not placed potential candidates into available apprenticeship positions, but the entire community of apprenticeship has suffered overall. As apprenticeship regains some of its former momentum the entire community and culture must be re-established and re-cultivated in order to support the growing need for skilled laborers.

The assignment of new apprentices in the automotive OEM's, and their suppliers typically followed the three and four-year contractual cycles of the OEM's themselves. Each of the three main U.S. Automotive manufactures would come to an agreement each time a national contract was negotiated that would determine how many apprentices would be indentured during the life of that agreement. Community Colleges and Technical Training providers could be assured that the manufacturing base of their educational itinerary would get a boost each time the Detroit 3 settled their agreements. The automotive suppliers at the Tier I and Tier II levels, both union and non-union, would indenture new apprentices along the same schedule, in order to participate in available technical courses. This pattern was present because this was the time when the RTI providers would schedule the courses that are required of by all manufacturing apprentices, and economies of scale would benefit all parties concerned. This continual ebb and flow of new apprentices ran on a very predictable cycle for generations. The cost to the apprentice; however was to endure the training process itself as well as be available for working midnights and non-production hours. This also meant many weekends, holidays and extended shifts in the plant in order to maintain equipment that is needed for product producing operations. When the U.S. Economic situation began to

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erode in 2004, the cycle of indenturing new apprentices along these lines came to an abrupt halt.

As a result, of the sudden stop of new apprentices coming through their doors, the RTI providers, and many of the High School vocational programs that courted their students towards a future in a skilled manufacturing occupation, had to shift resources away from these programs. Manufacturing jobs simply were not available to their students, and did not appear to be returning anytime soon. Educational and Training resources at colleges and vocational centers were quickly diverted toward emerging technologies, health care and other service industry occupations.

Industrial and manufacturing apprenticeship programs are struggling to return to a nominal level and related training providers are moving, albeit apprehensively, towards reestablishing the curriculum necessary to educate the newer generations of apprentices. This will not be accomplished by simply cleaning out the storeroom, setting up moth-balled equipment and dusting off the books and materials that were once staples of the related training programs and bringing in new students to use them. It will mean a complete re-development of all course materials in order to bring the programs up to meet the demands required by today's manufacturers. The base of manufacturing technology has moved at such a rapid rate during the apprentice program hiatus in the United States that past generations of textbooks, training materials and equipment are no longer relevant, and are more likely to be viewed as museum exhibits. Investment into new materials and technologies by training providers is moving pensively at best. Training providers have no way of forecasting how many apprentices or manufacturing technology students may participate in their programs if the investment is made.

The economic downturn and subsequent bankruptcy proceedings of two out of the three Detroit automotive manufactures also had an interesting 'revolving door' effect for many of the senior skilled trades persons associated with manufacturing. As the Detroit 3 entered into bankruptcy proceedings there were a number of facilities identified for closure, many more were selected to experience greatly reduced rates of production. Entire shifts of workers, both skilled and non-skilled were eliminated, products that were in development were shelved and the general outlook of American manufacturing was

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perilous at best. Highly skilled, highly experienced skilled tradespersons were in fear that their coveted job-security was being torn away from them for the first time in history. All of the Detroit three OEM's made financial offers to entice high-seniority skilled personnel to accept retirement incentives in order to cut the skilled workforce headcount significantly. This was in response to the reduced need for personnel and major reductions in manufacturing capacity. Many of those accepting the retirement incentives soon returned to work, most often in the Tier I and Tier II automotive the supplier sector. This was a truly a boon to the supplier sector; suddenly available were highly skilled, highly experienced skilled tradespersons, ready to go to work at the lower scale. The Detroit 3 was not placing new apprentices, and the suppliers did not require additional skilled labor due to the availability of highly skilled professionals flooding the market during the economic downturn. This revolving-door effect had all but eliminated the need for manufactures to indenture new apprentices, as well as the need for educational providers to supply the training services for a market that did not exist. However, due the advanced age of the current manufacturing skilled workforce OEM's and suppliers are taking notice and are beginning to take action towards rejuvenating their skilled workforce.

A recent study through the Economic Modeling Specialists International (EMSI) Class of Worker 2013 shows the average age of those currently working in skilled trades positions in the manufacturing sector.



A majority of the skilled workers in these specialties are, on average, forty-five years of age or older. On the surface, this may not appear to be an alarming situation; an individual in his/her late forties can be expected to work another 15-20 years. However, when it is taken into account that it takes a minimum of four years to train a manufacturing skilled trade's apprentice, and in some trade classifications, especially in the tool and die making sectors, it takes much longer for the craftsman to become truly proficient even after apprenticeship is completed. In reality, this means that the tradesperson in the metalworking trades must often reach a mastery-level of proficiency in the job classification in order to be considered competent. Most often, this requires an additional 2-4 years under the guidance of more experienced Journeyman and engineering personnel.

Another stigma that needs to be overcome by the manufacturing industry is that manufacturing facilities are perceived as dark, dangerous and filthy places in which to earn a living. Many do not understand that modern manufacturing processes simply will not tolerate the conditions we have seen in old documentaries and photographs. The machining tolerances and precision of manufacturing required by today's designs and engineering requirements take into account the ambient conditions within the facility. Facilities must be kept very clean, temperature, humidity and air quality must be controlled in order to maintain the consistency required of the modern manufacturing process. Relegated to history, are the dark, dirty, and arduous working conditions experienced by our predecessors. A career in a Skilled Trades occupation in manufacturing can still be fraught with many dangerous situations, but safety practices and regulations have advanced as quickly as all other aspects of manufacturing technology. The rates of injury and fatality are less than a fraction compared to the historical trends of our skilled trades' forefathers.

The reasons for shortages in the Skilled Trades workforce are known, and while unfortunate, they can even be considered public relations issue at the behest of the currently aging workforce. The shortage has grown global. The most recent Manpower Group Talent Shortage Survey shows (Fig 5) that "Worldwide, the most difficult-to-fill vacancies in 2013 are for skilled trades workers. The skilled trades' category has

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topped the rankings in five of the past six years”. (Manpower 2014) Number four on the list from the Manpower Group survey shows that technicians are a hard to fill occupation category as well. Manufacturing production operators, quality control techs, and machine programmers are often classified as technicians working with CNC and NC controlled equipment and are considered part of the Skilled Trades in the manufacturing setting.

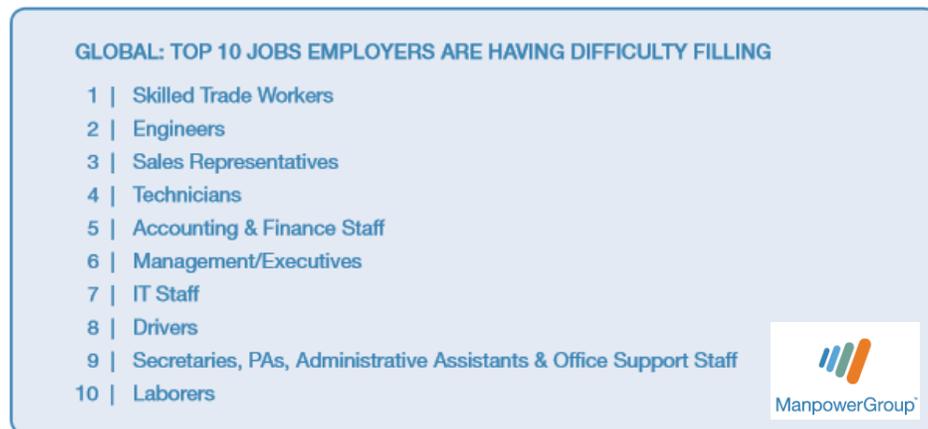


FIGURE 5

The Manpower Group survey also posted some alarming results regarding why potential skilled trades candidates were becoming difficult to find. On a Global scale, employers are unable to find employees with basic the mechanical reasoning and spatial relation skills required to fill entry-level positions.

*The largest proportion (34%) cited a lack of specific technical competencies (or hard skills) required for a particular role, closely followed by a straightforward lack of applicants (32%) (Figure 6). Among the employers who report a lack of hard skills, shortages are most often a result of candidates lacking either the necessary professional qualifications or relevant skilled trades experience.*

The reasons for this anomaly may in fact just be a simple cause and effect principle. The incoming generation of skilled craft persons has grown up in a very technologically driven environment. They've spent their childhoods with computers, video games and have experienced at least some of their educational time in a 'virtual environment'.

Simple toys ranging from wooden blocks, Erector sets, Legos and the like, taught the previous generation how to exercise spatial abilities and the mechanical limitations of poor decision making when their projects failed. Advances in small engines and throwaway designs on small appliances have meant that routine repairs around the house have become relegated to historical lore. We simply do not fix things anymore; we throw away and buy new. Consequently, we have removed the younger generation’s opportunity to experiment and simply learn how things work. We then find ourselves taken by surprise when there is a lack of basic technical, spatial and mechanical aptitude skills as they come of age and show interest in the manufacturing environment. The picture in the United States mirrors that of the global perspective the Manpower group study reports that “The hard skills shortage is most commonly explained as a lack of industry-specific professional qualifications or a lack of industry-specific skilled trades certifications” (Manpower Survey, 2013).

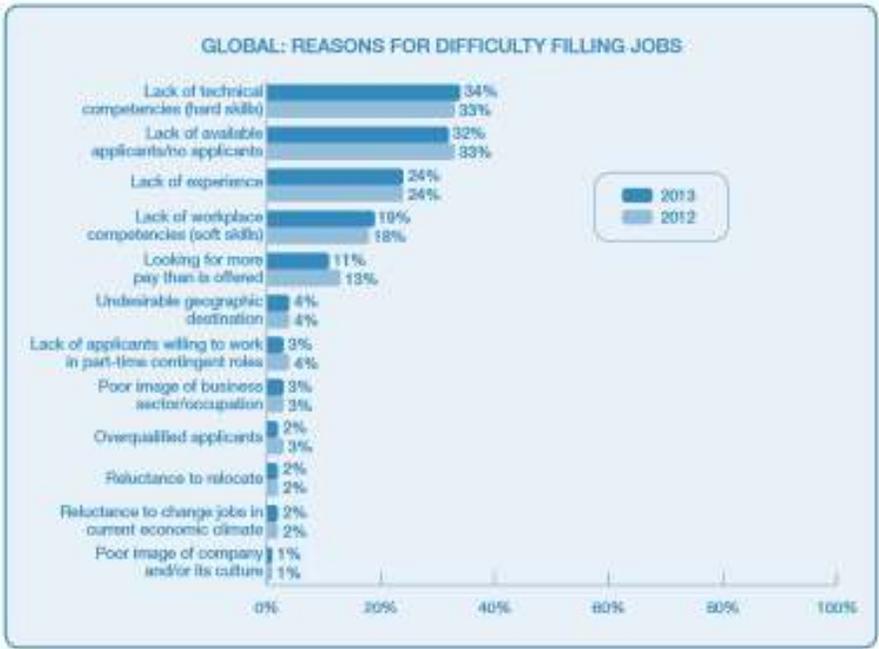


FIGURE 8



Globally and domestically, the shortage of available for hire, qualified skilled tradespersons has reached a point that manufactures are growing concerned about their ability to produce. Many ‘quick fix’ programs and curricula have begun to surface in

a shortsighted attempt to rectify the current lack of skilled trades technicians needed for high tech manufacturing.

**V. Training of qualified and proficient skilled trades' personnel is an investment of resources and time.**

Recognizing the impending shortage of skilled trades' technicians, there have been a number of program launches through non-profits and technical training providers that are working to 'fill the pipeline' of future skilled technicians that will be capable of providing basic maintenance services for a company at reduced time and cost to the employer. Many of these programs culminate with certificates and recognition and may even encourage the student on a pathway towards a two-year associate's degree. The classroom training will often contain general educational courses that are not normally part of RTI curriculum under historical registered apprenticeship and may even contain soft skills courses. As students enter into these programs they should make every effort to obtain as much technical and hands-on laboratory training as available. Future employers, especially those participating in registered apprenticeship, will consider all technical certificates and pre-skills training that has been completed and advance the apprentice in their respective programs accordingly upon hire. Employers and apprentice committees have known for generations that the soft-skills and collaborative experience required will take place through the normal course of on the job learning with the apprentices' assigned journeyworker. An up-front investment from potential and future skilled tradespersons in his/her own future will assist them in gaining exposure to manufacturing systems, as well as go a long way in showing prospective employers that they are willing to continue their pathway of continuous learning that will begin with tier first day as an apprentice.

Those seeking employment as a skilled trades person will still likely begin as a production operator in any manufacturing workplace. However, when the time comes to place new apprentices into the ranks of the skilled trades and begin an apprenticeship program, those that have made an investment of their own resources and time will most likely perform higher on standardized aptitude tests. They will also likely be able to

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interview at a higher level and enter the program with a better understanding of the requirements and rigors of serving and apprenticeship program

## **V. Return on Investment of training an Apprentice.**

An overriding concern of many employers is whether or not they will see a return of their investment if they seek to sponsor a local apprenticeship program. The short answer to this question is yes; a recent study through the Canadian Apprenticeship Forum concludes, “More than one-quarter (30.2%) of surveyed employers indicated that the benefit of training the apprentice exceeds the costs by the end of the second year of the apprenticeship”. The Canadian study surveyed almost 1000 employers across all provinces of the Nation and found that the hours based apprenticeship model is utilized throughout most areas of service and industry, in all cases there was a tangible return on investment well before the Apprentice graduated to Journeyman status.

**Figure 1**  
**Total Per Apprentice Costs and Benefits by Trade**

Trades	Duration <sup>1</sup> of Apprenticeship (Years)	Costs <sup>2</sup> (\$)	Benefits <sup>3</sup> (\$)	Net Benefit <sup>4</sup> (\$)	Benefit-Cost Ratio <sup>5</sup>
Automotive Service Technician	4	250,016	423,138	173,122	1.69
Boilermaker	4	246,889	473,696	226,807	1.92
Bricklayer	4	237,687	316,853	79,166	1.33
Cabinetmaker	4	180,369	247,298	66,929	1.37
Construction Electrician	4	196,811	293,048	96,237	1.49
Construction Millwright and Industrial Mechanic	4	254,287	403,272	148,985	1.59
Cook	4	125,344	164,868	39,524	1.32
Electrical Power Line and Cable Worker	4	336,770	319,759	(17,011)	0.95
Hairstylist	2	77,096	42,620	(34,476)	0.55
Heavy Duty Equipment Mechanic	4	252,371	497,636	245,264	1.97
Machinist	4	204,921	383,877	178,955	1.87
Motor Vehicle Body Repairer	4	210,088	362,237	152,149	1.72
Plumber	4	237,681	329,728	92,047	1.39
Refrigeration and Air Conditioning Mechanic	4	240,060	344,601	104,541	1.44
Sheet Metal Worker	4	258,160	322,022	63,862	1.25
Partsperson	4	215,323	361,276	145,954	1.68
<b>Average</b>	<b>4</b>	<b>220,242</b>	<b>330,371</b>	<b>110,128</b>	<b>1.47</b>

1 Source: Apprenticeship Survey (Q28)  
2 Represents the total per apprentice costs incurred over the apprenticeship period.  
3 Measured as the revenue generated by an apprentice.  
4 Benefits – Costs  
5 Benefits / Costs

A breakdown of those trade classifications related directly to manufacturing positions shows that the average company return is \$1.58 for every dollar invested. Over the course of this same study, the Canadians also concluded that there were other significant benefits associated with the training your own approach. “Over sixty percent (61.3%) of employers consider a journeyperson they trained as an apprentice to be more productive” meaning that a vast majority consider a “Homegrown-Journeyworker” to be significantly more productive than a Journeyman hired from off the street.

Employers rated “better fit with the organization” as the most significant benefit of employing a journeyperson who they trained as an apprentice. Employers also indicated that training their own journeyperson results in “reduced risk of skill shortages,” “increased potential for career advancement for the apprentice in the company,” “greater overall productivity,” and “fewer mistakes

-Canadian Apprenticeship Forum

The Canadian study did take into account all significant concerns associated with the training of an apprentice. Wages and benefits including pension plan, and workers compensation as well as opportunity costs associated with the lost productivity from the Journeyman assigned to provide On the Job Instruction of the Apprentice, additional scrap material and the additional time required to complete a given project assignment. Payments associated with Related Training tuition, books, registration and lab fees and wages paid while in attendance of Related Training courses. Finally, costs associated with the administration of sponsoring the apprentice program itself were considered in the final calculations when determining the total ROI of training an Apprentice.

The overall ROI appears to be very consistent across trade classifications and correlates the same returns for union and non-union proponents of apprenticeship training. A recent study through the Associated Building Contractors concluded that

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“apprenticeship is a proven method of combining classroom instruction with paid on-the-job training. Apprentices earn while they learn, working as regular employees, contributing to the company’s output and mastering skills under the guidance of the journey-level workers. Employers receive a return when they invest in apprentices. It is estimated that for every dollar invested in apprenticeship training a return of \$1.47 is realized”.

A viable concern of many potential apprentice program sponsors is in fact turnover. Companies are apprehensive to the idea of training their own skilled workforce under a Registered Apprenticeship program for fear that once the apprentice completes his/her training they may leave the company for higher wages or better benefits at a larger employer. A study Commissioned through Bank of America, titled “Manufacturing: Apprentice Programs Create Pipeline of Skilled Workers” discusses a facility in Freeport Pennsylvania engaged in the manufacture of aircraft components. The study quotes the Manager of Corporate Communications stating that the company realizes a \$100 return for every \$1 invested in Apprentice Training. The Communication Managers touts the success of their apprentice program for its contribution towards productivity and reduced turnover among its skilled workforce “It helps boost efficiency because skilled workers make fewer errors. This leads to cost savings from less rework and reduced scrap...The firm also retains more of its employees and experiences lower turnover because of its continual pipeline of trainees”.

No matter the trade classification or industry, it can be concluded that the indenturement of an apprentice will realize a positive ROI for the employer in very short order. The qualitative results also show that loyalty to the company and the use of “Home-Grown” Journeyman will benefit the company with higher productivity rates and lower turnover.

## **VI. Retention of graduated apprentices**

For those employers that cannot be convinced that they will be able to retain their workers who complete a Registered Apprenticeship program there are methods available that may alleviate concern. The ‘indentured servitude’ clause is becoming more and more commonplace within manufacturing apprentice programs. As with all

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Registered Apprenticeship Programs, the apprentice signs an agreement, which explains the requirements and benefits of the apprentice's participation in the program. These agreements are furnished either by The U.S. Department of Labor-Office of Apprenticeship, or by the appropriate State Apprentice Council. Local joint apprentice committees are drawing up secondary agreements, commonly referred to as indentured servitude clauses, which further explain for the apprentice the potential benefits and responsibilities. These may also include items such as a tooling allowance, or mileage paid to and from the related training provided, as well as a requirement for term of service following the completion of the apprentice program. All of these items, among others, are outside of the DOL-Office of Apprenticeship or State Agencies' ability to enforce and therefore cannot be contained within apprenticeship program language that will be registered with the appropriate agency. It is up to local employers, manufacturing associations, labor organizations and their legal departments to develop and retain such secondary program commitments.

While it may not be completely comforting to the apprentice program sponsor, the retention of newly graduated apprentices is not as significant of a concern as some might believe. It is likely true that an OEM will have a more attractive compensation package, but the young journeyman will likely find him/herself on an undesirable work schedule due to their seniority level. As mentioned earlier, the manufacturing apprentice most often starts in the non-skilled production area of their facility and may have many years of service invested in retirement plans and earned benefits upon completion of their apprentice program. Lastly, the OEM's are not as attractive to the budding Journeyman as they once were the benefits, defined pensions and lifetime healthcare are no longer available to entice the younger skilled workers to sacrifice family and community pleasures in order to become an employee of the Big 3.

## **VI. Whether forecast**

Within the manufacturing industries, it has been widely known that there is an impending shortage of skilled labor on the immediate horizon. Some companies have already had experienced and many more including Detroit's big 3 are in fear that their

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ability to operate will be seriously compromised if action is not taken. Employers are becoming increasingly creative with efforts to retain their current workforce up to arbitrarily increasing the skilled workers' hourly rate of pay. While this practice is discouraged and even questionable on a legal basis it is a prime illustration of the level of desperation that employers a feeling in many areas of manufacturing. At this point, the choice is not whether or not to consider putting an apprentice training program in place, it is more a matter of working to register a program with the U.S. Department of Labor or State Apprenticeship Council agency as soon as possible. The current group of skilled tradespersons is already in the stages of weighing their retirement options and the skills and techniques they have carried from their own predecessors along with the newer practices they have developed in keeping pace with changing technologies may very well leave with them. Each new U.S. DOL office of apprenticeship program registered with the assistance of State and Federal agencies and the UAW's International Skilled Trades Department, will guarantee a company's ability to produce quality products, on time that meet customer requirements and also secure America's position as the leader in the advanced, high-speed manufacturing marketplace.

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