A World without Craftsmen

"Craftsmanship" results when highly trained, skilled, and knowledgeable workers use tools and machinery to perform their work, or trade, with the highest levels of quality and appeal. But this "craftsmanship" and pride in workmanship is nothing new. Artisans were the predominant producer of goods in the era before the late 18th century Industrial Revolution and were the predecessors of the "craftsman." Artisans, and later craftsmen, were revered in their knowledge and abilities to build, create, or construct their products with high degrees of excellence. Centuries ago, craftsmen were admired and highly sought after. Today, unfortunately, "maintenance" is not a trade or craft in the traditional sense of the word … but it should be if we expect high performing, reliable, cost competitive equipment and facilities. Our nation, its business and industry, its infrastructure will continue to be at risk if we do nothing to change the perceptions, the development, and the retention of the highly skilled employees who tend to our equipment and facilities, assuring that they are reliable and cost effective. Let's look at the historical development of a "craftsman" as a lesson for our future.

Craftsman & Tradesman

Skilled manual workers in a specific trade or craft were called craftsmen or tradesmen (PC today: craftworker or tradesperson). Their status was considered between a laborer and a highly trained and educated "professional." Most had high degrees of both practical and theoretical knowledge of their trade.

Since the 14th century, a journeymen wishing to become "master craftsman" would produce a "masterpiece" that would be judged by the craft guild members (professional associations). Successful candidates would then be elected as "masters" in their craft and were generally obligated to take on young apprentices in order to pass on their skills and knowledge.

A shortage of skilled trade workers or craftsmen grew rapidly in societies where educated professionals were highly prized. This led to lucrative niche markets in the trades. (History is repeating itself!)

Journeyman

A craftsman or tradesman typically begins as an apprentice, working for and learning from a master craftsman, and after four to seven years is released from his master's service as a journeyman. Craft and trade training in European cultures has been a formal tradition since the late Middle Ages. The word "journeyman" comes from the French word *journée*, meaning the period of one day and referred to his right to charge a fee for each work day. In England, the journeyman would typically work as an employee for daily pay. In Germany, the journeyman would often "journey" from workshop to workshop learning from many different masters while being paid for his daily work. The term *jack* is sometimes used as an informal name for journeyman. A *"jack of all trades…"* is a common term for someone who possesses a degree of skill in more than one trade but has not made a continuous career of any one to become a master tradesman or master craftsman *("and master of none").*

Apprenticeship

The formal system of training a new generation of skilled craft or trade practitioners, which is still popular in some countries, is called an apprenticeship. Apprentices build their careers through structured, formal apprenticeship training. Most of their training is done on the job, balanced with classroom studies, while working for an employer who helps the apprentices learn their trade. The system of apprenticeship was developed in the later Middle Ages (14th and 15th centuries) and came to be supervised by craft guilds and town governments. A master craftsman was entitled to employ young people in his workshop as an inexpensive form of labor in exchange for providing formal training in the craft. Apprentices were usually about 14 to 21 years old, unmarried, and would live with the master craftsman's family. Most apprentices aspired to becoming master craftsmen themselves upon completion of their contract (usually seven years). Upon completion of the apprenticeship, they would work as a journeyman but a significant number would never achieve the status of master craftsman or acquire their own workshop.

During the 20th century, the apprenticeship process has changed in many ways. A craftworker or tradesperson still begins as an apprentice, but the apprenticeship is carried out partly through working with a qualified journeyman and partly through an accredited trade school for a definite period of time (usually around four years), after which they are a fully qualified journeyman. Very few trades still make a distinction between a qualified tradesman, journeyman, or a master.

Governmental regulations, bureaucratic rules, and the licensing of vocational-technical schools formalized the details of apprenticeship programs. In 1937, the U.S. Congress passed the National Apprenticeship Act**,** also known as the Fitzgerald Act, which established a national advisory committee whose task was to research and draft regulations to establish minimum standards for apprenticeship programs. The act was later amended to permit the U.S. Department of Labor to issue regulations protecting the health, safety and general welfare of apprentices, and to encourage the use of contracts in the hiring and employment of them.

A World without Craftsmen

Where do we stand as a nation? Are our maintenance and reliability technicians, mechanics, and electricians true journeymen or better yet masters? Have we perpetuated the centuries old apprenticeship processes of passing on skills and knowledge to the younger generations? Unfortunately not. Most small and mid-sized businesses and industries have not trained and developed the skills and knowledge of their maintenance workforce. Many have assumed that the "craft" of maintenance can be picked up along life's way. When they get in a bind, these business and industry managers typically resort to training for a short time.

I have said it before, and I will say it again: Most maintenance people in small to mid-sized plants today have not been formally trained and qualified to do the tasks we ask them to do each day at work. Sure, most maintenance people are good, in fact excellent at figuring things out. We love puzzles. We love challenges. But what about our business competitiveness today and on into the future? While I believe in structured apprenticeship training programs, I also know that many resource-constrained businesses quite frankly do not have the time or money to devote to such structured training processes. So, how do we proceed in securing the future of our highly mechanized, automated, techno-logic wired businesses and industries? We need "craftsmanship" now more than ever before!

21st Century Apprenticeships

We need to establish company-based apprenticeship-type programs to develop the skills and knowledge base required to competitively operate and maintain our infrastructure, facilities, and equipment… but not the "old apprenticeship-style" programs. We can learn from the mentoring process by which early apprentices learned to master new skills and knowledge. We can recognize that not every journeyman is a master craftsman; only the best achieve that status when recognized by their peers. We can accept the fact that quality workmanship (right the first time, safe, cost effective, timely) is a result of formal, structured learning processes. Briefly, here is what 21st Century Apprenticeships could be:

- Formal assessment and selection processes to identify the best and the brightest apprentices, those with high prospects of success.
- Organized training-learning processes from the prerequisite basics (reading, math, writing, safety, tools…) to core skills and knowledge (pumps, motors, gearboxes, drives…) to equipment and task specifics (Press #44, Allen-Bradley PLC, Line 8…). Don't stop with the core skills and knowledge assuming that they can "figure out" the specific equipment applications.
- Training focused on results, not training for training sake (high cost – low return). Focus on constraint, high maintenance cost, problematic, most penalizing, and critical at risk equipment or areas of the facility (low cost – high return).
- Detailed step-by-step procedures or "best practices" used as guides for equipment-specific instruction, and eventually job-performance requirements (standardized work instructions).
- Apprentice learners assigned to work with the top qualified employees as their mentors for specific skill sets. Mentors trained and held accountable for effective on-job coaching skills.
- Apprentice learners formally "qualified" through progressively more and more challenging task demonstration of on-job skills and knowledge.
- Apprentice learners pay advancement linked to progressively higher and higher demonstrated qualifications (pay-for-applied skills). Employees periodically re-qualified on job-critical tasks.

21st Century Reliability Technicians

Many, but not all of our maintenance mechanics of the future must be proficient in "reliability methods." Higher-level reliability skills and knowledge is the natural progression for those who are the highly successful products of the 21st century apprenticeships. The more our reliability technicians know about equipment and the fundamentals of good maintenance, the more efficient and effective they will be. Reliability "tools" alone will not make a reliability technician. Reliability methods help us look into the future, into equipment conditions, using tools and processes to identify and correct emerging problems before they negatively impact the business. The 21st century reliability technicians must be proficient in using many and varied appropriate reliability methods. Consider these as starters:

- Condition monitoring technologies and predictive maintenance (PdM) such as oil analysis, vibration analysis, infrared/thermography
- Preventive maintenance (PM) including ultrasound inspection
- Precise machinery lubrication (not oiling and greasing)
- Precision maintenance

- Root cause failure analysis (RCFA) and problem prevention
- Root cause success analysis (RCSA) to promulgate what works
- Reliability centered maintenance (RCM)
- Data collection and analysis from multiple sources to improve performance
- Partnering with operations to improve overall performance (Total Productive Maintenance)
- Cross-functional teamwork to improve performance, develop new methods, and design new equipment and facilities

A world without "craftsmen" will be disastrous. Today's maintenance and reliability craftsman must look considerably different from the model that is predominating in our culture today. Our nation, its business and industry, its infrastructure will continue to be at risk if we do nothing to change the perceptions, the development, and the retention of the highly skilled employees who tend to our equipment and facilities, assuring that they are reliable and cost effective. We must find new ways to tap and expand the talents in our present and future workforce, to formally develop their skills and knowledge, to maximize the proven technologies that exist today. A college education is not the only answer for successful and rewarding careers.

Imagine what our future could be if we had formal mentor-based development and progression processes from high school co-op students, to work study students, to employed helpers, to apprentices, to journeymen, to masters or reliability technicians. Imagine where we would be today in the globally competitive marketplace if we had a highly trained workforce thinking and acting "reliability" versus "repairs" maximizing the proven reliability tools and methods we have today. Imagine if we revived the essence of old-world apprenticeships combined with proven skills development methods from World War II and the most modern equipment and technologies in the world. Imagine! Imagine. Then, imagine our world without "craftsmen." Imagine…

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