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"Multi-skill maintenance" defined: Blending skills and knowledge across traditional maintenance craft- or trade-job definitions and boundaries to address modern equipment technologies and work efficiency and effectiveness.

Most plants and facilities in America have operated with a "multi-skill" maintenance workforce for generations. As I've said before, it's nothing new. Growing your own multi-skill maintenance technicians may make sense if you're not there yet—*especially when you consider skills shortages and the integrated equipment technologies in your plants and facilities.*

I started exploring multi-skill maintenance in American industry in the mid-1980s. It was around this time, as plants and facilities were modernizing with radically different state-of-the-art technologies, that we first began experiencing shortages of qualified maintenance technicians. Our solution was to develop models for defining required skills and knowledge, then training and qualifying the new "multi-skill" maintenance technician. Pay-for-skills compensation systems were used to recognize changing job-performance requirements. And it worked!

Skills blending is the operable term

In these early multi-skill jobs (and the move to multi-skill maintenance-job roles), mechanics were taught specific electrical and instrumentation skills, and electricians were taught specific mechanical skills, along with instrumentation and control skills. This "blending" of skills and knowledge addressed particular equipment and process maintenance requirements, where merely adding more mechanics and electricians would not adequately address the requirements.

The use of robots in manufacturing plants drove one of the BIG multi-skill maintenance training and qualification priorities in the 1980s. Robots of that era (similar to those of today) required a blending of maintenance skills and knowledge to troubleshoot, maintain and repair (i.e., skills and knowledge in the areas of mechanical, electrical, electronics, microprocessors, programmed logic controllers and hydraulics). Without these "blended" skill sets, there would

sometimes be four different maintenance tradesmen working on one robot trying to troubleshoot and make repairs. This traditional approach did NOT work.

Training and qualification is a must when developing multi-skill maintenance job roles. One of the biggest complaints in the history of multi-skill discussions (and arguments) is worker safety. “If they work outside their traditional job role they can hurt themselves and others!” Effective multi-skill maintenance jobs require formal training and qualification processes as defined in “Growing Your Own: Parts II and III” (Uptime, pgs. 8-10, MT, February and March 2011). To omit training is dangerous, counterproductive and downright insane.

Attention: multi-skill is NOT multi-craft

“Multi-skill” is blending skills and knowledge to fit the requirements of the equipment: This allows the maintenance technician to do more “whole jobs” rather than handing off part of a job to others and returning to complete the job.

“Multi-craft,” on the other hand, is often a combination of two or more maintenance job classifications and responsibilities. While this may look easy on paper, it can be extremely difficult to execute with very little benefit to the organization.

How to start multi-skill

Begin by evaluating the need for “multi-skill maintenance” with these questions:

- Where do we have new equipment maintenance and reliability challenges?
- What technologies are in the capital spending plans and new equipment projects forecasts?
- What does the equipment require us to know and do (knowledge and skills)?
- Do we have sufficient numbers of maintenance people with proper skills and knowledge?
- Does it take more than one maintenance person to diagnose a problem?
- Do equipment engineers routinely diagnose equipment problems?
- Do we have sufficient maintenance skills and knowledge on all operating shifts?
- Will we begin experiencing a shortage of skills due to retirements or quits?

Look at your traditional maintenance job roles and responsibilities and job descriptions. Do they encourage or prevent the blending of skills and knowledge? Oddly enough, there is little consistency in maintenance job roles and job descriptions across America. I continue to

discover that maintenance is the least defined of all industrial activities. Err on the side of flexibility.

Technology has changed maintenance job roles

Troubleshooting, problem solving, maintenance and repairs have become needlessly complex because of the perpetuation of traditional maintenance job roles. Mechanical maintenance job roles have changed significantly because of the “automation” of many types of equipment and electro-mechanical processes. Traditional mechanical maintenance work has been undermined because of the addition of control loops, sensors, interlocks, microprocessors and programmed logic devices. Seemingly simple mechanical problems are masked by layers of electronics and the use of electro-mechanical devices. Likewise, seemingly simple electrical/electronic problems are compounded by the interaction with mechanical devices.

Keep this important fact in mind: Business and industry will struggle when maintenance job roles are not updated, improved or altered to match the changing requirements of equipment technology.

Auto mechanics are multi-skill

I was a certified auto mechanic and instructor in 1970. Auto mechanics these days bear little resemblance to my peers of back then. Engines, transmissions, suspensions and interior controls are now largely controlled by microprocessors and on-board mini-computers. A great engine mechanic of the 1970s and 1980s would be hard-pressed to diagnose and solve problems in today’s vehicles. Auto mechanics’ jobs have evolved to address the changing requirements of the equipment they work on. This evolution has called for significant amounts and higher levels of training and qualification. That’s why many of the general auto repair shops of the 1970s and 1980 have disappeared—*and why auto dealership service departments have grown* . The little guys just couldn’t keep up with the technological changes.

Multi-skill maintenance is not for everyone

Changing to multi-skill job roles does not need to be wholesale, across the board for all maintenance roles in the plant. The focus should be on improved maintenance and reliability results through the targeted use of multi-skill job development. Some level of traditional maintenance craft and trade skills will always be needed. Some people may not have the interest or the aptitude to master the new multi-skill job requirements. They can continue to perform work in their “primary craft.” Other maintenance personnel may have unique, highly “specialized skills” that are not necessarily opportunities for multi-skilling.

Here are several examples of typical multi-skill maintenance training and qualification opportunities for mechanical maintenance personnel. In many traditionally structured plants, these job duties have been perceived as “electrical” and, thus, have not been performed by maintenance mechanics:

- Removing, replacing and terminating electric motors
- Phase-checking and rotation-checking newly installed small electric motors
- Removing and replacing electric-operated brakes and clutches
- Removing and replacing solenoids and actuators
- Removing and replacing switches, panel lights and buttons
- Re-setting tripped circuit breakers (over current devices)
- Unplugging power cords (220v and 480v)
- Performing preventive maintenance on motors
- Lubricating electric motors
- Replacing motor brushes and cleaning up commutators
- Adjusting speed controls
- Reading schematics and wiring diagrams
- Reading ladder logic diagrams
- Troubleshooting control loops, sensors and devices
- Troubleshooting electro-mechanical controls and devices
- Removing and replacing limit switches and sensors
- Installing conduit and pulling wires
- Installing, removing and replacing lighting

By the same token, though, multi-skill electricians can be cross-trained and qualified in a variety of basic mechanical and instrumentation/electronics skills and knowledge of job-performance requirements.

Regardless, when developing multi-skill maintenance job roles, formal training and qualification processes are a must. Modified compensation systems such as “pay-for-skills” to support multi-skill maintenance are also a must. Without changes in training and compensation systems, the multi-skill model will not work.

This is the right time to do it

The skills shortages we are currently experiencing have been and will continue to be exacerbated by hanging on to old, outdated, traditional maintenance job descriptions and expectations in the context of modern plants and facilities. Labor leaders, human resource

managers, maintenance managers, maintenance employees and local community colleges and tech schools, among others, must collaborate on the changing maintenance requirements in our businesses.

Maintenance and reliability
leaders who are facing the conflict of traditional job roles and modern equipment and facility technologies must take the lead to grow their own. The performance, reliability and competitiveness of our businesses and industries is in the balance. The time for action is now. **MT**

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