How Reliability Helps Plants Navigate Skilled Labor Shortages

By Andrew Espejo, CMRP, Reliability Managing Principal with Element6 Solutions

The skilled maintenance labor shortage is no longer a looming threat; it's a daily operational reality for manufacturers and heavy industry, and the #1 issue with nearly every maintenance stakeholder I talk to. As experienced technicians retire and fewer young workers enter the trades, organizations are left with a shrinking pool of skilled labor. While workforce development is essential, manufacturers can take immediate action by investing in reliability-focused projects that reduce labor demand, improve efficiency, and preserve institutional knowledge.

Below are five key reliability initiatives, rich in impact and practicality, that help address this challenge head-on:

1. Maintenance and Reliability Program Analysis

A maintenance and reliability program analysis should be a holistic evaluation of maintenance practices, Computerized Maintenance Management Software (CMMS) data, staffing, workflows, and Return On Investment (ROI) potential. It can be performed as a desk exercise; however, we recommend spending significant time with the trades evaluating their daily work to understand gaps for improvement. The projects should address inefficiencies such as redundant PMs, excessive emergency work, or underutilized staff, and a resulting roadmap should enable smarter allocation of labor and reduce the need for additional hires by improving how existing teams operate. Subsets of this analysis can include:

- **ROI Analysis for Strategic Prioritization**: Financial modeling and scenario analysis to evaluate the cost-benefit of reliability initiatives. This analysis can range from plant-level Replacement Asset Value analysis to deep dives in labor and spare parts improvement opportunity analysis. This helps leadership justify and make informed decisions about where to invest limited resources. By identifying the most cost-effective projects, organizations avoid spreading their workforce too thin and focus on initiatives that deliver the greatest labor efficiency gains.
- **Root Cause Failure Analysis, Bad Actor Analysis, Reliability Growth Model (Crow-AMSAA), and Weibull Analysis**: These are investigations into asset failures - frequency, severity, failure modes, PM effectiveness, and which assets consume the most resources. Understanding these factors helps to eliminate recurring problems that consume disproportionate labor hours and facilitate continuous improvement. By solving root causes, organizations reduce the reactive workload and free up skilled labor for proactive improvements.
- **CMMS and Asset Performance Management (APM) Optimization**: This can include system audits, data cleanup, workflow redesign, and dashboard development to improve work order accuracy, reduce administrative burden, and enhance decision-making. Skilled labor spends less time on paperwork and more time on value-added tasks.

- **Service Level Agreement (SLA) Optimization**: This involves reviewing and renegotiating third-party maintenance contracts and service agreements to eliminate non-value-added services, thereby redirecting savings to internal team development. It ensures external labor is used strategically, not as a crutch for poor internal processes.
- **Recapitalization Analysis**: This involves assessing the integration of maintenance strategies with capital planning and asset replacement schedules, as well as improving the recapitalization process. The goal is to ensure that aging assets, assets in poor physical condition, assets becoming obsolete, or single-point-of-failure risks are budgeted to be refurbished or replaced. Addressing asset recapitalization risks prevents over-maintenance of aging assets and aligns labor planning with long-term asset strategies.

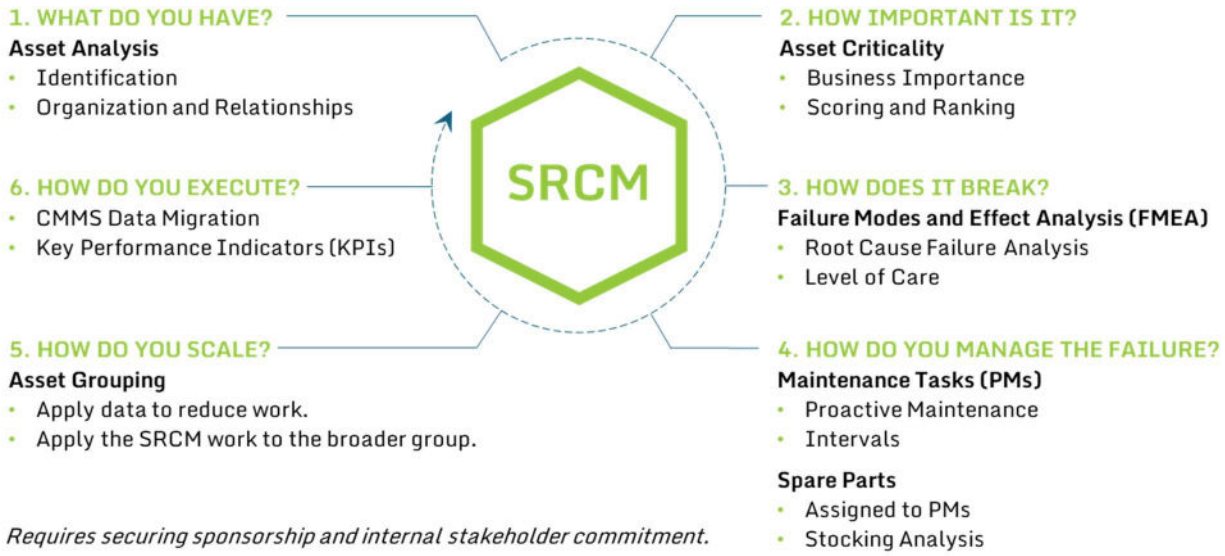
2. Production Performance Assessment

This is a cross-functional initiative targeting equipment availability, performance, and product quality. It can be performed system-by-system, with an end-to-end analysis of each system's process to develop detailed gaps to improve, which can include materials, equipment design, operator care, maintainability, changeovers, etc. By reducing downtime and improving throughput, these projects lessen the reactive workload on maintenance teams and allow skilled labor to focus on preventive and strategic tasks rather than firefighting.

3. Streamlined Reliability Centered Maintenance (SRCM)

SRCM is foundational to reliability. This linear process involves:

- evaluating and improving the asset register and data,
- performing asset criticality analysis,
- assigning maintenance strategies based on criticality, ensuring assets receive the proper level of care based on their importance to the business,
- identifying failure modes to write value-added PMs to mitigate the cause of failure (and removing non-value-added PMs), and
- identifying spare parts needed to complete the maintenance work efficiently.



This process eliminates unnecessary PMs and ensures critical assets receive the right level of attention, reducing wasted labor hours, ensuring skilled technicians are deployed where they're most needed, and that they have the spare parts on hand to perform the work.

Subsets of this process can include:

- **Operator-Based Autonomous Maintenance**: This involves documenting PMs with operator tasks, training, and implementation of visual standards for operators to perform basic maintenance. This shifts routine tasks (e.g., cleaning, inspections, some lubrication, etc.) to operators, freeing up maintenance technicians for more complex work. This cross-functional approach extends the reach of the maintenance team without increasing headcount. This also leads to increased operator ownership of the equipment and manufacturing process.
- **Planning & Scheduling Optimization**: This involves facilitating planners and schedulers to redesign workflows and train them to enhance job readiness and labor utilization.
- **Condition Monitoring & Predictive Maintenance**: During the SRCM process, vibration analysis, thermography, ultrasonics, oil testing, and other technologies will be assigned based on asset criticality, the asset, and the plant's ability to execute and diagnose.
- **Spare Parts Optimization**: Optimizing spare parts identified through SRCM, a warehouse analysis, and vendor research (cost, lead time, obsolescence, and superseded parts) can reduce costs of excess inventory holding and ensure there are parts available when needed. This allows spare part kitting that eliminates technicians hunting for parts, costing valuable wrench time.

4. Digital Twin Development

This entails 3D scanning of physical assets and systems for simulation and planning. It enables remote troubleshooting, training, and scenario testing without disrupting operations. It reduces the need for on-site expertise (allowing remote SMEs to participate) and accelerates the onboarding of new technicians. Efficiencies can be as simple as pulling up the model on a computer or phone and viewing equipment, rather than walking or driving across the plant (in inclement weather), climbing stairs, taking pictures, measuring, etc. Tie in live operational data (temperatures, pressures, flows, power, etc.) empowers the condition-based / predictive maintenance benefits.

5. Training & Mentorship

Structured technical training, reliability fundamentals, and on-the-job mentorship build internal capability and preserve institutional knowledge. It reduces reliance on external contractors and improves retention by investing in employee development. Most importantly, it supports the company's culture of expertise and investment in people, leading to increased job satisfaction and lower attrition rates.

A Strategic Path Forward

Addressing the skilled labor shortage requires thoughtful, targeted action. By leveraging these five reliability-driven approaches, manufacturers can optimize labor deployment, reduce operational stress, and future-proof their maintenance organizations.

At Element6 Solutions, we understand the pressure this challenge puts on operations, and we're committed to helping organizations navigate it with practical, reliability-focused strategies. Andrew Espejo, CMRP, Element6 Solutions Reliability Managing Principal collaborates closely with clients to identify opportunities for improvement, optimize maintenance planning, and build internal capability.

If you're exploring ways to make better use of your current workforce or looking to improve long-term asset performance, Andrew and the Element6 Reliability Team are available to share insights and discuss what might work in your environment. Reach out to reliability@elmt6.com to start the conversation.