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BEST PRACTICES IN PROTECTION SYSTEM TESTING AND VALIDATION

BY JACOB LOYD and MICHAEL WILSON, Megger

Testing plays a critical role in verifying that the protection scheme is designed to meet its intended purpose. It ensures the field wiring matches the schematics and everything works seamlessly. This article defines function testing and functional testing and explains the advantages and disadvantages of each test.

WHY DO WE TEST?

While engineers and electricians are highly skilled professionals, they are human and can make mistakes. That's why, during the commissioning process, we meticulously search for errors, knowing full well that they can exist anywhere.

It is imperative to verify cable sizes, color codes, and termination labeling in even the most carefully planned designs to ensure accuracy. Moreover, the creation of precise as-built drawings is crucial for future projects. Without proper maintenance, it becomes increasingly difficult to plan and design upgrades.

WHAT IS FUNCTION TESTING?

In the world of commissioning, function testing involves the manual or electrical manipulation of various components, such as relays, sensors, gauges, and contacts, to verify the presence or absence of electrical signals through the different paths of a schematic. This signal can be verified by picking up or dropping out a downstream device or by using a metering device like a multimeter to measure voltage or current.

Because each device and customer design has unique schematics, creating a standard commissioning procedure that ensures point-to-point continuity through an AC or DC circuit can be a complex and meticulous process. As a commissioning engineer gains experience with exposure to systematically testing different devices and designs, they develop an appreciation for the science and art of commissioning.

To illustrate, consider the DC schematic of a breaker trip circuit shown in Figure 1. The normally open OUT101 contact breaks the positive leg of the 125 VDC circuit of a trip coil. The circuit breaker's trip coil is energized by pulsing the OUT101 contact, proving that the signal is passed to a downstream terminal point or device when the contact is closed.

Pulsing the relay contact also verifies the relay contact's ability to operate from an open to closed

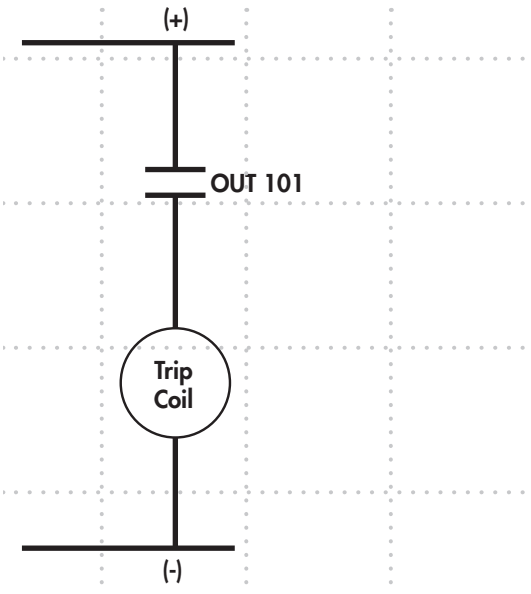


Figure 1: *DC Schematic of a Trip Unit*

Analog values are injected through a test switch to validate the wiring between a switch and a relay.

position and back again. Note that for simplicity, we have removed the auxiliary contacts that are usually present to provide supervision.

WHAT IS FUNCTIONAL TESTING?

Functional testing is an intricate process that not only checks the relay's output contact movement from closed to open and back again, but also verifies when the contact should operate. To elaborate, consider Figure 2.

We observe that the relay's OUT104 contact is connected in series with the 86BF breaker failure lock-out relay (LOR). During function testing, we pulse the output to test the lockout relay's operation or roll, followed by verifying the contact development to validate the circuits connected with the 86BF LOR.

While function testing involves pulsing the output to confirm the lock-out relay's operation and validating the contact development to prove the circuits associated with the 86BF LOR, functional testing takes a more comprehensive approach.

In this method, we examine the circumstances that could cause OUT104 to operate, such as the trip condition that exists after 18 cycles, typical in programming breaker-failure logic. This approach allows the trip to be initiated, monitors the secondary current magnitude, and asserts a separate contact to operate a lockout relay that trips adjacent

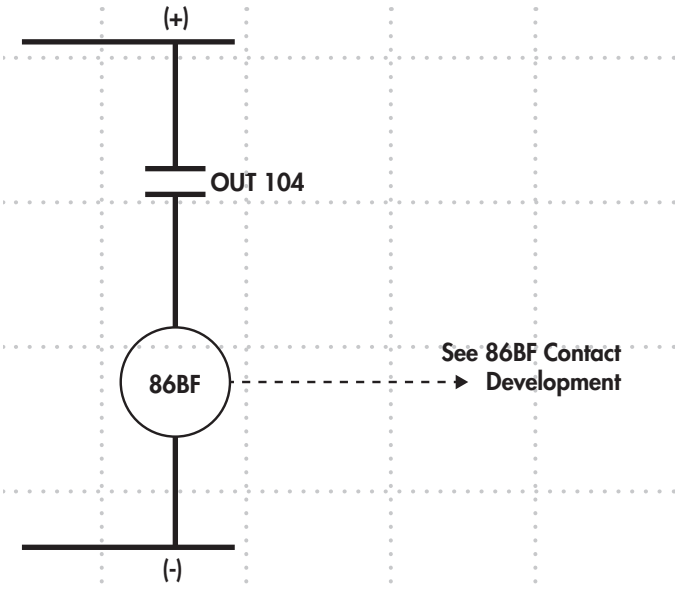


Figure 2: *DC Schematic of an LOR Circuit*

circuit breakers, blocks auto-reclosing, and sends necessary alarms to the station relay terminal unit (RTU). However, testing the operability of the OUT104 contact alone can lead to missing the conditions that must be fulfilled and dictated when OUT104 operates.

Even if the OUT104 contact is properly wired, the wiring diagrams are accurate, and the output is pulsed successfully during commissioning, there is still a chance of missing critical details. For instance, the OUT104 definition could be flawed or dependent on some other bit of logic that might have been inadvertently brought over from a previous project or an entirely different substation.

As technology advances and protection schemes evolve, testing methodologies must adapt to keep up. Commissioning engineers must ask themselves if their current testing strategies could miss critical details. If the answer is yes, they must make changes accordingly to ensure that the system is thoroughly tested and meets the desired standards.

HOW DO WE TEST NOW?

As commissioning engineers and test technicians, our work often involves testing various devices, alarms, and circuits in newly implemented designs. Sometimes, we are required to do these tests on short notice due to necessary isolations or in-service equipment that could potentially be affected. While this approach may not be the most efficient, it does allow us to make progress while waiting for additional circuits to become available.

Additionally, it offers greater insight into terminated cables and their potential impact on existing equipment, enabling us to identify and address any issues that may arise. By doing so, we can ensure that the devices, alarms, and circuits in the newly implemented design are functioning optimally and that any potential problems are identified and resolved quickly and efficiently.

Advantages of Current Testing Methods

Engineers and technicians should test protection and control circuits as they become available to ensure that all construction and commissioning activities are well-coordinated. This approach allows them to verify the accuracy of issued-for-construction (IFC) schematics and wiring diagrams and identify any discrepancies early on.

Typically, commissioning activities are driven by construction activities, and technicians tend to coordinate their testing based on the availability of electricians to install, form, and terminate cables running from panels. By commissioning circuits as they become available, engineers can ensure that the construction activities are aligned with the commissioning activities and that discrepancies are addressed immediately.

It is important to note that customers often have strict protocols regarding returning equipment to service and completing the required documentation. Since the final protection settings may not be available at the start of a project, it is crucial to test the operation of inputs and outputs, even without actual relay settings. This approach helps engineers identify possible wiring or equipment issues early on that may require replacement, which could have a lengthy lead time.

In the case of modifications, these problems can even be latent issues with wiring or labeling that have gone unnoticed for years. By identifying such issues early in the project cycle, engineers can ensure they are addressed while there is still enough time to commission the equipment and avoid any delays.

Ultimately, getting an early start on highlighting or verifying drawings is critical to submitting as-built drawings on a timely basis. This approach is also essential for ensuring that newly commissioned equipment is placed into service as soon as possible. Commissioning circuits as they become available is an efficient and effective way to achieve these objectives while ensuring that all construction and commissioning activities are well-coordinated.

Disadvantages of Current Testing Methods

Testing circuits as they become available has several disadvantages compared to a more structured and coordinated approach. Multiple touches are often required, which can lead to human error and wear and tear of the contact being operated. Lifting terminations during testing can also increase the risk

of human error, while the time required for warning others before operating devices in the substation yard or switchgear room can be substantial.

Moreover, when a trip or close coil saturates and operates, an arc develops across the contacts as it interrupts the circuit. This arcing causes pitting and degradation of the contact's life (Photo). Therefore, minimizing the number of operations performed on a device, such as a circuit breaker, motor-operated disconnect, or lock-out relay, is crucial to reducing the chances of degradation.

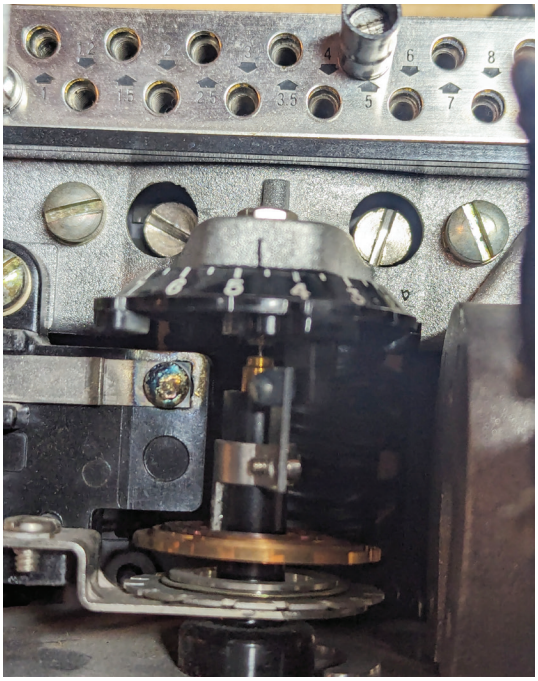
We recommend a more structured approach to testing circuits to achieve overlap in testing procedures while minimizing the number of operations performed on a device. This will reduce the risk of human error and contact wear and tear, ultimately improving the efficiency and performance of the circuit.

For example, if testing a protective scheme on a circuit breaker equipped with a lockout relay, the first relay operation can be verified to trip the lockout relay, which then trips the breaker. Now that the circuit between the 86 and the circuit breaker has been verified as intact and functional, we can avoid additional operations of that breaker by leaving it in the trip state and testing all further trips to the 86, helping to prolong the life cycle of the breaker.

ADVANTAGES AND DISADVANTAGES OF FUNCTIONAL TESTING

Functional testing can be a complicated process, depending on the protection schemes being tested and the affected equipment. Upgrades of abandoned or underutilized sites often involve in-service equipment and require weeks, if not months, of planning due to potential environmental contamination. Protection outages (temporarily disabling specific protection schemes, such as secondary relaying, etc.) can put the power system at risk, and planned station outages may require extensive switching in the field. However, functional testing should not be disregarded without proper documentation and clear communication with the customer.

The advantages of functional testing are numerous. Functional testing not only provides reassurance that the scheme works as intended but also gives the technician a better understanding of the protection scheme. Verifying interoperability with overlapping schemes is critical and should be investigated thoroughly before placing equipment into service. This reduces the risk of future misoperations and, if coordinated, can minimize the time spent testing.



Arcing results in pitted contacts and reduced contact life.

WHAT CAN WE DO BETTER?

Ultimately, as engineers and technicians, we should always try to balance technical rigor with speed and efficiency to meet project needs. Rather than being rigidly committed to one way of working, flexibility and openness to new methods allow us to continue to improve. While the most critical elements of the protection system or those with a high degree of dependence on outside interactions are better served by functional testing of the larger system, we can identify discrete elements and functions that can be easily verified inside a smaller test envelope.

This efficiency can ultimately give us more time to respond to emergent problems on the project or spend longer working on the most critical aspects. Isolating some of these discrete elements also allows us to quickly identify some issues and respond

earlier in the process, avoiding potential delays late in the project's life cycle.

CONCLUSION

Implementing functional testing with function testing when performing commissioning activities has numerous advantages. We've shown that, given the proper coordination and planning, many normal commissioning activities can be combined to make the commissioning process more efficient. This more holistic approach ensures that each element has been verified against its settings. It can also prove that there are no unexpected interactions with other elements internal to that relay and externally elsewhere in the circuit.

By intelligently applying these combined methods, the work of commissioning and testing will be made easier, and we can help design and manage the project more successfully by finding issues as early in the project's life cycle as possible. While there is no one-size-fits-all solution to protection system commissioning and testing, examining our practices and finding opportunities to apply the right techniques at the right time gives us our best chance to be successful and efficient in our work.

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IS YOUR ELECTRICAL SAFETY INTENTIONAL?

BY THOMAS WIRE,
USC Power Services

A proper safety program will be intentional, but what does that really mean? Let's consider the ground circuits installed in homes and businesses. For normal operation, zero current will be flowing in the grounding conductors. By code, we are required to intentionally install a grounding circuit that we hope will never be used for current, and many measures are in place to ensure these ground fault circuits operate properly. When applying this methodology to the safety program, one example is that we must train on accident reporting and emergency procedures, even though we hope to never need to submit an accident report.

Figure 1: *How to Build Structure into a Safety Program*

One safety challenge people face is that it may seem like a waste of time because we are preparing for something that should not happen. This type of thinking can impact other ideas, such as "How much time do we spend on training?" or "What should we train on?" By all merits, a safety program should be intentional, not because we intentionally devote time to it, but because we ensure the program is functional and operates properly.

SETTING POLICY

A company without a safety program is equivalent to driving a car without traffic laws or street signs, hoping that nothing goes wrong and everyone does the right thing. If an accident were to occur, being able to provide policy, doctrine, and records to prove that the company met the legal requirements could help prevent fines, penalties, and lawsuits. The policy will also protect employees, because it outlines the requirements and expectations of the company.

There is no one-size-fits-all for a safety program. Your program must have structure (Figure 1), make sense, and cover your company's core principles. An effective program also provides a method for feedback and improvement. Gathering feedback can be challenging for a safety program because people do not always have a way to bring that information back. The feedback from reporting, leadership, employees, new laws, and changing technologies should drive changes to ensure that the safety program is compliant. No system is perfect, but with constant improvement (ideally, annual revision), any program will become better.

With this in mind, consider:

1. How thorough is your company's safety policy?
2. Do your employees get (annual) training on it?

PHOTO: WWW.ISTOCKPHOTO.COM/PORTFOLIO/HAILSHADOW

REPORTING MISTAKES

People make mistakes, and assuming that work is always performed flawlessly is blindness to reality. A safety professional will double-check their own and other people's work, not in an attempt to discredit, but rather as an effort to ensure the task is properly completed. However, when a mistake is found, it is important to report and/or record it. Everyone should report potential concerns so the issues can be corrected.

Reporting mistakes is also a valuable opportunity to learn. If the report was in error, the person making the erroneous claim could learn something new. Teaching others and building up the team is extremely important for instilling a culture of trust and safety. It is not a violation of trust to report an issue; rather, it is an obligation to each other to ensure we perform our jobs properly and safely.

Above all, reporting must be an avenue for improvement and communication. When reporting becomes a system associated with reprimands and negative action, it will never be used to improve and benefit others.

With this in mind, consider:

1. When was the last time a stop-work authority was used?
2. Do employees come to you for help when they are unsure?

SAFETY TRAINING

Safety training is for performing job hazard analysis and lock-out/tag-out (Figure 2), but it should also include training in industry standards such as NFPA 70E, NFPA 70B, AED/CPR/First Aid, and company policies and procedures. Some business units dedicate an entire week of the year to these trainings. Consider that many employees only know what was taught to them on the job, but is that enough? No one wants to get hurt or make mistakes, but people should know their company's policies and procedures to ensure that emergencies are handled properly.

Training on company policy during initial or annual refresher training may also identify policy issues that require updates and revision. As we continue to develop the next generation of electrical safety professionals, let us make sure we are providing them with the required safety training so they know where to find the answers to critical questions, such as the correct PPE, and the required approach distances for an arc-flash boundary.

With this in mind, consider:

1. Could OSHA deem your employees unable to perform their jobs safely?
2. How often do your employees question LOTO?

ON-THE-JOB AND PERSONAL TRAINING

Employees need training to be qualified to perform their tasks. One type of training is on-the-job (OTJ) training. This can be beneficial because it is a real environment and it is billable. Unfortunately, some companies do not document this OTJ training. This leads us back to the issue where an employer would have no proof if an incident were to happen. Training sessions and courses have an advantage because they quite often include exams and certifications.

Personal development is a responsibility we all must accept. Unless you accept this responsibility, the only thing you will ever know is what your employer provides. Many people spend two to four years working on a self-funded college degree, with no employer assistance, but plenty of resources are available, including reading, free online platforms, books, schools, and online courses. There is no excuse for a lack of training other than a lack of commitment to ourselves.

PRODUCTION AND SAFETY WORK TOGETHER

Production is the focus of every business, but customers do not want to work with unsafe companies. They want to be confident that the company they hire will make an effort to prevent damage to equipment, injury to personnel, loss of production time, and ultimately, lost money. Having a safety mindset and devoting more time to safety can help customer relations, boost retention, and even save money.

The right balance between spending too much time or too little time on safety can best be answered in the company safety program. This approach ensures transparency and helps to assure compliance. When personnel have no time to breathe due to a high-pressure operational tempo, the likelihood of accidents and mistakes increases. It is important to have scheduled downtime where employees can recover their equipment, finish paperwork, work on teambuilding, and complete training.

With this in mind, consider:

1. Is training often cancelled because of job requirements?
2. Have you refused to work with a customer due to safety concerns?

QUALITY LEADERSHIP

It is often stated that safety is a top-down approach. If we as leaders encourage employees to do what is right regardless of the outcome, this mentality can spread, resulting in a lead-by-example mentality across the entire team.

Are you a leader or a manager? Leaders focus on demonstrating the right example and building people up, while managers focus more on streamlining processes, efficiency, and holding people accountable. Both are required to ensure efficient and safe production. The goal of leading by example is to influence others to do a task; it has nothing to do with doing the work yourself. Instead, it is showing others how to properly do the work and influencing them to want to do it too.

Having a safety mindset and devoting more time to safety can help customer relations, boost retention, and even save money.

As a leader, it is also important to demonstrate that you are human. Many employees hold their supervisors in high regard, but leaders need to be open about their faults and strengths. This demonstrates that we value open communication and don't hide our personal shortcomings.

With this in mind, consider:

1. Are leaders also tasked with work, leaving too little time to supervise and observe?
2. As a supervisor, do you regularly share your mistakes to help others learn?

ATTITUDE & TEAM MENTALITY

A good attitude is crucial for any task. Without it, no crew will ever be a team. Some people walk by issues and say, "That's not my job to fix." It would

be better to say, "Let me see if I can find out who is working on that." This focuses on the solution rather than acknowledging a problem and brushing it off. If individuals have poor attitudes during less stressful times, it will get worse during times of high stress. A good attitude reinforces the team mentality, while a poor attitude causes people to avoid each other.

In effective teams, every member holds themself accountable. This is not easy because it usually means the spotlight is on that individual, but it is necessary to ensure that the safety culture is never undermined by any person or process. It also proves that each member genuinely cares about safety and doing their job, even when other people may be against them. Failure is a time for learning, and it is important to have a positive attitude when teaching a lesson. If one person ignores an issue, it can be the small crack that eventually destroys the foundation.

With this in mind, consider:

1. When people intervene to help, are they welcomed and applauded?
2. Are employees sent out to perform work alone?

CONCLUSION

A company's safety program is the responsibility of every person in the company. If one person fails to do their part, it is only a matter of time before the program itself is in jeopardy. Accidents will happen, even with a perfect safety program, but having an effective safety program can reduce risks, hazards, accidents, injuries, and even reduce costs.

REFERENCES

Merriam-Webster Dictionary (n.d.). Safety, *Merriam-Webster.com*.

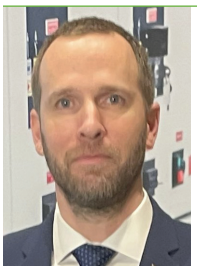
"Employees Are Concerned About Safety and Lack of Training," *EHS Today*, June 13, 2024.

S&H Staff. "One-Third of Workers Say Their Employer Favors Productivity over Safety, NSC Survey Shows," *Safety + Health*. June 22, 2016.

Brietta, Austin. "Study Smarter By Improving Your Memory," Rio Salado College News, June 9, 2022.

Sellars, K. "Auditing Electrical Safety," Training Talk, Summer 2023 *NETA World*, Vol. 8, No. 1, pp. 7–8.

Occupational Safety and Health Administration. Training Requirements in OSHA Standards, pp. 79–80), OSHA 2254-09R 2015.



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EQUIPMENT DEFICIENCIES AND RETURN TO SERVICE UNDER NFPA 70B

BY MATTHEW J. ROBINSON,
Sigma C Power Services

When electrical equipment is designated as non-serviceable, a natural question follows: What comes next? From the standpoint of NFPA 70B, *Standard for Electrical Equipment Maintenance*, this is a legitimate concern. While the standard provides clear criteria for classifying equipment as *serviceable*, *limited service*, or *non-serviceable*, it offers limited guidance on how to return that equipment to normal operation once deficiencies are corrected.

The absence of a defined pathway is not necessarily an oversight. Electrical equipment failures span a wide spectrum—from simple, discrete component issues to complex mechanical, electrical, or insulation system degradation. As such, prescribing a single recovery method would be impractical. Instead, NFPA 70B establishes a framework for evaluation and maintenance, leaving the application of that framework to the qualified personnel.

Consider a medium-voltage circuit breaker with a failed trip coil but otherwise within manufacturer specifications. Because it cannot operate as intended, it clearly falls into a *non-serviceable* condition per NFPA 70B 3.3.11.3. But once the trip coil is replaced, important questions remain:

- Is the equipment immediately considered serviceable?
- What level of testing is required before re-energization?
- Should the maintenance interval be adjusted—and if so, how?
- Are additional inspections or services warranted?

NFPA 70B does not yet provide definitive answers. This article proposes a practical, common-sense framework to help maintenance professionals and equipment owners navigate the return-to-service process.

CONDITIONS OF MAINTENANCE VS. PHYSICAL CONDITION

NFPA 70B primarily evaluates electrical equipment using two complementary metrics: condition of maintenance and physical condition. Understanding the interaction between these two concepts is critical when determining a path back to service.

Condition of maintenance is divided into three categories:

- Serviceable: Equipment is electrically and mechanically sound.
- Limited service: Deficiencies exist but do not compromise safe operation.
- Non-serviceable: Equipment cannot operate safely within required parameters.

Physical condition, by contrast, reflects the equipment's observed state:

- Condition 1: Like new or fully functional
- Condition 2: Requires further investigation or monitoring
- Condition 3: Requires urgent repair or attention

These metrics are not redundant—they serve different, but interconnected purposes. Condition of maintenance determines operability, while physical condition informs maintenance planning. As outlined in Chapter 9 (including 9.4.2), maintenance intervals may be adjusted based on these classifications, allowing owners to align maintenance strategies with risk, reliability, and system criticality.

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However, while NFPA 70B clearly defines how equipment moves into degraded states, it is less explicit about how equipment progresses back to baseline conditions after repair.

MEETING THE LETTER OF THE CODE, NOT THE INTENT

Revisiting the earlier example of a breaker with a failed trip coil, NFPA 70B Section 9.2.1.4.1 indicates that non-serviceable equipment should not be returned to service. However, if the failure is identified during scheduled maintenance—and all other tests pass—the path forward becomes less clear once the faulty component is replaced.

Key questions emerge:

- If the trip coil is replaced during the same maintenance window, are additional tests beyond functional verification required?
- Does the timing of the repair (immediate vs. delayed) affect testing requirements?
- Should the equipment's maintenance interval be modified following repair?
- After repair, is the equipment considered serviceable or limited service?

NFPA 70B offers partial insight. Section 9.1.2 addresses maintenance frequency and states that if two consecutive maintenance intervals are completed without requiring additional service, the owner is permitted to resume the original maintenance interval (see 9.1.2.1.2). This implies a pathway for equipment to return to a baseline condition over time.

Interestingly, the standard does not define a minimum interval between maintenance cycles. In theory, two consecutive successful intervals could be completed in rapid succession, technically satisfying the requirement but not its intent. This highlights a broader issue: Compliance with the letter of the standard does not always equate to sound engineering judgment.

A PRACTICAL SERVICE APPROACH

In the absence of prescriptive guidance, maintenance professionals must rely on experience, consistency, and a commitment to safety. The following scenarios outline a practical approach to restoring equipment, based on common field conditions.

What follows is this author's opinion on how to handle the myriad deficiencies encountered when servicing electrical equipment, but each technician and service organization must strive to employ a consistent standard that provides the highest degree of safety, quality, and value to their clients and the industry at large.

Replaceable Failed Components. For equipment rendered non-serviceable due to discrete, replaceable components (such as coils, relays, or auxiliary devices), the path to restoration is generally straightforward.

- Repair during maintenance window: Repeat all tests associated with the replaced component. If results are satisfactory, the equipment may be returned to *serviceable* status with its original maintenance interval.
- Repair outside maintenance window: Perform a full suite of maintenance tests prior to re-energization. If all results are acceptable, return the equipment to serviceable condition under the original maintenance interval.

This approach also applies to retrofits where obsolete components are replaced with modern equivalents.

Equipment Requiring Calibration or Off-Site Service. Some deficiencies—such as abnormal timing, excessive contact resistance, or calibration drift—require more extensive service, often performed off-site. Because such work can affect multiple subsystems, a higher level of scrutiny is warranted:

- Perform comprehensive testing upon return.
- If results are satisfactory, classify the equipment as serviceable but assign a physical condition of 2 and adjust the maintenance interval accordingly.

After two successful maintenance intervals without further issues, the equipment may be returned to physical condition 1 and its original maintenance schedule.

Conflicting or Erroneous Test Results. Occasionally, equipment may be classified as non-serviceable based on one set of test results, only to pass subsequent testing by another party. This can occur due to:

- Faulty or improperly calibrated test equipment
- Environmental or test condition variations
- Human error
- Intermittent equipment behavior

In such cases, neither set of results can be dismissed in light of the other, and both have to be considered when assessing the condition of the equipment. Consider erring on the side of caution with a prudent approach:

- Classify the equipment as serviceable if it passes current testing.
- Assign a physical condition of 3 and adjust its maintenance interval accordingly.

If the equipment performs reliably over two consecutive maintenance intervals, it may be restored to physical condition 1.

Each technician and service organization must strive to employ a consistent standard that provides the highest degree of safety, quality, and value to their clients and the industry at large.

A PATH TO NORMAL SERVICE

These scenarios illustrate a broader principle: NFPA 70B provides a framework—not a step-by-step playbook—that is clear on when equipment should be progressed to higher maintenance or physical condition, but is less clear on the path to a return to normal service. As a result, organizations must develop internal standards that promote consistency in the approach to repairs and restoration while maintaining the highest degree of safety and value for the owner.

While not an all-inclusive list, such a standard should include clear criteria for post-repair testing,

documented thresholds for condition classification, defined triggers for adjusting maintenance intervals, and emphasis on trend analysis rather than single data points.

Consistency across technicians and service providers is essential. Without it, identical equipment could be classified—and treated—very differently depending on who performs the assessment.

Ultimately, returning equipment to service is not an entirely procedural exercise. It requires engineering judgment, informed by manufacturer recommendations, historical performance data, system criticality, and safety considerations. While it may be tempting to fast-track equipment back to service—especially under production pressure—doing so without adequate validation introduces unnecessary risk. A conservative, methodical approach not only aligns with the intent of NFPA 70B but also supports long-term reliability and safety.

CLOSING THOUGHTS

NFPA 70B has made significant strides in standardizing how electrical equipment is evaluated and maintained, but it stops short of defining a clear path from non-serviceable back to serviceable. In that gap lies a challenge and an opportunity.

The challenge is the potential for inconsistency, ambiguity, and misapplication of the standard. The opportunity, however, is for organizations and industry professionals to establish thoughtful, experience-driven practices that uphold the intent of the standard while addressing real-world complexities.

Returning equipment to service should never be reduced to a checklist exercise. It demands careful consideration of the repair performed, the reliability of test data, and the broader impact on system safety. By applying consistent methodologies, prioritizing thorough testing, and respecting the difference between compliance and sound judgment, maintenance professionals can bridge the gap left by the standard.

In the end, the goal is not simply to return equipment to operation, but to return it to operation with confidence.

REFERENCE

NFPA. NFPA 70B, *Standard for Electrical Equipment Maintenance*, 2026 Edition.

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SKILLED TRADES SURVEY: 5 KEY TAKEAWAYS FOR ORGANIZATIONAL LEADERS

BY JIM PAULEY,
National Fire Protection Association

Tens of millions of people work in the skilled trades in the United States. A survey recently conducted by NFPA® sheds light on major trends across these industries, from the anticipated impact of artificial intelligence (AI) in 2026 to tradespeople's desire for more education and training opportunities.

The survey, conducted virtually between October 27 and November 3, 2025, gathered responses from more than 500 U.S.-based workers in the skilled trades, representing industries ranging from electrical and fire protection to government and health care. In it, respondents answered questions to gauge their perceptions on AI; the importance of codes and standards; education, training, and career development; the value of professional memberships; and more.

Download the full report: A nine-page report summarizing the full results of "The State of Skilled Trades Report 2026" can be downloaded for free at nfpa.org.

This blog includes five key takeaways for leaders of organizations.

AI IS YOUR ALLY. EMBRACE IT, DON'T REJECT IT.

There's no denying that a sense of fear has defined a lot of discussions around AI, with many worrying that AI has the potential to entirely replace humans across the workforce. But it doesn't have to be that way.

Instead of thinking about AI as tech that's going to take jobs away, organizational leaders should think about how AI can complement and even enhance workforce education and development. According to the recent NFPA skilled trades survey, nearly 40% of professionals believe that AI and other technological advancements will reduce mundane tasks in 2026, allowing for increased organizational efficiency and giving workers more opportunities to focus on and build competence in higher-skilled tasks.

Overall, over two-thirds (68%) of survey respondents said they believe AI and other tech advancements will have a tangible impact on their work this year. As organizations wrestle with technological advancements, leaders must recognize that learning to work with AI and advanced technologies is a must to stay competitive among industry peers. It's a classic case of "get on board or get left behind."

ENCOURAGE EMPLOYEE EDUCATION AND DEVELOPMENT

When survey respondents were asked what they hoped their organization's priorities would be in 2026, increased trainings for a more skilled workforce emerged as the top choice, with 29% preferring this option. Additionally, more than half of respondents (54%) said they plan to take part in more trainings this year, and 38% plan to sit for more certifications.

Employee training, especially safety training, is not something organizations should take lightly. In addition to the more obvious benefits of reducing employee injuries, investing in safety training can also help organizations reduce operational disruptions, boost productivity, and ultimately increase profits. A study published in the journal Safety Science in 2024 concluded that building a culture of workplace safety,

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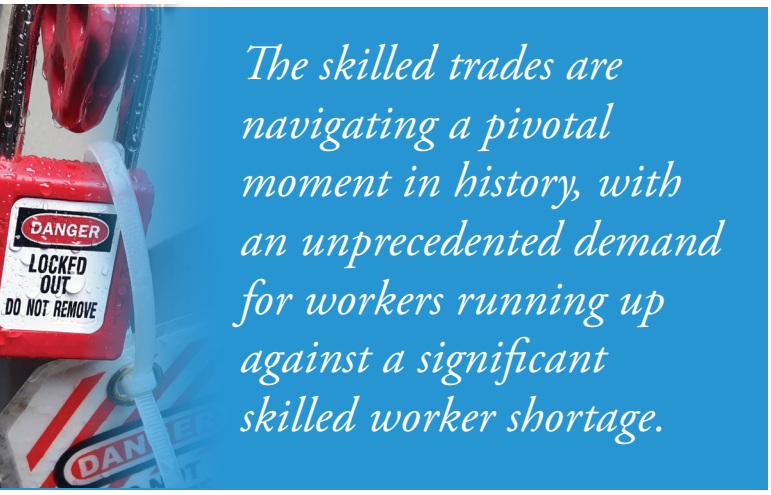

The skilled trades are navigating a pivotal moment in history, with an unprecedented demand for workers running up against a significant skilled worker shortage.

which includes ensuring workers are adequately trained, "will have a favorable impact on financial performance and corporate reputation."

AVOID SILOS AND ASK FOR EMPLOYEE INPUT

While survey respondents expressed a desire for and plan to pursue more education and development opportunities in 2026, only 17% said they think their organizations will prioritize that for them.

It wasn't the only area where survey results illustrated a disconnect between employee preferences and anticipated employer priorities. Over one-third (35%) of survey respondents also said they think their employer will prioritize increased technology deployment in 2026, but only 26% of employees said they preferred that as a priority.

As leaders across the skilled trades establish and evaluate priorities, it's essential to avoid silos and ensure employee input at all levels of the organization is taken into consideration. When employees feel as though their preferences are reflected across priorities and operations, morale and retention increase.

ENCOURAGE LEARNING ABOUT THE VALUE OF CODES AND STANDARDS

Codes and standards development and compliance are cornerstones of the skilled trades. But recent legislative efforts in the U.S. have aimed to undermine the process, seeking faster and at times cheaper avenues that can compromise safety. More than one-fourth (26%) of survey respondents said they are already feeling the impact of codes and standards deregulation.

Organizational leaders can help by encouraging workers to learn more about the value of codes and standards, with the aid of campaigns like "Don't Chance Safety."

"We don't imagine a world without sprinklers and smoke detectors in buildings for a reason: Safety

codes and standards work, and that very truth is making it harder for the public to see why we need them—and why we should all be concerned about ongoing rollbacks," says Lorraine Carli, vice president of Outreach and Advocacy at NFPA. "We all want to live in a safe world, which means we all need to work together to protect the codes and standards that have long protected us."

PROFESSIONAL MEMBERSHIPS PLAY A CRITICAL ROLE

Roughly four out of five (78%) survey respondents reported being members of a professional organization or trade association. Furthermore, nearly half (43%) said they have benefited from networking opportunities with industry professionals as well as professional development and training programs because of these memberships.

Organizational leaders should encourage employees to learn more about the value a professional membership can provide and what options might be best for them.

THE RECIPE FOR SUCCESS

The skilled trades are navigating a pivotal moment in history, with an unprecedented demand for workers running up against a significant skilled worker shortage. For organizations to succeed in this challenging environment, they must start by listening to and learning from tradespeople; surveys like the one recently conducted by NFPA are a valuable starting point.

On the bright side, today's challenges invite intelligent adaptation and the exploration of new possibilities, which is key to unlocking new levels of efficiency and safety across all industries. Organizations that support and embrace AI-driven tools, education and training opportunities for employees, the time-tested standards development process, and professional memberships can better address labor shortages and skill gaps to build a more resilient, future-ready workforce.

Be sure to download the full report summarizing the recent survey results to discover other insights and takeaways for organizational leaders and employees working in the skilled trades.

REFERENCES

Irene Bautista-Bernal, Cristina Quintana-García, Macarena Marchante-Lara. "Safety Culture, Safety Performance and Financial Performance. A longitudinal study," *Safety Science*, Vol. 172, 2024, 106409, ISSN 0925-7535.

NFPA. Creating a Culture of Safety at Your Business. Access at *https://www.nfpa.org/for-professionals/for-business/creating-a-culture-of-safety*.

Roman, Jesse. "Tip of the Spear," *NFPA Journal*, October 2025.

NFPA. "Safety Doesn't Happen by Chance." Video: *https://www.dontchancesafety.org/*.

Eaton, Kit. "The Skilled Worker Shortage May Hit Hard in 2026," *Inc. eNewsletter*, December 24, 2025.

NFPA. The Standards Development Process. Access at *https://www.nfpa.org/for-professionals/codes-and-standards/standards-development*.

NFPA. The State of the Skilled Trades Report 2026. Access at *https://www.nfpa.org/forms/Skilled-Trades-Report*.

JIM PAULEY *is President and CEO of the National Fire Protection Association (NFPA).*

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- **Intro to Low-Voltage Circuit Breakers** — 3 days, 2.1 CEUs | Virtual
- **Power Quality Harmonics** — 4 days, 2.8 CEUs | In-Person

Overhead Contact Systems | ONSITE ONLY

- **Introduction to Overhead Contact Systems** — 4.5 days, 3.2 CEUs
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Protective Relay | All courses below are In-Person

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- **Cable Fault Location & Tracing, Medium-Voltage** — 4.5 days, 3.2 CEUs
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- **Intro to Low-Voltage Circuit Breakers** — 3 days, 2.1 CEUs | Virtual

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- **Electrical Safety for Mining** — 3.5 days, 2.5 CEUs | Onsite Only
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- **NFPA 70E® Electrical Safety** — 2 days, 1.4 CEUs | In-Person & Virtual
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- **OSHA Generation, Transmission and Distribution** — 2 days, 1.4 CEUs In-Person & Virtual Options
- **National Electrical Safety Code Changes (NESCC)** — 1 day, 0.7 CEUs In-Person, Virtual, Onsite Options

NEW!

NEW!

- **NFPA 70B Standard for Electrical Equipment Maintenance**— 2 days, 1.4 CEUs In-Person, Virtual, Onsite Options

Substation | All courses below are In-Person, except where noted

- **Advanced Transformer Maintenance and Testing** — 4.5 days, 3.2 CEUs
- **Battery Maintenance & Testing** — 4 days, 2.8 CEUs
- **Grounding and Bonding** — 3 days, 2.1 CEUs | In-Person & Virtual Options
- **Substation Maintenance I** — 4.5 days, 3.2 CEUs | Classroom Lecture & Hands-On Training
- **Substation Maintenance II** — 4.5 days, 3.2 CEUs | Classroom Lecture & Hands-On Training
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- **Substation Components, Testing and Interpretation** — 5 days, 3.5 CEUs Virtual (Live, Instructor-Led)
- **Transformer Maintenance and Testing** — 4.5 days, 3.2 CEUs
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