BLUE RUNNER switchgear

2,210
nonfatal electrical injuries in 2017

When switchgear malfunctions, the consequences are often catastrophic. Damage to the switchgear itself can be extremely expensive, but that pales in comparison to corollary damage and the potential hazards to people.

5%
of electrical injuries in 2017 were fatal

Implementing an effective switchgear testing, inspection, and maintenance program is essential. Even switchgear labeled "maintenance free" requires periodic testing and maintenance.

Preventative Maintenance and Testing Programs

OSHA and the NFPA recognize that a safe work place depends on properly maintained equipment. Regularly scheduled maintenance and testing reduces the probability of an unscheduled outage and can save you significant downtime and money. Blue Runner Switchgear is a full service maintenance and testing company with experience working with a range of industries including heavy industrial, utilities, medical, and commercial.

Switchgear-Low & Medium Voltage

Ground Fault Testing and Inspection
Circuit Breaker Testing and Rebuilding
Pringle Switch Maintenance and Testing
Bolted Pressure Switch Maintenance
Trip Unit Retrofit Services
All Types of Switchgear PM and Testing
High Voltage Switch PM and Testing

Transformers (Oil and Dry-Type)

Power Factor Testing
Turns Ratio Testing
Insulation Resistance Testing
Winding Resistance Measurement
Leak Repair and Dehydration/Degassing
Tap Changer Maintenance
Field Inspections

High/Low Voltage Cable Testing

Insulation Testing of Cables
Hi-Pot Testing of Cables
Cable Inspection
Repair and Termination of Cables
Installation of Cables
Inspection and Cleaning

Testing and Predictive Maintenance

Infrared Scanning Services
Ultrasonic Air Leak Testing
Ground Resistance Testing
Insulation Testing of Motors
Feeder Cable Testing
Power Quality Monitoring

Vacuum/SF6/Oil Breakers

Timing of Circuit Breakers
Vacuum Bottle Testing
Power Factor Testing
Contact Resistance
Lubrication and Inspection
Drain and Inspect Oil Breakers
Contact Replacement

Insulating Fluid Analysis of Oils

Dissolved Gas Analysis
Karl Fischer Water Testing
Dielectric Testing
Neutralization Number
Color, Visual, Specific Gravity
Power Factor and Furan Analysis

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Why An Effective Electrical Preventive Maintenance Program Pays Dividends

Switchgear maintenance is usually considered a low priority by most management teams, who defer or ignore it until a failure occurs.

Switchgear is the lifeline of the industrial facility and failures can be catastrophic, unfortunately switchgear maintenance is often not thought about until a failure occurs. When you fail to conduct the proper maintenance, the risk of loss is high. But a solid maintenance program is much less costly than the impact of switchgear failure, which can include injury or death, lost product and production, as well as clean-up and switchgear replacement costs. When you give maintenance the thought and effort it deserves, you improve safety, reliability, uptime, and profitability.

Without an EPM program, management assumes a greatly increased risk of serious electrical failure and its consequences.

Case Study 1

In one industrial plant, the failure of a transformer caused a total plant shutdown. Contamination of the transformer's insulating oil caused the failure. The contamination went undetected because the oil had not been tested for several years. Fire damage and equipment replacement costs amounted to $50,000 (U.S.), exclusive of the cost of plant downtime. This amount would have paid for the cost of operating an EPM program covering the entire plant's electrical distribution system for several years.

Case Study 2

In another industrial plant, damage amounting to $100,000 (U.S.) was attributed to the failure of the main switchgear. Fouling by dirt, gummy deposits, and iron filings caused the failure. The cost of this failure would have supported a comprehensive EPM program covering all of the plant's electrical distribution system for several years.

Case Study 3

An automotive supplier suffered a complete plant wide outage that caused them to miss shipments to the OEM as a result of a 1600A breaker that failed to trip during a ground fault event. As a result of the breaker failing to trip the main transformer was damaged by the unmitigated electrical fault. The 2 day lead time of the new transformer resulted in significant interruption to the plant delivery schedule.

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Arc Flash Safety

35,000° F
Arc flash temperature

An arc flash is very harmful because of the intense degrees of temperature it produces. With 35,000 degrees Fahrenheit, it can become four times hotter than the suns surface temperature is. When the electrical current jumps, it may also cause extremely bright flashes of light that can temporarily or permanently damage eyesight.

140 decibels
noise level for an arc flash explosion

"Arc flash is a very, very dangerous phenomenon. It is truly instantaneous. If you're watching video of it, it would last less than a second."

Bill Burke, division manager for the Quincy, MA-based National Fire Protection Association.

What is an arc flash assessment (or study or analysis)?

Blue Runner Switchgear will collect electrical system data, model your system using power system software, analyze the results, and document the findings in a report. Site specific and equipment specific arc flash hazard warning labels will be printed and installed at your facility following the guidelines of IEEE Standard 1584 - Guide for Performing Arc-Flash Hazard Calculations and the latest edition of NFPA 70E - Standard for Electrical Safety in the Workplace.

What is an electrical arc flash?

An arc flash is not the same as electrical shock. Shock hazards are associated with current flowing through the body. Arc flash hazards happen when current flows through air in an unintended and dangerous way with an explosion of heat and energy.

What causes an arc flash?

Arcs can be started when conductor insulation or spacing allows current to flow where it is not designed to flow. Arcs can be initiated by equipment failure, human error such as a misplaced tool, critters, improper installation, water, and many other causes.

Who is responsible for arc flash safety?

- OSHA requires employers to identify and communicate workplace hazards. Arc flash safety was first introduced by the NFPA in 1995 and employers should consider arc flash safety a high priority.
- Each individual is responsible for their own safety and actions.

What is needed to be in compliance with arc flash safety requirements?

- Perform an arc flash study and label the hazards at each location.
- Perform arc flash safety training.
- Communicate hazards to employees and visitors through safety policies.
- Maintain electrical equipment

What training is needed for site personnel?

NFPA safety training requirements are "determined by the risk to the employee" and can be classroom and/or one-the-job based training according to NFPA 70E Article 110.2(B). Blue Runner Switchgear offers training based on the specific needs of your facility and incorporates your existing safety policies (when available).

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Arc flash testing, like any test method, is intended to provide a way to compare materials in a controlled testing environment with a high amount of repeatability. This can be difficult to achieve – especially with a hazard as unpredictable and variable as an arc flash.

Causes:

- Dust
- Mishandling of tools
- Accidental contact
- Condensation
- Equipment/ material failure
- Corrosion
- Faulty installation

Results:

- Burns
- Fire
- Flying objects
- Blast pressure
- Sound blast
- Extreme heat

How to protect workers:

- De-energize the circuit
- Energized electrical work permit
- Personal protective equipment
- Insulated tools
- Written safety program
- Job briefing

What policies are required by OSHA and the NFPA?

Both OSHA and the NFPA have themes of communication and documentation when it comes to electrical safety. Blue Runner Switchgear recommends each employer has the following policies and procedures:

1 Overall electrical safety program *(see NFPA 70E Article 110.1)*

2 Job briefing form for unusual tasks *(see NFPA 70E Article 110.1(H))*

3 Energized work permit *(see NFPA 70E Article 130.2(B))*

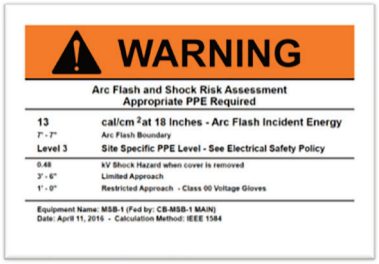
4 Lock out tag out policy *(see NFPA 70E Article 120)*

The electrical safety program should be a part of the "employer's overall occupational health and safety management system, when one exists" according to NFPA 70E Article 110.1(A). If your group does not have an ESP (electrical safety program), Blue Runner Switchgear can help you write a program that fits your particular needs.

Codes and standards are periodically updated and Blue Runner Switchgear can audit your existing program to "to verify that the principles and procedures of the electrical safety program are in compliance" as required by Article 110.1(I).

What does an arc flash label look like?

Our standard label includes all of the information required per NFPA 70E Article 130.5(D) including the nominal system voltage, arc flash boundary, site-specific level of PPE, and the working distance. Other helpful safety information is included such as the shock boundaries and glove class. Labels can be customized as needed to match your facilities existing policies (when applicable).



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