

# MINIMIZING ELECTRICAL HAZARDS



Taking the proper steps toward implementing your Electrical Safety Program to the site level.

By Paul Idziak

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**A FEW YEARS AGO, THE WIND MARKET** was building farms as fast as turbines were available. During the same time period, there were few concerns about onsite safety and minimal contractor qualifications. Times are changing in the wind market. Employee worksite safety is a major priority from the CEO level down to the technician level. This is evident by the development of sophisticated EHS departments, stringent contractor qualifications standards, and a growing safety culture. Another change has been the involvement of OSHA in the wind industry. OSHA now understands the wind industry considerably

better and is making its rounds to the wind sites more frequently.

With the changes noted above, the wind industry has been focusing on creating Electrical Safety Programs tailored to their specific needs. The question is, what happens after the Electrical Safety Program (ESP) has been developed? This article will review what an ESP is, what standards should be incorporated, and then delve into the implementation of the plan.

## **WHAT IS AN ELECTRICAL SAFETY PROGRAM?**

OSHA requires an electrical safety program that focuses on the employee's exposure to electrical



- The organization's electrical safety program principles
- Electrical safety program controls
- Electrical safety program procedures
- Procedures for conducting a hazard/risk evaluation
- Procedures for conducting job briefings

Developing an ESP is time-consuming and expensive, but considers the very tangible benefits of creating your program. Having an electrical injury or fatality incident at your site can lower the morale of other workers onsite and can even affect the morale of the entire organization. The cost of down time, equipment replacement, medical expenses, possible fines, and likely lawsuit by those involved or their families are tremendously expensive. Productivity will often diminish as a result of an incident. What is the cost of your downtime?

The Electrical Safety Program needs to be part of the overall Safety Program. The Electrical Safety Program needs to be supported by the corporate offices down to the onsite technicians. Getting buy-in from each will help create a fully-functional safety culture and enhance implementation of your ESP.

## POLICIES AND STANDARDS

To help guide the development of your Electrical Safety Program there are already industry recognized consensus standards in place:

- NFPA 70 – National Electric Code (NEC)  
A standard for the safe installation of electric wiring and equipment in the United States. The NEC codifies the requirements for safe electrical installations into a single, standardized source.
- NESC – National Electric Safety Code  
A standard which sets the ground rules for practical safeguarding of persons during the installation, operation, or maintenance of electric supply and communication lines and associated equipment.
- NFPA 70B – Recommended Practice for Electrical Equipment Maintenance  
A recommended practice, which does not contain mandatory language. NFPA 70B covers preventive maintenance for electrical, electronic, and communication systems and equipment and is not intended to duplicate or supersede instructions that manufacturers normally provide.
- NFPA 70E – Standard for Electrical Safety in the Workplace  
NFPA 70E addresses employee workplace electrical safety requirements. The standard focuses on practical safeguards that also allow workers to be productive within their job functions.
- ANSI/NETA MTS – Standard for Maintenance Testing Specifications for Electrical Power Equipment and Systems

hazards. The ESP needs to establish standards to prevent hazardous electrical exposures and provide compliance with regulatory requirements. This can be reinforced by OSHA's statement "Energized parts — If the exposed live parts are not deenergized (i.e., for reasons of increased or additional hazards or infeasibility), other safety-related work practices shall be used to protect employees who may be exposed to the electrical hazards involved." (Section and regulation this is pulled from is 29CFR1910.333(a)(2).

The following components, while not required to be in your ESP by OSHA, are required by NFPA 70E, "Standard for Electrical Safety in the Workplace":

NETA Maintenance Testing Specifications were developed for use by those responsible for the continued operation of existing electrical systems and equipment to guide them in specifying and performing the necessary tests to ensure that these systems and apparatus perform satisfactorily, minimizing downtime and maximizing life expectancy.

In addition to using the above-listed consensus standards, specific procedures and policies that pertain specifically to your company/locations will still have to be developed. Here are a few recommendations:

- Insulated Tools
- Personal Protection Equipment
- Personal Safety Ground
- Lock Out/Tag Out
- Job Hazard Analysis
- Hazard Risk Analysis
- Work Zones
- Arc Flash Hazard Analysis
- Safe Approach Distances
- Switching Procedures
- Hot Work Permits
- Confined Space
- NERC PRC-005
- Site Safety Meetings
- Incident Reporting
- Electrical Maintenance Program

A common practice is for the company to create an Electrical Safety Program that is generic enough to cover common practices at each wind farm. Some companies have bought Electrical Safety Programs off the Internet for pennies on the dollar to try to be in compliance. Although the price may be right, packaged programs often require so much work that the end cost is as much or more than one developed specifically for your installation. Each wind farm has different hazards, electrical designs, and electrical equipment. The key is to develop an Electrical Safety Program for each wind farm to reinforce the actual safety practices down to the site level and help create the safety culture to the technician level.

## PLANNING

During the Planning stage ideas, thoughts, outcomes, and desired results need to be positioned to help the final product with its intended use. NFPA70E provides six areas that must be included in the Electrical Safety Program: Awareness and Self-Discipline, Electrical Safety Program and Principles, Electrical Safety Program Controls, Electrical Safety Program Procedures, Hazard/Risk Evaluation Procedure, and Job Briefings.

As soon as the Electrical Safety Plan is finalized it will be probably out of date. Some questions

then arise: “How will the EHS department will stay abreast of constant changes in codes, standards, tooling, electrical equipment, electrical designs, and legislation to keep the Electrical Safety Program current? What metrics will the Electrical Safety Program use to measure performance?” Upper management will want to see how an Electrical Safety Program is saving money, reducing down time, lawsuits, and reducing workman’s compensation/insurance cost.

Failure to plan is planning to fail. You must begin with the end in mind to create a program that will stand the changing markets and quickly changing technology.

## IMPLEMENTATION

After spending hours upon hours planning out your Electrical Safety Program and completing the development of the document, what are the next steps? Implementation of the document is the most important and hardest step to accomplish. Implementing will never end because the document will always be changing and new employees will require training on the Electrical Safety Program.

To be successful at implementation involving the stakeholders and day-to-day workers is an important part. Including managers, supervisors, and workers creates the safety culture that is needed in order to adopt the Electrical Safety Program and live the safety lifestyle.

The first step towards implementation is to provide training to make the technicians Qualified Electrical Workers. The technicians have to be trained on the hazards, processes, procedures, and risks in order to become qualified and comfortable around your electrical equipment. Reinforcement training is required to update the individuals on the changes in your Electrical Safety Program and provide a review of past trainings. Having fully-involved qualified workers onsite will breathe life into the Electrical Safety Program and help with the safety lifestyle the EHS department is trying to accomplish.

The next step is to ensure steps have been taken to ensure the workers and contractors are protected. It is very important to verify the arc flash study is correct and update to date. Equally important is to verify the arc flash labels are correct on each piece of gear and easily identifiable. Also make sure the wind farm meets the other electrical codes that are essential to the wind farms operation.

Once you have trained your workers and your wind farm is code compliant, develop and implement safe work practices for the workers. Safe work practices can vary from wind farm to wind farm, so be sure to understand what work practices or procedures are likely to change and maintain the safe work practices for those specific tasks. Up-to-

date safe work practices will help the employees understand the task at hand, the risk at hand, and how to safely and properly perform the task. These safe work practices will also help the employee determine what the proper PPE is required for the job and if they need any permits to perform the work. Developing consistency among your fleet is important and the ESP is one method to do so.

Lastly, whenever the Electrical Safety Program is revised, what is the methodology for getting the changes out to the site and employee level? How are these changes implemented and how are they verified?

Implementation will be the longest step in the process, but it is the most important step. Implementing effectively will be vital to the Electrical Safety Program along with creating the safety lifestyle.

## DOCUMENTATION

Providing written documentation for the corporation to reference and for the technicians to use will build consistency of corporate safety policies and procedures across each wind farm. The written documentation is also imperative for third party contractors performing work at the job site to safeguard against any confusion pertaining to onsite safety.

Below are examples of documentation critical to the Electrical Safety Program:

- Policies
- Switching Procedures
- Performance Objectives and Standards
- Procedures
- Permits
- Job Hazard Analysis
- Audits
- Improvement Plans
- Training Records
- Incident Recording

If the documentation is used as a reference, resource, or is seen as a benefit to the employee, it can be a huge asset to your Electrical Safety Program. On the other side, if not used properly or if it is seen as a burden it can have a negative impact on morale and your Electrical Safety Program.

## EVALUATION AND IMPROVEMENT

As discussed previously numerous times, the Electrical Safety Program is a living and breathing document. Because of this it will constantly need to be reviewed, edited, and revised.

Evaluating the Electrical Safety Plan can be done several ways. One method is to perform internal audits on the documented processes and procedures to find ways for improvements. Another possible method is to use a third party to perform audits on your Electrical Safety Program. It is good to get a fresh set of eyes on the program, but at the same time it can be expensive. Incidents or near-misses

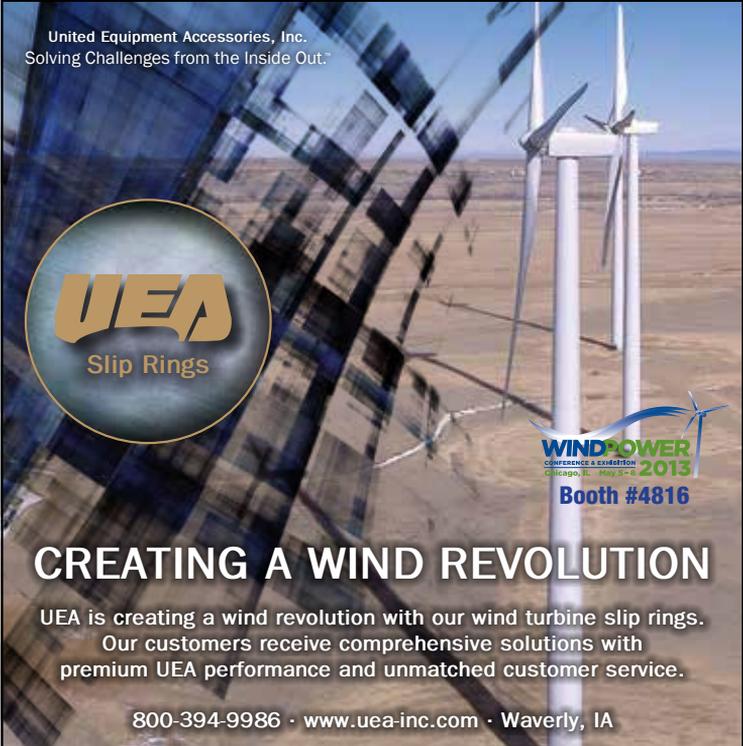
must be investigated to determine if additional policy or procedures need to be implemented. Lastly, unannounced site visits by the EHS department can prove to be beneficial.

Best practices from the evaluations will need to be implemented into the Electrical Safety Program. Once implemented, the proper media will need to be determined in order to get the recommended changes out to the site level.

## CLOSING

An Electrical Safety Program is crucial to develop the safety culture within the organization. With the ever changing markets and legislation the Electrical Safety Program will need to be constantly revisited to make certain the newest regulations are followed and the procedures and work practices are up-to-date.

Implementing the program from a corporate level to a site level is challenging but extremely important to promote the safety culture down to the technician level. 



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