



ERI Safety Videos

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THE MARK STANDIFER STORY: *Lessons Learned From An Arc Flash Tragedy*

Leader's Guide

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This easy-to-use Leader's Guide is provided to assist in conducting a successful presentation. Featured are:

INTRODUCTION: A brief description of the program and the subject that it addresses.

PROGRAM OUTLINE: Summarizes the program content. If the program outline is discussed before the video is presented, the entire program will be more meaningful and successful.

PREPARING FOR AND CONDUCTING THE PRESENTATION: These sections will help you set up the training environment, help you relate the program to site-specific incidents, and provide program objectives for focusing your presentation.

REVIEW QUESTIONS AND ANSWERS: Questions may be copied and given to participants to document how well they understood the information that was presented. Answers to the review questions are provided separately.

INTRODUCTION

Mark Standifer received 2nd and 3rd degree burns over 40 percent of his body and was nearly killed when he was engulfed in an arc blast while performing an electrical task at a wastewater treatment plant. While installing relays on the door of a 13,800-volt switchgear, he made several crucial errors resulting in a tragedy that will affect Mark and his family for the rest of their lives. In this powerful program, viewers will see the mistakes Mark made and learn the lifesaving lessons from the incident. The importance of understanding all hazards of a job task and taking the necessary precautions to protect yourself from them are stressed throughout the video.

PROGRAM OUTLINE

THE ARC FLASH INCIDENT

Mark Standifer had spent six weeks installing and testing high-voltage equipment at the wastewater treatment plant where he was employed. The job had been particularly tough on Mark because he had to be away from his family, work long hours and deal with ill-tempered contractors. Because of these pressures, he decided to take a new job that would allow him to spend more time with his wife Bonnie and son Rick. All Mark had to do was complete a few routine tasks and he would be ready to start a promising new career.

After discussing the new job with co-worker Joe, Mark proceeded to install some relays on the door of a new 13,800-volt switchgear. He assembled his tools and opened the first high-voltage switch. Procedure called for him to perform a visual inspection of the switch blades to ensure they had opened properly, but he was interrupted by the general contractor Dale Jennings beforehand. Obviously upset that the relays hadn't already been mounted, Dale angrily told Mark to finish the job as soon as possible so the new control system could be tested.

Had Mark remembered to inspect the switch, he would have discovered that one blade of the three-phase switch had failed to open. He also didn't have a functioning high-voltage tester, known as a tic-tracer. Without it, he had no way to verify if the load side of the switch was de-energized (it wasn't). To mount the relays, he had to drill several holes in the cabinet door. As he stretched into the cabinet to plug in the drill, his right leg got close enough to the 13,800-volt bus for the electricity to jump the air gap and enter his leg. The extreme temperatures of the electric arc ignited the air around the arc into a huge fireball known as an arc blast.

Mark was badly burned over 40 percent of his body. He was transported to a burn unit, where he began his battle for survival. His wife said Mark didn't think he was going to make it; he didn't think he could stand the pain. But he didn't die. At the burn center, he underwent the excruciatingly painful treatments necessary to recover from his severe burn injuries.

LESSONS LEARNED FROM THE INCIDENT

- One of the first lessons to be learned from Mark's incident was that it didn't have to happen. He let his anger and emotion distract him from his number one task, his personal safety.
- Another mistake Mark made was failing to test for energized parts. Had he done so, he would have discovered that one phase of the switch didn't open, which left the load side energized at 13,800 volts. Since his tic-tracer was broken, he just assumed the switch did its job.
- As electrical workers, we must be committed enough to our personal safety to overcome the outside distractions and complacency that tempts us to take chances or shortcuts.
- Another lesson to be learned from the incident is the importance of wearing proper personal protective equipment designed to provide protection from the intense heat of an arc blast. At the time of Mark's incident, there were no commonly followed rules concerning clothing for electrical workers, but now there are.

HAZARDS OF JEWELRY AND FLAMMABLE CLOTHING

As Mark dressed that morning, he put on blue jeans and a polyester shirt. He also wore a large metal belt buckle, a plastic watch and his wedding ring. During the incident, the belt buckle burned a hole in his stomach, the shirt diffused into his skin, the watch melted into his wrist and the wedding ring nearly severed his finger.

- The electrical fault and resulting arc blast lasted for only one-quarter cycle (.004 seconds), but that was enough time to set Mark's clothing on fire. He received 2nd and 3rd degree burns over 40 percent of his body.
- His polyester shirt diffused into his skin, causing most of the damage and 3rd degree burns. To prevent these types of burn injuries, regulations have been developed that require electrical workers to wear flame-resistant (often called "FR") clothing when performing tasks that carry an increased risk of burns due to an arc flash incident.
- These regulations specifically prohibit the wearing of "flammable-meltable" fabrics such as polyester, rayon, nylon and blends of these materials.
- Also prohibited is metallic jewelry or conductive clothing that can not only conduct electricity, but also heat that causes severe burns during an arc flash incident.
- The most obvious benefit to flame-resistant clothing is that once the initial heat of the arc blast dissipates, FR clothing will not continue to burn.

CONCLUSION

- Sadly, Mark's story is not unique. Many similar incidents happen to electrical workers each year. Make sure you do not become one of them by always following your company's procedures governing arc flash protection.
- Don't allow anger, discomfort, complacency or simply being in a hurry to become an excuse for placing yourself at risk of a serious burn injury.

PREPARE FOR THE SAFETY MEETING OR TRAINING SESSION

Review each section of this Leader's Guide as well as the videotape. Here are a few suggestions for using the program:

Make everyone aware of the importance the company places on health and safety and how each person must be an active member of the safety team.

Introduce the videotape program. Play the videotape without interruption. Review the program content by presenting the information in the program outline.

Copy the review questions included in this Leader's Guide and ask each participant to complete them.

Make an attendance record and have each participant sign the form. Maintain the attendance record and each participant's test paper as written documentation of the training performed.

Here are some suggestions for preparing your videotape equipment and the room or area you use:

Check the room or area for quietness, adequate ventilation and temperature, lighting and unobstructed access.

Check the seating arrangement and the audiovisual equipment to ensure that all participants will be able to see and hear the videotape program.

Place or secure extension cords to prevent them from becoming a tripping hazard.

CONDUCTING THE PRESENTATION

Begin the meeting by welcoming the participants. Introduce yourself and give each person the opportunity to become acquainted if there are new people joining the training session.

Explain that the primary purpose of the program is to show viewers the severe consequences of an arc blast incident.

Introduce the program and play it without interruption. Review the program content by presenting the information in the program outline.

Lead discussions about specific job tasks that your employees undertake that involve arc hazards and what must be done to prevent these hazards from causing injury or death. Use the review questions to check how well the program participants understood the information.

After watching the videotape program, the viewer will be able to explain the following:

- The circumstances and shortcuts that led to Mark Standifer's arc blast incident;
- The lessons to be learned from Mark's story;
- The hazards of jewelry and flammable clothing around arc blast hazards.

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DISCUSSION QUESTIONS

1. Have you ever let your emotions distract you from maintaining your personal safety on the job? If so, what could have been the consequences of your failure to work safely?
2. Have you ever taken a shortcut to complete a task in less time? If so, what could have been the result of the risk you took?
3. What type of clothing and PPE are required for the electrical job tasks you undertake at this facility? Do you always wear it when it is required?
4. What are some of the reasons that jewelry should not be worn when performing electrical work? What are some of the injuries that could occur should jewelry be involved in an electrical incident?