

8.1 cal Arc With 4 cal Clothing (1/10th of a second)



Tyndale Enterprises, Inc. - Confidential

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DON'T BE ME

HOW COMPLACENCY NEARLY KILLED ME

• Presented by: Jason Brozen

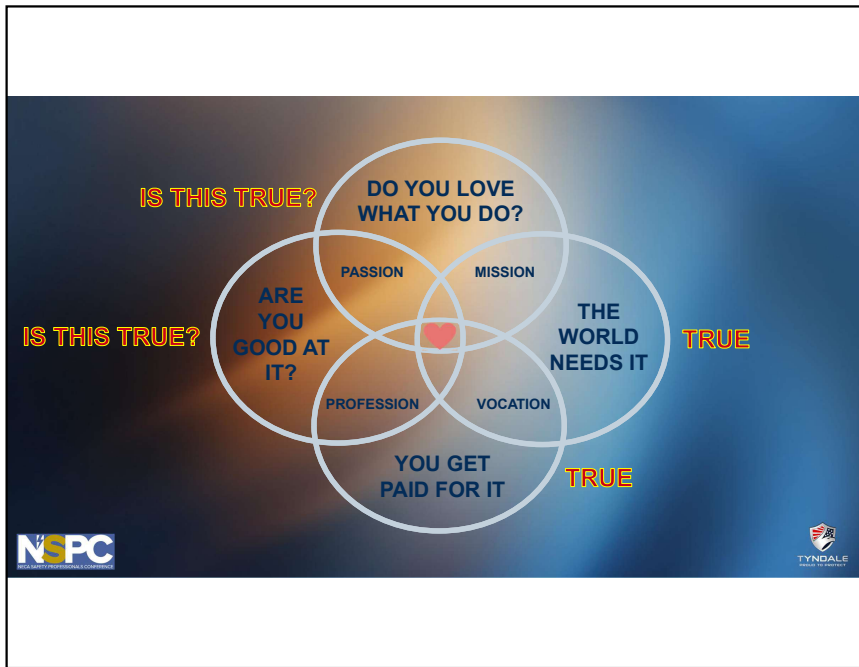
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NECA SAFETY PROFESSIONALS CONFERENCE



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PROUD TO PROTECT





What Qualifies Me?

- Safety & Technical Training Manager
- NFPA CESP (Certified Electrical Safety Compliance Professional)
- Master Electrician for over **30-years**
- Construction industry for nearly **40-years**
- OSHA Trained
- **Arc flash survivor** - Mission, Vision, Passion

}

Vocation
Profession
Occupation

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WARNING

GRAPHIC CONTENT

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Goals

- 1
- 2
- 3

CASE STUDY

DATA CONDITIONS EXAMINATION METHOD IN-DEPTH ANALYZING

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Arc Flash Characteristics

Shrapnel

Intense Light

Sound Waves
140-150 db

Pressure Waves
700-800 mph

Molten Metal
1,200 – 2,800 °F
FABRIC MELTS / IGNITES
BETWEEN 300° to 700° F

Hot Air-Rapid Expansion

Copper Vapor

35,000°F
3.5x hotter than the sun

Skin is totally destroyed at 160°

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HUMAN CONSEQUENCES

My StoryANCE

EMERGENCY ENTRANCE

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Fire Department Video

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Coma Week

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Two Weeks in ICU



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Minutes



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Hours



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Days



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Months



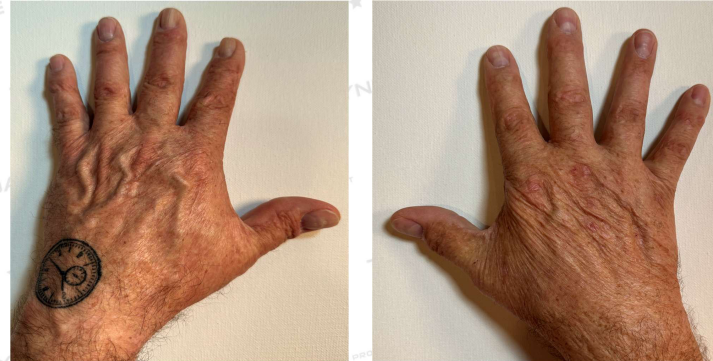
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Years



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"Takes a Licking & Keeps on Ticking"



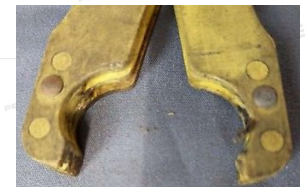
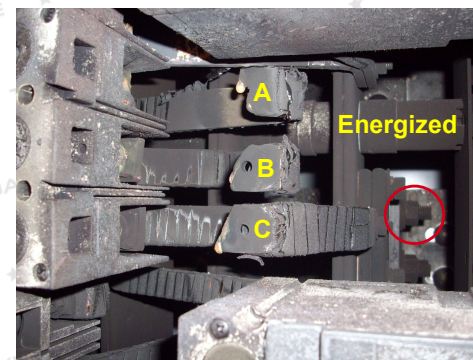
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What Happened?



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The Equipment



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What Happened?

Accident Report Detail

Accident Summary Nr: 200375723 - Employees Are Injured In Arc Flash; One Dies Of Burns

Accident Summary Nr: 200375723 -- Report ID: 0454510 -- Event Date: 10/28/2011

Inspection Nr	Date Opened	SIC	NAICS	Establishment Name
315695429	10/31/2011	8062	622110	Loris Community Hospital District
Inspection Nr	Date Opened	SIC	NAICS	Establishment Name
315695445	10/31/2011	1731	238210	Cayce Company Inc

Abstract: On October 28, 2011, Employees #1 through #4, with Loris Healthcare System, and Employee #5, an electrician with Cayce Company, Inc. (an electric contractor), were adding a circuit to the outside of Sea Coast Medical Center to power mobile medical equipment. They were preparing to pull electrical wire through a recently-installed conduit. Employee #1, the Plant Services Supervisor, removed the factory-installed protective tape from the energized bus bar of a 480 volt, 3000 Amp main breaker panel in the main electrical room. He was standing directly in front of the open panel with his hands inside it. When Employee #1 used a screw driver to scrape away tape adhesive, an arc flash occurred. He was engulfed in flame and received third-degree burns over approximately 48 percent of his body, primarily from the waist upward. Employee #1 died approximately three weeks later. Employee #2, an electrical communications technician who was standing beside Employee #1, approximately 1 ft from the front of the panel, was hospitalized for third-degree burns on his face and arm. Employee #3, who was standing approximately 6 ft from Employee #1, was treated at Sea Coast Medical Center for smoke inhalation. Employee #4, who was approximately 12 to 16 ft from the panel and walking away from it, was struck by flying debris but uninjured. Employee #5, who was working approximately 8 ft from the panel, received first-degree burn on his upper arm from a piece of flying slag from the bus bar. This task was nonroutine for the employees of Loris Healthcare System; standard practice was reported to be that all energized electrical work was to be performed by contractors. Factors in the incident included failure to wear arc flash PPE, lack of a cover on the main panel, and failure to prohibit employees from working in proximity of energized electrical parts.

Keywords: respiratory, electric arc, ppe, electrical cabinet, smoke inhalation, burn, electrician, mechanic, health care facility, lockout

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Physical Consequences (14% Burn)

- In a coma for 1-week
- ICU / Burn unit for 2-weeks
- Couldn't drive for 2-months
- Dependent on family for everything
- 5-months of intense hand therapy
- 7-months off work
- Compression gloves for over a year
- Loss of function and feeling for life

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Mental / Emotional Consequences

- **ASD (Acute Stress Disorder)** typically lasts for approximately month
- **PTSD (Post Traumatic Stress Disorder)** can last a lifetime
- Co-workers were stressed and worried
- My family was traumatized

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What are you Willing to Lose?



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NON-HUMAN CONSEQUENCES

Count the Costs



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Non-Human Consequences (14% Burn)

- \$220,000 hospital bill
- \$65,000 in OSHA fines and citations
- \$15,000 GE repair team
- Installing contractor (unknown)
- Legal fees (Ours, Hotel, GE, Original Installer, Work-Comp, OSHA)
- Increased insurance premiums
- Loss of trust, future work, and contracts
- Downtime, loss of jobsite production



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Count the Costs

\$5 is spent
per
\$1 of medical expense



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Count the Costs



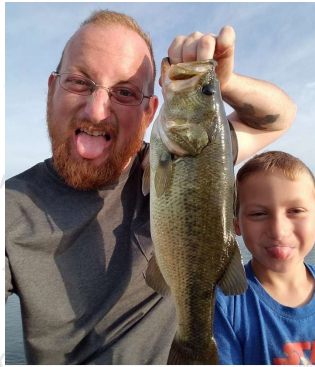
**79 Days.....
34 million dollars**

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TYNDALE PROUD TO PROTECT

Jubal D. Hubbard (Kansas City)



- 28 Years old
- 1st year Pipefitter
- Father
- November 27th, 2017

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INCIDENT ENERGY




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What is Incident Energy?



It's the amount of energy impressed on a surface, a certain distance from the source, generated during an electrical arc event. Incident energy is measured in calories/cm².



1 Calorie is the amount of energy needed to raise a 1cm cube of water 1° C.

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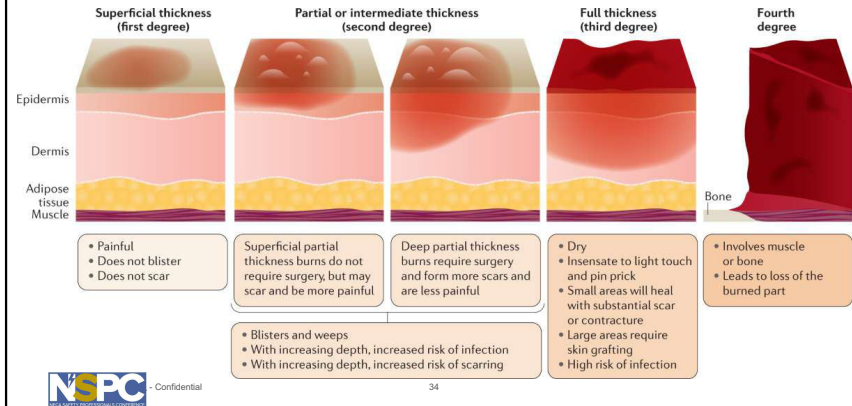
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This would be 130 – 160 lighters for the average hand

If you took a disposable lighter and put the palm of your hand over the hottest part of the flame for 1-second, it will result in a 1.2 calorie (second degree) blister burn



Degree of Burn



1.2 Cal – 2nd Degree Burn



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THE ROOT CAUSE



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Complacency

Self satisfaction especially when accompanied with an unawareness of actual dangers or deficiencies.

Synonyms:

- Bigheadedness
- Conceitedness
- Proud - Smug
- Self-important
- Egotistical
- Arrogant



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Complacency



“Just be careful”

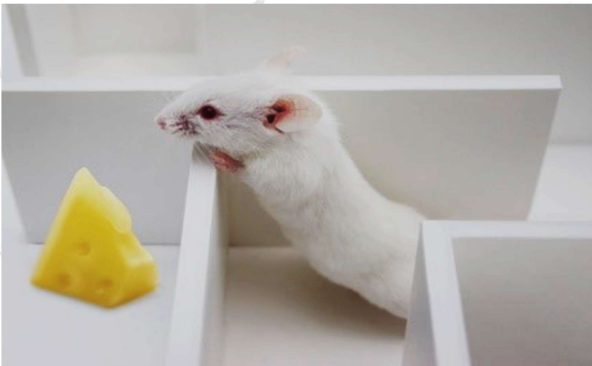


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Complacency

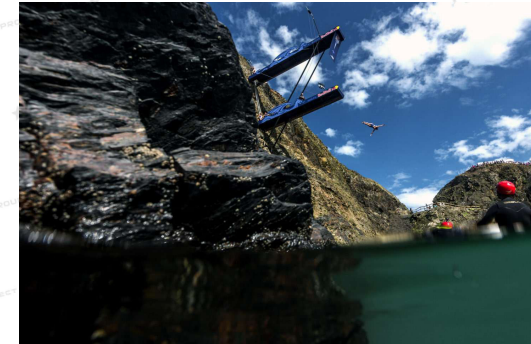


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Complacency

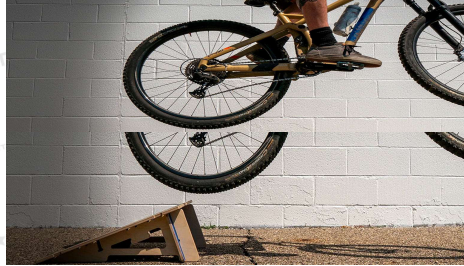


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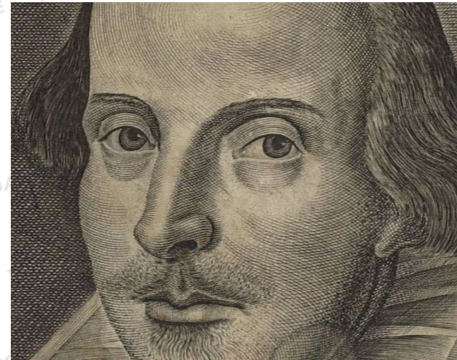


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Shakespeare



“Your greatest strength begets your greatest weakness”



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Complacency Statements



“We’ve always done it that way”

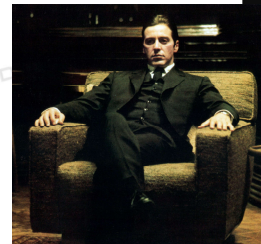


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Complacency



Accidents don't happen to people who take accidents as a personal insult.
OWN IT!
— Mario Puzo —



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Complacency Statements



“I’ve done this a million times”

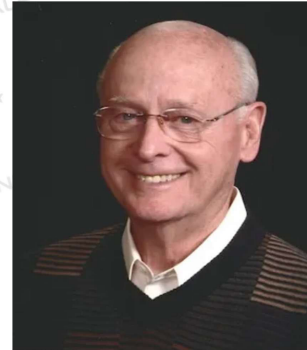


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Complacency – Richard Lee Winkle



- 83-Year-old from Muncie, Indiana
- USAF Veteran
- Engineer, Master Electrician,
- Decades long Business Owner
- Husband of 48-years
- Father, Family Man, Missionary



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Complacency – Richard Lee Winkle

FATALITY

Accident Report Detail

Accident Summary Nr: 155110.015 - **Employee Is Killed When Severely Burned In Arc Flash**

Accident Summary Nr: 155110.015 -- Report ID: 0551800 -- Event Date: 03/30/2023

Inspection Nr	Date Opened	SIC	NAICS	Establishment Name
1660371.015	03/31/2023		331110	Delaware Dynamics

Abstract: At 10:39 a.m. on March 30, 2023, an employee working as an electrician for a die cast mold manufacturer was removing a 480-Volt Flex-A-Plug bus plug. The employee attempted the removal while the fuse was still in the circuit. An arc flash occurred causing the employee's upper body to be severely burned, killing him the following day.



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Complacency Statements



“I don’t need PPE, I’m just going to...”
(Fill in the blank)



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Complacency



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Complacency Statements



“Don't tell me how to do my job, I've been doing this for 20, 30, 40 years!”



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How Experience Affects Accidents 18 - 34

BLS Stats	2017	2018	2019	2020	2021
Under 16 years	15	13	17	14	7
16 to 17 years	7	9	17	12	17
18 to 19 years	62	56	50	66	85
20 to 24 years	293	282	325	260	289
25 to 34 years	872	946	866	833	882
35 to 44 years	907	966	967	898	977
45 to 54 years	1059	1114	1082	954	1087
55 to 64 years	1155	1104	1212	1051	1140
65 years and over	775	759	793	676	702



6,167



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How Experience Affects Accidents 45 - 65

BLS Stats	2017	2018	2019	2020	2021
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14,663



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William Harger – Eaton Corp.



On August 9, 2024, a **64-year-old** electrician with over **38 years** of experience was burned from a 4,160 arc flash.

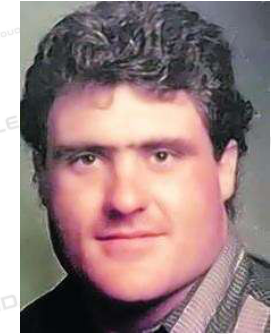
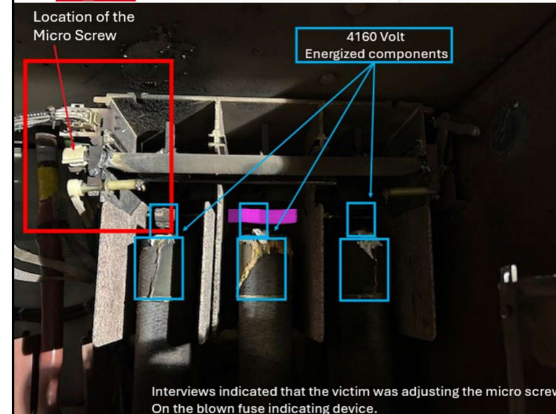


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Died 2-Weeks Later



Complacency Statements



“It’s only going to take a second”

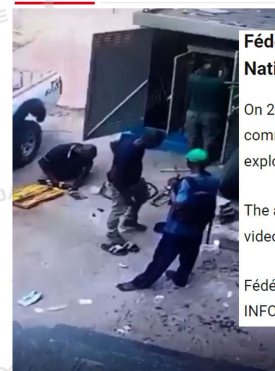


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Lack of Training and PPE



Fédé Intuku, in his forties, was head of maintenance at the National Electricity Company (SNEL).

On 24 May, while carrying out a routine task in an electrical booth in the commune of Gombe with three other officers, he was violently hit by an explosion. Severely burned, he was evacuated to Nganda Hospital for treatment.

The accident was filmed by a surveillance camera in a nearby building and the video went viral on social media.

Fédé Intuku will succumb to his injuries on Saturday, Saturday, June 3, reports to INFOS. CD, a colleague of his.



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Lack of Training and PPE



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Complacency Statements



“We’ve made it this far without any recordables”



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Complacency

The absence of **ACCIDENTS** doesn't mean the existence of **SAFETY**, Don't play the odds or rely on luck.

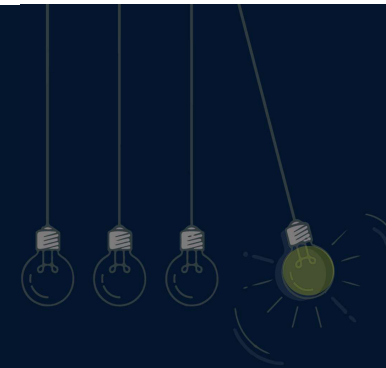


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SOLUTIONS



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Solutions

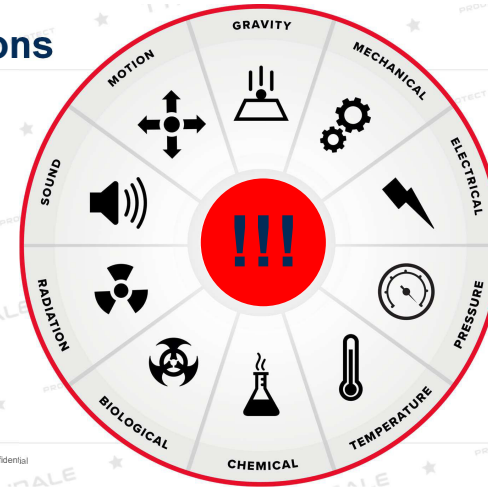


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Solutions



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Personal Protective Equipment (PPE)



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My Coat – Polyester/Nylon (FUEL)



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My Incident Energy

	Bus Name	Protective Device Name	Bus kV	Bus Bolted Fault (kA)	Prot Dev Bolted Fault	Prot Dev Arcing Fault (kA)	Trip/ Delay Time (sec.)	Arc Flash Boundary (in)	Working Distance (in)	Incident Energy (cal/cm ²)	PPE Level / Notes ("N)
1	SWGR	SWGR MAIN SW	0.208	22.36	22.36	10.14	2	155	18	37.5	Level 4 (N9)
2	SWGR MAIN	MaxTripTime @2.0s	0.208	22.36	22.36	10.14	2	155	18	37.5	Level 4 (N2) (N9)



SWGR MAIN
Voltage 2081sc 3P 2236A
AF Inc Eng 37.48 Cal/cm²
AF PPE Level 4
AF Boundary 155 inches

SWGR MAIN SW
GOULD SHAWMUT A4BY
Voltage 600V
Amp Rating 2500A
Trip 2500A

SWGR
Voltage 2081sc 3P 2234A
AF Inc Eng 37.48 Cal/cm²
AF PPE Level 4
AF Boundary 155 inches



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Near Miss and Close Call Reporting



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Qualified vs. Unqualified - 70E Article 100

Qualified - One who has demonstrated skills and knowledge related to the construction and operation of electrical equipment and installations and has received safety training to identify the hazards and reduce the associated risks.



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Qualified

- ✓ Demonstrated skills, physically done it (intern, apprentice)
- ✓ Demonstrated knowledge (class training, you understand)
- ✓ Understand how its built.
- ✓ Understand how it operates.
- ✓ Understand how its installed.
- ✓ Received OTJ training to identify specific hazards
- ✗ Received OTJ training to reduce the risk (PPE training)



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Do You Believe in Miracles?

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Do You Believe in Miracles?

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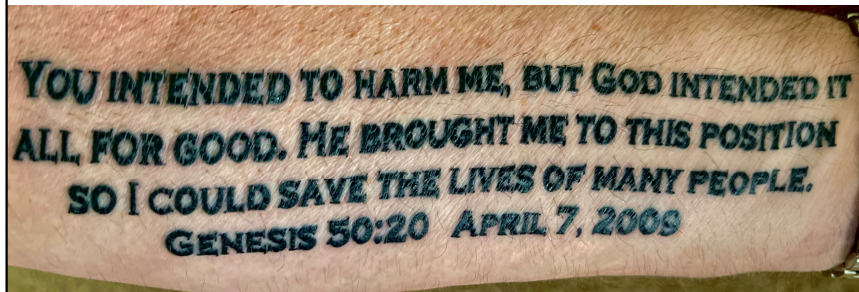
Do You Believe in Miracles?

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Mission, Vision, and Passion

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My Mission, Passion, and Vision



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THANK YOU!

Questions?

Jason Brozen CESP
Lead Safety & Technical
jbrozen@tyndaleusa.com
913.309.0190



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