

ARC FLASH AWARENESS (5/11/06)

“Something was probably telling me ‘Get out of that room’ and I got, I finally get out of the room and he follows me out. And I can remember patting, he was patting my head, as he told me later, he was still putting the fire out, that my hair was still burning.”

- Jon Beley

“The skin on my face was basically burned off. Lost parts of my ear, ears.....There was actually metal impaled in my teeth.”

- Andy Tomko

“ When I looked back and saw I had no pants on the back of legs, and literally, the skin was hanging off my arms and legs, I just....I just knew something horrific had happened. “

- Don Stewart

(narrator)

Electricity is an essential part of our lives. It lights our homes and powers our industries. We rely on electricity everyday.

- Night shot, city of Pittsburgh from overlook

Electricians and other workers who install and maintain electrical power systems and equipment make this all possible. These workers are at risk for electrical injury on a daily basis.

- Electricians working

In industries like construction and mining for example, electrical incidents are a leading cause of fatal injuries on the job. Shock is one of the more obvious risks in electrical work, but a hazard that sometimes goes unrecognized is the danger from an arc flash.

- **WS- Construction site**
- **Underground coal miner flips switch at power center**

An arc flash can occur while working on an energized circuit, or from electrical equipment failure. When an arc flash occurs, workers can suffer serious burns and other injuries. Such injuries may require months of painful recovery, result in permanent disability, or even be fatal.

- **Staged arc flash**
(Square-D supplied clip)

Title over video :

“ARC FLASH AWARENESS”

You are about to hear the personal stories of three experienced electricians who were injured in two separate arc flash incidents. They will recount the sudden and destructive power of an arc flash, and discuss how these events affected their lives.

- **On-camera talent**

- **INCIDENT # 1**

“My story begins in 1995, in the spring of 1995 in May. We were to show up at a building to perform preventative maintenance on some switch gear. We arrived at the job site about 7:00 that morning and we got together. The two other gentlemen and myself got together to discuss what tasks we had to perform..... One of the tasks to be performed was to change a disconnect-out in one of the panels. I was standing in front of one of the compartments and said, ‘I will change-out this disconnect’. Jon was to my right and Scott was to my left. Jon was going to proceed tightening the load wires of the disconnects of the panel that he was in.....”

- **Don Stewart**

- Jon Beley

“ When I got to one of the switches which was still energized on the line side, when I shut that disconnect door, that is when the incident started. It was so fast, it was unbelievable. The room was as bright as it could be right now. Horrific noises, humming, banging, and just molten metal flying everywhere. I sort of remember that, I can remember it. I can remember it being right in front of me, I believe I got blown back. There was a wall not too far away, so there wasn't too much room where I could go back, maybe 3 ft. I hit a wall and I went straight down. Luckily one of the workers was walking out the door for something. I'm not even sure what he was doing, getting another extension cord or whatever. He was lucky enough just to scamper out of the room when this happened, so he did not get burned at all. My working partner, however, he did eventually get burned. But the incident happened right in front of me, and I went down. He was not in front of the actual arc, but he did turn around to come and lift me up. As he was lifting me up, this gear was still arcing and melting down. This is when he received burns on his back side, the back of his legs, and the back of his arms, as he was trying to pick me up. ”

- Don Stewart

“.....I can remember I was bending down to pick the disconnect and I could see his motion of him closing the door. When he closed the door, it was just a horrific explosion, the ball of fire and the noise. The noise was so deafening. It was like somebody was in there with shotguns just shooting at you....”

- Jon Beley

“As it turns out, as a result of the incident, I received burns over 58% of my body. The worst burns were from my fingertips up to my elbows. While I was under in the hospital, they had did

skin grafts to my arms, through my fingers. Luckily, I had enough skin left, although it was close, from what I heard, to do my arms. They took skin from my mid-section. They would have like to did skin grafts to my legs, but I didn't have enough skin, and it was borderline, and they thought maybe there were a couple areas that probably could have used them on my legs. Pretty much as I laid there in the hospital and finally started realizing what happened. I mean, there was not too much of my body that was not burned. Some places were better than others. I can remember being, at the time, I had garment on my arms, sort of maybe the first time I woke up and was conscience and just couldn't believe the total coverage of the injuries. My legs, both legs, both arms, my back, there is a patch on my back that got burnt pretty good, my face and my ears. My ears were pretty bad, I like to tell everyone they looked like if you leave a marshmallow in a campfire too long that is sort of what my ears looked like. They would actually, when I would lie in bed in the hospital, my ears would touch the pillow, they would almost stick to the pillow. I remember not being able to move my head because both of my ears were stuck to the pillow....."

".....I am not here to scare you, not here to talk you out of being an electrician--I am going to retire as an electrician. My son has started the program. I constantly talk to him about what's going on, what can happen. I can't talk to every electrician out there what can happen, but maybe this message here will get to a lot of you....."

“.....I would say the biggest way it has changed me, it is in my attitude. It’s trying to expect the unexpected. It’s being ready for anything, because anything may happen. With what we do, we’re more at risk of something like that happening, than maybe anybody else that may be walking down the street. Or maybe whatever you do in your profession, we may be more suspect to those freakish kinds of accidents that happen.....”

.....In terms of arcing accidents, it’s kind of funny, when I was in the hospital recovering, when I was well enough to speak and to see people. Every electrician that I talked to, had their own little arc story that they lived through. A lot of them were harmless, you know, injury free. However, they were arcing incidents and well could have been, you know, cause of an injury. It is amazing how many, a very high percentage. It would probably be hard for us to talk to an electrician that never was exposed to an arc that he had caused or was around.....Now we electricians should know this and be ready for it. It is going to happen, what are you going to be like when it happens ? What are you going to have on your body when it happens, what are you going to have over your eyes when it happens ? You may not stop them from happening, but we can stop them from hurting us. “

- INCIDENT # 2

- Andy Tomko

“ June 19, 1997, I was requested to go to Brownsville Elementary School. Met my partner at a bus stop, the park and ride, and we went in one vehicle. We went in a company vehicle out to the job site. It took us about an hour to get there.....”

“.....We got to the job site, what we want to do is to check and see if the hardware would let us adapt new buckets to old switch gear. The switch gear was in a revamped boiler room, clean atmosphere, but the boilers have been removed. Upon inspection, when we removed the side panels on the switch gear, I could see that there was an old film across the buses and a pretty good indication that all the paint on the outside didn't help what was on the inside. This switch gear there was quite a few switches that were defective. The intent here was to order new buckets to be installed. The original manufacturer was no longer in business. This was a retrofit and it was just a matter to see if the connected hardware was going to line up....”

“.....I decided I was going to see if I could safety disconnect the bucket. See if we could get hardware to match up. My partner went out to the vehicle to get something. In the mean time, I was able to reach in work around this switch very comfortably. I was able to switch electrically and mechanically and was attempting to remove it from the switch gear. When the accident occurred, there was arc over there was a flash, the brightest light I had ever seen in my life. The noise was

deafening and I probably blacked out for, I had no idea how long, seconds. It could not have been more than a minute. Regaining my composure, I looked at myself and I saw that I had been burned pretty severely. I had skin hanging from my ears, from my arms, and my chest. I was able to walk out of the building, met my partner who was coming in. He was just aghast, couldn't believe because it was just a matter of seconds, basically. There was hardly any time from the last time I saw him, until I saw him again, and he was just looking at me like. He was probably more upset than I was. It was probably because I was in shock. We decided that he should drive me over to the hospital rather than waiting for emergency help. Because the hospital was so close, we did that, went to Brownsville Hospital. The decision was made to send me down to West Penn Hospital Burn Unit. Which, interestingly enough, I was instrumental in wiring. Two things I never got to enjoy was helicopter ride because I was out, and the burn unit. Never really got to see the inside of it because I was more or less in a coma the whole time. The coma was induced. I was out for five weeks. The skin on my face was basically burned off and lost parts of my ear, ears. I am probably jumping ahead here, but there was actually metal impaled in my teeth, you know like spears. My arms were burnt from where my sleeves, I had a short sleeve shirt on, so from under the short sleeves, my arms were burnt. My neck was burnt. I had a hard hat on, had safety glasses on, essentially that was about as far as it went.....”

“.....Power should have been shut off, plain and simple. I think that I made a very costly error by not insisting that the power be turned off. As a result, I came very close to dying. I had acute respiratory distress from the smoke that I inhaled. That was probably the biggest thing they had to work with, or on.....”

“.....I would have to say that my family did not deserve that mistake that I made.....Again, I will just reiterate, you could actually see this light and explosion that takes place and the devastation after the fact. If you could see that, you could witness that, you would never work on anything that was hot....”

“.....Part of what happened to me was because of my own ego. Because I have done it so many times that, like I said, you get the feeling you are infallible. You find out that you're just skin and bones.....”

“.....I was never complacent, I mean, I was always very careful, always very careful. My fault, it was my fault, because in retrospect, I made that decision to work on it hot.....”

“.....Your life has to be just as important as everyone else. Someone's asking you to work on that hot. What inconvenience could that be, being in the hospital for nine months, was it worth it.....”

“.....When it comes to working on live circuits, live equipment, you really do have a choice. You don't have to work on energized equipment. It can be shut off. You're just too important, think of your family, think of you family.”

(Lanny Floyd – mgt. comments)

**- Management
Spokesman (on-camera)**

It's important to recognize that much that can be done to prevent arch flash events are beyond the control of the individual who may be at risk of injury. Today we have the tools and technology to analyze the workplace, to identify the arch flash hazards. We can use those tools and knowledge to better engineer facilities from the very beginning. To better engineer facilities if we are retrofitting or renovating a facility so that we reduce arch flash hazards either in magnitude or in frequency.

It is important that the commitment to manage this hazard be visible at the very top of an organization. Management must demonstrate the commitment to provide a safe work environment and apply to that commitment to the unique hazards of electric arch flash. Engineers that do the design of the facility, of the processes, of work practices can bring added value to preventing these events from happening. Partnerships with equipment suppliers that can bring innovative technology to both from a, say an industrial switch gear, a commercial switch gear as well as the tools and protective clothing that people use on a daily basis.

**- Mgt. / Engineers doing
“design...”**

**- Partnership with
suppliers**

- Safety Professionals

The safety professionals have a very important role in coaching the organization, management as well as workers, in keeping the workplace safe. I think the more that the safety professional understand about arch flash they will be able to apply their expertise in hazard control measures, again to the unique hazard of electric arch flash. Trainers and educators whether they are in-house or people that you may contract with to provide those services to you. We need to make sure that they are knowledgeable and up-to-speed with current state-of-the-art knowledge on arch flash hazards as well as electric shock so that we are training and teaching people that best way we know how. I think lastly, the worker, the person at risk, having had the training and education provided, having had the tools, and protective clothing provided, need to really make a commitment to use that knowledge, to use those tools and to use that protective equipment everyday. To watch out for their co-workers make sure they are doing that too.

- IBEW Trainer in classroom

- Electrician working (wearing protective clothing)

- Management Spokesman (on-camera)

(narrator)

Your safety depends on all electrical work being carefully planned and carried out. The safest way to work on an electrical circuit is to de-energize, lock-out, and then verify that the circuit is de-energized. It is important to follow recommended safe work practices and use proper tools and equipment in addition to appropriate PPE. The decision to work safely is yours, and the choices you make can save your life.

- On-camera talent

- (DISCLAIMER)

This video provides only a brief overview of arc flash hazards. The viewer is advised to obtain formal training on electrical safety, including arc flash hazards. Electrical work should always conform to applicable workplace safety regulations, such as those in CFR29 (OSHA) and CFR30 (MSHA). In addition, NFPA 70E, Standard for Electrical Safety in the Workplace, provides detailed recommendations for electrical safety.