



The

# ***Broadcasters' Desktop Resource***

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## **Broadcast Operations**

### **Personal Safety Must Be Your Priority**

*[September 2010] The recent death in Mississippi of an experienced engineer is a reminder that safety in a broadcast facility does not come about by chance. A casual attitude could be lethal.*

At many worksites, there is a sign – usually a point of pride – that lists how many days a factory or construction site has gone without an injury or death. Some are quite elaborate, others just handwritten on a whiteboard. But the message is clear, accidents are not what a company wants to see.

Of course, the sign itself is not the cause of a plant's safety, but a reminder of the thinking and planning that leads to a safe environment. It may sound a bit silly, but it is true: safety does not come about by accident.

#### **DON'T TOUCH THAT!**

Most seasoned engineers will remind anyone who will listen that the first thing to do when dealing with technical issues – from routine maintenance to a frozen automation system to a transmitter on fire – is to stop and take in the whole situation before touching anything.

Sometimes the problem is that the first impulse often the wrong one. Some time back, I was standing in a station when the silent sense alarm went off. The engineer quickly pushed a button that turned on the standby STL. Unfortunately, the problem was just momentary and in a few seconds, the two STLs were feeding the transmitter with a combined 200% modulation. It did not sound very good.

More than one directional array has been mistuned by personnel who come in and turn the handles to “fix” something before taking the time to understand what they were doing. Aside from circulating currents that could destroy components, the costs of bringing someone in to retune an array can be fairly substantial.

More damage was done at a station when the morning crew let the automation come to a halt and, to avoid blame for the dead air, hit the remote control to switch the transmitters, the auxiliary to the antenna and the main to the dummy load. There were only two problems: the auxiliary did not work – while the main did just fine, into a dummy load whose fan was (as they say in the UK “Wait for it!”) off. Yes, the result was a molten dummy load.

However, the theme of this article is personal safety, so while stopping and carefully checking out the situation is important, far more important is to recognize the potential threats to life and limb.

#### **NO. REALLY DON'T TOUCH THAT!**

Upon arrival at the site of any technical emergency, the first step should be to rapidly check to see what dangerous conditions exist, both to personnel and equipment. Sometimes, it is instantly apparent where the problem is – smoke, arcing, or burning hot spots are a quick giveaway.

In such situations, dropping the breaker quickly is usually a smart move.

But, how can you troubleshoot a piece of gear that is de-energized? ***First, it is critical to understand that just because you dropped the breaker does not mean everything is safe.*** You might just find a disconnect switch was mislabeled or broken.

Far too often there are cases where a previous engineer wired two circuits from two breakers into one transmitter – or somehow managed a power backfeed from another circuit or a generator, for example. Sometimes the interlocks do not work properly; they may be broken, defeated, or lead to an “open” drain resistor. And just lurking there in the dark are capacitors that can hold a large charge.

All of this leads us to grounding sticks, and the many lives they have saved. In short, *always use the grounding stick.* Those engineers who have had a screwdriver or wrench turn into in an ad hoc grounding stick will tell you how enormous the “flash” can be!

Again: ***Never trust your life that something is de-energized until you prove it with the stick. And keep one hand in your pocket.***

It might seem inconvenient, but until you have ensured all power sources are discharged, having a hand in a pocket will prevent even an inadvertent “circuit” from being formed through your body. Once everything is discharged, then you can use both hands. But, *be sure* you have carefully made the way safe.



**Before touching anything, ensure any power is dissipated**

If you look carefully at the picture, you will see at least four safety actions taken by the engineer to ensure he is not “bitten.”

- He is not working in the dark. He can see what he is doing.
- The breaker is down.

- He is using the grounding stick to ensure the transmitter is safe.
- He has one hand in his pocket, just in case. This prevents creating a path for any charge to flow through his body.

Those of you who observed and noted the safe practice shown may now take a gold star out of petty cash.

## **IT CAN HAPPEN TO ANYONE**

We would all like to think we are safety conscious. No one in their right mind would stick their hand in a transmitter that was operating with five or ten kilovolts, or more. Yet, there are a number of circumstances that might cause us to violate our own standards.

The most dangerous is pressure – pressure to get a station back on the air quickly - often accompanied by a series of phone calls from a demanding owner or general, an engineer can find himself doing things to speed up the process just so he can get the pressure stopped. In such an environment, it does not take much inattention to cause an accident.

Less dramatic might be inserting the wrong parts in the wrong order, causing part failure, perhaps some smoke or even a flash. The result is additional time off-the-air, and more pressure, including from pride “I know I can fix this more quickly.”

Such an attitude might lead to something as simple as failing to use the grounding stick *each and every time* the back of the transmitter is opened, trusting in the interlocks, as unwise as climbing a tower rapidly without the proper safety precautions, or as sad as working past the point of becoming tired, and leaning in just a bit too far at just the wrong time.

The point is that nothing is worth a life, especially if only to gain a few seconds less of dead air.

## **LOOK FOR THE DANGER BEFORE IT FINDS YOU**

There are many places around a transmission facility can be dangerous - from the transmitter itself to the tower environment. And additional hazards lurk back at the studio as well.

With the increased use of IT people and managers filling in for an engineering staff that has been cut down or completely laid off, the potential for coming into contact with lethal voltages and currents has gotten high. - high enough that some manufacturers are getting very cautious as to how far they will go to assist someone over the phone, even if they are off the air.

Then there is this potentially lethal situation, combining *two* errors: a disk jockey suddenly notices the transmitter is off the air and pushes the remote control “on” button. Meanwhile, the engineer is working inside the transmitter, having forgotten to disengage the remote control. It does not even sound funny, does it?

One of the reasons OSHA mandates “lockout tags” on breakers and disconnect boxes is how easy it is for someone to happen upon an open box, without knowing someone is working in a room down the hall or farther away. A quick flick of a switch, and someone could get zapped.



**A sample OSHA  
Lockout Tag**

True, it is not uncommon for an engineer to be alone at the transmitter site, so it might seem as though a lockout tag would not be of much use there. But the visual cue could be very helpful. It is easy to get busy and become so engrossed in the task at hand that you forget whether the breaker is on or off. And when alone it can be especially dangerous, because it only takes a tiny memory slip and one could literally turn to toast.

### **KNOW FOR SURE WHICH BOX IS THE RIGHT ONE**

The best protocol is to have two persons on site at all times. In some markets, union contracts forbid an engineer to work alone on high voltage - and some companies make this their policy as well.

A second person can be instrumental in saving a life in case of accident, whether by performing CPR, calling 911, or simply being ready to kill the power switch. Even a non-technical second person can be “in charge” of remembering if the tower is hot or not, and determining “go” and “no-go” for climbers.

Whether or not your chore is routine maintenance, it is important to know *exactly* which disconnect feeds which equipment. Mark or label each box clearly. And, unless you are testing the transmitter’s operation, turn it *off* before opening the transmitter.



**Clear marking prevents mistaking  
which breaker feeds which transmitter**

## **LEAVE AS SAFE AS YOU ARRIVED**

Safety is not a “check it once and you are all right” deal. Each iteration of troubleshooting and energizing of equipment needs to be met with equal care in making sure you will not get zapped. Yes, it takes more time. You might even be off the air for an extra ten minutes (or an hour). But in the end, you will be alive.

A brief comment on the lost air time: Many stations continue to operate with only one transmitter. This is an economic choice the owner has made. Would he operate the station or drive his car without proper insurance? Of course not. A brand new solid-state one kilowatt transmitter is now so inexpensive (and small in size) that not having such insurance is a bad business decision.

This just cannot be stressed enough: *your life is worth more than any downtime*. So please work smart, work carefully, and stay alive!

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