

Tragedy Strikes Texas Church

Pastor Electrocuted in Baptistry

Waco, Texas – Tragedy struck the congregation of University Baptist Church when the church's lead pastor, Reverend Kyle Lake, was electrocuted as his hand reportedly made contact with a wired microphone connected to the church's audio system while standing waist-deep in the church's baptism.

Chuck Wilson, executive director of the NSCA (National Systems Contractors Association), informed us that the final findings as to the cause of the accident have been released. Four independent electrical engineers have inspected the facility and have determined that the cause of the incident was a faulty water heater in the baptismal coupled with a lack of proper grounding and fault protection of the electrical supply to the baptismal heater and pump.

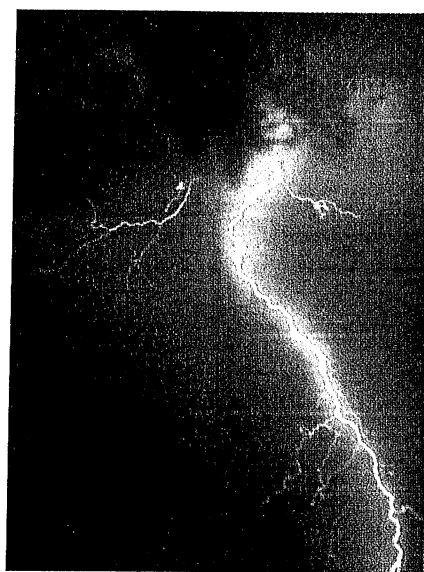
According to Wilson, there were two likely scenarios that could have caused this problem. Although the exact cause of the accident is now known, it's important for churches to recognize both potentially fatal situations when dealing with electrical systems.

The cause of this particular fatality was a short-circuit which had developed in the baptismal water heater. Normally when such a short

develops, the current gets routed to the ground wire provided through the electrical supply, tripping the circuit breaker and preventing fatalities. However, in this case the older wiring was not up to current electrical codes and lacked a ground wire. Additionally, the outlet was not a GFCI (ground-fault circuit interrupter) outlet, which would also have prevented the accident even without a ground wire present. Without these two modes of protection, approximately 80 volts of electricity was placed into the water, simply awaiting a path to ground to be completed. When the Pastor's hand made contact with the properly installed and grounded audio system, that path to ground was completed through the pastor's body, causing the electrocution.

The second possible cause could have been (but was not) an improperly installed audio system. Audio systems can be susceptible to "hum" coming through the loudspeakers, caused by ground-loops through the electrical power system of the facility. According to Bill Whitlock, an expert for the NSCA in the area of proper grounding of audio equipment, a common (and dangerous) method of dealing with this problem is to lift (disconnect) the safety grounds

By Jim Kumorek



on some pieces of equipment. "Lay people hear through unreliable sources that you can eliminate hum by lifting the safety ground," Whitlock reports. "This creates a tremendous liability situation, and can cause a microphone [housing] to become [energized to] 120 volts."

Whitlock continues, "The reason the code provides for the safety ground is if a short-circuit should happen, a high amount of current flows in the circuit, causing the circuit breaker to trip so there's never any danger of people being exposed to high voltage." Once a safety ground is lifted, however, the short-circuit remains a high-voltage potential on

SAFETY CHECKLIST FOR SOUND SYSTEMS

- 1) Find out who did the sound system installation and determine from them if they used code-compliant grounding practices.
- 2) Determine if any lay-people moved, added, or changed anything in the system.
- 3) Find out who did the electrical work in the building, determine their qualifications and verify that all work was done to current electrical code.
- 4) Find out if any lay-people moved, added, or modified any electrical devices, appliances, etc.
- 5) Examine the results from the above steps and if still in doubt, bring in someone trained in safety and technical grounding practices.
- 6) Have them verify that the sound system and other electronic systems have the safety ground in place and no ground lifters are in use.
- 7) Verify that a qualified electronic systems technician was the last person to work on any electronic devices in use.
- 8) Verify that a qualified electrician was the last person to do any electrical work in the building and that they did a complete safety grounding test on the electrical outlets in the building. Make sure this test was done with professional quality test equipment and not devices found at local hardware stores.
- 9) Make sure your building is up to code and that GFCI (ground fault circuit interrupter) outlets or breakers are in place where required.
- 10) Establish a policy within your church to hire professionals to perform this type of work. The money saved by using non-professional volunteer labor is just not worth it.

Source:

NSCA – National Systems Contractors Association

the case, just waiting for a path to ground to be completed – which may be through a human body.

With a permanently-installed baptistry, the water in the baptistry connected to metal plumbing lines and drain pipes creates an excellent conductor to ground. All that is needed is for a person standing in the baptistry to make contact with a high-voltage source such as an improperly grounded audio system to cause a potentially fatal incident.

While the accident at University Baptist Church involved a baptistry, other equally dangerous scenarios can occur that don't involve water.

Wilson gives this example: "Let's say you have an exposed conduit that runs up the side of a pillar – a common occurrence in older churches. If someone holding onto a component of an improperly grounded audio system also makes contact with that conduit, this could allow enough current to cause a shock."

Wilson strongly encourages churches to follow strict adherence to electrical codes, and discourages churches from performing audio system installation and electrical work themselves. Often churches save money by using volunteers for work, but if those volunteers are not trained and licensed, they may inadvertently be creating a fatally unsafe environment for the church staff, volunteers and the congregation.

What should your church do if the safety status of the audio or electrical systems is unknown?

"I would certainly encourage churches to have a professional look at their

system and confirm it is properly installed and grounded," Whitlock says. He also encourages churches to check all the cabling involved in powering the audio system. Some techs use pliers to twist off the ground pin from the plug in an attempt to eliminate ground-loop hum. When plugged in, the cable looks like a proper three-prong connector, but because the ground pin is missing, the safety ground has been defeated. Whitlock stresses that "If equipment comes with a three-prong power cord, that ground connection is absolutely required for the equipment to be safe."

"At the very least," Whitlock adds, "if you're not certain about the condition of your sound system, use a wireless microphone when you are going to be around water. The sound system may still be unsafe, but at least one glaring source of electrocution is eliminated." It's far better to risk losing a wireless transmitter to water damage than your pastor to electrocution.

Churches meeting in relatively new facilities have fewer challenges in ensuring their audio system is properly grounded, but many church facilities were built before grounded wiring was added as a requirement to the electrical code. In this case, the building's wiring has no safety ground to connect to. What options do those churches have?

Whitlock explains that "If you have equipment that has three-prong plugs and you only have two-prong, ungrounded circuits, you have two alternatives. One is to replace the outlet with a GFCI outlet, which

does not require a safety ground." A GFCI outlet monitors the electrical current leaving the "hot" side of the outlet and compares it to the current returning on the "neutral" side of the outlet. If more than 0.005 amps are missing from the returning neutral line, the GFCI assumes the current has found another path to ground (such as through a person) and trips the breaker in the outlet. This lets you safely connect three-prong equipment to ungrounded circuits. Whitlock adds, "The second (and best) option is to rewire the circuits with grounded outlets. If the building wiring is run through metallic

conduit and junction boxes, often the conduit can serve as the safety ground conductor back to the breaker box. This enables mounting three-prong outlets in the boxes. However, if the conduit doesn't support this, the only alternative is to rewire the building or use GFCI outlets."

In summing up, Wilson says "The NSCA has been teaching [contractors] for years to make sure that safety grounding is done up-front, and only then do you start the rest of your work."

He adds, "We want churches to know that if they feel they have some risk in their electrical system that our membership is here to help. Our

web site, www.nsca.org, has a list of qualified people in their area that can do a ground-potential test for them."

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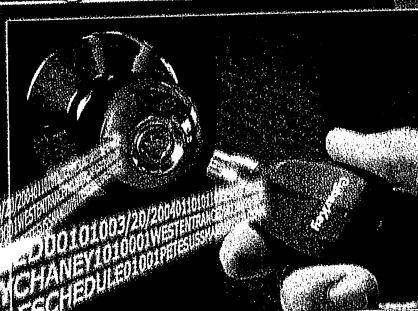
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