Arc Fault Circuit Interrupter

SUCCESS STORIES
AFCI Alerts Homeowner of Potential Fire Risk

Case Study

- Homeowner built home 2017
- Tripping issues started on one circuit soon after move in.
- It should be noted the homeowner had reached out several times to Electrical Contractor with multiple onsite visits with no success in repairing the problem.
- Homeowner contacted SE for help
- SE FSR completed an onsite visit and identified a problem between Neutral & Ground conductors.
- Drywall was removed and discovered a nail in the conductor.

Fact – AFCI’s do their job!
AFCIs avert potential disaster in South Carolina

“I would like to take the time and thank you for the Arc Fault breaker, your product saved our lives and our home.”

- Homeowner built house in 2005; experienced AFCI Tripping
- Advised to replace AFCIs with Standard Breakers
- Homeowner worked with the manufacturer and a contractor to locate the problem
- Electrical contractor located arcing in the home run circuit
- During troubleshooting, gas leaks found in the vicinity of the damaged conductors
- The wire was shredded due to being pulled through a jagged hole drilled in a gusset plate
- AFCI Breaker averted disaster

“So, because the AFCI breaker was doing it’s job, its relentless and nerve racking tripping saved my family’s life (myself, my wife, and 2 daughters) both from fire and from gas explosion since I had an arcing wire and a gas leak! Not to mention saving my home and its valuable contents. Thank you very much for the Arc Fault breaker. It did its job and saved our lives.”
AFCI Protects From Failing Garage Lamp

“Fortunately, the AFCI caught the arc before things got out of hand.”

- Homeowner built house in 2004
- AFCI protecting lights for front porch and garage door tripped on October 2014
- Wiring failure in a light on the left side of garage caused the AFCI to trip
- Disassembly of the light fixture showed the wires were twisted which caused the wires to fail and arc.
- AFCI Breaker averted disaster

“Insulation Failure Combined With Twisted Wires Caused The Wires To Arc. The AFCI Caught The Arc Before Things Got Out Of Hand.”
AFCI Covers For Teen’s Mistake

“I became a firm believer in Arc Fault Technology.”

- Pool pump and salt water generator that pulls about 14A in total through 120’ Power Cord (12-2)
- Teen must have unplugged cord to mow the lawn, but reconnected with another 25’ extension cord.
- Outlets were warm and discolored, but no electricity
- Pulling 14A at 100% duty cycle for hours on end.
- Outlet began to arc, AFCI tripped.
AFCI Saves Kentucky Home

“The faulty wiring may have never been noticed without the AFCI, until it was too late...”

- Home built in February 2004
- Wire insulation failed and began to arc
- AFCI Tripped
- Arc occurred between phase conductor and ground conductor
- Wire cut short to remove the damaged section, then reinstalled into AFCI

“Thankful the AFCI discovered the faulty wiring, before something terrible happened.”
AFCI Detects damaged wire

“The faulty wiring may have never been noticed without the AFCI, until it was too late...”

- AFCI tripping on microwave circuit
- Thinking it was an incompatible microwave, the electrician who owns the house experimented with different breakers and circuits
- Electrician decided to remove the homerun and replace with a new wire.
- The damaged wire was above a duct and behind insulation.

“AFCIs do indeed work as intended!”
Pennsylvania renovation reveals arcing wire in wall

“Without the AFCIs, the faulty wiring may not have been discovered for some time and worse, could have caused a fire in the wall…”

- Home built in 1979 in Hampton Township, PA
- Homeowner chose to do a significant renovation in June of 2001
- Upgraded electrical service to include AFCIs
- Kitchen AFCI tripped
- Troubleshooting revealed stripped conductor in kitchen wall

“As a result, I’m now a big fan of AFCI breakers and would recommend them to anyone as original or replacement equipment. Why take a chance? “
AFCI detects damaged wire in Alabama home

“Without the AFCIs, the faulty wiring may not have been discovered for some time and worse, could have caused a fire in the attic...”

• Home in Alabama – almost one year old
• This cable was part of a 3-way switch loop
• Cable was damaged in the attic where a staple was driven too tight

“Needless to say, this contractor is certainly a believer now.”
AFCI stops fire hazard from stapled wire

“Fortunately, the wires running up out of the panel in the garage, they found the issue...”

- Home run from Electrical panel inadvertently stapled in wall
- AFCI Tripping identified issue before other damage could occur

Effective operation of breaker, coupled with good troubleshooting by electrical contractor, eliminated hazard.
AFCI detects damaged NM Insulation

Damage to the cable feeding the master bedroom, exposed by the AFCI.

- AFCI feeding the master bedroom receptacle outlets began tripping 3 years after renovation
- 12-2 cable was stapled to a floor joist using cable staples like the ones in the photo
- Outer sheath indicated a hammer mark
- Cable sheath removed to reveal the hot and neutral wires had shorted, there was charring inside the outer sheath.

Fire hazard was discovered only because the Arc Fault Circuit Interrupter was able to detect the short in the cable.
Arc Fault Breakers: worth it or just another government imposed rule?

*Idaho code requires new homes be equipped with arc fault breakers in every bedroom.*

- Arc Fault breaker intermittently tripping
- Troubleshooting techniques enabled contractor to narrow it down to the damaged wire
- Wire had been struck by a finish nail in a closet rod holder
- Nail piercing was causing a small arc between the wire and the nail.

“Having the arc fault breaker installed certainly helped to prevent any damage to the home and its occupants.”
Contractor Careless “Fix”

“My wife and I are very lucky that I stumbled onto the problem. What if we were away and a fire had started? We could have lost the house, or worse, what if we had been at home asleep?”

• 73 year old home upgraded to 200Amp service with AFCIs on every circuit

• At the end of the installation, contractor told homeowner that one of the AFCIs kept tripping, but he “fixed” the problem

• Ceiling light in a bedroom was out and new bulb immediately blew out

• Homeowner discovered the fixture had a threaded porcelain socket that loosened over time allowing the socket to rotate and the hot and neutral wire to twist near where the insulation was stripped

• There is no question that arcing was happening because of the missing pieces of wire, bubbled and retracted insulation, charred wallpaper, and small bits of copper sprayed around.

• Homeowner then discovered contractor had replaced the tripping AFCI with a conventional breaker.

“Our electrical contractor’s “fix” was to replace the AFCI protecting that circuit with a conventional breaker. I think he missed the point.”
Decorative lamp caused fire hazard

An AFCI detected a series arc in a lamp before any damage could be done.

- Resident of an apartment complex experienced intermittent tripping on one of the AFCI breakers
- Electrician discovered arcing between the light bulb and socket of a decorative lamp.

The connection between the light bulb and socket is important to check as this is a common place for arcs to occur.
Furnace caused fire hazard

*An AFCI detected a low current series arc before any damage could be done.*

- Customer has had all 15A and 20A circuits protected by AFCIs for years
- The AFCI Tripped on the Furnace Circuit
- After investigating, the igniter coil to the right was found to have failed.
- The AFCI tripped on a low current series type of arc
- The furnace was repaired and put back into service on same day

*Combination AFCIs detect Series Arcs in a circuit to protect against faulty electrical devices.*
NFPA ROP Testimonials

Two cases as reported from the NFPA where AFCIs tripped due to damaged wire.

• AFCI Stops damaged lamp wire from burning engineer’s house down and was able to reuse the AFCI.

• In 1998, a number of AFCI’s were installed in homes in Florida. Only two tripped caused by damage to the conductor insulation, causing low-level faults.

Combination AFCIs detect Arcs in a circuit to protect against damaged wire.
Bose Recalls Home Theatre Speakers

Bose has received 2 reports of defective products which resulted in the home’s Arc Fault Circuit Interrupter tripping

• **Name of product:** Bose Dual Voltage Home Theatre Audio Speakers (Between 2009 and 2012)

• **Units:** About 20,000

• **Manufacturer:** Bose Corporation of Framingham, Mexico

• **Hazard:** Bass module of the system can fail when used in electrical outlets rated at 220 volts or higher, and presents a fire hazard to consumers.

• **Incidents/Injuries:** Bose has received two reports of the bass modules igniting when used in 220-volt electrical outlets. No injuries have been reported in connection with the defective systems.

*AFCI breakers detect faulty equipment which is determined to be hazardous.*
Ceiling Mounted Light Fixtures Recalled by Thomas Lighting Due to Fire and Shock Hazards

Thomas Lighting has received 11 reports of defective fixtures which resulted in the home’s Arc Fault Circuit Interrupter tripping.

• **Name of product:** Thomas Lighting ceiling flush mount light fixtures

• **Units:** About 83,750

• **Manufacturer:** Thomas Lighting, of Elgin, Ill; part of Philips Consumer Luminaires Corporation, of Elgin, Ill.

• **Hazard:** The fixture’s socket wire insulation can degrade, leading to charged wires becoming exposed, causing electricity to pass to the metal canopy of the fixture. This poses a fire and electric shock hazard to consumers.

• **Incidents/Injuries:** Thomas Lighting has received 11 reports of defective fixtures which resulted in the home’s Arc Fault Circuit Interrupter (AFCI) tripping. No injuries have been reported to the firm.


*AFCI breakers detect faulty light fixtures which are determined to be hazardous.*
Ceiling Mounted Light Fixtures Recalled by Dolan Northwest Due to Fire and Shock Hazards

*Dolan Northwest has received 2 reports of defective fixtures which resulted in the home’s Arc Fault Circuit Interrupter tripping.*

- **Name of product:** Ceiling-Mounted Light Fixture
- **Units:** About 8,000
- **Manufacturer:** Dongguan Young Long Electric Co. Ltd.
- **Importer:** Dolan Northwest LLC, of Seattle d/b/a Seattle Lighting, Globe Lighting, Builders Lighting and Destination Lighting.
- **Hazard:** The fixture’s socket wire insulation can degrade, leading to charged wires becoming exposed, causing electricity to pass to the metal canopy of the fixture. This poses a fire and electric shock hazard to consumers.
- **Incidents/Injuries:** Dolan Northwest has received 2 reports of defective fixtures which resulted in the home’s Arc Fault Circuit Interrupter (AFCI) tripping. No injuries have been reported to the firm.


*AFCI breakers detect faulty light fixtures which are determined to be hazardous.*