

Test Before Touch

The meter was in his pocket. He never used it.

10 MIN

NFPA 70E Art. 120 — Electrically Safe Work Condition

NIOSH FACE 87-63

WHAT HAPPENED

1987 · Maryland · Electrical contractor · 30-year-old electrician

A crew was relocating conduit and wiring for a refrigeration unit fed by TWO separate 480-volt supplies — one for the compressor motor, one for controls. The two disconnects sat in adjacent panel boxes, labeled in pencil, and the compressor-motor marking was barely legible. The crew opened the controls circuit. The compressor circuit was overlooked and stayed hot. The electrician disconnected and taped a conductor, pulled it through conduit with a steel fish tape, then removed the tape from the still-energized wire while holding the fish tape against grounded conduit. He completed the path to ground and was killed.

WHY IT HAPPENED

He had a volt meter with him and never used it. Absence of voltage was assumed from a pencil label instead of verified with an instrument.

WHAT THE STANDARD REQUIRES

- De-energize, isolate, lock, tag, release stored energy — then TEST for absence of voltage.
- Prove the test instrument on a known source before AND after the test.
- Identify every source feeding the equipment. Two feeds is normal, not exotic.
- Disconnecting means must be legibly and durably marked — not in pencil.

TALK ABOUT IT — DO NOT SKIP THIS PART

1. Name a piece of equipment here that has more than one source feeding it. How do you know?
2. Where on this site is a disconnect label wrong, faded, or missing?
3. When did you last prove your meter before and after a test? Walk us through it.

WHAT WE WILL DO DIFFERENTLY HERE

ATTENDANCE

PRINT NAME	SIGNATURE	PRINT NAME	SIGNATURE

The Circuit That Wasn't On The Drawing

He turned off the switch, opened the breaker, and checked the prints. All three were wrong.

10 MIN

NFPA 70E Art. 120 · Art. 110 — Qualified Person

Washington State FACE 04WA080

WHAT HAPPENED

2004 · Washington · Assisted living facility · 32-year-old maintenance worker

A facility maintenance worker set out to change a metal halide bulb in a ceiling fixture about 16 feet up. He turned off the wall switch and taped it off. He used the building's as-built drawings to find and open breaker #12. But the drawings were wrong: the fixture was on an EMERGENCY lighting circuit fed from a different breaker somewhere else in the building, and no breaker anywhere was labeled as that circuit. He crawled into the attic, removed the light can, gripped the grounded fixture housing, and touched the energized bulb base with a non-insulated multi-tool. He was not found for about four hours.

WHY IT HAPPENED

He trusted a switch, a breaker, and a drawing. He never locked out and never tested. The emergency-lighting feed was a second source nobody had identified.

WHAT THE STANDARD REQUIRES

- A switch or a breaker is not an electrically safe work condition. Lock it and test it.
- Drawings are a starting point for investigation, never proof of isolation.
- Only a qualified person — qualified for THIS task on THIS equipment — performs the work.
- Emergency, life-safety, and standby circuits are designed not to go dead. Treat them that way.

TALK ABOUT IT — DO NOT SKIP THIS PART

1. Which circuits in this building will still be hot after we open the main?
2. When did we last verify our panel schedules against reality — not against the last drawing?
3. Who here would have caught this? What exactly would you have done differently?

WHAT WE WILL DO DIFFERENTLY HERE

ATTENDANCE

PRINT NAME	SIGNATURE	PRINT NAME	SIGNATURE

Reaching Across The Live Bus

He was warned about the wires that morning. He reached over them that afternoon.

10 MIN

NFPA 70E Art. 130 — Approach Boundaries · Art. 110 — Training

New Jersey FACE 91NJ009

WHAT HAPPENED

1991 · New Jersey · Electrical contractor in a foundry · 21-year-old helper

A small electrical contractor was running surveillance camera cable through the ceiling structure of a foundry-equipment factory. That morning the owner walked the job with his two helpers and specifically pointed out the exposed 480-volt bus wires feeding the overhead cranes. Working from a scissor lift, the crew ran cable over two crane beams without incident. At the third beam, roof height differences put the two workers out of sight of each other. The 21-year-old apparently climbed onto the lift's guardrail to reach across the I-beam and contacted the energized bus. Burn marks were found on his chest and right elbow.

WHY IT HAPPENED

The 480-volt crane bus was left energized, unguarded, and unlocked while workers reached directly across it. A verbal warning was the only control in place.

WHAT THE STANDARD REQUIRES

- Pointing at a hazard is not a control. De-energize it, guard it, or barricade it.
- Exposed energized parts within reach require insulating barriers, blankets, or line hose.
- Establish and enforce the limited and restricted approach boundaries.
- Never work out of sight of your partner when either of you is near exposed energized parts.

TALK ABOUT IT — DO NOT SKIP THIS PART

1. Where on this site is there exposed energized equipment we walk past every day?
2. What would it actually take to de-energize the crane bus — have we ever asked?
3. Have you climbed a lift rail to reach something? What made that feel acceptable?

WHAT WE WILL DO DIFFERENTLY HERE

ATTENDANCE

PRINT NAME	SIGNATURE	PRINT NAME	SIGNATURE

Wrong Meter, Wrong Voltage

A 600-volt meter on a 14,400-volt circuit. He lived 18 days.

10 MIN

NFPA 70E Art. 110.6 — Qualification · Art. 130.5 — Arc Flash Risk Assessment

Colorado FACE 92CO039

WHAT HAPPENED

1992 · Colorado · Process equipment manufacturing · 38-year-old maintenance electrician

A co-worker asked the maintenance electrician to find out why an 85-horsepower motor would not run. He took a multimeter rated for 600 volts and went to check the motor's power supply. The motor was fed from inside a 14,400-volt, 600-amp metal switch box whose voltage rating was not clearly marked. When he attempted to check the fuse on that circuit, the air inside the cabinet ionized and a flash fire followed. He suffered burns over 50 percent of his body and died 18 days later.

WHY IT HAPPENED

The equipment was not labeled with its voltage, and he was not authorized to work above 440 volts — but nothing in the system stopped him from opening that door with the wrong instrument.

WHAT THE STANDARD REQUIRES

- Test instruments must be rated for the circuit — the right CAT rating AND the right voltage.
- Equipment must carry legible voltage and arc flash labeling before anyone opens it.
- Qualification is task-specific and equipment-specific. Know the limit of your authorization.
- Arc flash risk assessment happens BEFORE the door opens, not after.

TALK ABOUT IT — DO NOT SKIP THIS PART

1. What is the highest voltage you are authorized to work on here? Who told you that, and is it written down?
2. Pull out your meter. What is its CAT rating and voltage rating? Is it right for our gear?
3. Which enclosures on this site have no voltage or arc flash label?

WHAT WE WILL DO DIFFERENTLY HERE

ATTENDANCE

PRINT NAME	SIGNATURE	PRINT NAME	SIGNATURE

Alone, At Night, With No Meter

The panel was open. That is not the same as dead.

10 MIN

NFPA 70E Art. 120 · Art. 110 — Program & Emergency Response

California FACE 92CA016

WHAT HAPPENED

1992 · California · Ship repair yard · 35-year-old journeyman electrician

Working the night shift alone, an electrician whose experience was mostly low-voltage was directed by a new supervisor to troubleshoot a ground fault and service the yard's high-voltage power mounds. Earlier that evening he had accidentally dropped power to a dry dock and may have been reprimanded; co-workers believed that made him rush. At about 10:10 p.m., after a plant-wide outage, he was found unconscious on wet ground in front of the south power mound, wearing no PPE, his gloves on the far side of the mound. Investigators found the feeding panel open — but noted backfeed or stored energy could still have remained, no ground was installed, and no test equipment was anywhere nearby.

WHY IT HAPPENED
An open panel was treated as an electrically safe work condition. No lockout, no verification test, no protective grounding, and no one working with him.

WHAT THE STANDARD REQUIRES

- Open does not mean dead. Lock it, test it, and ground it where required.
- Stored energy and backfeed survive an open disconnect. Discharge and verify.
- Nobody performs high-voltage work alone.
- Emergency response has to be trained and available — minutes decide the outcome.

TALK ABOUT IT — DO NOT SKIP THIS PART

1. Who is working alone on this site tonight? Near what?
2. When you are behind schedule or embarrassed, what changes about how you work? Be honest.
3. If someone went down at the far end of this site right now, how long until we found them?

WHAT WE WILL DO DIFFERENTLY HERE

ATTENDANCE

PRINT NAME	SIGNATURE	PRINT NAME	SIGNATURE

The Bucket Went Up Into The Lines

Two men, one bucket, one reach. Nobody called the utility.

10 MIN

NFPA 70E Art. 130 · OSHA overhead line approach distances

California FACE 16CA003

WHAT HAPPENED

2016 · California · Tree care / date palm orchard · 45- and 22-year-old trimmers

Two seasonal tree trimmers, neither certified, were pollinating date palms. They parked the aerial lift truck directly beneath high voltage lines running about 15 feet above the tops of the palms. Both men got in the bucket and raised it into the lines. One reached out to move a line. The arc electrocuted both men and set the bucket on fire; the second man fell to the ground. The employer had no written injury and illness prevention program, no daily hazard analysis was performed, and the utility was never told work would happen near its lines.

WHY IT HAPPENED
The lift was set up under energized conductors and raised into them. No approach distance was established and no one asked the utility to de-energize, cover, or guard the lines.

WHAT THE STANDARD REQUIRES

- Survey for overhead lines BEFORE the truck is positioned — that is where this was decided.
- Maintain the minimum approach distance. Ten feet is a floor for lines under 50 kV, not a target.
- Notify the utility so lines can be de-energized, grounded, or covered.
- Train workers in a language and at a literacy level they actually understand.

TALK ABOUT IT — DO NOT SKIP THIS PART

1. Point at every overhead line you can see from where we are standing. How high? How far?
2. Who on this crew has the authority to stop a setup under a line? Does everyone know that?
3. Have we ever called the utility on this job? What is the number?

WHAT WE WILL DO DIFFERENTLY HERE

ATTENDANCE

PRINT NAME	SIGNATURE	PRINT NAME	SIGNATURE

The Master Electrician Who Was Also The Safety Guy

Twelve hours the day before. On site by 5 a.m. Reaching into an energized junction box.

10 MIN

NFPA 70E Art. 120 · Art. 130.2 — Energized Work Justification

Massachusetts FACE 12MA007

WHAT HAPPENED

2012 · Massachusetts · Printing manufacturer · 53-year-old master electrician

A printing company was mid-relocation. A licensed master electrician — who was also the company's main safety representative and trainer — was overseeing the disassembly, move, and reassembly of about 15 machines, working extended hours. He had worked roughly 12 hours the previous day and was on site by 5 to 6 a.m. An envelope machine that had been split in two for the move was running, but its 480-volt three-phase blower motor was not working right. He replaced fuses in the main panel, traced an apparent short, then reached into a floor-level junction box near the machine's split point that was both physically and visually inaccessible. He contacted an energized component and was killed. A co-worker pulled him free by his sleeve.

WHY IT HAPPENED

No lockout was applied. The circuit was never de-energized, locked, and verified dead before he put his hand in the box. Investigators could not even determine whether he was testing or still troubleshooting live.

WHAT THE STANDARD REQUIRES

- Troubleshooting and diagnostics on exposed energized parts IS energized work.
- Energized work requires a written justification and a permit — schedule pressure is not a justification.
- Never reach into a space you cannot see into. If you cannot see it, you cannot assess it.
- Fatigue is a hazard. Schedule work so people get rest between shifts.

TALK ABOUT IT — DO NOT SKIP THIS PART

1. The most qualified person in the building died doing this. What does that tell us about relying on experience?
2. When is the last time anyone here filled out an energized work permit? Where are they kept?
3. Who is working their second long day in a row right now?

WHAT WE WILL DO DIFFERENTLY HERE

ATTENDANCE

PRINT NAME	SIGNATURE	PRINT NAME	SIGNATURE

A Forty-Eight Foot Aluminum Ladder And A Gust Of Wind

Ten feet eight inches from the line to the wall. A father and his son.

10 MIN

NFPA 70E Art. 130 · OSHA overhead line approach distances

Washington FACE 71-210-2021

WHAT HAPPENED

2020 · Washington · Painting contractor · 55-year-old contractor and his 27-year-old son

A father-and-son painting crew had spent about a month on the exterior of a two-story church with a 60-foot steeple and were cleaning up for the day. The two men were moving an aluminum extension ladder that was still at its full 48-foot extension, holding it vertically while the son tried to retract it. Wind was blowing 15 to 30 miles per hour with gusts to 40. A gust pushed the ladder onto a 14,460-volt overhead line. Both men were electrocuted. The father died at the scene; the son died nearly a month later. Investigators measured just 10 feet 8 inches from the power line to the face of the building.

WHY IT HAPPENED

A fully extended aluminum ladder was carried upright in gusting wind next to a 14.4 kV line, with no survey, no non-conductive ladder, and no plan for how the ladder would be moved.

WHAT THE STANDARD REQUIRES

- Survey and record overhead line locations, heights, and distances before ladder work starts.
- Use non-conductive ladders anywhere near power lines.
- Lower the ladder and carry it horizontally. Most contacts happen during the carry, not the climb.
- Wind is a trigger to stop, not a difficulty to work through.

TALK ABOUT IT — DO NOT SKIP THIS PART

1. The job was over. They were cleaning up. When does our hazard assessment end?
2. How many aluminum ladders are on this site right now? Where are they used?
3. What wind speed stops work here — and who makes that call?

WHAT WE WILL DO DIFFERENTLY HERE

ATTENDANCE

PRINT NAME	SIGNATURE	PRINT NAME	SIGNATURE

“We Thought That One Was A Ground”

The operator raised the boom instead of running the winch.

10 MIN

NFPA 70E Art. 110.6 · OSHA crane clearance requirements

NIOSH FACE 88-22

WHAT HAPPENED

1988 · Chemical plant · Pipefitting contractor · 51- and 36-year-old welders, 4 days on the job

A five-man crew used a rented 58-foot crane to reposition a welding shed inside a chemical plant. The shed had been set down directly beneath a 12.4 kV three-phase line 27 feet above ground, and the boom had been extended up between the lower ground and telephone wires and the energized conductors. Four crew members took hold of the structure to rotate it by hand. When the foreman called for a lift, the operator — a pipefitter with no crane training — raised the boom instead of running the winch. The building rose about four feet and the boom contacted an energized conductor at 7,200 volts to ground. Two men died. A third survived with burns.

WHY IT HAPPENED

The ten-foot minimum approach distance was not maintained, the lines were never de-energized, and an untrained operator was running the crane.

WHAT THE STANDARD REQUIRES

- Boomed equipment does not operate within the minimum approach distance of energized lines.
- Only trained, qualified operators run powered equipment — no exceptions for “just moving it.”
- Ask the utility to de-energize and ground the lines, then VERIFY it was done.
- Never position a load, or people, underneath an energized line.

TALK ABOUT IT — DO NOT SKIP THIS PART

1. A survivor told investigators they thought one wire was a ground because it was not insulated. Every conductor up there was uninsulated. What do we assume about lines overhead?
2. Who here has operated equipment they were not trained on because it was quicker?
3. Four days on the job. What does a new person on this crew actually get told about the lines?

WHAT WE WILL DO DIFFERENTLY HERE

ATTENDANCE

PRINT NAME	SIGNATURE	PRINT NAME	SIGNATURE

One Hundred And Ten Volts Killed Him

He grabbed a light fixture chain so the bucket would not hit it.

10 MIN

NFPA 70E Art. 110 · OSHA GFCI / assured equipment grounding

NIOSH FACE 85-47

WHAT HAPPENED

1985 · Indiana · General contractor, ironwork · 18-year-old apprentice, 6 weeks on the job

Crews were installing a wind screen in the gable end of a 65-foot-high airport hangar. At afternoon break, a truck-mounted aerial bucket picked up the scaffold crew to lower everyone to the floor. As the bucket descended through the roof trusses it came near a metal light fixture hanging on a 20-foot chain. The 18-year-old apprentice reached out and grabbed the chain to keep the bucket from striking it. He was electrocuted at 110 volts. The source was a shorted receptacle inside the aerial bucket. Investigators found extension cords with bad splices, missing grounds and reversed polarity, an ungrounded drill, and the bucket receptacle with reversed polarity and its cover removed.

WHY IT HAPPENED

Neither a GFCI nor an assured equipment grounding conductor program was protecting the cord-and-plug equipment or the receptacle in the bucket. The fixture had been known faulty for at least five months.

WHAT THE STANDARD REQUIRES

- GFCI protection, or a documented assured equipment grounding conductor program. Pick one and run it.
- Inspect cords, plugs, and tools before use. Remove damaged equipment from service and mean it.
- Field modifications are made by a competent person — not with whatever is in the truck.
- Known electrical faults get corrected now, not on the next shutdown.

TALK ABOUT IT — DO NOT SKIP THIS PART

1. One hundred and ten volts. Who here still thinks of 120 as the safe one?
2. Grab the nearest extension cord. Check the ground pin and the jacket. What did you find?
3. What is on our site right now that we know is faulty and have not fixed?

WHAT WE WILL DO DIFFERENTLY HERE

ATTENDANCE

PRINT NAME	SIGNATURE	PRINT NAME	SIGNATURE

Two forty-amp fuses protecting fifteen-amp receptacles. A GFCI that would not trip.

10 MIN

NFPA 70E Art. 110 · NFPA 70 (NEC) temporary installations

Wisconsin FACE 93WI214

WHAT HAPPENED

1993 · Wisconsin · Residential electrical contracting · 45-year-old self-employed electrician

A self-employed electrician was wiring a house under construction, drilling holes in overhead basement joists with a half-inch metal-cased electric drill. The drill was fed from a temporary construction power pole through three chained extension cords — two missing their grounding pins, one with about half an inch of outer insulation gone at each end. After heavy rain, the outdoor cord ends were lying in puddles of water and mud, and there was standing water on the basement floor where he worked. The cords were plugged into a GFCI receptacle on the pole that had been inspected and certified to local code. He was found face down on top of the drill. Post-incident testing showed the GFCI would not trip, and the fuse box serving the 15- and 20-amp receptacles held two 40-amp fuses.

WHY IT HAPPENED

The temporary service was certified but never tested. The GFCI was inoperative and the overcurrent protection was grossly oversized, so nothing was protecting a metal tool fed through damaged, ungrounded cords in standing water.

WHAT THE STANDARD REQUIRES

- Test GFCIs on a schedule. A certificate of inspection is not a test result.
- Temporary construction power meets the same code as permanent — including correct overcurrent protection.
- Keep cord ends up out of water and mud. Inspect the jacket and the ground pin every time.
- Maintain cords, plugs, receptacles, and tools under a preventive maintenance program.

TALK ABOUT IT — DO NOT SKIP THIS PART

1. Who tested the GFCIs on our temporary power, and when? Can we prove it?
2. Walk the site in your head — where are cord ends sitting in water right now?
3. Somebody put 40-amp fuses in that box on purpose. Why do people do that, and does it happen here?

WHAT WE WILL DO DIFFERENTLY HERE

ATTENDANCE

PRINT NAME	SIGNATURE	PRINT NAME	SIGNATURE

Three conduits. Four cables each. Seven thousand two hundred volts.

Washington FACE 71-136-2015

2014 · Washington · Site preparation contractor · 38-year-old laborer

A crew was digging trenches and installing storm drains in a hospital parking lot. A buried duct bank sat directly in the path of the planned storm drain run — three lines of PVC conduit encased in concrete, each conduit carrying four 7,200-volt power cables. To get the storm drain pipe down to grade, the crew used an excavator, a breaker bar, and a rivet-buster jackhammer to chip away the duct bank's concrete encasement. The laborer was in the trench chipping concrete when the rivet buster punctured a conduit and contacted an energized cable. He died at the scene.

The crew knowingly worked on a live buried duct bank that had never been positively de-energized and grounded by the owner.

- Locate buried lines precisely before work begins — and treat locates as approximate until proven.
- Assume every buried line is energized until the owner confirms it is de-energized AND grounded.
- Do not perform work that exposes people to contact with energized lines. Redesign the work.
- General contractors and subs plan the site safety plan together, before mobilization.

1. Everyone knew that duct bank was there. What made chipping into it seem like the plan?
2. What is buried under where we are digging this week? Who confirmed it, and how?
3. Who has the authority here to say 'we are not doing it that way' and make it stick?

WHAT WE WILL DO DIFFERENTLY HERE

ATTENDANCE

One Circuit Left Hot Inside A Locked-Out Substation

He installed the temporary service himself, months earlier.

10 MIN

NFPA 70E Art. 120 · Art. 110 — Host / Contract Employer Duties

Missouri FACE 98MO101

WHAT HAPPENED

1998 · Missouri · Utility substation reconstruction · 39-year-old journeyman lineman

A city was converting its distribution system from 4 kV to 12,470 volts and a contractor was replacing substation components. The day before, the city opened and locked out both the incoming and outgoing gang bus bars; the contractor verified the lines dead and applied grounding clamps. But two temporary service circuits — which the victim himself had set up months earlier to keep the town in power during the rebuild — remained energized, each with a lightning arrestor grounded to the substation structure. Working out on the steel checking and tightening bolts, he worked his way over to the still-energized 4 kV circuit, sat down next to the lightning arrestor, and contacted it with his left hand and forearm. It was unwitnessed.

WHY IT HAPPENED
One live circuit remained inside an otherwise locked-out and grounded substation, uncovered, with no line hose or blanket separating it from workers — and it was the one circuit everyone had stopped thinking about.

WHAT THE STANDARD REQUIRES

- Cover energized conductors with line hose or blankets wherever people work nearby.
- Apply YOUR OWN locks and tags at a host facility, in addition to the host's and other contractors'.
- Host and contract employers must exchange hazard information in writing before work starts.
- 'Mostly de-energized' is a description of a hazard, not of a safe work condition.

TALK ABOUT IT — DO NOT SKIP THIS PART

1. He built that temporary feed himself and still forgot it. What have we stopped seeing here?
2. When we work at a customer site, whose locks are on the disconnect? Are ours?
3. What did the host tell us in writing about this site's hazards? Has anyone read it?

WHAT WE WILL DO DIFFERENTLY HERE

ATTENDANCE

PRINT NAME	SIGNATURE	PRINT NAME	SIGNATURE