OSHA 1926

CONSTRUCTION | ELECTRICAL

Find the energy. Establish the boundary. Control the exposure.



JOY GLAD, CSP

Electrocution + Electricity

Dynamic Safety and Environmental LLC

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OBJECTIVES

By the end, you can control electrical exposure before work begins

01

Recognize

shock, arc-flash, overhead-line, temporary-wiring, and tool hazards.

02

Plan

the work zone, deenergization, guarding, grounding, and access.

03

Protect

with GFCI/AEGCP, compatible equipment, boundaries, and PPE.

04

Respond

without becoming a second victim—and arrange prompt medical care.

[Watch on YouTube: Arc flash in slow motion (1:10)]

Field question: What will keep people, tools, and equipment outside the energized exposure?

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WHY IT MATTERS

Electricity can injure before a worker ever touches a conductor

Shock can stop the heart; arcs can burn and blast; involuntary movement can create a fall. The safest plan removes or isolates the energy before exposure.

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Electrical exposure begins with the source, path, distance, and environment

Look for energized parts, concealed conductors, overhead lines, damaged equipment, moisture, and changes that can defeat insulation or grounding.

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One event can combine shock, burns, blast, and a fall

S

shock path

Current through the body can disrupt muscles, breathing, and heart rhythm.

A

arc energy

An electrical arc can produce intense heat, pressure, sound, and molten material.

F

secondary fall

Startle or muscle contraction can throw a worker from a ladder or elevated surface.

Treat electricity as an energy-control problem—not only a contact hazard.

Source: OSHA Electrical Safety eTool; 29 CFR 1926 Subpart K

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Plan the work so contact cannot occur

01	**ASCERTAIN**	Before work, determine whether exposed or concealed energized circuits can be contacted.
02	**ADVISE**	Identify locations, hazards, protective measures, and required warning signs.
03	**PROTECT**	Deenergize and ground—or guard effectively by insulation or other means.
04	**CONTROL SPACE**	Keep passages clear and block access while energized parts are exposed.

Distance is a control only when the boundary is defined and maintained.

Source: 29 CFR 1926.416(a)–(b)

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Crane planning begins with the 20-ft trigger zone

01	**MAP THE WORK ZONE**	Consider equipment, load line, load, rigging, and maximum working radius.
02	**CHECK 20 FT**	If any part could come within 20 ft, use one of OSHA's three compliance options.
03	**PREFER DEENERGIZATION**	Have the utility deenergize and visibly ground the line at the site.
04	**USE VERIFIED CLEARANCE**	Otherwise maintain 20 ft or the applicable Table A minimum with required controls.



Presume lines energized until the utility confirms otherwise.

Source: 29 CFR 1926.1408, Table A

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Locate the energy before cutting, drilling, or excavating

01	**INQUIRE**	Use utility records, site information, direct observation, and locating instruments.
02	**MARK + COMMUNICATE**	Post warnings and brief crews on the line location and protective measures.
03	**EXPOSE SAFELY**	Use controlled methods near marked utilities; update the plan when conditions differ.
04	**PROTECT HAND WORK**	Where exact underground locations are unknown, provide insulated protective gloves for specified hand-tool work.



A paint mark is a starting point—not proof of exact depth.

Source: 29 CFR 1926.416(a)(2)–(3)

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CONTROL THE ENERGY

Deenergization is the default; PPE supports the remaining risk

Sequence work to remove energy first, then isolate, guard, ground, verify, and control access before relying on personal protective equipment.

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CONTROL SELECTION

Use the highest practical control before exposure

01	**DEENERGIZE**	Open the source, render it inoperative, tag every energizing point, and verify.
02	**GUARD / INSULATE**	Enclose, barricade, or insulate energized parts and maintain working space.
03	**GROUND + PROTECT**	Provide effective equipment grounding plus GFCI or an approved AEGCP.
04	**PPE + PROCEDURE**	Qualified people use task-specific boundaries, tools, and protective equipment.

Never use PPE as permission to skip a feasible deenergization.

Source: 29 CFR 1926.403; 1926.416–.417

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OSHA requires GFCI protection or an AEGCP on construction sites

GFCI

Approved GFCIs protect employees using 120-V, single-phase, 15- and 20-A receptacles that are not part of permanent wiring.

AEGCP

A written assured equipment grounding conductor program may be used when it meets OSHA inspection, testing, record, and competent-person requirements.

Choose the method deliberately—then maintain it for every covered circuit and tool.

Source: 29 CFR 1926.404(b)(1)

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An assured grounding program is documented, tested, and owned

1

DOCUMENT

Keep the written program and procedures at the jobsite.

2

ASSIGN

Designate one or more competent persons to implement it.

3

INSPECT + TEST

Inspect before daily use; test continuity and terminal connection at required intervals.

4

RECORD

Identify equipment that passed and the last test date or interval.

Test before first use, after repair or suspected damage, and generally every 3 months.

Source: 29 CFR 1926.404(b)(1)(iii); OSHA AEGCP

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Temporary power still follows a controlled installation

01	**DISTRIBUTE**	Feed temporary circuits from approved distribution points with overcurrent protection.
02	**PROTECT**	Use appropriate enclosures, guarding, grounding, and GFCI/AEGCP protection.
03	**SUPPORT**	Route wiring to avoid physical damage, sharp edges, traffic, and trip hazards.
04	**REMOVE**	Remove temporary wiring immediately when construction or its purpose is complete.



“Temporary” describes duration—not a lower safety standard.

Source: 29 CFR 1926.405(a)(2)

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Inspect the full cord set before each use

01	**THREE-WIRE**	Use grounded 3-wire extension cords for grounded tools and equipment.
02	**HARD SERVICE**	Use cords marked for hard or extra-hard usage and suited to the environment.
03	**STRAIN RELIEF**	Prevent tension at joints, terminals, plugs, and fittings.
04	**REMOVE DAMAGE**	Take cords with exposed conductors, missing pins, crushed jackets, or failed repairs out of service.



Never hoist tools by their cords or run cords where damage is predictable.

Source: 29 CFR 1926.405; OSHA Flexible Cords

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A tool must be approved, grounded or double-insulated, and intact

01	**APPROVED**	Use listed, labeled, or certified equipment for its intended purpose.
02	**PROTECTED**	Use approved double-insulated tools or tools grounded under Subpart K.
03	**INSPECTED**	Check housing, cord, plug, guards, switches, and environmental suitability.
04	**USED AS DESIGNED**	Follow listing and manufacturer instructions; never bypass grounding or guards.



A three-prong adapter or field repair can defeat the protection.

Source: 29 CFR 1926.302(a); 1926.403(b)

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The environment can defeat otherwise sound equipment

DAMP / WET

Use conductors and equipment identified for the operating environment; protect dry-location equipment from weather during construction.

CORROSION / HEAT

Select raceways, boxes, fittings, supports, and equipment for gases, vapors, liquids, corrosive agents, and excessive temperatures.

If conditions change, reassess the equipment—not just the task.

Source: 29 CFR 1926.432

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A continuous fault path lets protective devices work

G

grounded conductor

Identify the grounded conductor and preserve correct polarity.

EGC

equipment grounding

Keep the equipment grounding conductor continuous to exposed metal parts.

B

bonding path

Join metal raceways and enclosures into an effective continuous conductor.

A grounding terminal is for grounding—never repurpose it.

Source: 29 CFR 1926.404(a); 1926.405(a)(1)

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Deenergized circuits must be rendered inoperative and tagged

01	**IDENTIFY**	Locate every source and point where the circuit can be energized.
02	**DEACTIVATE**	Controls deactivated during work are tagged; circuits are rendered inoperative.
03	**TAG EVERY POINT**	Attach tags at all energizing points and identify the equipment or circuit being worked.
04	**CONTROL THE RETURN**	Keep access controlled and follow the employer's verification and release procedure.



A tag communicates status; it does not replace physical energy isolation.

Source: 29 CFR 1926.417

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Guard energized parts and keep the approach clear

1

ENCLOSE

Use approved cabinets, boxes, covers, and barriers for energized parts.

2

MAINTAIN ACCESS

Keep required working space and dedicated access clear.

3

BARRICADE

Prevent passage through the space while energized parts are exposed.

4

CLOSE THE SYSTEM

Replace covers, blanks, doors, and dead fronts before normal use.

Storage, cords, and traffic can turn a compliant panel into an exposure.

Source: 29 CFR 1926.403(i); 1926.416(b)

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Arc-flash planning begins before justified energized interaction

NFPA 70E is a consensus standard for safe work practices; OSHA enforces its own regulations and may use consensus standards as evidence of recognized practice.

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Determine the task, hazard, boundary, and protection

ASSESS THE TASK

Identify shock and arc-flash hazards, assess risk, and apply the hierarchy of risk controls using the documented electrical safety program.

SELECT ONE METHOD

Use either incident-energy analysis or the arc-flash PPE category method for the equipment—not both on the same equipment.

The assessment drives the work practice, arc-flash boundary, and PPE—not the label alone.

Source: NFPA 70E 110.5(H), 130.5; NFPA guidance

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An energized work permit formalizes justified exposure

01	**JUSTIFY**	Establish an electrically safe work condition unless energized exposure is justified.
02	**AUTHORIZE**	Use the energized electrical work permit when required by approach or arc-flash exposure.
03	**BOUNDARIES**	Set shock and arc-flash boundaries and keep unqualified people outside.
04	**PROTECT**	Select arc-rated clothing, face/head protection, gloves, and other PPE for the assessment.



Arc-rated PPE reduces injury severity; it does not eliminate the hazard.

Source: NFPA 70E Article 130; NFPA, Sept. 30, 2024

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Match the PPE to shock and arc-flash risk

01	**HANDS**	Voltage-rated rubber insulating gloves with leather protectors when required.
02	**HEAD + FACE**	Nonconductive hard hat, safety glasses, and arc-rated face or hood protection.
03	**BODY**	Arc-rated clothing with an arc rating suitable for the selected method and exposure.
04	**TOOLS + TESTERS**	Insulated tools and properly rated test instruments used by qualified persons.



Inspect, test, store, and replace electrical PPE on the required schedule.

Source: NFPA 70E Article 130; manufacturer instructions

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Do not become the second victim

1

ISOLATE

Do not touch the person or equipment until the electrical source is controlled.

2

CALL

Activate site emergency communication and request prompt medical response.

3

AID

Trained responders provide first aid/CPR/AED when the scene is safe.

4

SECURE

Preserve the scene, quarantine equipment, and investigate before restart.



Electrical injuries require medical evaluation—even when external burns appear small.

Source: 29 CFR 1926.50; employer emergency plan

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PRE-TASK SCAN

A 60-second electrical scan prevents improvisation

01	**ENERGY**	What sources, voltages, backfeeds, or stored energy can reach the task?
02	**BOUNDARY**	Where can a person, tool, load, or machine enter the exposure?
03	**CONTROL**	Can we deenergize? If not, what guarding, grounding, work practice, and PPE apply?
04	**VERIFY + RESPOND**	Who verifies status—and what is the emergency response plan?

If any answer is uncertain, pause before approaching the work.

Source: 29 CFR 1926.403–.417; NFPA 70E

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OFFICIAL RESOURCES

Keep the standards and electrical-safety tools close

01	**OSHA SUBPART K**	osha.gov/laws-regs/regulations/standardnumber/1926/1926SubpartK
02	**GFCI + AEGCP**	osha.gov/electrical/hazards
03	CRANE POWER LINES	osha.gov/laws-regs/regulations/standardnumber/1926/1926.1408
04	**NFPA 70E**	nfpa.org/codes-and-standards/7/0/e/nfpa-70e

Training overview—not legal advice. Verify the current rule, employer program, and equipment instructions.

Source: OSHA; eCFR; NFPA

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