SKILLSIGNAL™
Construction Safety & Compliance

TOOLBOX TALK

Seven Forms of Hazardous Energy: The Power Is Off. The Machine Can Still Kill You.

TOPIC NO.	DURATION	AUDIENCE
LO-02	10 to 15 min	All Crew

OSHA REFERENCE 29 CFR 1910.147(b) · 29 CFR 1910.147(d)(5) · 29 CFR 1926.600(a)(3)

PROJECT / JOBSITE	DATE	PRESENTED BY

01 THE HOOK

START HERE

An excavator is shut down, key out, operator gone to lunch. A mechanic crawls under the raised bucket to look at a leaking hydraulic line. He loosens a fitting. The pressure that was holding the bucket up goes out the fitting, and the bucket comes down. The engine was off. The battery was disconnected. The machine was as dead as a machine gets, and it still had enough energy stored in it to crush a man. "De-energized" is not one thing. It is seven things, and electricity is only the first one on the list.

02 WHAT "HAZARDOUS ENERGY" MEANS IN THE STANDARD

29 CFR 1910.147(b) defines energy source as "any source of electrical, mechanical, hydraulic, pneumatic, chemical, thermal, or other energy." The standard draws one more line that matters more than the list: energy is either **active** (the machine is running or powered) or **stored** (the machine is off but still holding energy that can move something). **1910.147(d)(5)** requires that after isolation, all stored or residual energy be **"relieved, disconnected, restrained, and otherwise rendered safe."** Turning the switch off handles the first kind. The next six talks are mostly about the second.

03 THE SEVEN FORMS, AND WHERE THEY HIDE

ENERGY 1

ELECTRICAL

The obvious one: motors, panels, cords, control circuits. The hidden one: **capacitors** in variable-frequency drives, welders, and some motor controllers that hold a lethal charge for minutes after the disconnect opens. Also batteries on mobile equipment. Isolation means the disconnect, not the stop button, and then a test to prove it.

ENERGY 2

PNEUMATIC

Compressed air in cylinders, actuators, receiver tanks, and lines. **Shutting off the compressor does nothing to the air already in the tank and the lines.** A cylinder that still has pressure behind it will stroke when the valve shifts. Bleed it, and watch the gauge go to zero.

ENERGY 3

HYDRAULIC

Fluid under pressure holding up buckets, booms, beds, masts, and press rams. Pump off, pressure still there. Accumulators store it on purpose. **Lower it to the ground, or block it with something rated for the load**, then bleed the circuit. **1926.600(a)(3)(i)**: raised equipment is blocked or cribbed before anyone goes under it.

ENERGY 4

MECHANICAL

Springs under compression or tension. Flywheels that coast for a minute after the motor stops. A cam resting at the top of its stroke. Counterweights. A conveyor belt loaded on an incline. All of it will move when something lets go, and none of it needs power to do it. **Restrain it, release it, or wait it out, and confirm it is stopped.**

ENERGY 5

THERMAL

Steam, hot water, hot oil, a boiler, a radiator, a hot exhaust manifold. Heat burns on contact and builds pressure in a closed system. A hot line opened wrong flashes to steam. **Let it cool, vent it, and check the gauge and the surface temperature before you open it.**

ENERGY 6

CHEMICAL

Reactions that generate heat or gas inside a closed pipe or vessel. Caustics and acids in process lines. Fuel in a line you are about to cut. The energy is in what the chemical will do when it hits air, water, or another chemical. **Drain it, flush it, blank it, and check the SDS before you break the line.**

ENERGY 7

GRAVITY

Anything raised: a hoist hook, a dump bed, a forklift mast, a scissor lift platform, a loaded chain fall, a vehicle on a slope. Gravity never turns off. **Lower it, pin it, block it, chock it.** A hydraulic lock or a parking brake is not a block.

04 ACTIVE VS. STORED: THE QUESTION TO ASK TWICE

ACTIVE ENERGY	STORED ENERGY
WHAT IT IS **The machine is powered and can run right now**	WHAT IT IS **The machine is off, but something inside it is still loaded and waiting**
HOW YOU HANDLE IT Shut it down, isolate every energy source at the disconnect or valve, lock it	HOW YOU HANDLE IT Bleed, drain, vent, block, lower, restrain, or wait, then verify it is at zero
HOW IT GETS MISSED Somebody isolates one source and forgets the machine has three	HOW IT GETS MISSED Somebody assumes “off” means “safe” and reaches into a loaded spring or under a raised load

ACTIVE ENERGY	STORED ENERGY
THE STANDARD 1910.147(d)(2) and (d)(3): shutdown and isolation	THE STANDARD 1910.147(d)(5): stored energy relieved or restrained. 1926.600(a)(3): raised equipment blocked

⚠ **IF IT CAN MOVE, SLIDE, DROP, SPIN, SPRAY, OR BURN, IT IS NOT DE-ENERGIZED**

Before you put any part of your body in the machine, ask of every component: what would happen if this let go right now? If the answer is anything but “nothing,” it has stored energy and it has to be released or restrained first. The written procedure for the machine lists the energy sources. If it lists one and you can think of two, stop and get the competent person.

05 WHY IT MATTERS

[JOBSITE]

FOR THE CREW

Machine-specific procedures under 1910.147(c)(4) have to name every energy source and how to control it. A crew that can list all seven forms writes better procedures and catches the one the procedure missed. That is what the annual audit under (c)(6) is supposed to find.

[INDIVIDUAL]

FOR YOU

The injuries from stored energy are crush injuries, amputations, and burns. The power was off. The person believed they were safe. The difference between them and you is asking the second question: what is still loaded?

[HOME]

FOR LIFE OFF-SITE

The garage door spring, the pressure in the pressure washer hose, the raised car on the jack. Same seven forms, same question. Lower it, block it, bleed it before you reach in.

06 TODAY’S DRILL

TODAY’S DRILL **COUNT THE ENERGY**

Pick one piece of equipment you work on: a pump, a mixer, a compressor, a lift, a conveyor, a vehicle. Walk around it and count every energy source, active and stored, using the seven forms. Then compare your count to the written lockout procedure for that machine. If you found one the procedure does not list, or there is no procedure, that goes to the foreman today.

07 CREW DISCUSSION

Take 2 minutes. Pick one.

1. What is the heaviest thing on this site that is held up by hydraulic pressure or a cable? Has anyone been under it with it unblocked?
2. Which machine here has a flywheel, a spring, or a counterweight that keeps moving after the power is off?
3. Has anybody ever opened a line or fitting and had something come out they did not expect? What was it?

08 ATTENDANCE & SIGN-OFF

All attendees confirm they participated in this Toolbox Talk and understand the content covered.

NAME (PRINT)	SIGNATURE

SUPERVISOR SIGNATURE

_____ Date: _____

SKILLSIGNAL™

Construction Safety & Compliance

READY TO DIGITIZE YOUR TOOLBOX TALKS?

Digital sign-offs, instant distribution, and your full safety program in one place. No more paper.

Book a demo at **skillsignal.com**