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In collaboration with:
AMERICAN SOCIETY OF SAFETY PROFESSIONALS
San Diego Chapter

CAL/OSHA Petition 580

A practical look at how this petition seeks to protect California workers

A recording of this live presentation is available online at:

https://youtu.be/b5DhKy9-_ao

www.makesafetools.com | scott@makesafetools.com | (415) 937-1808

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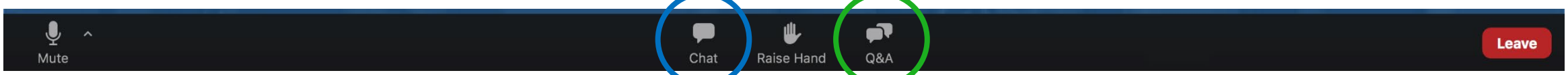

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Sponsored By

MAKESAFE® TOOLS

Manufacturer of:

One-Stop

Your All-In-One Emergency Stop System

An easy-to-install retrofit that provides:

- A Category 1 Emergency Stop
- Accidental Restart Prevention
- And motor braking.

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San Diego Chapter

With special thanks to:

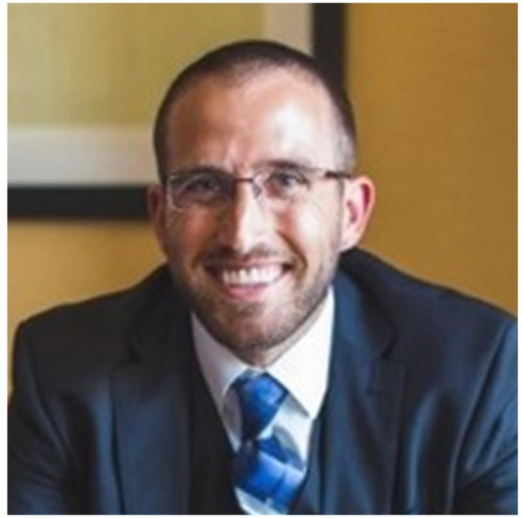
Fernand, David, Scott, and Lee

for helping to organize the event

sandiego.assp.org

Our Speaker

- Active participant in regulatory process with the NFPA, OSHPD, NRTLs, and CAL/OSHA.
- Over a decade of experience with electrical design for hospitals, data centers, and renewable energy systems.
- Managed production and training shops across three industries.
- Carpenter, machinist, programmer, engineer.
- Has been featured in four documentary films, holds a US patent, and loves his greyhounds.



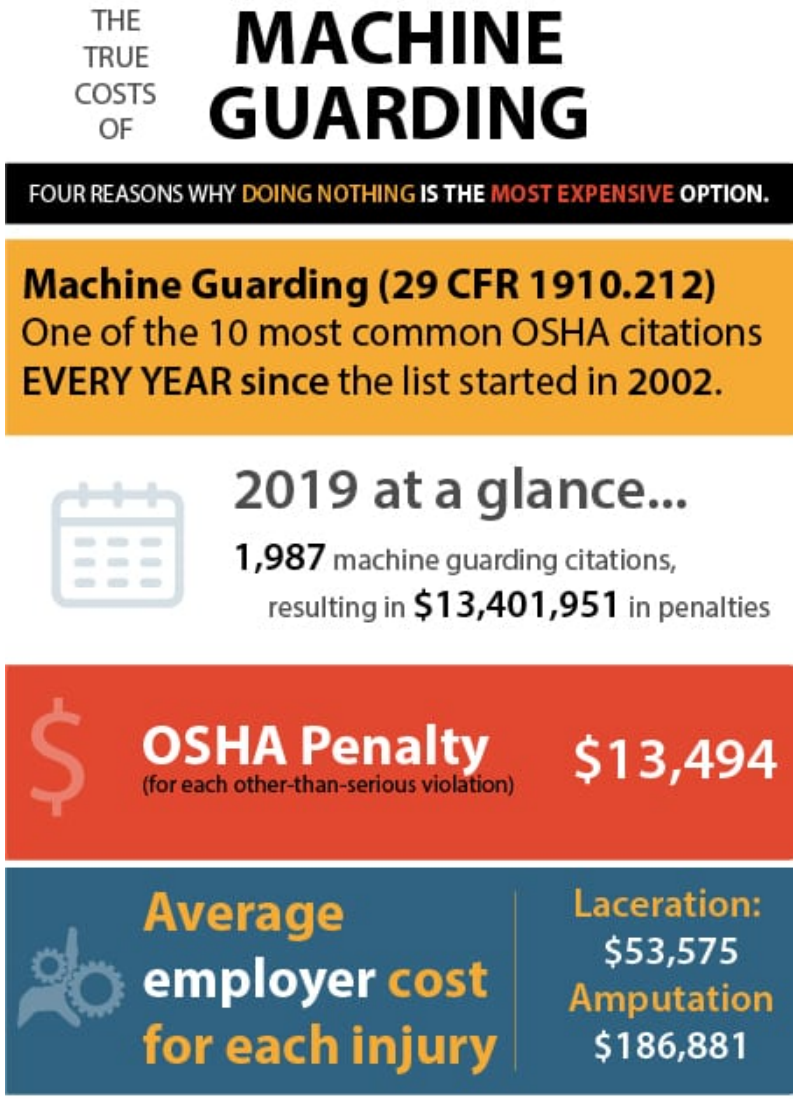
Scott Swaaley, PE

Founder and President,

MAKESafe Tools, Inc.

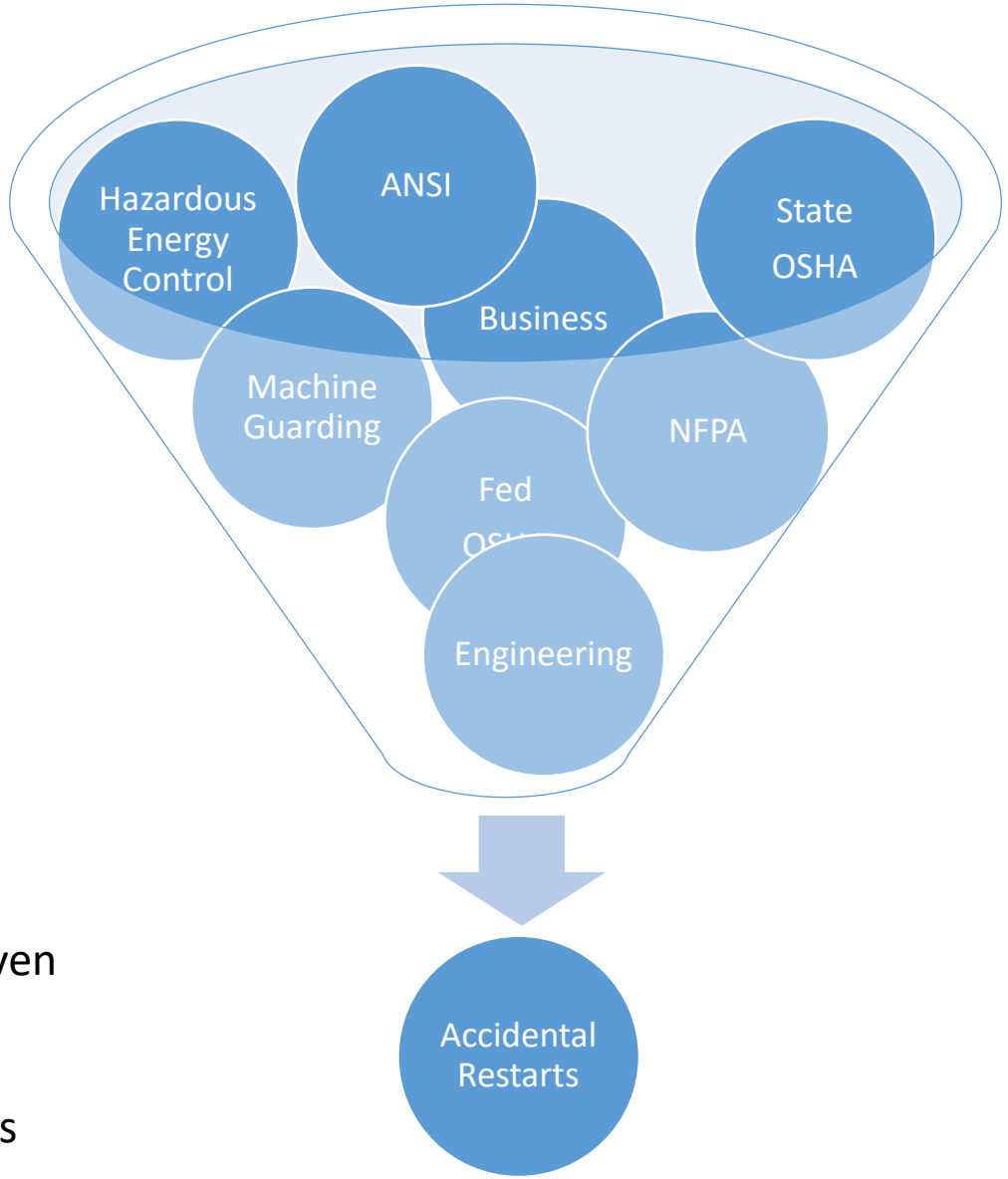
Why this Topic?

- Because 40,000 people each year suffer from traumatic machinery-related injuries, and it's been the same for over a decade.
- Because machine guarding has been on the top ten list of most commonly citations every year for a decade.
- And because many of these injuries and citations are easily avoidable by implementing some simple safeguards.
- Because it sometimes feels like details don't matter … until they do.



Webinar Scope

- Audience:
  - Safety Professionals
  - Facility Managers
  - Inspectors & Risk Managers
  - Machine Operators
- Geographical:
  - California – Petition 580
  - USA – All concepts and related regulations
- Topics:
  - Primary Topics: Unintentional restarts for electric-motor driven machinery
  - Related Topics & Discussions: Navigating NRTL approvals, Hazardous energy control, other types of energy and restarts (mechanical, gravitational, hydraulic, pneumatic, chemical, thermal, etc.)



What is Petition 580?

- A clarification of existing state and federal regulation that requires a means to prevent the unintentional restart of machinery.
- A request that Nationally Recognized Test Labs (NRTLs) withdrawal their approval of hazardous safety devices currently on the market.

- Full Petition Text (Cal/OSHA Website)
- More Information on NRTLs (Fed/OSHA Website)

NRTLs
All equipment in a workplace is required to be approved for it's specific use by a Nationally Recognized Test Lab (like UL).

OSHA
Fed/OSHA is the regulating body that oversees and regulates NRTLs.

Unexpected Startup (big picture)

Causes

- Accidental activation or reset (by operator)
- Intentional turn-on or reset (by someone else)
- Restoration of power, caused by:
  - Circuit breaker reset (after local or branch overcurrent event)
  - Automatic reset of thermal protection after overload event (i.e. integral motor protection)
  - Manual reset of emergency stop
  - Utility brown-out or black-out
  - Group control (shared power with other machine or process)
  - Plugging-in

Hazardous Conditions for Restart

- Machine operator in contact with a hazardous part of the machine.
- Technician has bypassed guards or machine is partially disassembled.
- Work-piece in contact with moving part of machine.

Kinds of Machinery

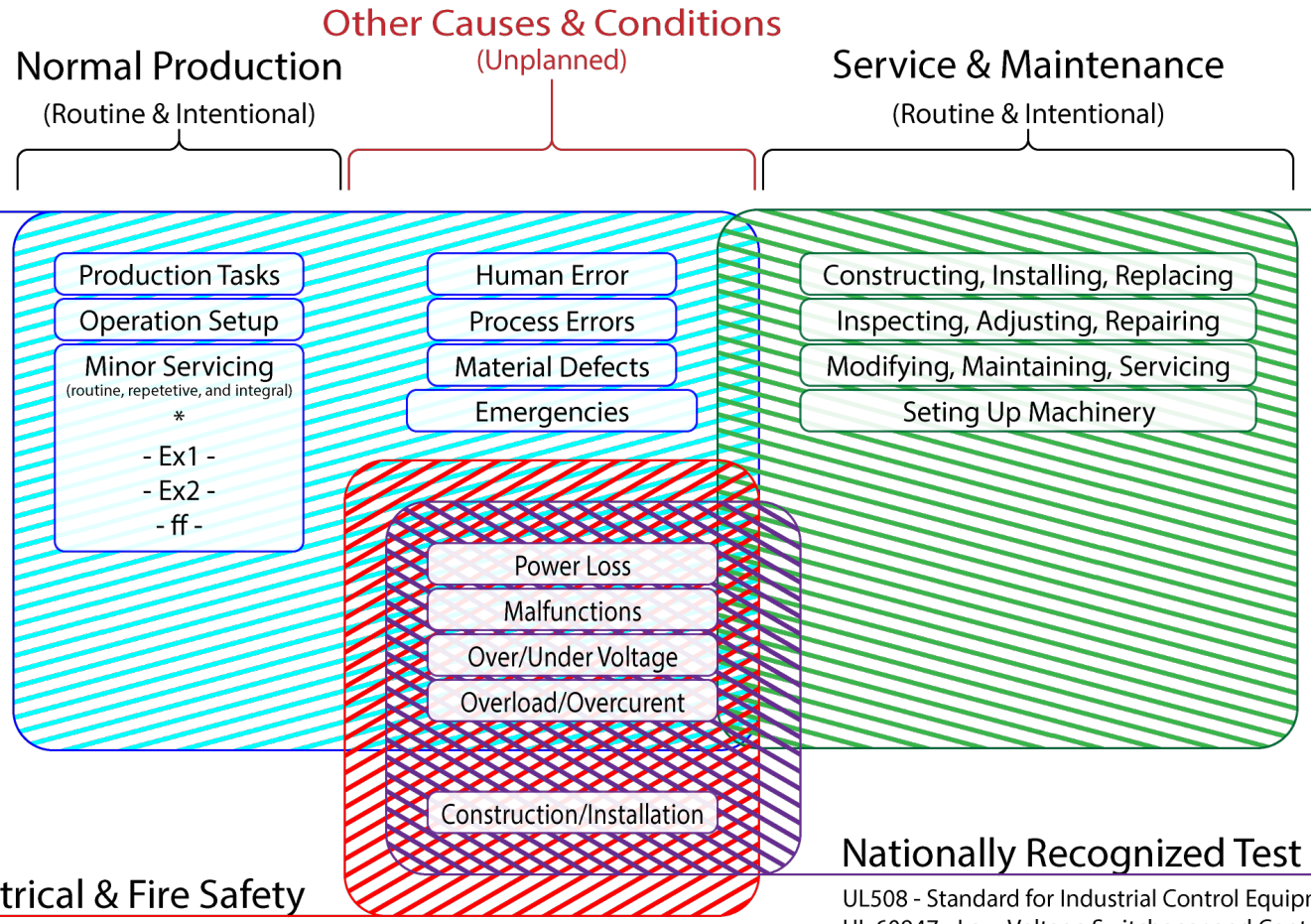
Everything with a Motor

Process & General Machinery

Conveyors & Infeed Rollers

Power Tools & Machine Tools

Regulation



Machine Guarding

OSHA 29 CFR 1910 Subpart O - Machinery and Machine Guarding
ANSI B11.19 - Performance Criteria for Safeguarding

Hazardous Energy Control

OSHA 1910.147 - The control of hazardous energy (lockout/tagout)
ANSI Z244.1 - The Control of Hazardous Energy Lockout, Tagout and Alternative Methods

Electrical & Fire Safety

NFPA 70 - National Electric Code
NFPA 79 - Electrical Standard for Indusrial Machinery
OSHA 29 CFR 1910 Subpart S - Electrical

Nationally Recognized Test Labs

UL508 - Standard for Industrial Control Equipment
UL 60947 - Low-Voltage Switchgear and Controlgear

Unexpected Restarts (our focus)

After the loss and restoration of power.

Causes

- Accidental ~~activation or~~ reset (by operator)
- Intentional ~~turn-on or~~ reset (by someone else)
- Restoration of power, caused by:
  - Circuit breaker reset (after local or branch overcurrent event)
  - Automatic reset of thermal protection after overload event (i.e. integral motor protection)
  - ~~Manual reset of emergency stop~~
  - Utility brown-out or black-out
  - Group control (shared power with other machine or process)
  - Plugging-in

… by any other name …

The tendency of a machine to restart after loss of power is referred to by many terms, including:

"Safe Start"
"Accidental Restart Protection"
"Anti-Automatic Restart Protection"
"Low Voltage Dropout"
"Magnetic Switches"

Evaluating Existing Machinery

This evaluation is for machinery with relatively simply on/off controls and not for evaluating control systems.

1. Turn the machine **ON**.
2. While the machine is **ON** and running, remove power (unplug it or turn-off at local disconnect).
3. Count to 2 and restore power (plug it in or turn-on at local disconnect).

Evaluate:

*If the machine turns back **ON** when power is restored, then you do not have accidental restart prevention!*

Limitations

The test described above is meant for machinery with simple on/off controls. Control systems should be evaluated more thoroughly using the relevant standards for the machine.

Other Startups

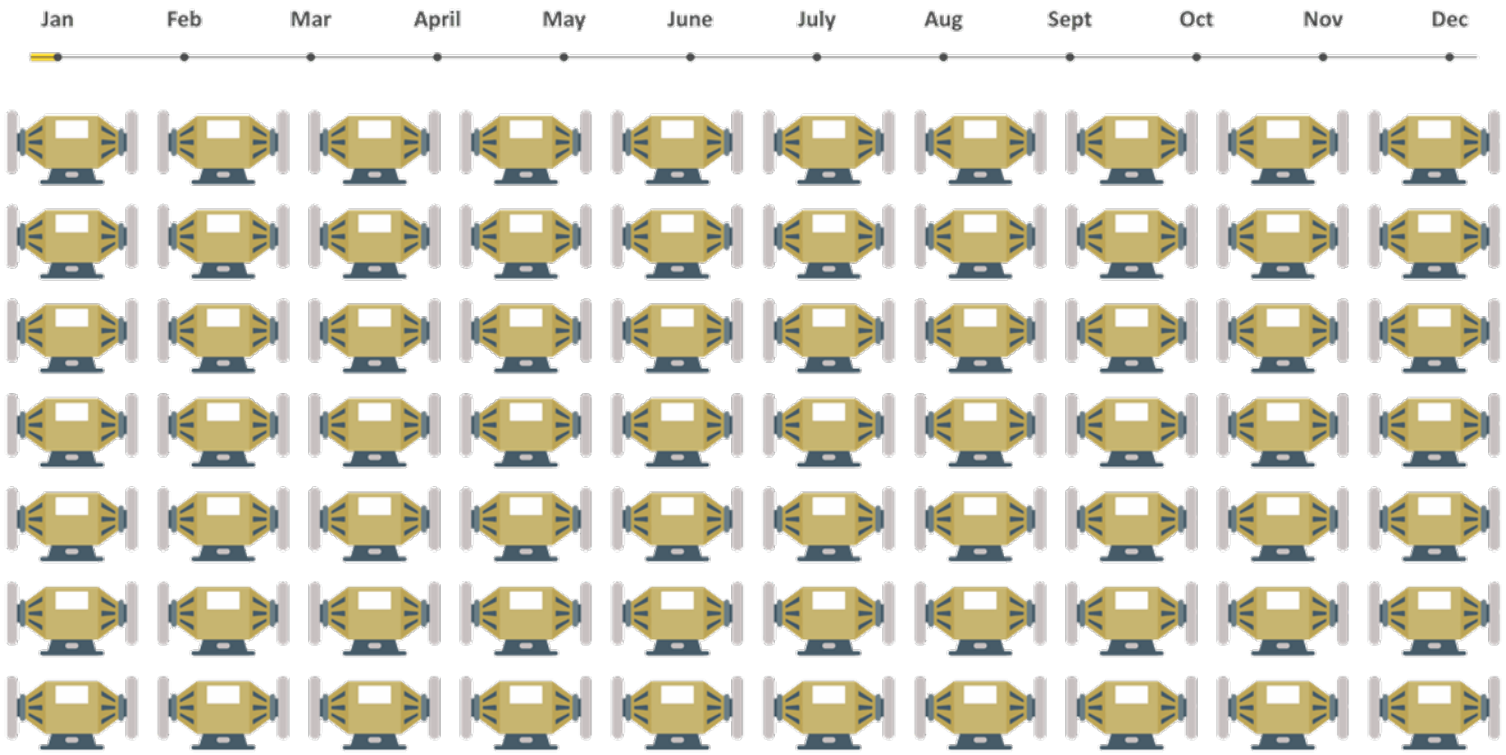
Restart upon restoration of power is just one of many ways a machine can restart unexpectedly. A risk assessment should also include all other applicable startup conditions.

Other Energies

While motor-driven parts of a machine are an obvious hazard, keep an eye out for other energies that may be released (even if the motor doesn't start back up)

Misleading Products

- Customer: Aerospace parts manufacturer
- Intent: Protect operators and comply w/ anti-restart regulation.
- Context: Customer has a pedestal bench grinder at each CNC operator station, used for tool sharpening.
- Project Scope: Install commercially available anti-restart devices on 70 bench grinders.
- Result: Based on monthly testing, between one and three devices failed each month.



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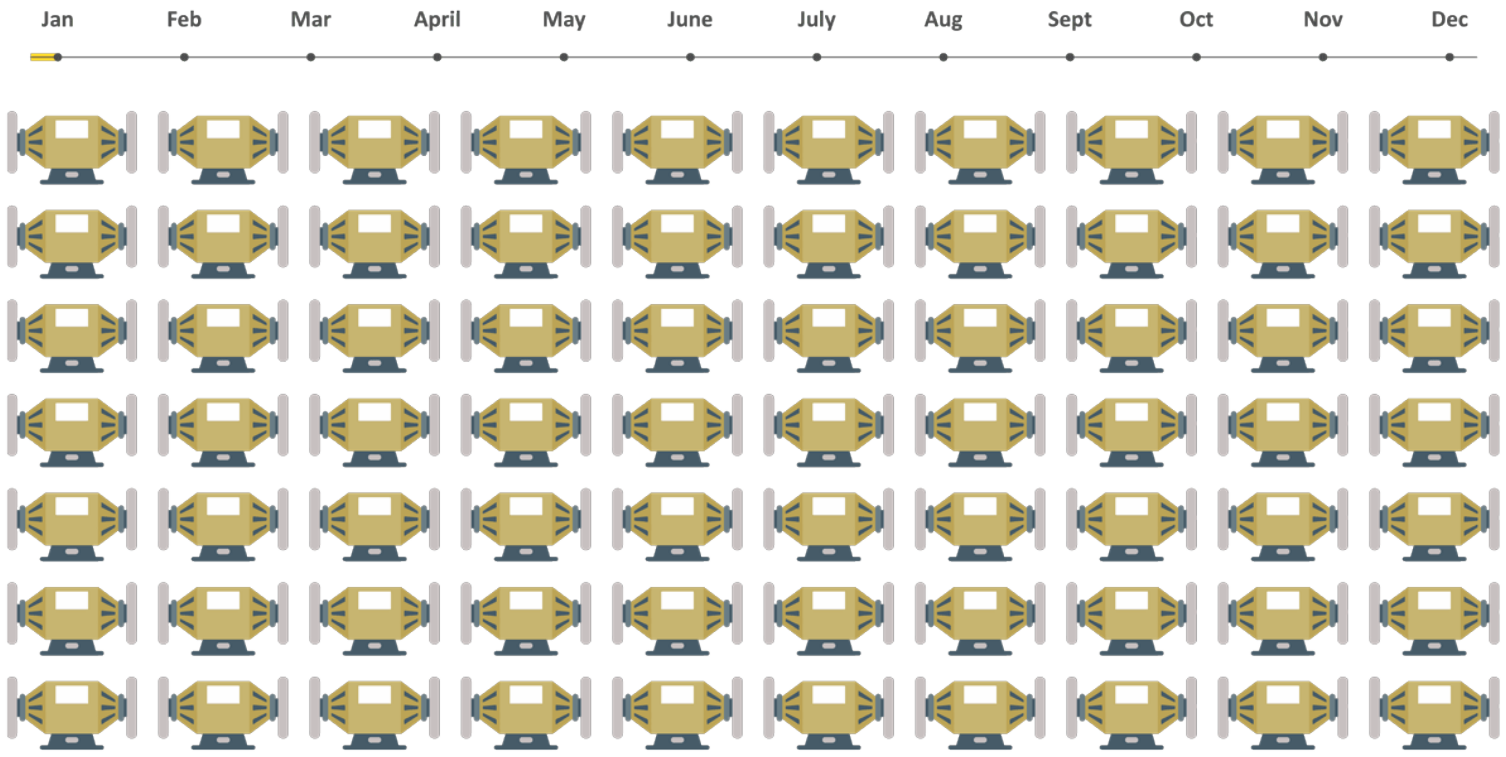


Why they fail (Electrically)

The Machine

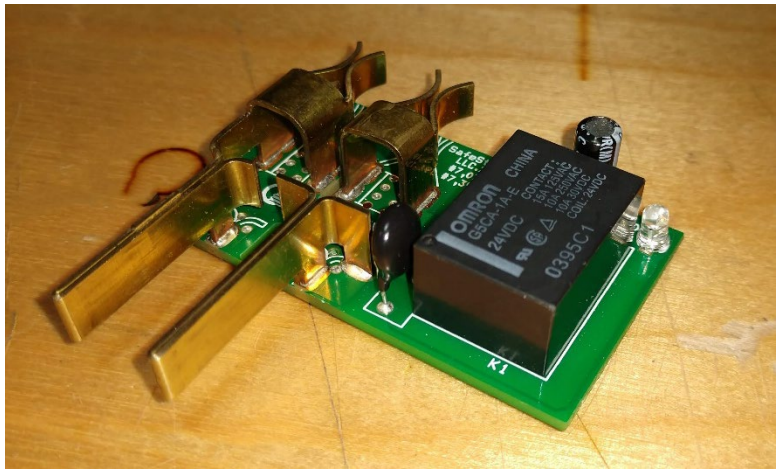
8” Bench Grinder

1HP

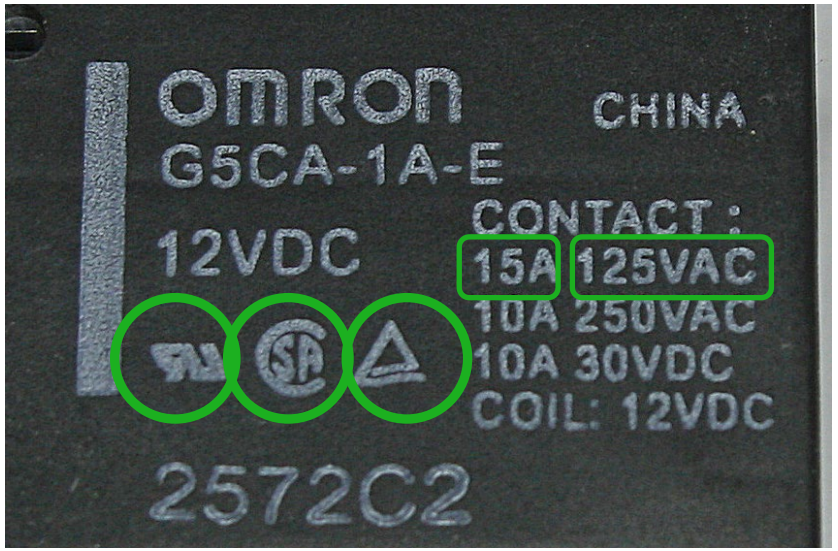
120V, 60Hz

8A

The Failed Device



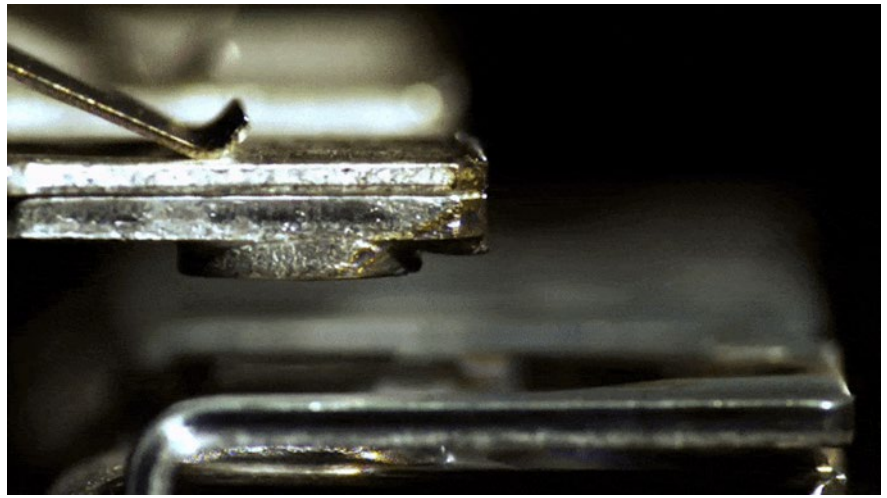
The Relay Inside



Just One of Many

The product shown here is just one of many anti-restart devices that suffer from the same shortcomings.

Why they fail (Electrically)



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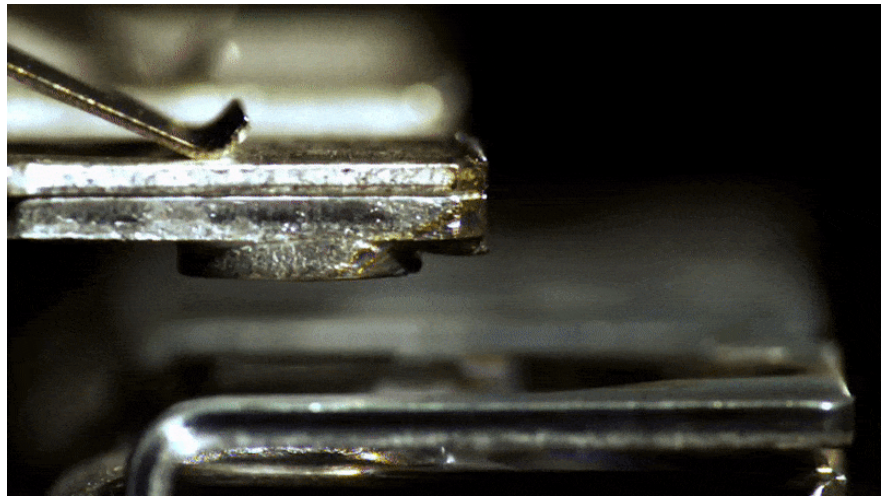


Why they fail (NRTLs)

UL 246A - Appliance Controls

"This category covers controllers … [with] one or more output switching components to directly control … household-type appliances, such as portable luminaires, audio/video equipment, etc."

"They are not intended for controlling motor-operated appliances"

UL 508 - Industrial Control Equipment

"These requirements cover industrial control devices, and devices accessory thereto, for starting, stopping, regulating, controlling, or protecting electric motors. "

Two relays with similar current ratings under each standard

(to scale)

Alternatives

* In some cases, OSHA considers momentary foot switches to meet basic anti-restart and e-stop requirements.

Features & Protection

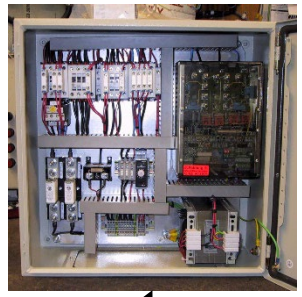
Magnetic Switches
(anti-restart only)

In-Line Protection Devices
(anti-restart only)

Momentary Foot Switches
(anti-restart & e-stop*)

UL508A Control Boxes
(anti-restart + e-stop)

MAKESafe One-Stop
(anti-restart + e-stop + motor braking)



Custom Control Cabinets
(anything you want …)

Cost

$20 — $40-$150 — $400-$1,000 — $3000+

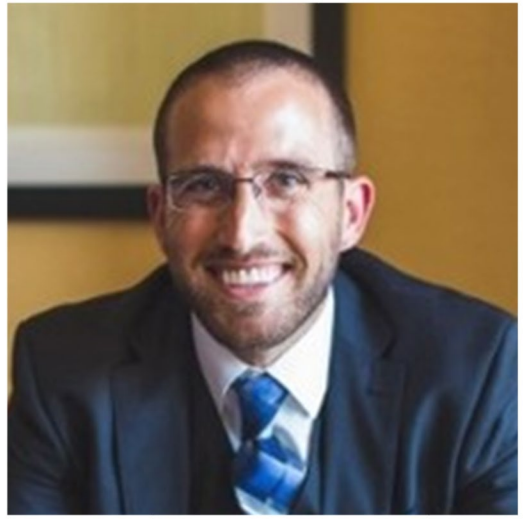
In summary

- Whether or not the petition is approved, you're still responsible for the regulations discussed today.
- Go evaluate your machinery!
- If needed, purchase and install compliant anti-restart devices!

MAKESafe Demo

We're here to help!

- scott@makesafetools.com
- (415) 937-1808



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