Advanced Lockout-Tagout (LOTO)
Modern Techniques to Address Safety and Productivity Goals

Servio-Tulio Moreno
Rockwell Automation (ESC Business Unit)
Operations Support Manager

PUBLIC
Safety doesn’t have to come at the expense of production / business goals.

Balancing Safety with Production.
The Core Intent of LOTO

“To prevent unexpected re-start of the equipment during service from causing harm to employees.”

Engineering safe alternatives is key to establishing a advanced lockout-tagout.
LOTO - Intent to Prevent

Source: Jack Benton – ehssafetynews.wordpress.com
Agenda

Lockout-Tagout – Facts and Stats

Quick Review of LOTO – 5 Components + Sustainability

Common “Blind Spots”

Ensuring Your Program Pays You Back
Safety Facts ‘n Stats

How many amputations do you think occur every day in the US workplace? ~21/day or 7,990/year

How many deaths do you think occur every day in the US workplace? ~14/day or 4,628/year

How many years has OSHA’s regulation 1910.147 been in the top 10 most cited regulations? 19 Years (of the last 19 years)

(hint: You can search back 19 years of electronic data with OSHA)
20 Year History of Workplace Fatalities

Number of fatal work injuries, 1992–2012*

- Only -1.5% per Year

The 2012 preliminary total of 4,383 fatal work injuries represents a decrease of 7 percent from the final count of 4,693 fatal work injuries reported for 2011.
# Lockout-Tagout Trends -
## Top 10 Most Dangerous Industries and Occupations

<table>
<thead>
<tr>
<th>Rate Ranking</th>
<th>Industry</th>
<th>Fatality Count</th>
<th>Fatality Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Agriculture, forestry, fishing and hunting</td>
<td>621</td>
<td>27.9%</td>
</tr>
<tr>
<td>2</td>
<td>Mining</td>
<td>172</td>
<td>19.8%</td>
</tr>
<tr>
<td>3</td>
<td>Transportation and warehousing</td>
<td>661</td>
<td>13.7%</td>
</tr>
<tr>
<td>4</td>
<td>Construction</td>
<td>774</td>
<td>9.8%</td>
</tr>
<tr>
<td>5</td>
<td>Wholesale trade</td>
<td>191</td>
<td>4.9%</td>
</tr>
<tr>
<td>6</td>
<td>Other services (exc. Public administration)</td>
<td>192</td>
<td>3.0%</td>
</tr>
<tr>
<td>7</td>
<td>Utilities</td>
<td>26</td>
<td>2.8%</td>
</tr>
<tr>
<td>8</td>
<td>Professional and business services</td>
<td>364</td>
<td>2.6%</td>
</tr>
<tr>
<td>9</td>
<td>Manufacturing</td>
<td>329</td>
<td>2.3%</td>
</tr>
<tr>
<td>10</td>
<td>Leisure and hospitality</td>
<td>238</td>
<td>2.3%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Rank</th>
<th>Occupation</th>
<th>Count</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Fishers and related fishing workers</td>
<td>38</td>
<td>15.20%</td>
</tr>
<tr>
<td>2</td>
<td>Logging workers</td>
<td>60</td>
<td>9.35%</td>
</tr>
<tr>
<td>3</td>
<td>Aircraft pilots and flight engineers</td>
<td>78</td>
<td>7.06%</td>
</tr>
<tr>
<td>4</td>
<td>Farmers and ranchers</td>
<td>308</td>
<td>4.25%</td>
</tr>
<tr>
<td>5</td>
<td>Mining machine operators</td>
<td>22</td>
<td>3.70%</td>
</tr>
<tr>
<td>6</td>
<td>Roofers</td>
<td>57</td>
<td>3.24%</td>
</tr>
<tr>
<td>7</td>
<td>Refuse and recyclable material collectors</td>
<td>26</td>
<td>2.98%</td>
</tr>
<tr>
<td>8</td>
<td>Driver/sales workers and truck drivers</td>
<td>718</td>
<td>2.30%</td>
</tr>
<tr>
<td>9</td>
<td>Industrial machinery installation, repair, and maintenance workers</td>
<td>96</td>
<td>2.07%</td>
</tr>
<tr>
<td>10</td>
<td>Police and sheriff's patrol officers</td>
<td>134</td>
<td>1.81%</td>
</tr>
</tbody>
</table>
OSHA’s Top 10 – As of September 2015

LOTO is #5 for all Industries

NAICS Code: ALL NAICS Codes

<table>
<thead>
<tr>
<th>Standard</th>
<th>Citations</th>
<th>Inspections</th>
<th>Penalty</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>82,174</td>
<td>25,922</td>
<td>$141,029,665</td>
<td>All Standards cited for NAICS Codes</td>
</tr>
<tr>
<td>19100147</td>
<td>3,125</td>
<td>1,806</td>
<td>$10,011,554</td>
<td>The control of hazardous energy (lockout/tagout)</td>
</tr>
<tr>
<td>19100175</td>
<td>3,095</td>
<td>2,178</td>
<td>$4,531,392</td>
<td>Powered industrial trucks</td>
</tr>
<tr>
<td>19100134</td>
<td>3,059</td>
<td>1,910</td>
<td>$2,900,699</td>
<td>Wiring methods, components, and equipment for general use</td>
</tr>
<tr>
<td>19100124</td>
<td>2,627</td>
<td>1,085</td>
<td>$1,601,594</td>
<td>General requirements</td>
</tr>
<tr>
<td>19100114</td>
<td>2,359</td>
<td>900</td>
<td>$1,001,584</td>
<td>General requirements</td>
</tr>
<tr>
<td>19100104</td>
<td>2,190</td>
<td>700</td>
<td>$600,000</td>
<td>General requirements</td>
</tr>
<tr>
<td>19100103</td>
<td>1,900</td>
<td>500</td>
<td>$400,000</td>
<td>General requirements</td>
</tr>
<tr>
<td>19100102</td>
<td>1,700</td>
<td>400</td>
<td>$300,000</td>
<td>General requirements</td>
</tr>
<tr>
<td>19100101</td>
<td>1,500</td>
<td>300</td>
<td>$200,000</td>
<td>General requirements</td>
</tr>
</tbody>
</table>
Agenda

Lockout-Tagout – Facts and Stats

Quick Review of LOTO – 5 Components + Sustainability

Common “Blind Spots”

Ensuring Your Program Pays You Back
Quick review of LOTO – 5 components +Sustainability (ScanESC™)
Training must be provided to **authorized** employees who will be utilizing lockout-tagout.

Training must be provided to **affected** employees who are in the general area.
2:5 LOTO Procedures

- Procedures need to be developed for all "serviceable" equipment in your facility.
- 8-criteria helps to ensure no equipment is overlooked.
OSHA’s 8-Criteria 1910.147(c)(4)(i)

1. The machine or equipment has no potential for stored or residual energy or reaccumulation of stored energy after shut down which could endanger employees.

2. The machine or equipment has a single energy source which can be readily identified and isolated.

3. The isolation and locking out of that energy source will completely deenergize and deactivate the machine or equipment.

4. The machine or equipment is isolated from that energy source and locked out during servicing or maintenance.

5. A single lockout device will achieve a locked-out condition.

6. The lockout device is under the exclusive control of the authorized employee performing the servicing or maintenance.

7. The servicing or maintenance does not create hazards for other employees.

8. The employer, in utilizing this exception, has had no accidents involving the unexpected activation or re-energization of the machine or equipment during servicing or maintenance.
Graphical Procedures = Faster & Easier

Which would you rather follow on a daily basis?
3:5 Auditing

- Every Year, Every Procedure.
- Inspecting Authorized Employees Annually.
Ensure your devices are adequate to provide effective “deterrent” to inadvertent reenergization.

Locks, tags, and devices must be uniform and consistent with the rules you lay out in your policy.
A corporate policy should act as a guide for employees to follow that the company approves.

The policy helps prevent misunderstandings and miscommunication between management and employees.

Include all dynamic elements of your program to ensure efficient updates.
Manage your procedures with the safety and security of the cloud. Make sure your tablets can perform fully WITHOUT internet access. Collaborate your team and view your leading indicators for safety/performance.
iPad App Overview

- Internally manage and maintain your LOTO programs
- Easily demonstrate real-time compliancy status
- Access to procedural updates
- Automatically pushed down through server

Revolutionary
Patented and only one of its kind
ScanESC addresses common compliance gaps by systemizing the process to keep it simple, consistent, and quick.

- Audits can be performed much quicker (up to 85% quicker in some cases) by allowing users to identify and document who did the audit, what checks were conducted, when it was done and if there were any findings from that audit for each procedure….All from simply scanning a QR code.
What ScanESC is…

Cloud enhanced, not cloud based.

*Data synchronization occurs when internet access is established.*
Procedure QR Codes

Scan QR codes
- Installed on equipment
- Procedures never lost
- Quickly finds procedure

Simple to assign.

QR codes easily replaced as needed.
Dashboard

- Easily view procedure and employee audit status
- Multiple facility statuses available
Manage Procedures / View Status

- Easily manage and upload procedures to server
- Automatically pushes updates down to all iPads
- View critical data
  - LOTO status (locked or unlocked)
  - Audit status (who audited, when, which equipment)
Agenda

Lockout-Tagout – Facts and Stats

Quick Review of LOTO – 5 Components + Sustainability

Common “Blind Spots”

Ensuring Your Program Pays You Back
Common Blind Spots

- Lack of documentation
- Audit gaps
- Machine specific procedures
- Misinterpretation of the law
Avoid The Unnecessary Costs

Workplace accidents cost the US $192B annually.*

For the last 10 years, Lockout-Tagout is the #1 most cited regulation in the manufacturing industry.**

Lockout-Tagout is in the top 10 most cited regulations and has been for over 10 years for all industries.**

OSHA lockout-tagout fine totals are increasing over 50% on average for last two years.**

Lawsuits from accidents are averaging 50x OSHA fines as a cost to businesses.***

*http://www.ncbi.nlm.nih.gov/pubmed/22188353 - The number of fatal and nonfatal injuries in 2007 was estimated to be more than 5,600 and almost 8,559,000, respectively, at a cost of $6 billion and $186 billion.

**www.osha.gov – historic OSHA fine records

***Based on published information with civil litigation settlement amounts verses proposed OSHA citation.

Data collected and presented by www.escservices.com - for educational use only
Total estimated lockout-tagout accident costs to industry with OSHA fines + lawsuits:

- LOTO fines 2013 - ~$14MM* (federal + state stats combined)
- Settlement Estimates** – ($14 x 50 = $700MM)
- Downtime and Damage to Equipment / Property*** = $28MM
- Insurance Annual Premium Increase = $70MM****
- Trouble Recruiting Employee Talent/ Damaged Morale

Total = $812 Million Cost To US Businesses Annually

*www.osha.gov – FY2013 statistics
**Settlements estimated at 50 times fine amounts from several known published settlements.
***Damage and downtime estimates based on 2:1 ratio derived from avg. amounts from published data and known average production and equipment values.
****Based on published fine data compared with known first year premium increase from adjusted mod rate for large corporations.

Does not include cost to brand damage and damaged PR.

Data collected and presented by www.escservices.com - for educational use only
Agenda

Lockout-Tagout – Facts and Stats

Quick Review of LOTO – 5 Components + Sustainability

Common “Blind Spots”

Ensuring Your Program Pays You Back
Alternative De-energization Procedures
Permitted by OSHA

An employee is required to remove or bypass a guard or other safety device; or

1910.147(a)(2)(ii)(B)
An employee is required to place any part of his or her body into an area on a machine or piece of equipment where work is actually performed upon the material being processed (point of operation) or where an associated danger zone exists during a machine operating cycle.

Note: Exception to paragraph (a)(2)(ii): Minor tool changes and adjustments, and other minor servicing activities, which take place during normal production operations, are not covered by this standard if they are routine, repetitive, and integral to the use of the equipment for production, provided that the work is performed using alternative measures which provide effective protection (See Subpart O of this Part).
What isn’t allowed is any “increased risk” to the employee by using Alternative de-energization (ADP) procedure.

In other words - any ADP developed must provide the same (or greater) level of protection as LOTO in order to comply with CFR1910.147.
**LOTO vs ADP Comparison**

**LOTO:** ~5-6 Min.

**ADP:** <1 Min.

**Uptime:** ~$2,700/hour  
Or $45/min.

ADP saves $315 every time it’s used over LOTO
Comprehensive Approach – Yields R.O.I.
Further info – ESCservices.com

- Learning Center - great for additional information.
- NEWS Center – updated weekly with new articles written by our engineers.
- Latest insight from technology to OSHA regulatory updates.
Thank you. Any questions?
Questions from the audience

Attendee: What is the best practices around shift changes with LOTO?

ESC Response: One popular path many companies choose is to have all their locks for LOTO as one color (like RED) – then have a separate colored lock (that does not say LOTO on it) that is specifically for shift changes. That way you can maintain control of the equipment until another employee applies their personal lock.

Questions from the audience

**Attendee:** How can we safely service equipment when we need to do trouble shooting?

**ESC Response:** ADP (Alternative De-energization Procedures) Procedures are critical for any equipment that needs servicing and lockout-tagout is infeasible. Lockout (by definition) requires that all energy sources are accounted for an isolated/controlled. ADPs create a safety option that is as effective as LOTO for the particular task.

Questions from the audience

Attendee: How can we ensure our locks/tags/devices stay available after issuing them?

ESC Response: One way to ensure your LOTO device inventory stays the way you want it is to do inventory assessments with your audits. Common best practice is to conduct quarterly inventory assessments along with procedures and people per the regulation requirements.

Reference: https://www.escservices.com/2014/05/14/keeping-lockout-tagout-program-date/
Questions from the audience

Attendee: How does the single source exemption affect certain equipment for LOTO?

ESC Response: 1910.147(c)(4)(i) – states 8 criteria that are required to be met for a piece of equipment to be exempt from requiring a pre-written procedure to be created. There are times when cord-and-plug equipment can be serviced without using LOTO, but we don’t recommend that technique – and the equipment may still require a procedure to be created.

Reference: https://www.escservices.com/2012/12/06/lockout-tagout-procedures/