



**Fibre Box Association – Safety
Committee Meeting - July 20, 2011**

**Issues and Developments in
OSHA Enforcement of Box
Plant Converting Energy
Isolation**

DISCLAIMERS

- I'M NOT A LAWYER
- NOT GIVING LEGAL ADVICE
- NOT MY COMPANY'S VIEWS
- MY OWN OPINIONS
- ONLY GOAL IS TO MAKE YOU AWARE

PURPOSE & WORDS

To make you aware of issues evolving around OSHA perspective, activity (e.g. citations) regarding machine energy isolation during routine production in corrugated converting.

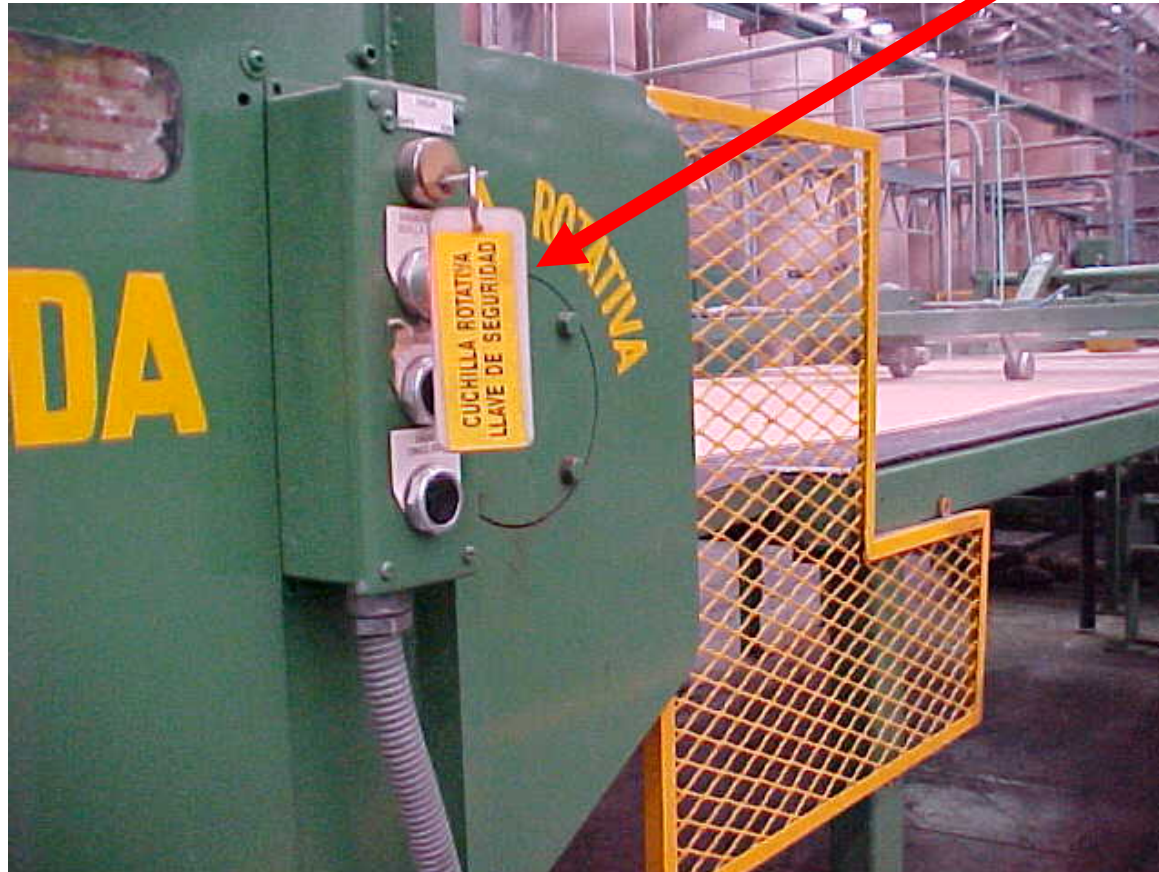
Corrugated Box Machine Minor Servicing **Important Terminology**

- **Lockout - Zero Energy State (ZES)**
Usually achieved through the use of personal padlocks and identification tags.
- **Intermediate Energy State (IES)**
Usually achieved through the use of a key switch in the machine control circuitry.

ZES Example Lockout of Corrugator Cut Off Knife



Example IES Key Switch



KEY WORDS & PHRASES

- “Maintenance”
- “Maintenance and Servicing”
- “Normal Production”
- “Set-Up”
- “Routine, Repetitive and Integral”
- “Alternative Protective Measures”

LOTO History Events Time Line

- **1977– OSHA published Request for Information**
- **1980 – OSHA issued ANPRM --**
Developing LOTO Std. for “Maintenance”
- **April 29, 1988 – NPRM – LOTO – few industry comments made – “Maintenance & Servicing”**

Word Definitions in LOTO Std.

Servicing and/or maintenance. Workplace activities such as constructing, installing, **setting up**, adjusting, inspecting, modifying, and maintaining and/or servicing machines or equipment. These activities include lubrication, cleaning or unjamming of machines or equipment and making adjustments or tool changes, where the employee may be exposed to the **unexpected** energization or startup of the equipment or release of hazardous energy.

LOTO History Events Time Line

- **June 1989** - Std. approved by DOL and sent to OMB for review and approval
- **Aug. 3, 1989** – United Technologies petition to reopen rulemaking – concern that rule would require routine adjustments, clearing of jams and set up activities be performed under LOTO -- inadequate notice provided to industry
- **Aug. 1989** – OMB inserts minor servicing exemption into std. but does not modify Servicing & Maintenance definition to remove “Setup”.

LOTO History - Continued

- **Aug. 1989** – OMB inserts minor servicing exemption into std. with the following criteria:
 - **Routine**
 - **Repetitive**
 - **Integral to use of machine for production**
 - **Takes place during normal production operations**
 - **Alternative measures provide effective protection**

LOTO History - Continued

- **Sept. 1, 1989** – final rule issued. OSHA unclear on interpretation of minor servicing exemption written by OMB. Industry recognizes potential burden of application to “Servicing & Maintenance”.
- **Nov. 1989** –NAM & other major trade associations file suits challenging rule with Chocolate Manufacturers and National Confectioners focusing on application of minor servicing exemption to clearing jams. Unions challenge minor servicing exemption.
- **Jan 31, 1990** – Std. went into effect
- **2/1/90 – 2/13/90** – No apparent compliance problem for paper industry

LOTO History - Continued

- **Feb. 14, 1990** - OSHA visits Westvaco - Eaton, OH box plant. Cites for LOTO while setting the slotter section without LOTO of drive motor
 - “During normal production operations”
 - “-” ALJ – means machine is running
 - “+” Review Commission later reverses on that point
 - “-” ALJ & Review Comm. - “Set-Up” performed to prepare for rather than “during normal production operations” and not included in “minor servicing”
 - “?” Case settled on appeal; decision stands although largely ignored by OSHA until 2008 CPL
- **Sept. 16, 1992** – Printing Industries of America receives an “interpretation” letter saying certain “make ready” (a/k/a/ “set up”) activities on printing presses were “minor servicing” and their “Inch Safe” procedure provided effective protection to workers

LOTO History - Continued

- **Sept. 1992** –(Same time period) OSHA Nat'l Office issues “Inch Safe” interpretation, Regional Solicitor is asserting before Review Commission that “set up” was not performed “during normal production operations”.
- **1994** - Westvaco Case settled on appeal with sole requirement to lock out open/close motor. OSHA Area Director testified key switches would provide effective protection and be a de minimis violation.
- **April 26, 1995** – GM-Delco Div. – LOTO not required if no “unexpected energization”

LOTO History - Continued

- **April 4, 2004** – OSHA issues 2nd letter of interpretation for Printing Industries of America – confirming certain “make ready” (a/k/a “set up”) activities are “minor servicing” performed “during normal production operations”.
- **Feb. 11, 2008** - CPL 02-00-147 OSHA Compliance Directive on LOTO. Some inspectors assert that “minor servicing” exemption only applies when machine is running!



OSHA'S EVOLVING VIEW OF LOTO/MG

OSHA 2-11-2008 LOTO Directive

- “As a general principle, the LOTO standard does not apply to: “... servicing and maintenance activities when employees are not exposed to hazardous energy. Therefore, employees can be protected from these ... incidents by ... Effective machine guarding, in compliance with Subpart O, that eliminates or prevents employee exposure from the hazardous energy associated with the machines or Equipment...”
- **“Methods, such as machine guarding, may be effective alternatives to LOTO, if the alternative eliminates employee exposure to the hazardous energy.”**

CONCERN OVER LOTO FOR “SET-UP” OR “MAKE READY” TASKS

- **Printing and Binding Industry Two-pronged approach**
 - **Went to OSHA with existing industry standards.**
 - OSHA Letters described “certain make ready activities” as minor servicing activities, and that controls in *ANSI B65.1-1985 and ANSI B65.2-1988 provided effective protection*
 - **Continued development of industry standards**
 - *ANSI Printing Press Safety Standard, ANSI B65.1-1985 (revised in 1995, and 2005)*
 - *ANSI Binding Equip Safety Standard, ANSI B65.2-1988 (revised in 1999 and 2005)*
 - *Evolving design criteria appears to be influenced by EU standards*

CONCERN OVER LOTO FOR “SET-UP” OR “MAKE READY” TASKS

- **Paper Converting Machinery**
 - **Tasks: changing blankets, printing plates, etc.**
 - **Impact of LOTO**
 - Loss of heaters, ink circulation, and computer memory
 - Need power to open machine (open/close) and position drums (aux motors) to change plates and blankets.
 - Significant loss of productivity
 - **OSHA generally seemed to following guidance of Printing Industries letters**
 - **2008 LOTO CPL indicates OSHA HQ continuously reinterpreting its standards to “raise the bar” based on updated national consensus standards such as ANSI B11.19, which is generally tracking or chasing new and updated EU standards**

- Corrugated Industry – Recent OSHA Enforcement History

2006 – LOTO Citation Ward Die Cutter

- Serious Citation – LOTO not used to disable the open and close motors of the Ward Die Cutter
- Local management agreed to the citations but had no plan for abatement.
- OSHA was pushing for installation of Category 3, “Control Reliable” electrical circuits.
- Management decision to subsequently remove the machine eliminated the issue.

- Corrugated Industry - Recent OSHA Enforcement History

2007 - Flexo Folder Gluer

- Serious LOTO citation.
- Local management accepted citation through informal conference, but was unclear on required abatement.
- Negotiated abatement led to upgrade machine electrical control circuits to Category 3, “Machine Reliable” circuits.

- Corrugated Industry - Recent OSHA Enforcement History

Flexo Folder/Gluer

Proposed LOTO Citations Settlement - Late 2008 Late 2007

- | | |
|--|-----------|
| • Performing set-ups | • Dropped |
| • Unjamming machines and conveyers | • Dropped |
| ◦ Entering counter ejector; | - |
| ◦ Entering folding section; | - |
| ◦ Reached into or climbing under the die cutter. | - |
| • Putting transfer belts back on rollers | • Dropped |
| • Cleaning and adjusting folding rails | • Dropped |
| • Changing glue tab knives | • Dropped |

- Corrugated Industry - Recent OSHA Enforcement History

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Proposed Citations Late 2007

- Cleaning printing dies and cylinders
- Removing/replacing ink pans
- Cleaning anilox and printing rollers
- Cleaning the print cylinders
- Entering the pit under the EMBA FFG
- Installing die cutter anvil impression pads on die cutter

Settlement Late 2008 – Retained b/c NOT Minor Servicing

- Cleaning impression cylinders
Removing/replacing ink pans
- Cleaning anilox and rubber rollers
- Cleaning the print cylinders
- Working in the pit under the EMBA FFG
- Installing die cutter anvil impression pads on die cutter

- Corrugated Industry - Recent OSHA Enforcement History

2008 – Serious LOTO Violation – While rethreading the corrugator, “Operators adjusting feeds, cleaning rolls and performing other procedures used a local switch to turn the power off to stop a specific section of the corrugator rather fully locking out the equipment to achieve zero energy state.”

- At informal conference the location demonstrated that power was needed to perform the minor servicing tasks at hand, which included advancing the machine at a “crawl” speed to facilitate rethreading.

- Corrugated Industry - Recent OSHA Enforcement History

2009 - Serious Citation – Print Die/Anilox Injury

- **“29 CFR 1910.147 (a)(2)(ii):** Minor tool changes and adjustments, and other minor servicing activities, which took place during normal production operations, were not provided with using alternative measure which provided effective employee protection.”
- **“CONVERTING DEPARTMENT:** The employees, engaged in normal routine set up of the Langston Mini Flexo Folder Gluer (FFG) by removing/replacing of the printing plates at the first and second down were not provided with “Alternative Safety Measures” or an equivalent and were exposed to in-running nip point created by the top and bottom printing cylinders/rolls.”

- Corrugated Industry - Recent OSHA Enforcement History

2010 - Serious Citation – “All Converting Machines”

- Serious citation of 1910.147 throughout the plant for using control circuit isolation key switches during toll changes, die changes machine adjustments and unjamming.
- Appealed, mounted aggressive defense and solicitor’s office withdrew citations six months later.
- Another office recognized accepted practice

- Corrugated Industry - Recent OSHA Enforcement History

2011 - Serious Citation – Paper Machine

- Serious citation of 1910.261(b)(1) for not applying LOTO or alternative measure apparently based on Category 3 circuitry when removing paper tail on an overfeed discharge conveyor. 1910.261(b)(1) allegedly preempts minor servicing activity exemption of 1910.147.



**SIX Converting IES –
Alternative Protective
Measures – with
varying levels of use in
the Industry**

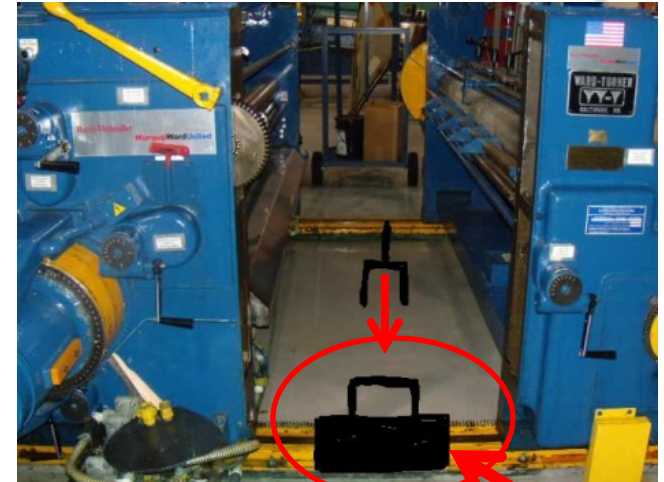
SIX Converting IES – Alternative Protective Measures – Varying Levels of Use

- **#1** - Mechanical open/close blocking – watch for clear SOP's – Category “B” or I circuits.
- **#2** – Key Switch in Control Circuit – Std. Wiring convention – Category I&2 circuits
- **#3** – #2 with Light Indicator while in safe position
- **#4** – #3 with “control reliable” interface components – Category 2+ circuits
- **#5** – Local disconnect on open/close motor and/or local disconnect on drive power. Cat 2
- **#6** – Category 3 “control reliable” components and circuits, redundant wiring.

Example #1

Category “B” or “I” Circuitry

- Off switch hold down
- Steel “U” channel block on open/close rail
- May have Pre-Start up alarm
- SOP to observe “all clear” before closing machine



Example #2 - IES

Key Switch Safe System – Basic Category 1 & 2 circuits

The Key Switch System includes:

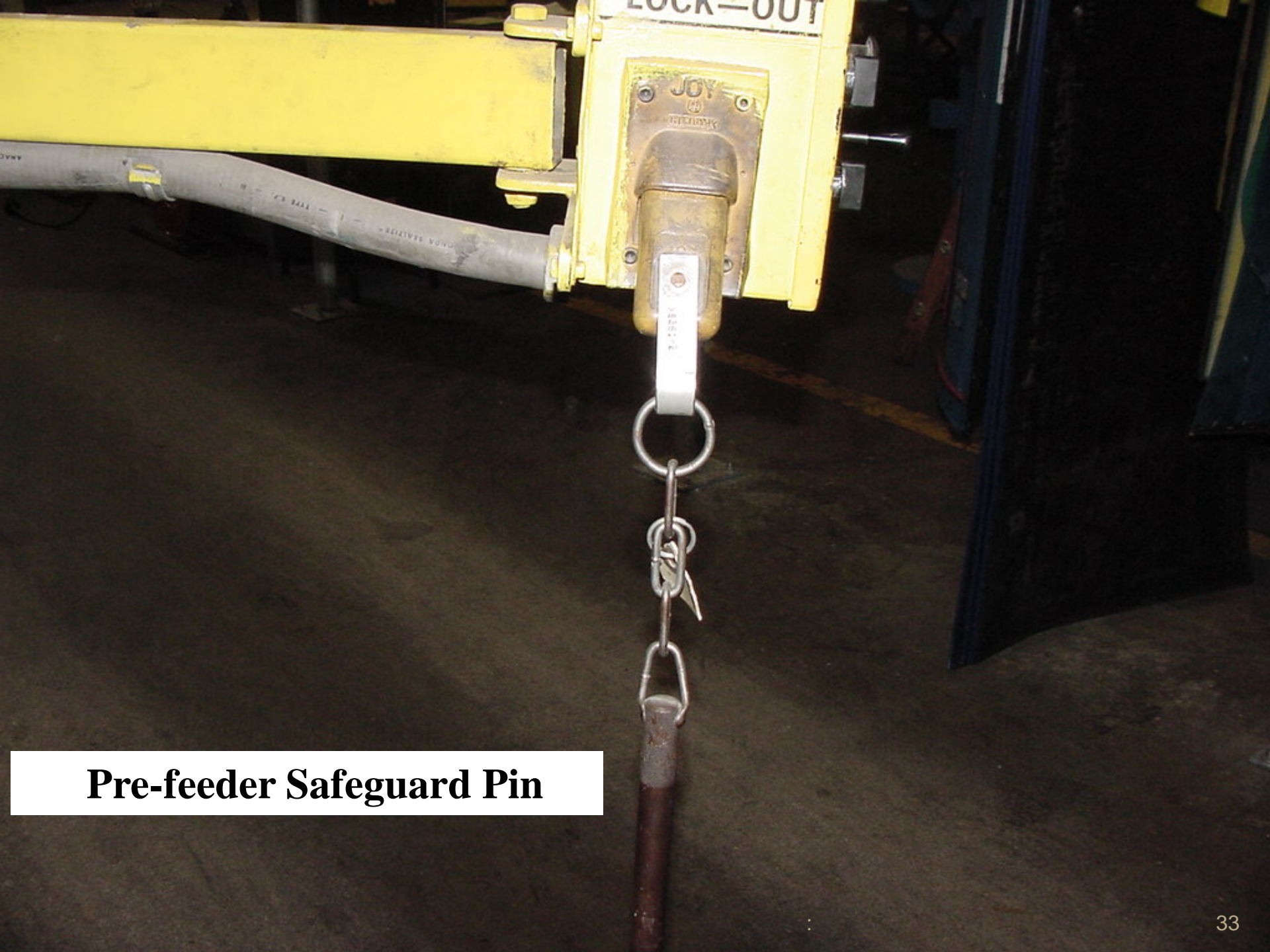
- Individual key switches, wired in “series”, in control circuits for all employees exposed to minor servicing tasks such as die change, minor jams and machine adjustments for customer order change.
- A company policy that every exposed employee must have a key on their person at all times when exposed.
- No indicator light for “safe” condition.

Multiple IES Key Switches with Identification Tags





Pre-feeder IES Key



Pre-feeder Safeguard Pin



Load Former Disconnects & Safety Pins

Example #3

IES - Key Switch System with Indicator Light Category 2 Circuits

- Individual keys in control circuits for all employees exposed to minor servicing tasks such as die change, minor jams and machine adjustments for customer order change.
- A coiled strap to be kept on the wrist or elbow.

Example #4 - IES - Key Switch System - Indicator Light & Safety Relay Category 2+ circuit

- Individual keys in control circuits for all employees exposed to minor servicing tasks such as die change, minor jams and machine adjustments for customer order change.
- Individual Key to be kept on all exposed personnel.
- A light indicator with red or green. Green = Safe
- **High integrity relay used in the key switch control circuit**



Example #5

IES/ZES Combination – Lock Out System Category 2 circuits

- **Local IES electrical disconnects** are wired near the operator station and traditional LOTO methods used to isolate drive and movement hazards during minor servicing tasks such as die change, minor jams and machine adjustments for customer order change.
- Power needed for die mounting knife and slot changes remain active and energized.
- All exposed employees are protected with individual locks on the local IES disconnect.

IES (Secondary Disconnect) – Lock Out System – Example #5 continued



IES Disconnects



ZES Disconnect

Example #5 continued

Guide Chart for Each Machine Showing IES (Secondary Disconnect) Versus ZES Isolation Points

DANGER ELECTRICAL HAZARD **DANGER HIGH VOLTAGE**

CORRUGATOR C1

Corrugator C1 Flute

5/2009

CORRUGATOR C1

Corrugator C1 Flute

28/05/2009

C1	SINGLEFACER (SF)				WATER	SPLICER	ROLLSTAND		
TASK	S-A C-Flute Make/Demo	S-B SingleFace Drive Power	S-C SingleFace Control Power	S-D Steam	S-E Medium Water	S-F Medium Splicer	S-G Roll Stand	S-H Roll Stand	S-I Roll Stand
Energy Type	0000	0000	0000	0000	0000	0000	0000	0000	0000
TASK	000	00	00	00	00	00	00	00	00

Example #6

IES - Key Safe System – Indicator light, Safety Relay & Cross Monitoring

Category 3 Circuits

- Individual keys in control circuits for all employees exposed to minor servicing tasks such as die change, minor jams and machine adjustments for customer order change.
- Individual Key to be kept on all exposed personnel.
- A light indicator with red or green. Green = Safe
- High integrity “self monitoring” relay used in the key switch control circuit
- **Two wire Control Circuits assure system cross monitoring.**



Energy Isolation Issues – Corrugated Box Plants - Opinion (Not Advice) of what a company could do.

- Perform a risk analysis of routine “minor servicing” tasks for “customer order changes.”
- What redundant alternative protective measures safeguard the employee? E.g. key switches, multiple interlocks, “try step”, start up delay, start up protocol, etc.
- Is the task routine, repetitive, integral to the operation of the machine?

Energy Isolation Issues – Corrugated Box Plants - Opinion (Not Advice) of what a company could do. (cont.)

- Review your company production & safety records to determine if your system has been historically reliable in protecting employees.
- Review company PM procedures to assure routine testing of safety devices is performed.
- Review tasks in which IES protection is used and define when ZES line is crossed.
Document and communicate in JSA's to EE's.

REVIEW

Relevant Exemptions from the Lockout/Tagout Standard

- **No Potential for “Unexpected Energization” to Cause Injury**
 - 1910.147 (a)(1)(i)
 - GM Delco and related cases, 2008 CPL
- **Minor Servicing Activities**
 - Note to 1910.147 (a)(2)(ii)(b)
- **Testing & Positioning Activities**
 - 1910.147(f)(1) – overlooked in *Westvaco*
- **Infeasibility and greater hazard**

REVIEW

EXCEPTIONS TO LOTO REQUIREMENT

- **No Potential for “Unexpected Energization” to Cause Injury**
 - GM Delco and related cases
 - Mere existence of hazardous energy does not mean LOTO is required
 - Must be demonstrated exposure to “unexpected energization”
 - Likely to be decided on case by case basis

REVIEW

“MINOR SERVICING” ACTIVITIES

➤ **Criteria**

- Routine
- Repetitive
- Integral to use of machine for production
- Takes place during normal production operations
- Alternative measures provide effective protection

➤ **Printing Industries Letters – OSHA** cites and apparently relies on industry determination as to what is minor servicing activity

REVIEW

“NORMAL PRODUCTION OPERATIONS”

- The utilization of a machine or equipment to perform its intended production function.
- Preamble to proposed LOTO rule included routine set-up activities
- *Westvaco*: Set-up activities fall outside the scope of tasks performed during “normal production operations”; therefore not minor servicing
- Despite *Westvaco*, OSHA enforcement practice has generally treated routine set-up activities as minor servicing

REVIEW

TESTING AND POSITIONING

➤ **Technical Infeasibility Provision**

- Need power to perform task

➤ **Scope**

- Overlooked by *Westvaco* decision
- Narrowly interpreted by 2-2008 OSHA CPL issued by OSHA HQ
- Field Exercises Discretion

ENERGY CONTROL OPTIONS

- **Eliminate energy source**
- **Control energy source**
 - LOTO
 - Safeguarding
- **Areas of Uncertainty**
 - What is effective safeguarding?
 - OSHA pushing Category 3 now.
 - What will be next? ISO 13849?
 - Old machines v. rebuilt/new machines
 - Responsible risk management of the issue requires a balanced approach