

# Safety And Forensic Engineering JOURNAL

Volume 4

January 2005

---

## *Procedural Aspects Of: Lockout/Tagout, Confined Space Entry And Warnings*

by: Gary M. Hutter, P. E., Ph.D., C.S.P.  
Meridian Engineering & Technology, Inc.  
Glenview, IL 60025 847-297-6538

### **I) Introduction:**

Methods of "**Safeguarding**" equipment can often be divided between physical safeguarding devices, and procedural methods. A barrier guard, a fuse, an interlock, a light curtain are all examples of "*physical*" methods of safeguarding. Under "*physical safeguarding*" there typically is some device that provides the primary component of safety. Training, operating procedures, safety admonitions, permits, operating licenses and all examples of procedural methods of safeguarding. Following the "*procedures*" provides the primary component of safety. These two categories of safeguarding are analogous to the hardware and software approaches to safety, and may be companions of overall safety.

The procedural, or software-like aspects of safeguarding play important roles in assuring safe workplaces, and have been well utilized in both of OSHA's **Lockout/ Tagout** requirements (29CFR1910.147), and in their **Permit Required Confined Spaces** entry requirements (29CFR1910.146). Under Permit Required Confined Space entry, many of the requirements of the Lockout/ Tagout criteria may apply. A review of OSHA's "Interpretations" reveals the interplay that may exist between these two standards for such things as equipment/ electric power isolation. Without following the proper procedures of these two standards individually or in combination, compliance will most likely fall short, and accidents are more likely to occur.

With "hardware" safeguarding there is less left to interpretation and decision making; whereas with procedural safeguarding, interpretation and decision-making play more predominant roles.

*The following article briefly discusses a few of the interpretation and decision-making activities associated with OSHA'S Lockout/ Tagout and the Permit Required Confined Space criteria in reference to "warnings/ signage posting."* Both standards address warnings/ signage posting in their text.

### **II) Brief Description of Lockout/ Tagout Practice and Warnings**

*"Lockout/tagout" refers to specific practices and procedures to safeguard employees from the*

*unexpected energization or startup of machinery and equipment, or the release of hazardous energy during service or maintenance activities. This requires, in part, that a designated individual turns off and disconnects the machinery or equipment from its energy source(s) before performing service or maintenance and that the authorized employee(s) either lock or tag the energy-isolating device(s) to prevent the release of hazardous energy and take steps to verify that the energy has been isolated effectively." (OSHA Web site 11/04)*

**"Tagout device: A prominent warning device, such as a tag and a means of attachment, which can be securely fastened to an energy isolating device." 29CFR1910.146(b)def**

**"Durability... tagout devices shall be capable of withstanding the environment to which they are exposed..." 29CFR1910.147(c)(5)(ii)(A)**

**"Tagout devices shall warn of hazardous conditions..."29CFR1910.147(c)(5)(D)(iii)**

### **III) Brief Description of Permit Required Confined Space and Warnings**

**"Permit Required Confined Spaces"** *Many workplaces contain spaces that are considered "confined" because their configurations hinder the activities of any employees who must enter, work in, and exit them. For example, employees who work in process vessels generally must squeeze in and out through narrow openings and perform their tasks while cramped or contorted. OSHA uses the term "confined space" to describe such spaces. In addition, there are many instances where employees who work in confined spaces face increased risk of exposure to serious hazards. In some cases, confinement itself poses entrapment hazards. In other cases, confined space work keeps employees closer to hazards, such as asphyxiating atmospheres or the moving parts of machinery. OSHA uses the term "permit-required confined space" (permit space) to describe those spaces that both meet the definition of "confined space" and pose health or safety hazards." (OSHA Web site 11/04)*

*"If the workplace contains permit spaces, the employer shall inform exposed employees by posting danger signs or by other equally effective means, of the existence and location of, and the danger posed by the permit spaces." 29CFR1910.146 (c)(2)*

*"The completed permit shall be made available to all authorized entrants by posting it at the entry portal or by any other equally effective means..." 29CFR1910.146 (e)(3)*

### **IV) Discussion based on OSHA Interpretations**

The Safety Hierarchy approach to safety has "warnings" as a lower level item, than physical safeguards. The OSHA standards for the Control of Hazardous Energy (Lockout/ Tagout) and Permit Required Confined Spaces, both rely heavily of procedural methods, including warning and warning-like written items. A review of the OSHA web sight indicates several dozen requests for interpretations of various aspects of these two standards. Both standards require posting of signage ("posting" as a confined space/ "tagging" as locked out) under certain conditions; but the details of this posting is subject to some vagary, and is one issue explored in the interpretations of OSHA.

#### **A) Custom & Practice and Tagout**



There are many situations where a mechanic is working on a vehicle with the engine running and an accompanying hazard may be present; would that mechanic need to lockout and tagout the equipment? In a May 20, 1991 OSHA interpretation ( P.K Clark, Directorate of Compliance Program to Mr. Raymond Halsdey, Colin Laboratories), certain adjustment maintenance on a truck with its engine running is considered to fall under the lockout/ tagout criteria. A strict interpretation of the requirements of that standard would suggest that the vehicle be "tagged out." Based on a cursory review of vehicle maintenance shops, it is not customary practice for vehicle mechanics to post lockout and tagout signage on vehicles.



Figure 1

Furnaces are sources of carbon monoxide (CO). To find a leak of CO it is important to have the furnace operating, as the exhaust flow, thermal cycling, and formation of the CO gas are all critical in the evaluation. It is impractical; to tagout many furnaces when checking for small leaks of CO gas, and technicians commonly run such tests wit the furnace operating..

Tagging out following OSHA guidelines is not always performed and is not always possible for all maintenance tasks, and for some operations the custom and practice is in conflict with the tagout notion.

## B) Alternative Methods/ Considerations

Do all confined spaces need to have a posting at all times that they are confined spaces? Every manhole found in a street can be expected to lead to a confined space, most of which are likely to be Permit Required Confined Spaces (PRCS). It would be most rare to see such manholes posted as confined spaces. In an OSHA Interpretation dated March 13, 1998 from J. Miles, Directorate of Compliance Program, to Mr. J. Mc Daniel it is stated that "signs would be the principal method of warning under the standard." but that there are alternative methods. These "alternatives" include training and other communications.

Similarly, the telecommunications industry has one of the largest collection of confined spaces and subterranean vaults. This industry is not bound by the labeling criteria suggested in 29CFR1910.146 and an inspection of many telecommunications facilities shows that PRCS labeling is not the most common means of addressing this problem, but training is the common mode of safeguarding.

<table border="1" style="width: 80%; margin: auto; border-collapse: collapse;"> <tr> <td style="padding: 5px;">DANGER</td> <td style="padding: 5px;">This lock belongs to:</td> </tr> <tr> <td style="padding: 5px;">EQUIPMENT</td> <td style="padding: 5px;">NAME: _____</td> </tr> <tr> <td style="padding: 5px;">LOCKED OUT</td> <td style="padding: 5px;">DEPT: _____</td> </tr> </table>	DANGER	This lock belongs to:	EQUIPMENT	NAME: _____	LOCKED OUT	DEPT: _____
DANGER	This lock belongs to:					
EQUIPMENT	NAME: _____					
LOCKED OUT	DEPT: _____					
<p><b>Question:</b> Do labels, which are usually white in background meet the requirement for the locks to be unique by size, shape or color?</p> <p><b>Reply:</b> Color is not the only prescribed factor for the standardization of lockout and tagout (LOTO) devices. At a minimum, a lock's shape, or size or color must provide employees with the capability to identify and distinguish a lockout device from other similar devices (e.g., security locks) in the workplace.</p>						

Figure 2

## C) Appearance of Postings/ Signage

There are several American National Standards Institute (ANSI) standards that address the design and configuration of tags and signs ( e.g. ANSI Z353 Series). OSHA can adopt this criteria under their General Duty clause 5(a), where there is no existing OSHA standard for a tag or signage. In the August 30, 2002 OSHA Interpretation from Mr. Richard Fairfax, Directorate of Enforcement Programs, to Mr. Mr. R. Austin, there is a discussion of the appearance and form of a lockout tag. In that communication

there is a rather bland tag offered for review as to its adequacy. The OSHA representative could not specifically accept or reject the tag, indicating other considerations were needed to make the decision. In essence, lockout tags should be:

*"standardized within the facility tin at least one of the following criteria: color, shape; or size..."*

## **V) Conclusions/ Closure**

Procedures and practices are becoming more important in improving safety standards.

Some safety procedures and practices rely more on people, and less on devices; are more difficult to codify because of local conditions; and are more subject to interpretation and discussion.

OSHA does offer written guidance on many of these items through their "Interpretations" available in the public domain. Consultation of these materials helps to define the problems and concerns for implementation of such codes and standards.