Lockout/Tagout (LOTO):
Automating the process

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1. The traditional LOTO process

The primary purpose of LOTO activities is to prevent accidents, save lives and protect equipment from extensive damage. The most important requirement for any overhaul and maintenance operation is the safety of the workers. This is the reason why there are outage planners and OSHA regulations for locking and tagging procedures. These procedures, accompanied by compliance regulations, are common place for many companies and dealt with on a daily basis. This could cause these life saving activities to be viewed as routine. Thus, they may not be receiving the constant attention that they deserve.

In many ways 'routine' is a good word. It implies regular practice and performance. However, it also has negative connotations such as ordinary, mundane and unchanging. It is this second perception that needs to be eliminated. Why? Well, what if a tag position was viewed in a performer's mind as mundane? Or a worker viewed a safety procedure as a burden? Would this encourage a safe working environment? More importantly, would your work force safety ever improve?

When something is viewed as a routine, it is often difficult to improve the process. Routine suggests an already established course, whereas improvement changes direction. In terms of safety, a change in direction may raise warning flags in your mind, which is a good thing. If a process is working, you are inclined to keep it that way. But, what if there were a better way? What if potential errors could be prevented? What if accidents could be eliminated? What if lives could be saved? Wouldn't these possibilities at least warrant further consideration? To find a better way, let us first look at what is typically considered the 'routine'.

To start with, we will look at the overhaul, repairs or maintenance work. This work emerges in the form of work orders generated for the operations and maintenance department. This may come directly from a Computerized Maintenance Management System (CMMS). Whether planned or not, if this work requires locking and tagging of equipment, it will eventually need to transfer to a boundary planner or someone in operations. Here is where the safety aspects of the work begin. First, isolation boundaries are created. These will need approval. The next step is performance. Tags are printed and hung in the field and then independently verified. Once work is authorized, the maintenance department takes it over as approved work that is ready to be performed. Workers then sign on and off of work packages, perhaps at a specific physical location like a tagging desk, as the work is completed. Finally, at the conclusion of this work, tags are cleared and normal operations resume.

This entire process requires many information transactions. These transactions come in the form of paperwork, electronic data or a combination of both. Proper management and distribution of this information is what keeps your plant workers safe. While the traditional LOTO process is effective, there is a way to make this entire effort better, quicker and ensure that your equipment and workers are even safer by completely 'automating the process'.

2. Why automate?

At the dawn of the industrial revolution, automation was considered an ideal. Simply put, machines would make life easier. At the start of the digital age, many were still idealistic about technology. Now things have changed. People have begun to realize a danger in automation. Computers are viewed as unreliable at times. Software may have bugs. So the question then is: why automate?

Most people recognize time savings in accomplishing complex tasks as the real advantage in 'automation'. Automation implies taking a complicated labor intensive manual process and making it more efficient and effective. However, for LOTO, the question is not merely 'will it save time' or 'will it save money'? The real question is: can software make the process safer? There are lives at stake; there is no room for 'bugs' or 'technical difficulties'. The good news is the answer to these questions is "yes".

Before discussing the many benefits of automating the LOTO process, you must ask yourself an important question: is automating LOTO right for me? There are several issues to consider when answering this question. We'll address three important areas for consideration:

- Technical aspects
- Financial feasibility
- Process improvement

2.1 Technical aspects

To automate the LOTO process, finding the right software solution is obviously the key to your success. However, the first software that you should consider is not the LOTO software that you're interested in, but rather the software that is already in place at your facility. The primary applications to consider are CMMS or an EAM as they are extensively used for work control.

So, do you have a CMMS or EAM? This question greatly affects the direction you should take. If your answer is 'no' you should ask yourself 'why not'? Many of the issues that prevent you from having such an application will be the same issues you'll face with LOTO software.

One common area of concern is your IT Infrastructure. A lack of personnel may have prevented a CMMS solution from being implemented. While a LOTO application will likely take less support, IT support may continue to be an area of concern.

Similarly, infrastructure integration plays a major role in any software purchase. Details from platforms and operating systems to network and hardware requirements all have to be considered. This level of infrastructure integration can be labor intensive for many organizations. Is that the case with yours? Data migration and entry are also involved. No safety application is simply 'plug and play'. What kind of commitment of technical resources is your company willing to make?

Of course LOTO applications can be, and are, implemented without work control software. Most operate in an independent manner by providing their own equipment and/or device records and personnel records for locking and tagging activities. Even without CMMS or EAM integration, automating LOTO brings many benefits. However, the benefits are significantly increased when these applications work together.

If you have a CMMS or EAM application in place, an automated LOTO system will work for you much more effectively. Now the question becomes one of integration. Integrating these two applications can reduce your workload significantly. As an example, the LOTO system can automatically create isolation boundaries to protect workers conducting preventative maintenance activities and get the necessary tagout procedures ready for approval or waiting to be performed. For some companies, this is not just something that they would like to have happen, it really happens. Those companies had to make an investment for that level of integration to be possible. How much is your company willing to invest? This directly affects how tightly integrated your applications will be. Then, consider the additional support required for such integration.

2.2 Financial feasibility

When analyzing the financial feasibility, you will be asked to compute your return on investment (ROI). Fortunately, LOTO applications have great payback potential. These applications can greatly reduce the amount of time planning and performing safety activities, thereby reducing the overall time to complete the work. In some cases, a payback can be achieved in a single overhaul or outage.

Costs associated with software are specific to each installation. Software companies also have their own pricing structures. There are a few common things though that will help you get a relatively accurate estimate.

First, attempt to identify the number of users of this application. Primarily, focus on planners, approvers and the plant operating personnel who will be assigned the tagging responsibilities. Once you have a rough estimate, you may want to evaluate how many of these users will use the product concurrently as this is a common licensing arrangement.

Another consideration is data migration. If you're replacing an older application, you may want to leverage your data. Knowing the amount of rows and columns will help to determine the cost. We previously spoke about integration from a technical viewpoint, but now we'll briefly focus on the cost. The more integrated your application will likely mean the more money it will cost. This could also affect the amount you pay for your support or maintenance agreement on one or both of the applications. And of course, the more integrated your application, the more benefits your users will derive from it.

The amount of time spent on implementation of the software is another financial consideration. Implementation includes: project management, configuring the solution, installation, testing and training, among other things. Experienced LOTO software providers can help you estimate the amount of time your particular implementation will take.

2.3 Process improvement

This is the most important area of concern. While there are universal regulations dealing with LOTO, companies may handle these in drastically different manners. Software applications are no different. There will likely be some flexibility in almost any solution, but you will eventually run into a feature or process that will be new to you. Change is not always bad. Implementing changes can be a challenge though.

Commitment to a process is absolutely critical. So before you decide on which application, you should first secure commitments from all your groups. Does your company see the need for a change? Are your planners and operations personnel prepared to support a software solution even if it means drastically changing their current process? Total buy-in is unrealistic, but a general sense of commitment is not.

3. Benefits

We will discuss the benefits of automating LOTO from two perspectives:

- Business benefits
- Financial benefits

3.1 Business benefits

The business benefits of LOTO do not need to be explained. They are obvious. Instead we will turn our attention to the business benefits of automating this important process. We will begin by answering this question: how can LOTO software make your equipment and workers safer?

The first advantage is gained by reducing human errors. Take as an example a lengthy 'hang' procedure. Analyzing these procedures takes concerted effort. An error can easily slip in, whether it be a conflicting tag position, an unnecessary or incorrect isolation boundary or otherwise. However, with a LOTO software solution, these analyses and conflict checks take place in seconds. Also, a well designed application will not permit invalid component configurations or procedures to clear tags that are still protecting workers.

Another important benefit is the way a LOTO application manages 'scope creep'. This terminology refers to the tendency for the scope of work to change or increase as work is being completed. CMMS or EAM software applications may even highlight this as a flexibility feature, allowing additional work to be assigned to open or active work orders. In a LOTO restrictive environment, this could be a dangerous feature and at the very least cause anxieties for your planners.

Maintenance applications may also allow you to employ business rules that would prevent the alteration of work orders after approval, based on some specified field such as work order 'type'. However, an automated LOTO solution takes it to the next logical level. When emerging work arrives in the CMMS or EAM, the LOTO application can signal to your planners the need to alter your isolation boundaries or assign additional boundaries to a tagout. Based on the equipment associated to this emerging work, additional boundaries could be automatically derived and processed according to your work flow. A complete boundary change process can also be initiated with active workers in the field. A well designed automated LOTO system removes the human error from these technical processes, making your workers the safest they can be.

3.2 Financial benefits

The financial benefits of automating LOTO come in the form of faster and safer planning and more efficient performance of work, resulting in reduced equipment downtime. One feature that highlights this is the shared tag concept. Sharing tags means that only one tag is hung on a device or piece of equipment with multiple work orders sharing it. These work orders may have been associated to each other in the initial tagout or they may have come along later and required that same isolation point.

There are many benefits associated to this one feature. For example there will be fewer tags, therefore less money spent on tags. This feature will also directly affect the time spent locking and tagging and in clearing those locks and tags. As a result, your workers will be safer since there will be fewer opportunities to get hurt while performing these activities in potentially high risk areas. Secondly, with fewer trips into the field for hanging, clearing and sometimes independently verifying locks or tags, there will be fewer man hours spent on these activities, thus providing a significant cost savings. With manual processes, these benefits are virtually impossible to achieve.

4. Choosing the 'right' LOTO software

Comparing LOTO software solutions is not an easy task. So instead of looking for the 'right' software, focus on the one that is 'right for you'. Here are a few examples of functionality that you should look for in an Automated LOTO solution:

Shared tags
This feature significantly reduces your workload and simplifies a complex procedure. A LOTO application that provides this feature will help you reach your ROI in a much faster time.

Seamless CMMS integration
LOTO applications with this feature will allow your work to be performed faster and safer by being directly linked with work orders. It is not uncommon for a LOTO application to claim integration with a variety of CMMS applications. However, there are many different levels of integration. Their integration may simply reference a work order number to a tag. So look to establish what level or integration you're trying to achieve. Does your integration include identifying isolation boundaries on individual pieces of equipment? Do you want your LOTO software to cross reference tags not only to work orders, but down to their individual steps and each worker signed into that step? There are LOTO applications that can do this. This type of functionality makes the most of a CMMS to LOTO application integration

Ease of use
Software that is easy to use will result in faster training, implementation and deployment. LOTO software that is easy to use incorporates visual cues to communicate to the end user the tag type, the position it is in and the results from conflict checks. During the planning process, the application should identify the areas in which conflicts are occurring. It should also communicate these in plain language so that the planner can easily correct the problem.

Comprehensive safety
The application should emphasize safety at every level of LOTO activities. Electronic sign-on and electronic sign-off functionality will tell the control room personnel which worker has signed on or off of protected work and record when it happened. When isolation procedures are performed, the application will allow them to be immediately documented for maximum communication and safety.

Selecting the solution that is 'right' for you will prevent accidents, save lives and protect equipment from extensive damage. It will also save you time and money. So, when you choose to automate LOTO, carefully evaluate your choice. Then your organization will begin to benefit from automating the complex LOTO processes.

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