

Process Safety Forum

Knowledge Exchange Note #009 – Issued on 11th June 2026

Lock Out / Tag Out / Try Out - Energy isolation (LOTOTO)

This knowledge exchange note is shared in order to promote learning and improve safety. You should seek appropriate guidance regarding the relevance, accuracy, and completeness of this alert to your circumstances prior to implementation.

Theme

Assets - Plant & Equipment, Work control & permits, Management Systems

Making plant & equipment safe to maintain, including mobile plant.

Summary of Issue

Maintenance of powered plant and equipment has inherent dangers for workers from energy sources that provide often unseen risks. There is a long list of types of energy including, electrical, hydraulic, pneumatic, gravitational, springs, magnets, thermal, potential/stored, rotational and others, even radiation.

An effective safe system of work must always include all energy isolation considerations both prior to commencing, and completion of maintenance. In particular, the step to restore energy must include a Try Out process to ensure that the maintenance has been successfully completed and, after a final temporary operational check, can be restored to full operation.

Description

It is inevitable that powered plant and equipment (“equipment”) will need to be maintained from time to time involving workers being placed at risk of injury and therefore needs to be very carefully considered. Such maintenance work must have a safety process to carry it out, and an intrinsic part of that must be an energy isolation safety process. The more complex the equipment, the more complex will be the procedures to be carried out, and yet the steps are the same for simple and complex situations.

1. Preparations / Notifications
2. Switch Off / Shutdown
3. Isolations / Making Safe
4. Lock Out and Tag Out
5. Zero Energy State (Performing Maintenance Tasks)
6. Preparations / Notifications for Try Out
7. Remove Locks and Tags only to enable Try Out and replace afterwards
8. Inspect / Re-do tasks and repeat Try Out if required
9. Restore to Operation status / Final Removals of Locks and Tags

LOTOTO processes require comprehensive and regularly audited documentation and management of change procedures associated with them. For example, should a maintenance task involve a change of the source of a power supply to a piece of equipment, the relabelling of the equipment must be accompanied by updating of all LOTOTO procedures and all controls associated with that piece of equipment, with the new information.

During LOTOTO processes, it is strongly advised to have more than one competent person to, fully independently, check and confirm each step of the process. It is not adequate for a second person to observe the first person making their checks. For more complex equipment, a third person check requirement should be considered.

LOTOTO supervision competency should require individual training, recording and auditing to ensure full understanding of the equipment and energy sources to be isolated, prior to being given permission to supervise LOTOTO. Mentoring by experienced supervisors is strongly advised to gain the benefits of their knowledge and trainees should be encouraged to challenge the processes.

Where any physical restraints, such as a wedge, chains or a restraining frame, are required to address sprung, gravitational or similar energy sources, these must also have a locking mechanism to ensure that they cannot be unintentionally dislodged or readily removed and are a part of the LOTOTO process.

Communication is a critical aspect of LOTOTO to ensure, for example, that the control room personnel and the maintenance workers have agreed the means of communication, as well as the persons responsible for the communications. Additional considerations are to try out the communication processes, including agreed wording, prior to the work, and an agreed 'fail to safe' approach for energy risks when communications are not totally clear. A secondary means of communication should also be agreed and in what situations it should be used.

Special considerations

Some sensors on plant and equipment can contain radiation sources which will need specific actions. Stored energy in equipment that has malfunctioned must be considered as an additional concern requiring a planned and controlled release.

Key Learnings

1. The Try Out step of the LOTOTO procedure carries the equivalent, if not more risk, than the Lock Out and Tag Out steps. Restarting equipment after maintenance may be impacted by acts or omissions in the maintenance work.
2. Equipment/controls labelling and procedure documentation are critically important to the protection provided by the LOTOTO process and regular auditing of labels, as well as procedures and worker / supervisor training, should be mandatory.
3. Management of change for all equipment, and the associated LOTOTO procedures and labelling, are key concerns for ongoing review and audit.
4. Independent secondary checks and supervision of LOTOTO processes should be a basic requirement for all equipment. For more complex equipment, tertiary-level independent checks should also be considered.
5. Communications systems should be checked in advance as part of the LOTOTO process. Clear and consistent communication is essential between all those involved in LOTOTO, particularly, for example, in noisy environments where pre-agreed visual signals may be more appropriate.

The Process Safety Forum has been set up to provide an industry association platform whereby initiatives, best practice, lessons from incidents and process safety strategy can be distilled and shared across sectors, to influence our stakeholders (including the Regulators), and to drive the process safety management agenda. The Process Safety Forum consists of representatives from across industry, refer to the website for details

The website is www.p-s-f2.org.uk.