HSE SIMPLIFIED

Integrating HSE and maintenance into an enterprise asset management (EAM) system is the key to assured compliance, says Ultimo's Chris van den Belt

> **AMONGST THE** largest and most infamous industrial accidents in history is the 1984 Bhopal disaster in India. A runaway reaction in a tank containing methyl isocyanate vented lethal quantities of this poisonous chemical into the atmosphere. Death toll estimates range from 3,700 to 16,000.

On a smaller scale, deaths and injuries caused by storage tank explosions continue to this day. Examples from the last two years alone include those from liquid solvent tanks at a waste incineration site in Germany, a chemical tank at a wastewater treatment plant in the UK, a crude oil tank at a terminal in the US, fuel tanks at a refinery in Indonesia, and more.

As these examples demonstrate, managing health, safety and environment (HSE) in relation to storage tanks is complex. Workers handle substances which may be explosive, flammable, toxic, harmful to nature, or hazardous in other ways. To complicate things further, storage facilities must be managed and maintained in conjunction with a diversity of connected plant equipment.

Maintenance activities are vital to controlling risks, but at the same time, they expose workers to hazards, and if executed incorrectly, they generate further risks. Businesses need to comply with HSE legislation, such as the EU's Seveso III Directive, and most have community and employee care principles that go beyond the minimal legal requirements. Meanwhile, economic drivers to avoid accidents include potential repair, clear-up and compensation costs, productivity losses, fines and reputational damage.

CUTTING THROUGH THE COMPLEXITY

The first problem solved by an EAM system is that of maintaining a clear overview. Instead of using separate systems for information on the operation's assets, their maintenance and the related HSE processes, the EAM cloud platform brings everything together into one place. HSE and asset management become fully integrated and functionally linked in a system which signals the condition and status of assets in real time. Digitalisation and integration avoid duplication, reduce effort, increase efficiency and give a clearer picture.

WORK PERMITS AND LOCKOUT-TAGOUT

Crucially, the leading EAM systems not only set HSE processes and procedures but also enforce them, by permitting maintenance tasks to go ahead only when all the required safety steps have been taken. In other words, they ensure automatic and demonstrable compliance. Work permits issued in this way are central to the step-by-step functionality of Ultimo's environment, health and safety (EHS) software.

Via joint decision, it specifies the necessary safety measures and who will take them. Its digital administration begins with receipt of a job request (work order). Appropriate staff members prepare the work permit and digitally validate it at each stage to confirm its issue, extension (if necessary) and, finally, completion. Full details, including task risk analysis and lockout-tagout conditions, can be viewed at any time.

The system's lockout-tagout (LOTO) module prevents equipment from starting up unexpectedly during maintenance work. Locks are placed on parts of the plant – or processes – that need to be isolated for safety, along with tags identifying the person placing them. Only that person can authorise tag removal and unlocking.

Prior to issuing a work permit, the number and position of locks and tags is determined by those holding the
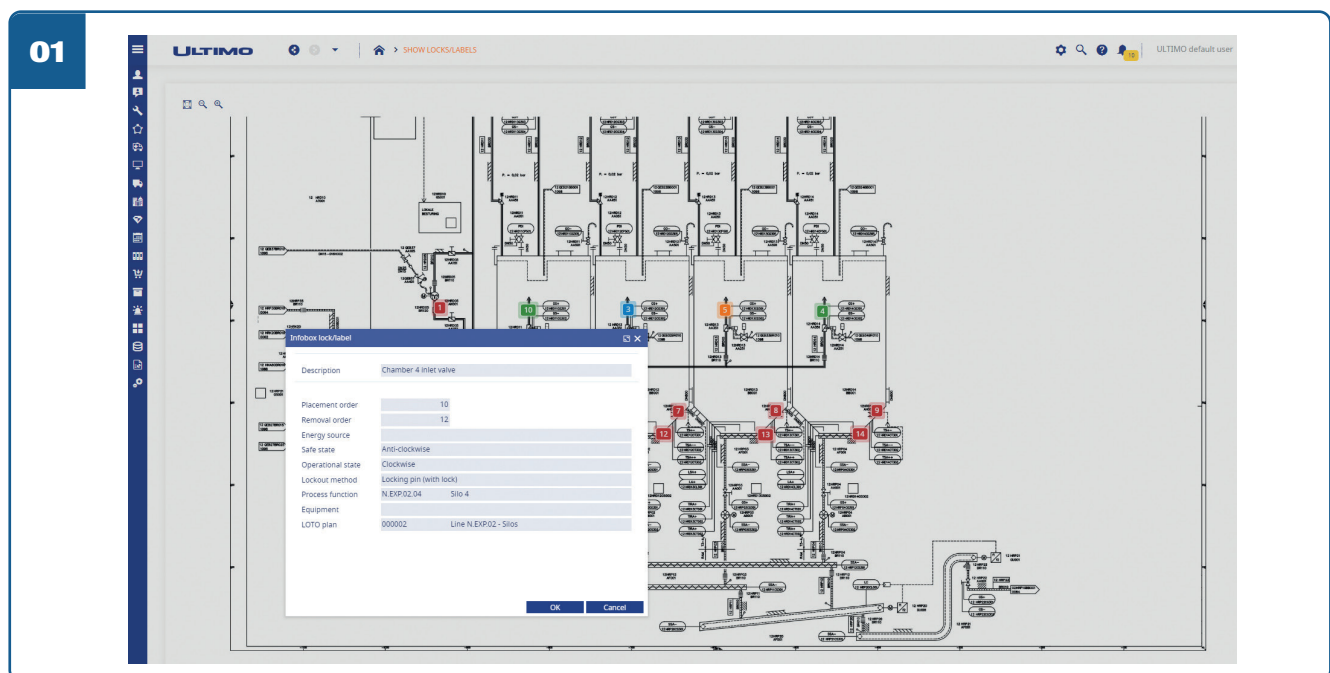
appropriate knowledge and responsibility. This may be aided by reference to digital templates and P&IDs (piping and instrument diagrams) on the system (See Figure 1). The work permit process ensures they stay in place until the work is finished.

MANAGEMENT OF CHANGE

While some maintenance-related activities are routine, others bring about changes to a plant's equipment or processes. Examples include fitting a new valve type instead of a like-for-like replacement or storing a different material. In Ultimo, these can be introduced safely using processes governed by the management of change (MoC) module.

Instigated by a request for modification, changes are managed from the earliest planning stage to completion. Like all Ultimo EHS software modules, MoC sets a structured process, aided by checklists and enforced by validation procedures. This module makes users consider, in advance, the change's potential consequences and how to reduce the associated risks. It also enables modification projects to be efficiently integrated with the existing flow, processing and management of maintenance jobs. After completing changes, the MoC process concludes by assessing whether the intended results have been achieved.

As well as ensuring safety, the MoC module saves hugely on time and complication compared to conventional paper-based practices. All relevant information, documents and records of communication are saved in one location, and assessments, signatures for approval and other actions can take place simultaneously.

INCIDENT MANAGEMENT

EAM can also play a key role in incident management and reporting. In Ultimo, this is managed through EHS incidents module. When an incident or near miss is reported, the designated safety officer is immediately alerted. By learning from the new event and any previous issues, the platform aims to reduce the number and impact of future incidents.

The safety officer first ensures full recording, processing and correct registration of the incident. EAM software minimises the number of steps needed, and with much of the background information already on the system it is easy to gather relevant details. An incident record is emailed to the reporter and supervisors and made accessible to authorised users, and immediate safety measures are documented.

After an initial risk analysis, the safety officer determines whether further examination is needed. The process investigates an incident's consequences and seeks both immediate and root causes. By connecting information on assets and their maintenance history with risk assessments and records of previous incidents, near misses and problem areas, the software readily enables trend and root cause analysis. Based on its results, new safety measures are defined and implemented, and follow-up work is planned. The process goes on to evaluate these measures, and assess any residual risk, before their final approval as a permanent safety solution.

For example, consider a sudden tank valve leak. After immediate safety measures to minimise its impacts, an incident report may recommend repair or like-for-like replacement of the valve. Alternatively, analysis may reveal a pattern suggesting that a different type of valve is needed. That would initiate the MoC process, which in turn might call for a task risk assessment and lockout-tagout procedure before a work permit could be issued for the new valve's installation.

DEMONSTRABLE CONTROL OF HSE

Utilising EAM to manage essential HSE practices can provide managers with a clear and accurate overview of the plant's safety processes and block unsafe practices. It can help contribute to better control over assets and the way they are managed, and, ultimately, give peace of mind that vital HSE processes are always taken care of.

For more information:

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01 Visual guide to location of locks and tags

CASE STUDY: OPTIMISING VTTI'S SAFETY WITH EAM

Antonis Constantinou, project manager at VTTI, explains how Ultimo's EAM works for his company.

VTTI is a leading provider of oil, chemical and gas storage, with 17 terminals strategically located in major logistics hubs across the globe. For many years, we have used internally developed software to manage the maintenance of our assets. As pacesetters in our field, we needed to extend our maintenance practices to match modern asset management strategies, therefore we switched to Ultimo's EAM platform in 2017.

The challenges of our industry's operating environment mean that having an effective EAM system is essential. We must be ready to variate our operational framework at a moment's notice in response to the commercial fluctuations in the markets, to meet our customers' changing requirements in a safe manner. A robust EAM system ensures that the terminals' assets are always available and reliable. What's more, it helps optimise operational efficiency through the monitoring of the condition of our assets throughout their lifecycle while ensuring that key health and safety processes are managed precisely and efficiently.

We use EAM to control our maintenance processes, including work permits and energy isolation. Managing these tasks in the EAM platform gives us complete control. Safety control measures cannot be bypassed without authorisation, and jobs cannot progress unless the safety requirements prescribed have been fulfilled. Having a digital log of every action taken simplifies incident investigation, reporting and lessons learnt. By linking technical data from our assets to the related information from the safety processes, we gain valuable insight into their performance in the context of operational safety. The digital records also help prove compliance to internal and external auditors.

The EAM platform is integral to how we operate, but it has taken a lot of work to get to where we are now. We have very specific requirements and have invested a lot of time developing the platform with Ultimo to ensure it offers all the features we need especially in the context of asset performance and monitoring, operational safety, work permits and energy isolation. The customisability of the software, and Ultimo's willingness to tailor it to our needs, was one of the main reasons we chose Ultimo over other EAM providers.