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# FACTS

European Agency for Safety and Health at Work

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## Safe maintenance in practice — Success factors Summary of an Agency report

### Introduction

Buildings and structures that are not maintained regularly eventually become unsafe not only for the people who work in them, but also for the general public. Machinery that is poorly maintained or not maintained regularly may make working conditions unsafe for operators and create risks for other workers. While maintenance is absolutely essential to ensure safe and healthy working conditions and prevent harm, the maintenance work itself is a high-risk activity.

It is the responsibility of each employer to protect their workers against possible work-related hazards. The report 'Safe maintenance in practice' shows that many European companies, insurers and authorities have developed innovative approaches to tackling hazards that arise from maintenance work. Based on the examples presented in the report, this factsheet summarises the success factors for the prevention of risks during maintenance operations.

### Key success factors in the prevention of risks during maintenance operations

#### *Management commitment and safety culture in the organisation*

Management commitment and safety culture are essential for safety and health at work in general and even more so during maintenance operations. Management commitment may be the single most important determinant of the safety culture of an organisation. It determines the resources (time, people, money) allocated to safety and health and produces higher levels of motivation for health and safety throughout the organisation.

#### *Involvement and participation of the employees*

Active employee participation in safety and health management is important to build ownership of safety at all levels and exploit the unique knowledge that employees have of their own work. Quite often they already know and can suggest practical ways of eliminating or mitigating risks.

#### *A well-conducted risk assessment*

Before starting any maintenance work, a risk assessment should be carried out. Workers should be involved in the initial risk assessment. They may need to conduct further assessments during the task.

#### *Preventive measures according to the prevention hierarchy*

Preventive measures can be identified and implemented according to the results of the risk assessment. It is important to apply the principle of the prevention hierarchy (elimination — substitution — engineering — administrative controls — use of personal protective equipment) at all times.

#### *Combination of preventive measures*

Preventive measures are more successful when used in combination. For example, conducting risk assessments and implementing safety procedures and safe systems of work should be backed up with behavioural safety initiatives, training and information.

#### *Safe work procedures and clear guidelines for maintenance work*

A well-defined workflow for each maintenance task needs to be prepared and safe work procedures must be clearly communicated and understood. Procedures need to be in place for unexpected events. Part of the safe system of work should be to stop work when faced with an unforeseen problem or a problem exceeding one's own competence.

#### *Effective and continuous communication*

All relevant information related to the maintenance operations should be shared between all parties concerned. This includes not only the workers directly involved in the maintenance task, but also those likely to be affected by it or who may be working in the immediate vicinity. Communication between maintenance and production staff, as well as between the different contractors involved, is crucial.

#### *Continuous improvement/development*

Safety and health performance during maintenance operations should be continuously evaluated and improved based on audits and inspections, the results of risk assessment, incident, accident and near-miss investigations and feedback from employees, contractors and OSH personnel.

#### *Safety training*

Workers performing maintenance tasks, including contractors, should be competent in their professional areas of responsibility. They should also receive safety and health training, and be informed about the hazards related to specific jobs and about safe working procedures. There is a legal obligation for employers to provide information and training on health and safety to all employees who need it, including temporary staff and contractors.

#### *Maintenance included in the comprehensive health and safety management system*

Maintenance tasks and their health and safety aspects should be an integral part of a company's comprehensive health and safety management system, including all the elements mentioned above. The safety management system should be continuously developed and improved.

## Prevention through design — eliminating hazards at the design stage

One of the best ways to prevent and control occupational risks related to maintenance is to address them early in the design process of buildings and structures, work environments, materials and plant (machinery and equipment).

The report 'Safe maintenance in practice' contains several examples of considering maintenance during the design phase.

In the example presented by the Polish National Research Institute (CIOP-PIB), a reeling machine was fitted with a stop mechanism that included an automatic hazard detection system to prevent any unexpected start-up of the machine during maintenance work. Considering future maintenance issues when the machine was being designed helped eliminate hazards and minimise the potential for injury while the machine was being serviced or repaired.

Another example presents the design of engine maintenance workshops of Air France Industries at Orly Airport using a simulation tool which helped identify safety, ergonomic or production issues at the design stage.

Together with TNO, NedTrain, a company based in the Netherlands, has conducted a pilot project to design a workshop for the maintenance of high-speed trains. Various stakeholders were involved and consulted. This inclusive approach has led to several innovations such as the introduction of an automatic lifting robot to prevent mechanics having to lift heavy loads, and several solutions to improve safety when working at height.



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## Good maintenance in the chemical industry

When maintaining installations and pipes that contain dangerous substances, the risk of coming into contact with them cannot be completely prevented by technical measures. Pockets of chemical residues can always be found in dead spaces. At the BASF site in Ludwigshafen, Germany, 225 production units are supplied with liquid and gaseous chemicals through more than 2 000 km of pipes.



© By courtesy of BASF Ludwigshafen

In order to prevent work accidents, BASF has introduced a number of safety measures including a well-defined work flow which covers every step of maintenance work from risk assessment (with a consignment note (*'Begleitschein'*) system) before starting the work, to remounting pipes at the end of the process. In addition, the management actively supports the training of its own employees and contract workers, and encourages a lively safety culture.

Since 2003, when the consignment note system was introduced, notifiable accidents during maintenance work caused by dangerous substances have been avoided. General accident numbers remain significantly below the chemical industry's average.

## Major overhaul of conventional thermal power station

Power stations require regular maintenance in order to run smoothly and efficiently. These maintenance operations are complex and may involve hazards for the workers. Electrabel in Belgium has developed a management system for major overhauls of its power plant in Langerlo, including well-established communication structures and integrating safety and health issues throughout the whole process. A major overhaul involves a large number of contractors, which presents an additional risk factor. Electrabel developed an operational procedure for working with contractors which covers the relevant health and safety regulations that contractors need to be aware of, and all the rules that apply specifically to the Langerlo site.

## Further information

The full report is available in English on the Agency's website at: <http://osha.europa.eu/en/publications/reports/TEWE10003ENC/view> where it can be downloaded free of charge.

This factsheet is available in all EU languages at: <http://osha.europa.eu/en/publications/factsheets>

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