



Safe maintenance – For employers Safe workers – Save money

What is 'maintenance'?

Maintenance includes all technical, administrative and managerial actions during the life cycle of an item — a workplace (building), work equipment or means of transport — intended to keep it in, or restore it to, a state in which it can perform the required function⁽¹⁾, protecting it from failure or decline. Maintenance activities include:

- inspection
- testing
- measurement
- replacement
- adjustment
- repair
- fault detection
- replacement of parts
- servicing.

There are two main types of maintenance:

- preventive (proactive) maintenance — carried out to keep something functional; usually planned and scheduled in accordance with the manufacturer's instructions;
- corrective (reactive) maintenance — repairing something to get it working again; an unscheduled, unplanned task, usually associated with greater hazards and risks than preventive maintenance.

Hazards and risks

Maintenance is conducted in all sectors and by almost all professions — it is not the exclusive domain of maintenance technicians and engineers. Hence, workers carrying out maintenance are exposed to a wide variety of hazards — chemical, physical, biological or psychosocial. They may be at risk of:

- developing musculoskeletal disorders, through working in awkward postures, sometimes also in unfavourable environmental conditions (e.g. cold);
- exposure to asbestos — while maintaining old buildings or industrial installations;
- asphyxiation in confined spaces;
- exposure to chemical agents (e.g. greases, solvents, corrosives);

⁽¹⁾ Association Française de Normalisation. Terminologie de la maintenance. Norme NF-EN 13306. X 60-319, AFNOR, Saint-Denis La Plaine, juin 2001.

- exposure to biological hazards — hepatitis A, legionella;
- exposure to dust, including carcinogenic wood dusts;
- accidents (all types, including falls through or off something, and being hit by a piece of machinery).

(For more information, see factsheet on 'Maintenance and OSH — A statistical picture'.)

Occupational safety and health aspects of maintenance

Maintenance is one of the workplace activities that can affect the health and safety not only of the workers directly involved in it, but of other workers and even members of the public, if safe work procedures are not followed and the work is not done properly.

Maintenance activities can cause harm to workers and others in three main ways:

- an accident/injury may occur during maintenance — for example, workers repairing a machine may be injured if the machine is switched on by mistake, if they are exposed to dangerous substances, or if they have to adopt awkward postures;
- poor-quality maintenance, for example, using the wrong parts for replacement or repair, may result in serious accidents;
- lack of maintenance may not only shorten the lifespan of equipment or buildings, but may also cause accidents — for example, unrepaired damage to the floor of a warehouse may cause a forklift accident, injuring worker/s, but also causing damage to the property.

Aspects to be considered

Considering the wide range of hazards and risks associated with maintenance, it may be necessary to include it in the comprehensive management system of the company. A thorough risk assessment has to be conducted, including all stages of the activity and all hazards. This is especially important for small and medium-sized enterprises, because they are more vulnerable to adverse effects of accidents.

Structured approach

The process of maintenance starts with the design and planning stage. Allocating sufficient time and resources for maintenance work, ensuring training and competence of the maintenance staff, putting in place safe systems of work based on an appropriate risk assessment, effective

communication between production and maintenance staff are key issues. Guidelines need to be followed and records kept. After maintenance operations are completed, special checks (inspections and tests) should be carried out to ensure that maintenance has been properly done and that the equipment or workplace is left in a safe condition for continued operation.

Systems of work

Maintenance may mean stopping a production process and may require workers to operate in unusual, hazardous locations (e.g. inside machinery and plant). Maintenance is often performed under time pressure – to restart an interrupted production process, or to complete scheduled work before a deadline. Maintenance workers may also have to work with machinery that does not have usual safeguards in place. There are many associated hazards and risks, as outlined above. Therefore, a system has to be in place, based on the risk assessment, to ensure that maintenance can be carried out safely, that the workers involved in an ongoing production process remain safe, and that equipment can be started up safely afterwards. A risk assessment record should be included in usually kept task documentation.

Training

The competence of the people carrying out maintenance, including inspection and testing, is vital to safety. Most workers carry out some maintenance tasks. Even though workers are frequently multi-skilled and routine maintenance may be part of their job description, activities that are not performed regularly have to be included in their training. Accidents may occur if workers try to do tasks they are not trained for or experienced in. **Employers must ensure that workers have the skills to carry out the necessary tasks, are informed about the hazards and safe work procedures and know what to do when a situation exceeds their skills.**

Procurement of equipment

Maintenance activities can require workers to operate in dangerous locations, as outlined above. This may involve the use of equipment that is not routinely used in the workplace, including personal protective equipment (PPE). Procurement procedures must be in place to ensure that the necessary tools and PPE (along with the necessary training and care of this equipment) are available for safe maintenance. For example, temporary lighting may need to be explosion protected, and appropriate PPE provided (e.g. respiratory protection for use when cleaning filters).

During the procurement of new machinery and buildings, ease of access for performing maintenance should be considered: **risks during maintenance can be minimised or even eliminated through good design of work**

equipment, availability of relevant tools and information from the supplier or manufacturer.

Subcontracting

Organisations are increasingly outsourcing their maintenance activities, which means that the procurement and management of contracts between companies has a strong impact on OSH. Maintenance carried out by a contractor has to be well integrated into the ongoing activities of the company to safeguard the safety and health of all workers involved. Good practice examples, where the needs of both contractor and host company are taken into consideration, include 'good neighbour schemes', 'safety passports' and induction procedures. **During the procurement process, in addition to competency and communication, the issues of cultural and language differences have to be considered**, in case of migrant workers, as well as issues resulting from the precarious employment of some sub-contractors.

Maintenance as a process

It is essential to consider maintenance as a process rather than a single task. The process starts with the **planning** phase, when a comprehensive risk assessment is carried out. The scope of work is decided upon and the required resources are identified (e.g. range of skills and number of workers and their roles, tools needed), as well as the hazards and precautions to be taken. It is advisable to involve the maintenance workers or their representatives in the planning process. **The work area needs to be secured and kept clean and safe** — power locked-off, moving parts of machinery secured, temporary ventilation installed, access and egress routes established, etc. **Appropriate tools** (including PPE) have to be made available. **Procedures** decided on in the planning stage **have to be followed** but provision must also be made for managing unexpected problems. Once the actual maintenance is finished, the work needs to be checked to make sure that the item worked on is safe to use again, all isolations removed, all tools retrieved and any waste removed.

The process should be documented and records of tasks performed, as well as the sign-off condition, should be verified and approved.

Maintenance activities can put workers at risk, but not carrying out maintenance may put more workers at risk. Employers who do not maintain work equipment properly or who ignore plant safety, particularly items critical for safety (e.g. guarding and cooling systems, alarms), risk catastrophic failure.

Further information

This factsheet has been produced to support the European 2010/11 campaign on Safe Maintenance. Other factsheets in the series and further information on this topic are available at <http://osha.europa.eu/topics/maintenance>. This resource is being continually developed and updated.

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