

SAFE MAINTENANCE: WORKING WITH CONTRACTORS AND SUBCONTRACTORS

1. Introduction

Outsourcing has been a strong trend in business for many years. A report and a fact sheet published by EU-OSHA in 2002 [1], [2] highlighted this development and concluded that ‘many companies now only carry out core functions in-house while ancillary functions have been outsourced. This results in chains of suppliers and subcontractors including:

- The client (or host company) = *the company that outsources* the task. The work is usually done at the client’s premises.
- The contractor (and workers) = the company that signs the *contract with the client* for providing services such as maintenance works.
- The subcontractor (and workers) = third company *contracted by the contractor*, for example for specialised or minor ancillary works.

Maintenance, corrective as well as preventive, is a typical ancillary activity that enterprises outsource by contracting external service providers. A survey conducted in France showed that maintenance is the most subcontracted function in the French industrial sector [3].

In European countries, between 10% and 20% of all work accidents and between 10% and 15% of all fatal work accidents can be attributed to maintenance operations [3].¹ Because maintenance is carried out in all workplaces, it involves many different risks. In addition the specific hazards of working with contractors in maintenance lead to an even higher risk of workplace accidents [4].

Subcontractors often have a higher rate of occupational accidents than in-plant staff [5], [1]. A study that examined the French work accidents database EPICEA identified 79 accidents in 2002 related to (sub)contracting and showed that (sub)contracted maintenance staff were the second most common group of victims of these accidents, just behind (sub)contracted construction workers [6].

2. Health and safety aspects of working with maintenance contractors

2.1. Hazards in maintenance work

Maintenance is a generic term for a variety of tasks carried out in all sectors and all kinds of working environments. Depending on the work environment and activity performed, maintenance workers are exposed to a variety of hazards and risk factors. These can include biological hazards (e.g. bacteria, mould and fungi in installations), chemical hazards (e.g. solvents, chemical residues, dust, asbestos), ergonomic hazards (e.g. working in awkward positions, heavy loads), physical hazards (e.g. heat, cold, vibration, noise, working at heights), hazards in plant and machinery (e.g. working in confined spaces, moving parts of machinery, electricity) and psycho-social risk factors (e.g. working alone, time pressure). Some of these risk factors affect the health of workers mainly in the long term (e.g.

¹ For the statistics, the following operations (ESAW methodology) were defined as ‘maintenance works’: setting up, preparation, installation, mounting, disassembling, dismantling, maintenance, repair, tuning, adjustment, mechanised or manual cleaning of working areas and machines, monitoring, inspection of manufacturing procedures, working areas, means of transport, equipment – with or without monitoring equipment.

musculoskeletal disorders, breathing problems, cancer), while others are the cause of work accidents (e.g. falls from height, burns, electrocution).

In addition, there are some hazards typical of maintenance work that can increase the risk of accidents and exposures especially in combination with the already mentioned hazards. Typical maintenance-related hazards are:

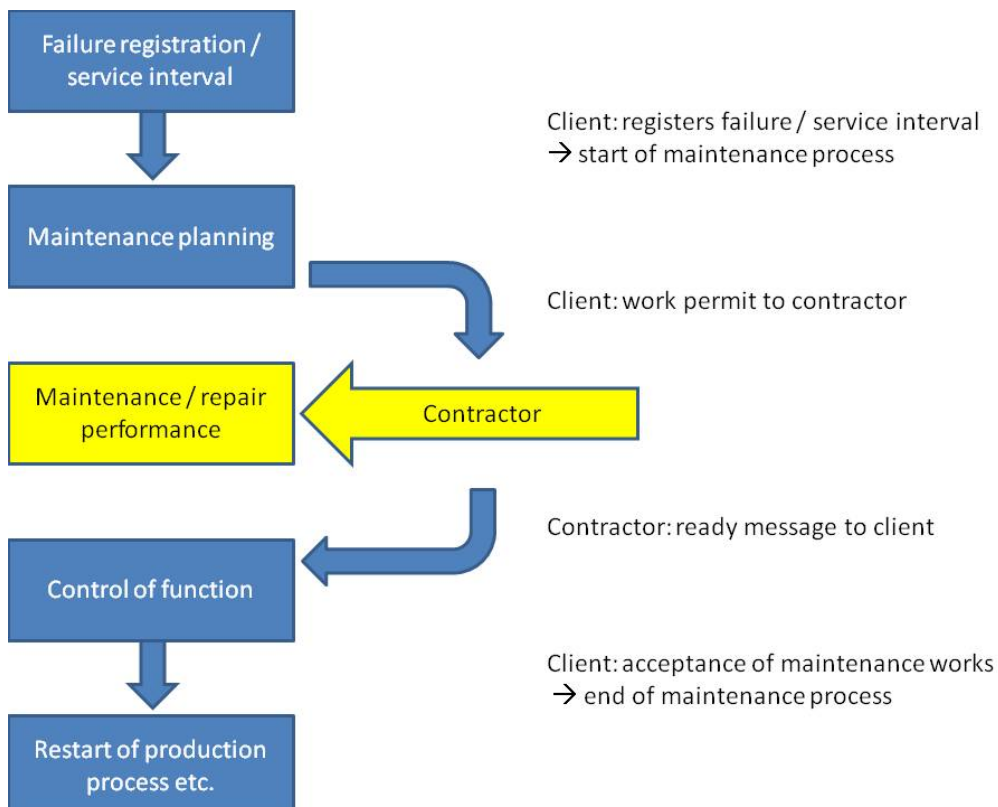
- *No or little routine:* Every maintenance situation can be a new situation for the worker. Preventive maintenance is performed at intervals (e.g. once a year), and corrective maintenance in case of unforeseen incidents.
- *Unknown environment:* As maintenance is not daily routine work the work environment or the setting where the maintenance takes place changes. This means new hazards may arise even if the maintenance work itself stays the same.
- *Time pressure:* This is a key issue for maintenance works. Often the production process comes to a halt and needs to be restarted as quickly as possible. This puts pressure on the maintenance workers to work quickly rather than safely.
- *Lack of communication between production and maintenance staff:* Maintenance often takes place while business goes on as usual. If production and other workers are not informed about the maintenance severe or even fatal accidents can result.

2.2. Specific hazards when working with (sub)contractors

There are specific risks associated with outsourcing maintenance.

Outsourcing represents a significant change to work organisation and employment arrangements and poses a challenge to occupational safety and health (OSH). The challenge is to include the external workers in the client's management processes. This affects quality management and safety management as well. The maintenance tasks carried out by the contractor(s) are embedded in preparation and follow-up tasks that are usually carried out by the client's workers.

Figure 1: Maintenance flow chart (adapted from [7])



The rupture in the process represents a challenge for both the external and the internal staff (see also [9]), including the following:

- *Unknown working environment and unknown hazards for contractors' workers* as they are new to the client's premises and have little time to become familiar with the situation.
- *Complexity in organisation of work, roles and responsibilities* as the contract workers belong to one organisation (the contractor's business) but work in the environment of another organisation (the client's business).
- *The presence of different actors - client and contractor, production and maintenance staff, several contractors, and chains of contractors and subcontractors* is a challenge for the coordination of the works and communication.
- The presence of contractors and the maintenance activities carried out by them may introduce *risks to workers already working permanently in the establishment*. For example, contractors might bring their own transport on-site or use equipment which might be a source of ignition, such as welding equipment.
- *Differences in safety culture*
- *A lack of understanding of safety rules and instructions*. Many external services operate across Europe and may employ migrant workers. Weak language skills can hinder communication between client and contract workers.
- *Unskilled workers* can be found more frequently in temporary employment or (sub)contracting.

Strong *competition among (sub)contractors* might lead to situations where the reduction of costs is obtained by the sacrifice of training, safety procedures, know-how, skills and equipment. Therefore the client should set quality standards as early as the procurement process. For more information on good practice in the procurement processes, see the E-Facts on Procurement of maintenance services and health and safety at work [8]

3. Legislation

The Framework Directive (89/391/EEC) lays down the obligation of the employers to cooperate in implementing the safety and health provisions and coordinate their actions in matters of the protection of workers and prevention of occupational risks, where several undertakings share a work place. and shall inform one another and their respective workers and/ or workers' representatives of these risks.

The Framework Directive also stipulates that the employer ensures that contractors and their workers engaged in work in his undertaking and/ or establishment receive adequate information and appropriate instructions concerning the safety and health risks and protective and preventive measures during their activities in his premises.

Council Directive 92/57/EEC of 24 June 1992 addresses the minimum safety and health requirements at temporary or mobile construction sites. Here the term 'temporary or mobile construction sites' refers to any construction site where building or civil engineering works are carried out, which may include repair and maintenance activities.

The Directive establishes that the client or the project supervisor must appoint one or more coordinators for safety and health matters for any construction site on which more than one contractor is present. For instance, during the project execution stage the coordinator must organise cooperation between employers, including successive employers and self-employed persons (or any person whose professional activity contributes to the completion of a project) on the same site, coordinating their activities with a view to protecting workers and preventing accidents and occupational health hazards.

These Directives have been transposed into the national legislation of the Member States. Employers that do not comply with the requirements can also be fined by the national authorities in accordance with national regulation.

4. Good practice

Good OSH management practice in maintenance, when followed, should reduce the likelihood of incidents and exposures and ensure compliance with health and safety standards. Although maintenance varies between industries, some basic principles should be taken into account when working with contractors:

1. Planning

The *client* is responsible for planning the maintenance works. To identify a contractor capable of undertaking the work and to allow potential contractors to make informed decisions it is necessary to define the work that has to be done. Issues to consider include time and resources, potential hazards and risks, communication, competence and training, and the impact on others in the workplace.

The location, access and egress requirements, storage, waste disposal and many other factors also need to be considered in the planning stage. An initial risk assessment can be completed and control measures and site rules can also be defined at this stage. Consideration should be given to the need for permits to work and similar procedures.

Choosing the contractor and cooperation in the planning stage

In addition to technical competence and relevant experience, compliance with safety standards, OSH training, and the provision of suitable equipment should be taken into account when choosing the contractor (See also E-Facts Procurement of maintenance services and health and safety at work [8]).

The contractor should be involved as early as possible in the planning. The client should:

- complete an adequate risk assessment in cooperation with the contractor;
- provide to the contractor all the necessary documentation, including documentation of the risk assessment and a document of the failure registry in cases of corrective maintenance;
- agree with the contractor on safe working practices and site rules;
- provide all the necessary information to the contractor about the site, required personal protective equipment (PPE), tools, emergency plans, etc;
- consider the impact of maintenance activities on others sharing the site and notify those that might be affected;
- nominate a supervisor who knows the premises, the plant and the processes. This supervisor should be responsible for communicating with contractor, informing or instructing him and supervising the works.

The use of subcontractors should be discussed and agreed upon during the procurement process, and ideally included in the contract. Generally subcontractors are managed by the principal contractor but the health and safety responsibility of the client remains the same.

Risk assessment

Preventive measures must be based on a workplace risk assessment performed before starting the maintenance works and both the client and contractor should be party to it [9], [10]:

- The client must carry out a risk assessment for maintenance activities in his own premises.
- The contractor must assess the risks to his own workers.
- Both parties must cooperate and exchange information on the effects of interaction between the workers and tasks of both parties and to assess the possible risks arising from such interaction.
- Both must agree on the risk assessment and also on the preventive measures that will be applied while the maintenance is in progress.
- Both must inform all workers who will be part of the process or who may be affected by the maintenance.
- The described duties also concern subcontractors who should be involved in the process of common risk assessment and also be part of the agreement.

2. Preparing the plant for maintenance

Roles and responsibilities in the client's company should be clear and the health and safety expert should be involved in the preparation of the works. As part of risk management, **the client needs to:**

- *prepare the plant or equipment to be maintained by implementing adequate safety measures* as indicated by the manufacturer and taking account of the results of the risk assessment. Lock-out procedures should be applied and the plant even shut down if necessary;
- *use permit to work system for high-risk jobs* (e.g. a 'hot works permit' for welding works).
- *special guidance can also be attached to the machines or installations* (see below the example of the consignment notes of BASF, which inform about special hazards or the colour guidance system of Electrabel which defines which part of the machinery needs to be maintained);
- *secure the work area to **prevent unauthorised access***, for example, by using **barriers** and **signs**;
- *inform his own workers about the maintenance works*, and notify others sharing the site that might be affected ;
- *provide a site induction* for anyone attending a site for the first time, so that everyone is aware of site rules and regulations, roles and responsibilities
- *make sure that the contractor and the workers understand the information.* (e.g. through workshops; see also the example of Electrabel below).
- *use a checklist* to ensure that none of the abovementioned points are forgotten, especially with regard to training and information.

Permits to work should be used for dangerous tasks (e.g. hot works permit, permit for welding works and work in confined spaces). The permit to work is a documented procedure that authorises certain workers to carry out specific work within a specified time frame. It is a way to control hazardous activities. It describes what work will be done and how, setting out the precautions required to complete the work safely, based on a risk assessment. A permit-to-work is a formal check to ensure that all the elements of a safe system of work are in place before starting the work [11].

The contractor has to cooperate with the client. In order to ensure the safety of his workers, **the contractor needs to:**

- *make sure that the information* about hazards and risks at work, the plant, the reason for maintenance, working environment, personal protective equipment (PPE), special tools, escape routes and emergency planning is complete;
- *verify the risk assessment* taking into consideration the work processes of the maintenance work before starting. *inform his own workers* of the results of the risk assessment and the measures to be taken. All the facts and information given by the client should also be passed on to the workers;
- *consider performing a last minute risk analysis (LMRA)* and provide proper training on it to the workers (See the example of SPIE, Belgium below)
- *provide appropriate training to his workers, including* health and safety training;
- *provide workers with adequate tools and PPE* needed to do the job safely;
- *countersign the checklist* given by the client to make sure that he has been informed thoroughly.

3. During the works

Contractors should be monitored and supervised when on-site. The agreed safe systems of work and site rules should be referred to when monitoring contractors. The level of supervision depends on the risks involved and on the impact the contractor's work could have on the health and safety of others, e.g. subcontractors, client's staff and members of the public. Monitoring and supervisory measures should be agreed before work starts.

During maintenance works, **the contractor and his workers** should:

- follow *safe systems of work* and site rules;
- use *appropriate tools and equipment*, including *personal protective equipment*;
- *inform the supervisor in cases of unforeseen incidents* instead of trying to save time by using shortcuts;
- keep the site clean and tidy, equipment, materials and working environment free of risks;
- maintain safe access and egress, including emergency access;

4. Acceptance of the works and reviewing on completion

When the works are completed, they have to be verified by the supervisor with a view to provisional or final acceptance in the presence of the contractor.

Verification of the works by the Supervisor with a view to provisional or final acceptance shall take place in the presence of the contractor.

When work has been completed and the contractors have left a review should be conducted. The purpose of the review is not only to evaluate the performance of the contractors but also to assess how unforeseen problems were dealt with. Reviews can be used for future reference when choosing a contractor.

Before re-starting the plant, the safety standards have to be re-established. The client should:

- *use clear procedures and assign responsibilities for the re-start* to ensure that the plant is not on-line before the acceptance is officially declared;
- *make sure that there is no risk to the workers (e.g. by carrying out another risk assessment)* before re-starting the plant.

5. Good practice examples from companies

5.1. Last Minute Risk Analysis, SPIE, Belgium

SPIE is a provider of electrical and mechanical engineering and HVAC (heating, ventilation and air conditioning) services, energy and communication systems. SPIE Belgium was awarded (with a partner company) a multi-year contract for mechanical maintenance works within the TOTAL refinery in the port of Antwerp.

A three-tier training system has been developed for the SPIE personnel involved on the TOTAL site. Beside the required VCA training SPIE personnel did receive the same training as the client personnel for risks that are specific to (parts of) the TOTAL plant. In 2009, training on 'last minute risk analysis' (LMRA) was given to all personnel. As part of this training, technicians were also taught to address colleagues on safety and risk issues.

Given that the local work environment may have changed between the moment of the work preparation and the actual maintenance intervention, it is essential to make the individual technicians as autonomous as possible on safety evaluation. To this effect personnel have been trained to take time to evaluate and react to previously undetected risk factors prior to starting any task [12].

5.2. The 'Safety Passport'

The Health, Safety and Environment Passport schemes ensure that workers of both client and (sub)contractors have basic health and safety awareness training. As they help the promotion of good practice, passports are a means of improving health and performance and reducing accidents and ill health caused by work. The passports are especially useful for workers and contractors who work in more than one industry or company. They are usually of credit card size with photograph and signature. Their features are [13]

- A passport shows that a worker has up-to-date basic health and safety (or health, safety and environment) awareness training. Some cover other subjects too.
- Passports are a means of controlling access to work sites – only workers with valid passports are allowed to work.
- A passport belongs to the worker not to the employer. Workers can hold more than one passport if they have been trained for work in more than one industry.
- They are a very simple means for workers who move from one industry to another, or work in more than one industry, to show employers that they have basic training.
- A passport is a starting point for a worker's further training for health, safety and environmental qualifications.

In Portugal the Safety Passport was introduced at the end of 2001, and currently there are approximately 40,000 passports in use. There are eight geographically distributed entities that provide the required training. Moreover, the use of passports has been promoted by more than ten of the largest Portuguese companies [14]. Similar schemes can also be found in other European countries, e.g. the United Kingdom, Finland.

5.3. Health and safety in the chemical industry

At the BASF site in Ludwigshafen, Germany, maintenance is dealt with by approximately 7,000 skilled workers: 4,000 of BASF's own employees and 3,000 contractors. In order to prevent accidents during maintenance work, BASF has introduced a bundle of safety measures for its own and (sub)contractors' workers, including:

- The Guideline for Safety, Health and Environment is the basis for maintenance works. It specifies that before any maintenance work is started a risk assessment has to be carried out, and it gives advice on how to do this and how to document it correctly.
- A special set of guidelines entitled 'Safety rules for skilled labour' describes the specific safety measures set out following the risk assessment. These guidelines help the workers to take appropriate precautions.
- Maintenance work does not begin until BASF's responsible supervisor declares that the preparatory safety measures are complete and countersigns the working permit. The supervisor also informs the workers about the results of the risk assessment, the working permit system and the required personal protective equipment.
- A 'consignment note' is attached to the components and pipes at all times. It gives an overview of the results of the risk assessment for a particular job and summarises the special risks that might be involved. It specifically states which dangerous substance – and how much of it – might be in the installation, and how it should be dealt with.
- To ensure that contracting companies have all relevant information about internal safety culture and standards, BASF sets out safety, health and environment (SHE) quality standards in its contracts [15].

5.4. Health and safety management in building maintenance

Romec employs approximately 5,000 workers across the UK. Most of them are involved in building maintenance, looking after services such as power supply, lighting, heating, air-conditioning, ventilation and water supply and drainage. Many employees may encounter materials or situations that pose risks to their health and safety (e.g. asbestos, use of step-ladders, etc.).

Romec has therefore implemented a health and safety management system that can continually be updated and revised in the light of new risks or practices. Robust safety procedures, safe systems of work and risk assessments have been implemented throughout the business. These procedures have been backed up by behavioural safety initiatives designed to create a working environment where safety is easy to understand and becomes second nature. Emphasis has been placed on providing

training and maintaining communication with all employees, and on ensuring that subcontractors work to the same standards [15].

5.5. Health and safety management in major overhauls of plants

Electrabel in Belgium has developed a management system for major overhauls of the power plant. It includes 700 contractors who are engaged in the overhaul process. During the preparation phase, three consecutive meetings are organised. These meetings involve the OSH management of the client and also single workers of the contractors. They ensure that:

- the housekeeping rules of the plant are explained to the contractors;
- information is given about the overhaul and the expected work and tasks ;
- the contractors respect standards of working safely;
- the contractors provide their workers with all tools and materials needed to perform the job efficiently and safely;
- the contractors respect 'hold and witness points' – situations in which the contractor must stop working immediately;
- the contractor and the workers are informed about special hazards and risks of the different maintenance tasks.

Documentation and agreements help in remembering relevant information. When the contractor finally starts the work, he has to collect the relevant working permit sheet which certifies that the area of the workstation is safe. This is further confirmed by a green card attached to the workstation in the relevant area. The green card is a signal for all workers that maintenance is being done in that specific workstation. Machines in the area that are not part of the task are tagged with a red danger card [15].

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7. Additional information and further resources

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