

SAFE MAINTENANCE – ASBESTOS IN BUILDING MAINTENANCE

Introduction to maintenance

Maintenance can be defined as working on something to keep it in a functioning and safe state and preserving it from failure or decline. The “something” could be a workplace, work equipment, or means of transport (e.g. a ship).

- 🔍 Preventive – or proactive – maintenance is carried out to keep something functional. This type of activity is usually planned and scheduled.
- 🔍 Corrective – or reactive – maintenance is repairing something to get it working again. This is an unscheduled, unplanned task, usually associated with greater hazards and higher risk levels.

Maintenance is not the exclusive domain of fitters and mechanics. It is the responsibility of almost all workers in every sector and is carried out in almost every working environment.

Workers' health and safety can be affected during the maintenance process, but also by lack of maintenance or inadequate maintenance. Design of equipment and the work area also has a significant impact on the health and safety of workers performing maintenance.

Asbestos and maintenance

Asbestos is the collective name for several naturally occurring fibrous silicate minerals that can be separated into thin, durable threads. It was once widely used because of its properties: it is heat resistant, withstands acids and other chemicals, is a good insulator, has a high strength and can be woven. The main forms are:

- 🔍 chrysotile or white asbestos;
- 🔍 crocidolite or blue asbestos;
- 🔍 amosite, also known as grunerite or brown asbestos;
- 🔍 anthophyllite;
- 🔍 actinolite.

The first and to a lesser extent the second and the third have been the main commercially used varieties of asbestos.

The Nordic countries banned asbestos between 1970 and 1980. Germany followed in 1993. The European Union issued a relevant directive in 2005. However, asbestos is still present in many buildings and other structures. Building maintenance workers are at a high risk of coming into contact with the fibres when working on insulation in buildings and industrial installations such as pipes, roofs, walls etc. In both East and West Germany the use of asbestos reached its peak between 1965 and 1980. During that period asbestos-related diseases (which are often deadly) were below 100 cases per year. After that they rose sharply, to reach almost 1900 cases in 2000. [1]

This E-fact will help building maintenance companies and workers become more aware of the risks of asbestos, and develop the knowledge and skills to avoid exposure to the hazardous fibres.

A brief overview of the risks resulting from exposure to asbestos

Asbestos is a very friable material. Depending on the degree of binding of the asbestos into a product or material and on the degree of disturbance, microscopic asbestos fibres are released into the air in smaller or larger quantities. When these fibres are breathed in, they may get into the lungs and may remain there for many years because they are not soluble. Over time they may cause scarring and inflammation, which can affect breathing and – usually decades later – lead to serious health problems.

Depending on the type of the fibres and the level and duration of exposure these health problems can develop into:

- ☑ asbestosis, a chronic lung disease that can cause shortness of breath, coughing, and permanent lung damage;
- ☑ lung cancer;
- ☑ mesothelioma, a cancer of the thin membranes that line the chest and abdomen;
- ☑ to non-malignant pleural lesions, known as pleural plaques.

A smoker who inhales asbestos is 50 times more likely to develop lung cancer than a non-smoker who has not been exposed to asbestos. [2]

There is no known safe level of exposure to asbestos. The more you are exposed, the greater the risk of developing an asbestos-related disease. The time between exposure to asbestos and the first signs of disease can be as much as 30 years.[3]

At a conference on asbestos in 2003, initiated by the Senior Labour Inspectors' Committee (SLIC) of the EC, the likely total number of deaths annually across seven European countries (UK, Belgium, Germany, Switzerland, Norway, Poland, Estonia) from asbestos-related diseases was estimated at about 15,000. [4] Asbestos reached its maximum worldwide production level in the late 1970s and early 1980s. Asbestos-caused mesothelioma cases are expected to reach maximum levels about 40 years later in industrialised countries.[5]

It is vital for anyone who has been in contact with asbestos to check with an occupational health physician if any of the following symptoms develop:

- ☑ Shortness of breath, wheezing, or hoarseness;
- ☑ A persistent cough that gets worse over time;
- ☑ Blood in the sputum (fluid) coughed up from the lungs;
- ☑ Pain or tightness in the chest;
- ☑ Difficulty swallowing;
- ☑ Swelling of the neck or face;
- ☑ Loss of appetite;
- ☑ Weight loss;
- ☑ Fatigue or anaemia [6]

Areas of the building where asbestos may be found

Although the use of asbestos has been banned, millions of cubic metres of materials containing asbestos are still in place in existing buildings. Typically, these materials can be present in the following forms.

Bulk:

- Asbestos laggings and packing for heat insulation of boilers, pipes, electrical ducts, electrical water heaters, fire doors and partitions, industrial equipment;
- Sprayed asbestos on steel structures or on concrete slab soffits for building fire protection and noise insulation.



Source: CRAMIF

Sheets or boards:

- Asbestos millboard and paper for heat insulation (chimneys, ovens, gas or electric convector heaters, etc.), jointing and surface thermal protection;
- Boards for false ceilings or fire retardant facings, fire doors or dampers, light partitions.

Yarns or fabrics:

- Yarn, cord or rope, caulking and lagging material (lagging of boiler doors, heating pipework, engine exhausts, etc.);
- Fabric band for heat protection;
- Electrical insulating tape (electrical appliances and ductwork);
- Fire resistant, noise insulation or expansion joint seals on structures or in partitions.

Asbestos cement products:

- Flat or corrugated sheets, tiles, slates and other roofing panels;
- Window ledges, façade cladding sheets;
- Internal partition and false ceiling boards and panels;
- Other panels or construction shelves, permanent forms;
- Chimney flues, ventilation ducts, downpipes, rubbish chutes;
- Water supply and drainage pipes;
- Fire dampers and fire retardant panels;
- Planters and garden items.

Incorporated in various binders (resins, bitumen, etc.):

- ☒ Floor tiles (vinyl-asbestos), linoleum;
- ☒ Adhesives for various flooring materials;
- ☒ Mastics (glazing, etc.);
- ☒ Textured coatings and paints;
- ☒ Roof weatherproofing bituminous felts in rolls or sheets, roofing bituminous coverings, heat insulation coverings;
- ☒ Impervious, expansion joint, plumbing, engine, etc., seals;
- ☒ Levelling and finishing coats for floors and internal partitions, tiling adhesive mortars, adhesive and impervious coatings;
- ☒ Plaster-based coatings and mortars for fire protection;
- ☒ Friction materials (brake pads for lifts, motors and various machines);
- ☒ Resin-based electrical insulating components.

Materials containing asbestos can therefore be encountered anywhere in a building. Plumbers, pipe fitters, heating engineers, electricians, roofers, false ceiling installers, bricklayers, tilers, painters, plasterboard craftsmen, lift engineers, etc. can all breathe in asbestos dust during seemingly harmless operations.

A structured approach to maintenance

Planning: safety and health management, clear responsibilities

To ensure the safety and health of workers, employers have to provide the necessary organisation of work, appropriate equipment, safe systems of work, training, information, and supervision.

The employer or the authorised representative must ascertain whether any asbestos-containing material has to be handled during any envisaged work. If there are any doubts, they have to have samples analysed in a qualified laboratory.

The “Best Practice Guide” issued by SLIC also requires employers to:

- ☒ provide adequate training so that employees can recognise materials that may contain asbestos and understand what to do when and if they come across materials suspected to contain asbestos;
- ☒ obtain good and reliable information on the presence or absence of asbestos-containing materials, e.g. from building plans and/or the building architects (some Member States require the responsible person to produce an inventory of the asbestos-containing materials in a building);
- ☒ ensure that good records are kept of the materials which are confirmed as containing or not containing asbestos (either within your organisation or by the building owner);
- ☒ provide written information on the site regarding the presence of known asbestos-containing materials, including an asbestos inventory and warning signs where appropriate;
- ☒ provide written instructions on the procedures to follow if asbestos-containing materials are encountered unexpectedly.[7]

In cases where there are several contractors involved in the maintenance work a coordinator has to be appointed to ensure effective communication between all parties involved.

Risk Assessment

Before any work is done, a comprehensive risk assessment has to be carried out and preventive measures have to be established.

Any risk assessment process should:

- ➊ involve employees and worker representatives, including consulting them about the risks and prevention measures in the process and providing information on risk assessment results;
- ➋ take account of individual worker differences in general or generic risk assessments;
- ➌ look for the hazards (whether arising from work activities or from other factors, e.g. the layout of the premises);
- ➍ decide who might be harmed and how, and identify groups of workers who might be at greater risk;
- ➎ evaluate the extent of the risks involved;
- ➏ decide whether existing precautions are adequate or whether more control and preventive measures should be introduced;
- ➐ take action: plan the implementation, who does what and when;
- ➑ monitor and review the process;
- ➒ record the findings.

The risk assessment for maintenance work which possibly involves asbestos needs to be based on clear information on where asbestos is located and this may require a survey conducted by experts.

Subject to national regulations, asbestos-containing materials that are in a safe state (that is, in good repair or enclosed or encapsulated) may be left in place, provided that there is effective monitoring and management of the retained material. In some Member States regulations demand that asbestos-containing materials have to be removed where practicable.[8]

The hazards and the resulting risks should be assessed for the specific sites. Based on measurements under similar circumstances, the likely exposure of workers and others in the vicinity (occupants, other contractors) should be evaluated.



Source: B. Floret/INRS

These data should be used to prepare clear, written instructions for each job. The instructions have to detail the technical, organisational and personal protection measures, explain the communication channels, give clear guidelines for emergency cases and include sufficient information to enable possible exposure to be estimated.

Both the risk assessment and the instructions should be communicated to all workers involved. They should also be made easily available on the site for reference.

Notification and licences

Maintenance work involving asbestos has to be notified to the appropriate national authority. Provided that “the worker exposure is sporadic and of low intensity, and when it is clear from the results of the risk assessment that the exposure limit for asbestos will not be exceeded in the air of the work place”, a notification may not be necessary “where work involves:

- short, non-continuous maintenance activities in which only non-friable materials are handled;
- removal without deterioration of non-degraded materials in which the asbestos fibres are firmly linked in a matrix;
- encapsulation or sealing of asbestos-containing materials which are in good condition;
- air monitoring and control, and the collection of samples to ascertain whether a specific material contains asbestos.”[9]

In addition to notification, in some Member States (e.g. the UK, Germany) sub-contractors may need to obtain special licences for work involving asbestos.[10] [11] This relates mainly to asbestos removal and demolition.

Training

Before people start any work that could involve asbestos, they have to be trained to do so in a safe manner. In the course of their work there should be periodical – and recorded – assessments and refresher training. Additional training should be conducted if work procedures change.

The training should be organised and conducted by a specialised training provider. It should be given in a language that is easily understood by the workers. Records of the training courses should be kept.

Among several specifications the SLIC guide also stresses that the “training of asbestos removal workers must include practical sessions so that trainees learn how to use and maintain equipment that affects safety (enclosures, personal protective equipment, respiratory protective equipment, and personal decontamination, and dust suppression equipment and controlled removal equipment).”[12]

Employers or their authorised representatives and supervisors should receive special training covering:

- Relevant legislation, roles and responsibilities;
- Conducting a risk assessment and developing a plan of work (written site specific instructions);
- Work supervision;
- Inspections of equipment (e.g. decontamination unit, enclosure, suppression equipment, etc.);
- Disposal of asbestos or asbestos-containing material.

Apart from comprehensive general training workers should also be given task-specific instructions, particularly if they may encounter unusual features associated with a particular job. However, according to the Directive 2003/18/EC, workers and their representatives have to receive adequate information on all relevant issues, such as:

- ☑ The risks to health from exposure to dust from asbestos or materials containing asbestos;
- ☑ The statutory limit values and the need to monitor airborne asbestos;
- ☑ Hygiene requirements, including the need to refrain from smoking;
- ☑ The precautions to be taken as regards the wearing and use of protective equipment and clothing;
- ☑ Special precautions designed to minimise exposure to asbestos.

Using appropriate equipment

Appropriate equipment for the jobs has to be provided. There has to be adequate training and supervision to ensure that it is used correctly. It must be inspected and maintained regularly and related records have to be kept.

Depending on whether the risk assessment declares the work to pose a non-notifiable lower risk or a notifiable high risk, different ranges of equipment are necessary.

- ☑ Special power and hand tools that produce little dust and may have integrated extraction;
- ☑ Appropriate lighting;
- ☑ Emergency power systems (in case of notifiable high risk work);
- ☑ Materials to separate the work area (barriers, warning signs, etc.), enclosures, extraction-, negative pressure-, dust suppression- and water filtration-units (in case of notifiable high risk work);
- ☑ Emergency equipment (fire extinguishers etc.);
- ☑ Decontamination units including personal hygiene facilities (in case of notifiable high risk work);
- ☑ Systems and containers for cleaning and disposal;
- ☑ Measuring systems including smoke generators for leak identification (in case of notifiable high risk work);
- ☑ Personal protective equipment like overalls, boots, respirators, air fed breathing systems.



Source: B. Floret/INRS

Special care should be taken in selecting, wearing and servicing the respiratory protective equipment. The selection has not only to consider the nature of the job and the movements of the worker but also individual differences (shape of face, medical fitness). Guidance in selecting the proper equipment can be found in various national information brochures (see Resources at end of document) and in the SLIC guide.[4] In any instance where the equipment has to be used, it is the supervisors' responsibility to ensure that it is not only used but used correctly.

Monitoring

The employer not only has to guarantee proper on-site supervision but in the case of notifiable high-risk work also has to ensure that air sampling is carried out in order to prove compliance with all relevant regulations. According to the EU Asbestos Worker Protection Directive 83/477/EEC as last amended by Directive 2003/18/EC, air sampling has to be carried out by qualified personnel, and the samples have to be analysed in laboratories equipped for fibre counting.

The monitoring has to comprise:

- Background sampling, e.g. prior to work starting;
- Personal monitoring, to measure the concentration of fibres in the breathing zone. This also provides a basis for checking whether the protection factor of the personal respiratory protective equipment is adequate. The exposures have to be recorded and records kept for a minimum of 40 years;
- Environmental monitoring;
- Leak testing;
- Clearance monitoring.

The employer or his authorised representative has to act promptly on the monitoring results.

Medical surveillance

Employees whose work involves exposure to asbestos are required to undergo a medical examination before they start work. Subsequent examinations are necessary at least once every three years (or more frequently if required by national regulations), and thereafter for as long as exposure to asbestos continues.

The 2003 European conference on asbestos called upon the European Commission and the Senior Labour Inspectors Committee (SLIC) to promote continuing post-exposure medical surveillance. Some Member States (e.g. Germany) demand that follow-up medical examinations are offered after termination of employment as well.

For other employees with a risk of possible exposure to asbestos, an assessment has to be made whether medical surveillance is advisable or required (by national regulations), based on the risk assessment.

Diseases such as asbestosis, lung cancer or mesothelioma have to be reported in compliance with national regulations. It must be ensured that all workers can be readily identified in such records.

Guidelines

While there are different guidelines available, a good European-level overview is given by the Senior Labour Inspectors Committee, SLIC, in their guide.[4] Many Member States have also issued guidelines considering their national specialities (see Resources at end of document).

Examples of good practice guidelines

Based on practical experience the following guidelines have been developed by INRS and the French insurance funds to serve as a rule for companies of all sectors that have to deal with asbestos. Several enterprises are successfully applying these guidelines in their daily practice.



Source: B. Floret/INRS

▪ *Asbestos cement roof opening for an air exhaust duct*

While several solutions may be used, the most satisfactory involves removing the whole roofing sheet without breaking it and replacing it with a pre-drilled asbestos-free roofing sheet.

The asbestos cement sheet should be removed from inside the roof space if the construction configuration permits. This operating procedure has the advantage of avoiding the risk of a fall from a height (fall from or through roofing sheet) as well as allowing different roof structures to be cleaned.

For removing the asbestos cement roofing sheet:

- ☑ Provide safe high-level access equipment from inside roof space with its floor covered by plastic sheeting and from outside roof space;
- ☑ Prohibit and/or restrict access beneath the working area;
- ☑ Provide operator with a type 5 coverall with hood, gloves and a disposable filtering half-mask (EN 149 FFP3);
- ☑ Spray water containing a surfactant on the roofing sheet;
- ☑ Unscrew fixings or cut them with a hand-tool, whilst locally vacuuming the surfaces using a HEPA filter vacuum cleaner (H13 filter complying with standard EN 1822);
- ☑ Lift and remove the roofing sheet without breaking it and put it carefully into the wrapping provided for its disposal;
- ☑ Clean the structural members (beams, etc.), adjacent roofing sheets and the high-level access equipment using the HEPA filter vacuum cleaner, then wipe with a wet rag;
- ☑ Re-install a suitably dimensioned, pre-drilled asbestos-free roofing sheet;
- ☑ Put the plastic sheeting, rags, coverall, gloves and disposable half-mask into an asbestos waste bag.

▪ *If the asbestos cement roofing sheet needs to be cut:*

- ☑ Prohibit and/or restrict access beneath the working area;

- ☑ Provide operator with a type 5 coverall with hood, gloves and a disposable filtering half-mask (EN 149 FFP3);
- ☑ Ensure safe high-level access from both inside and outside roof space;
- ☑ Position a rigid plastic container supported by props and any other suitable system at the cutting location. Carefully fix and seal the container using adhesive tape or foam sealant. They are later to be put into the asbestos waste bag;
- ☑ Carefully moisten the external surface of the roofing sheet with water containing a surfactant and apply wallpaper adhesive to the cutting location;
- ☑ Cut the roofing sheet using a handsaw, whilst locally vacuuming the surfaces with a HEPA filter vacuum cleaner (H13 filter complying with standard EN 1822);
- ☑ Wipe the edges of the cut with a wet rag;
- ☑ Detach the container and put it in the asbestos waste bag. The bags have to be disposed of in special waste management plants as required by law;
- ☑ Put the rag, coverall, gloves and disposable half-mask into the asbestos waste bag.

▪ ***Replacing a fluorescent tube in a lighting unit fixed to a wall covered with sprayed asbestos***

- ☑ Provide operator with a type 5 coverall with hood, gloves and a disposable filtering half-mask (EN 149 FFP3);
- ☑ Protect floor with plastic sheeting;
- ☑ Vacuum the lighting unit using a HEPA filter vacuum cleaner (H13 filter complying with standard EN 1822);
- ☑ Remove lighting unit cover and vacuum its interior and mounting;
- ☑ Change fluorescent tube;
- ☑ Replace lighting unit cover;
- ☑ Fold up plastic sheeting and put it into the asbestos waste bag, along with the coverall, vacuum cleaner bag and/or filter, gloves and disposable half-mask.

Overview of applicable legislative provisions

Council Directive 89/391/EEC of on the introduction of measures to encourage improvements in the safety and health of workers at work.

This Directive aims to ensure a higher degree of protection of workers at work through the implementation of preventive measures to guard against accidents at work and occupational diseases, and through the information, consultation, balanced participation and training of workers and their representatives.

In addition, **Council Directive 83/477/EEC** on the protection of workers from the risks related to exposure to asbestos at work and its amendments, deal specifically with protecting workers from the risks related to exposure to asbestos at work.

The Member States have transposed the provisions of this directive into their own national legislations, while sometimes including additional requirements.

Council Directive 89/656/EEC on the minimum health and safety requirements for the use by workers of personal protective equipment at the workplace.

This Directive lays down minimum requirements for personal protective equipment (PPE) used by workers at work.

Council Directive 89/686/EEC on the approximation of the laws of the Member States relating to personal protective equipment.

This Directive stipulates that personal protective equipment must comply with the relevant Community provisions on design and manufacture with respect to safety and health.

European regulations also focus on prohibiting asbestos usage (Commission Directive 1999/77/EC of 26 July 1999).

Some member states have set up additional requirements.

France

In France, identification and state of conservation assessment of asbestos-containing materials is compulsory for all buildings, except in private areas of residential buildings and private dwellings.

Prior to any operation, the company manager is duty-bound to request all identification findings from the building owner; the building owner, for his part, is duty-bound to communicate these findings to all intervening contractors. In the absence of identification, the intervening contractor is responsible for assessing the presence of asbestos by all suitable means.

The company manager is required to adopt all measures designed to reduce asbestos exposure levels. In France, the asbestos occupational exposure limit value is 0.1 fibre/cm³ for one hour.

Employees are required to submit a medical certificate of fitness before they can be allocated a job in which they may be exposed to asbestos dust. The employer must draw up an exposure record for each worker, detailing the type and duration of work, working procedures, equipment used and expected exposure level. Employees have a legal right to close medical surveillance on an annual basis. When the employee leaves the company, he must be given an exposure certificate drawn up by the employer and the occupational physician. Medical records must be kept for 50 years.

In the case of maintenance and servicing operations likely to cause exposure to asbestos dust, the company manager is required to draw up a general operating procedure according to the directive.

This document is subject to the opinion of the occupational physician and of health, safety and working conditions representatives. It must be forwarded to the relevant labour inspectorate and to French prevention bodies. All changes to working conditions must be duly declared.

Germany

The German Committee on Hazardous Substances (AGS) has issued a technical rule (number 519) on "Asbestos – Demolition, reconstruction or maintenance work". The Technical Rules for Hazardous Substances (TRGS) reflect the state of technology, occupational safety and health and occupational hygiene as well as other definite knowledge relating to activities involving hazardous substances. They are announced by the Federal Ministry of Labour and Social Affairs in the Federal Labour Gazette and provide a detailed and mandatory guideline for companies. The technical rule demands, among other things, that follow-up medical examination has to be offered after termination of employment.

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- [7] See [4], p. 17.
- [8] See [4], p. 33.
- [9] Council Directive 83/477/EEC of 19 September 1983 on the protection of workers from the risks related to exposure to asbestos at work (second individual Directive within the meaning of Article 8 of Directive 80/1107/EEC) (83/477/EEC) (OJ L 263, 24.9.1983, p. 25), as last amended by Directive 2003/18/EC of the European Parliament and of the Council of 27 March 2003 L 97 48 15.4.2003.
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Resources:

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