



HEALTH AND SAFETY
AUTHORITY



Guidelines on Working with Materials Containing Asbestos Cement

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Examples of asbestos cement containing materials

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WORKING WITH MATERIALS CONTAINING ASBESTOS CEMENT

INTRODUCTION

Materials containing asbestos cement may no longer be placed on the market, used, re-used or installed in buildings. However, asbestos cement products of different types exist widely within our building stock and are likely to be routinely encountered for decades to come. These guidelines describe the properties of asbestos cement (often referred to as AC), and where the material can be found. The guidance given offers practical advice on the necessary precautions to prevent exposure to asbestos fibres or, where this is not reasonably practicable, to reduce exposure to asbestos fibres. There are also examples of possible levels of exposure for typical work activities.

The guidelines do not apply to work with asbestos insulation, asbestos coating and asbestos insulating board (AIB), which should be carried out by specialist asbestos contractors.

The guidance given is aimed at anyone who is liable to control or carry out work with asbestos cement, including employers, project supervisors, design and construction staff, designers, architects, contract managers, site agents, self-employed builders and contractors involved in construction, maintenance, refurbishment and demolition work.

Other guidance being published by the Health and Safety Authority (HSA) will deal with the most immediate risks from asbestos cement: the physical risks of workers falling from or through fragile asbestos cement sheets during construction, maintenance, refurbishment or demolition. Most asbestos cement sheets will not support a person's weight. Falls from, and through, fragile roofs are a major source of deaths in construction and maintenance work, and precautions to prevent such accidents should receive priority.

1

WHY IS ASBESTOS DANGEROUS?

Breathing in asbestos fibres can lead to asbestos-related lung diseases, mainly cancer, which kill more people than any other single work-related illness. The diseases can take from 15 to 60 years to develop – so you and your employees will not be immediately aware of a change in someone's health after breathing in asbestos fibres. The body gets rid of any asbestos fibres taken in with food and water naturally. Asbestos fibres cannot be absorbed through the skin. The danger, therefore, from exposure to asbestos fibres arises when asbestos fibres become airborne. They form a very fine dust which is often invisible. It is important to remember that people who smoke and are exposed to asbestos fibres are at greater risk of developing lung cancer than those who do not smoke.

In summary, the primary route of concern, i.e. the route whereby asbestos fibres can get into the body and cause harm or injury, is via the inhalatory route – the action of breathing. Other potential routes of entry into the body are not a problem because the body naturally gets rid of any asbestos fibres taken in with food and water (i.e. ingestion). Also asbestos fibres cannot be absorbed through the skin. However, asbestos fibres which are airborne can enter the body when contaminated air is inhaled and can lead to the development of one of three fatal diseases:

Asbestosis – which is a scarring of the lungs

Lung cancer

Mesothelioma – which is a cancer of the lining around the lungs and stomach.

While the body's natural defence mechanisms can get rid of the larger fibres, microscopic fibres can pass into the lungs where they can cause asbestos-related diseases. Because such fibres can remain in the lungs for a long time, small but repeated exposures to materials containing asbestos can lead to the development of these diseases. ***This is why it is important to prevent or control exposure on every single job involving asbestos.***

Asbestos is a term used for the fibrous forms of several naturally occurring minerals. There are three main types of asbestos which have been commonly used:

- ▼ crocidolite (often referred to as 'blue asbestos')
- ▼ amosite (often referred to as 'brown asbestos')
- ▼ chrysotile (often referred to as 'white asbestos').

All types of asbestos (blue, brown and white) are dangerous and can give rise to the associated asbestos-induced diseases. However, the risk of exposure to asbestos fibres can be directly related to the possibility of fibres being released, thus allowing the potential for exposure to the fibres by

workers. On this basis, the risk of fibres being released from materials containing asbestos cement is less, as a result of the fact that the fibres are tightly bound in a cement matrix.

While all types of asbestos are hazardous it is the risk of exposure to those fibres which determines the possibility that workers could be exposed, i.e. the possibility or likelihood that the asbestos fibres can become air-borne which is directly related to the ease with which asbestos fibres can be released into the air. The different types of asbestos, blue, brown (both of which carry a higher risk) or white cannot usually be identified by visual inspection alone. As well as being bound or contained in other materials or substances it should be noted that, where heat and chemicals affect asbestos, the colour and appearance can change. There is no simple test to identify the different types of asbestos. Laboratory analysis is required. Asbestos often occurs as a mixture of fibres and unless you are sure which type of asbestos fibres are present you must treat the material as if it contains blue or brown asbestos, i.e. adopt a “worst case scenario” by assuming the higher risk asbestos fibres are present and control accordingly.

2

WHAT IS ASBESTOS CEMENT?

Asbestos cement is predominantly a mixture of cement and asbestos fibres which in a dry state has a density greater than 1 tonne per cubic metre (1000 kg/m³). It is a light grey, hard material which generally contains approximately 10% asbestos fibre, but can occasionally contain more than 10% fibre, bound in a matrix of Portland cement or autoclaved calcium silicate.

Asbestos cement differs from Asbestos Insulation Board (AIB) in that it is denser and harder to the touch. It is not friable: it cannot be crushed in the hand. As the fibres are tightly bound in the cement matrix they will only be released if the material is subject to significant disturbance, such as drilling, sawing, sanding etc. It should be noted that while this material is not friable, asbestos cement can be relatively brittle and so can be broken quite easily, e.g. if dropped from a height, driven over by vehicles, or struck with tools or implements, and of course is a fragile roof material which cannot withstand a person's weight.

There are two major groups of asbestos cement products. The first comprises corrugated or profiled and flat sheets, slates, rainwater goods (gutters, downpipes and troughs), flue pipes and bends and, less commonly, decking tiles, cisterns and sumps. The second group consists mainly of asbestos cement pressure pipes for the transport of drinking water, while thinner walled asbestos cement pipes have also been used for sewage and drainage.

The majority of asbestos cement products contain only chrysotile asbestos fibres but some older products may contain the more hazardous crocidolite or amosite asbestos fibres. The importation of crocidolite voluntarily ceased in 1970 and amosite in 1983. The placing on the market and use of crocidolite and amosite fibres and products containing these fibres was prohibited initially in 1994 by Regulations, which were subsequently further amended in 1998. These Regulations also placed some restrictions on the marketing and use of chrysotile asbestos in certain products but did not introduce complete prohibition at that time. In 2000, a prohibition on the placing on the market and use of chrysotile was introduced in Ireland by the European Communities (Dangerous Substances and Preparations) (Marketing and Use) Regulations, 2000 (S.I. No. 107 of 2000). That prohibition was continued in the European Communities (Dangerous Substances and Preparations) (Marketing and Use) Regulations, 2003 (S.I. No. 220 of 2003) which prohibit the placing on the market of all types of asbestos fibres and products containing them. The legislation, therefore, prohibits the use, re-use, sale, supply, further adaptation etc. of chrysotile containing materials.

However, the use of asbestos cement products which were already installed or in service before 5 April 2000 (i.e. in existence or use before that date) continues to be authorised until they are disposed of or reach the end of their service life. Once these materials are removed (because they have reached the end of their service life or because they have deteriorated/become damaged/disturbed), they cannot be re-used for other purposes, and must go for disposal, after being removed in a safe manner.

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WHAT HAS ASBESTOS CEMENT BEEN USED FOR?

Asbestos cement products have been put to a wide range of uses, some of which are given in Table I (a non-exhaustive list).

TABLE I
ASBESTOS CEMENT PRODUCTS AND THEIR USES

Asbestos cement product	Use
Corrugated/Profiled sheets	Roofing and wall cladding
Slates (made from fully compressed flat sheet)	Roofing and wall cladding
Semi-compressed flat sheet and partition board (not AIB)	Partitioning in farm buildings, housing and industrial buildings, bath panels, soffits, linings to walls and ceilings, portable buildings, propagation beds in horticulture, fire surrounds, ironing board panels and composite panels for fire protection
Fully compressed sheet and partition board (not AIB)	As above, but where stronger materials are required, for example, laboratory bench tops, external sills, fire surrounds and hearths for electric, gas fires and façade cladding
Tiles (made from fully compressed flat sheet)	Decking and promenade tiles for flat roofs
Moulded products	Cisterns and tanks, drains, sewer pipes and rain water goods; flue pipes and ducts; roofing components and accessories (ridges, ventilators, facias, soffits, etc.); cable troughs; window/flower boxes
Pipes and joints (including pressure pipes)	Water supply, sewage and underground drainage

Asbestos cement products can often be found behind non-asbestos materials or coated with decorative or other coatings and are, therefore, not always readily identifiable. They may also be used in areas which are not readily accessible.

Asbestos cement products, such as roof sheets etc., may sometimes be found in conjunction with other materials containing asbestos. For example, a warehouse may have an asbestos cement roof which has a sprayed asbestos coating (limpet) on the inner surface. The presence of such materials significantly alters the risk associated with work on the asbestos cement sheets. This is because sprayed coatings are loose friable materials which are easily disturbed, leading to very high exposures. In these circumstances, more stringent precautions are required than for work on asbestos cement alone, and the work needs to be carried out by a specialist asbestos contractor. This scenario can be very dangerous if not identified prior to work commencing, i.e. it must be identified initially and assessed thoroughly through the performance of a risk assessment, taking into account the presence of the sprayed asbestos.

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THE RISK POSED BY ASBESTOS CEMENT PRODUCTS

Because the fibres in asbestos cement products are tightly bound in the material or matrix, they will only be released if the product is subject to mechanical damage (for example the use of abrasive tools, breakage, etc.) or as a result of weathering. This contrasts with other materials or products containing asbestos such as sprayed coatings and lagging which generally have a greater fibre content and, being loosely bound, release fibres relatively easily when damaged or disturbed. The level of risk depends on the ease with which fibres are released and the type of asbestos present.

Asbestos cement products, such as roof sheets used externally, will weather slowly. The low rate of fibre release means that the risk of exposure is extremely low if the sheets are left undisturbed. The re-use of such roof sheets is now prohibited.

After several years of external use, asbestos cement may become covered in lichen, algae or moss. Although such growths rarely have a noticeable effect on the strength, durability or lifetime of asbestos cement, they may become visually unattractive (in some areas they can actually be regarded as mellow and pleasing, and are therefore encouraged). If these growths are removed without taking adequate precautions, this can result in fibre release and high exposures (see Section 10 – ‘Cleaning Weathered Asbestos Cement’).

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LEGISLATIVE REQUIREMENTS

As with any work activity the requirements of the Safety, Health and Welfare at Work Act, 1989, and the Safety, Health and Welfare at Work (General Application) Regulations, 1993 (as amended) apply and must be considered with respect to the protection of workers at the place of work. In addition, as regards specific work activities involving working with materials containing asbestos, particular attention must be taken concerning the requirements and control measures as outlined in the following legislation:

▼ **Safety, Health and Welfare at Work (Construction) Regulations, 2001 (as amended)**

Under these Regulations a preliminary health and safety plan must be drawn up by the project supervisor for the design stage (PSDS) on most construction projects. This plan must specify, among other items, any **particular risk** which exists at the premises, including the presence of asbestos-containing materials.

▼ **European Communities (Protection of Workers) (Exposure to Asbestos) Regulations, 1989 (as amended in 1993 and 2000)**

These Regulations apply to all types of asbestos (including asbestos cement) and to all work activities that could expose persons to risks arising from the inhalation of asbestos dust or fibres. These Regulations require that adequate information, instruction and training be provided to workers with respect to the potential risk to their health should they be exposed to asbestos fibres and outline the precautions and procedures to be taken to provide adequate protection. Information regarding the planned removal of materials containing asbestos must be set out in a written document ('Plan of Work') and must include the site-specific measures required to ensure the activity is performed in a safe manner and that adequate control measures are used to protect those performing the activity as well as others who may be affected by the work activity.

▼ **European Communities (Dangerous Substances and Preparations) (Marketing and Use) Regulations, 2003**

As mentioned in Section 2, these Regulations, among other matters, prohibit the placing on the market or use of asbestos materials or products containing asbestos materials or fibres (including asbestos cement).

All work involving materials containing asbestos requires a written risk assessment and a plan of work to be prepared by a competent person under the Safety, Health and Welfare at Work (Construction) Regulations, 2001 (S.I. No. 481 of 2001) and the European Communities (Protection of Workers) (Exposure to Asbestos) Regulations, 1989 (S.I. No. 34 of 1989), as amended by the European Communities (Protection of Workers) (Exposure to Asbestos) (Amendment) Regulations, 1993 (S.I. No. 276 of 1993) and the European Communities (Protection of Workers) (Exposure to Asbestos) (Amendment) Regulations, 2000 (S.I. No. 74 of 2000). The risk assessment should include an assessment of the likely exposure to asbestos fibres of those workers involved and any other risks identified which may adversely affect their safety or health. The survey, to identify the presence of asbestos material, and the ensuing risk assessment must be performed by a competent person(s). Based on the outcome of the risk assessment a Plan of Work relating to the materials containing asbestos should be drawn up by the firm that will carry out the work on site.

If the asbestos material is identified as asbestos cement **and** it is determined that the action level will not be exceeded during the course of the work activity then a general contractor (provided he has the knowledge, experience and adequate training) may draw up the plan of work and proceed on that basis to perform the work activity. If, however, the asbestos is identified as any other type of material containing asbestos the plan of work and the related work activity must be performed by a specialist asbestos contractor.

The risk assessment (for all asbestos-related work activities) must be in writing and cover:

- ▼ Identification of asbestos type and location
- ▼ Estimated quantity and condition of the asbestos
- ▼ A description of the work, including the type of work and its duration
- ▼ The steps taken to prevent or reduce exposure to the lowest level reasonably practicable
- ▼ The reasons for the chosen work methods
- ▼ The steps taken to control the release of asbestos fibres into the environment
- ▼ Details of expected exposures and the number of people affected
- ▼ The procedures for the selection, provision, use and decontamination of personal protective equipment (PPE), including respiratory protective equipment (RPE)
- ▼ Procedures for the removal of waste
- ▼ Procedures for dealing with emergencies
- ▼ Any other information relevant to safe working, e.g. working at heights, working in a confined space, working on a fragile roof.

It may not always be necessary to carry out a full assessment before each individual job if you are carrying out work which involves similar jobs of a similar scale on a number of sites on a regular basis. However, even in such cases a written risk assessment must be available for each site/job and must be clearly site-specific in content. Where the work varies significantly from site to site, for example in demolition, you will have to carry out a new assessment for each job. A copy of the assessment and plan of work must be kept readily available on site.

It should be noted that some of the information required as part of the risk assessment will also be relevant to the site-specific Plan of Work. While these are two distinct documents it may be possible on occasion, and as appropriate, to cross-reference the information from the risk assessment document to the Plan of Work document so as to avoid duplication. However, this does not detract from the obligation to develop and maintain both documents on-site and to produce both documents for examination, e.g. upon request by an inspector.

LIMIT VALUES

A limit value is that concentration of asbestos fibres in the air at a place of work when measured or calculated by reference to an eight-hour reference period (i.e. the duration when workers are normally at the workplace) to which employees must not be exposed, unless they are wearing suitable respiratory protective equipment (RPE). The relevant limit values are:

- (a) Chrysotile alone – 0.6 fibres per millilitre of air, and
- (b) All other forms of asbestos either – 0.3 fibres per millilitre of air
alone or in mixtures
(including mixtures containing chrysotile)

ACTION LEVELS

Action levels apply to exposure in the longer term, and are cumulative exposures calculated over any continuous three-month period. The three-month period should not be chosen to avoid exceeding an action level and, in fact, should represent a 'worst-case scenario' for the work being undertaken. The action level with respect to the concentration of asbestos fibres in the air at a place of work is reached when the concentration (measured or calculated) is, in the absence of RPE, equal to or in excess of:

- (a) Chrysotile alone –
 - (i) 0.2 fibres per millilitre of air in relation to an eight-hour reference period, or
 - (ii) a cumulative exposure of 12 fibre-days per millilitre of air over a three-month period;
- (b) For all other forms of asbestos either alone or in mixtures (including mixtures containing chrysotile) –
 - (i) 0.1 fibres per millilitre of air in relation to an eight-hour reference period, or
 - (ii) a cumulative exposure of 6 fibre-days per millilitre of air over a three-month period.

NOTE: *F/ml* – fibres per millilitre of air averaged over any continuous period
Cumulative exposures are calculated by adding together all the individual exposures over a three-month period.

Table 2 gives examples of typical exposures during work with asbestos cement. It should be noted, however, that while this Table lists a number of techniques or activities involving asbestos cement, it does not infer that these techniques or activities are necessarily acceptable, e.g. machine cutting without exhaust ventilation, dry brushing etc., but provides a list of activities which could be performed and so provides an indication of the level of fibres expected to be released. The values assist in illustrating which work practices produce or result in high exposures and also illustrate the importance of using specific work practices to ensure that exposures are kept to as low as is reasonably practicable. The values in this Table originate from measurements taken by the HSE (UK).

Activity	Typical exposure (f/ml)
Machine sawing with exhaust ventilation	Up to 2
Machine cutting without exhaust ventilation	
– abrasive disc cutting	15-25
– circular saw	Up to 20
– jig saw	2-10
Hand sawing	Up to 1
Machine drilling	Up to 1
Removal of asbestos cement sheeting	Up to 0.5
Stacking of asbestos cement sheets	Up to 0.5
Remote demolition of asbestos cement structures dry	Up to 0.1
Remote demolition of asbestos cement structures wet	Up to 0.01
Cleaning asbestos cement (Roofing)	
– Dry brushing (wire)	3
– Wet brushing (wire)	1-3
Cleaning of asbestos cement (vertical cladding)	
– Dry brushing (wire)	5-8
– Wet brushing (wire)	1-2

NOTIFICATION

Regulation 11 of the 1989 Asbestos Regulations (as amended) requires an employer to submit a notification, in writing, to the Health and Safety Authority where the planned asbestos-related work activity will expose, or could possibly expose, his or her workers to a concentration of asbestos fibres in air in excess of the Action Level (see page 9). This notification applies to all types of asbestos (including asbestos cement) once there is the possibility that the action could be exceeded. The notification must be submitted 28 days prior to the commencement of the work activity. For specifically defined occasions, there is the possibility of commencing such work before the 28-day period is over, i.e. the employer may seek a 'waiver' to the required 28-day period. However, the reason for such a 'waiver' request must be clearly justified, e.g. emergency, unforeseen risk etc. It should be noted that well planned, risk assessed and properly surveyed work should not require a request for a waiver. Ideally waiver requests should occur infrequently and generally result from accidents or dangerous occurrences which require urgent remedial action to be undertaken that could not be anticipated or foreseen.

It should be noted that if the recommended good practice and safe procedures are fully implemented, work involving the removal of asbestos cement roof-sheeting etc. should not exceed the Action Level and so should not require the submission of a notification (28 days prior to starting the work). However, this does not remove the obligation on employers to perform a risk assessment regarding every activity involving potential for exposure to asbestos fibres (including asbestos cement) and also does not remove nor dilute the legal requirement on employers to prepare a plan of work having considered the findings, conclusions and recommendations of the risk assessment.

PROHIBITION

The European Communities (Dangerous Substances and Preparations) (Marketing and Use) Regulations, 2003 prohibit the placing on the market, the supply and use of asbestos fibres of all types and of products containing asbestos fibres. The Regulations continue a prohibition on the re-use of old asbestos cement products which first came into force on 5 April, 2000.

SAFETY, HEALTH AND WELFARE AT WORK (CONSTRUCTION) REGULATIONS, 2001

These Regulations place duties on clients, project supervisors for the design and construction stages of work, as well as on designers and contractors to ensure that the health and safety aspects of the work are taken into account, and then co-ordinated and managed effectively throughout all the stages of a construction project. This includes all stages in the lifecycle of a project, from conception, design and planning through to the execution of works on-site and subsequent construction, maintenance and repair, refurbishment, removal, demolition etc.

In the majority of situations work activities involving materials containing asbestos (including asbestos cement) are covered within the definition of 'construction work' and so the Construction Regulations apply to this type of work activity. If any doubt exists regarding the overall description or nature of the work, clarification should be sought and specific reference made to the definition in the Regulations, including its inferred interpretation. In particular, Schedule 2 to the Regulations refers to work involving 'particular risk', i.e. involving materials containing asbestos, including asbestos cement. The Regulations require that:

- ▼ when planning works, clients must appoint project supervisors to identify and provide information about the location, type and condition of asbestos cement
- ▼ designers should take account of this information in their designs and, based on risk assessment, should remove or reduce the need to work with asbestos cement where possible
- ▼ project supervisors should ensure that information about asbestos, relevant to the work in hand, is available to designers and contractors as appropriate
- ▼ the main contractor on-site should ensure that individual contractors are aware of the relevant information, and all workers should be briefed
- ▼ anyone arranging for persons to undertake construction work should be reasonably satisfied that their appointees are competent to undertake the work safely and without risk to health

- ▼ where work with asbestos cement is part of the construction work, employers should provide employees with sufficient information, training and instruction to ensure that they are aware of the risk and the control measures, safe practices and safe systems required to perform their work activities in a safe manner
- ▼ at the end of a project, a safety file, including relevant information about asbestos, should be prepared for the client.

TRAINING SHOULD INCLUDE THE FOLLOWING:

- ▼ the health hazards of asbestos, including the added danger of smoking and working with asbestos
- ▼ the presence of other hazards such as working at heights
- ▼ work methods and equipment
- ▼ correct choice, use and maintenance of personal protective equipment (PPE)
- ▼ decontamination procedures
- ▼ maintenance of control measures
- ▼ emergency procedures, and
- ▼ waste disposal.

Refresher training should be given every year, or more often as necessary, where:

- ▼ work methods change, or
- ▼ the type of work changes significantly.

Maintenance workers at premises where asbestos cement materials (based on risk assessment) remain in situ should receive appropriate and adequate training with respect to the possible risk should these materials be disturbed in an uncontrolled or unplanned manner. They should also be provided with information about the condition and location of such materials. Ideally such training should be sufficient to allow maintenance workers perform their work activities safely and without risk of exposure to asbestos fibres in the air. If asbestos cement materials are assessed and remain in situ, a management plan regarding the continued presence of the materials must be developed and provided to all relevant personnel, so as to ensure these materials remain safe and do not increase in risk over time. They should be assessed regularly to ensure they have not become damaged or disturbed, or have deteriorated or degenerated naturally or through intentional or unforeseen intervention.

6

HOW TO IDENTIFY ASBESTOS CEMENT

If you own, manage or have responsibilities for a workplace building which may contain products containing asbestos (including asbestos cement), you need to think about the risk of exposure to workers and others who may use the building. You need to manage the risk. In order to do this you need to know, the:

- ▼ the location of the asbestos
- ▼ form of the asbestos (lagging, coating, ceiling tiles, asbestos cement, etc.)
- ▼ condition of the asbestos
- ▼ type of asbestos present.

One way of finding this information is to perform a survey, with sampling, so as to identify the presence, location, estimated quantity, type and condition of asbestos. This work should be performed only by a competent person(s). If this is not done, one must assume that all suspect materials contain asbestos and plan the required work accordingly. Having identified the presence of materials containing asbestos, the location of these materials should be indicated on the plans of the workplace and a risk assessment should be performed regarding the potential for exposure to asbestos fibres. Based on the outcome of such a risk assessment a management plan should be developed so as to adequately manage the risk as identified. If materials containing asbestos remain in situ and are being managed, it is necessary to consider the presence of these materials before commencing any planned maintenance, refurbishment, demolition work etc. – i.e. the effect and potential risk of their presence – and plan the work accordingly so that it can be carried out in a safe manner.

Specific guidance on how to manage asbestos cement products already in place is given in Section 7.

7

HOW TO MANAGE ASBESTOS CEMENT ALREADY IN PLACE

Once an asbestos survey has been carried out, you should know, as far as is reasonably practicable, the location, type and condition of the asbestos cement. Some may be damaged, have deteriorated or degenerated with time, or be liable to be damaged as a result of its location, some may be in good condition, and some situated in areas due for maintenance, refurbishment or demolition. Based on this information, you need to make a decision on what remedial action is required and on how to manage the asbestos cement, i.e. can it be left in place or should it be removed.

There is a difference in the risk presented by asbestos cement located inside, compared with outside, a building. Inside the building, the asbestos cement may be at greater risk of accidental damage or disturbance, and any fibres released may be close to the occupants, or accumulate on flat surfaces, pipes etc. and be disturbed later. Such matters need to be taken into account when making a decision on how to deal with the material.

Asbestos materials, including asbestos cement, which are in good condition and are not likely to be disturbed, can be left where they are (indicating their location and marking them as asbestos-containing materials) but will need to be managed.

If the asbestos cement is only slightly damaged, it can be repaired and sealed, the material left where it is and managed. Where there is external asbestos cement cladding on a building, you normally only need to seal the relevant internal surfaces (based on risk assessment), as it is damage or abrasion to these areas that can cause the release of fibres. It is not normally necessary to seal internal surfaces at high level, because the location of the material means that disturbance is unlikely. However, ultimately the assessment of the material by the surveyor will determine whether any surface needs to be sealed, labelled and managed.

Sealing involves the application of a coating (polymeric, bituminous or cement-based paint), the type of which will depend on the nature of the material, the level of damage and protection. The risk assessment (performed by a competent person) will determine if sealing is the best and most appropriate option and will also determine who should do the sealing activity i.e. dependent on risk.

The coating should adhere firmly to the surface of the asbestos cement. Where the surface of the asbestos cement is dusty and may not permit a good coating, it can be prepared by cleaning with a Type H (BS 5415) vacuum cleaner or wiped with a damp cloth (which should be disposed of as asbestos waste). You can use an alkaline-resistant primer or other suitable material (asbestos cement is alkaline) to prime the surfaces for sealing, before applying the topcoat.

Where it is possible that some damage may reoccur, instead of removing the asbestos cement it can be enclosed or encased. This involves repairing any minor damage and then covering the

asbestos cement with a non-asbestos material, forming a physical barrier. However, resistance to the spread of fire must be maintained. The enclosed area between the covering and the asbestos cement should be sealed, and adequate cavity fire barriers constructed. This action must be performed only on the basis of a risk assessment having been completed. In addition, any enclosed asbestos cement should be indicated on the plans of the building to ensure that, should future work activities be planned, they can be carried out safely with the knowledge that asbestos cement material is present.

You need to consider removing asbestos cement if it is in a poor condition, or is likely to be damaged or disturbed as a result of building maintenance, refurbishment or demolition works, because of normal work activities within an area, or if there are plans to change work activities in the area which may subsequently damage or disturb the existing asbestos cement.

Asbestos surveys and sampling, carried out in accordance with a validated methodology, should be performed only by competent people with adequate knowledge, training and experience.

It should be noted that cementitious asbestos-containing slates and corrugated sheets used on roofs of buildings prior to 1990 are likely to contain asbestos fibres. However, since the early 1990s, such products have been gradually replaced or substituted by equivalent non-asbestos containing materials, i.e. on a voluntary basis prior to the formal ban of their use which came into force in the year 2000. Therefore, there now exist substitute materials for asbestos-containing corrugated sheets and slates so that, when removing asbestos-containing roofing slates or corrugated sheets, these substitutes can be installed to fulfil the same function.

However, with regard to asbestos-containing pipes, it should be assumed that **all** such pipes contain asbestos fibres and so care must be taken when working with or removing them.

8

HOW TO WORK SAFELY WITH ASBESTOS CEMENT

PLANNING AND PREPARATION

An assessment of the proposed work should be carried out, as required under the European Communities (Protection of Workers) (Exposure to Asbestos) (Amendment) Regulations, 2000. The assessment will determine the risk presented by the work and the precautions to be taken to prevent exposure or, where this is not reasonably practicable, for controlling exposure. It is important to remember that a higher risk is caused by breathing more fibres, because the concentration is higher, or when the exposure is over a longer period, or if the work is not planned and controlled adequately in order to prevent or reduce the potential for exposure, i.e. not performed in a safe manner.

The following general principles should be followed when planning the work (these points are discussed in more detail in subsequent Sections):

- ▼ where reasonably practicable, keep asbestos cement damp when working on it, i.e. as a method of dust suppression **
- ▼ where reasonably practicable, avoid using power and pneumatic tools
- ▼ use cleaning methods which minimise dust disturbance
- ▼ make sure your employees have adequate information on the hazards and risks associated with working with asbestos cement, and are properly trained in the correct working practices and use of control measures.

*** Consideration must be given when 'dampening down' roofs etc. so as to avoid the introduction of conditions which could create the additional risk of slipping.*

AREA SEGREGATION

You will need to segregate the work area to prevent the spread of asbestos dust and prevent the exposure of people not involved in the work. How much you need to do depends on the outcome of your risk assessment, e.g. the risk will be greater within an occupied building compared with external work. In most cases it is sufficient to mark out the work area with signs to prevent non-asbestos workers approaching. However, if the work is likely to result in significant disturbance of the asbestos cement, you need to consider erecting a physical barrier for segregation purposes. The extent of the barrier will depend on the outcome of the risk assessment carried out before the work starts.

A physical barrier should prevent the spread of debris and airborne fibres, i.e. contain any dust which may be generated during the work activity, and so also assist in cleaning up the 'contaminated area' which should be within the segregated zone. This is usually done using the fabric of the building and heavy gauge polythene sheeting. However, it is unlikely that full enclosure with negative pressure units will be necessary when working with asbestos cement materials if the

work activity is performed in a safe and correct manner. If your assessment identifies the need for a full enclosure then a specialist asbestos removal contractor must be employed to do the asbestos-related work.

Whatever means of segregation are used, there is a need to post asbestos warning notices. Where the limit value is liable to be exceeded, the notices must clearly state that the area is a 'respirator zone' and RPE must be worn. If the action level is liable to be exceeded, the area should be designated as an 'asbestos area'. Employees not engaged in the work should not be permitted into either of these designated areas.

WORK METHODS

Working with asbestos cement products can be divided into two categories:

- ▼ repair, maintenance and other similar work
- ▼ removal and demolition.

REPAIR, MAINTENANCE AND OTHER SIMILAR WORK

Work with asbestos cement can cover a variety of activities such as the repair of existing products and other small-scale work such as the attachment of fixtures and fittings to asbestos cement sheets. These activities can present different problems and risks. There are a number of general precautions which are common to all work and should be used to prevent or control exposure to asbestos fibres. They can be summarised as follows:

- ▼ where reasonably practicable, avoid the need to attach items to asbestos cement and avoid routing items such as wiring and pipes through it
- ▼ make sure surfaces that may get covered in dust and debris are covered with polythene sheeting
- ▼ keep the material dampened when working on it
- ▼ where reasonably practicable, avoid breaking or cutting asbestos cement
- ▼ use hand tools in preference to power or pneumatic tools, e.g. a hand bolt cutter to remove roof sheets etc.
- ▼ where there is no choice but to use power or pneumatic tools, these tools should be set at the lowest effective speed with additional control measures such as Local Exhaust Ventilation (LEV). Typical measures include:
 - a cowl fitted with LEV located around a drill bit (the cowl should be fitted with a spring so that it remains in contact with the surface of the material as the drill bit penetrates), or
 - shadow vacuuming (this is where the nozzle of a type H (BS 5415) vacuum cleaner, fitted with a suitable attachment, is held as close as possible to the source of fibre release throughout the task)
- ▼ wear suitable PPE, including RPE
- ▼ keep the work area clean and tidy
- ▼ avoid the use of cleaning methods such as sweeping which will make dust airborne
- ▼ make sure the work area is thoroughly clean on completion of the work.

Long-term weathering of external asbestos cement products, such as corrugated sheeting, can result in the release of quantities of fibrous debris which can accumulate in areas such as drainage gutters, on roofs, as well as other surfaces exposed to the dust. As this accumulated material can be dry in nature, where reasonably practicable, and before any work commences, these areas should be cleaned out, keeping the debris wet. The wet debris can be removed and placed in a suitable container, and disposed of as asbestos waste. Any remaining residues can be removed using a low-dust technique such as damp cloths (disposed of as asbestos waste). Operators may require suitable PPE, including RPE. Great care must be taken as the work may need to take place at a high level, with the associated risk of falls.

9

SPECIFIC TASKS ASSOCIATED WITH MATERIALS CONTAINING ASBESTOS CEMENT

When working with materials containing asbestos cement, in addition to consideration relating to 'normal' health and safety protection, specific consideration must also be given to the methodology or procedure used which will best protect the worker(s) from the risk of exposure to asbestos fibres should they be released from the bound matrix during the course of the task. Workers or others concerned must be provided with appropriate training, instruction and supervision as necessary and given the necessary PPE (including RPE) as required relevant to the task being undertaken.

GENERAL GUIDANCE ON CLEAN-UP AFTER TASKS

This Section gives general information relating to the clean up and disposal of items which are asbestos-contaminated. In addition, information is given relating to hygiene and assurance that the task has been performed safely and the area is properly cleared of materials containing asbestos cement.

- (a) **Wet rags used to clean equipment, surfaces, access or work platforms and the segregated area should be placed in designated asbestos waste container(s) for proper and safe disposal as asbestos waste material. All debris, polythene sheeting and other waste should also be placed in such dedicated waste containers. Disposable overalls (cover shoes if used), masks etc. must also be disposed of as asbestos waste.**
- (b) **Workers must adopt appropriate hygiene standards. Where possible, workers should wash thoroughly when leaving the work area or as soon as possible after leaving the work area.**
- (c) **If waterproof overalls are used (e.g. for outside or wet work) these should be adequately wiped down using wet rags.**
- (d) **On completion of any of the tasks mentioned below, the area and work should be inspected visually to ensure that the area, work, site of work and surrounding area is clean. While clearance air sampling would not normally be required, monitoring could be considered as required or if requested.**

The practices at (a), (b), (c) and (d) above should be considered and implemented with respect to each of the tasks specified below, where and when the items, areas, equipment etc. are used for the purposes of performing the task under consideration.

In relation to any of the following specific tasks, if the work has to be performed at a height, the appropriate precautions must be in place regarding protection of workers from the anticipated risks related to work at heights and on fragile roofs.

(A) Drilling holes in asbestos cement (and/or other tightly bonded materials)

This task should only be considered after performance of risk assessment. Ideally tasks which have the potential to release asbestos fibres from a bound matrix (e.g. drilling) should not be undertaken unless all possible alternative methods have proven not to be possible. The methodology as outlined can be used where holes have to be drilled in asbestos cement, floor tiles, decorative coatings, bitumen products containing asbestos and other tightly bonded (in a matrix) materials containing asbestos.

PREPARATION FOR TASK

Unauthorised personnel must not have access to the work area. The number of workers involved should be kept to the minimum required to do the task safely. Sufficient warning notices, signs, tape etc. should be used to demarcate and segregate the designated work area. If working at a height, specific precautions must be taken regarding adequate segregation of the area beneath, in addition to the precautions necessary to protect workers when working at heights from falls, access etc. There should be adequate light to perform the task. Polythene sheeting, secured with duct tape, should be used to cover any surface which could become contaminated within the area of work.

THE TASK

Cover the point to be drilled (including rear area, if accessible) with tape to prevent edges crumbling. If cable or pipe-work is to be passed through the drilled hole ensure that the hole is made slightly bigger to prevent abrasion. Cover the entry and exit points (if accessible) with a generous amount of thick paste (e.g. wallpaper paste). Drill through the paste. Use wet rags to clean off paste and debris generated (including surfaces at the rear, if accessible). Seal cut edges with appropriate sealant. If a cable is to be passed through, insert a sleeve to protect the inner edge of the hole. Use wet rags to clean equipment, surfaces and segregated area.

(B) Cleaning debris from guttering on an asbestos cement roof

This task refers to situations where debris containing asbestos needs to be removed from guttering (which may or may not be made of asbestos) on an asbestos cement roof.

PREPARATION FOR TASK

Reduce to a minimum the number of workers required to perform the task safely. Restrict access using sufficient warning tapes, notices etc. Erect an access work platform appropriate to the task.

THE TASK

Mix water and detergent. Using a watering can or garden type spray, pour the water into the gutter **but** avoid over wetting as this will create a slurry. Remove the debris using a scoop or trowel. Wet the material or debris again if dry material is uncovered. Repeat this process as many times as is necessary during the task. Place the debris immediately and directly into the assigned asbestos waste container. Use wet rags to clean equipment, access work platform, etc.

(c) Removal of asbestos cement debris

This task refers to situations where there is contamination from asbestos damaged cement and includes decontamination work following the rupture of asbestos cement cladding in a fire.

(Note: This task is not for use when cleaning debris from damaged asbestos lagging, coating, insulating board etc.)

PREPARATION FOR TASK

Restrict the number of workers to the minimum required to perform the task safely. Restrict access to segregated work area using sufficient notices, warning signs and warning tape. Ensure there is adequate lighting to perform the task.

THE TASK

Using a garden type spray dampen the debris. Pick up larger pieces of debris and place immediately and directly into a designated asbestos waste container. In smaller or awkward areas, use wet rags to wipe clean contaminated surfaces. For larger areas, such as following the rupturing of asbestos cement in a fire, it is not always practical to wipe all surfaces, so cleaning may need to be restricted to obvious contamination in occupied areas, e.g. windows. If the contaminated surface is rough, keep the asbestos debris damp and scrape into the designated asbestos waste container. Tape can be pressed onto dust deposits to pick them up. If necessary, based on risk assessment, repair the asbestos cement, following recommended safe practices.

(D) Repairing damaged asbestos cement

The task refers to situations where, based on risk assessment, it is considered necessary to repair damaged asbestos cement. **(Note: This method must not be used for repair of other types of asbestos-containing materials e.g. AIB, lagging etc.)**

PREPARATION FOR TASK

Restrict the number of workers to the minimum required to perform the task safely. Restrict access to the segregated work area using sufficient notices, warning signs and warning tape. Ensure there is adequate lighting to perform the task. Use polythene sheeting, secured with duct tape, to cover surfaces within the segregated area which could become contaminated.

THE TASK

If the asbestos cement is badly damaged with holes etc., based on risk assessment, this material should be removed in accordance with recommended safe practices and procedures as outlined in these Guidelines. Dampen down any debris using a garden type spray. Clean up debris and dampened loose material and dispose of immediately and directly into a designated asbestos waste container. Paint damaged areas of asbestos cement (see task (E) below). Alternatively, protect asbestos cement by attaching a non-asbestos panel over the asbestos cement and clearly mark its location on site plans or designs of the building or structure so that it can be managed and assessed regarding potential to release fibres over time.

(E) Painting asbestos cement sheets

This task relates to situations where asbestos cement is in good condition and requires painting. Care must be taken when performing this task and workers should be trained for the task.

PREPARATION FOR TASK

Restrict the number of workers to the minimum required to perform the task safely. Restrict access to the segregated work area using sufficient notices, warning signs and warning tape. Ensure that there is adequate lighting to perform the task. Use polythene sheeting, secured with duct tape, to cover surfaces within the segregated area which could become contaminated.

THE TASK

NEVER prepare surfaces by sanding. If lichen or other growths are present, remove using the recommended practices and procedures outlined in these Guidelines. Before starting the task, check the asbestos cement for damage (and if necessary repair) and assess the risk to the workers fully. Wipe dusty surfaces with a wet cloth. It is recommended that a low-pressure spray be used to apply the paint. If this is not possible the paint may alternatively be applied using a roller or brush lightly to avoid abrasion or damage. Spray the paint on the surface using a sweeping movement. Do not concentrate on one area as this can cause damage to the surface being painted, i.e. the asbestos cement. Paint both sides of the sheet.

(F) Removal of asbestos cement products such as flues and tanks

This task relates to situations where asbestos cement products such as flues, water tanks, toilet cisterns etc. require to be removed from areas such as attics, lofts etc. If these asbestos cement products are covered or sheathed in asbestos insulating board this task and associated procedures cannot be used. It is important, therefore, to initially survey, and clearly identify, the type of asbestos material concerned. If, following a risk assessment, such asbestos cement products should be identified as redundant, i.e. no longer needed or used, and it is considered they will not, by virtue of their presence and location, interfere with any other work and are assessed to be in good condition, then it is best practice to label and note their location rather than undertake removal works. If those products are left in situ the location should be marked on the plans or designs of the building and the products should be assessed to ensure that they remain in good condition and undisturbed.

PREPARATION FOR TASK

Restrict the number of workers to the minimum required to perform the task safely. Restrict access to the segregated work area using sufficient notices, warning signs and warning tape. Ensure that there is adequate lighting to perform the task. If the asbestos cement product is in an area such as an attic, board out an area which can be worked on large enough to prevent contamination of adjacent attic insulation. Use 1,000 gauge polythene sheeting, secured with duct tape, to cover any surface within the segregated area which could become contaminated.

THE TASK

Where possible minimise breakage of asbestos cement. Every effort should be made to try to remove the asbestos cement product intact or whole, strengthening damaged areas or sections with duct tape as required. In order to remove the product intact, where possible, the supports should be unscrewed. If this is not possible, ensure that the asbestos cement is adequately dampened. Wrap the asbestos cement fully in 1,000 gauge polythene before breaking. Using a hammer, carefully break the asbestos cement product into pieces small enough for removal. It is not necessary, nor recommended, that the breaking process should continue to a stage of producing dust and minute pieces. The need to break the product relates to the effort required to release or remove the product. The larger the pieces the less dusty the residue generated. All debris must be placed immediately and directly into designated asbestos waste containers. Larger items such as flues, which cannot be placed in such containers because of their shape and size, must be double wrapped in 1,000 gauge polythene and affixed with appropriate asbestos-warning stickers or labels. Use wet rags to clean equipment and the segregated area.

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**CLEANING WEATHERED
ASBESTOS CEMENT**

After years of use the external surface of asbestos cement may become covered in lichens, algae or moss. For aesthetic reasons, or before application of surface coatings, you may need to remove these growths. Great care must be taken when cleaning weathered asbestos cement. Moss and lichen growth is normal and, while it may not be attractive, this growth is not detrimental to the material. Consideration must be given before performing this task as to whether or not it is absolutely necessary, as this activity can result in the release of, and exposure to, asbestos fibres. Operators also must consider the fact that this work may need to be carried out at a high level, with the associated risk of falls and, therefore, the system of work must be planned to perform the task safely. The following techniques have been known to be used:

- ▼ high-pressure water jetting
- ▼ remote cleaning
- ▼ cleaning with surface biocides.

The practice of dry scraping or wire brushing is not recommended, can lead to high exposures to asbestos fibres and should be avoided.

As with all asbestos-related work activities, prior to commencing the work, access to the work area should be restricted using notices, warning tape etc.

The following paragraphs describe these techniques in a little more detail.

HIGH-PRESSURE WATER JETTING

High-pressure water jetting (at 138 bar (2,000 psi) and above) is a technique which has been used in the past. Apart from the risk of driving debris between the overlaps of the roof covering, causing the roof to leak, there are several health and safety problems associated with this method:

- ▼ the jet can cause the cement matrix to disintegrate, so releasing asbestos fibres
- ▼ a vast amount of virtually unmanageable slurry, containing free asbestos fibres, is produced which can readily contaminate surrounding areas. In addition, once the slurry dries there remain loose clumps of friable asbestos containing fragments and fibres
- ▼ the jet can cause serious injury.

There have been several examples of untrained personnel carrying out this work, without the proper precautions and supervision. This has resulted in exposure of the operators (and others not involved in the work) to asbestos fibres, and in gross contamination of buildings and surrounding areas. Subsequent clean-up operations have proved very expensive.

Due to the range of problems associated with this method of cleaning, *it should only be used in exceptional circumstances, by specialist contractors, with well-trained personnel and under close supervision.* Before performing the task a full risk assessment must be carried out by a competent person. If you are considering this technique, you should discuss it first with the HSA.

REMOTE CLEANING

There are remotely operated units available with enclosed rotary cleaning heads which use high-pressure jets and brushes to clean asbestos cement roof sheets. This system has the advantage of the operator being remote from the immediate cleaning area thus reducing the potential risk of exposure to asbestos. However, provision still needs to be made to collect the resulting slurry. The manufacturer's operating instructions should be followed closely and the equipment operated by workers who have received specific training and are properly supervised. Operators must take great care as they may need to carry out the work at a high level, with the associated risk of falls.

CLEANING WITH SURFACE BIOCIDES

There is a range of approved biocide products which can be used to kill plant material growing on asbestos cement surfaces. However, if considering the use of biocides, an assessment must be performed to select the most appropriate biocide and to ensure that it does not in any other way increase the potential for exposure to asbestos fibres. Advice should be sought as to the best biocide for the intended work. Some biocides can irritate the skin and so workers should wear protective gloves. Care should be taken to note and follow any safety and health-related information available, such as a label on the biocide container or in its associated Safety Data Sheet (SDS). Specific information relating to biocides can also be obtained from the Pesticides Control Unit, Department of Agriculture and Food, Abbotstown, Co. Dublin.

Products containing salts of dichlorophen or o-phenylphenol, or benzalkonium chloride (quaternary ammonium salts), will kill plant material. These cause no damage to asbestos cement if they are used at the recommended concentrations during non-frosty conditions. The biocides should be applied as low-pressure sprays or as washes only.

Once moss and algae are dead, they can be removed with water, using gentle brushing. However, dead lichen crusts and ivy roots are unlikely to be removed so easily and these are probably better left where they are. You should note that the roots of mosses may well hold loosened asbestos fibre. Therefore, efforts to remove them could in fact increase the risk of exposure to asbestos fibres and actually cause damage to the integrity of the roof sheeting, so it is important to assess these possibilities before commencing the task.

This method is preferable to the use of gentle wet brushing alone for moss and algae because the pesticide product will first loosen the moss and algae's hold on the asbestos cement, making removal easier. However, operators need to take great care as they may have to carry out the work at a high level, with the associated risk of falls.

FOR CLADDING ACCESSIBLE FROM GROUND LEVEL

Having prepared the biocide solution in accordance with the manufacturer's instructions, it can be applied to accessible cladding using a low-pressure spray. Having allowed sufficient time for the

biocide to kill the growths and having removed them by gentle scraping on the wet asbestos cement materials, the debris should be placed without delay in a designated asbestos waste container.

FOR CLEANING AN ASBESTOS CEMENT ROOF

Due to the nature and fragility of an asbestos cement roof and the difficulties associated with access, the possibility of something going wrong and leading to possible exposure to asbestos fibres, **this cleaning work should be performed only by specialist roof cleaning contractors.** These contractors will have specialist-cleaning machines for the specific task. The technique creates a lot of slurry which must not enter the building and should be collected for disposal. Gaps and other possible points of entry for the slurry should be sealed using polythene sheeting secured with duct tape. However, care must be taken during this sealing procedure as it is dangerous to seal over exhaust vents from heating units in use. The down pipes should be disconnected to allow the slurry generated to be diverted directly to a collection and filtration system. Any solid waste and/debris should be kept wet and disposed of in designated asbestos waste containers. Clean water should then be used to flush out the slurry collection system.

Workers involved in either the scraping off of growth or operating the filtration should wear disposable particulate respirators (FF P3).

Any wet rags used to clean equipment and the segregated area, polythene sheeting and disposable PPE and RPE should be placed in designated asbestos waste containers. Workers should wash thoroughly when leaving the work area. On completion of the task the area and work should be inspected visually to ensure that the area is clean. While clearance air sampling would not normally be required, reassurance monitoring could be considered as required or if requested.

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REMOVAL AND DEMOLITION OF ASBESTOS CEMENT SHEETING

Dismantling and demolishing buildings, roofed or clad with asbestos cement sheeting, presents special problems, especially if they are old and crumbling. Many asbestos cement products, such as roof sheets, cladding, drainpipes and gutters, are located at a height and therefore present a risk of falls. Asbestos cement is a fragile material, and people must not walk on it as it cannot be relied on to support a person's weight. It is important to emphasise that falls from, and through, fragile roofs are of major concern and a factor in deaths in construction work annually. Precautions to prevent such accidents must be given priority and be considered at the stage of preparing the risk assessment for a job.

In order to minimise exposure and control the spread of asbestos fibres, you need to consider the following general precautions:

- ▼ where reasonably practicable, the asbestos cement should be removed before the rest of the structure is demolished
- ▼ where possible, avoid breaking or cutting the sheets
 - should broken pieces or debris occur, these should be kept damp, hand-picked and bagged without delay
- ▼ keep the material dampened when working on it (taking particular care regarding the overlap of sheets)
 - use hand bolt cutters to release sheets, i.e. avoid the use of powered tools which generate fine dust
 - check for debris in the fasteners or bolt holes and clean with wet rags
- ▼ where possible, lower the material intact onto a clean hard surface (**do not use rubble chutes**)
 - where Mobile Elevated Work Platforms (MEWPs) are used, consideration must be taken regarding the weight of the sheets with respect to the load capacity or load bearing of the MEWP used for the task
- ▼ once lowered to the ground, sheets should be double-wrapped in heavy (1,000) gauge polythene and stacked in a safe and secure place for disposal as soon as possible (in accordance with local rules)
- ▼ waste and debris must be removed from the site as soon as possible to prevent it being crushed underfoot or by moving vehicles
- ▼ do not bulldoze broken asbestos cement or sheets into piles or use mechanical means to break asbestos cement materials
- ▼ do not sweep asbestos cement debris
- ▼ dispose of the waste and debris safely and promptly.

MANUAL DISMANTLING METHODS

If asbestos cement sheets are in good condition and it is reasonably practicable to produce a safe system of work and provide safe access, they should be taken down whole. Roof sheets should preferably be removed from underneath (cutting the bolts manually with croppers) using mobile elevating work platforms, such as scissor lifts or cherry pickers, to gain access.

The sheets should not be dropped or damaged. Fixings should be carefully removed using bolt cutters. Operators may require suitable PPE, including RPE, based on the outcome of the risk assessment performed by a competent person(s). Once the sheets have been removed and wrapped intact in polythene sheeting, they should be placed in an appropriate enclosed container for safe disposal in accordance with the relevant legislation.

REMOTE DISMANTLING METHODS

If the sheets are disintegrating, the risk of falls is too great or the building is in a dangerous state of collapse, then remote demolition techniques such as deliberate controlled collapse should be considered based on the outcome of a risk assessment performed by a competent person(s). Remote demolition will give rise to low exposures for the equipment operators, and to those who subsequently load the waste into lorries for disposal.

When remote techniques are used, the work area must be continually sprayed with water to suppress the spread of dust which may contain asbestos fibres. The roof sheeting should be broken into the building in a controlled manner onto the floor or hardstanding, for instance by using excavators fitted with suitable demolition attachments. You should ensure that this area is clear of other materials before work commences, where possible, given the outcome of the risk assessment and the condition of the building. The system of work should be designed to minimise breakage of sheets. Before, and while loading the broken sheeting into lorries, you should keep it damp by spraying with water. Where possible debris, broken pieces and sheets should be bagged or wrapped in polythene. The lorries should be securely covered or sealed over to prevent the asbestos waste drying out on its way to disposal.

To members of the public, the remote method can appear noisy, dusty and often uncontrolled. They are often concerned about demolition of this type when they know or suspect the building was roofed or clad with asbestos cement. In order to alleviate these concerns about this type of work, contractors should:

- ▼ keep the neighbours informed about the work
- ▼ carry out background air sampling at the perimeter of the site
- ▼ clearly cordon off the work, erect warning signs and prevent unauthorised access to the demarcated work area.

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THE BEHAVIOUR OF ASBESTOS CEMENT IN FIRES

Asbestos fibres can change their mineral structure following prolonged exposure to heat. But research has shown that in fires, only the outer layers of the material containing asbestos cement are altered with the interior often remaining unaffected. This means that there will still be hazardous asbestos fibres present in debris and ash.

Exposure to the heat of a fire can cause the cement content of asbestos cement roofing, cladding, etc. to violently rupture, discharging asbestos fibres into the atmosphere and spreading debris over a wide area. Fire can also weaken the binding matrix in asbestos cement, resulting in fibres being released more easily if the solid debris or ash from the fire is disturbed. The emergency services, building occupants and contractors involved in remedial work will be those most likely to be exposed following a fire.

Before taking any remedial action, you should determine the types of materials containing asbestos present in the building. The risk from debris and ash, containing only asbestos cement, will be low as long as a number of simple precautions are taken when decontaminating the area:

- ▼ the contaminated area should be cordoned off and warning notices posted
- ▼ only essential personnel should enter the cordoned off area
- ▼ personnel should wear suitable PPE, including RPE
- ▼ disturbance of ash and debris should be kept to a minimum
- ▼ the debris should be carefully dampened down, avoiding over-wetting (to prevent the build up and spread of slurried material) and carefully removed, for example by shovelling
- ▼ larger pieces of debris should be picked up by hand and placed in heavy gauge polythene bags (made secure and appropriately labelled).

Where other materials containing asbestos cement such as asbestos insulation, asbestos coating, or AIB are present in the building, more stringent precautions will be required and **the remedial work must be carried out by a specialist asbestos removal contractor.**

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DECONTAMINATION AND CLEANING

When working with asbestos cement, employees should clean up at the end of each stage of a job to prevent the accumulation of debris and dust. As a minimum, this should be at the end of each shift, but more frequent cleaning will normally be necessary. They should use low dust cleaning methods. Once the work is complete, all surfaces should be given a final clean, again using low dust methods, before the area is handed back for normal occupation.

The following cleaning methods can be used:

- ▼ Where possible, very large pieces or whole sheets of asbestos cement should not be broken or cut for disposal as this can result in the release of asbestos fibres. They are best disposed of by wrapping in heavy gauge polythene sheeting and placing in a secure and enclosed container for safe transport to the point of disposal.
- ▼ Medium pieces of asbestos cement debris may be picked up by hand, double bagged in heavy gauge polythene bags (labelled for asbestos) and disposed of as above.
- ▼ Small pieces of asbestos cement debris and dust deposits should preferably be removed using a Type H vacuum cleaner (BS 5415). Where they are too big for vacuuming or where there is a significant amount of debris spread over a wide area, it may be more practical to collect the debris (as above).
- ▼ The external surfaces of waste containers should be cleaned before removal from the work area.

Once the work is complete, a supervisor or foreman should carry out a final inspection to confirm that all the asbestos debris has been removed and that the work area is adequately cleaned.

Workers involved in clearing up asbestos debris need to wear suitable PPE, including RPE, and receive adequate information, training and instruction so that they are aware of any risk and can perform the activities in a safe manner.

14 WASTE DISPOSAL

- (a) Waste disposal, including the disposal of asbestos cement, is covered by the provisions of the Waste Management Act, 1996. Asbestos cement is classified as hazardous waste under European waste legislation, and a specific code applies to waste construction material containing asbestos, as listed in the European Waste Catalogue and Hazardous Waste List, 2002 (EWC 17-06-05), available from the Environmental Protection Agency (EPA).
- (b) **Prior to any removal work, a suitable facility for disposal should be identified.** Asbestos waste can be disposed at an appropriate facility either in Ireland or exported abroad. The trans-frontier shipment of asbestos waste is subject to control procedures under EU and national legislation, the Waste Management (Transfrontier Shipment of Waste) Regulations, 1998.
- (c) Within the State asbestos cement can only be disposed of at a waste facility licensed by the Environmental Protection Agency. Only a small number of the landfills in Ireland actually accept asbestos waste and, of those sites, the Local Authority landfills generally only accept small quantities of this type of waste from private dwellings. Large quantities of waste, such as that from a factory roof removal, will require disposal at a private landfill licensed by the Environmental Protection Agency or be exported to a similar facility.
- (d) Once the asbestos cement is removed safely it should be wrapped in heavy gauge polythene bags (labelled for asbestos). The movement of hazardous waste within the State is subject to a notification procedure, involving the provision of consignment notes to local authorities of the despatch and destination. Any hauliers or contractors used to transport the asbestos cement waste must be authorised under the Waste Management (Collection Permit) Regulations, 2001, and have a valid waste collection permit to collect this type of waste.
- (e) Asbestos cement can also be disposed of via hazardous waste transfer stations licensed by the Environmental Protection Agency. These facilities accept asbestos cement and then arrange to have the waste disposed of at an appropriate facility either in Ireland or abroad.
- (f) Details of Landfills and Hazardous Waste Transfer Stations are available on the **EPA website: www.epa.ie**

The Council Decision of 19 December, 2002 (in accordance with the Landfill Directive 1999/31/EC) established criteria and procedures for the acceptance of waste, including asbestos waste, at landfills.

Construction materials containing asbestos and other suitable asbestos waste may be landfilled at landfills for non-hazardous waste in accordance with Article 6(c)(iii) of the Landfill Directive without testing.

For landfills receiving construction materials containing asbestos and other suitable asbestos waste, the following requirements must be fulfilled:

- the waste contains no hazardous substances other than bound asbestos, including fibres bound by a binding agent or packed in plastic
- the landfill accepts only construction material containing asbestos and other suitable asbestos waste. This waste may also be landfilled in a separate cell of a landfill for non-hazardous waste, if the cell is sufficiently self-contained.
- in order to avoid dispersion of fibres, the zone of deposit is covered daily and before each compacting operation with appropriate material and, if the waste is not packed, it is regularly sprinkled
- a final top cover is put on the landfill/cell in order to avoid the dispersion of fibres
- no works are carried out on the landfill/cell that could lead to a release of fibres (e.g. drilling of holes)
- after closure a plan is kept of the location of the landfill or cell indicating that asbestos wastes have been deposited
- appropriate measures are taken to limit the possible uses of the land after closure of the landfill in order to avoid human contact with the waste.

For landfills receiving only construction material containing asbestos, the requirements set out in Annex I, point 3.2 and 3.3 of the Landfill Directive can be reduced, if the above requirements are fulfilled.

Facilities accepting significant quantities of asbestos cement will require reassurance fibre monitoring.

Upon removal of materials containing asbestos cement it is recommended that these waste materials be disposed of in an appropriate and proper manner without delay. It should be noted that, under the requirements of the Waste Management Act, 1996, waste cannot be stored for long periods of time on-site and the storage of waste for more than six months requires a waste licence.

Disposal of materials containing asbestos cement, other than in an approved manner, will result in prosecution, under the Waste Management Act, 1996, of those found responsible for such activity.

For further information on waste disposal, contact should be made with the relevant Local Authority and/or the Environmental Protection Agency.

15 AIR MONITORING

The need for air monitoring should be determined as part of the assessment of the work. It may be required for one or more of the following reasons:

- ▼ to confirm that airborne concentrations of asbestos fibres are as low as reasonably practicable and that the correct choice of RPE has been made
- ▼ to confirm that there has been no measurable spread of airborne fibres to areas adjacent to where work with asbestos cement has taken place
- ▼ to confirm that the work area has been adequately cleaned before being returned to normal use.

Air monitoring is not always required but may be of particular importance where:

- ▼ large quantities of asbestos cement have been handled
- ▼ the work involved necessary use of powered tools or breakage of the material
- ▼ where significant contamination has occurred.

As an employer, you must only engage competent persons to carry out monitoring and analytical work etc.

If you wish to carry out your own air monitoring, you should make sure that employees carrying out the monitoring are competent to do this work, including the need for training, etc.

16

**RESPIRATORY PROTECTIVE EQUIPMENT
(RPE) FOR WORK WITH ASBESTOS CEMENT**

RPE should not be used as the only means of controlling exposure. Before considering the use of RPE, airborne asbestos fibre concentrations should be reduced to as low a level as is reasonably practicable by other means. If, despite these precautions, the exposure of your employees to asbestos fibres is likely to exceed the limit value you must always provide suitable RPE. Your workers must be trained in the use of RPE. This should reduce exposure to as low a level as is reasonably practicable and, in any case, below the limit value.

Always remember to choose RPE which protects employees to a level of exposure well within the upper limit of its protection range. If in doubt, always select higher performance equipment, providing that it is suitable, i.e. consider the 'worst case scenario' and protect for that situation.

Workers should receive appropriate and adequate information and training regarding the use, maintenance, handling, storage, cleaning and disposal of RPE as necessary, dependent on the work activities and level of RPE protection required.

Remember that you should never rely on RPE as your main method of controlling exposure. RPE is no substitute for good fibre suppression.

17

PROTECTIVE CLOTHING FOR WORK WITH ASBESTOS CEMENT

The type of protective clothing provided will depend on the likely exposure and should be suitable for the job. As a general rule, employees need to be provided with protective clothing if asbestos dust is liable to get on their clothes. You should regard any deposit of dust as potentially containing asbestos fibres, based on the nature of the work activity and the conclusions of a risk assessment.

Disposable overalls are normally preferable to cotton type overalls as this removes the need for sending them to a laundry suitably equipped to handle clothing contaminated with asbestos. However, the final choice will depend on the assessment and the suitability of the protective clothing for the work. For example, working outside in cold and wet conditions may require the use of waterproof clothing.

Contaminated clothing should be vacuumed using a Type H vacuum cleaner (BS 5415), and be removed on leaving the work area for work-breaks and at the end of the work period. It should be stored separately from clean clothing. It must **never** be taken home for cleaning. Arrangements need to be made with a specialised laundry equipped to deal with asbestos-contaminated clothing, and you must follow their procedures for packaging the laundry. Waterproof clothing needs to be sponged or wiped clean.

Disposable overalls should be disposed of as asbestos waste at the end of each shift.

Workers should receive appropriate and adequate training regarding the use, maintenance, handling, storage and disposal of PPE.

18

CLEANING AND HYGIENE FACILITIES

Facilities need to be provided for employees to wash thoroughly after working with asbestos cement. The type and extent of the washing facilities depend on the nature and degree of exposure to asbestos. Where exposure is low and infrequent, e.g. in the case of minor repair work, the facilities may be shared with other employees who are not likely to be exposed to asbestos.

However, you normally need separate hygiene facilities where it is likely that protective clothing may become significantly contaminated with asbestos, for example, where:

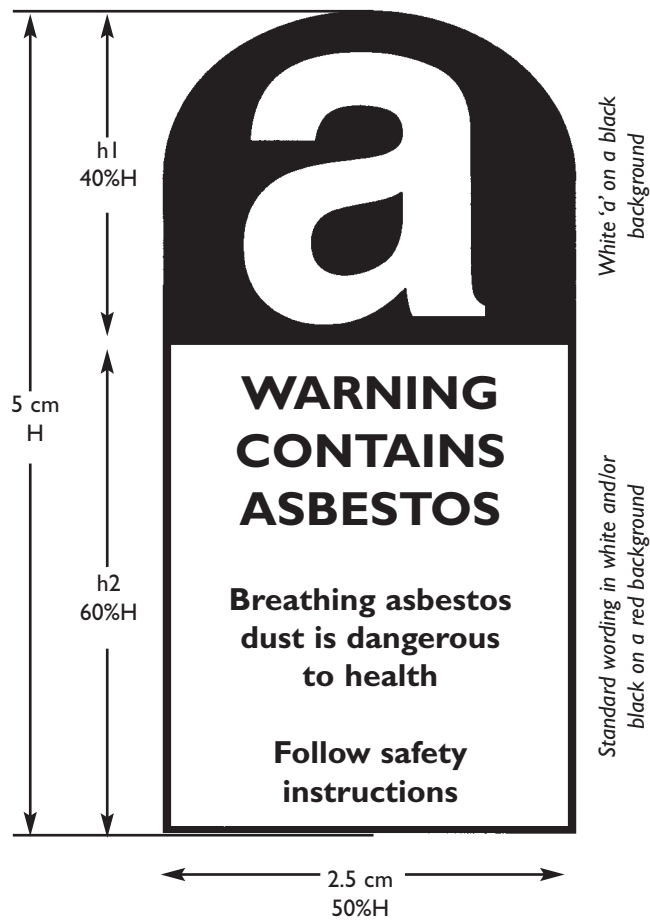
- ▼ large quantities of asbestos cement have been handled
- ▼ the work involves the necessary use of powered tools or breakage of the material
- ▼ significant contamination needs to be removed.

Where this level of contamination is likely to occur, the work should only be performed by a specialist asbestos removal contractor, who will have the training, equipment, clothing, portable or appropriate facilities etc. to cope with such situations.

APPENDIX I

LABELLING REQUIREMENTS FOR PLASTIC BAGS/SACKS CONTAINING ASBESTOS WASTE

European Communities (Dangerous Substances and Preparations) (Marketing and Use) Regulations 2003 (S.I. No. 220 of 2003)



APPENDIX 2

WARNING NOTICES



Figure 1: Standard wording.



Figure 2: Wording for highlighting specific ACMs in situ.

APPENDIX 3

WARNING NOTICES – FRAGILE ROOF (ASBESTOS CEMENT CONTAINING ROOF)





Examples of asbestos cement containing materials

Guidelines on Working with Materials Containing Asbestos Cement

*Achieving a
Healthy
and Safe
Working Life
-Together*

HEALTH AND SAFETY
AUTHORITY HEADQUARTERS

10 Hogan Place, Dublin 2

Tel. 1890 289 389

Fax. (01) 614 7020
website: www.hsa.ie



HEALTH AND SAFETY
AUTHORITY

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