INTRODUCTION

This guidance note provides information on the risks of exposure to asbestos dust when working with asbestos cement and on the precautions which should be taken.

The physical dangers to workers, who are particularly at risk during construction, maintenance, or demolition, are not dealt with. 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 work and precautions to prevent such accidents should be given priority. Advice is contained in Guidance Booklet HS(G)33 Safety in Roofwork.

LEGISLATION

The Control of Asbestos at Work Regulations 1987 (CAWR) apply to all work with asbestos-containing materials, including asbestos cement. In particular they place duties on employers to prevent or reduce to the lowest level reasonably practicable the spread of asbestos from the workplace and the exposure of employees to asbestos. It is important to remember that ‘exposure’ refers to the level of airborne dust outside any respirator that is worn. Two Approved Codes of Practice (ACOPs) give advice on the kind of precautions needed to comply with the requirements of the Regulations. Only one of them The control of asbestos at work - applies to work with asbestos cement. The other Work with asbestos insulation, asbestos coating and asbestos insulating board, should not be used.

The Regulations set control limits and action levels for asbestos. Control limits are expressed as concentrations of airborne fibres averaged over any continuous 4 hour or 10 minute period. Action levels are expressed as cumulative exposures over any continuous period of 12 weeks. The average levels of asbestos fibre in the air inhaled by anyone must not exceed the control limits. The action levels govern the operation of some of the Regulations of CAWR: those dealing with notification, medical surveillance and designation of work areas. It is unlikely that the action level will be exceeded for anyone carrying out routine, intermittent site work with asbestos cement.

COMPOSITION, PROPERTIES AND USES

Asbestos cement products have been widely used for many years in the construction and other industries, most commonly as flat or corrugated roofing or cladding sheets, tiles, pipes and guttering. It is still used in new construction work.

Asbestos cement is a grey, hard brittle material normally containing 10-15% asbestos fibre. New material contains exclusively chrysotile (white asbestos) but in the past crocidolite (blue asbestos) and amosite (brown asbestos) have been used, particularly in the manufacture of asbestos cement pressure pipes. Some asbestos cement products (eg cladding sheets, tiles and rain water pipes) are painted or coated before they are sold, or at a later stage. Asbestos cement differs from asbestos insulating board in that it is denser and more brittle. If there is doubt about the nature of an asbestos material the bulk density of a dry sample can be calculated. Detailed guidance on measuring the density of asbestos cement is given in British Standard BS 4624:1981.

The main uses of asbestos cement are in:

(a) corrugated sheets (for roofing and cladding of farm buildings, factories, warehouses and garages);

(b) accessories for corrugated sheeting such as ridge caps, eaves and fillers for roofs;

(c) flat sheeting for partitioning, cladding and door facings;
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(d) rainwater goods such as gutters, pipes and troughs;
(e) roofing tiles and slates;
(f) other products such as flue pipes, decking tiles, cisterns and sumps;
(g) large cement pipes for conveying liquids and gasses.

IDENTIFICATION

8 Asbestos cement products can generally be identified by their appearance, but you can never be sure from colour alone if asbestos is present, or of the type involved. Many newer non-asbestos products resemble asbestos cement. Even though new asbestos products should normally be marked with an 'a' logo it is unlikely that it will be found on materials already installed on site. Other sources of information are building plans and original specifications. Suppliers should be able to give an indication of the type and quantity of asbestos you may find in given products.

9 If there is doubt about the presence of asbestos in cement products the only satisfactory way to find out is by laboratory analysis of a bulk sample. Taking samples can itself be dangerous if the material is on a roof or in a place where there is a risk of a fall, and in those cases should be done only when alternative means of identification have failed and there is a definite need to confirm the presence or type of asbestos. The bulk samples should be taken only by someone with suitable training and experience.

10 The composition of cement products is normally uniform making representative sampling a simple task. The sampling site chosen should be readily accessible and easy to clean and repair after sampling.

11 Where old asbestos cement is involved, the type of asbestos should be confirmed by sampling and analysis as some of it may be amosite or crocidolite asbestos. An alternative is just to assume that the asbestos is crocidolite or amosite and act accordingly.

12 During sampling for bulk material these precautions should be taken:
(a) a safe means of access must be provided if any work is to be done at heights, eg on roofs or wall claddings;
(b) only people involved in the sampling should be allowed in the immediate area;
(c) care should be taken to minimise damage to the asbestos cement from which the sample is taken. A small hand tool should be used and the sample placed in a sealable container such as a self sealing plastic bag with suitable labelling;
(d) any surfaces contaminated during sampling should be cleaned using a dustless method. It should be possible to sample asbestos cement without the need for Respiratory Protective Equipment (RPE) or for protective clothing (see paras 26 to 30), but a judgement should be made depending upon the amount of contamination of the sampler's clothes;
(e) sampling should not leave ragged or crumbling edges.

Risk of exposure

13 Asbestos cement is a hard composite material and generates less dust than most other products containing asbestos. But the risk of fibre release is still there, either through accidental abrasion or in the normal course of work with the material. The risk of fibre release is greater when the material is damaged or decaying.

14 The extent of dust release depends on the nature of the work. Simple tasks with hand tools on new asbestos cement products will usually create exposures well below the control limits. More extensive work and work on worn, crumbling or damaged products can cause higher exposures which may exceed them.

15 Work with power tools is often particularly dusty, for example machine sawing, grinding, or cutting with abrasive discs. Cleaning of old and weathered asbestos cement can also produce high airborne fibre levels especially if the surface is dry. Some machine sawing and cutting operations without exhaust ventilation can produce respirable airborne fibre concentrations of 10 fibres/ml or more. Handling new asbestos cement products will not normally give rise to exposures above the control limit or the action level, but if contamination of clothing is likely suitable protective clothing should be provided and worn.

ASSESSMENT

16 An important requirement of CAWR is that before work begins employers (including the self employed) should make an assessment of the likely exposure. The assessment should include an account of the steps to be taken to prevent or reduce that exposure. It should be in writing unless the work is small-scale and exposures are low, such that it is simple and can be easily repeated and explained. Some work with asbestos cement will fall into this category but for larger-scale and more complicated jobs the assessment should be written down. Normally it will be unnecessary to prepare a separate one for each job. If the work varies little from site to site and precautions are always the same, one overall assessment will do. But if there are significant differences a supplementary assessment may be needed to cover the things which are specific to a particular site.

PRECAUTIONS

17 Employers should try first to plan work so that exposure to asbestos is avoided altogether. If that cannot be done then precautions should be taken to
keep exposure as low as reasonably practicable and to make sure that workers are adequately protected.

18 The precautions needed will depend on the kind of work to be done, where it is, how long it will take and who will be affected by it. For example, stricter precautions will be needed for work inside an occupied building than on a remote site in the open air.

19 The following precautions should be taken for all work with asbestos cement, even where exposure to dust is likely to be low.

(a) Instruct workers in ways of working that keep dust generation to a minimum;

(b) Keep the work area clean and tidy. Take care to prevent the spread of contamination and the accumulation of waste materials. Clean by a dustless method such as washing or by using vacuum cleaners suitable for asbestos.

20 Some tasks are likely to create substantial releases of dust or put workers at greater risk of contamination. They include:

(a) work on products containing crocidolite or amosite;

(b) work on asbestos cement which is old, brittle, liable to break or whose surface has become powdery;

(c) work with power tools such as cutting and grinding discs or high speed circular saws;

(d) breakage of large quantities of asbestos cement;

(e) cleaning operations on asbestos cement sheet;

(f) wet-flushed disc cutting of asbestos cement where slurry and/or water has dried out.

21 For those higher risk operations, or any other where the assessment shows that similar amounts of dust are likely to be generated, the following extra precautions should be taken:

**Planning and preparation**

22 Plan the work to minimise the amount of work on asbestos cement which breaks it or creates dust.

23 If possible, carry out high risk operations such as cutting and machining at a central point to make supervision, control and prevention of the spread of contamination easier.

24 Mark the work area with warning signs and segregate it to prevent non-asbestos workers approaching. Where the control limits are liable to be exceeded, the notices should say that the area is a 'respirator zone' and RPE must be worn in it. If the action level is liable to be exceeded the area should be identified as an 'asbestos area'. In either case employers should not permit people who are not engaged in the work to remain in the area.

**Work methods**

25 Choose work methods which do not create unnecessary dust. The following 'do's' and 'don'ts' give an idea of how to keep dust levels to a minimum.

(a) Do use exhaust ventilation equipment wherever reasonably practicable;

(b) Do keep the material wet wherever possible;

(c) Do not use cutting and grinding discs or circular saws to cut or mitre asbestos cement. Use a hand or reciprocating saw or scribe and break flat sheets or slates;

(d) Do not use any dry abrasive processes such as sand blasting, sanding, or dry brushing;

(e) Do not use cleaning methods for asbestos cement sheeting which generate excessive dust or water mists.

**Personal protective equipment**

26 Respirators should be worn if the control limits are liable to be exceeded. The equipment provided should either be type-approved by HSE or conform to a standard approved by HSE. Information on the protection offered, suitability and the approval of RPE should be obtained from the manufacturer. Type approved equipment will be shown on the list of HSE type-approved RPE. It should give adequate protection against likely dust levels and should be suitable for the job. Respirators which rely on a good face seal to be effective (e.g. on nasal and some high efficiency types), are not suitable for people with beards or spectacles.

27 Workers should be trained how to use respirators. The equipment should be maintained in good working order, cleaned and disinfected after use and stored in a suitable locker or container.

28 Workers should be provided with protective clothing if a significant quantity of asbestos is liable to be deposited on their clothes. Protective clothing will not be required where dust levels are very low and exposures are brief and there is little risk of asbestos materials sticking to clothing. Protective clothing should be matched to the job. Airborne fibre levels are one factor among several to be taken into account, but where expected levels are high, as in much asbestos removal for example, it is likely that a full suit of protective clothing including headwear, clothing and footwear will be necessary. Where exposure is low but still liable to
lead to deposit of significant quantities of asbestos, perhaps through rubbing contact with wet or friable material, industrial working clothing, such as dust jackets and overalls will be adequate. Contaminated clothing should be stored in a secure place away from changing facilities.

29 After work, asbestos workers should wash thoroughly. Where significant bodily contamination is possible, it may be necessary to provide separate decontamination units including showers.

30 Contaminated overalls should never be taken home for cleaning. They should be sealed in suitably labelled impervious bags and sent to a laundry equipped and able to deal with asbestos contaminated clothing or, where appropriate, disposed of as asbestos waste.

Cleaning

31 At the end of the shift, the work area should be cleaned of any asbestos dust or debris. In particular:

(a) waste and debris must be cleaned up and taken for disposal as soon as possible. Fine debris or waste liable to generate dust should be placed in suitable closed containers which prevent the escape of asbestos dust. Heavy duty polythene bags may be suitable. When the container is full it should be sealed, the outside cleaned and it should be placed in a separate storage area for disposal. Containers should be labelled to show that asbestos is present. The CAWR and ACOPs set out how this should be done. Larger pieces of asbestos cement, including whole sheets, should not be broken or cut for disposal in plastic sacks. Whole sheets and large pieces of asbestos cement are best disposed of by careful transfer to covered lorries or skips, or by wrapping intact in sheet plastic or other suitable material;

(b) the external surfaces of waste containers should be cleaned before the containers are removed from the work area;

(c) work surfaces should be cleaned by a dustless method such as a vacuum cleaner. Vacuum cleaners should comply with BS 5415 (Type ‘H’). If a vacuum cleaner is not used debris should be thoroughly wetted before shovelling into strong plastic bags. Workers involved should wear suitable personal protective equipment and other non-essential personnel kept well away.

DEDEMOLITION WORK AND REMOVAL OF ASBESTOS CEMENT SHEETING

32 Dismantling and demolishing buildings roofed or clad with asbestos cement sheet presents special problems. A large number of sheets will have to be removed which are often old and crumbling. The following factors have to be weighed against one another:

(a) the exposure of the worker to asbestos dust;

(b) contamination of the surrounding environment by asbestos dust;

(c) the risk that the worker will fall, especially through the asbestos cement itself.

33 If the sheets are in good condition and it is reasonably practicable to provide safe access then they should preferably be taken down whole. If they are disintegrating, or the risk of falls is too great, remote demolition by machine, such as crane and ball, pusher arm or deliberate collapse may be used. Careful remote demolition gives rise to low dust concentrations of about 0.1 f/ml, but subsequent clearance may result in much higher concentrations of more than 1 f/ml. To avoid the risk of spread of contamination the following precautions should be taken.

(a) Carry out the work before demolition of the rest of the structure.

(b) Drop the material on to a clean, hard surface.

(c) Keep the material wet whenever practicable.

(d) Remove waste and debris from the site as soon as possible to prevent it being disturbed, eg by moving vehicles.

(e) Handle and dispose of the material in the way described in para 31.

(f) Take care to avoid plant being driven over asbestos cement sheet. If, following remote demolition techniques broken asbestos cement sheet is gathered by mechanical means it should be well wetted to minimise fibre release. Broken asbestos cement sheet should not be bulldozed into a pile.


35 Guidance on the disposal of asbestos waste is given in the Code of Practice for the disposal of asbestos waste published by the Institute of Waste Management. Asbestos cement waste will always be 'controlled waste' under the Control of Pollution Act 1974, and should therefore be taken to a site licensed by the waste disposal authority. Unless it contains crocidolite or has been finely crushed it is unlikely to be 'special waste' for the purpose of the Control of Pollution (Special Waste) Regulations 1980. If waste is to be removed from a site it should be sealed in a clearly marked container labelled as required by CAWR. There should be effective arrangements for dealing with any spillage and, if necessary, for decontamination of any vehicle used for transport.

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CLEANING WEATHERED ASBESTOS CEMENT SHEETS

36 After several years asbestos cement used externally may become covered with lichens, algae or mosses. Such growths will have no noticeable effect on the strength, durability or lifetime of the structure although it may become visually unattractive. Unless the vegetative growth is removed or disturbed there will be no measurable release of asbestos fibre. Contractors and owners/occupiers should ask themselves whether it is necessary to clean asbestos cement sheets at all on grounds of aesthetic appearance as cleaning operations will result in some fibre release. If it is decided to remove these growths one or more of the following methods might be appropriate.

(a) Wet wire brushing.
(b) Dry scrubbing.
(c) Toxic washes.
(d) Water jetting.

When deciding how to clean, remember that dry methods are much dustier than wet ones. On the other hand, water jetting, though it can clean quickly and thoroughly, has serious drawbacks. It is likely to strip off the surface of the sheets themselves, producing significant levels of airborne fibre, and in some circumstances enclosure may even be needed. A lot of slurry, which is difficult to control, is also formed. Unless these effects can be properly dealt with, water jetting should not be chosen as a cleaning method.

OTHER SOURCES OF GUIDANCE

Approved Code of Practice COP 21: The Control of asbestos at work covers all work activities with asbestos and gives advice on compliance with CAWR. HMSO ISBN 0 11 883984 5.

HSE Guidance Notes

EH 10: Asbestos exposure limits and measurement of airborne dust concentrations gives practical advice for people who need to have asbestos sampling and analysis done. (HMSO ISBN 0 11 885401 1 - revision in preparation).

EH 35: Probable asbestos dust concentrations at construction process includes advice on likely dust concentrations when working with asbestos cement sheets and pipes. HMSO ISBN 0 11 885421 6


EH 47: The provision, use and maintenance of hygiene facilities for work with asbestos insulation and coatings HMSO ISBN 0 11 883933 0.

EH 50: Training operatives and supervisors for work with asbestos insulation and coatings HMSO ISBN 0 11 885400 3.

EH 51: Enclosures provided for work with asbestos insulation, coatings and insulating board HMSO ISBN 0 11 885408 9.

EH 52: Removal techniques and associated waste handling for asbestos insulation, coatings and insulating board. HMSO ISBN 0 11 885409 7


HS(G)33: Safety in roofwork HMSO ISBN 0 11 883922 5.


GS 29/4: Health and safety in demolition work Part 4: Health hazards HMSO ISBN 0 11 883604 8

Respiratory protective equipment (RPE). Lists of HSE approved standards and type approved equipment. Available from HSE Public Enquiry Points.

Other publications

BS 4624: Methods of Testing for Asbestos Cement in Building Products.

BS 5415 Supplement No 1 (1986), Section 2.2: 1986, Specification for Type H industrial vacuum cleaners for dusts hazardous to health, both available from BSI, Linford Wood, Milton Keynes MK14 6LE.

Audiovisual package on training in the use of respiratory protective equipment against Asbestos for Construction, Demolition and similar work on ships - available from CFL Vision, Chalfont Grove, Gerrards Cross, Bucks SL9 8TN.
A comprehensive list of these and other Government publications on asbestos is given in the Asbestos Subject Catalogue. This is a free publication which can be obtained from any HSE Area Office or from any of HSE's public enquiry points at the following addresses:

Health and Safety Executive
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Broad Lane
SHEFFIELD S3 7HQ
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