

Possible mesothelioma risk to residents of Anderson Tower, Motherwell

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The level of risk to residents reoccupying Anderson Tower depends on four factors:

the concentration of asbestos fibres present in the building when residents reoccupy the building;

the type of asbestos fibres that were released into the building;

the likely duration of exposure to asbestos fibres; and,

the age range and likely life expectancy of the residents.

I address these four factors below.

The concentration of asbestos fibres present in the building when residents reoccupied the building

This concentration will depend on the criterion applied by the Council when releasing the building for reoccupation and whether fibre levels in both circulation and residential areas were sampled.

I would have expected both areas to have been sampled; particularly on the storeys in which asbestos was disturbed, as, depending on wind speed and direction, contaminated air could have entered one or more residential area when doors to circulation areas were opened.

For many years it has been the habit of Councils to interpret the Clearance Indicator level of 0.01 fibres/ml as the level below which mesothelioma risk is "low", although the contemporary Approved Codes of Practice (ACoP) have explicitly stated that such level "is not an acceptable permanent environmental level", e.g. see HSC (2006).

In a recent series of HSE/British Occupational Hygiene Society (BOHS) Roadshows Dr. Martin Gibson of the HSE suggested that Reassurance Sample results should be below 0.001 fibres/ml, Gibson (2013).

The type of asbestos fibres that were released into the building

From the literature amosite was commonly used in 1960s and 1970s tower blocks to provide fire protection, e.g. as in the Red Road Flats.

In the following risk assessment it will be assumed that the type of asbestos disturbed was amosite.

The likely duration of exposure to asbestos fibres

It is generally recognised that airborne fibre levels in buildings from which asbestos has been removed remain above the pre-work level for a number of months after completion of the work, e.g. see Jaffrey et al (1988).

For the purposes on a risk assessment it is considered reasonable to assume that such elevated fibre levels will last for about 3 months.

Conventional risk estimates, e.g. as in Hodgson and Darnton (2000), are based on a 40 hours per week exposure duration, i.e. are based on occupational exposures.

In residential situations the exposure duration per week is likely to range from about 60-140 hours depending on the residents' age and employment status. That is, the total number of fibres inhaled by residents in a given airborne fibre concentration will be 1.5-3.5 times higher than would have been inhaled in an occupational environment.

The age range and likely life expectancy of the residents

There is generally a long delay between exposure to asbestos and development of mesothelioma. Such "latent period" is generally about 40 years and can be longer for "low level" exposures.

As younger people are more likely than older people to survive for about 40 years from date of exposure, the younger residents are more likely to live long enough to develop mesothelioma than residents aged over about 50.

Mesothelioma risk increases as the time since exposure to the power 3-4.

As younger residents are likely to survive for substantially longer than 40 years from exposure their risk of developing mesothelioma will continue to increase for many decades.

In addition, current data from the Office for National Statistics (ONS) suggest that about 1/3-2/3 of today's babies are likely to survive to age 100, e.g. see ONS (2012).

In assessing mesothelioma risk it is therefore essential to take account of residents age and likely life expectancy.

In the following risk assessment it is assumed that 30 year-olds will survive at age 80 and 0-4 and 10 year-olds will survive to age 90.

Risk assessment

The following risk assessment is based on an extension of Hodgson and Darnton (2000) using the Doll and Peto (1985) model and as in Howie (2013).

For the purposes of the assessment it will be assumed that exposure levels will be equivalent to either 0.01 or 0.001 fibres/millilitre (fibres/ml) of amosite over a period of 3 months and that exposure durations over that period will be 60 hours per week for adults and school children and 140 hours per week for pre-school children, i.e. total exposures of about 720 hours for adults and school children and 1700 hours for pre-school children. Adults will be assumed to be aged 30 and school children will be assumed to be aged 10.

Note that it is usual to assess risk in terms of risk per million exposed persons.

Estimated mesothelioma risk per million exposed persons

Exposure group	Exposure level (fibres/ml)	
	0.01	0.001
pre-school children - aged 0-4	245	44
school children - aged 10	95	17
adults -aged 30	14	2

From the above the risks to pre-school children and 10 year-olds are about 20 and 8 times higher respectively than to 30 year-olds.

HSE has defined the upper boundary of "acceptable" risk as being a rate of 1 per million per year, HSE (2001, 1992, 1988).

For cancer risks accumulated over a short period the above risks can be considered as being in units of risk per million per year. That is, for pre-school children the risks from 0.01 and 0.001 fibres/ml can be assessed as being about 245 and 44 times the level of "acceptable" risk and that the risks for 10 year-olds are 95 and 17 times the "acceptable" level respectively.

In assessing risk it is usual to take account of those likely to be the most vulnerable.

It is therefore essential that the Council have taken full account of all the above factors in permitting residents to reoccupy the Anderson Tower.

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