**SHERIFFDOM OF LOTHIAN AND BORDERS**

**IN THE ALL-SCOTLAND SHERIFF PERSONAL INJURY COURT**

**Case ref: PIC-PN1252-20**

JUDGMENT

by

SHERIFF CHRISTOPHER DICKSON

in causa

ALEXANDER STRACHAN

PURSUER

against

GLASGOW CITY COUNCIL

DEFENDERS

**Pursuer: McNaughtan KC; Thompsons**
**Defender: Rolfe; Glasgow City Council**

**Edinburgh, 30 May 2024**

The sheriff, having resumed consideration of the proof, finds the following facts admitted or proved:

**FINDS IN FACT**

1. That the pursuer is Alexander Strachan. His date of birth is 27 July 1940.

2. The defenders are Glasgow City Council a local authority established under and in terms of the Local Government etc. (Scotland) Act 1994. The defenders are the successors to Glasgow Corporation.

3. The pursuer has asbestos related pleural plaques.

4. The pursuer has asbestos related diffuse pleural thickening. The pursuer suffers 10 per cent respiratory disability attributable to his diffuse pleural thickening condition.

5. The pursuer began employment with Glasgow Corporation when he was aged 15. On his 16th birthday, on 27 July 1956, the pursuer began an apprenticeship with Glasgow Corporation as an apprentice electrician. The pursuer remained in that position and successfully completed his apprenticeship on 4 August 1961. After completing his apprenticeship the pursuer continued his employment with Glasgow Corporation until 12 August 1966. Between 4 August 1961 and 27 January 1963 the pursuer was employed as an electrician and thereafter, between 28 January 1963 and 12 August 1966, he was employed as a work study observer.

6. When the pursuer began his apprenticeship with Glasgow Corporation he worked on building sites at Drumchapel and Easterhouse. About one year into his apprenticeship the pursuer moved to what was known as 'the central work shop'. This entailed the pursuer being sent to various buildings owned by Glasgow Corporation in order to conduct electrical works.

7. In around early 1958 the pursuer was required to conduct electrical works at Glasgow High School, Elmbank Street, Glasgow (all references will be to this school). The pursuer was required, with other workers, to re-wire at least two of the buildings within the school. These works took a total of about six months. As part of these works the pursuer was required to conduct electrical works in the school boiler room of one the said two buildings within the school.

8. The school boiler room was about 25 metres in length, about 9 to 10 metres in width and the ceiling was about 14 feet (approximately 4.2 metres) above the floor. At that time the school boiler room contained six new oil fired boilers. Each oil fired boiler was about 2 metres in length and 4 metres in width. The oil fired boilers were located in a row with about a 2 metre gap between each oil fired boiler. At one end of the school boiler room was an empty space but that empty space contained pipes that ran to the oil fired boilers. The oil fired boilers were in operation when the pursuer was conducting the electrical works in the school boiler room.

9. The electrical works in the school boiler room involved the pursuer: (i) installing surface mounted three quarter inch diameter conduit on the walls and ceilings; (ii) running cables through the conduit; and (iii) installing rows of light fittings and sockets. The most time-consuming part of the electrical works in the school boiler room was the installation of the conduit on the walls and ceilings. The conduit was fixed to the walls and ceilings at approximately 3 metre intervals. This involved drilling holes by hand every three metres, inserting a rawl plug into each hole and screwing the conduit to the wall or ceiling using a component known as a saddle. When the pursuer was fixing conduit to the ceiling he would sit on the top of an 'A' frame trestle. The 'A' frame trestle had two sides each containing rungs. The two sides of the trestle were connected by two ropes which prevented the two sides from moving too far apart. The top part of the trestle that the pursuer sat on was slightly less than a metre in length. When the pursuer was sitting on the trestle the top of his head would be about 150mm below the ceiling of the school boiler room.

10. The pursuer worked in the school boiler room for about two weeks. During that period he worked five days per week between 08.00 hours and 17.00 hours with a 30 minute break for lunch. Tea breaks were not permitted and whilst other workers took unofficial tea breaks the pursuer generally did not do so. The pursuer commenced his shift at a room (which was known locally as a 'howf') in the school that the workers had been allocated to store their tools and take their lunch break. The pursuer commenced work at the howf at 0800 hours and was working in the school boiler room by about 08.15 hours. The pursuer took his 30 minute lunch break at the howf and would leave the school boiler room at about 16.45 hours and return to the howf. The pursuer completed the electrical works in the school boiler room alone. During the two week period that it took the pursuer to complete the electrical works in the school boiler room the pursuer spent about 8 hours a day working in the school boiler room and a total of about 80 hours working in the school boiler room (8 hours x 10 days = 80 hours).

11. Throughout the pursuer's time working in the school boiler room there were three or four other men working in the school boiler room who were known as laggers. These laggers were applying insulation to the pipes in the school boiler room. The laggers were using bags of dry powder to make the insulation. The bags of dry powder were around the same size as a 50kg bag of concrete but weighed less than that. The consistency of the dry power ranged from pea sized to fine dust. The dry powder contained asbestos. The laggers used a metal bath, which was located in the school boiler room and which was around 1 metre in length, 0.5 metres in width and 0.5 metres in depth, to mix the dry power with water. The laggers put water in the bath. They would then slit open three or four bags of the dry powder and empty them into the bath. The laggers would shake the

upturned bags of dry powder in attempt to ensure that all the dry powder was out of the bag. This process produced a substantial quantity of asbestos dust. The asbestos dust went everywhere. The laggers mixed the dry powder and water in bath with spades and ended up with a stiff mix, which was known as "monkey dung". The laggers then applied the mix to the pipes in the school boiler room with their bare hands and shaped and smoothed it around the pipe to a thickness of about 50mm.

12. The laggers repeated the process of emptying and mixing three or four bags of the dry powder in the bath with water (the "mixing process") at a frequency of approximately every 30 to 45 minutes throughout each day the pursuer was conducting the electrical works in the school boiler room. This repeated mixing process resulted in the asbestos dust never clearing from the school boiler room.

13. The way the electrical and lagging works ended up being carried out resulted in the pursuer and laggers unintentionally following each other around the school boiler room and resulted in them being in close proximity with one another. For the majority of time the pursuer spent conducting the electrical works in the school boiler room he worked in close proximity to the laggers, which included when the laggers were conducting the mixing process. The distance the pursuer was from the laggers generally varied between about 0.5 metres to 3 – 4 metres, but the pursuer was more usually closer to the 0.5 metre end of the said range. On occasions the pursuer would not be in close proximity of the laggers but the school boiler room was nevertheless full of asbestos dust from the dry powder. The asbestos dust from the dry powder would linger in the school boiler room throughout the day. There was no ventilation in the school boiler room other than natural ventilation via the boiler room door or doors and possibly windows. During the

electrical works at the school boiler room the pursuer wore a blue boiler suit but that quickly became grey due to the asbestos dust from the dry powder. The asbestos dust from the dry powder got on the pursuer no matter where the laggers were in the school boiler room. The pursuer's blue boiler suit was not provided by Glasgow Corporation.

14. After the pursuer had finished working at school he was required to conduct electrical works, in the second half of 1958, at Cranstonhill Baths, Elliot Street, Glasgow (all references will be to these baths). As part of his duties the pursuer required to re-wire lights and sockets in the rooms that made up the boiler house. There were three rooms in total. There was a room that contained a dilapidated coal fired boiler ("the bath boiler room") and two other rooms next to the bath boiler room. The pursuer spent about three weeks working in the three rooms but only around three half days in the bath boiler room. Therefore the pursuer spent a total of about one and half days' working in the bath boiler room. The pursuer commenced his shift at a howf located in the baths. The pursuer again commenced work at the howf at 0800 hours and was working in the three rooms by about 08.15 hours. The pursuer took his 30 minute lunch break at the howf and would leave the three rooms at about 16.45 hours and return to the howf. The pursuer again was not permitted to take tea breaks and smoked whilst he worked.

15. The ceiling of the bath boiler room was about 10 or 11 feet (about 3 to 3.4 metres) above the floor. The coal fired boiler was about 3 metres in length and four metres in width. There was an area of clear floor space in front of the coal fire boiler of about 3 metres by 2 metres, with the rest of the bath boiler room being taken up with the coal fired boiler and pipes. The pursuer's work in the bath boiler room involved him crawling along heating pipes which had been insulated with 'monkey dung' many years before. The old

insulation on the heating pipes contained asbestos and also had in places coal dust on top of the insulation. As a result on the pursuer crawling along the heating pipes the old insulation on the heating pipes became damaged, which created dust containing asbestos. When this occurred the pursuer breathed in a combination of asbestos dust and coal dust. After working in the bath boiler house the pursuer's blue boiler suit would be dirty with a combination of asbestos dust and coal dust.

16. Prior to and during the electrical works at both the school boiler room and bath boiler room Glasgow Corporation did not: (i) provide the pursuer with a mask or other personal protective equipment; (ii) provide the pursuer with any warning about working with asbestos; (iii) advise the pursuer that asbestos was dangerous to his health; (iv) provide any non-natural ventilation; (v) devise any means to stop the pursuer breathing in asbestos dust; (vi) provide the pursuer with any instruction or warning to stay away from laggers in the school boiler room; or (vii) devise any means of completing the electrical works in bath boiler room without rubbing against the old insulation. Glasgow Corporation did not take any steps to damp down the asbestos dust in the bath boiler room when the pursuer was working in that room.

17. Other than the two exposures to asbestos at the school and the baths referred to above, the pursuer was not exposed to asbestos.

18. The three main types of asbestos fibres that were used commercially were: (i) crocidolite; (ii) amosite; and (iii) chrysotile.

19. In 1930 Dr Merewether, HM Medical Inspector of Factories and C.W. Price, HM Engineering Inspector of Factories prepared a report titled "Report on Effects of Asbestos

Dust on the Lungs and Dust Suppression in the Asbestos Industry" (the "M and P report"). HM Chief Inspector of Factories, Gerald Bellhouse, submitted the report to the Home Secretary and in a covering letter dated 17 March 1930 stated:

> "I submit herewith the report prepared by Dr. E.R.A. Merewether and Mr. C.W. Price on their inquiries into the health conditions of the asbestos industry. Dr. Merewether's investigations on the medical side are of great scientific value. They establish the facts that the inhalation of asbestos dust over a period of years results in the development of a serious type of fibrosis of the lungs, that the development of the disease varies in direct proportion to the length of exposure to dust, and that susceptibility to the disease is not affected either by age or sex.
>
> The remedy for these conditions is to be found as in the case of so many industrial diseases, in the suppression of dust. The second part of the Report indicates that this point has only recently been appreciated. In the non-textile section of the industry, no serious difficulties arise as regards the application of exhaust ventilation. For the textile section, it is evident that a good deal of experimental work will have to be carried out before completely successful ventilating appliances are evolved effectively to remove all the dust".

20. The M and P report included the following:

> "The most important local effects which may follow the inhalation of dust include pulmonary and bronchial catarrh, asthma, bronchitis, fibrosis of the lungs and secondary changes, such as emphysema, local or diffuse. These changes in the lungs, which may be looked upon as a measure of the efforts of the living tissues to repel or incarcerate the irritant particles of dust, necessarily cause interference with the general efficiency of the lungs. The impairment of functional capacity may be slight or severe, and temporary or permanent, depending on the variety of dust, and on other factors, such as concentration of dust and length of exposure." (under the heading "Effect of Irritant Dust Upon the Lungs", page 5)
>
> "To sum up, therefore, it appears probable that concentration of dust and length of exposure as factors in the production of fibrosis are interdependent within certain limits. While it seems necessary for the production of generalised fibrosis of the lungs that a definite minimal quantity of dust must be inhaled, the lower the concentration of dust in the air breathed, the longer the lapse of time before the fibrosis is fully developed, and within a certain limit, the higher the concentration of dust, the sooner the fibrosis becomes fully developed and the more intense the involvement of the lung tissue." (under the heading "Concentration of Dust and Length of Exposure Necessary to Produce Fibrosis", page 15).
>
> "In many works several processes are carried on in the same room. In the absence of effective means of preventing escape of dust into the air, many workers are

subjected to a risk from which they would otherwise be immune, or to a greater risk than that arising from their own work… In non-textile premises there is more effective separation of dusty work and processes from non-dusty" (under the heading "Separation of Processes", page 20).

"The wet mixtures for millboard, paper, and asbestos cement products are prepared in a beater, as used in paper mills. Dry fiberised asbestos is emptied into the beater trough, the sacks being shaken to some extent. Evolution of dust occurs before the material becomes mixed with the circulating water. Occasionally a sack is emptied before the water is turned on. Several sacks are required for a charge and the process is repeated a number of times daily. Precautions are not taken at present but the dust might be avoided by (a) mechanical feeding under enclosed conditions, as appears to be done in some foreign works, (b) applying exhaust draught, (c) feeding in small quantities and in such a way that the material is wetted at once." (under the heading "(b) Millboard, Paper, Sheets and Tiles", page 26)

"Magnesia" the most important insulating composition, is produced on a large scale by the principal manufacturers by enclosed methods with pneumatic conveyance of the mixture to automatic sack fillers. Weighing and feeding the fiberized asbestos gives rise to dust for which exhaust is necessary.
Fiberized asbestos or "magnesia" is a component of many insulating compositions ... The proportion of asbestos in the final product varies widely. In many small works the materials are mixed 'dry', by hand, in an open manner, involving sack emptying and filling. Shovelling and weighing. Enclosed rotary mixers could apparently be used for such work with exhaust applied at feeding points and the material discharged and bagged under enclosed conditions. If hand work is retained, exhaust should be applied." (under the heading "(c) Insulation Materials and Articles", page 27)

21. On 7 November 1931, following a direction from the Home Office, a report titled "Asbestosis-Inquiry into the Existence of the Disease in Packers of Manufactured Articles" (the "1931 report") was issued by two H.M. Medical Inspectors of Factories, namely Dr Merewether and E.M. Middleton following visits to 15 factories where persons "wholly employed in packing were likely to be found". The 1931 report stated the following at page 2:

"We found that in some cases packers of manufactured articles were exposed incidentally to dust produced in manufacturing processes, and, particularly in the case of smaller undertakings, packers were employed part of their time on

packing and at other times in occupations in the factory, some of which involved exposure to dust produced in manufacturing processes."

22. The types of manufactured articles handled by the 40 packers examined included "insulating mattresses and sections, and rope lagging; insulating mixture in bulk containing asbestos" amongst other materials. There is then following at page 4 of the 1931 report which reports on the relative risk of such materials:

> "As a result of this inquiry we have formed the opinion that certain workers whose occupation is nominally that of packer, storekeeper or warehouseman, are exposed to a definite though very variable risk of contracting asbestosis.
>
> The risk involved to this heterogeneous group of workers is derived from two sources. The first is from dust arising in the essential handling operations associated with packing, dispatching or warehousing, the amount being dependent on the class of material handled. With some materials, for example, brake linings and packings, the amount is trifling and the resultant risk negligible; with others such as insulating mixtures in bulk, insulating sections, and to a less extent cloth and mattresses, the dust evolved is considerable and the work is comparable with that in certain manufacturing processes included in the Scheme.
>
> The second source of risk is from the dust of manufacturing processes suspended in the air of the rooms, and thus incidentally encountered by those packers who are required to collect and distribute materials in such rooms.
>
> Clearly then the risk varies within wide limits and the results of the examinations were in accordance with this fact. It appears to us, therefore, that provision should be made for such workers in the Scheme, with the possible exception of any packers who are exclusively employed in handling manufactured asbestos articles impregnated with bitumen or other bond of an adhesive nature, provided that they are not incidentally exposed to the dust from other processes.
>
> In the course of the inquiry we met with two classes of workers who are exposed to a similar risk. These are, (1) sample makers and packers, (2) stock clerks and checkers whose office accommodation opens upon a manufacturing room in which they are required to remain for variable periods from time to time.
>
> In considering any amendment of the Scheme, the position of casual workers should be remembered. We found in a large boiler-covering works that it was the practice to employ extra men for the bagging and dispatching of large orders, - work which is hazardous. While these men were not continuously employed it was found actually that the same individuals regularly undertook the work. The intervals between periods of employment varied with the state of trade."

23. In 1933, Dr Merewether in a paper titled "A Memorandum of Asbestosis" published in the journal Tubercle stated:

> "Within certain high and low limits, the concentration of dust in the air of workrooms is the determining factor in the onset of the disease, and also, within certain limits, concentration of dust and length of exposure determine the incidence rates in different processes in the industry." (page 109)
>
> "The fact is that work in a dense concentration of asbestos dust over a comparatively short period will lead inevitably to the development of a profound fibrosis, provided that the worker lives long enough for it to develop." (page 110)

24. In the Her Majesty's Factory Inspectorate ("HMFI") 1938 annual report the Chief Inspector of Factories stated at page 63:

> "One of the greatest problems facing industry today is that of dust, and consideration is given later in the report to silicosis and asbestosis. We are but on the threshold of knowledge of the effects on the lungs of dust generally and I have referred in my reports from year to year to the enquiries made into cases of illness and deaths alleged to be due to the inhalation of dust. While Section 47 of the Factories Act 1937 may be thought somewhat ambiguous in its reference to a "substantial quantity of dust of any kind," it is, I consider, an admirable one in that it requests precautions even before it is possible to say specifically that the dust in question is harmful to a recognisable pathological extent. There can be no doubt that dust if inhaled is physiologically undesirable. Moreover, dust that is thought today to be harmless may, following research, be viewed in another light tomorrow. It is not many years ago when the dust of asbestos was regarded as innocuous, while today it is recognised as highly dangerous."

25. The 1943 annual report of the Chief Inspector of Factories contained an analysis of fatal cases of asbestosis and the shortest duration of exposure to asbestos resulting in asbestosis was 6 months.

26. In 1945, the Chief Inspector of Factories, A.W. Garrett, in a letter to the various Trade Associations representing the Shipbuilding and Shiprepairing Industries, stated:

> "I am concerned by the considerable development during the war years in the use of asbestos, either alone or as part of a mixture, in the Shipbuilding and Shiprepairing Industries mainly for the purpose of heat and sound insulation, and

the accompanying increase in the number of workers exposed to risk of injury to health through asbestosis."

[…]

"I would, however, emphasize that, while asbestos dust may not have any apparent effects at first, experience shows that, particularly if the workers are exposed to the dust in substantial concentrations, serious results are apt to develop later. It is therefore important that, even if the work will only be temporary, all reasonably practicable steps should be taken to reduce the risk to a minimum.

I suggest that protection can be secured on the following basis:

1) In some cases preparatory work, e.g. the making up of insulation mattresses, to which the Asbestos Industry Regulations, 1931, apply is carried on in a shed in the shipbuilding yard or near the dockside; in such cases those Regulations should, so far as the provisions are applicable, be carefully observed in practice.
2) On board ship steps should be taken, in accordance with the spirit of the Regulations, to prevent unnecessary concentrations or accumulations of asbestos dust - for instance by having good ventilation arrangements in confined spaces, damping down dust, and clearing up asbestos debris and accumulations of dust as soon as practicable.
3) The provision of a respirator (Home Office Mark No.584042 or other approved type) for each workman engaged in the fitting or removal of any dry insulating material containing asbestos, on board ship.
4) The provision of a similar respirator for all persons engaged in the spraying of asbestos or asbestos mixture and work ancillary thereto which renders them liable to exposure to dust or spray. During spraying, no other person should work in the same compartment unless also provided with a respirator.
5) No person under 18 should be employed in any process giving rise to asbestos dust or in any compartment or enclosed space where such a process is being carried on.
6) Specific arrangements for supervising the maintenance, care and use of respirators.

I may say that these arrangements have been accepted by the Shipbuilding Employers' Federation and by the Trade Unions concerned, and I therefore hope you will be prepared at once to accept the precautions suggested."

27. Garrett's 1945 letter was referred to in HMFI's annual report for 1945 (which was published in December 1946) and was sent to the Thermal Insulation Contractors Association (who requested 70 extra copies of the letter for distribution to their members).

28. In the 2nd Edition of "The Works Engineer – A Practical Manual on Building and Plant Maintenance for the Works Manager and Works Engineer" by W R J Griffiths published as a reprint in 1945 under the heading "Industrial Diseases" there is the following passages:

> "With the introduction of so many new industrial processes in recent years, a careful watch should be kept at all times so that any harmful effects on the workpeople may be observed and means devised to overcome or at least to minimize such effects."
>
> […]
>
> "Asbestosis is a disease similar to silicosis except that the latter is caused by breathing fine silica dust into the lungs and the former by breathing fine asbestos fibre. The results are much alike. The remedy is the complete covering of the machines, efficient dust exhaust systems, and liberal exhaust ventilation in the workshop."

29. In 1949, the view of HMFI was sought in respect of work with asbestos lagging in Power Stations. The following reply was received from Deputy Chief Inspector of Factories:

> "The Regulations apply in the circumstances described by you to the mixing of asbestos (as defined by the Regulations) and also to the making of insulation slabs or sections, if these are pre-formed before being fixed to the boilers, steam pipes, etc.
>
> The Regulations do not apply to the removal of old lagging, nor to the actual application of the insulation to steam pipes etc. In regard to dusty processes which are outside the application of the Regulations, all possible steps should be taken against the inhalation of dust and the standards of the Regulations should be followed as far as practicable. Section 47 of the Factories Act 1937 requires that all practicable measures be taken to protect persons against the inhalation of, inter alia, injurious dust and that when practicable exhaust ventilation is to be provided. Apart from exhaust ventilation, other safeguards such as using suitable appliances for the operations, wearing respirators, avoiding unnecessary scattering and spillages and damping material before cleaning up, are of importance. The respirator approved under the Regulations is the Mark IV Respirator (Home Office Mark N.584042); for certain work such as spraying of asbestos or carrying on very dusty processes in confined spaces a Fresh Air Respirator with face piece and air supply may be necessary.

> I enclose for your information a copy of a circular letter of August 1945 dealing with asbestos insulation on ships. This deals with similar risks and may be of interest to you."

30. In 1949, Seven Oaks Press published a book titled "Factory Well-being" by Conway Plumbe (a retired Superintending Inspector of Factories). The foreword was written by G.P. Barnett, Chief Inspector of Factories and included the following:

> "The aim of the employer in these more enlightened days should be to provide not only the bare minimum of amenities as laid down by law, but the means whereby to develop healthy and contented groups of workers. To this end he must endeavour to understand the spirit which underlies so much of the legal phraseology – the spirit which has prompted well-meaning pioneers during the various stages of the development of the factory system to pave the way for making the factory a happy community."

31. At chapter VII of "Factory Well-being" under the heading "Poison – General Rules", Plumbe stated the following:

> "… On the other hand inhalation and resultant contact of the poison with the lungs is a danger that is widespread and not everywhere understood.
>
> The first thing to realise is that unless and until there is contact there can be no poisoning.
>
> None of these dangerous substances act through any kind of vague proximity. They are not black magic. If they are not allowed to touch they can do no harm. The starting point for the avoidance of every kind of industrial disease then is essentially obvious. The answer to the problem is to prevent any kind of contact with the source of injury."

32. At chapter VIII of "Factory Well-being" under the heading "Poison – Certain widespread hazards", Plumbe stated the following:

> "Silicosis – Grinder's rot, potter's rot and other local names are applied to the disease of the lungs caused by the chemical action of minute particles of silica on the lung tissues. The distressing effect of gradual diminution of breathing capacity over many years is familiar in metal grinding, pottery, sandblasting, ganister crushing and other factory industries as well as in some kinds of mining. […]
> Asbestosis, though different from silicosis medically, is very similar in general terms. It is caused by inhalation of minute particles of asbestos. Precautions are the same and equally necessary. The dust must on no account be inhaled."

33. In the 1949 annual report the Chief Inspector of Factories stated the following under the heading "Asbestos Regulations":

> "The Code of Regulations dealing with the dangers arising in the handling of asbestos has been in force since 1931, and reports show that constant vigilance is necessary in order to ensure that there is no slackening in the fulfillment of the precautionary measures laid down. In factories where processes scheduled under the Regulations are carried on, the maintenance of dust control, particularly adequate exhaust ventilation at all possible points where dust may be evolved, is of the utmost importance. Those firms which have had long experience with the product and realise how the incidence of asbestosis arises are fully alive to the many problems involved, and from the inspection point of view, it is then very necessary to keep an ever watchful eye for the new use of asbestos in some manufacturing or other process, for example, on ships or buildings where the work may be undertaken by someone not fully realising the necessity of preventing as far as possible the inhalation of asbestos fibre and dust."

34. In 1953 The National Trade Press Ltd published the "Factory Health Safety and Welfare Encyclopaedia" which provided guidance in relation to many health and safety issues which faced employers and the importance of safety, health and welfare in industry. The Foreword was written by Sir George Barnett (the Chief Inspector of Factories) and included:

> "Broadly speaking, no longer is it the practice to await the periodical visit of H.M. Inspector before deciding on the provision of better safeguarding of plant and machinery or precautionary methods for avoiding the onset of industrial disease. The wise employer is anxious not merely to comply with minimum standards laid down in the Factories Act and Regulations, but rather to establish conditions which will go far to ensure safe, healthy and comfortable conditions of work. There are few books giving comprehensive information on this subject from which advice in this field can be culled, and the present volume must assuredly prove a most useful text book, in attractive form, for ready reference by the busy works manager, personnel officer, safety officer, and other interested executives."

35. The following passages were included in the "Factory Health Safety and Welfare Encyclopaedia":

> "ASBESTOSIS. This disease of the lungs, caused by inhalation of fine particles of asbestos dust, is superficially similar to silicosis. Asbestos is a silicate and,

medically, the injury to the lungs develops somewhat differently from that caused by pure silica, but the essential symptoms —shortness of breath and coughing— are the same for the workers in both. In the figures published in 1951, fatal cases numbered 17.

Prevention—always to be reinforced and controlled by periodical medical examination—consists in application of exhaust ventilation, and on occasion in the use of breathing apparatus to prevent inhalation.

Simple respirators are useless. It is to be realised that *asbestos dust is one of the most dangerous of all industrial poisons*. No degree of care at all stages of handling, machining, mixing, cleaning, packing or unpacking etc. of any material consisting of or containing asbestos is wasted effort." [*Emphasis in the original*]

[…]

"BREATHING APPARATUS. Air reaching the neighbourhood of a worker's face should be fit to breathe without filtration or purification. The first aim of the ventilating engineer or safety officer must be to ensure this. Use of breathing apparatus is invariably a second-best device. It is quite essential never to be content to fall back on its use unless no adequate system of exhaust ventilation is capable of giving satisfactory results. This means in practice that breathing apparatus should practically never be required at a regular process but only in a sudden emergency or on jobs arising very occasionally."

[…]

"Where the poison in the air is not gas but dust, various types of respirators are in use. It is emphasised that a mere piece of cotton material held in a wire frame pressed over the face is without any value. In nearly every case where such a makeshift is applied the dust should and could be removed by exhaust ventilation. In the few cases where a simple respirator is allowable it must reach the Government approved Mark IV standard. Nothing else must be accepted. Much of the most dangerous dust is extremely fine—for instance, dust of silica or asbestos—and only a respirator that (a) really takes the whole of the air through it rather than round the fitting and (b) really stops all dust in the filtering medium, will do. The Mark IV, properly fitted to the individual wearer, complies with these conditions."

36. On 30 October 1954, JC Scott, one of HM Inspectors of Factories wrote to Nechells Power Station in the following terms:

"Ventilation
It was understood that from time to time asbestos would be used for lagging purposes. Mixing of asbestos with water etc. should be carried out under efficient

> exhaust draught or preferably a fully enclosed mixing machine could be provided. Stripping of lagging should either be done under exhaust draught or if this is not practicable efficient respirators should be provided and worn e.g. the Mark IV or Microfilter respirators made by Siebe Gorman and Co Ltd."

37. The 1956 annual report of the Chief Inspector of Factories contained a discussion on the Asbestos Industry Regulations 1931 at Chapter 15 and stated:

> "One very hazardous process, to which the Regulations do not apply, is the removal of old heat insulation lagging. The handling of this very dry industrial material presents a serious health risk, which is all the more serious because the work is often done in confined spaces. Much of this work is done in premises not subject to the Factories Act and in any case the operation does not take long. The persons who do it are, however, regularly engaged on it and are constantly exposed to risk."

The 1956 annual report also made reference the use of approved respirators.

38. The booklet titled "Toxic Substances in Factory Atmospheres" was prepared and issued by the Ministry of Labour in March 1960 (the "1960 booklet"). Page 5 of the booklet provides:

> "While systems of control should be as effective as it is practicable to make them, it is desirable to have some guide to which the efficiency of control measures can be related. In the List at the end of this booklet there are set out figures of maximum permissible concentrations of certain substances used in industry. For each substance a figure of concentration in atmosphere is given. If this concentration is exceeded, further action is necessary to achieve satisfactory working conditions."

The figures provided in the booklet related to average concentrations for a normal working day based on an eight hour day and provided an eight hour time weighted average ("8 hr TWA"). Under the heading "Mineral Dusts" the maximum permissible concentration ("MPC") for asbestos on an 8 hr TWA was 177 particles per cubic centimetre of air ("ppcc")

39. An 8 hr TWA of 177 ppcc is approximately equivalent of an 8 hour TWA of: (i) 5 million particles per cubic foot; and (ii) 30 fibres/ml.

40. The M and P report and 1931 report highlighted risks to vicinity workers in the same room where processes with asbestos were undertaken.

41. The pursuer's exposure during the mixing process at the school boiler room to asbestos dust was higher than the 100 fibres/ml and closer to the 167 – 199 fibres/ml. During the lagging process that the pursuer's exposure to asbestos dust would have been in the region of 5 to 10 fibres/ml.

42. Whilst the pursuer's exposure to asbestos dust was limited to a two week period at the school boiler room, he was, during that period, subjected to sustained exposure to asbestos dust for around 80 hours with there being exposure to very high levels of asbestos dust every 30 to 45 minutes during the mixing process. During that two week period the pursuer would have been subjected to in the region 100 mixing processes for a total duration in the region of 1,000 minutes. The pursuer exposure to asbestos dust during each mixing process would have been many times the yet to be published MPC for asbestos in the 1960 booklet. The pursuer's 8 hr TWA in the school boiler room would also have been higher and perhaps significantly higher than the yet to be published MPC for asbestos in the 1960 booklet.

43. During the pursuer's time working in the school boiler room there would have been significant levels of visible dust clearly there to be seen, if considered by any careful employer. The visible dust would have been particularly dense and apparent during each of the frequent mixing processes.

44. During the said two week period in the school boiler room the pursuer was exposed, on a daily basis, to a substantial quantity of asbestos dust.

**FINDS IN FACT AND LAW**

1. That the Asbestos Industry Regulations 1931 (the "1931 Regulations") were made under section 79 of the Factory and Workshop Act 1901, which provided:

> "Where the Secretary of State is satisfied that any manufacture, machinery, plant, process or description of manual labour, used in factories or workshops, is dangerous or injurious to health or dangerous to life or limb, either generally or in the case of women, children or any other class of persons, he may certify that manufacture, machinery, plant, process or description of manual labour to be dangerous; and thereupon the Secretary of State may, subject to the provisions of this Act, make such Regulations as appear to him to be reasonably practicable and to meet the necessity of the case."

2. That the preamble to the 1931 regulations provided that "they shall apply to all factories and workshops or parts thereof in which the following processes or any of them are carried on …". There followed a list of six processes:

> "(i) breaking, crushing, disintegrating, opening and grinding of asbestos, and the mixing or sieving of asbestos, and all processes involving manipulation of asbestos incidental thereto;
> (ii) all processes in the manufacture of asbestos textiles, including preparatory and finishing processes;
> (iii) the making of insulation slabs or sections, composed wholly or partly of asbestos, and processes incidental thereto;
> (iv) the making or repairing of insulating mattresses, composed wholly or partly of asbestos, and processes incidental thereto;
> (v) sawing, grinding, turning, abrading and polishing, in the dry state, of articles composed wholly or partly of asbestos in the manufacture of such articles;
> (vi) the cleaning of any chambers, fixtures or appliances for the collection of asbestos dust produced in any of the foregoing processes."

3. That after the list of processes, the preamble to the 1931 Regulations makes an exception:

> "Provided that nothing in these Regulations shall apply to any factory or workshop or part thereof in which the process of mixing of asbestos or repair of insulating mattresses or any process specified in

(v) or any cleaning of machinery or other plant used in connection with any such process, is carried on, so long as

(a) such process or work is carried on occasionally only and no person is employed therein for more than eight hours in any week, and

(b) no other process specified in the foregoing paragraphs is carried on."

4. That Part I of the 1931 regulations contained the duties of occupiers of factories and workshops. Regulation 2(a) provided:

> "Mixing or blending by hand of asbestos shall not be carried on except with an exhaust draught effected by mechanical means so designed and maintained as to ensure as far as practicable the suppression of dust during the processes."

Regulation 8 provided:

> "(a)
> A sack which has contained *asbestos* shall not be cleaned by hand beating but by a machine, complying with Regulations 1 and 5.
>
> (b)
>
> All sacks used as containers for the transport of *asbestos* within the factory shall be constructed of impermeable material and shall be kept in good repair."

5. That the Factories Act 1937 came into force on 1 July 1938. Sections 4(1) and 47(1) provide:

"**4. - Ventilation**

(1) Effective and suitable provision shall be made for securing and maintaining by the circulation of fresh air in each workroom the adequate ventilation of the room, and for rendering harmless, so far as practicable, all fumes, dust and other impurities that may be injurious to health generated in the course of any process of work carried on in the factory."

"**47. – Removal of dust or fumes**

(1) In every factory in which, in connection with any process carried on, there is given off any dust or fume or other impurity of such a character and to such an extent as to be likely to be injurious or offensive to the persons employed, or any substantial quantity of dust of any kind, all practicable measures shall be taken to protect the persons employed against inhalation of the dust or fume or other impurity and to prevent its accumulating in any workroom, and in particular, where the nature of the process makes it practicable, exhaust appliances shall be

provided and maintained, as near as possible to the point of origin of the dust or fume or other impurity, so as to prevent it entering the air of any workroom."

6. That Glasgow Corporation owed the pursuer a duty, during his employment with them, to take reasonable care to protect him against a foreseeable risk of injury to his health.
7. That in early 1958 a reasonable and prudent employer, taking positive thought for the safety of their employees in light of what they knew at the time or ought to have known at the time, should have appreciated from a visual assessment of the school boiler room that there was a foreseeable risk of personal injury if their employee was exposed to the levels of asbestos that the pursuer was exposed to in the school boiler room for a period of about 80 hours.
8. That Glasgow Corporation should have appreciated from a visual assessment of the school boiler room that the pursuer's repeated exposure to asbestos during the mixing process in the school boiler room for a period of about 80 hours was, of itself, of sufficient intensity, duration and frequency to give rise to a foreseeable risk of injury to the pursuer.
9. That Glasgow Corporation should have been aware that the pursuer's exposure to asbestos dust in school boiler room in 1958 gave rise to a significant risk of an asbestos-related injury.
10. That Glasgow Corporation could have taken one or more of the following precautions at the school boiler room to reduce or eliminate the significant risk to the pursuer of an asbestos-related injury: (i) segregating the laggers from other workers by sheeting or roping off; (ii) providing suitable methods of minimising the release and spread of asbestos dust, such as exhaust ventilation, damping of products and good general ventilation; or (iii) requiring the mixing process to be conducted outside.

11. That Glasgow Corporation failed to take any precautions that were available to them at the time and therefore failed to take proper precautions to reduce or eliminate the significant risk to the pursuer of an asbestos-related injury.
12. That Glasgow Corporation conduct fell below the standard of the reasonable and prudent employer in the position of Glasgow Corporation and they therefore breached the duty of care they owed to the pursuer.
13. That the said breach of duty by Glasgow Corporation at the school boiler room caused or materially contributed to the pursuer suffering from asbestos related pleural plaques and asbestos related diffuse pleural thickening.

**FINDS IN LAW**

1. That the defenders are liable to make reparation to the pursuer in the sum of £40,000 (inclusive of interest to 17 April 2024) with interest at the rate of 8% per year from 18 April 2024 until payment.

**NOTE:**

**Introduction**

[1] The defenders are the successors to Glasgow Corporation. In this action the pursuer contends that he was exposed to asbestos on two occasions in 1958 when employed by Glasgow Corporation as an apprentice electrician and, as a result, has developed pleural plaques and diffuse pleural thickening.

[2] The proof was heard over four days, namely 17 to 19 and 30 April 2024. The pursuer did not insist on his crave for provisional damages (crave (a) of the initial writ) and sought full

damages in terms of crave of (b) of the initial writ. Parties had agreed quantum, in relation to crave (b) of the initial writ, at £40,000 (inclusive of interest to 17 April 2024) and had helpfully agreed a number of other matters in two joint minutes of agreement. The pursuer called the following two witnesses to give evidence:

1. The pursuer;

2. Alison Heyes, Health and Safety Practitioner.

[3] The defenders called the following witness to give evidence:

1. Neil Davey, Occupational Hygienist.

Both Mr Heyes and Mr Davey were present in court when the pursuer gave evidence.

**The Evidence**

***The pursuer's evidence***

[4] The pursuer explained that he had retired when he was aged 70 and spoke to the matters set out in finding in facts 1, 5 (in part) and 6 to 17. The pursuer could not remember whether the school boiler room had windows but accepted there may have been. He could not recall how many doors the school boiler room had but accepted that there could be have been more than one door. The pursuer thought that there was a mechanism on the school boiler room door to swing it shut and advised that the boiler room had no obvious ventilation. When he sat on the 'A' frame trestle he sat on it like a person would sit on a horse. When he was sitting on the trestle the laggers would be working below him in close proximity to him. The closest the lagger could get to him would be about half a metre but they could on occasions be 3 or 4 metres away from him. The laggers could not work under the trestle because of the two ropes connecting the

sides of the trestle. The laggers started and finished work at about the same time as the pursuer and the pursuer accepted that they may have had a morning tea break. The pursuer knew the bags containing the dry power were lighter than 50kg because he lifted one. He asked the laggers what they were doing and they said they were applying "monkey dung", which they explained was asbestos mixed with water. The pursuer estimated, given the size of the school boiler house, that he would have installed 3 rows of lights. He accepted that the school boiler room was not a public space. The pursuer advised at that time he smoked about 10 cigarettes a day and did so while he was working on the school boiler room.

[5] It was put to the pursuer that a study [*the L and S study – see para 13 below*] showed that the mixing of asbestos took 5 to 15 minutes and that the mixing process was repeated every two to four hours. The pursuer considered that the men in the study must have not been working very hard / were working slowly and he did not think he was wrong in estimating that the mixing process in the school boiler house took place every 30 to 45 minutes, however he noted that he was not timing the laggers and he was happy to allow a margin for error. The pursuer explained that even though there was an empty space in the school boiler room pipes ran the full length of the boiler room, including in the empty space, with pipes being fixed to both the floor and the wall. The pursuer could not recall seeing the laggers lagging the boilers (as opposed to the pipes). He did not ask the laggers to stop making dust. It was not possible for the pursuer to work at a distance from the laggers. The pursuer had to get on with the electrical work and the laggers had to get on with their work. The nature of the work meant that the pursuer and the laggers could not make an arrangement to keep a distance between them. The old insulation at the bath boiler room was old 'monkey dung'. The pursuer thought the old insulation could be 40 or 50 years' old and believed it contained asbestos. The pursuer accepted that he had

assumed that the old insulation at the bath boiler room contained asbestos, however, it looked the same but much older than the dust at the school boiler room and the pursuer considered that his assumption about it being asbestos was correct.

***Alison Heyes' evidence***

[6] Ms Heyes is a Health and Safety Practitioner. She has a degree in biochemistry and microbiology, a post graduate diploma in Occupational Health and Safety and a post graduate diploma in Health and Safety Law and Environmental Law. She had been an HM Inspector of Health and Safety between 1992 and 2015. In that role her work included: (i) the inspection of a wide variety of work places; (ii) the enforcement and provision of advice in relation to the Control of Asbestos at Work Regulations and Asbestos Licensing Regulations; (iii) asbestos management audits in hospitals, schools and local government and inspection of demolition and refurbishment work; (iv) the application and enforcement of legislation in relation to work with both licensed and non-licensed asbestos material; and (v) management of complex investigations involving multiple duty holders. Since 2015 she has conducted skilled person work. To date, she had completed over 300 reports for cases as a skilled person, with the vast majority of these reports relating to asbestos. All her reports were for a pursuer or claimant. Since 2020 she had also conducted contract work for the Health and Safety Executive as HM Inspector of Health and Safety to carry out COVID secure workplace spot checks and use a range of enforcement powers. Ms Heyes had prepared an 85 page report for the present case, which she adopted as her evidence.

[7] Ms Heyes confirmed the pursuer's work history with Glasgow Corporation (see finding in fact 5) and explained the three main types of asbestos fibres that were used commercially (see finding in fact 18). Asbestos containing materials were widely used historically to thermally

insulate boilers, pipework and plant. Thermal insulation is often referred to as 'lagging', which covers a wide range of materials including spray, pre-formed pipe sections and plastered cement applied as a paste which dried to a plaster like finish. The use of asbestos lagging materials for thermal insulation of plant / pipework declined in the late 1960s and ceased altogether during the early to mid-1970s. The asbestos content of lagging depended on the type of material. Common forms of pipe and boiler lagging contained 15% asbestos. The majority of thermal insulation materials installed on plant such as boilers and associated pipework, particularly that associated with higher temperatures and steam, prior to around the late 1960s / early 1970s, was likely to have been asbestos based insulation. From around the 1940s onwards Ms Heyes' view was that majority of insulation installed was amosite based, however, most employers in the 1950s would not be able to distinguish between different types of asbestos. Ms Heyes opinion was, in the present case, that the bags of dry powder used by the laggers at the school and old insulation at the baths was likely to contain asbestos (with the asbestos used at the school likely to be amosite). Mr Davey also took the view that the lagging applied at the school was wet applied asbestos composite which was often referred to as "monkey dung".

[8] As regards terminology, the term primary exposure meant the person doing the task using the asbestos dust. Secondary exposure, bystander exposure and in the vicinity, were interchangeable and all meant in the vicinity of the task being carried out with the asbestos dust.

[9] Dust levels associated with the handling of asbestos were first reported qualitatively. The ability to carry out asbestos dust measurements mainly developed during the 1960s. Therefore data in the public domain reporting quantified measurements of asbestos dust associated with activities involving asbestos materials, including asbestos lagging, first became available after the pursuer had finished his apprenticeship. Such data was therefore only useful

to make a retrospective comparison. Given that dust measurement was in its infancy and data was unavailable at the time of the pursuer's alleged exposure in 1958, duty holders, such as Glasgow Corporation, had to rely on qualitative measures to determine the levels of any dust (including dust containing asbestos) and in particular the visibility of dust in the air and / or released by a process in order to assess the risk of exposure.

[10] Given Glasgow Corporation in 1958 were unlikely to have the ability to undertake contemporaneous measurements or obtain literature outlining the same and given the likely variability in the concentrations of dust present in the atmosphere over time, it was not possible to offer a definitive quantified estimate of the concentration of the asbestos released by the activities alleged or of the pursuer's potential exposure.

[11] It was after the pursuer's alleged exposure, in 1960, that the Ministry of Labour issued the 1960 booklet. The figures provided in the 1960 booklet were based on American Threshold Limit Values ("TLV") and included a TLV for exposure to asbestos. Ms Heyes accepted that: (i) the figures provided in the 1960 booklet related to average concentrations for a normal working day based on an eight hour day and provided an 8 hr TWA; and (ii) in the 1960 booklet under the heading "Mineral Dusts" was "Asbetsos" which had an 8 hr TWA of 177 ppcc. An 8 hr TWA is the average exposure to asbestos over a working day. Ms Heyes, whilst noting that there was not a definitive conversion from ppcc to fibres/ml accepted that a conversion that had been used was that an 8 hr TWA of 177ppcc was the equivalent to an 8 hr TWA of 30 fibres/ml, however, she noted that there was other literature that questioned that conversion. She did not suggest that the English Court of Appeal was wrong in a recent case to use that conversion. As regards page 5 of the 1960 booklet (see finding in fact 38), Ms Heyes highlighted the first sentence which identified that the duty holder should take control measures to start with.

[12] However, Ms Heyes would not usually refer to the 1960 booklet in a case where the alleged exposure was prior to the issue of the 1960 booklet and was, in any event, of the view that on her reading of the literature that the American TLVs generally, and specifically for asbestos, were largely ignored in UK industrial practice in the 1960s. In his 1966 annual report (published in August 1967) the HM Chief Inspector of Factories noted that:

> "In the United Kingdom, the law has never embraced threshold limit values. The American authors of the list of values which the Minister of Labour publishes (Dust and Fumes in Factory Atmospheres, Safety, Health and Welfare Booklet no 8) themselves declare the values they give should not be incorporated into legislation."

His report also suggested that observation of visible dust was used by HMFI as the primary method of assessing whether or not a hazard was present. At page 5 of his said report he noted:

> "Protective measures could be readily enforced by Inspectors without recourse to mechanical aids or instruments" and that "Inspectors' five senses are invaluable tools for industrial hygiene".

[13] The first data that Ms Heyes was aware of in relation to emptying bags of asbestos, mixing it with water and applying asbestos lagging to boilers and pipe work, was produced, after the pursuer's alleged exposure, in a limited study by Leathart and Sanderson in 1963 (the "L and S study"), in relation to the mixing of lagging in a hospital. The authors provided the following comments and photograph, which qualitatively refer to mixing being a dusty process:

> "The installation of a new heating system in a local hospital gave us a chance to watch the work in progress and to make a few measurements of dust concentration. The workers say that the mixing of powered magnesia/asbestos plaster with water, and the stripping off of old lagging, are the dustiest processes. Mixing is done in a bucket, dustbin, or large box, depending on the amount required, and is illustrated in Fig. 4. The mixing process takes 5-15 min and is repeated every 2-4 hr. Usually the mixing is all done by one person, often by the apprentice who has just started work. Knowing that asbestos

is slow to develop one might suggest that it would be better if this dusty work were to be done by the elderly worker nearing retirement." [*Figure 4 is reproduced below*]:

Fig 4: Air sampling by thermal precipitator during mixing of magnesia/asbestos plaster with water

[14] The L and S study also commented on dust counts as follows:

"We used a thermal precipitator to take samples for dust counts (Fig. 4) in which only the fibrous particles between 5 and 50μ in length were counted. The results of these counts are illustrated in Fig. 6 [*reproduced below*]. It can be seen that the dust count rose above the official MAC [*maximum allowable concentration*] of 177 particles per cm3 during the mixing process but this was a localised dust cloud. It can also be seen that a small proportion of the asbestos dust floated in the air for a long time and travelled quite a distance… Thus during the process of thermal insulation in a hospital the chief hazard appeared to be the mixing of dry magnesia/ asbestos plaster with water. It must be stressed that our observations were not extensive and were limited to one particular building. They require confirmation in other situations."

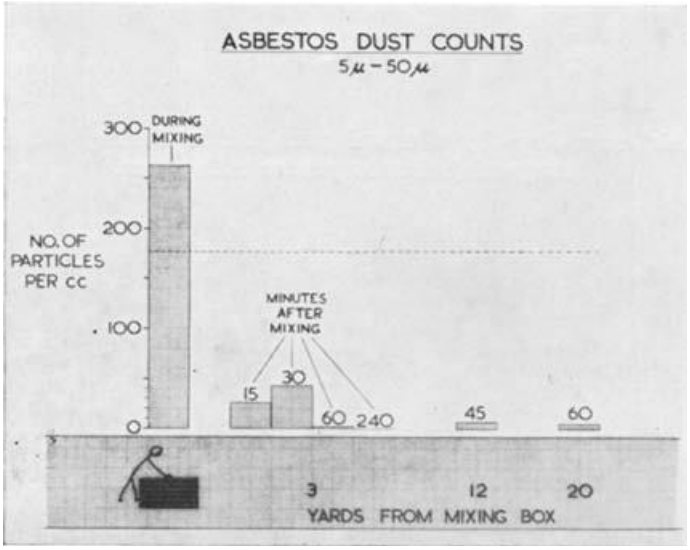


Fig. 6. Concentrations of asbestos dust particles in the air of a corridor during and after mixing. The dotted line is the M.A.C.

[15] Figure 6 showed the dust counts recorded and the dotted line indicated the MAC of 177 ppcc. The dust counts ought to be considered with some care since the units used were based on 'particles' which are fundamentally different from 'fibres', with dust counts now being measured in fibres/ml. The counts of the L and S study were said to have been only of 'fibrous particles', which suggested that the figures cited by them may be broadly indicative of dust counts in fibres/ml. Also the peak value of 260 ppcc at the time of mixing was of the same order as recorded in a subsequent study by Harries in fibres/ml (on which see para 17 onwards below).

[16] Figure 6 showed the presence of measurable fibrous dust concentration (of the order of 25-40 ppcc) present at 3 yards from the mixing operation 15-30 minutes after mixing. Dust concentrations of the order of 5-10 ppcc appeared to be present 60 minutes after mixing at 20 yard. The concentration after 60 minutes at 20 yards is reported to be greater than at 3 yards, which suggested some uniformity in dust concentration may have been reached. It had to borne in my mind that this study did not specify how many bags were emptied and it did not involve

the mixing process being repeated. There was no doubt that the mixing process was a dusty process.

[17] It was over a decade after the pursuer's alleged exposure before detailed studies were undertaken on board ships in the late 1960s were first reported by Commander PG Harries. In Harries' 1971 paper titled "Asbestos dust concentrations in ship repairing – a practical approach to improving asbestos hygiene in naval dockyards" (Annals of Occupational Hygiene, vol 14 p241-243) (the "Harries paper") he outlined, at page 243, the difficulties of assessing asbestos exposure:

> "These reports mention the difficulty of making an accurate assessment of asbestos exposure for insulating workers. This difficulty is due to the variety of materials used, each containing a different amount or asbestos, and due to the intermittent nature of the work. Both of these factors help to produce widely different dust concentrations, not only between different processes, but also during the course of a particular process. Without continuous dust monitoring of every process it will not be possible to establish accurate estimates of time weighted dust exposures for insulating workers."

The above clearly highlighted that without dust monitoring any assessment of the laggers exposure in this case ought to be considered as a rough estimate at best and any estimate of the pursuer's alleged exposure in the vicinity of laggers even more so.

[18] Harries reported the following results of the measurements for mixing asbestos:

1. Removing asbestos plastic mix from container (general atmosphere) – mean 199 fibres/$cm^3$;

2. Removing asbestos plastic mix from container (breathing zone) – mean 217 fibres/$cm^3$;

3. Mixing asbestos plastic mix with water (general atmosphere) – mean 167 fibres/$cm^3$; and

4. Mixing asbestos plastic mix with water (breathing zone) – mean 256 fibres/$cm^3$.

It was not clear from the Harries paper what area was covered by the 'general atmosphere'. The 'breathing zone' was the location of the person doing the removing / mixing. Whilst the L and S study used a different measurement and found a dust count of 260 ppcc. The mean figure found by Harries for mixing asbestos plastic mix with water (breathing zone) of 256 fibres/cm³ was similar and therefore the two studies tended to align in that regard.

[19] Harries also considered the application of asbestos lagging and reported the following results:

1. Boiler rooms (general atmosphere) – mean 22.4 fibres/cm³;
2. Boiler rooms (breathing zone) - mean 16.8 fibres/cm³;
3. Engine rooms (general atmosphere) - mean 2.1 fibres/cm³;
4. Engine rooms (breathing zone) - mean 7.3 fibres/cm³;
5. Accumulator room (general atmosphere) - mean 16.5 fibres/cm³; and
6. Accumulator room (breathing zone) - mean 9.6 fibres/cm³;

Ms Heyes had tried to work out an average for both 'general atmosphere' and 'breathing zone' by adding each of the three figures together and dividing by three, but she recognised there was an error in her calculations. Ms Heyes calculations had incorrectly brought out an average for general atmosphere of 10.4 fibres/cm³ and for breathing zone of 11.0 fibres/cm³ [*from the above figures it seemed the average for general atmosphere was 13.7 fibres/cm³ (22.4 + 2.1 + 16.5 = 41 / 3 = 13.7 fibres/cm³) and for breathing zone was 11.2 fibres/cm³ (16.8 + 7.3 + 9.6 = 33.7 / 3 = 11.2)*]

[20] If court found that the pursuer worked in the vicinity of the laggers in the school boiler room as they emptied the bags of asbestos, mixed it with water and subsequently applied the

asbestos paste, where no precautions were taken to prevent or control dust, the dust counts would be likely to have been similar to those found in the L and S study in the Harries paper, namely:

1. The laggers – 217-260 fibres/ml during the opening / emptying of the bags and mixing with water;

2. The laggers – 10 fibres/ml during the application of the lagging (although this figure was based on the incorrectly calculated average – see para 19 above)

3. The pursuer – up to 167 – 199 fibres/ml if the court were to find the pursuer was in close proximity to laggers during the opening / emptying of the bags and mixing with water;

At other times the dust concentrations were likely to have been within 25 – 40 fibres/ml as suggested in the L and S study after 15 to 30 minutes at around three yards. After 45 minutes to an hour, asbestos dust levels were likely to have become more uniform and general reduced to levels around 5 - 10 fibres/ml at distances of 12 to 20 yards from source. If mixing occurred every 30 to 45 minutes for around 10 minutes then: (i) there was likely to have been a cycle of very high dust concentration within 10 feet of the source during the mixing process: (ii) the frequency of the mixing process would result in the dust not having a chance to settle; and (iii) the pursuer would be exposed to asbestos dust continuously during his working day. According to the pursuer's evidence he worked an 8 hour day for five days per week at the school boiler room for a period of two weeks and therefore that would mean he had 80 hours of asbestos exposure while working at the school boiler room.

[21] The Harries paper also reported on dust measurements associated with crawling around pipework previously lagged with asbestos lagging which did not have a protective coat applied. Harries made the following comments at page 252:

> "Most of the existing insulation in ships, and some of the new materials still contain asbestos, and there will still be the problem of men working in compartments in which the insulation is incomplete and liable to be damaged. Until the protective layer of glass fibre cloth has been applied over the insulating sections, they are vulnerable to damage by tools, other equipment, or merely by men crawling over them to reach other work. Measurements have been made of asbestos dust concentrations created by men working in a boiler room in which the lagging had not been completed. Long running samples over the working shift showed general atmosphere concentrations of less than 2 fibres/cm3. The values for breathing zone long period samples were between 2-5 fibres/cm3 but some short samples taken when men were crawling over partly insulated pipes showed dust concentrations of 6-144 fibres/cm3. Men are therefore required to wear dust respirators when they are working on or close to pipes on which the friable insulating material is still exposed."

The above illustrated the potential for very high peak asbestos dust concentrations to be released, in the order of up to 144 fibres/ml, and to lower long terms averages where persons crawled over asbestos lagging that was not protected. In the present case if the court considered that the lagging at the baths contained asbestos and was paste or sectional lagging either in poor conditions and / or unprotected, then on the basis of the measurements in the Harries paper, the pursuer was potentially exposed to high asbestos dust concentrations for brief periods when he disturbed such asbestos lagging, but in general was likely to have been exposed to low levels averaged out over a longer period of time (Ms Heyes accepted that the pursuer's evidence was that he came into contact with the lagged pipes for only one and half days). If, however, the court considered that the lagging at the baths did not contain asbestos or was protected by an outer layer which was either in good condition and / or prevented the disturbance of asbestos below, the pursuer would be unlikely to have been exposed to asbestos dust as a result of the alleged disturbance.

[22] Ms Heyes explained that she was not aware of any data concerning dust concentrations from crawling over very old lagging. She had not considered or seen a Health Effects Institute publication "Asbestos in Public and Commercial Buildings" (1991) (the "1991 report"), which reproduced data provided during a study of the incidental exposures of heating, ventilation and air conditioning ("HVAC") workers whilst installing, replacing or inspecting equipment located near to asbestos containing insulation materials. Fourteen samples were collected which ranged from 0.11-6.9 fibres/ml, with a geometric mean of 0.61 fibres/ml. When the 1991 report was put to her Ms Heyes explained that that report did not appear say what condition the lagging was in or how it was coated, however, if she had been aware of it she would have included the geometric mean figure of 0.61 fibres/ml along with the figures in the Harries report to show a range of potential exposure.

[23] At the time of the pursuer's alleged exposure in 1958 Ms Heyes was of the view that qualitative methods of dust assessment, namely the visibility of dust in the air or accumulations on surfaces, were likely to have been the only methods available to have alerted employers to the potential risks from inhalation of dust generally and from tasks on or around lagging in particular. Based on the M and P report, the 1931 Regulations and the HMFI annual reports / letters available at the time, the mixing process was qualitatively described as dusty and the extent of dust evolved on handling was said to be considerable. The literature that post-dated the pursuer's alleged exposure also illustrated localised dust clouds produced during the mixing process which reduced to a lower but uniform level over a longer period of time.

[24] Ms Heyes' understanding was that pleural plaques and pleural thickening could arise as a result of variable exposures to asbestos and did not require a particular level of cumulative exposure to have occurred for medical experts to attribute the causation of such to asbestos. In

that regard it was noted under the heading "Exposure Criteria and Diagnosis" in the Helsinki Criteria for Asbestos-Related Disease (1997) that:

> "Asbestosis is generally associated with relatively high exposure levels…. Lower exposures from work-related, household and natural sources (below 0.01 fibres/cm3) may induce pleural plaques but for diffuse pleural thickening higher exposure levels may be required."

The pursuer's alleged exposure was significantly higher than 0.01 fibres/ml.

[25] Ms Heyes explained, given exposure dose was not a parameter that employers or other duty holders needed at the time of the pursuer's exposure to consider in deciding whether precautionary measures were necessary, that she did not routinely comment or provide exposure dose estimates in pleural plaques and pleural thickening cases (she would provide an exposure does estimate in asbestosis or lung cancer cases to allow consideration of the Helsinki Criteria but would not do so in pleural plaques and pleural thickening cases because the Helsinki criteria did not set a an exposure dose for those conditions, but rather identified, in the passage set out above, a dust concentration 0.01 fibres/ml for pleural plaques and a dust concentration of over 0.01 fibres/ml for pleural thickening). Furthermore, in matters where employers or duty holders would not have been able to determine exposure dose at the time, it was Ms Heyes' view that since there never had been and still was not a safe level of exposure of asbestos, consideration of any exposure dose retrospectively was unlikely to have a bearing on whether any employer ought to have foreseen the risk of pulmonary injury and take action to prevent same occurring at the time.

[26] When the British Occupational Hygiene Society ("BOHS") considered hygiene standards for chrysotile asbestos dust in the context of asbestosis risks in 1968 they designated categories of dustiness with the greatest level of exposure being categorised as "high" and being defined as

"over 10 fibres/ml" (averaged over a 3 month period). Further the HMFI in their Technical Data Note 13 "Standards for asbestos dust concentration for use with the Asbestos Regulations 1969" and in subsequent documents defined a concentration of 12 fibres/ml over a 10 minute sampling period as a level above which they would seek to enforce the provisions of the Regulations. In view of the foregoing, the meaning of 'any substantial quantity' of dust would be open to interpretation and whether or not 'any substantial quantity of dust' was produced by any work process would be a matter for the court. Whilst it was a matter for the court, in the absence of dust measurement, a visible cloud of dust could be reasonably interpreted as 'a substantial quantity' of dust. Once measurement became possible in the late 1960s the presence of a concentration of asbestos dust in excess of 10 to 12 fibres/ml could be reasonably interpreted as a substantial quantity of dust.

[27] Prior to the pursuer's period of employment with Glasgow Corporation, a substantial amount of authoritative literature referring to the hazardous properties of asbestos had become available and for half a century it had been known that the inhalation of asbestos could give rise to pulmonary injury. In general, the main developments at the time of the pursuer's employment were: (i) the general association of dust inhalation with pulmonary injury in the early 1900s; (ii) the link between inhalation of asbestos dust and asbestosis established in the 1930s; and (iii) the link between inhalation of asbestos dust and lung cancer confirmed in the mid-1950s.

[28] Ms Heyes then made reference to the legislation and literature that was available in the public domain to Glasgow Corporation prior to the pursuer's alleged exposure in 1958 (see findings in fact 19 to 37 and findings in fact and law 2 to 5). Whilst the seminal M and P report suggested a threshold existed below which fibrosis was unlikely to develop, no known safe level

of exposure to asbestos emerged. That report also highlighted the risks to vicinity workers in the same room as asbestos processes. Further papers, including the 1933 paper by Dr Merewether (see finding in fact 23), linked exposure to asbestos and asbestosis. The 1943 HMFI report highlighted the shortest time for asbestosis to occur was 6 months (see finding in fact 25). The understanding was that the higher concentration of asbestos dust inhaled, the shorter the period before symptoms developed. At the time, since an employer could not have known the extent to which any person may or may not be further exposed to asbestos in the future and therefore of the potential cumulative exposure an employee may eventually be exposed, employers ought to have been alert to any work likely to expose employees to asbestos. The HMFI annual reports and letters from 1938 (finding in fact 24), 1943 (finding in fact 25), 1945 (finding in fact 26) and 27, 1949 (finding in fact 29) and 33), 1954 (finding in fact 36) and 1956 (finding in fact 37) further highlighted known risks of asbestos. Information published for factory or workshop occupiers, including those set out in findings in fact 28 and 30 to 35, also highlighted the known risks of asbestos.

[29] In the absence of any literature referring to the risks associated with *ad hoc* disturbance of asbestos lagging or advising that precautions ought to be taken for such disturbance (apart from that associated with packers in an manufacturing environment), Ms Heyes' view was that *ad hoc* disturbance of asbestos from crawling over or touching lagged pipework which did not result in the obvious release of dust was unlikely to be considered of such character and / or to such an extent to be injurious to health at the material time.

[30] Ms Heyes considered that Glasgow Corporation ought to have been aware that task such as the mixing process carried on in buildings owned or occupied by them and which gave rise to dust, was a hazardous activity and was associated with a risk of pulmonary injury. Glasgow

Corporation therefore should have acted to enable the works in the school boiler room to be undertaken in accordance with the contemporaneous knowledge of the day.

[31] With specific regard to the alleged mixing process undertaken in Glasgow Corporation's premises and/ or under their control and in the vicinity of the pursuer, Ms Heyes' view was that being the pursuer's employer, building occupier or in control of those undertaking the work they should have:

(a) Ensured all work with asbestos lagging was planned, including the handling, emptying and mixing of bags of asbestos lagging and subsequent application was undertaken by competent employees and/ or contractors, that wherever practicable others (including the pursuer) were not required to work alongside those carrying out work on asbestos lagging or its associated dust and debris where reasonably practicable;

(b) Ensured segregation of those working with asbestos lagging from other workers by enclosure, sheeting or roping off. Where this was not practicable, Glasgow Corporation should have ensured any of his employees were also provided with protection and controls identical to those provided to those undertaking the work with asbestos lagging or associated dust and debris;

(c) Ensured suitable work methods, equipment and tools to minimise the release, spread and accumulation of dust were provided and used; for example, where practicable the provision of exhaust ventilation, damping of products and good general ventilation;

(d) Ensured provision and use of suitable methods for dustless cleaning of associated dust and debris were provided and used e.g. by vacuum cleaning or damp cleaning otherwise and no dry sweeping allowed;

(e) Ensured suitable receptacles for the collection and disposal of waste asbestos containing materials ("ACMs") and associated dust and debris;

(f) Ensured the use of approved respiratory protective equipment and clothing to those working with asbestos lagging and cleaning associated with dust and debris and other vicinity workers where good ventilation not practicable and/ or risk of dust inhalation exists, in addition to provision of suitable accommodation, hygiene facilities, storage and cleaning arrangements;

(g) Ensured the provision of information and instructions to those employees working with and/ or in the vicinity of work with asbestos lagging regarding the risks associated, the procedures and equipment to be followed;

(h) As with any safe system of work, supervised and monitored the work of contractors and/ or their employees to ensure work with asbestos materials was carried out in accordance with contractual procedures, safe systems of work and equipment provided was being used appropriately by authorised and trained personnel.

[32] The above control measure were not too costly or difficult to provide. Similar control measures could have been produced by an active consideration of steps to reduce any potential exposure to asbestos dust associated with the circumstances alleged by the pursuer, within the context of the knowledge of the day, from the start of the pursuer's employment with Glasgow Corporation.

[33] In cross examination Ms Heyes confirmed that she had not: (i) visited the school boiler room; (ii) measured the school boiler room as it was in 1958; (iii) conducted any experiments to assess the concentration of asbestos in the school boiler room in 1958; or (iv) visited the baths. She accepted that: (i) she could not definitively say that the insulation material at the bath boiler room was asbestos; and (ii) it was now impossible to determine the actual level of asbestos exposure at the school boiler room or bath boiler room. She had not calculated an 8 hr TWA at the school or baths but had in her report identified the dust concentrations the pursuer was exposed to and calculated an estimated exposure dose of 0.5-0.9 fibres/ml.years based on various assumptions. That exposure dose figure had been calculated on the basis of the mixing process being at the frequency described in the L and S study (every 2 to 4 hours), which led to Ms Heyes making an assumption of 4 mixing processes a day. She had also assumed that the pursuer spent less time in the vicinity of the laggers that the pursuer had said that he did in evidence. Ms Heyes had not recalculated the pursuer's exposure dose on the basis of the pursuer's evidence, however, if she did so it would result in a higher estimated exposure dose figure being arrived at. The exposure does figure was not an 8 hr TWA.

[34] Ms Heyes accepted that the pursuer's 8 hr TWA at the school and baths in 1958 was unlikely to have exceeded 30 fibres/ml, but noted that 8 hr TWA was only relevant to exposure that occurred after the 160 booklet was published. She was not surprised at the frequency of mixing process suggested by the pursuer (every 30 to 45 minutes) as: (i) she had come across other claimants who had suggested a similar frequency; and (ii) three to four laggers would require quite a lot of the mix to keep them going. She was not aware of studies, other than the L and S study, that dealt with the frequency of mixing, and she noted that it was a limited study. She thought figure 4 in the Land S study (see para 13 above) was a photograph taken at the

hospital of the work being done that was observed during the L and S study in the hospital and agreed that the person that looked to be a scientist in the photograph had not taken any precautions against the inhalation of the asbestos dust. She thought that figure 5 in the L and S study was a stock picture of a lagger (rather than a lagger being observed during the L and S study in the hospital), but could not be sure.

***Mr Davey's evidence***

[35] Mr Davey is an Occupational Hygienist. He had a number of qualifications including: (i) a degree in environmental science; (ii) a proficiency certificate in asbestos and other fibres from the British Institute of Occupational Hygienists; (iii) a proficiency certificate in building surveys and bulk sampling for asbestos from the BOHS; and (iv) a post graduate diploma in occupational hygiene. He was a member of the Faculty of Asbestos Assessment and Management. He trained as asbestos analyst and surveyor. Between June 2006 and October 2015 he was a HM Inspector of Health and Safety. In that role he was a specialist inspector dealing with volatile material. Between October 2015 and April 2019 he was a senior industrial hygienist for General Electric providing expert advice and support across Europe and Sub-Saharan Africa on industrial hygiene and asbestos. In April 2019 he founded his own consultancy providing a broad range of occupational hygiene services. He had over 20 years' experience in recognising, evaluating, controlling and managing asbestos in the workplace. Since August 2019 he has conducted skilled person work. To date he had completed about 16 reports for cases as skilled person with about 20% being for the pursuer / claimant and the remainder being for the defender. Mr Davey had prepared a 111 page report for the present case, which he adopted as his evidence.

[36] In terms of terminology, primary exposure related to the person doing the work with the asbestos, bystander exposure could be another person working in the same area as the person

working with the asbestos or a manager observing the person working with the asbestos. Mr Davey considered that the pursuer: (i) at the school was subject to bystander exposure; and (ii) at the baths was not subject to bystander exposure, rather it was unintentional incidental exposure to the work he was doing.

[37] The lagging compositions (which had a variety of names, including 'monkey dung') would have been applied by hand to engines, boilers, plant or pipework, often with some form of reinforcement, such as wire mesh, and then built up in layers until a sufficient thickness was achieved. Such insulating material would often have been finished with a thin layer of hard-setting composition which consisted of cement reinforced with asbestos fibres. The final coat would usually be shaped using a special wooden tool. There was no typical depth for lagging and it would depend on the diameter of the pipe in question.

[38] Under reference to figure 4 of L and S study (see para 13 above), Mr Davey explained that it was normal for water to put into the bath first and then for the asbestos to be poured into the water. Mr Davey thought that the person to the left of figure 4 might be a research scientist and noted that that person was not taking any precautions. As regard figure 5 of the L and S study, Mr Davey was not sure whether the photograph was a stock picture of a lagger or a lagger being observed during the L and S study in the hospital Mr Davey considered that L and study approach to the mixing process time (5 to 15 minutes) and frequency (every 2 to 4 hours) was reasonably and what he would typically expect. If a lagger was looking to apply 50mm thick lagging Mr Davey thought the lagger would: (i) look at length of the pipe to be lagged determine how much mix that would take; and (ii) either: (a) clean the pipe and then apply the mix to build up to a thickness of 50mm; or (b) clean the pipe, attach chicken wire and then apply the mix to build up to a thickness of 50mm. That process would take time and therefore Mr Davey

considered that there would be a significant period of time between mixes. Once mixed the mix would stay wet for days or even weeks.

[39] The manufacture of asbestos as an insulating material declined after the mid-1960s. By 1970 the manufacture and use of non-asbestos 'plastic' forms of insulation were well established and the manufacture and supply of asbestos forms of 'plastic' lagging was in significant decline. The manufacture of asbestos as an insulating material had stopped completely by 1978 at the latest. Government guidance stated that asbestos insulation was very unlikely to be found in buildings constructed after 1980.

[40] The M and P report was focused on the asbestos textile industry. Mr Davey was not sure if the 1945 letter (see finding in fact 26) was restricted the shipbuilding industry but noted that there was lots of asbestos lagging on ships with lagging often being in confined spaces where the concentration of asbestos would be higher. The 1945 letter may have been sent to the Thermal Insulation Contractors Association because the laggers employed in that industry did similar work to the ship workers. By 1945 the focus was on primary exposure to the workers working with asbestos. Mr Davey accepted, under reference to the 1949 annual report by the Chief Inspector of Factories (see finding in fact 33), that any slackening of the precautionary measures would make it worse for the workers. In 1957 the Asbestos Research Council ("ARC") was formed by three asbestos manufacturing companies. In 1957, when ARC was formed: (i) it was known that substantial occupational exposure to asbestos over a long period of time could cause asbestosis; (ii) the link between asbestosis and lung cancer had been made; and (iii) the association between mesothelioma and asbestos had not been recognised.

[41] The three most common types of asbestos were as set out in finding in fact 18. The most dangerous was crocidolite, then amosite, then chrysotile. Prior to 1960, there was no

quantitative specifications of occupational exposure limits for asbestos. In March 1960 the Ministry of Labour published the 1960 booklet. Mr Davey spoke to finding in fact 38 and explained that he considered substantial exposure to asbestos to be exposure over the MPC for asbestos set out in the 1960 booklet of 177 ppcc on an 8 hr TWA. Mr Davey did not agree that the MPC of 177 ppcc was given limited heed in the UK. Common conversions were that 177 ppcc was the equivalent of: (i) 30 fibres/ml; and (ii) 5 million particles per cubic foot. Mr Davey considered that a substantial exposure of asbestos was over 30 fibres/ml on an 8 hr TWA. The MPC of 177 ppcc (or 30 fibres/ml) on an 8 hr TWA did not change until the issue of TDN 13 in 1970. The current MPC was 0.1 fibres/ml on a 4 hr TWA. Mr Davey's view was that asbestos insulation being mixed in the school boiler room was likely to be wet applied asbestos composite (plastic) insulation.

[42] Mr Davey explained that he had attempted to calculate the pursuer's exposure on an 8 hr TWA. The way in which the L and S study had reached the measurement of 260 ppcc was broadly in the order of 260 fibres/ml. The measurements taken in the L and S study in relation to the mixing process were not dissimilar to those in the Harries paper (on which see paras 17 to 19 above). Mr Davey then used the breathing zone and general atmosphere measurements during the lagging process conducted by Harries (see para 19 above) and calculated the average breathing zone concentration to be 10.3 fibres/ml and the average general atmosphere concentration to be 10.4 fibres/ml [*I was unable to understand the calculation conducted by Mr Davey – see para 19 above*].

[43] Balzer and Cooper (1968) had carried out personal sampling of insulation workers: (i) during general cleaning activities in commercial buildings; (ii) in light / heavy industrial buildings carrying out cleaning; and (iii) in marine construction and repair carrying out cleaning.

The mean of the three measurements was 2 fibres/ml for cleaning activities typically carried out between 0.5 and 3 hours. The Harries paper provided, in table 5, that during sweeping and bagging amosite debris the mean fibre concentration in the general atmosphere of 564 fibres/ml (range 76.3 – 1191 fibres/ml). In the same table cleaning calcium silicate debris produced a mean fibre concentration in the general atmosphere of 134 fibres/ml (range 32 – 237 fibres/ml) and in the breathing zone a mean of 155 fibres/ml (range 90 – 277 fibres/ml). Mr Davey did not consider that the mean of 155 fibres/ml represented the levels the laggers cleaning up dried and semi dried lagging paste from the floor of the school boiler room. Rather, he considered that due to the type of lagging work being carried out in the school boiler room - applying wet paste, rather than extensive removal of asbestos lagging in confined area during ship repair work – the average breathing zone concentrations would be much lower than 90 fibres/ml (the lower end of the range from the Harries paper), but higher than the levels reported by Balzer and Cooper (mean of 2 fibres/ml). In the circumstances Mr Davey estimated the laggers breathing zone fibre concentration at the school boiler room would have likely to have been 20 - 30 fibres/ml during cleaning up activities.

[44] On the basis of para 42 and 43 above, Mr Davey considered that the levels of exposure by the laggers themselves during the mixing process and when applying the asbestos lagging would have ranged from 200 fibres/ml during the mixing process down to around 10 fibres/ml during the application of the lagging and 25 fibres/ml during the cleaning up activities at the end of a shift. Mr Davey professional opinion was that the mixing process would not have taken place every 30 to 45 minutes but rather would have occurred every 2 to 4 hours for a period of 5 to 15 minutes as was the case in the L and S study. In the circumstances Mr Davey had made the following assumptions in his report:

1. up to 1 hour site preparation to set up the equipment ready to mix and apply the lagging;

2. an average of 10 minutes to mix the asbestos, two mixes, one in the morning and one in the afternoon;

3. an average of 3 hours to apply the lagging, one 3 hour in the morning and one 3 hour in the afternoon;

4. 30 minute break across an 8 hour shift; and

5. around 1 hour at the end of the shift to clean up.

[45] Therefore the laggers would have been exposed to two 10 minute [*Mr Davey had calculated this 20 minute period as 0.2 hours but recognised this calculation was wrong and should be 0.33 hours*] mixing activities and might have received 200 fibres/ml on each occasion. Whilst applying the lagging for two 3 hour periods the laggers might have received an average exposures of 10 fibres/ml on each occasion. In the last hour of their shift the laggers, whilst clearing up at the end of their shift, might have received an average exposure of 25 fibres/ml.

[46] Mr Davey considered that bystander exposure suffered by the pursuer would be less than the primary exposure suffered by the laggers. The pursuer's level of exposure would depend on: (i) the nature of the task being performed; (ii) the density of the material being worked and the type of asbestos it contained; (iii) the pursuer's proximity to the work; and (iv) the level of ventilation within the work area. Mr Davey was not aware of any literature that specified where in a room that the mixing process should occur and he considered that it was possible for the mixing process to be done in one location in room or for the mixing process to move around to follow the lagging work being conducted. Given that the pursuer suffered bystander exposure Mr Davey, under reference to TDN 42 issued in 1973, and bearing in mind

all the variables, reduced the figures by 50% so that they were (i) 100 fibres/ml (for the mixing); (ii) 5 fibres/ml (for the application) and (iii) 12.5 fibres/ml for the cleaning up. Given the pursuer's evidence regarding the frequency of the mixing process, the number of laggers that were present and that the laggers were working for more than one day, Mr Davey reduced the preparation / cleaning up time and altered his assumptions and calculations as set out below:

*30 minute mixing frequency*

16 ten minute mixes = 2.7 hours at 100 fibres/ml

Application time = 7 hours (given the number of laggers) at 5 fibres/ml

Cleaning up = 0.5 hours at 12.5 fibres/ml

$$\frac{(100 \text{ fibres/ml} \times 2.7 \text{ hrs}) + (5 \text{ fibres/ml} \times 7 \text{ hrs}) + (12.5 \text{ fibres/ml} \times 0.5 \text{ hrs})}{8 \text{ hours}}$$

$$= \frac{(270 + 35 + 6.25)}{8 \text{ hours}} = 38.9 \text{ fibres/ml as an 8 hr TWA}$$

*3 hour mixing frequency*

2 ten minute mixes a day = 0.3 hours at 100 fibres/ml

Application time = 6 hours at 5 fibres/ml

Cleaning up = 0.5 hours at 12.5 fibres/ml

$$\frac{(100 \text{ fibres/ml} \times 0.3 \text{ hrs}) + (5 \text{ fibres/ml} \times 6 \text{ hrs}) + (12.5 \text{ fibres/ml} \times 0.5 \text{ hrs})}{8 \text{ hours}}$$

$$= \frac{(30 + 30 + 6.25)}{8 \text{ hours}} = 7.7 \text{ fibres/ml as an 8 hr TWA [*Mr Davey arrived at 7.65 but my calc is 8.28*]}$$

[47] As regards the baths, the geometric mean of 0.61 fibres/ml in the 1991 report was a more appropriate figure to use that those in the Harries paper because the lagging that was crawled on in the Harries paper did not have a protective cover that the lagging would normally be finished with. According to the pursuer's evidence he spent three half days working in the bath boiler room. Therefore the calculation ought to be as follows:

$$\frac{(0.61 \text{ fibres/ml} \times 4 \text{ hours})}{8} = 0.31 \text{ fibres/ml as an 8 hour TWA}$$

[48] In cross examination Mr Davey calculated that 38.9 fibres/ml as an 8 hr TWA was the equivalent of 229 ppcc and the 7.7 fibres/ml as an 8 hr TWA was the equivalent of 45 ppcc. Mr Davey noted that his calculations were rough and ready estimates but explained that in his opinion the 7.7 fibres/ml as an 8 hr TWA was the appropriate estimate. He accepted that if the court found that the pursuer's exposure was over 177 ppcc as an 8 hr TWA (or 30 fibres/ml as an 8 hr TWA) that his exposure would have been substantial. He accepted that if the asbestos exposure was over the MPC in the 1960 booklet of 177 ppcc that further precautions would have been required to be put in place. He agreed that the 1960 booklet did not set out the methodology used by the American Conference of Governmental Hygienists, but he explained that they were a respected body He also accepted that there was no MPC in 1958. He considered that even in 1958 one had to consider the level of exposure over a working day but accepted that the mixing process was the dustiest part of the lagging process. He consider that in 1958 that a subjective assessment of the working conditions and the application of the knowledge and advice available to Glasgow Corporation would have been the primary drivers in determining what actions were required of them under the regulatory provisions that existed

at the time. Mr Davey accepted that the term 'bystander exposure' was fairly elastic and could include a person very close to the asbestos or someone standing far away.

[49] As regards the precautions proposed by Ms Heyes (see para 31 above) Mr Davey had the following observations [*Mr Davey's observation correspond to the list in para 31 above*]:

(a) Mr Davey disagreed with the comments regarding those in the vicinity of asbestos lagging;

(b) Mr Davey did not expect an enclosure in 1958 but did accept that there could be sheeting or roping off. He also disagreed with the comments regarding those in the vicinity of asbestos lagging;

(c) and (d) Mr Davey agreed that there ought to have damping of the product when the lagging was carried out and he would expect spraying of debris on the floor. He also accepted that good ventilation in terms of keeping the doors and windows open was reasonable practicable as was exhaust ventilation;

(e) Mr Davy agreed in principle but questioned what was meant by "suitable receptacles".

(f) Mr Davey agreed with the first part regarding providing respiratory equipment and clothing for those working with asbestos lagging but only in relation to mixing process and not the actual lagging of pipes. Mr Davey did not consider that the approach suggested for vicinity workers would have been expected in 1958.

(g) Mr Davey disagreed with the comments regarding those in the vicinity of asbestos lagging; and

(h) Mr Davey agreed.

Mr Davey also noted that the mixing process could have been conducted outside. Mr Davey did not consider that he should defer to Ms Heyes' view on appropriate precautions and noted that he had previously been a specialist HM Inspector of Health and Safety and would therefore have been brought in to support general HM Inspectors of Health and Safety such as Ms Heyes.

[50] Mr Davey accepted that: (i) asbestosis is dose related; (ii) the court will treat asbestosis as a divisible injury; and (iii) the Helsinki Criteria could be used to make an apportionment in respect of a defender if a person had a cumulative exposure to asbestos. Mr Davey accepted under reference to para 5.90 of his report, that the pursuer's alleged exposure could have contributed to asbestosis if the level of cumulative exposure reached 25 fibres/ml.years or more. The figure of 25 fibres/ml.years related to cumulative exposure over a number of years and was completely different to the figure 30 fibres/ml that had already been discussed at length.

**Submissions**

[51] The Senior Counsel for the pursuer lodged a 30 page written submission and Counsel for the defenders lodged a 20 page written submission. Both also made additional oral submissions.

***Submissions for the Pursuer***

[52] The questions for the court in the present case were the same as the questions identified by Underhill LJ in *Bussey v Anglia Heating Ltd* [2018] ICR 1242 at para 63 (see para 78 below). The court should answer those questions on the basis of what was reasonably foreseeable to Glasgow Corporation in 1958, without reference to later knowledge documents and without the need to consider any fibre count calculations, which were irrelevant (Senior Counsel for the pursuer maintained his objection to the admissibility of knowledge documents published after 1958

where they were used to inform what was known or could be reasonably foreseen in 1958). In 1958 there was no means to fibre count and all that a reasonable employer could do was to consider the visible dust in the air. The answer to question (1) in *Bussey* should be 'yes' and the answer to question (2) should be 'no'. If the court was minded to consider fibre count calculations then, in any event, the pursuer was exposed to substantial levels of asbestos which exceeded the MPC in the 1960 booklet (with Mr Davey calculating the pursuer's 8 hr TWA at 38.9 fibres/ml, which was above the MPC of 177 ppcc or 30 fibres/ml in the 1960 booklet).

[53] Chapter 16 of *Munkman on Employer's Liability*, 17th Ed provided a helpful overview of the approach taken by the courts in negligence claims for dust diseases. In the present case para 16.3, 16.9, 16.11 to 16.15, 16.17 to 16.18 and 16.20 to 16.22 of *Munkman* were of particular relevance. The court should bear in the mind the phrase "clearly bad" in *Stokes v Guest, Keen & Nettlefold* [1968] 1 WLR 1776 when considered the present and other cases cited. There were some cases, such as *Williams v University of Birmingham* [2012] PIQR P4, where the type of asbestos exposure was not of the type that a reasonable employer would have thought would give rise to a foreseeable risk of injury, however, in the present case the pursuer's exposure in the school boiler room was "clearly bad" and the case of *Williams* ought to be distinguished.

[54] The Court of Appeal of England and Wales case of *Jeromson v Shell Tankers* (UK) Ltd [2001] ICR 1223 had been correctly decided and should be followed. Under reference to paras 31 to 51 of *Jeromson* it was contended: (i) in considering the question of foreseeability, it was not appropriate to consider an 8 hr TWA; (ii) the reasonable and prudent employer ought to have considered the potential exposure to a worker working in an environment where there were large quantities of visible dust in high concentrations; (iii) consideration of a worker's health and safety should not be diluted by averaging it out over an arbitrary 4 or 8 hour period (that was

particularly so when the M and P report indicated that the more that could be done to reduce the concentration of dust in the air would cause "a great increase in the length of time before workers develop a disabling fibrosis"); (iv) it was known from the M and P report that asbestosis developed over time and therefore high concentrations of asbestos dust (in the early days) would contribute to the later development of the disease; (v) the levels of exposure in *Jeromson* were similar to the present case; (vi) the court should consider the knowledge of Glasgow Corporation in 1958 (being a large local authority with a mixed estate of properties dating back to the 19th century) to being similar to that of Shell in *Jeromson*; (vii) the first instance judge in *Jeromson* correctly confined his consideration to literature published before 1961; (viii) whilst the skilled persons in the present case were helpful in setting out the relevant literature, what a reasonable and prudent employer should have made of it was a matter for the court; (ix) the 1931 Regulations informed the common law and in the present case the mixing process lasted more than 8 hours weekly; and (x) Glasgow Corporation did not know what future potential asbestos exposure the pursuer would have (and indeed subjected him to a further exposure 6 months' later at the baths) and ought to have known that high concentrations of asbestos dust (if repeated) could lead to the development of asbestosis.

[55] In the case of *Bussey* an argument was advanced that TDN 13 (which was issued in 1970) could inform standards in 1965 to 1968 but the court held that TDN 13 was not a bright line to be applied before or after 1970. Rather it was necessary to look at the information which a reasonable employer in the defendant's position at the relevant time should have acquired and then determine what risk such an employer should have foreseen. In the present case the court should take the same approach and find, on the basis of M and R report, the 1931 Regulations, the 1937 Act and HMFI reports produced from 1938 to 1958, that a reasonable employer would

have found it reasonably foreseeable that the pursuer would have been at risk of some injury if sent into an unventilated school boiler room to work alongside three to four laggers for a two week period. In 1958 Glasgow Corporation could not have known whether the pursuer's asbestos exposure would have been over the MPC which was not published until the 1960 booklet. However, what they could know was that the pursuer's work over that two period regularly exposed him to large quantities of asbestos. In the present case there were precautions that Glasgow Corporation could have taken to reduce the pursuer's exposure to asbestos dust, but they did not do so. The performing of back calculations (or back-guestimations) against subsequently published figures in the 1960 booklet was unsound (and it was held to be unsound to do so in *Bussey* at para 62 in relation to TDN 13).

[56] The very recent Court of Appeal of England and Wales case of *White v Secretary of State for Health and Social Care* [2024] EWCA Civ 244 (issued on 14 March 2024) was wrongly decided and should be treated with caution. It could not be regarded as settled law because it was understood that permission to appeal to the Supreme Court had been sought in that case.

[57] Under reference to paras 4 to 10, 36, 40, 46, 64, 111, 112 to 124, 128 and 130 of *White* (which concerned two actions, namely "the White appeal" and "the Cuthbert appeal"), it was contended: (i) the pursuer's level of exposure at the school boiler room was more in line with that found in *Jeromson* and more substantial than the exposure the court was considering in both the White appeal and the Cuthbert appeal and both should be distinguished on the facts; (ii) as at 1930 it was known that inhalation of dust could cause injury to the lungs as a generality, with fibrosis being recognised as the most important lesion (see *White* at para 46 per Stuart-Smith LJ quoting from the M and P report), however, as could be seen from the M and P report at page 5 (see finding in fact 20 above) it was not the only known injury to the lung (however, Stuart-

Smith LJ did not refer this section of the M and P report) and by the mid-1950s there had been regular cases of workers developing silicosis and other forms of pneumoconiosis as result of dust exposure; (iii) Stuart-Smith LJ at para 63 and 64 put an unwarranted and incorrect gloss on what the Chief Inspector of Factories said in the 1938 report (see finding in fact 24 above), in particular: (a) the Chief Inspector did not say asbestos was only highly dangerous if inhaled at high concentrations over a long period of time; and (b) Stuart-Smith LJ's gloss departed from the approach of all courts to the Chief Inspector's 1938 report; (iv) it made no sense to say what was reasonably foreseeable at the end of the 1950s could be determined by what came to be known thereafter; (v) in any event, nowhere in the 1960 booklet was there any reference to a "safe" level of asbestos exposure and the 1960 booklet highlighted the importance to always be on the look-out for hazards and bear in the mind the possible need for precautions; (vi) whilst Stuart-Smith LJ's analysis of the case law between paras 112 and 124 was unobjectionable (and indeed endorsed the test set out in *Bussey*) his approach to *Jeromson* was wrong and the correct approach was that taken by Hale LJ in confining herself to literature published before 1961 (when Mr Jeromson's employment and exposure ceased); and (vii) the case of *White* was not a test case; it was not considering pleural plaques or diffuse pleura thickening, which, unlike mesothelioma (which the court was considering in *White*), were both cumulative and dose related (see also *Fairchild v Glenhaven Funeral Services Ltd* [2003] 1 AC 32 at para 6, 7 and 14) and therefore the court ought to be reluctant to consider and apply the comments in *White* to the present case.

[58] In the case of *Gibson v Babcock* 2018 SLT 886 Lady Carmichael was considering secondary exposure to a wife of a worker during the period 1962 and 1971 and did not consider it necessary to consider fibre counts and the same approach should be taken in the present case. The Inner House case of *Watt v Lend Lease Construction (Europe) Ltd* [2023] CSIH 19 did not support the

proposition that it would be relevant to look at documents from 1960 to 1969 in determining what was foreseeable to a reasonable employer in 1958. In any event the case of *Watt* could be distinguished from the present case because the asbestos exposure in that case was, unlike the present case, characterised as a low level exposure over a short period.

[59] The pursuer was a credible and reliable witness. His evidence taken with that of Ms Heyes and Mr Davey supported that the laggers in the school boiler room were using asbestos. The pursuer had a clear recollection of events and was the only witness who was actually present in the boiler room. There was no evidence that the work at the school boiler room was carried along the same lines as the work studied in and L and S study and that study was not a template for the frequency of mixing. The pursuer was clear that the mixing process was repeated every 30 to 45 minutes and that he was working in close proximity to the laggers. There was nothing to contradict the pursuer's account of what occurred in the school boiler room. The pursuer's evidence regarding dust going everywhere during the mixing process was supported by Ms Heyes and Mr Davey accepted it was a dusty process. Ms Heyes considered that the mixing process generated high concentrations of asbestos dust in the general atmosphere (167 – 199 fibres/ml) and even greater concentrations in the breathing zone (217 - 260 fibres/ml). These concentrations were the peak potential exposure that required to be considered if the court applied Hale LJ's approach in *Jeromson* at para 37 (which also made clear that it was not appropriate to consider a TWA). Those concentration were considerably higher than the 177 ppcc or 30 fibres/ml MPC in the 1960 booklet. When the factual circumstances were considered against the knowledge that was available as at 1958, namely the M and P report (see finding in fact 19 and 20), the 1931 Regulations (see finding in fact and law 2 to 4), the 1931 report (see finding in fact 21 and 22), the Merewether paper of 1933 (see finding in fact 23), section 47 of the

Factories Act 1937 (see finding in fact and law 5), the 1938 annual report of the Chief Inspector of Factories (see finding in fact 24), the 1945 HMFI report and the letter from the Chief Inspector of Factories, A.W. Garrett (see findings in fact 26 and 27) and the 1949 annual report of the Chief Inspector of Factories (see findings in fact 33), it was clear that Glasgow Corporation ought to have been aware that the exposure to levels of asbestos dust that the pursuer experienced gave rise to a significant risk of asbestos-related injury.

[60] Whilst it was accepted that Glasgow Corporations duty was to take reasonable care, Ms Heyes had set out precautions (see para 31 above) which could reasonably have been taken at the time. Mr Davey had also noted that the mixing process could have been conducted outside. No precautions had been taken and, in the circumstances, Glasgow Corporation had therefore not taken proper precautions to reduce or eliminate the significant risk of an asbestos-related injury that the pursuer was expose to. The two questions in *Bussey* should therefore be answered as contended for at para 52.

[61] It was not suggested that negligence had been established in relation to the pursuer's exposure to asbestos at the baths. However, Glasgow Corporation knew that they had already exposed the pursuer to substantial levels of asbestos dust in the school boiler room and then went on to expose him to further asbestos dust (and therefor another dose of asbestos) at the baths in circumstances where he was not given any information, warnings or equipment to reduce the risk of injury from asbestos.

[62] Causation was not in serious dispute. There was no evidence that the pursuer had been exposed to asbestos other than during his employment with Glasgow Corporation. In the circumstances, if the court found that Glasgow Corporation where in breach of duty at the school boiler room it should have little difficulty in concluding from the agreed medical

evidence that the pursuers pleural plaques and diffuse pleural thickening were caused or materially contributed by his exposure to asbestos dust at the school boiler room.

***Submissions for the defenders***

[63] It was accepted that the first question set out in the case of *Bussey* at para 63 applied to the present case, however, that question should be answered in the negative. In the present case Glasgow Corporation did not operate factories and did not operate in the: (i) asbestos industry; or (ii) shipbuilding or ship repairing industries. The pursuer's alleged exposure to asbestos was for a limited period of time. The burden of proof was on the pursuer. It was not reasonably foreseeable to Glasgow Corporation in 1958 that there was a risk of respiratory injury from the extent and duration of the pursuer's exposure. The pursuer's exposure at the school boiler room was for two weeks and at the baths was for three days, 50% of the time. In 1958 asbestos was known to cause asbestosis or lung cancer but the pursuer developed neither condition.

[64] Whilst the pursuer was doing his best to tell truth he conceded that his memory was not what he hoped it would be. The pursuer recollection of the frequency of the mixing process was incorrect. He did not time the frequency of the mixing process with his own watch. In the L and S study the mixing process occurred every 2 to 4 hours and Mr Davey considered that level of frequency was reasonable. Ms Heyes only prepared reports for a claimant / pursuer and was a partisan witness. Her report and oral evidence contained errors such as not recognising that the L and S study had taken place in a working environment. In the circumstances the court should find that the frequency of the mixing process occurred every 3 hours.

[65] Neither Ms Heyes nor Mr Davey considered that the MPC in the 1960 booklet of 177 ppcc or 30 fibres/ml 8 hr TWA had been exceed at the baths. Ms Heyes did not think that the MPC

had been exceeded at the school boiler room. Mr Davey provided the court with the means to calculate the pursuer's 8 hr TWA at the school boiler room (on which see para 46 above). He had used his best estimations in the calculations that he had performed. The three relevant calculations were as follows: (i) mixing process every 30 minutes; (ii) mixing process every 45 minutes; and (iii) mixing process every 3 hours (the mid-point of the L and S study). If the mixing process was every 30 minutes Mr Davey calculated the pursuer 8 hr TWA to be 38.9 fibres/ml, however, he had included 0.5 of an hour for clearing up but there was no evidence to support that the pursuer was exposed during cleaning up. If clearing up was discounted and errors in calculations corrected the relevant calculations were as follows: (i) mixing process every 45 minutes - ((100 x 1.833 hours) + (5x7)) / 8 = 27.2857 fibres/ml; and (ii) mixing process every 3 hours - ((100 x 0.333 hours) + (5x7)) / 8 = 8.54 fibres/ml. As such if he court accepted the defenders' contention as regards the frequency of the mixing process being every 3 hours the pursuer's 8 hr TWA was 8.54 fibres/ml. Therefore the pursuer's alleged exposure at both the baths and the school boiler room were significantly below the MPC in the 1960 booklet. However, even if the court considered the mixing process occurred every 45 minutes the pursuer 8 hr TWA was still below the MPC in the 1960 booklet.

[66] Whilst the skilled persons could bring the court's attention to various literature, legislation and guidance that was available at the material times it was matter for the court to determine what the reasonable and prudent employer would have made of the literature etc. (*Jeromson* per Hale LJ at paras 41 to 50).

[67] The most recent and authoritative case on what should be derived from the literature was the very recent case of *White*. Under reference to paras 16, 30, 44 to 100, 104 to 111 of *White* it was contended that: (i) the court in *White* derived assistance from the development of knowledge of

foreseeability of pulmonary injury which post-dated the relevant periods of exposure; (ii) the M and P report was restricted to those involved in "manufacturing processes involving the use of pure asbestos, or asbestos mixed with a very small percentage of cotton or other vegetable fibre and the reference to the term "the use of asbestos" at para 104 of *White* should be seen as relating to the asbestos manufacturing industry; (iii) there was no evidence that Glasgow Corporation were working in the asbestos industry; (iv) the court should follow the eight propositions set out at para 104 to 111 of *White*; (v) in the eighth proposition (para 111 of *White*) the passage that stated "up to the end of the 1950s, it was not reasonably foreseeable by employers that exposure to asbestos at levels significantly lower than those apparently endorsed thereafter gave rise to a significant foreseeable risk of injury." was only a reference to the exposure in the White appeal and Cuthbert appeal and ought not to be construed as an attempt by the court to limit their eight propositions solely to cases where exposure was deemed "significantly lower" than the levels endorsed thereafter; (vi) any exposure which was lower than a level endorsed thereafter (i.e. the MPC in the 1960 booklet) must be deemed by the court as having given rise to no foreseeable risk of injury; (vii) as the pursuer's exposure was below the MPC in the 1960 booklet the defenders should be assoilzied; and (viii) *White* followed an approach that had been taken in Scotland in the Outer House in the case of *Watt Lend Lease Construction (Europe) Ltd* 2022 SLT 723 (that Outer House decision was subsequently upheld by the Second Division ([2023] CSIH 19).

[68] The case of *White* had now cast doubt on the Court of Appeal's decision in *Jeromson.* Under reference to paras 39 and 45 of *Jeromson* it was contended that: (i) the level of exposure in *Jeromson* were found to be "substantially higher" that the MPC of 30 fibres/ml, which could be contrasted with the present case; (ii) Hale LJ went wrong at para 45 (when she stated that "given the high incidence found after longer periods it would be quite unsafe for anyone to conclude

what might be the safe level of exposure.") for the reasons explained by Stuart-Smith LJ in *White* at para 61 to 62, 127 to 128 and 139; (iii) on a proper reading of the M and P report and the Merewether paper of 1933 it can be seen that there had been thought to exist a level of asbestos dust to which one could be exposed that would not lead to the development of asbestosis - the 'dust datum' (referred to in the Merewether paper of 1933 at page 116); (iv) *Jeromson* did not support any assertion that exposure beneath a MPC of 30 fibres/ml prior to 1960 would give rise to foreseeable risk of pulmonary injury; (v) the reasoning of Stuart-Smith LJ in *White* should be preferred to that of Hale LJ in *Jeromson* because he has regard to the full spectrum of relevant documentation; and (vi) the case of *White* did not ultimately take issue with the decision in *Jeromson* given the substantial levels of exposure in *Jeromson.*

[69] In all the circumstances what could be reasonably be foreseen in the 1958 could be informed by guidance issued thereafter. As the pursuer's exposure occurred before 1960 at levels which would have been within the MPC in the 1960 booklet, there was no foreseeable risk of injury from the levels of exposure that the pursuer was subjected to. In such circumstances decree of absolvitor should be granted.

**Analysis and decision**

***Conclusions on the evidence***

[70] Senior Counsel for the pursuer did not contend that Glasgow Corporation had been negligent at the baths, however, he did contend that they were negligent at the school boiler room. The key factual disputes in present case were the frequency of the mixing process at the school boiler room and the pursuer's level exposure during the mixing process. The pursuer gave his evidence in a thoughtful, clear and confident manner. He was asked to recall events in

1958 and it was understandable that he could not recall all the details about the time he worked in the school boiler room. However, he was very clear that there were three or four laggers working in the school boiler room and that the frequency of the mixing process was approximately every 30 to 45 minutes. Ms Heyes explained that she had dealt with other cases where the mixing process was said to be of a similar frequency and I considered that her hearsay evidence in that regard provided some support for the pursuer's evidence. The frequency in the L and S study of 2 to 4 hours was based on one limited study (the L and S study notes "[i]t must be stressed that our observations were not extensive and were limited to one particular building.") with an unknown amount of laggers. Mr Davey considered that that level of frequency was reasonable. When the level of frequency in the L and S study was put to the pursuer, his immediate response, which I considered to be genuine, was that the laggers in that study may not have been working very hard. I considered that pursuer made appropriate concessions against his own interest during his evidence and was not shaken on cross examination. I considered the pursuer was doing his best to tell the truth and I found him to be a credible and reliable witness. He was the only eye witness to mixing process in the school boiler room and I accepted his evidence in general and in particular as regards: (i) the mixing process taking place at a frequency of approximately every 30 to 45 minutes; and (ii) him working in the school boiler room, for the majority of the time, in close proximity to the laggers (and I inferred from his evidence that he was working in close proximity to the laggers during when the mixing process was taking place).

[71] I considered that both Ms Heyes and Mr Davey were generally credible and reliable witness who were doing their best to be of assistance to the court. Both appeared to accept that in 1958 Glasgow Corporation would not have had the ability to measure dust concentrations and

therefore, at that time, were only in a position to make a qualitative assessment of the level of dust that the pursuer would be exposed to. Both Ms Heyes and Mr Davey relied on the L and S study (from 1963) and the Harries paper (from 1971) to attempt to estimate the asbestos dust concentrations that the pursuer was exposed to (whilst Senior Counsel for the pursuer objected to the admissibility of knowledge documents post-1958 where they were used to inform what was known or could be reasonably foreseen in 1958, he did not object to the use of such literature to estimate the dust concentrations). Mr Davey then went on to estimate the pursuer's 8 hr TWA. What became very clear during the evidence of these skilled persons was that it was only possible to arrive at very rough estimations and that any estimation of the pursuer's 8 hr TWA required a number of assumptions to be made. Assumptions to calculate the pursuer's 8 hr TWA required to be made as regards: (i) the frequency of the mixing process; (ii) the level of dust that the pursuer was exposed to during the mixing process; (iii) the duration of the mixing process; (iv) the number of hours the actual lagging took place for; and (v) the level of dust that the pursuer was exposure to during the lagging process.

[72] The L and S study showed a peak value of 260 ppcc during the mixing process. The Harries paper showed the following measurements for the mixing process (Harries did not, however, report the duration of the mixing process): (i) general atmosphere (the area included in the general atmosphere was not known): 167 – 199 fibres/ml; and (ii) breathing zone (which was breathing zone of the worker doing the mixing process): 217 – 256 fibres/ml. Both skilled persons considered that the L and S study figure of 260 ppcc was broadly equivalent to 260 fibres/ml and accorded with the breathing zone measurements in the Harries paper. Ms Heyes, after considering both the L and S study and the Harries paper, came to view that the pursuer's maximum peak exposure during the mixing process would have been approximately 167 – 199

fibres/ml if the pursuer was working within close proximity to the laggers (within several feet). Mr Davey after considering that study and paper thought that the laggers' exposure during the mixing process would have been 200 fibres/ml and then allowed a 50% reduction to 100 fibres/ml to allow for the variable distances that the pursuer would have been from the laggers during the mixing process.

[73] Ms Heyes then thought that the dust concentrations were likely to have been around: (i) 25 – 40 fibres/ml, as suggested in the L and S study, after 15 to 30 minutes at around three yards; and (ii) around 5 -10 fibres/ml at distances of 12 to 20 yards after 45 minutes to an hour. Mr Davey, on the basis of the measurements in the Harries paper for both general atmosphere and the breathing zone in relation to the lagging process considered that the laggers' exposure during the lagging process was 10 fibres/ml and then again allowed a 50% reduction to 5 fibres/ml to allow for the variable distances that the pursuer would have been from the laggers during the lagging process.

[74] The pursuer explained: (i) the high frequency of the mixing process; (ii) that the mixing process produced a substantial amount of dust; (iii) the dust went everywhere; (iv) the frequency of the mixing process resulted in the dust never clearing; (v) that for majority of time in the school boiler house he worked in close proximity to the laggers; (vi) that the school boiler room did not have anything other than natural ventilation; (vii) that his blue boiler suit quickly became grey due to the asbestos dust; and (viii) that he worked in the those conditions in the school boiler room for around 80 hours over a two week period. Mr Davey's starting figure of 200 fibres/ml for the exposure of the laggers during the mixing process seemed to be somewhat reduced from the figures in the L and S study (260 fibres/ml) and the Harries paper (217-256 fibres/ml). Whilst I could understand why some percentage reduction ought to be applied to

take account of the pursuer only being in the vicinity of the laggers, the reduction of 50%, in the particular circumstances of the present case, as described above, where the pursuer worked in close proximity of the laggers for the majority of the time, seemed to be too high and did not accord with the general atmosphere figures of 167 – 199 fibres/ml in the Harries paper (which Ms Heyes thought were the peak figures that the pursuer would have been exposed to during the mixing process). I also considered a 50% reduction to the starting figure of 10 fibres/ml for the lagging process may have been too high given that the Harries paper showed that the general atmosphere figures showed an average range of 11.2 fibres/ml (on my calculation - see para 19 above). However, Ms Heyes did consider that the dust levels would generally reduce to around 5 – 10 fibres/ml at distances of 12 to 20 yards from source after 45 minutes to an hour (although that was on basis of a mixing process every 2 to 4 hours). In the particular circumstances of this case I considered that the pursuer's exposure during the mixing process was likely to have been higher than the 100 fibres/ml suggested by Mr Davey and closer to the 167 – 199 fibres/ml suggested by Ms Heyes. I was prepared to accept from the evidence of both Ms Heyes and Mr Davey that during the lagging process that the pursuer's exposure would have been around 5 to 10 fibres/ml.

[75] As I have already noted the actual level of the pursuer's exposure to asbestos can only be very rough estimate. However, even if one took a 45 minute frequency for the mixing process (and therefore not taking an average between 30 and 45 minutes), an exposure of 5 fibres/ml during the lagging process and ignored Ms Heyes' estimate of 25 – 40 fibres/ml after 15 to 30 minutes at around three yards, anything above the pursuer being exposed to 112 fibres/ml during the mixing process produces an 8 hr TWA above the MPC of 30 fibres/ml in the 1960 booklet ((112 x 1.833) + (5 x 7) / 8 = 30.04 fibres/ml).

[76] In my opinion the pursuer's evidence, which I accept and have summarised at para 74 above, made clear that he was exposed to significant levels of visible asbestos dust during the mixing process which occurred at a frequency of 30 to 45 minutes in circumstances where there was nothing other than natural ventilation in the school boiler room. The frequency of the mixing process resulted in the dust never clearing, lingering and the pursuer's blue boiler suit quickly turning grey due to being covered in the asbestos dust in the general atmosphere. The pursuer worked in those conditions for around 80 hours over a two week period and I consider that, during that period, he was exposed, on a daily basis, to substantial levels of asbestos dust.

[77] Findings in fact 1 to 5 were not in dispute. Findings in fact 6 to 17 are based on the evidence of the pursuer and the inferences drawn from his evidence. Findings in fact 18, 38 and 41 are based on a combination of the evidence of Ms Heyes and Mr Davey. Findings in fact 19 to 37 and 40 are based on the evidence of Ms Heyes. Finding in fact 39 is based on the evidence of Mr Davey. Findings in fact 42 to 44 are based on a combination of the evidence of the pursuer, Ms Heyes and Mr Davey and the inferences drawn from said evidence.

***The common law case***

[78] The pursuer's case was only based on the common law. There was no dispute that the duty of the employer in a common law case was to take reasonable care to protect those affected by an activity against a foreseeable risk of injury to their health (*Munkman*, para 16.9). In the end there was also not any dispute that the questions that the court should answer in the present were those set out by Underhill LJ in the Court of Appeal of England and Wales case of *Bussey* at para 63:

> …In my view the right approach in principle to the necessary inquiry is twofold: (a) the first question is whether Anglia should at any time during Mr Bussey's employment—

> that is, between 1965 and 1968 (the precise dates are not known)—have been aware that the exposure to asbestos dust which his work involved gave rise to a significant risk of asbestos-related injury. (I say "significant" only so as to exclude risks which are purely fanciful: any real risk, albeit statistically small, of a fatal illness is significant.) That will depend on how quickly the knowledge, first widely published in 1965, of the fact that much lower exposures than had previously been thought to be dangerous could cause mesothelioma was disseminated among reasonable and prudent employers whose employees had to work with asbestos. One aspect of this question is whether, even though Anglia may have been aware of the risk in general terms, it was reasonable for it at the material time to believe that there was a level of exposure below which there was no significant risk, and that Mr Bussey's exposure was below that level. (b) If the answer to the first question is that Anglia should have been aware that Mr Bussey's exposure gave rise to such a risk (including that there was no known safe limit) the second question is whether it took proper precautions to reduce or eliminate that risk. On the facts of the present case, that question may not be difficult to answer, since, as Jackson LJ says at para 56, the judge found that there were two simple precautions that could have been taken, and there seems to be no suggestion that they were either impractical or unreasonably expensive: even if the risk was understood to be small, given its seriousness if it eventuated, the precautions ought to have been taken. I do not in fact think that this differs from what Jackson LJ says at para 49 of his judgment; my concern is only with the introduction in para 44 of the concept of "unacceptable" risk. Although that term is indeed used in the *Williams* case I do not believe it forms part of Aikens LJ's ratio."

[79] The two questions for this court were therefore:

(1) whether Glasgow Corporation should have been aware, at the time they sent the pursuer to work at school boiler room alongside the laggers, that his exposure to asbestos dust gave rise to a significant risk of injury (where significant is meant to exclude risks which are purely fanciful);

(2) if the answer to issue 1 is 'yes', whether Glasgow Corporation took proper precautions to reduce or eliminate that risk.

[80] I considered that the pursuer had correctly identified that provided some injury was foreseeable, it did not matter that if the particular injury which resulted was not foreseeable (see *Munkman* at para 16.17; *Jeromson* per Hale LJ at para 32; but see also Stuart-Smith LJ at para 107 to 111, 136 to 137 and 139 of *White*). The defenders did not take issue with the pursuer's reliance

on the case of *Stokes* and I considered that the following words of Swanwick J in that case (at page 1783) remained an accurate statement of the law in relation to the foreseeability of injury in areas involving developing knowledge:

> "From these authorities I deduce the principles, that the overall test is still the conduct of the reasonable and prudent employer, taking positive thought for the safety of his workers in the light of what he knows or ought to know; where there is a recognised and general practice which has been followed for a substantial period in similar circumstances without mishap, he is entitled to follow it, unless in the light of common sense or newer knowledge it is clearly bad; but, where there is developing knowledge, he must keep reasonably abreast of it and not be too slow to apply it; and where he has in fact greater than average knowledge of the risks, he may be thereby obliged to take more than the average or standard precautions. He must weigh up the risk in terms of the likelihood of injury occurring and the potential consequences if it does; and he must balance against this the probably effectiveness of the precautions that can be taken to meet it and the expense and inconvenience they involve. If he is found to have fallen below the standard to be properly expected of a reasonable and prudent employer in these respects, he is negligent."

[81] The pursuer relied heavily on the case of *Jeromson* and the defenders relied heavily on the case of *White*. Both cases were decisions of the Court of Appeal of England and Wales and whilst they were not binding on me, I considered they both required to be given considerable respect. Given the reliance placed on these cases and the fact that the decision in each case is not on all fours with one another I have considered each case in some detail below.

*Jeromson*

[82] In the case of *Jeromson* there were in fact two appeals (the other was *Dawson v Cherry Tree Machine Co Ltd and Shell Tankers (UK) Ltd*). The Dawson appeal concerned a breach of the 1931 Regulations (Hale LJ held that there was a breach of the 1931 Regulations) by Cherry Tree Machine Co Ltd and common law negligence case against Shell. The Jeromson appeal concerned only a common law negligence case against Shell. For the purposes of the present case it is the

decision by Hale LJ in respect of the common law negligence claims in both appeals that is relied upon by the pursuer.

[83] In that case Hale LJ identified, at para 35 to 37, the issue as follows:

> "35. The issue in this case is not one of balancing the effectiveness, expense and inconvenience of the precautions required against the extent of the risk: the issue is whether the risk should have been identified. With the benefit of hindsight, it is now quite clear that the exposure in these cases was sufficient to cause mesothelioma, the disease from which Mr Dawson and Mr Jeromson eventually died. But the link between asbestos and mesothelioma was not established until 1960. Until then the known risk was of lung disease, in particular asbestosis, and, in the 1950s, lung cancer associated with asbestosis. The issue was whether the degree of exposure in this case was such that a reasonable employer should have identified a risk.
> 36. […]
> 37. Mr Mackay, on behalf of Shell, argues that where the issue is whether any risk at all should have been identified, it is more appropriate to consider whether the average as opposed to the potential exposure was sufficient to ring the bell. However, where an employer cannot know the extent of any particular employee's exposure over the period of his employment, knows or ought to know that exposure is variable, and knows or ought to know the potential maximum as well as the potential minimum, a reasonable and prudent employer, taking positive thought for the safety of his workers, would have to take thought for the risks involved in the potential maximum exposure. Only if he could be reassured that none of these employees would be sufficiently exposed to be at risk could he safely ignore it."

Those passages make clear that Hale LJ rejected an argument that it was an average exposure that should be considered when determining the degree of exposure and took the view that the prudent employer should be considering potential maximum exposure that their workers would be exposed to.

[84] Both Mr Dawson and Mr Jeromson had been employed by Shell as marine engineers on various ships, Mr Dawson between July 1951 and May 1957 and Mr Jeromson between June 1957 and July 1961. The first instance judge found that marine engineers would be exposed to dust when asbestos insulation had to be stripped away and replaced. The stripping of asbestos lagging by crude methods gave rise the high concentrations of visible dust, as did mixing

asbestos powder with water for new insulation and dry sweeping of asbestos debris. Cutting asbestos lagging by handsaw gave rise to less high but still significant concentrations and handling asbestos mattresses in a poor condition to moderately high concentrations. As with the present case, there was, at the time, no way of measuring such concentration and until the 1960 booklet there were not "published limits". The first instance judge concluded that: (i) all but the last activity would have given rise to concentrations substantially above the lower limit set in 1960; (ii) the last activity would have given rise to concentrations above the lower limit set in 1960; and (iii) the "five activities would have given rise to significant levels of visible dust … clearly there to be seen, if considered by any careful employer.". The first instance judge considered that, at the material time, marine engineers were liable and likely to encounter intense concentrations of asbestos dust on a regular basis with these exposures generally being for minutes rather than hours (but on occasion the exposures would be for hours and at even higher intensity). The first instance judge's above findings were not challenged and Hale LJ considered, at para 40, that the question was whether "whether the actual exposure found by the judge was such that the reasonable and careful employer taking positive thought for the safety of his workers would have identified enough of a risk for him either to take precautions or to take advice."

[85] Hale LJ noted that parties were in agreement that Shell should be treated as a major land-based employer, having no less but no more access to relevant knowledge than any other major employer. She then conducted a review of literature and noted, at para 42, that the first instance judge had been careful to confine his consideration to the literature published before 1961 (when Mr Jeromson's employment with Shell ended). Hale LJ referred to the M and R report and stated at para 45:

> "45 … Even then, while the headline message was that prolonged intense exposure would inevitably lead to asbestosis, it must have been apparent to any careful reader that the effect of much lower levels of exposure was quite unknown. Dr Merewether himself, in an article published in an American medical journal pointed out that it was "wholly untenable" to infer that "so long as the … exposure does not exceed five years the risk of contracting asbestosis is almost negligible". ("A Memorandum on Asbestosis", Tubercle, December 1933, p 110). Although that publication would not have been available to most European employers, he was only stating what should have been obvious to the prudent reader of Merewether and Price: *given the high incidence found after longer periods it would have been quite unsafe for anyone to conclude what might be the safe level of exposure*. The message, as Mr Allan on behalf of the claimants points out, was that asbestos dust is harmful and the precaution needed is to suppress it." [*my emphasis*]

[86] Hale LJ considered the 1931 Regulations and noted that they only offered a green light to occasional exposure with the obligations in the 1931 Regulations being strict, which she regarded as considerable warning of the dangers involved. Hale LJ went on to consider section 47 of the 1937 Act (see finding in fact and law 5), the comment in the annual report of Chief Inspector of Factories for 1938 (see finding in fact 24) (which Hale LJ accepted provided a potent description of asbestos dust), the annual reports of the Chief Inspector of Factories for 1943 (see finding in fact 25), 1949 (see finding in fact 33) and 1956 (see finding in fact 37) and considered that the overall message was striking in their tone. At para 51 to 53 Hale LJ concluded:

> "51. Having reviewed the literature, the judge referred to the different conclusions reached at first instance, by Waterhouse J in *Gunn v Wallsend Slipway & Engineering Co Ltd* (unreported) 7 November 1988, and by Buxton J in *Owen v IMI Yorkshire Copper Tubes Ltd* (unreported) 15 June 1995. He could not agree with Waterhouse J that "the literature justifies the conclusion until 1960, that asbestosis was attributable only to heavy and prolonged exposure". He preferred the formulation of Buxton J that from the beginning of Mr Owen's employment in 1951:
>
> > "the difficulties related to and the threats posed by asbestos were sufficiently well known, and sufficiently uncertain in their extent and effect, for employers to be under a duty to reduce exposure to the greatest extent possible."
>
> He did so "in the context of the absence of any means of knowledge of what constituted a safe level of exposure". He accepted Mr Allan's submission that "a reasonable employer, being necessarily ignorant of any future potential asbestos exposure, cannot safely assume that there will never be sufficient cumulative exposure". In an uncertain state of knowledge, the risk could not (in the words of Lord Upjohn in *C Czarnikow Ltd v Koufos [1969] 1 AC 350* , 422 c ) be "brushed aside as far fetched".

> 52. The point which impressed the judge was the certain knowledge that asbestos dust was dangerous and the absence of any knowledge, and indeed any means of knowledge, about what constituted a safe level of exposure. Mr Mackay's argument relies heavily on the explosion of knowledge which took place during the 1960s. Only then did it become apparent that mesothelioma could result from very limited exposure. In particular, it was only then that knowledge began to develop of the risks to those outside the workplace, such as the wife washing her shipyard worker husband's overalls (as in *Gunn*) or people living near to asbestos works. But just as courts must beware using such later developments to inflate the knowledge which should have been available earlier, they must beware using it to the contrary effect. The fact that other and graver risks emerged later does not detract from the power of what was already known, particularly as it affected employees such as these, working in confined spaces containing a great deal of asbestos which might have to be disturbed at any time. There is no reassurance to be found in the literature that the level of exposure found by the judge in this case was safe and much to suggest that it might well not be so. The judge was entitled to conclude that a prudent employer would have taken precautions or at the very least made inquiries about what precautions, if any, they should take.
>
> 53 If Shell had made inquiries, the judge was in little doubt what advice they would have received. The obvious place to begin was the Factory Inspectorate. In August 1945, the Chief Inspector of Factories wrote to the shipbuilding and ship repairing industry of his concerns about "Asbestos insulation aboard ships". This emphasised that:
>
> > "while asbestos dust may not have any apparent effects at first, experience shows that, particularly if the workers are exposed to the dust in substantial concentrations, serious results are apt to develop later. It is therefore important that, even if the work will only be temporary, all reasonably practicable steps should be taken to reduce the risk to a minimum."
>
> Interestingly, among the precautions advised on board ship was "the provision of a respirator … for each workman engaged in the fitting or removal of any dry insulating material containing asbestos". Similar advice was given to regional safety officers by the chief safety officer about the lagging of steam pipes in generating stations in September 1949 and to at least one power station in 1954."

The Shell appeal was therefore dismissed in both cases.

*White*

[87] In *White* the appeals to the Court of Appeal by each of the claimants were ultimately dismissed. In the White appeal Mr White was exposed to asbestos between 1949 and 1960 whilst working as a junior lab technician. This arose from the use of protective mats made of asbestos millboard that were used under Bunsen burners. The mats were relatively soft and friable. Abrasion of the mats by normal usage was likely to cause small amounts of dust to be emitted at

a concentration of 1 – 2 fibres/ml. The first instance judge rejected a submission that the lab benches would be covered in asbestos dust or that there was a constant flow of asbestos dust in the environment and found that when intermittent emissions of dust occurred they were cumulatively for no more than 12 minutes in an 8-hour working day. Mr White's 8 hr TWA was around 0.02 to 0.05 fibres/ml on the days when activities that exposed him took place (which was 75% of the time Mr White was working). The first instance judge held Mr White's exposure to asbestos during the relevant period (the claimant was also exposed to asbestos during a later period but that later period was not considered during the appeal to the Court of Appeal) was modest and infrequent, and in overall terms, not more than minimal. The first instance judge found, in the circumstances, that Mr White's employer was not in breach of duty.

[88] In the Cuthbert appeal it was alleged that Mr Cuthbert was exposed to asbestos dust when employed between about 1956 and 1959 and engaged in construction work at a school. The first instance judge rejected much of Mr Cuthbert's evidence. He found that Mr Cuthbert had had irregular and intermittent contact with carpenters at the site and that, at times, they were engaged in cutting up asbestos materials when he was in their vicinity. Sometimes the cutting of asbestos boards took place outside and from time to time Mr Cuthbert undertook sweeping up debris for a period in the order of 10 minutes per day. The first instance judge held, after making assumptions that favoured Mr Cuthbert that his average daily exposure was in the order of 2 fibres/ml (the first instance judge made clear that this was no more than an approximation which would vary from day to day and Stuart-Smith LJ in the Court of Appeal indicated, at para 31, that it required further downward qualification)). The first instance judge concluded that: (i) Mr Cuthbert's "exposure to asbestos when employed by the defendant was of a low order, light and intermittent and, in the main, as a bystander."; (ii) a reasonable employer

keeping abreast of the available knowledge could not reasonably have foreseen that there was a significant (i.e. more than fanciful) risk of injury as a result of the level of Mr Cuthbert's exposure to asbestos; and (iii) that the defendant was not in breach of duty where the exposure was light and intermittent. The Cuthbert appeal challenged the first instance judge's description of the level of Mr Cuthbert's exposure and contended that the finding ought to have been that his exposure was substantial but intermittent.

[89] After setting out the key facts of each appeal Stuart-Smith LJ conducted a detailed review of the literature and legislation between paras 44 and 100. At para 48 Stuart-Smith LJ highlighted that the authors of the M and P report considered that there was probably a low-end threshold of a minimum quantity of asbestos dust that was required to cause fibrosis and that they referred to this as the "dust-datum". After reviewing the literature and legislation up to 1973 Stuart-Smith LJ stated:

> "100. The growing appreciation of the dangers of low-level exposure to asbestos was reflected in the collapse of the levels suggested to be acceptable between 1960 and 1970, to some of which I have referred above. A helpful table (prepared by counsel but not as an agreed document) is attached to this judgment as Annex 1. In summary, between 1960 and 1966 the first three editions of the booklet Toxic Substances in Factory Atmospheres held steady with MCPs and TLVs remaining 30 fibres/ml for all asbestos. In 1968 and 1969 the TLVs for asbestos remained at 30 fibres/ml but with a recommendation for a reduction to 12 fibres/ml. In 1970 TDN 13 suggested enforcement values of 0.2 fibres/ml for crocidolite and 2 fibres/ml for chrysotile and amosite, which remained unchanged until 1983 when the current revision to Environmental Hygiene Note 10 provided for values of crocidolite and amosite to be 0.2 fibres/ml and other types of asbestos to be 0.5. Those values were changed by a subsequent revision the following year to 0.2 fibres/ml for crocidolite, 0.5 fibres/ml for amosite and 1 fibre/ml for other types of asbestos."

[90] At paras 104 to 111 Stuart-Smith LJ then, subject to the caveat that no review of the literature could claim be fully comprehensive, explained that his review of the literature and legislation provided clear evidence in support of the following eight propositions:

“104. First, the risks that were appreciated to arise from the inhalation of asbestos were, until the 1960s, the risk of asbestosis and (later) the risk of lung cancer. These risks were known and appreciated by the medical establishment, government, and HM Factory Inspectorate. They were, or should have been, appreciated by employers whose business involved the use of asbestos. So much is clear from Merewether and Price, the subsequent statutory interventions in the form of the 1931 Scheme and the 1931 Regulations, and successive Annual Reports of the Chief Inspector of Factories: see [46]-[74] above.

105. Second, appreciation of those dangers was not limited to those working in the Asbestos Industry. As the use of asbestos expanded (for example, with increased use on board ships and in buildings), so an appreciation of the risks of injury through asbestosis spread: see, for example, [66], [67] above.

106. Third, the risk of asbestosis (and subsequently lung cancer) was a risk that was thought to arise on what would now be regarded as substantial exposure to asbestos. Throughout the period with which we are concerned, it was thought that there was a "dust datum" below which there was no real risk of contracting disabling asbestosis during a normal working life: see [48], [49], [50], [51], [56], [59], [60], [66].

107. Fourth, the 1960s saw a sea-change in the perception of risk after 1960 (by reason of Wagner's paper) and, dramatically, after the publication of Newhouse and Thompson's report in 1965: see [84]-[88] above. It was only in and from the 1960s that mesothelioma was appreciated as a foreseeable risk of asbestos inhalation at all, or that there was a foreseeable risk of mesothelioma after exposure to asbestos at levels that had previously not been thought to give rise to a risk of asbestosis or lung cancer.

108. Fifth, there is no evidence to support the proposition that employers before 1960 should have appreciated that exposure to asbestos at levels below what were thought necessary to create a risk of asbestosis (and, subsequently, lung cancer) would give rise to a foreseeable risk of pulmonary or other personal injury. The references to asbestos being dangerous during that period were referring to the danger of asbestosis (and subsequently lung cancer) and not to any perceived risk of pulmonary or other injury attributable to lesser levels of exposure.

109. Sixth, there is no evidence that any body of employers (or, for the avoidance of doubt, any significant body of medical expertise, government or HM Factory Inspectorate) appreciated before the 1960s that there was a foreseeable risk of injury after exposure to asbestos at levels significantly below those thought necessary to cause asbestosis or lung cancer.

110. Seventh, the emergence of an appreciation that exposure to lower levels of exposure than were thought to be necessary for the contraction of asbestosis or lung cancer can clearly be traced in the literature in and from the 1960s but not before: see [91]-[96].

111. Eighth, the repeated references to MCPs, TLVs, and enforcement levels, while not providing a bright line, general yardstick or universal test for determining the issue of

> foreseeability, are evidence that there had been and continued to be an understanding that exposure to asbestos below certain levels was safe: see [73], [74], [76], [80], [97], [100]. It is material that such publications repeatedly referred to their being designed to give advice about best practice in the fields of safety, health and welfare, or similar statements, and that they purported to give advice that could and reasonably should be applied by employers: see [73], [80]. As such these references are relevant evidence to support the proposition that, in the period up to the end of the 1950s, it was not reasonably foreseeable by employers that exposure to asbestos at levels significantly lower than those apparently endorsed thereafter gave rise to a significant foreseeable risk of injury."

[91] Between para 112 to 124 Stuart-Smith LJ endorsed the approach suggested by Underhill LJ at para 63 of the case of *Bussey* (on which see para 78 above) and identified what he considered to be the establish principles that required to be applied when answering the first question identified at para 63 of *Bussey*. He then turned to the case of *Jeromson.* At para 127 Stuart-Smith LJ reviewed Hale LJ's review of the legislation and literature and stated at para 128:

> "128. What does not appear in the Court of Appeal's analysis of the literature in *Jeromson* is any acknowledgement that the risks being referred to throughout the relevant period, both in the quoted examples and in other relevant literature were asbestosis and, from about 1955, lung cancer; nor is there any reference to the understanding, subsequently proved to be quite wrong, that there were levels of exposure below which those risks did not arise or were insignificant. Nor is there any reference to literature published after 1961 despite it including much evidence that is relevant to any consideration of what was and had been prudent employers' state of knowledge, what risks were or had been reasonably foreseeable, and what levels of exposure were or had been considered to be acceptable."

[92] Stuart-Smith LJ after considering paras 51 to 55 of *Jeromson* stated at para 130:

> 130. On the facts as found by the trial Judge, I would accept that the decision in *Jeromson* was both justifiable and correct. The levels of exposure as found by the Judge and summarised by Hale LJ at [38]-[39] (set out above) fell comfortably within the sort of levels that were known to give rise to a risk of asbestosis or to contribute to its severity, it being a divisible disease. The citation from the Annual Report for 1949, quoted at [53] of *Jeromson*, made that clear [*the quote from para 53 of Jeromson is actually from the 1945 letter of the Chief Inspector of Factories - see finding in fact 26*]. It fully justified the reference in [52] to "the power of what was already known, particularly as it affected employees such as these, working in confined spaces containing a great deal of asbestos which might have to be disturbed at any time."

[93] During Stuart-Smith LJ's consideration of *Jeromson* he referred to the case of *Maguire v Harland and Wolff PLC* [2005] EWCA Civ 1 in which the Court of Appeal of England and Wales held that it was not reasonably foreseeable between 1960-1965 that a wife washing clothes of a husband who was exposed to asbestos to a negligent degree would herself be likely to suffer risk of personal injury. Stuart-Smith LJ considered that the Court of Appeal had determined *Maguire* on "conventional tortious terms" and stated at para 132:

> "I describe this as a statement in conventional tortious terms because it brings into play the principles summarised above by requiring assessment of what risks to health are foreseeable on the current state of knowledge, applying the standard of the well-informed defendant (albeit not an employer) who keeps abreast of the developing knowledge and applies his understanding without delay but is not required to act ahead of contemporary understanding."

[94] Stuart-Smith LJ then returned to his consideration of *Jeromson* and stated at paras 135 to 139:

> "135. It is not, and never has been, the law that a person is obliged to take all possible steps to prevent the occurrence of a risk that is not reasonably foreseeable. A risk does not become foreseeable simply because hindsight shows that it has not been excluded; and the mere fact that a certain level of exposure to asbestos is recognised to be dangerous does not necessarily give rise to a foreseeable risk of injury in the event of different levels of exposure or different contexts.
>
> 136. … More fundamentally, as appears from the literature review that I have set out above, the *only* risks that were identified as foreseeable in the period before the 1960s were asbestosis and, subsequently, lung cancer, both of which were understood to be caused by substantial exposure and which, from 1930 onwards, were thought to be subject to a low-end threshold or dust datum. References to the dangers of asbestos exposure are to be seen in that context. There is no support in the literature that we have seen for an assertion that there was any appreciation that exposure to levels of asbestos significantly lower than those thought necessary to cause or contribute to asbestosis either did give rise or might give rise to a significant risk of pulmonary or other personal injury.
>
> 137. Applying conventional principles, therefore, the issue in each appeal is whether during the 1950s a reasonable and prudent employer, taking positive thought for the safety of his employees in the light of what he knew or ought to have known, should have appreciated that there was a foreseeable risk of personal injury if their employee

was exposed to the levels of asbestos found by the respective judges (subject, of course, to the challenge to the Judge's findings of fact in the Cuthbert case). Adopting Underhill LJ's more concise formulation: should the employers in these appeals at any time during Mr White and Mr Cuthbert's respective employments have been aware that the exposure to asbestos dust which their work involved gave rise to a significant risk of asbestos-related injury? That question must be answered in the context that there is no evidence in the literature to suggest that there was any appreciation during the relevant period that there was any foreseeable risk from the exposure to asbestos other than asbestosis and, later, lung cancer. The fact that the risks from lower levels of exposure had not been excluded is neither determinative nor even particularly relevant: what matters is whether there was a foreseeable risk of injury against which the employers should have protected their employees.

138. If and to the extent that Buxton J's dictum [*in Owen v IMI Yorkshire Copper Tubes Ltd –see para 51 of Jeromson at para 86 above*] goes beyond this, I consider it to be ill-founded because Buxton J did not identify any other risk than asbestosis and lung cancer that was foreseeable so as to give rise to a duty to "reduce exposure to the greatest extent possible". It should not, in my judgment, be accepted as creating any form of precedent for other cases.

139. Nor do I consider that we are bound to apply Buxton J's dictum in the present appeals. First, for the reasons already given, it was not necessary to the determination of *Jeromson* since the levels of exposure in that case as summarised by Hale LJ at [38]-[39] fell comfortably within the levels that were recognised as giving rise to a risk of causing or contributing to asbestosis. Second, Hale LJ did not unequivocally endorse Buxton J's formulation as being of general application. Third, Hale LJ's decision rested (at [52]) on the substantial levels of exposure and "what was already known, particularly as it affected employees such as those working in confined spaces containing a great deal of asbestos which might have to be disturbed at any time"; and that there was "no reassurance to be found in the literature that the level of exposure found by the Judge was safe and much to suggest that it might well not be so." Fourth, *Jeromson* was not set up as any sort of test case or given particular status so as to bind us in our decisions on these appeals. Fifth, if and to the extent that *Jeromson* was decided on the basis of the literature review as set out in the judgment, that review was not comprehensive and omitted important aspects that should, in my respectful opinion, have been brought into account. Specifically, it omitted any reference to (a) the fact that the risks in contemplation before the 1960s were asbestosis and lung cancer and not mesothelioma; (b) the prevalent belief throughout the relevant period that there was a lower threshold that was relevant to the risk of injury; (c) the absence of support in the literature for a suggestion that reasonably prudent employers should during the relevant period reasonably have foreseen some other personal injury caused by lower levels of exposure; and (d) the evidence that even as the 1960s progressed there was ample material supporting a continued belief that there were safe levels of exposure, which was also material to the question of reasonable belief in the relevant period."

[95] In dismissing the White appeal Stuart-Smith LJ stated:

> "147. Standing back, I can detect no error in the overall approach adopted by the Deputy Judge. Nor can I find any merit in the submission that, because measurements were not taken, the employer should have considered the potential maximum exposure and satisfied themselves that, in the light of that potential maximum exposure, Mr White would not be exposed to a risk that could not be ignored. The Judge's findings about the circumstances and levels of exposure, both transient and over time, were so clear that, in my judgment, the question simply did not arise. As an indicative point of comparison to illustrate the point, Mr White's exposure at a concentration of 0.02 to 0.05 fibre/ml (8-hour TWA) on those days on which he was exposed would be a tiny fraction even of the indicative levels (albeit for enforcement) set out in TDN 13 in 1970 and an even smaller fraction of the MCP of 30 fibres/ml given in the 1960 edition of "Toxic Substances in Factory Atmospheres". That is not determinative; but it is relevant."

[96] In the Cuthbert appeal Stuart-Smith LJ rejected the attack on the first instance judge's findings in fact and finding of light and intermittent exposure. In dismissing the Cuthbert appeal he stated at para 165 to 167 and 170 he stated:

> "165. The Appellant submits that the Judge paid inadequate attention to evidence of clouds of dust being generated by the cutting of Asbestolux and when sweeping up. In support of this submission the Appellant relies upon the finding in the 1997 Glasgow survey which recorded the dry sweeping of asbestos waste to be the dustiest and most hazardous operation identified in the survey. It is submitted that, where there may be peaks or spikes in the level of exposure, it is the peaks that should be considered rather than the general level of exposure. That is not controversial provided that it is recognised that the peaks need to be of sufficient intensity and duration to give rise to a foreseeable risk of injury. During the period of Mr Cuthbert's exposure it was not possible to measure the precise levels to which a person in his form of employment would have been exposed. Any assessment was bound to be impressionistic at best. What can be said with confidence is that the Judge considered the exposure generated by the carpenters cutting the Asbestolux and sweeping up in reaching his impressionistic and qualitative assessment of the levels of Mr Cuthbert's exposure.
>
> 166. Turning to the expert evidence, the Appellant also criticises the Judge's use of the back-calculation recorded at [43] of the judgment: see [30] above. In my judgment this criticism is misplaced. The Judge stressed that the figure of two fibres/ml agreed by the experts on the assumptions there set out was "no more than an approximation" which provided "some insight into his likely overall level of exposure to asbestos dust." That was an appropriate approach to adopt, as was his conclusion that the experts' agreed figures were entirely consistent with what he described as his own "impressionistic assessment of the degree and extent" of Mr Cuthbert's exposure. He did not treat them as determinative of the level of exposure or of the issue he had to decide.
>
> 167. Nor can the Judge validly be criticised for his references to the 1960 "Toxic Substances in Factory Atmospheres" publication or TDN 13. The Judge was entitled and

right to hold that "on any view of the evidence, … the deceased's exposure was very substantially below the limits set by the 1960 publication, both in the short term and over the daily average levels which have to be calculated to make meaningful comparison with the 1960 limits." Similarly, his treatment of TDN 13 at [83] of the Judgment was legitimate and appropriate: see [41] above. He did not treat either publication as determinative or as providing a bright line or test (universal or otherwise). What he did, and was entitled to do, was to treat the disparity between the experts' figures and the figures offered by the 1960 publication or TDN 13 and the fact that the levels of exposure referenced in TDN 13 were "far in excess of the levels to which [Mr Cuthbert] was exposed" as supportive evidence for his conclusion that the levels to which Mr Cuthbert was exposed did not give rise to a foreseeable risk of injury. The disparity was all the greater given that the figure of 2 fibres/ml was the appropriate figure on the basis of hypothetical assumptions set out at [43] of the judgment which assumed greater levels of exposure than the Judge had found: see [31] above. Given his findings about the levels of exposure, and in the absence of other evidence or findings about the frequency, intensity and duration of any "peaks" of exposure, the Judge was entitled to conclude overall that the levels of exposure did not give rise to a foreseeable risk of injury."

"170. The Appellant's primary submission is that the Judge erred in finding that only exposure to "significant quantities" of asbestos carried a reasonably foreseeable risk of harm in the mid- to late 1950s. I have attempted to explain above that this was not the Judge's approach. What he did was to distinguish between (a) the levels of exposure that were sufficient to give rise to a foreseeable risk of asbestosis and (b) what he found to be the much lower levels of exposure to which Mr Cuthbert was exposed. As I have explained, his use of the word "significant" was simply a comparative label used to distinguish between exposure falling within category (a) above, and those levels which he found in the present case. He did not make the mistake of attempting a spurious precision by reference to numerically specific levels; nor did he treat the various publications from 1960 onwards as providing either a bright line or a universal test showing when there was a foreseeable risk of injury and when there was not. To the contrary, the evidential use he made of the 1960 Toxic Substances in Factory Atmospheres publication and TDN 13 was permissible and appropriate."

*The pursuer's objection to the post-1958 knowledge documents / literature*

[97] After considering and quoting from the cases of both *Jeromson* and *White* in some considerable detail it is first convenient to deal with the pursuer's objection to the admissibility of knowledge documents / literature published after 1958 where they were used to inform what was known or could be reasonably foreseen in 1958. I considered that the passages quoted from *White* above made clear that Stuart-Smith LJ was simply using the literature that came after Mr White's and Mr Cuthbert's exposure to identify the state of their respective employer's

knowledge at the time of the relevant exposure. In my view Stuart-Smith LJ considered that his detailed review of the literature before 1960 showed was that there was an understanding that exposure to asbestos below certain levels did not pose a real risk of contracting asbestosis and that a consideration of the literature that became available from 1960 onwards, and in particular the 1960 booklet, evidenced that that understanding (which turned out to be incorrect) still persisted. I did not consider that Stuart-Smith LJ made any suggestion that later developments in the state of an employer's knowledge that occurred after the relevant exposure had taken place and which could not have been known at the date(s) of the relevant exposure, ought to be considered. Rather, I considered that the use he made of the literature after the relevant exposure ended was for the purposes of ascertaining what the employer's knowledge was at the time of the relevant exposure. In my view, that was a legitimate use of the post-exposure literature and I considered that the post-exposure literature referred to in present case could be used in the same way. In the circumstances I repel the pursuer's objection.

*Whether there was a breach of duty in the present case?*

[98] Contrary to what was suggested by the defenders in the present case (see para 67(v) to (vi) above) I did not consider that the proposition set out in the last sentence of para 111 of *White* (which is set out at para 90 above) was restricted to the facts in the White appeal and Cuthbert appeal and considered it to be a more general proposition. Nor did I consider that the case of *White* in general, or at para 111 in particular, determined that any exposure in the 1950s which was lower than a level endorsed thereafter (in this case the level subsequently endorsed and relied upon by the defenders was the MPC of 177 ppcc or 30 fibres/ml in the 1960 booklet) must be give rise to no foreseeable risk of injury. Indeed para 111 of *White* makes clear that the references to MPCs, TLVs and enforcement levels do not provide a bright line, general yardstick or universal test for determining the issue of foreseeability.

[99] In *Bussey* Underhill LJ considered the use of back calculation at para 62:

> "62. I agree that this appeal should be allowed and, reluctantly, that it must be remitted to the judge for further consideration. My reasons at most points correspond to those given by Jackson LJ. In particular, I think that the judge was wrong to treat this court in *Williams v University of Birmingham [2012] PIQR P4* as having laid down a binding proposition that employers were entitled to regard exposure at levels below those identified in TDN13 as "safe", even in the period 1970–1976, still less at a period prior to its publication. There is the further point that in the present case, and I suspect in many others, there is no reason to suppose that the employer took any steps to measure the level of exposure which Mr Bussey or others doing similar work encountered and could not have accordingly known whether it was above or below any supposed "maximum safe limit". Attempting to answer the issue in this case by comparing back-calculations (it might be fairer to say "back-guestimations") of Mr Bussey's exposure against subsequently published figures of the kind appearing in TDN13 is in my view unsound."

The pursuer contended it was unsound to use back calculations in the present case. What I considered to be unsound in the present case, for same reason given in the passage in *Bussey* above, was the defenders' invitation to the court to find that it was not reasonably foreseeable by Glasgow Corporation in 1958 that the pursuer's exposure to asbestos in the school boiler room would give rise to a significant risk of injury if his 8 hr TWA was below the MPC in the yet to be published 1960 booklet. As I have already pointed out, I did not consider the case of *White* supported such an approach (the proposition in the last sentence of para 111 refers to "exposure to asbestos at levels *significantly lower* than those apparently endorsed thereafter") and such approach also took no account of: (i) the fact that Glasgow Corporation would not have been able to measure the level of exposure that the pursuer encountered and would therefore have no way of knowing whether they were below or above any supposed MPC or "dust datum" (where there was no published MPC before 1960); and (ii) both *Jeromson* (at para 37) and *White* (at para 165) both accepted that it was potential maximums, peaks or spikes in exposure that should be considered (at para 165 of White Stuart-Smith LJ goes on to note that peaks needed to be of sufficient intensity and duration to give rise to a foreseeable risk of injury). That all being said, I did, however, consider, in accordance with para 166 of *White*, that it was helpful to consider the

back calculations in the present case (on the understanding that they were no more than very rough estimates of the pursuer's level of exposure) for the purposes of gaining some insight into the pursuer's level of exposure to asbestos dust in the school boiler room.

[100] Stuart-Smith LJ's review of the literature in *White* reached a different conclusion to Hale LJ's review of the literature in *Jeromson*, with Stuart-Smith LJ finding that before 1960 there was a "dust datum" and Hale LJ finding that it would be quite unsafe for anyone to conclude what might be the safe level of exposure. Stuart-Smith LJ also, at para 138 of *White*, found that Buxton J's dictum in *Owen* (which is quoted at para 51 of *Jeromson*) was ill-founded and considered that Hale LJ did not unequivocally endorse Buxton J's formulation as being of general application. However, in *Jeromson*, Buxton J's dictum was endorsed by the first instance judge and Hale LJ did not criticise that endorsement. Nor did I understand the court in *White* to expressly address the submission accepted by the first instance judge in *Jeromson* (and again not criticised by Hale LJ) that "a reasonable employer, being necessarily ignorant of any future potential asbestos exposure, cannot safely assume that there will never be sufficient cumulative exposure" (see Jeromson at para 51). In the present case the pursuer made a similar submission. However, in the end, given the findings in fact I have made, I did not consider that it was necessary for the disposal of this case to prefer the analysis in *White* over *Jeromson* or *vice versa*. That is because I considered that, on the particular facts of this case, the pursuer had proved, on the balance of probabilities, a breach of duty whether I followed the differing approaches in *White* or *Jeromson*.

[101] The decision in *White* was founded on and was most favourable to the defenders and I therefore now explain why I considered that the pursuer had proved that Glasgow Corporation were in breach of duty on the basis of an acceptance of the approach taken in *White* and, in particular, an acceptance of Stuart-Smith LJ's review of the literature and the eight propositions he set out at paras 104 to 111 of that case.

[102] The pursuer contended that the court in *White* had failed to recognise that the M and P report identified other conditions to the lungs. However, I was unable to accept that Stuart-Smith LJ had failed to consider other conditions of the lungs, rather, after reviewing the literature before 1960 I considered that he considered that the references in the literature before 1960 to asbestos being dangerous were referring to the danger of asbestosis (and subsequently lung cancer) and not to any perceived risk of pulmonary or other injury attributable to lesser exposure (see the fifth proposition at para 108 of *White*).

[103] I accepted the pursuer's submission that I should consider the knowledge of Glasgow Corporation in 1958 to be no less but no more than any other major employer. I considered, on the basis of the first, second and third propositions in *White* (paras 104 to 106): (i) that the risk of asbestosis and lung cancer from the inhalation of asbestos ought to have been appreciated by Glasgow Corporation in 1958; and (ii) that that risk arose on what would now be regarded as a substantial exposure to asbestos. I also considered that it was highlighted as early as the M and P report and the 1931 report that that risk extended to those working in the vicinity of processes involving asbestos and that Glasgow Corporation ought to have appreciated that in 1958.

[104] I have explained at para 74 to 76 the level of exposure to asbestos that I considered the pursuer to have been subjected to in the school boiler room. Whilst the pursuer's exposure to asbestos was limited to a two week period (putting aside his limited exposure in the baths) he was, during that period, subjected to sustained exposure to asbestos dust for about 80 hours with there being exposure to very high levels of asbestos every 30 to 45 minutes during the mixing process. In the present case even using a 45 minute frequency (with the mixing process estimated to take 10 minutes) the pursuer, on the basis of the defenders' calculation, would be subjected to around 11 mixing processes per day for a total duration of around 110 minutes per day. Therefore over the two week period the pursuer would have been likely to have been

subjected to over 100 mixing processes for a total duration of over 1,000 minutes. The pursuer's exposure during each mixing process would have been many times the yet to be published MPC in the 1960 booklet (although I accept that the MPC was an 8 hr TWA). The pursuer's 8 hr TWA would also, in any event, have been likely, for the reasons explained at paras 74 and 75 above, to be higher and perhaps significantly higher than the yet to be published MPC in the 1960 booklet. I considered that during the pursuer's time working in the school boiler room that there would have been significant levels of visible dust clearly there to be seen, if considered by any careful employer in 1958. I considered that the visible dust would have been particularly dense and apparent during each of the frequent mixing processes.

[105] I considered that the pursuer's exposure in the present case was for a very much shorter period than the periods considered in *Jeromson* and *White*. However, I considered that the pursuer's exposure was much more intense than that experienced by Mr Dawson and Mr Jeromson and that he was exposed to far higher concentrations of asbestos than Mr White or Mr Cuthbert. Whilst it was agreed that the 1931 Regulations did not apply in the present case, the pursuer's exposure of around 80 hours was well above the occasional eight hour exception in the 1931 Regulations (and the Chief Inspector of Factories noted, in his 1949 annual report, under reference to the 1931 Regulation, that it was very necessary to keep an ever watchful eye for the use of asbestos in buildings – see finding in fact 33 above and Stuart-Smith LJ's second proposition at para 105 of *White*). In all the circumstances I considered that the pursuer, during the two week period in the school boiler, was exposed, on a daily basis, to a substantial amount of asbestos dust that was clearly there to be seen from a visual or qualitative assessment. Stuart-Smith LJ considered at para 130 of *White* that the levels of exposure in *Jeromson* fell comfortably within the sort of levels that were known to give risk to a risk of asbestosis or contribute to its severity and I considered that was also the position in the present case. I did not consider that

the pursuer's exposure could be described as modest, infrequent and not more than minimal, nor did I consider that his exposure to asbestos was at a level: (i) lower or significantly lower than those thought necessary to cause asbestosis or lung cancer (see the sixth proposition in *White* at para 109); or (ii) lower or significantly lower than those apparently endorsed thereafter in the 1960 booklet (see the eighth proposition in *White* at para 111). I considered that the 10 minute peaks or spikes in the pursuer's level of exposure during the frequent mixing processes were, of themselves, of a sufficient intensity, duration and frequency to give rise to a foreseeable risk of injury (see para 165 of *White*). In all the circumstances and even applying the case of *White*, I considered that in 1958 a reasonable and prudent employer, taking positive thought for the safety of their employees in light of what they known at the time or ought to have known at the time, should have appreciated from a visual assessment of the school boiler room (which was all that was available to them at the time) that there was a foreseeable risk of personal injury if their employee was exposed to the levels of asbestos that the pursuer was exposed to in the school boiler room for a period of around 80 hours. I therefore find that Glasgow Corporation should have been aware that the pursuer's exposure to asbestos dust in school boiler room in 1958 gave rise to a significant risk of an asbestos-related injury. I have therefore answer the first question posed at para 79 in the affirmative.

[106] As regard the second question, Ms Heyes highlighted precautions that could have been taken (see para 31 above). Mr Davey did not agree with all the precautions suggested by Ms Heyes but he did agree that: (i) the laggers could have been segregated from other workers by sheeting or roping off; and (ii) suitable methods of minimising the release and spread of asbestos dust, such as exhaust ventilation, damping of products and good general ventilation, could have been provided. Mr Davey also offered that the mixing process could have been conducted outside. I considered that Glasgow Corporation only required to take reasonable care to protect

the pursuer against what I considered to be a foreseeable risk of injury. I considered that the above three precautions were simple and there was nothing to suggest they were impractical or unreasonably expensive. I considered that, given the serious risk of injury that the pursuer faced, that one or more of these precaution ought to have been taken. Unfortunately Glasgow Corporation failed to take any precautions that were available to them at the time and I therefore considered, after conducting the above calculus of risk, that they failed to take proper precautions to reduce or eliminate the significant risk to the pursuer of an asbestos-related injury. I have therefore answered the second question posed at para 79 in the negative and found that Glasgow Corporation conduct fell below the standard of the reasonable and prudent employer in the position of the Glasgow Corporation. In the circumstances I therefore concluded that Glasgow Corporation breached the duty of care that they owned to the pursuer.

*Causation*

[107] Causation was not seriously in dispute. The only evidence before the court was that the pursuer had only had two exposures to asbestos dust in his lifetime. The first was in the school boiler room and the second was in the bath boiler room. There was nothing to contradict that evidence and I accepted the pursuer's evidence in that regard. It was a matter of agreement that the pursuer has asbestos related pleural plaques and asbestos related diffuse pleural thickening. In the circumstances I had no difficulty in finding, on a balance of probabilities, that the breach of duty by Glasgow Corporation at the school boiler room caused or materially contributed to the pursuer's injury.

**Disposal**

[108] For the reasons given above, I find that Glasgow Corporation were in breach of their common law duty of care to the pursuer and that the defenders, as Glasgow Corporation's

statutory successors, are liable to make reparation to the pursuer. Quantum was agreed at £40,000 (inclusive of interest to 17 April 2024). A hearing will now be fixed to determine the questions of expenses.

Sheriff C. Dickson

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