1. My name is Chris Chambers. I live at 43 Town Street, Lound, Retford, DN22 8RT with my wife, Louise and our two children, Jack and Erin. We have lived in Lound for the last five and a half years.

2. I am making representations to the planning inquiry in my capacity as a resident of the village of Lound which is only a short distance downwind of the Daneshill site in Retford.

3. I had originally intended to provide this inquiry with a written submission as to why these Appeals should not be allowed. However, I understand that the Inspector made a ruling on 7 March 2024 not to allow a written submission but that, providing I brought three copies of any new literature with me that I wished to refer to, I could make my submissions orally and they would be accepted.

4. I have brought copies of my speaking notes to assist this inquiry, particularly if there are any issues with the recording. If the parties would be assisted by having copies of those speaking notes, I would be happy to provide copies now.

5. I must say that I have been extremely surprised and disappointed in the last week with e-mail correspondence from lawyers representing the Appellants that they would seek to object to any submissions or documents provided to the panel in the format decided by the Inspector.

6. I believe that not hearing to my concerns or reviewing evidence supporting my view could prejudice this panel from being able to make a decision on the basis of all relevant evidence that should be available to it.

7. I am one of the UK's leading experts on asbestos dust and, for the last 12 years, I have specialised in preparing independent reports for the Courts in asbestos related disease claims. I have been instructed in around two thousand such matters where, sadly, people are dying or have died from an asbestos related disease.

8. I am currently, or have recently been, instructed in many cases where those dying from mesothelioma were exposed to asbestos as a result of their work as Actors, Film Producers, Lawyers, Bankers, Musicians, Teachers, Shop workers, Dentists, Doctors & Nurses.

9. Other cases involve or have involved people living near to others fitting asbestos cement sheeting to buildings, living within a few miles of industrial sites that used asbestos, pupils playing in the school yard near to industrial workplaces and family members bringing asbestos contamination home on clothing.

10. I have been instructed and involved in cases as far afield as Australia, the Far East and USA and have even advised representatives from the Japanese government. My role regularly requires me to give evidence before Coroners, the High Court and Court of Session.

11. Before working as an independent expert witness, I was one of Her Majesty's Inspectors of Health & Safety, working for the Health & Safety Executive in Sheffield. This was initially as an Operational Inspector before moving into developing HSE Policy, briefing Ministers, assisting HM Treasury Solicitors and advising the police and Crown Prosecution Service in manslaughter investigations.

12. I first became aware of the proposal of FCC to sort asbestos contaminated soils at Daneshill in or about 2020, during the first Covid lockdown. I was then asked by the Lound Parish Council what my thoughts were about the proposal and whether there was a risk to the local residents from it.

13. My opinions then are the same as they are now. I have serious concerns about this application and, in particular, the proposal to carry out the sorting of asbestos contaminated soils outdoors and within close proximity not only to the village of Lound, but also other sensitive receptor sites.

14. Those sites include a residential caravan park and development of a number of properties at Loundfield Farm. The area is also within very close proximity to several SSSI protected nature reserves, schools and other childcare settings.

15. The first thing I have to say is how poorly the appeal process has been handled, particularly as my understanding is that the appeal was lodged outside of time. Whilst I first became aware of the First Appeal in August last year, I did not become aware of a decision by the EA to vary that permit until during the first week this inquiry sat and none of the Appeal papers were available in the public domain until after this inquiry commenced.

16. I am however aware that for any appeal to be made, it has to be lodged no later than six months from the date of the decision or deemed decision[1].

17. Whilst the statutory provisions allow for the appeal period to be extended, guidance notes clearly state that that *"Appeals made outside the time limits are only accepted in very exceptional circumstances[2]"*.

18. The Appeal lodged by FCC in relation to the original decision made by the Environment Agency was lodged on 1 June 2023. The original decision by the Environment Agency was made on 20 October 2022 as communicated in a letter[3] of the same date. This included the following:

> *"I would like to take this opportunity to let you know that under the Environmental Permitting (England and Wales) Regulations 2016 we have completed our technical determination of the application to vary an Environmental Permit held by FCC Recycling (UK) Limited.*
>
> *The application involved a substantial variation to the permit to allow treatment of asbestos contaminated soils, and considered comments raised as part of the public participation.*
>
> *Our decision is to refuse aspects of the application which relate to the treatment of asbestos contaminated soils.*
>
> *We have detailed our conclusions in the final decision document which is publicly available along with the permit on the GOV.UK website…"*

19. It is clear from that letter the decision to refuse the aspects of the application that relate to the treatment of asbestos contaminated soils was a final or deemed decision, not a draft one. As such, the Appeal in relation to the Environment Agency's original decision is out of time. I did not become aware of this issue until after the first week this inquiry sat.

20. That is sufficient reason alone to not allow the First Appeal against the Environment Agency's original decision. This particularly as there do not appear to be any *"exceptional circumstances"* to extend the appeal period.

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[1] Environmental Permitting (England and Wales) Regulations 2016, Regulation 3(1)(e)
[2] "Environmental permit - Guidance on the Appeal procedure" paragraph 2.1.2
[3] Correspondence from the Environment Agency, dated 22 October 2022, reference EPR/NP3538MF/V008

21. I will however comment subsequently on what the minimum level of precautions which should be taken in are the event that work of this nature is allowed to be carried out at Daneshill and any other site. This is relevant to all of the Appeals for Daneshill and Maw Green.

22. The Second Appeal relates to an appeal by FCC in relation to a variation made to a permit by the Environment Agency relating to Daneshill.

23. I am not familiar with the third appeal, other than it relates to a site at Maw Green and a decision to vary a permit after an initial permit had been issued. Many of the comments I will make are however relevant to all three appeals. Some are however limited to Appeals 1 & 2 and reference to the Appellant in the context of what I am going to say refers to FCC and the permit for Daneshill.

24. The first time I was and other members of the local community were made aware of any variation to the permit made by the Environment Agency was as a result of the first few days of this Inquiry. This came from a local resident who happened to attend the inquiry.

25. Whilst I understand that the Environment Agency suggests that interested parties were consulted or communicated with, there was no public consultation. I wrote a detailed letter objecting to the original permit application and the justification in my letter formed the basis for much of the Environment Agency's decision to refuse permission to sort asbestos contaminated soils.

26. That Environment Agency's decision simply was in relation to FCC's proposal on the basis of how it intended to sort asbestos contaminated soils outdoors at Daneshill in way that did not comply with the Best Available Techniques. It is unclear to me why a subsequent decision was made to vary FCCs permit to allow the sorting of asbestos materials but in a building. This particularly as this was done with no consultation or transparency.

27. There were, for example, a significant number of written objections made to FCCs original permit application. The fact that very few comments were made in relation to the decision to unilaterally vary the permit without proper consultation is evidence of how badly this process was undertaken.

28. The Environment Agency has not, to my knowledge, made any attempt to outline what steps it took to ensure that the public were consulted in this process and it is a matter of fact that members of the public, including myself, were completely unaware that this had taken place until after this Public Inquiry started.

29. This is completely unacceptable and has meant that the community has not been afforded the necessary time to properly consider the consequences and legality of this variation.

30. If I may now turn to this inquiry and the reasons that I consider that the appeals by FCC should be rejected. This in addition to the First Appeal being brought outside of six months.

31. Asbestos is a word that has gone on a journey. Historically it was the magic mineral. It is now a word associated with pain, suffering and death because of the number of people it kills. This so much so that the town of Asbestos in Canada had to change its name for reputational damage.

32. Health & Safety Executive (HSE) statistics[4] show that 135 people were killed in work related accidents in 2022/23. The figure for mesothelioma was 2,268. For all asbestos related diseases,

[4] https://www.hse.gov.uk/statistics/overview.htm

it is thought that around 6,000 people die each year in the UK. Asbestos therefore accounts for around 95 – 98% of all work related deaths in the UK.

33. Asbestos is a naturally occurring mineral split into two different groups and six types. The first group are amphiboles and this group is made up of crocidolite, amosite, tremolite, anthophyllite and actinolite. The second group is serpentine asbestos and is made up of chrysotile.

34. Whilst only crocidolite, amosite and chrysotile were used commercially to manufacture asbestos containing materials, chrysotile is often contaminated with tremolite and this is unlikely to be identified on routine testing of those materials. That information is contained in documentary evidence already before this panel[5].

35. It is accepted that amphiboles are between one hundred and five hundred times more dangerous than chrysotile at similar intensities of exposure.

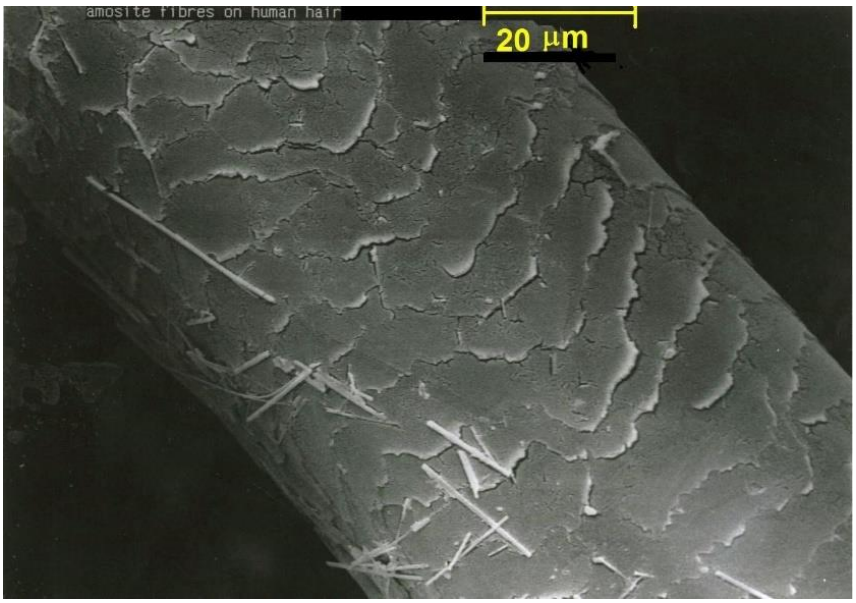
36. Asbestos fibres are very small and invisible to the naked eye. Asbestos fibres are usually counted using optical (phase contrast) microscopes and countable fibres are defined as *"particles with length >5 µm, width <3 µm and aspect ratio (length : width ratio) >3:1. Fibres having widths <0.2 µm may not be visible…"*[6]. It is therefore the case that 200 asbestos fibres measuring 5µm each, when placed end to end would measure 1mm.

37. There is no possibility therefore of being able to see asbestos fibres in the air although the presence of visible dust generated from the manipulation or disturbance of materials that contain asbestos inevitably means that some asbestos dust will become airborne.

38. The following image shows an advertisement from Johns Mansville in the USA indicating the size of asbestos fibres and that *"1500 asbestos fibres are finer than 1 human hair"*.

[5] Burdett, G *" Investigation of the chrysotile fibres in an asbestos cement sample"* HSL 2007/11 (2007)
[6] MDHS 39/4 *"Asbestos fibres in the air - Sampling and evaluation by Phase Contrast Microscopy (PCM) under the Control of Asbestos at Work Regulations"* HSE 1995

39. The following image[7] shows a number of asbestos fibres against a human hair. This puts into context just how small asbestos fibres are:



40. Whilst it may be possible to see some of the asbestos debris within contaminated soils and this can be picked out, it is impossible to see the hazardous asbestos fibres which are capable of penetrating into the pleura, peritoneum and pericardium (linings of the lung, stomach and heart).

41. Whilst asbestos is a naturally occurring mineral, it is not naturally occurring in the United Kingdom and any asbestos in this country results from its historic importation and use in many materials.

42. Despite this, in the UK we have the world's highest mortality rate from asbestos related diseases[8]. We also have the world's second highest number of total deaths from asbestos, second only to the USA which despite having a population roughly 4 – 5 times that of the UK has broadly similar number of total deaths.

43. It is right to say that, as a nation, we have a shameful legacy of pain and suffering from asbestos. This particularly as we have ignored the obvious warnings for over a hundred years and there is a real danger if we continue to ignore those warnings.

44. The hazardous nature of asbestos dust has been known since the late 19th century. In 1898 Lucy Deane, a Lady Inspector of Factories and a member of the suffragettes wrote[9] about the *"evil effects of asbestos dust"* and added that, in *"any quantity, the effects have been found to be injurious as might have been expected".* We should all strive to be like Lucy for many reasons.

45. In the early to mid 20th century, further warnings were ignored. In 1938 Dr Merewether wrote[10] that *"if a silica or an asbestos process produces visible dust in the air, then the invisible dust is certainly in dangerous concentration"*. Dr Merewether was the Chief Medical Inspector of

[7] https://twitter.com/SanctusLtd/status/1113834020218048514/photo/1
[8] Odgeral, C-A *et. al "Estimation of the global burden of mesothelioma deaths from incomplete national mortality data"* Occup Environ Med 2017;74:851–858
[9] Annual Report of the Chief Inspector of Factories for 1898, HMSO
[10] Merewether, E R A *"Dust and the Lungs with particular reference to silicosis and asbestosis"* Medical Press and Circular Supplement. 1938; p. xi-xvii.

Factories in Great Britain. His comments have historically and continue to have great weight placed on them by the Courts.

46. In 1949 Plumbe, a former Superintending Inspector of Factories, worked with various trades unions and large employers such as ICI Ltd and Associated Portland Cement worked together on a book[11] endorsed by the Factory Inspectorate. This included the following about hazardous substances:

> *"… 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."*

47. In relation to asbestos dust the guidance was that *"The* [asbestos] *dust must on no account be inhaled"*.

48. It is also important to note Plumbe made explicit reference to the measures that would be expected, in 1949, in relation to hazardous substances. The first step in the hierarchy of control was to use a safer substitute. The second step in the hierarchy of control was to box in or enclose the source of the danger.

49. It should be appreciated that this guidance was written well before there was any suspicion that asbestos dust was capable of causing mesothelioma or other forms of cancer. At the time it was only heavy and relatively prolonged exposure to asbestos dust that was considered to carry a risk of injury, in the form of asbestosis (a benign form of pulmonary fibrosis – essentially scarring of the lungs).

50. The link between asbestos and lung cancer developed in the 1950s and, during the very late 1950s a pattern began to emerge in people living near to the asbestos mines in South Africa of a new disease, mesothelioma.

51. Further research was carried out in the late 1950s and, during the early to mid 1960s, a study was carried out in Barking, London looking at the presence of mesothelioma in the local population. The results of that study were presented in a paper by Newhouse and Thompson[12] at an international symposium on asbestos held in New York in October 1964.

52. At the same conference, Dr Gilson (a leading pathologist from the Medical Research Council based in the Pneumoconiosis Research Unit in Llandough) presented a paper[13] summarising the steps that were needed and stated that the only acceptable action was to *"eliminate unnecessary exposure to asbestos dust wherever it occurred".*

53. The Newhouse and Thompson paper was subsequently published, under a revised title, in the UK in 1965.

54. Following publication of the Newhouse and Thompson paper, the Times and Sunday Times Newspapers published articles on 17 March 1965 and again on 7 October 1965 in relation to the

[11] Plumbe, C C *"Factory Well-being"* Seven Oaks Press (1949)
[12] Newhouse, M & Thompson H *"Epidemiology of Mesothelial Tumors in the London Area"* Annals of the New York Academy of Sciences, Dec 1965 (pp 579 – 588)
[13] Gilson, J C "Problems and Perspectives: The Changing Hazards of Exposure to Asbestos" Annals of the New York Academy of Sciences, Dec 1965 pp 696 - 705

studies by the London School of Hygiene and Tropical Medicine (this is the study by Newhouse and Thompson).

55. On 31 October 1965 the Sunday Times ran a front page headline article entitled *"Scientists Track down a killer dust disease"*[14]. The Courts now consider this date to be the watershed moment, most recently by the Court of Appeal in the cases of *White and Cuthbert*[15], at paragraphs 86 & 87.

56. In the lead judgment from Lord Justice Underhill, he makes the following comments at paragraph 136:

> *"… it is now generally recognised that any exposure to asbestos carries with it a significant risk of personal injury."*

57. In the case of Briggs[16] the High Court found that *"a single fibre can be sufficient to cause this lethal cancer"*.

58. It is important to further understand that the Claimants ultimately failed in all of these cases which related to historic exposures to asbestos dust.

59. The starting point for this inquiry has to be that any exposure to asbestos dust carries with it a significant risk of personal injury. The consequences from that injury is a highly aggressive and invariably fatal form of cancer called mesothelioma. All types of asbestos dust are known to be capable of causing mesothelioma and are classed by the International Agency for Research on Cancer (IARC) as Group I carcinogens.

60. Any process that involves the potential for asbestos dust to be released should therefore be considered to carry a significant risk. Asbestos is an extremely hazardous substance known to carry a significant risk of causing of the most aggressive forms of cancer at any level of exposure. That cancer being incurable and invariably fatal.

61. The Appellants in this case have presented evidence to the panel that suggests that the risk to health is so low that it should be permitted for asbestos dust to be processed outside and near to residential areas.

62. Whilst the probability of developing an injury at an individual level may be low, the consequences of that injury are extremely high, resulting in a significant risk. When that risk is applied to not only one person doing the work but to population groups (residents in local villages), that risk becomes greater still.

63. There are however well established statutory and common law principles to which require the following:

- Prevent exposure to asbestos or, where it is not reasonably practicable to do so, reduce exposure to the lowest levels that are reasonably practicable[17]; or
- Best Available Techniques[18].

[14] Byrne, A "Scientists track down a killer dust disease" Sunday Times, 31 October 1965, p1 & 3
[15] *White and another – v – Secretary of State for Health and Social Care and another [2024] EWCA Civ 244*
[16] Briggs – v – Drylined Homes Ltd [2023] EWHC 382 (KB)
[17] Under long established health and safety law and the common law duty of care
[18] Required under Environmental Permitting legislation

64. Those standards are therefore necessary in all circumstances against the risk from asbestos, accepted by the Court of Appeal insofar there is a significant risk of injury from any exposure to asbestos dust.

65. As indicated previously, the first step in the hierarchy of control measures is to ask the question as to whether any risk can be avoided by using safer alternatives. In the case of the First Appeal this is the position that the Environment Agency took. In my view that was the correct decision and, on the basis of FCCs proposal, the risk was so high that only soils that were not contaminated with asbestos could be sorted at Daneshill.

66. There is however a need for brownfield sites to be developed and these often have asbestos contamination on them resulting from the use of asbestos materials in industrial, commercial, agricultural and even residential buildings.

67. This also means that there is also a need for asbestos contaminated soils to be remediated in order to allow them to be used and prevent the need for the soils to be sent to deep landfill sites.

68. It does not necessarily mean that there is a need for asbestos contaminated soils to be transported, often long distances, by our road network in sheeted (not sealed) lorries. It is possible for mobile plant to go to those sites and sort and treat the asbestos contaminated soils there. Such work would typically take place for a couple of weeks as opposed to ten years. As such, any risk to health from those works would be at least two orders of magnitude lower (2 weeks as opposed to 500 weeks).

69. Any risk of soils escaping from the sheeted lorries, as has happened at Daneshill on many occasions and has blighted the Helliwell family for years, would also be prevented.

70. There are also a number of sites that already do this work, inside buildings and under controlled conditions, as outlined in the written evidence of Paul Barker[19]. The closest site being at Finningley Quarry, a distance of only 8 miles from Daneshill.

71. Having read the Proof of Evidence of Mr Barker, I am in complete agreement with him insofar that, if this panel decide that the Appellants have satisfied the inquiry of a need to sort asbestos contaminated soil at Daneshill (and Maw Green) all of the dusty processes have to be carried out inside a properly designed building with effective filtration to minimise the escape of asbestos dust.

72. Those dusty processes would include soil reception (i.e. the tipping of soils), storage of untreated soils and the sorting / treatment of those soils themselves.

73. In addition, there would also have to be other controls such as airborne monitoring, the establishment of community working groups, close supervision, the use of personal and respiratory protective equipment by those doing the work and steps to ensure that the workforce have proper training and supervision to ensure that the risk is minimised of the workforce.

74. Further conditions that may be outside the remit of this inquiry may also be needed and they can be considered at the planning stage and by the land owner.

[19] Proof of evidence of Paul Barker, dated 28 February 2024

75. I understand that the Appellants have suggested that the risk to health is so low that the applicants should be permitted to sort asbestos materials outside. In his proof Dr Cole refers to a paper by Hodgson & Darnton[20] to support this position.

76. Epidemiology is a very specialist field of statistical medicine and it is used to predict future outbreaks of disease in population groups. It should not be used as justification for failing to follow the principles of Best Available Techniques or the duty to prevent or minimise exposure as far as is reasonably practicable.

77. At evidenced during the recent pandemic, epidemiology is very uncertain. It also assumes that every person is the same. We are not.

78. For asbestos exposure, Hodgson and Darnton (H&D) assumed that first exposure was at the age of 30. In the case of exposure near to residential areas, any exposure could be from birth. The H&D model also makes no allowance for individual susceptibility to certain substances.

79. Whilst it may be reasonable to assume that the consequences to safety risks may be similar (for example, it 100 people fall from a height of 40ft they will probably all die, for exposure to hazardous substances, the risk is much more variable).

80. As in the case of smoking, one person can be exposed to asbestos dust for long periods and not develop mesothelioma whereas his or her neighbour may only have very slight exposure and be unfortunate enough to develop this fatal disease.

81. The Hodgson & Darnton model also relies on historic sampling results for work with asbestos materials, using PCM (phase contrast microscopy). Those sampling results report a massive variation in actual asbestos dust concentrations and the studies are often themselves decades old and measurements were taken and counted using very old techniques, such that those measurements are themselves often unreliable.

82. Another important limitation of epidemiology is that it cannot take into account individual susceptibility and predisposition to a risk. It is known, for example, that humans who carry the BAP1 protein as part of their genetic makeup have a much greater predisposition of developing certain types of cancer, including mesothelioma. We all also have different abilities to tolerate hazardous substances.

83. Unfortunately, in the absence of all the population having genetic sequencing undertaken, the only way of knowing if a person is more susceptible to developing mesothelioma is when they are unfortunate enough to do so.

84. The case law in this is well established. In the case of *Paris v Stepney Borough Council*[21] we have to protect those that are vulnerable to injury. In that case the Court held that an employer was required to take strict precautions for an eye injury in the case of Mr Paris who lost his sight in his other eye during the war.

85. As such, unless the Applicant can satisfy itself that there are not people at greater risk, such as infants, children and those carrying the BAP1 protein, present in the local community, it has to

[20] Hodgson, J and Darnton, A "*The Quantitative Risks of Mesothelioma and Lung Cancer in Relation to Asbestos Exposure"* Ann. occup. Hyg., Vol. 44, No. 8, pp. 565–601, 2000

[21] *Paris v Stepney Borough Council [1951] AC 367*

identify and take steps on the basis that some of the community are likely to have a higher than normal predisposition to developing mesothelioma.

86. This approach would be entirely consistent with the findings of the Court of Appeal in the case of Jeromson[22] where paragraph 37 includes the following:

> *"… 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."*

87. It is therefore the case that in the event that this panel considers that the Appellants have demonstrated a need for asbestos contaminated soils to be transported to and processed at Daneshill and Maw Green, measures will need to be taken in line with Best Available Techniques (BAT) and to prevent or reduce the release of asbestos dust so far as is reasonably practicable (SFAIRP).

88. Whilst the principles appear similar, there are some differences. For example, an assessment against the cost of a risk against the cost of protecting against the risk (in time, money and effort)[23] is allowed under the principles of what is reasonably practicable. Conversely, under Best Available Technique those carrying out the work need to provide justification on cost benefit grounds[24].

89. The Environment Agency guidance[25] on BAT includes the following:

> *"'Best available techniques' (BAT) means the available techniques which are the best for preventing or minimising emissions and impacts on the environment."*
>
> *"If your alternative technique will provide a level of environmental protection that's equivalent to the BAT, you need to explain how it will do so in the operating techniques section of the application form."*
>
> *"If your technique won't provide equivalent environmental protection, but you want to make a case that it's justified on cost benefit grounds, you'll need to provide a justification in the operating techniques section of the form and through your risk assessment and cost benefit analysis."*

90. The Appellants' cases do not appear to me to meet any of these important principles because:

- They are not proposing steps that prevent or minimise the escape of escape of asbestos dust (e.g. do the work in a building).
- They do not claim that the sorting of asbestos dust outside will offer an equivalent level of protection to sorting outside. They simply aver that there is not a significant level of risk.

[22] *Shell Tankers UK Ltd and others – v – Jeromson and others [2001] EWCA Civ 101*
[23] *Edwards v National Coal Board [1949] 1 All ER 743 CA*
[24] "Best available techniques: environmental permits" Environnent Agency, February 2016
[25] "Best available techniques: environmental permits" Environnent Agency, February 2016

- They have not put forward any positive case on cost-benefit grounds to justify a lower level of protection. Such a case would involve the Appellant outlining the income they are likely to receive from the sorting of asbestos contaminated soils and weighing that against the cost of providing the simple measures that the Environment Agency are proposing.

91. When considering what represents BAT or SFAIRP it is important to consider what steps are done elsewhere and what the enforcing authorities consider to be the minimum standards that are acceptable to achieve these outcomes.

92. As indicated in the proof of Paul Barker, the principles of BAT relevant to this case are contained in the EU Implementing Decision 2018/1147[26]. The General BAT Conclusions in the Implementing Decision is to *"implement and adhere to an environmental management system (EMS) that incorporates"* a number of features which include:

- *commitment of the management, including senior management;*
- *an environmental policy that includes the continuous improvement of the environmental performance of the installation;*
- *effective process control;*
- *safeguarding compliance with environmental legislation.*

93. Whilst a matter for this panel to consider, I would question whether a commercial decision to not use a building with filtration as a control measure would demonstrate any of the above.

94. BAT14 lists a number of techniques that are expected in order to reduce the risk of diffuse emissions to air (in this case asbestos and other dusts). The list at (d) includes the *"containment, collection and treatment of diffuse emissions"* and includes the following:

> *"This includes techniques such as:*
>
> - *storing, treating and handling waste and material that may generate diffuse emissions in enclosed buildings and/or enclosed equipment (e.g. conveyor belts);*
> - *maintaining the enclosed equipment or buildings under an adequate pressure;*
> - *collecting and directing the emissions to an appropriate abatement system (see Section 6.1) via an air extraction system and/or air suction systems close to the emission sources."*

95. As indicated, the principles of BAT very much advocate the use of a building to contain and treat diffuse emissions where fugitive dust is given off. The fact that those diffuse emissions include not only inert dusts such as soil, but class 1 carcinogens and probably all types of asbestos used in the UK, strongly would support the use of a building.

[26] Commission Implementing Decision (EU) 2018/1147 of 10 August 2018 establishing best available techniques (BAT) conclusions for waste treatment, under Directive 2010/75/EU of the European Parliament and of the Council (notified under document C(2018) 5070) (Text with EEA relevance.)

96. It is further the case that, as indicated by Mr Barker in his proof, other organisations have demonstrated and are continuing to demonstrate that it is possible to do this work commercially and inside a building with effective controls in place.

97. To uphold this appeal would mean that those organisations outlined in Mr Barker's proof at paragraphs 54 – 62 would be placed at a commercial disadvantage as they have set the benchmark for what is and is not acceptable under the requirements of BAT / SFAIRP.

98. As with any commercial venture, any costs of putting infrastructure in place inevitably are passed on to the customer. Any cost savings by not putting that infrastructure in place can effectively be used to undercut the competition. This is why much of the health and safety law applies equally to the self-employed as it does to large multi-national corporations.

99. When first researching FCCs proposal at Daneshill, I submitted a request to the Health & Safety Executive under the Freedom of Information Act 2000 (FOI). The HSE response[27] to my request included the following:

> *"1) Apart from nil, is there a safe level of exposure to asbestos dust?*
>
> *HSE is not aware that a safe level or threshold of exposure has been found, though there may be one.*
>
> *2) Are dutyholders required to prevent the release of asbestos dust where it is reasonably practicable to do so?*
>
> *Yes. HSE guidance such as L143 Managing and working with asbestos makes this clear (regulation 16).*
>
> *3) In circumstances where it is not reasonably practicable to prevent the release of any asbestos dust, are dutyholders required to minimise the release of asbestos dust at source?*
>
> *Yes, duty holders are required to do so and this and this* [sic] *is set out in The Control of Asbestos Regulations 2012 (regulation 16) and associated guidance. Further information can be found in L143 Managing and working with asbestos*
>
> *4) Does the current clearance limit / limit of detection of 0.01 f/ml represent a safe or acceptable level of asbestos dust?*
>
> *No. Duty holders must ensure that the level is reduced as low as is reasonably practicable.*
>
> *…*
>
> *8) Would HSE recommend the use of strict precautions to prevent the escape of asbestos dust into the environment?*
>
> *Yes, duty holders are required to prevent, or if this is not reasonably practicable to minimise, the spread of asbestos. This is set out in The Control of Asbestos*

[27] HSE responses to FOI request 202010232, responses dated 9 November 2020

Regulations 2012 (regulation 16) and associated guidance L143 Managing and working with asbestos."

100. It is therefore clear that both the Environment Agency and Health & Safety Executive would consider that controls should be identified and taken on the basis that there is no safe or acceptable level of asbestos exposure (apart from nil). That approach has effectively been endorsed very recently by the Court of Appeal in *White and Cuthbert*.

101. As such the only conclusion has to be that for any work which has the potential for asbestos dust to be released, it is carried out in a properly designed building with filtration and extraction.

102. I seem to recall that there may have been a suggestion that FCC would only be treating waste soils that were contaminated with bonded asbestos cement materials and, as such these only contained chrysotile. This is incorrect as asbestos cement can be a friable material and many asbestos cement products are known to contain amphibole.

103. A HSL Report[28] by Garry Burdett referred to in the evidence of Dr Cole (item 14 of his supporting documents) includes, for example, the following at 2.1 *"component materials"*:

> *"Asbestos cement is usually a mixture of about 10% asbestos and 90% Portland cement. The types of asbestos used may vary, chrysotile is normally always present but crocidolite and amosite (asbestos grunerite) were also added to many products. Some sources of chrysotile asbestos also contain small amounts of tremolite asbestos but this is unlikely to be detected during routine examination."*

104. It is not clear why FCC did not consider the potential for amphibole being present in the soils that it proposes to sort. Neither is it clear why Dr Cole did not include a copy of the whole document in the appendices to his report.

105. The relative friability and potential for amphibole content in asbestos cement was also considered in HSE guidance note EH36[29] which includes the following:

> *"9 Where old asbestos cement is involved, it is important to confirm the type by sampling and analysis so that appropriate precautions can be taken.*
>
> *10 HM Factory Inspectorate (HMFI) must be given 28 days notice before any work can start on materials containing crocidolite (blue asbestos). If there is any doubt of the type of asbestos, then it should be assumed that it is blue asbestos and HMFI should be notified.*
>
> *…*
>
> *19 Certain tasks create substantial releases of dust or put workers under a greater risk of contamination. These include:*
>
> *(a) work on cement products containing crocidolite or amosite:*
>
> *(b) work on cement which is brittle, liable to break or disintegrate or whose surface has become powdery;*
>
> *(c) work with power tools:*

[28] Burdett, G *" Investigation of the chrysotile fibres in an asbestos cement sample"* HSL 2007/11 (2007)
[29] EH36 *"Work with Asbestos Cement"* October 1984

(d) any other work which may involve breakage of the material (e.g. demolition, stripping out);

(e) any other work where significant asbestos dust is liable to be generated.

106. The possibility of amphiboles being present in asbestos cement samples was also outlined in a Cape Asbestos document[30] which included:

> *"Blue Asbestos and Amosite are, with great advantage, added to the fibrous component for the production of asbestos cement sheets…*
>
> *…*
>
> *Twenty-five per cent or more of the fibrous component may usefully consist of Blue Asbestos and/or Amosite for flat sheet manufacture. Up to fifteen per cent in recommended for use in corrugated sheets and sheets which are to be used lor moulded products."*

107. As the proposals relate to the sorting of asbestos contaminated soils where asbestos debris is present in the soils, even if *"bonded"* asbestos cement are likely to be in fragments, bundles of asbestos fibres and single asbestos fibres, EH36 would indicate that the sorting of asbestos contaminated soils could give rise to significant asbestos exposures.

108. It is further the case, that the airborne dust sampling at other sites refers to materials other than asbestos cement being present in the contamination, including asbestos lagging, containing amosite.

109. As such, precautions should be identified and taken on the basis of it being foreseeable that other asbestos materials may be present in the soils. Dr Cole says that the contamination in soils is usually uniform. He does not say that it is always uniform.

110. Included in the papers are the results of asbestos dust sampling in document CD6.1D[31] and those results could appear to support a view that asbestos dust concentrations are very low. They are not.

111. No measurements are included using PCM counts which is the only method that is permitted to be used when making any comparison against numerical limits and standards and the only method upon which any epidemiology studies are based. Whilst noting that PCM counts cannot reliably count asbestos concentrations below 0.01 f/ml, there is no reliable way of converting electron microscopy counts into PCM counts.

112. It is also relevant to note that, as a rule of thumb, PCM counts are noted to be higher than EM counts, as per a HSE position paper to a parliamentary committee[32] which notes that *"PCM provides a more cautious result* [to EM]*"* and that *"the relationship between results from PCM and EM techniques is complex, particularly at low asbestos concentrations"*.

---

[30] *"Asbestos – the Raw Material"* Cape Asbestos Company (1961)

[31] https://assets.publishing.service.gov.uk/media/66016b4b65ca2f67417da7c2/CD6.1.D_Factual_Monitoring_Report.pdf

[32] https://committees.parliament.uk/writtenevidence/39390/pdf/

113. As indicated in information on the Pragma and Associates website[33] seemingly low concentrations of asbestos dust do not mean that there are small amounts of asbestos dust in the air. The Pragma website includes:

> *"An apparent low concentration in fibres/ml does not necessarily mean a small number of asbestos fibres. For example, 0.01 is a small number and therefore 0.01 fibres/ml sounds like a small quantitiy* [sic] *of asbestos fibres. However, a concentration of 0.01 fibres/ml means that in every cubic meter of air, there would be 10,000 asbestos fibres.*
>
> *Put another way, there would be 1,000,000 asbestos fibres in a room measuring 8m x 5m x 2.5m: a reasonable sized office or a small classroom perhaps."*

114. If the sampling results of ERQ 197-198 (p11 of CD6.1D) of 9 March 2022, ERQ ASB1 (29 June 2022) and J262576 (15 June 2023) are accepted as a possible level of asbestos dust released at source then these levels are up to seven hundred times greater than the ambient concentrations of asbestos present in the environment[34].

115. In reality as the sampling at Edwin Richards Quarry was done by electron microscopy, the concentrations of asbestos in those samples are likely to have been elevated over a thousand times above true background concentrations of asbestos dust.

116. If mean asbestos dust concentrations of 0.0007 f/ml are present in a room 8m x 5m X 2.5m then this means that there would be seventy thousand asbestos fibres in that room.

117. Alternatively, a person exposed to asbestos dust concentrations of 0.0007 f/ml for ten years, at a standard respiratory rate of 8 litres per minute, as reported by the Medical Research Council[35] over a ten year period, i.e. the proposed duration of the works at Daneshill, that person would inhale ~29,500,000 asbestos fibres[36].

118. Conversely, if that same person was exposed to background concentrations of 0.00001 f/ml over the same period they would inhale ~42,000 asbestos fibres[37]. Their exposure in that period is likely to have been seven hundred times greater than it would otherwise have been.

119. It is however the case, for reasons I have outlined that the use of epidemiology and sampling showing what appear to be low levels of asbestos dust do not justify the Appellant's positions that a permit should be granted allowing the sorting of asbestos contaminated soils outdoors.

120. In summary, my comments are:

- The Appeal by FCC in relation to the Environment's Agency's decision of 22 October 2022 was not made within six months and should be rejected. There is no good reason why a decision was made to allow that appeal to be heard;

- The Appeal form completed by FCC first appeared on the EA website after the dates of the first hearing and therefore the public cannot have been aware that the appeal was out of time until that date;

[33] https://pragmaandassociates.co.uk/wp-content/uploads/2023/02/Dose-assessment.pdf
[34] *"Fibrous Materials in the Environment"* Medical Research Council / Institute of Environmental Health (1997)
[35] *"Fibrous Materials in the Environment"* Medical Research Council / Institute of Environmental Health (1997)
[36] 0.0007 f/ml x 1,000 millilitres in a litre x 8 litres a minute x 60 minutes an hour x 24 hours a day x 365.25 days a year x 10 years
[37] 0.000001 f/ml x 1,000 millilitres in a litre x 8 litres a minute x 60 minutes an hour x 24 hours a day x 365.25 days a year x 10 years

- There was no consultation or communication on the Environment Agency's decision to vary its original decision and to allow the sorting of asbestos contaminated soils inside a building. If it was not for two local residents that attended the first week of this inquiry, no local residents would have been aware of this, or the subsequent second appeal;

- On the basis of the Appellants' own evidence, asbestos and other fugitive dust emissions will be created by this work;

- Once asbestos dust escapes into the open air, it is impossible for the Appellants to control it. Inside buildings, it is.

- There is no safe or acceptable level of asbestos dust, apart from nil, and the Court of Appeal recently held that any exposure to asbestos dust is known to carry a significant risk of developing mesothelioma;

- Asbestos is a Group I carcinogen and, whilst the risks are greater with exposure to amphiboles, all types of asbestos are known to cause mesothelioma at very low levels of exposure;

- The materials that are proposed to be processed at Daneshill are known to have been manufactured using amphiboles;

- The proposal at Daneshill is in very close proximity to residential properties where it is known that very young children live. It is also a short distance (downwind) to the village of Lound and near to other sensitive sites, including schools and other childcare settings;

- Children are known to be at greater risk of developing mesothelioma, if nothing more for the simple reason than their longer life expectancy from the date exposed and the long latency period between exposure and the onset of symptoms;

- The only way that a person can find out if they have a greater than normal susceptibility or predisposition to develop mesothelioma, is after they have.

- Any work involving the potential for asbestos dust to be released should be considered to carry a significant risk to health at an individual level. Whilst the probability of developing an asbestos related disease on an individual level may appear to be low, when the consequences of that disease are fatal, that risk becomes significant and when that risk is applied to a population group, the risk becomes proportionally greater;

- The use of epidemiology to predict future risk is very uncertain and should not be used to justify a lower standard of control than would otherwise be expected. Epidemiology cannot take into account, for example, the susceptibility of an individual.

- The well established principles of Best Available Techniques (BAT) and reducing risk as low as is reasonably practicable (ALARP) strongly support the use of a building for all activities wherever fugitive dust from soils containing asbestos contamination is generated;

- The applicant has not put forward any financial justification as to why the use of a building is not possible. It has however gone to what is likely to be a very considerable expense in contesting this matter and possibly spent more on lawyers and consultants than it would have spent to simply put controls in place;

- Other companies carrying out this type of work do so inside properly designed buildings with filtration and dust extraction. To allow this appeal would put those companies at some commercial disadvantage;

- Those companies have demonstrated that it is reasonably practicable to apply the principles of BAT and carry out this work inside buildings.

121. For these reasons, I believe that each of the appeals should be rejected.

Our Ref: EPR/NP3538MF/V008

Date: 20 October 2022

Dear Sir/Madam

Decision on application for a substantial variation to permit FCC Recycling (UK) Limited at Daneshill Landfill, Daneshill Road, Lound, Nottinghamshire, DN22 8RB. Permit reference EPR/NP3538MF/V008

I would like to take this opportunity to let you know that under the Environmental Permitting (England and Wales) Regulations 2016 we have completed our technical determination of the application to vary an Environmental Permit held by FCC Recycling (UK) Limited.

The application involved a substantial variation to the permit to allow treatment of asbestos contaminated soils, and considered comments raised as part of the public participation.

Our decision is to refuse aspects of the application which relate to the treatment of asbestos contaminated soils.

We have detailed our conclusions in the final decision document which is publicly available along with the permit on the GOV.UK website and is available via this link;

Environmental permitting: waste, installations and radioactive substances activity notices of applications made - GOV.UK (www.gov.uk)

The documents will be available for 4 weeks.

Yours faithfully

MR Haslam

Mark Haslam
Area Environment Manager
(East Midlands)

Environment Agency, Trentside Offices, Scarrington Road, West Bridgford, Nottingham, NG2 5FA
Customer services line: 03708 506 506
Email: EMDcorrespondence@environment-agency.gov.uk
www.gov.uk/environment-agency

(2)

ANNUAL REPORT

OF THE

CHIEF INSPECTOR

OF

FACTORIES AND WORKSHOPS

For the Year 1898.

PART II.—REPORTS.

Presented to both Houses of Parliament by Command of Her Majesty.

LONDON:
PRINTED FOR HER MAJESTY'S STATIONERY OFFICE.
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The opinion of the workers, expressed to Miss Squire, that they were inhaling and coughing up silkworms thus received some support, and there is strange testimony from a keen medical observer in Italy over two centuries ago to the havoc that can be wrought by this ever-recurring tendency of a manufacture to make its profits out of cheapened materials. In his *De Morbis Artificum* (published 1670, translated into English 1705), Ramazzini wrote:—

> "Worst of all is the condition of those who comb the silk cakes that remain after the making of the silk in order to spin it into thread for several uses as being less chargeable (costly?) than the silk itself. For when the bags of the silkworms after being steeped in hot water are opened and untangled by our women . . . . and wound upon reels in small threads there are still some grosser threads or filaments behind, which have parts of the bodies of silkworms mixed with them; and of these they make a sort of cakes which they dry in the sun and give out to workmen to have drawn out into threads with small combs. Now the poor people that comb these cakes are usually troubled with a vehement cough, and a great difficulty of breathing, and few of them live to old age in that way of business. The virulence that gives rise to this tragedy is owing to the cadaverous particles of the silkworms that are mixed with the cakes. . . . I know a whole family in this city that got a good estate by the silk trade, and dy'd miserably of consumptions; the physicians imputing the cause of their calamity to the trade they were continually employed in.
>
> "I usually recommend to this sort of workmen a milk diet above all other things, there being nothing that more effectually corrects the corrosive and ulcerous acrimony. . . . But at the long run if they find their affliction grows upon them they must look out for another trade; for 'tis a sordid profit that's accompan'd with the destruction of health."*

Would that our workers in dangerous industries could avoid the evils that beset them by following this last recommendation!

Miss Deane reports on the abundant evidence she has had of the evil effects of dust:—

> "In the majority of cases the evil is very insidious, and the general symptoms produced by dust on the various respiratory organs are to the lay mind so similar to those produced by other causes that it is not always easy to trace the connection. The incessant 'sore throat,' the irritation of the bronchial passages, the frequent 'colds on the chest,' and 'hoarse voice' and 'morning cough' from which girls employed in dusty processes suffer are all symptoms which to casual observers might be easily accounted for in other ways. One or two sad cases of phthisis medically certified to be seriously aggravated, if not induced, by work in rope factories which came under my notice have emphasized in my mind the grave possibilities arising from work in these places.
>
> "Such instances can seldom be fully traced except with infinite labour and patience. The worker falls into ill-health, and sinks away out of sight in no sudden or sensational manner so that attention is seldom attracted to the ultimate source of the trouble.
>
> "The evil effects of asbestos dust have also attracted my attention, a microscopic examination of this mineral dust which was made by H.M. Medical Inspector clearly revealed the sharp, glass-like, jagged nature of the particles, and where they are allowed to rise and to remain suspended in the air of a room, in any quantity, the effects have been found to be injurious, as might have been expected.
>
> "As in china-scouring, so in a still greater degree in other dusty trades, the worker may continue for a very long time apparently unaffected, before the symptoms of the evil become marked.
>
> "It is often impossible to bring positive proof of definite injury solely attributable to working in a dusty atmosphere, for except in extreme cases the symptoms are similar to those attributable to other causes: but the certainty of the danger can be clearly demonstrated, as, for instance, by examination of the dust particles. Even when the evil reaches such grave proportions as to be capable of easy and tragic proof as in the case of china scouring or flax preparing, there is always a certain proportion of "old workers"—the survivors of their mates—who are to be found in every unhealthy industry, and who, like the Circassian poison-eaters, appear to thrive on their unhealthy calling.
>
> "In less obviously unhealthy conditions the only convincing proof of actual injury, viz., reliable comparative statistics of mortality, or of health-standards, is practically unattainable in the case of any given factory, at any rate with the time and opportunity at present at our disposal."

Security on idents.

Although, in accordance with regulations, questions relating to fencing of dangerous machinery are referred by H.M. Women Inspectors to H.M. Inspectors in charge of districts (99 cases of dangerous machinery having been so referred in 1898), considerable attention has, as hitherto, been given to various illustrations of the need of increasing security for workers at their employment. Often valuable suggestions can be gathered from study of the registers of accidents which occupiers are bound to keep in workshops as well as factories, and some gross cases of neglect to keep these useful records, for example, in aërated water works and laundries, we made the subject of proceedings.

In one case, with a view to obtaining penal compensation for a poor old woman needlessly injured in a laundry, I proceeded against the occupiers, not only for failure to register and report the accident, but for failure to place such a barrier as would from the position of the machine—which was a self-acting collar ironer near the wall—have prevented the accident. Grossly careless management had neglected not only this simple precaution, but had allowed pegs to be hung for outdoor garments immediately behind the moving part of the machine. It was the accidental setting in motion of the machine, when the old woman had got behind it at the dinner hour for her shawl to go home, that caused the injury which disabled her for further following her occupation.

My attention has been called, by repeated reports from the Inspectors, to cases of injured workers being pressed to remain at work during the first three days after an injury which would not be severe if it was carefully attended to. Miss Squire especially reported serious consequences as following a comparatively slight accident at a tin cutting works. One girl she saw had lost a finger by an operation some time after the accident which caused the original injury, and it was the opinion of the surgeon that, if the girl had rested and been cared for she would not have suffered a loss which many are apt to forget is far more serious to a bread-earner, who has only her hands to depend upon, than to others. Hand presses, both in metallic capsule works and in pen-making works, are responsible for many of these minor accidents, which are often of grave consequence to the sufferer. I was much struck by the frequency of maimed and misshapen forefingers in my first visits to pen

* English translation entitled, "A Treatise of the Diseases of Tradesmen. Written in Latin by Bern. Ramazzini, Professor of Physick at Padua. And now done in English." London, 1705.

of elaborate X-ray plant, is needless and uneconomic and is one of the ways in which industrial medical services can be adversely criticised both by the employer and the medical profession as a whole.

Voluntary Consultations

This particular aspect of the factory doctor's work has been intentionally left to the last. It is not infrequently the case that his most effective work is carried out in the privacy of his consulting room. The worker who is worried about his health, who may be emotionally upset because his immediate superior is a bully, or who wants information on one of a dozen other problems, should be able to find in the medical officer an adviser who can guide him through his difficulties, either by adjusting the position within the factory or by advising him to consult his own private medical practitioner and at the same time offering his help in collaboration. There is nothing worse than a feeling of disappointment and frustration in one's work. Discontent is a major cause of industrial unrest and strikes which have affected many thousands of otherwise happy and contented workers have arisen as a result of the petty failure of one person.

In modern psychotherapy, the scientific way of dealing with a man is also the humane and understanding way and humanity and understanding are wanted badly not only in industry but throughout the world to-day. The scope for this type of medical work in industry is great and can play a part of fundamental importance in the future development of the health services of this country.

And now one word in conclusion. We have discussed very briefly some of the measures carried out by the industrial medical officer and have shown how they bear on the work of the factory clinic. At the present day, however, there are probably not more than two or three hundred doctors engaged in this type of work in the country and it is estimated that of these only some fifty or sixty are employed in a whole-time capacity. It is obvious therefore that only a small percentage of industrial workers—and very often those employed in large and enlightened firms—have such facilities offered to them. If it is conceded that the work which has just been described is of importance in the general health schemes of the nation then the problem within industry becomes one of considerable urgency. Whether the work should be undertaken by far-sighted employers now or whether it should be left to the State to develop and control must be a matter of opinion and of politics. The important thing is that the work is there waiting to be done.

There are those who firmly believe that the future prosperity of the nation depends on the health and happiness of the individual workman. If this is so how can we as doctors take our part? The problem, I believe, is primarily one for the medical profession, and in part therefore for the industrial medical officer. What can be learned in the factory clinic to-day will most surely become the accepted practice throughout industry in the future and if properly developed cannot fail to contribute successfully to the problem of national fitness which is being so much discussed at the present time.

DUSTS AND THE LUNGS

WITH PARTICULAR REFERENCE TO SILICOSIS AND ASBESTOSIS

BY E. R. A. MEREWETHER, M.D., M.R.C.P., BARRISTER-AT-LAW
One of H.M. Medical Inspectors of Factories

SINCE the birth of the human race dust has exerted its baneful effects on civilisation. Some of our prehistoric ancestors died because of it, and countless are the deaths which have occurred since. To-day, the effects of dust on the human mechanism alone is one of the major problems of the age. Two questions at once obtrude themselves. Why, after so long, is it still a major problem, and what is the present position? To the first we can only excuse ourselves by pointing out that dusts are legion in variety. They act in many ways on different organs and different individuals. Their actions are often subtle and insidious, and irretrievable damage is done before the person most concerned even appreciates the attack. Scientific appreciation of the potentialities of the different dusts and mixtures of dusts, assessment of their effects, determination of appropriate preventive measures and the means of carrying them out, have all had to wait upon advances in many collateral sciences before even the full scope of the problem could be appreciated. Chemistry, physics,

The siliceous dusts and asbestos also differ from other dusts in that they cause a diffuse fibrosis of the lungs, silicosis and asbestosis respectively: that is to say that they irritate and destroy the essential lung tissues and excite the formation and the proliferation of ordinary scar or fibrous tissue, due, it is generally believed, to the very slow solution of the silica. This scar tissue is not only useless lumber but also, if there is much of it, exerts secondary harmful effects by blockage of the lymphatic drainage system, interference with the proper aeration of the blood, production of strain on the right side of the heart, blocking and distortion of bronchioles by contraction of the fibrous tissue, production of localised emphysema, and definitely acts as a bait for the tubercle bacillus.

The dust particles must be small, very small, to be dangerous, since they must be small enough to float in the air and small enough to get past the outer defences of the lungs, at least as far as the smaller bronchioles. Therefore, an industrial process which does not project dust particles into the air in sufficient number and of such size and weight that they will remain floating for a considerable time cannot be dangerous in this way.

With the silica dusts the dangerous particle size range is up to 10 microns, with the lighter asbestos dust it is much greater, extending even up to 200 microns. The majority of the particles, however, which get into and stay in the lungs are much smaller in each case—up to 5 microns in the case of silica dust and up to about 50 microns in the case of asbestos. That is to say, that the dust particles which are invisible to the naked eye are the important ones: this leads us to the practical point that if a silica or an asbestos process produces visible dust in the air, then the invisible dust is certainly in dangerous concentration.

The silicotic fibrosis is laid down in nodules, whereas that of asbestos is laid down as a cobweb. This distinction is important since it is reflected in the typical radiographic appearances. The explanation lies in the different physical and chemical characteristics of the dusts. The smaller and more stimulating silica particles are taken up by "dust cells" and hurried away from the alveoli into the lymphatics and towards the many minute lymph nodes at the junctions of these passages, and from thence to the large ones at root of the lung. Unfortunately, many phagocytes succumb and drop their hostile passengers on the way for others to collect the debris, until ultimately, with continued exposure to the dust, the traffic along the lymphatics becomes very congested and at the cross-roads complete stoppages occur; here we get accumulations of particles of silica and dead phagocytes, and slowly the silica dissolves and, in course of time, nodules of fibrous tissue appear. This explains many things; for example, that healthy lungs can dispose of quite a lot of dust, even silica, for so long as the traffic can be kept moving no serious effects will result; again, it explains the ill-effects of any antecedent illness which has damaged the lungs permanently, even if locally; the ill-effects of a coincident infection, for that congests the traffic in the lymphatics still more; and the danger of a late infection when silicosis has developed generally and the lymphatic system is already grossly damaged. Also clear are the causal factors underlying the production of massive silicosis, in which a mass of fibrous tissue, the size of a hen's egg, or larger, and consisting of innumerable small nodules tightly packed together, appears. Moreover, the obstruction of the lymphatic drainage by the silicotic nodules accounts also for the great retention of ordinary carbon and other dust in the silicotic lung.

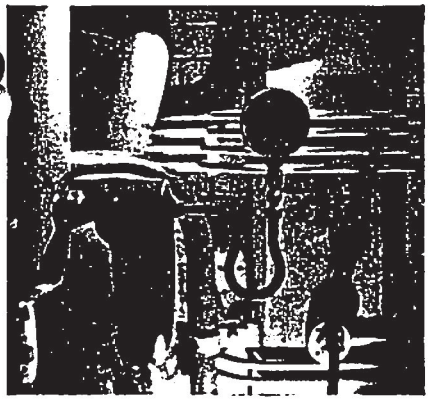
In asbestosis, the course of affairs is different. With the longer, awkward and often frayed-out asbestos fibres, transportation into the lymphatics is impossible, and Gardner and Cummings have shown that the fibrosis commences around the smaller bronchioles where the asbestos particles felt up and become immobilised. In some way or another, the silica is dissociated and dissolved out and diffuses into the neighbouring tissues, and the fibrous tissue is formed in radiating strands. The lymphatic system does not, therefore, bear the first brunt of the attack, and it may be that the longer patency of the system aids the cobweb-like formation of the fibrous tissue. Within a few weeks of the lodgment of the fibres, the curious beaded and clubbed asbestosis bodies, which are altered asbestos fibres, begin to appear.

Since the fibrous tissue formed is the result of the solution of the silica, the extent of the fibrosis, which will develop in any given case, is limited by the amount of silica immobolised and retained in the lungs: therefore, on post-mortem examination one sees all grades of simple silicosis from a few scattered nodules up to massive silicosis occupying over half of the lungs.

Knowledge of the pathology of these two diseases, together with inquiry into the length of exposure to the dust and the dustiness of the process concerned in any given case, gives one such an appreciation of the symptoms, signs and clinical course of these diseases that the alleged difficulties in diagnosis mostly vanish.

Needless to say, fibrous tissue takes time to develop, and also the less the concentration of the dust in the air breathed, the longer exposure to the dust will be required before

asbestos fibre raw material



Insulating Compositions

Amosite Medium Long Grades for Insulating Compositions
Amosite Short Grades for Finishing and Self-setting Compositions

Amosite is a very convenient fibre to use in heat insulating compositions. Its long, stiff fibres ensure that a good bulk is obtained and also provide the necessary reinforcement.

Mixtures of between twenty and fifty per cent of well-fiberised, long amosite with magnesium carbonate or a good grade of diatomaceous earth will give a composition having good thermal insulating properties. Up to ten per cent of clay may also be added to give some 'slip' and 'bind.'

For finishing compositions, up to ten per cent of well-fiberised Amosite may be used with cheap fillers such as chalk or sand; again, add up to ten per cent of clay to give 'slip' and 'bind.'

Self-setting compositions are prepared from cement containing between ten and thirty per cent of well-fiberised, short Amosite.

ASBESTOS SPRAY

Blue Asbestos and Amosite Medium and Short Grades

Short, well-fiberised Amosite or Blue Asbestos is the best fibre to use in asbestos spray.

Asbestos spray has been extensively developed as a heat insulating, acoustic, and anti-condensation medium.

The fibres are usually sprayed in a fine mist of water, and a soluble adhesive is sometimes added to the water.

When dry, the sprayed asbestos will have a density of 9–13 1b/cu ft (depending upon the conditions), at which its thermal conductivity will be in the region of 0·32 Btu/sq ft/hr/(°F/in).

BITUMEN AND PITCH MOULDING COMPOUNDS

Blue Asbestos and Amosite Medium and Short Grades

Mouldings for use in conjunction with water and chemicals have for many years been prepared from mixtures of bitumen or pitch with blue asbestos. Amosite asbestos may also be used.

It is usual to employ a short, well-opened Blue Asbestos or Amosite for this purpose and to mix it hot with bitumen or pitch, then to press it in water-cooled moulds or to extrude or otherwise form it into pipes.

A particular use for Blue Asbestos in this connection is in bitumen composition battery boxes.

'Dagenite' battery boxes being made from a Blue Asbestos-bitumen composition at Pritchett and Gold's works, Dagenham

ASBESTOS-CEMENT AND OTHER BUILDING BOARDS

Asbestos-Cement Sheets

Blue Asbestos and Amosite Medium and Short Grades

Blue Asbestos and Amosite are, with great advantage, added to the fibrous component for the production of asbestos-cement sheets. It is well known that the speed at which asbestos-cement machines may be operated depends upon the rate at which the film on the blanket may be filtered. Blue Asbestos and Amosite are unique in that they act as filter aids in this process and at the same time contribute to the reinforcement of the product.

As was pointed out earlier, the basic fibres of Blue Asbestos and Amosite are considerably coarser than those of White Asbestos, and experience has clearly shown that there is considerable advantage in having a proportion of coarser fibres present in order to keep the stock 'free' and to prevent the finer White Asbestos fibres from settling in too 'dead' a mass.

Twenty-five per cent or more of the fibrous component may usefully consist of Blue Asbestos and/or Amosite for flat sheet manufacture. Up to fifteen per cent in recommended for use in corrugated sheets and sheets which are to be used for moulded products.

THE SUNDAY TIMES

No. 7433 OCTOBER 31 1965 PRICE 8d.

MAGAZINE: **Life on a commuter train**

Scientists track down a killer dust disease

By Dr Alfred Byrne
Medical Correspondent

A DISQUIETING "new" occupational disease capable of killing not only the exposed workman but also perhaps his womenfolk and even people living near his place of work is the subject of intensive behind-the-scenes activity by British scientists, experts on industrial health and representatives of at least two Government Ministries.

The condition is a rapidly fatal tumour named mesothelioma that spreads over the pleural covering of the lung. So rare a disorder was it until recent years that many pathologists disputed its existence, but now the growth is being met in increasing numbers at autopsy, especially in patients at one time exposed to asbestos.

A remarkable report on an epidemiological investigation into this complaint by Dr. Muriel Newhouse and Mrs. Hilda Thompson, of the London School of Hygiene and Tropical Medicine, has brought this whole matter to the surface. From ward case notes, interviews with family doctors and surviving relatives, and the records of an asbestos processing plant near by, they obtained the occupational and residential histories of 76 patients who died from mesothelioma at the London Hospital.

35-year interval

It was found that 40 (52.6 per cent.) of the cases had a history of occupational exposure to asbestos, or of having lived in the same house as an asbestos worker, compared with nine (11.8 per cent.) out of 76 patients from the same hospital with other diseases. The interval between first exposure and development of the fatal tumour ranged between 16 and 35 years.

Of nine patients whose relatives worked with asbestos, seven were women. The most usual history was that of the wife who used to wash her husband's dungarees or work clothes. In one instance a relative said that the husband, a docker, came home "white with asbestos" every evening for three or four years, during which the wife brushed him down.

The authoritative touch: Mr Wilson in top form at the Salisbury Press conference

Wilson tells Rhodesians no excuse for UDI now

THE PRIME MINISTER returns to London today with a new proposal for resolving the Rhodesian independence crisis—a Royal Commission to decide the best way of consulting the Rhodesian people on a constitutional settlement and then to consult them on proposals prepared by the British and Rhodesian Governments.

Before he left Salisbury, Mr Wilson said there was now no excuse for a unilateral declaration of independence. Then he flew on to Zambia, Nigeria and Ghana to talk to African leaders.

Mr Bottomley, Commonwealth Secretary, and Sir Elwyn Jones, Attorney-General, who remained for talks with the Rhodesian leaders, are leaving for London later today. A British spokesman in Salisbury said they had made sufficient progress to enable them to report to the Cabinet.

The fact that Mr Smith has once again held his hand is taken in Salisbury as a sign that his Cabinet is by no means united. Mr Smith told a party meeting last night that if the Royal Commission idea failed "this would be the end of the road" and his Government would have to take "the other step," but he added that he was more confident about the prospects of a negotiated settlement.

Solution possible 'by the turn of the year'

David Holden, Salisbury, Saturday

THE proposal for a Royal Commission on the Rhodesian independence issue leaves the Rhodesian Government with "no excuse" for a unilateral declaration of independence.

This belief, firmly expressed by Mr Wilson here this morning, at the closing Press conference of his five-day stay, is the most hopeful note that anyone has sounded in Salisbury this week, and has left the world's Press, the City, and no doubt the whole of Rhodesia, in a whirl of bewildered speculation while the British Prime Minister flies off to explain himself further in Government issued a statement saying that it had proposed a three-man commission under Sir Hugh Beadle, the Rhodesian Chief Justice, to "decide only the question whether or not the 1961 Constitution, with adjustments to make the country independent, is acceptable to the people of Rhodesia as a whole."

At his Press conference Mr Wilson made it clear that this statement was issued without his knowledge, and he proceeded to put a significantly different gloss upon the proposal that was in fact strate his confidence in his view that the people of Rhodesia as a whole supported his policies, by putting it to the test of some form of democratic consultation, or he should agree to a Royal Commission under the chairmanship of Sir Hugh Beadle which would be given the responsibility of devising a new Constitution that would enable independence to be granted in a manner acceptable to the people as a whole.

Mr Smith had replied "ingeniously," with an amalgam of the two, suggesting that the two Governments should prepare an agreed document which would

means of consulting Rhodesian opinion as a whole.

"If at the end of the day," said Mr Wilson, "they found the Rhodesian people as a whole wanted independence on this basis, then we would all know where we stood. If on the other hand they reported that that was not the case, then again we would all know where we stood."

Replacing fear

Given time, Mr Wilson said in a prepared statement—and he added in reply to questions that this might mean by the turn of the year—the proposed Royal Commission could hammer out a solution which would lead to a

TREVOR-ROPER
THE SICK MIND OF CHINA 45

INSIGHT 8
Heathrow crash

Robens and the coal battle 35

Maurice Wiggin
A MAN AND HIS CAR 12
Stirling Moss
Maxwell Boyd
AT THE SHOW 10

NEXT WEEK
10 Book Pages
Beckett, Waugh, Connolly, Pope-Hennessy

Plowden inquiry to urge control of BAC

State hand in Concord firm

By Ian Coulter, Air Correspondent

STATE participation in the British Aircraft Corporation, builders of the Concord supersonic airliner and the VC10, is now certain to be recommended by the Plowden Committee investigating the aircraft industry. Lord Plowden and his committee are convinced that BAC's private-enterprise owners can no longer fund the company's future programme, including the Concord development. Of BAC's £20 million issued equity 40 per cent. is held by English Electric, 40 per cent. by Vickers and 20 per cent. by the Bristol Aeroplane Company.

With final drafting of the Plowden Report now being made, two "schools" have developed over BAC and nationalisation. One group advocates straightforward State ownership of the corporation, the other recommends the addition of Government-nominated directors to the Board, to give the Government representation in return for capital investment but maintain BAC's identity as a non-nationalised company.

The Committee's members, who have been conducting a minute investigation of the aircraft industry since last December, are said to be considering the State-ownership issue on "non-doctrinaire" lines.

Those close to both the Plowden Committee's deliberation and the Government's aviation planners say that BAC's own directors are not reluctant to have direct State participation in their affairs. The only question now is just how much Government control Lord Plowden, a former chairman of the Atomic Energy Authority and now chairman of Tube Investments, will recommend and Mr Harold Wilson will require.

Britain's other major airframe manufacturer, Hawker Siddeley, is not, I understand, being considered in the same way as BAC. This is because Hawker Siddeley (Aviation) Ltd. is now only a minority subsidiary of Hawker Siddeley Group Ltd., which has a majority of its investments in non-aviation industrial developments.

Biggs escape man caught

By Cal McCrystal

FOLLOWING a tip-off to Manchester City police, a night patrol yesterday arrested Robert Elfes Anderson, aged 26, who escaped from Wandsworth Prison on July 8 with Ronald Biggs, one of the men convicted of the Great Train Robbery.

Anderson was sentenced to 12 years' imprisonment on May 12, for burglary, shopbreaking and conspiring to rob. He was arrested yesterday at a bus station near the city centre by detectives on a Q-car night crime patrol which had been waiting since before 7 a.m. Anderson, who was carrying a small suitcase, did not put up a struggle.

Last night Manchester police confirmed that Anderson had been staying in a house in Whalley Range, Manchester, using the name "Andrew Thompson." One of the residents said last night that "Andrew Thompson" had boasted that he had escaped from Wandsworth Prison with Biggs, but they thought he was joking.

"He came here about a fortnight ago and said he had been living in another part of Manchester."

Anderson escaped with Biggs and two other prisoners by scaling a 20 ft. wall during afternoon exercise.

worked with asbestos, seven were women. The most usual history was that of the wife who used to wash her husband's dungarees or work clothes. In one instance a relative said that the husband, a docker, came home "white with asbestos" every evening for three or four years, during which the wife brushed him down.

The two men in this group had been boys of eight and nine when their sisters were working in an asbestos plant.

Homes near factory

Among the fatal cases with no occupational or domestic exposure to asbestos 11 (30.6 per cent.) had lived within half a mile of the factory, as against five (7.6 per cent.) of the other patients, says the "British Journal of Industrial Medicine."

There were three affected women who had lived within half a mile of the factory when it was in production on its original site; they were then between five and seven years old.

The previously unrecognised risk of this particular tumour from asbestos was first driven home in 1960 when Dr J. C. Wagner and co-workers reported 33 cases among people in South Africa who had been exposed to asbestos dust in the industry, or in the vicinity of the Cape asbestos mines. Their latest total is 130 cases.

Large increase

Dr Dermot Hourihane, now at Trinity College, Dublin, said yesterday that he had confirmed the diagnosis of this tumour in 141 cases at the London Hospital when he was pathologist there. "A few years ago there might have been perhaps four or five of these cases observed in a year in the whole of Britain," he added. "Recently we were seeing that number in one hospital. All were invariably fatal."

Professor W. T. E. McCaughey, his present chief at Trinity, said that he and his colleagues had found 48 cases of this tumour among men in Belfast who had been exposed to asbestos when ship-building during the first world war. "And they still keep coming up all the time." Other series of cases have been reported from Newcastle upon Tyne, Leeds and Liverpool.

The Chief Inspector of Factories has set up a committee of experts to review urgently all the evidence on the medical problems of asbestos exposure.

The Ministry of Pensions is about to make mesothelioma of

Dr Newhouse

Continued on page 3

reference of his five-day stay, is the most hopeful note that anyone has sounded in Salisbury this week, and has left the world's Press, the City, and no doubt the whole of Rhodesia, in a whirl of bewildered speculation while the British Prime Minister flies off to explain himself further in African lands elsewhere.

The idea of a Royal Commission emerged at one o'clock this morning, out of the midnight gloom that had steadily descended upon Mr Wilson's talks, when the Rhodesian adjustments to make the country independent, is acceptable to the people of Rhodesia as a whole."

At his Press conference Mr Wilson made it clear that this statement was issued without his knowledge, and he proceeded to put a significantly different gloss upon the proposal that was in fact agreed. The original proposal, he said, had come from him yesterday in the form of alternatives—the first of which was not mentioned in the Rhodesian Government's statement. Either, he had said, Mr Smith should demon-

of Sir Hugh Beadle which would be given the responsibility of devising a new Constitution that would enable independence to be granted in a manner acceptable to the people as a whole.

Mr Smith had replied "ingeniously," with an amalgam of the two, suggesting that the two Governments should prepare an agreed document which would incorporate such amendments in the 1961 Constitution as they thought necessary to meet their principles, and that this document should then be handed to a Royal Commission empowered to discover and apply adequate

all know where we stood."

Replacing fear

Given time, Mr Wilson said in a prepared statement—and he added in reply to questions that this might mean by the turn of the year—the proposed Royal Commission could hammer out a solution which would lead to a "speedy and honourable and acceptable basis for independence" which could take the brakes off Rhodesia's economic progress and replace fear by co-operation and trust.

But, he said, it depended on the will to work for a settlement. If the will existed in Rhodesia, he was "absolutely clear" that the means to a settlement had been found. If, on the other hand, there were those who did not want a settlement—"who prefer illegal action rather than agreed independence"—then there was no more he could do.

In the sombre and outspoken statement that he read to his Press conference, Mr Wilson rebuked both white Rhodesians and African nationalists for their fears and self-delusion. He had had to tell the Rhodesian African leaders he had met that there was no possibility of Britain attempting to settle all Rhodesia's constitutional problems with a military invasion.

Need to wait

Equally, he had told them that although Britain was irrevocably committed to guaranteed and unimpeded progress to majority rule, he did not believe that majority rule could, or should, come today or tomorrow. "A period of time is needed, time to remove the fears and suspicions between race and race . . . and the time required cannot be measured by clock or calendar but only by achievement."

Just as dangerous were the delusions held by others who believed they could take the law into their own hands and that Rhodesia could survive and flourish "friendless, almost alone, not in a neutral or apathetic world even, but in a bitterly hostile world."

He urged everyone to understand that the choice in Rhodesia was not simply between illegal independence today or an African majority tomorrow or next week. There were other courses open and they had to be examined.

Because of this, he concluded, he had "agreed in principle" to make one more effort through the Royal Commission, to find a basis for Rhodesian independence acceptable to the people of Rhodesia as a whole.

It was a tough and statesmanlike performance, of complete authority, but inevitably it has left some crucial questions unanswered. The chief of those was admitted by Mr Wilson—can the British and Rhodesian Governments agree on the document to be presented to the putative Royal Commission?

Tonight it seemed that they might, when it was announced that Mr Bottomley, the Commonwealth Secretary, and the Attorney-General, Sir Elwyn Jones, who had been deputed by the

Continued on page 2

Heath accuses Premier of 'lie' over payments gap

By James Margach
Political Correspondent

MR EDWARD HEATH yesterday intensified his attack on "the disgraceful lie" in Labour's propaganda claims about the "economic mess" which the Government inherited. But this time he went much further than before by accusing the Prime Minister directly.

"There is no truth in his suggestion that he was surprised to find a deficit," said Mr Heath. "He did know all the time. I have suspected for a long time that there was something phoney about this pretended ignorance."

Mr Heath, who was speaking at Bristol, obviously intends to mount a major political campaign to repudiate the charges that the Conservatives left an economic mess and to assert that the economic crisis was largely of Labour's own making. It was significant that this hard-hitting attack was directed exclusively at Mr Wilson himself, so as to put the Prime Minister in the dock as responsible for the misrepresentations.

"At Brighton I disposed of the disgraceful lie that the Labour Government inherited an £800 million economic mess. A few weeks ago, here in Bristol, Mr Wilson told you that he did not know how large the balance of payments deficit was until they took office," he said.

"I have suspected for a long time that there was something phoney about this pretended ignorance. Now I have got to the bottom of it. I have looked up Mr Wilson's speech to the Trade Union Congress of September 7, 1964.

"That was five weeks before the election. This is what he said then: 'This trade gap means a deficit on our current balance of payments of £500 million a year.'

In fact, the current balance for 1964 was £400 million, not £500 million. There is no truth in his suggestion that he was surprised to find a deficit. He did know all the time.

"Indeed, when he took office he should have been surprised to have found that the deficit was £100 million less than he had predicted five weeks previously. That was the current balance. It did not include the capital items of overseas investment. He knew about them too. The details were published two weeks before the election. He only included them later to exaggerate the total."

Mr Heath's speech—page 4

Pay talks still hold up automatic coal cutters

By Ian Coulter, Industrial Correspondent

MILLIONS OF POUNDS worth of automatic coal-cutting machines are idle because the National Coal Board and the National Union of Mineworkers cannot agree what miners should be paid for controlling the machines. Negotiations have now entered their second year.

Apart from the pay controversy, work at the new pit at Bevercotes in the East Midlands coalfield, which was shown to international mining engineers last July as the world's first remote control colliery, is six months behind schedule. It should have been in production by now. Even if there is agreement on pay, it will be 1966 before any coal comes to the surface.

The Coal Board has six of the £250,000 Rolf (remotely-operated longwall face) machines which are designed to cut, load and transport coal completely automatically. None of them is being operated by remote control.

Instead, in three pits miners are working them as if they were orthodox power loaders. In two others (including Bevercotes) installation is incomplete, and another is being overhauled for "technical reasons." Twenty of these machines are on order, at a cost of some £5 million.

The 1964-65 National Coal Board annual report said: "In October, 1964, the Board and the N U M agreed that the wages and conditions of men employed on remotely-operated longwall faces should be governed by a national agreement and at the end of the year negotiations had reached an advanced stage. Discussions also began on a national agreement on the wages and conditions of employment of men to be employed at Bevercotes colliery. Negotiations were still proceeding at the end of the year."

And they are still continuing. Mr Sidney Ford, President of the National Union of Mineworkers, told me yesterday: "I hope we will get acceptance of the terms which are now being put to the men in the coalfields."

I understand that the offer is of 72s. 6d. a shift generally and 80s. in the highly-profitable East Midlands coalfield, which embraces the pits of Nottingham, Derby and Leicester. This compares with an original Coal Board offer last year ranging from 70s. to 79s.

The Coal Battle—Page 35.

Second operation on $176,400 bull

By Evelyn Irons

NEW YORK, Saturday.

Lindertis Evulse, the $176,400 Aberdeen Angus bull bought from Sir Torquil Munro's Perthshire herd but found useless for breeding when he arrived in New York State, faces a second operation to correct his unhappy condition. Veterinary surgeons who operated in July said they had cured him, but he has not sired any calves yet and the outlook is not hopeful.

If the bull were fertile he could produce more than $10 million worth of calves, according to his American owners at Black Watch Farm. Lloyd's of London have already refunded the purchase price.

Bobby Simpson breaks arm

Bobby Simpson, Australia's Test captain, broke his left arm in an interstate match in Brisbane yesterday and may miss the first three Tests against England.

Simpson was struck on the arm by a ball at the start of the New South Wales second innings against Queensland. He will be out of cricket for two and a half months.—Reuter.

Jack Fingleton—page 22

Now vandals daub York Minster

VANDALS yesterday daubed the lectern and Archbishop's chair in York Minster with red paint 24 hours after a similar desecration was discovered at Canterbury Cathedral. At Canterbury, the Archbishop's throne, the lectern and the High Altar cross were sprayed with paint.

York police photographed fingerprints before a team of cleaners, including the wife of the Dean, Dr Alan Richardson, removed the paint for today's harvest festival services.

Then an anonymous telephone caller said there was a bomb in the Minster. But Evensong went on as usual.

"We don't think there was any strong connection with the Canterbury incident: some hooligan decided to copy it," said the Dean. "The damage is all cleaned up now. We cannot understand why nobody saw this happen, although it was dark during a thunderstorm this morning and it may have been done then."

He added that he "recognised" some words which had been daubed on the outside of the building, but he was not prepared to say what they were.

At Canterbury, last night, the Archbishop's chaplain, the Rev John Andrew, said that Dr Ramsey would not be making a statement either on Friday's desecration at Canterbury or yesterday's vandalism at York.

Canterbury Police say they have no lead yet to the paint sprayers.

'Work of madman'

The Archbishop of York, Dr Coggan, said in Berlin last night that the desecration of York Cathedral must have been the work of a madman.

Dr Coggan, who is on a five-day visit to Germany, said to a reporter that "no one in his senses would do that sort of thing."—A.P.

Fighting flares on Israel border

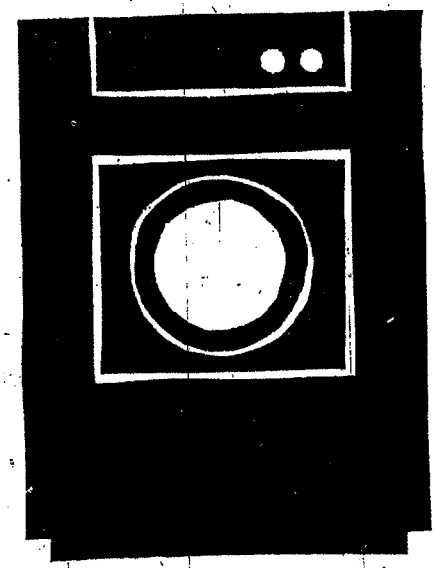
Fifteen Israelis were reported killed in a battle yesterday between Jordanian and Israeli armed forces in the Laproun area, some 10 miles west of Jerusalem.

A Jordan Government spokesman said that fighting flared up when Israelis opened fire at farmers ploughing their land.

An Israeli official in London said last night that the only casualties were two Israelis wounded.

arrested yesterday at a bus station near the city centre by detectives on a Q-car night crime patrol which had been waiting since before 7 a.m. Anderson, who was carrying a small suitcase, did not put up a struggle.

Anderson escaped with Biggs and two other prisoners by scaling a 20 ft. wall during afternoon exercise.



20 minutes—£20,000

In the time it takes this machine to do the washing, British life offices pay out £20,000 to policyholders. A thousand pounds every minute—more than ten million pounds a week.

These benefits are made possible by the mutual association of policyholders, who join together to protect their families and invest their savings. Today practically everyone has a stake in life assurance.

LIFE ASSURANCE PAYS OUT £10m A WEEK IN BENEFITS

ISSUED BY THE LIFE OFFICES' ASSOCIATION, LONDON, AND ASSOCIATED SCOTTISH LIFE OFFICES, EDINBURGH.

and rifles over the heads of the first rank and advanced. The first rank then looked for Viet Cong bodies, and dragged them off with their hooks.

The Marines' machine-guns laid down a devastating field of fire. Other Communist guerrillas drove on towards the Marine ammunition dump, smashed open flaps that killed every one of them.—B.U.P.

Richard Hughes cables from Hongkong: Communist forces in South Vietnam have increased by at least ten per cent. in the past three months, despite their heavy losses. They are estimated now to number about 250,000 men of all cadres.

Dust experts in talks on asbestos safety

Continued from page 1

the pleura a "prescribed" disease eligible for industrial benefit.

This is payable, however, only where the victim contracts a disease in the course of his employment. No compensation is due to the dependents of a woman who gets the tumour from contact with the dust brought home by her husband.

An enormous amount of experimental work on the biological effects of asbestos has been going on quietly at the Medical Research Council's pneumoconiosis unit at Cardiff, where Dr Wagner now works. They have shown there that exposing specially-bred rats to various kinds of asbestos can induce in the animals' lungs conditions resembling the asbestosis of human beings, mesothelioma, and even perhaps lung cancer.

Some of the current studies are designed to find out which variety of asbestos is the most noxious, and the minimum dose required to produce malignant changes. This could throw important light on the clinical disease for it seems that a very brief exposure to the dust can prove lethal in man.

The M R C's work is only one aspect of a vast international effort, for "outbreaks" of the tumour are being reported from other countries, notably the United States.

The International Union Against Cancer has enlisted a distinguished working party of doctors and scientists to study the association between exposure to asbestos and cancer. The world-wide programme of research they have recommended is detailed, elaborate and far-seeing. It goes a long way beyond considerations of mesothelioma, the incidence of which is a mere fleabite compared with that of lung cancer.

One particularly significant study already in progress is concerned with the presence of what are called asbestos bodies in the lungs. These are fibres of asbestos which have become coated with an iron-protein complex. Professor J. G. Thompson of Cape Town, first drew attention to the fact that they are abundant in cases of tumour but also present in otherwise healthy lungs. Since then Drs Hourihane and McCaughey and other researchers, both in this country and the U.S. have shown that between 20 and 30 per cent. of urban dwellers have asbestos bodies in their lungs, without any history of exposure to asbestos.

Asbestos is therefore very much in the air. Whether these particles could possibly cause other unwelcome changes in the lungs is one of the vital questions that remains to be answered by research.

Sunny, but rain on way

Areas 1, 2, 3, 5, 6, 15—Dry, with sunny periods, cloud and rain later. Wind westerly, backing southerly, fresh and strong. Near normal temperatures, maximum 12C (54F).

Areas 4, 7, 12, 13, 20—Sunny, cloud and rain later. Wind south-west, moderate, backing south, fresh or strong. Near normal temperatures, maximum 12 (54).

Areas 8, 9, 10—Bright early, mainly cloudy, rain or drizzle. Wind south to south-west, fresh to gale. Normal temperatures, maximum 13 (55).

Areas 11, 14, 29—Sunny periods, cloud and rain afternoon. Wind southerly, fresh to gale. Normal temperatures, maximum 11 (52).

Areas 16, 17, 21, 23—Sunny periods, cloud and rain later. Wind south-west, backing south, fresh to strong. Normal temperatures, maximum 11 (52).

Areas 18, 19—Sunny periods, scattered showers, cloud and rain later. Wind south-westerly, increasing fresh to strong. Near normal temperatures, maximum 11 (52).

Further outlook—Rain, followed by sunny intervals.

FOREIGN WEATHER.—Brussels: cloud, 13 (55); Geneva: fair, 13 (55); Lisbon: sun, 21 (70); Madrid: sun, 13 (55); Paris: cloud, 12 (54); Riviera: fair, 20 (68); Rome: cloud, 21 (70); Vienna: fair, 14 (57).

Guidance Note EH 36
from the
Health and Safety
Executive

Work with asbestos cement

Environmental Hygiene 36 (October 1984)

These Guidance Notes are published under five subject headings: Medical, Environmental Hygiene, Chemical Safety, Plant and Machinery and General.

INTRODUCTION

1 This Guidance Note provides information on the risks of exposure to asbestos dust when working with asbestos cement and on the precautions required for personal protection.

2 It does not deal with the physical dangers to workers who are particularly at risk during the construction, maintenance or demolition of asbestos cement roofing. Falls from, and through, fragile roofs are a major source of deaths in construction work and precautions to prevent such accidents should be given priority. Advice is contained in Guidance Note GS10 *Roofwork: prevention of falls.*

COMPOSITION, PROPERTIES AND USES

3 Asbestos cement products have been widely used for many years in the construction industry, most commonly as flat or corrugated roofing or cladding sheets, tiles, pipes and guttering etc. It remains a major material in new construction work.

4 Asbestos cement is a grey, hard, very brittle material containing 10–15% asbestos fibre, usually chrysotile (white asbestos). Some crocidolite (blue asbestos) and amosite (brown asbestos) has been used occasionally in the past, particularly in underground asbestos cement pipes. Some asbestos cement products (e.g. cladding sheets, tiles etc.) are painted or coated either before they are sold, or at a later stage.

5 The main uses of asbestos cement are in:

(a) corrugated sheets (i.e. roofing and cladding of farm buildings, factories, warehouses etc.);

(b) accessories for corrugated sheeting (i.e. ridge cappings, eaves and fillers for roofs);

(c) flat sheeting, partitioning, cladding, door facings;

(d) rainwater goods (i.e. gutters, pipes, troughs);

(e) roofing tiles and slates;

(f) other products (flute pipes, decking tiles, cisterns and sumps).

IDENTIFICATION

6 Asbestos cement products can generally be identified by their appearance, but you can never be sure from colour alone if asbestos is present or of the type involved, particularly as many newer non-asbestos products look similar to asbestos cement. A voluntary labelling scheme was introduced in 1976 using an 'a' logo to indicate the presence of asbestos, but it is unlikely that any such markers will be on products found in situ. Building plans or specifications are another source of information and the original supplier or importer should be able to give details about the presence, quantity and type of asbestos in a given product.

7 If in doubt, the only satisfactory way of determining if asbestos is present in cement is by bulk sampling and laboratory analysis. But even the sampling operation can put people at risk so it should only be done when the above alternatives have been tried and when there is a specific need to confirm the presence of asbestos. Sampling should only be carried out by someone with suitable training and experience.

8 The composition of cement is normally uniform so there should be little difficulty in selecting a representative site. The site should be readily accessible and easily cleaned and repaired after sampling. The removal of samples must not compromise the functions of other products.

9 Where old asbestos cement is involved, it is important to confirm the type by sampling and analysis so that appropriate precautions can be taken.

10 HM Factory Inspectorate (HMFI) must be given 28 days notice before any work can start on materials containing crocidolite (blue asbestos). If there is any doubt of the type of asbestos, then it should be assumed that it is blue asbestos and HMFI should be notified.

11 The following precautions should be taken during sampling:

(a) ensure a safe means of access if working at heights, (e.g. on roof or wall claddings);

(b) only the people doing the sampling should be in the immediate area;

(c) take care to minimise damage to the asbestos cement from which the sample is taken. Use a small hand tool and place the sample in a suitably labelled small sealable container (e.g. self sealing polythene bag);

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HEALTH & SAFETY LABORATORY

Investigation of the chrysotile fibres in an asbestos cement sample

HSL/2007/11

Project Leader: **G.Burdett**

Author(s): **G Burdett,**

Science Group: **Science Group 5**

2 DESCRIPTION OF ASBESTOS CEMENT

2.1 Component materials

Asbestos cement is usually a mixture of about 10% asbestos and 90% Portland cement. The types of asbestos used may vary, chrysotile is normally always present but crocidolite and amosite (asbestos grunerite) were also added to many products. Some sources of chrysotile asbestos also contain small amounts of tremolite asbestos but this is unlikely to be detected during routine examination. The product's performance requires that the cement matrix adheres to the outside of the fibres and fibre bundles so that the high tensile strength of the fibres is used to create a stronger product, than if just cement alone was used. The asbestos is added to the cement and wet mixed before being formed, compressed and cured to produce the end product. The addition of crocidolite and amosite was also used to help dewater the product quicker (e.g. increase production rate) and / or to allow greater compression to produce a product of greater strength (e.g. pressure pipes).

Portland cement is a complex mixture of calcium silicates and aluminates that is made by heating a mixture of clay and limestone to about 1,500 ^{o}C in a kiln. The mixture is then cooled, pulverized, and gypsum ($CaSO_4$.$2H_2O$) is added. When the powder is mixed with water, complex reactions take place and the cement sets to a solid, consisting of many small particles. After adding gypsum, the final cement reaction in the kiln is a mixture of 50% tricalcium silicate (Ca_3SiO_5), 25% dicalcium silicate (Ca_2SiO_4), 10% tricalcium aluminate ($Ca_3Al_2O_6$), 10% tetracalciumaluminoferrate ($Ca_4Al_2Fe_2O_{10}$), and 5% gypsum ($CaSO_4.2H_2O$). When water is added, the components of cement undergo a chemical reaction known as hydration. As this occurs, the silicates are transformed into silicate hydrates and calcium hydroxide ($Ca(OH)_2$), and the cement slowly forms a hardened paste. This process is complex and not complete, so a range of cement particles of different compositions will occur. A typical cement matrix in asbestos cement products consists of: $Ca(OH)_2$ calcium hydroxide (10 – 12 %), calcium silicate hydrates (60 – 80%), calcium aluminate hydrates (3 – 10%), calcium aluminate sulphate hydrates (0 – 5%) and unreacted cement.

Most occurrences of chrysotile (white) asbestos form when rocks from deep in the earths crust and upper mantle undergo recrystallisation under circumstances where there is relatively high pressure and low temperature and a relative abundance of water. This process is known as serpentisation and occurs over a geological timescale of millions of years. The asbestos forms in veins usually only a few centimetres wide and while it has a similar chemistry to the surrounding rock, it differs due to the fibrous habit of the particles formed. Particles which show similar degrees of growth on all the crystal axis are called equant (e.g. grains of salt) but the asbestos is an example of a particle formed from unequal growth along one crystal axis, to form an elongated particle (fibre). Asbestos fibres are regarded as being at the extreme end of particle shape continuum and this is sometimes referred to as the asbestiform habit. The individual fibres (known as fibrils) may be up to several centimetres in length but the fibril width is around 0.03 μm (about one million times less). These thin individual fibrils often form larger fibres and bundles of longitudinally aligned fibres,

MDHS

Methods for the Determination of Hazardous Substances

Health and Safety Laboratory

HSE Health & Safety Executive

39/4

Asbestos fibres in air

Sampling and evaluation by Phase Contrast Microscopy (PCM) under the Control of Asbestos at Work Regulations

November 1995

CONTENTS

INTRODUCTION

Nomenclature, health effects and legislation

1 Asbestos is a term used for the fibrous forms of some naturally occurring silicate minerals which have been exploited commercially for their useful properties of flexibility, high tensile strength, incombustibility, low thermal conductivity and resistance to chemical attack. The term 'fibrous' in this context means asbestiform, consisting of bundles of parallel, very high aspect ratio fibres (generally 20:1 to 1000:1) that split easily, may be curved, or that occur as thin needles or in matted masses. For regulatory purposes in Britain, the Control of Asbestos at Work Regulations (CAWR)[1,2] define asbestos as any of the following minerals (or any mixture containing them): chrysotile, amosite, crocidolite, fibrous actinolite, fibrous tremolite and fibrous anthophyllite. These fibrous minerals have been associated with the diseases that can result from the inhalation of asbestos, ie asbestosis, lung cancer and mesothelioma. Information on medical effects is given in an HSE Medical Series Guidance Note[3] and information on legislation, product types and control measures is given in Approved Codes of Practice[4,5] and other HSE publications.[6-11] In particular, the use of measurements is detailed in Guidance Note EH10.[6] Also, the Department of the Environment gives information on the use of asbestos in buildings.[12]

Outline of method and changes from previous MDHS

2 The following method is described for the measurement of airborne asbestos fibre concentrations, and revokes the previously recommended MDHS 39/3. The method involves the collection of air samples and the analysis of those samples using phase contrast microscopy (PCM).

SCOPE AND LIMITATIONS

8 The method measures the airborne concentration of countable fibres using phase contrast microscopy (PCM). Countable fibres are defined as particles with length >5 µm, width <3 µm and aspect ratio (length : width ratio) >3:1. Fibres having widths <0.2 µm may not be visible using this method,[13] and the PCM count represents only a proportion of the total number of fibres present. Therefore the count is only an index of the numerical concentration of fibres and not an absolute measure of the number of fibres present. The method does not permit the determination of chemical composition or crystallographic structure of fibres, and therefore cannot be used on its own to distinguish unambiguously between different fibre types. Hence, use of this method requires all fibres meeting the size definition to be counted.

Fibre discrimination

9 It is not permissible to discriminate between asbestos and non-asbestos fibres to determine compliance with the control limit or with the action level. However, it may be possible to discriminate between such fibres for sampling situations other than compliance sampling. Fibre discrimination will be dependent on the range of analytical techniques available and the skills of the microscopist. A hierarchy of methods is available to eliminate non-asbestos fibres such as man-made mineral fibres (MMMF), vegetable, aramid and other fibre types. Detailed discussion of these techniques is beyond the scope of this MDHS, and other reference documents should be consulted (an MDHS on discrimination strategy is in preparation). The report of the evaluation should include a statement on the type and numbers of interfering fibres which were present and the method by which the number of non-asbestos countable fibres have been eliminated from the original PCM count.

Hierarchy of methods	*Application*
Phase contrast microscopy (PCM)	Technique for all countable fibres
Polarised light microscopy with dispersion staining (PLM/DS)[14]	Allows subtraction from a count of some sizes and types of non-asbestos fibre
Scanning electron microscopy (SEM)[15]	Allows subtraction from a count of some fibres of regulated sizes: introduce elemental determination to the discrimination
Transmission electron microscopy (TEM)[16,17]	Ultimate technique for discrimination; includes quantitative elemental analysis as well as crystal structure determination

Lower concentration limit

10 Errors become very large when small numbers of fibres are counted. Statistical considerations show that, for a mean density of 10 fibres per 100 graticule areas, a count of 5 or fewer fibres per 100 areas will be obtained on about 5% of occasions. This relates to the 'blank count' allowed by paragraph 33, so that it can be argued that 10 fibres per 100 graticule areas should be regarded as the lowest reliably detectable count above background. For a sample volume of 480 litres, this corresponds to a calculated result of about 0.010 f/ml in the air. Moreover, there is some evidence that counters underestimate a blank count if they know it to be so.[18] This MDHS is written so that determination of the specified concentrations in paragraph 3 is never based on counts of fewer than 20 fibres. Bias and inter-laboratory differences will degrade the reliability of low concentration results even further. Therefore, the limit of detection of this method, assuming a 480 litre sample and 200 graticule areas examined, is 0.010 f/ml (see example, Appendix 3).

REAGENTS

11 Acetone and glycerol triacetate ('triacetin') are required for filter clearance. Analytical grade reagents are not essential, although excessive water in the acetone may reduce filter clarity. The triacetin should be clean, free from dust and moisture, and with no evidence of hydrolysis (possibly indicated by a smell of acetic acid) or other contamination.

APPARATUS

Sampling equipment

12 To comply with the standard method, an open-faced filter holder (Fig 1) fitted with an electrically-conducting cylindrical cowl extending between 33 mm and 44 mm in front of the filter, exposing a circular area of filter at least 20 mm in diameter, should be used for sampling. This type of holder is intended to protect the filter, while still permitting a uniform deposit. The cowl will point downwards when sampling. If O-rings are used, they should be made of PTFE or similar material. Flexible tubing is required to connect the filter holder to the pump, and a cap or bung is needed for the cowl entrance to protect the filter from contamination during transport.

13 The exposed area of each filter must be known and should be measured at least every time a type of cowl or O-ring is changed. A suitable method of measuring this is to use the filter holder and cowl to sample from a cloud of dark coloured dust and then to mount the filter on a slide in the usual way. The diameter of the dark deposit can be measured with vernier callipers, or by placing the slide on a microscope stage and observing the filter at low (100x) magnification while a diameter of the dark area is traversed by moving the stage. The distance moved can be obtained from the stage vernier scale. Two diameters should be measured at right angles, and three filters in separate holders should be checked in this way.

Neutral Citation Number: [2024] EWCA Civ 244

Case Nos: CA-2022-002485 and CA-2022-002456

Royal Courts of Justice
Strand, London, WC2A 2LL

Date: 14 March 2024

CA-2022-002485

IN THE COURT OF APPEAL (CIVIL DIVISION)
ON APPEAL FROM THE HIGH COURT OF JUSTICE
KING'S BENCH DIVISION
JEREMY HYAM KC (SITTING AS A
DEPUTY JUDGE OF THE HIGH COURT)
[2022] EWHC 3082 (KB)

Before:

LORD JUSTICE UNDERHILL
(Vice-President of the Court of Appeal (Civil Division))
LORD JUSTICE NEWEY
and
LORD JUSTICE STUART-SMITH

- -

Between:

(1) EMMA JANE WHITE
(2) SUSAN MARY WHITE
(3) STEPHEN THOMAS WHITE
(Executors of the estate of THOMAS ALBERT WHITE, deceased)
Claimants/Appellants

-and-

SECRETARY OF STATE FOR HEALTH AND SOCIAL CARE
Defendant/Respondent

- -

Harry Steinberg KC and **George Murray** (instructed by **James Murray Law**)
for the **Appellants**
David Platt KC and **Philip Turton** (instructed by **Clyde & Co**) for the **Respondent**

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136. It is now generally recognised that there is no safe level of exposure to asbestos. Put slightly differently, it is now generally recognised that any exposure to asbestos carries with it a significant risk of personal injury. With the benefit of hindsight and current knowledge it is therefore trite to say that an employer (or any other user of asbestos) is under a duty to reduce exposure to the greatest extent possible. That proposition, however, is dependent upon current understanding of the risk of mesothelioma. The risks from exposure to asbestos that are now reasonably foreseeable are not only asbestosis and lung cancer but also mesothelioma. Mesothelioma was not in contemplation before the 1960s because mesotheliomas were rare and, as recognised at [23] and [35] of *Jeromson*, the link between asbestos and mesothelioma was not established (even in published medical circles) until Wagner's 1960 paper: see [84.]-[87.] above. 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 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

Neutral Citation Number: [2023] EWHC 382 (KB)

Case No: QB-2020-001072

IN THE HIGH COURT OF JUSTICE
KING'S BENCH DIVISION

Royal Courts of Justice
Strand, London, WC2A 2LL

Date: 24 February 2023

Before:
Dexter Dias KC
(sitting as a Deputy High Court Judge)

- -

Between:

SADIE BRIGGS **(Widow and administratrix of the estate of Brian Briggs)**	**Claimant**
- and –	
DRYLINED HOMES LIMITED	**Defendant**

- -
- -

Simon Plaut (instructed by **Irwin Mitchell LLP**) for the **Claimant**
Amarjit Rai (instructed by **Brindley Twist Tafft & James LLP**) for the **Defendant**

Hearing dates: 7, 8 and 9 February 2023

- -

Approved Judgment

(Circulated to parties in draft 12 February 2023)

Briggs had died. His rapid medical deterioration came as a shock because prior to 2014, save for an atrial (heart) flutter he was managing with anticoagulant medication, Mr Briggs had been a fit man. He had worked for many years in the construction trade and mining. Naturally, his death was a cause of great distress to his wife Mrs Sadie Briggs, the claimant in this case. She, as executrix of her husband's estate and his dependent, brings a claim in negligence against one of her husband's former employers, Drylined Homes Ltd. ("DHL"). DHL engaged Mr Briggs to perform what is called "drylining" - putting up plasterboards - during house construction. This was between approximately 1975 and 1979. Therefore, this case examines what happened – or did not happen – well over 40 years ago in the house building industry when there was a mass of low-cost social housing construction to move inner city dwellers away from old and decrepit housing stock. In this sense, this case forms part of our collective social history.

5. The parties to the case are as follows: the claimant is Mrs Sadie Briggs, represented by Mr Plaut of counsel. Mrs Briggs brings the claim pursuant to the Law Reform (Miscellaneous Provisions) Act 1934 in respect of her husband's estate and under the Fatal Accidents Act 1976 as his dependent. The defendant is Drylined Homes Ltd., represented by Mr Rai of counsel. DHL, while very active in construction the 1970s, is now largely dormant. I must say at the outset that the court is particularly grateful to counsel for their focused advocacy and spirit of cooperation throughout.

B. BRIEF BACKGROUND

6. In December 2015, Mr Briggs's health began to deteriorate significantly. He developed a bad chest infection and had to be taken by ambulance to the New Cross Hospital in Wolverhampton. The story is taken up by the medical expert in the case, Dr Andrew Fairfax. He notes that investigations of Mr Briggs's condition showed that he had a malignant mesothelioma. Mesothelioma is a cancer in the lining of certain organs of the body. It is caused by exposure to asbestos dust and fibres. Indeed, a single fibre can be sufficient to cause this lethal cancer. Presently, there is no known cure. Survival times after diagnosis vary and Mr Briggs was, as his wife says, "a fighter". Brian Briggs died 9 months after diagnosis following what Mrs Briggs calls a "terrible time", involving chemotherapy and progressive breathlessness. The cancer had spread to his pericardium, the sac around our heart, and to his right lung.

7. Before he died, Mr Briggs wrote a statement. He said that he was exposed to asbestos while working for the defendant company. Mr Briggs was a plasterer who was fitting plasterboards to new-build properties (hence the "dry" in drylining as opposed to wet plastering). The plasterboards did not contain asbestos. No one suggests they did. But when it rained, carpenters who were working outside to make roofs watertight would come inside. The carpenters were fitting what are called "soffits", lengths of board that close the gap between the fascia and the house wall or frame.