

Restuccia v. Workers Compensation (Dust Diseases) Board

District Court of New South Wales

Matter No 2172 of 2001

Maria Restuccia v Workers Compensation (Dust Diseases) Board

JUDGMENT

12th August 2005

1. Introduction

Dominic Restuccia (“the deceased”) died on 28th May 1999. The cause of death was found to be lung cancer. The medical certificate identified a metastatic carcinoma of the lung and the medical experts agreed there was a non-small cell, or a large cell carcinoma with features of a poorly differentiated adenocarcinoma.[Exs 36 & 37]

The deceased had been a smoker for many years, though he had, from time to time, attempted to conquer the habit. For the purpose of these applications, it was agreed between the parties that the deceased had smoked one packet of ordinary cigarettes each day, from 1961 to 1996, with many attempts to cease for periods of up to 6 months.

But the deceased had also worked for many years, off and on, irregularly, in the winter months while he was not fishing, in situations where he was exposed irregularly to asbestos products.

A CT scan of 18/3/99 demonstrated “typical fibrous asbestos pleural plaques scattered throughout the pleural cavity on each side”. [Ex V]

There was no evidence of asbestosis or interstitial pulmonary fibrosis – nor of emphysema, or any other relevant abnormality.

The respondent submitted that, given the limited extent of the deceased’s exposure to asbestos, and given his smoking habit, it was almost certain that his death had been the result of the well known carcinogen, tobacco smoke. Common sense, the respondent maintained, would inevitably lead to such a conclusion.

The applicant did not agree. She maintained that it was at least probable that, given the extent of the deceased’s exposure to asbestos, and given the well recognised synergistic action between asbestos inhalation and tobacco smoke, the asbestos exposure had materially contributed to her husband’s death, and therefore was a cause of his death in the legal sense.

2. The Applications

These proceedings were commenced in the Compensation Court of New South Wales by two applications for determination filed on behalf of Maria Restuccia on 26th April 2001. They continued in the District Court of New South Wales pursuant to transitional provisions, after the abolition of the Compensation Court.

Maria Restuccia is the widow of Dominic Restuccia. Both her applications are appeals from the Dust Diseases Board’s refusal of her husband’s claim for benefits under the Workers Compensation (Dust Diseases) Act 1942 (“the Act”).

The first application (matter No. 2172 of 2001) is made by the widow as executrix of the estate of her

late husband, and claims certain medical and other expenses of the estate, as well as weekly payments of compensation from 17th March 1999, when the deceased ceased work, until his death on 28th May 1999 ("the estate claim").

The second application (matter No. 2173 Of 2001) is made by Maria Restuccia in her own capacity, and claims a lump sum death benefit as well as weekly payments as the dependant spouse, from the date of her husband's death ("widow's claim").

Both proceedings are prosecuted by way of appeal and are based on s8 I of the Act.

Some matters are not in dispute. It is conceded, for example, that Maria Restuccia was the dependant spouse of her late husband. It is also agreed that the Court need not bother determining the precise amount of any benefit under the Act. If Mrs Restuccia is to be successful in her claims, the Court need only determine her entitlement to benefits, since the Board will determine later the amounts to be paid.

The estate claim is brought pursuant to s8(1) (a) of the Workers Compensation (Dust Diseases) Act, whereas the widow's claim is based on s8(1) (b). Both subsections are in similar terms so that, for the purpose of my judgment, I will simply recite sub section (b) in respect of the widow's claim.

" (1) Subject to this Act;

(a).....

(b) where the medical authority certifies that a person dies from a dust disease and the person's death was reasonably attributable to the person's exposure to the inhalation of dust in an occupation to the nature of which the disease was due, the dependants of such person shall, if the board finds:

that such person was a worker during the whole of the time the person was engaged in such occupation; or

that such person was a worker during only part of the time the person was engaged in such occupation, and, on the report of the medical authority, further finds that the person's death was reasonably attributable to the persons exposure to the inhalation of dust in such occupation during the time that the board has found that the person was a worker in such occupation,

be entitled to an award from the board, and to receive compensation at prescribed rates from the Fund;"

Both in respect of subsections (a) and (b), the parties have agreed on the following matters –

That lung cancer, being reasonably attributable to exposure in airborne asbestos dust and fibre, is a dust disease within the meaning of those words as defined in s3 of the Act, namely - "asbestos induced carcinoma".

That the deceased was a worker within the meaning of the term "worker" as used in s8(1) (a) and (b) of the Act during the whole of the time he was engaged in his occupations as a painter and docker and as an ironworker.

That the deceased was totally disabled within the meaning of s8(1) (a) of the Act between 17th March and 28th May 1999.

That the deceased died on 28th May 1999 as a result of lung cancer.

That Maria Restuccia was the dependant spouse of the deceased, and his sole dependant.

Though Maria Restuccia did not make a formal claim for compensation to the Board on behalf of the estate or on her own behalf as widow, a claim was made by the deceased immediately before his death and his widow is a person affected by the decision of the medical authority as set out in the two certificates of cause of death dated 7th October 1999 and 28th October 1999, so that the widow has standing to appeal under s8 I of the Act.

In order for Mrs Restuccia to be entitled to benefits as claimed in both claims, she must establish that her husband's disablement and death were "reasonably attributable to the inhalation of dust" in one or both of his occupations, as a painter and docker or as an ironworker.

The test of “reasonable attributability” (or of being “reasonably attributable”) is the same test at law as to causation, and again as to material contribution. Just as ordinary common law principles of causation have been found to apply to the words “resulting from” as used in the Workers Compensation Act 1926 and thereafter, the same common law principles apply to “material contribution” and to “reasonable attributability”.

3. The Question of Causation

The principal issue to be determined therefore is whether, as a matter of common sense, the lung cancer from which the deceased died was reasonably attributable to his exposure to airborne asbestos dust and fibres during his employment as a painter and docker and/or as an ironworker. – Or, whether the asbestos to which the deceased was exposed in his work caused, or materially contributed to, his death.

This simple question launched a protracted enquiry involving many witnesses, both lay and expert, as well as mountain of documents and reports. The inquiry sought to determine –

- (1) the extent of the work undertaken by the deceased as a painter and docker, and as an ironworker.
- (2) The nature of his duties in the various situations where he performed his work.
- (3) The extent of his exposure to asbestos in the different locations – the types of asbestos; the probable proximity of the deceased to the various sources of asbestos dust; the probable concentration of fibres in the air.

Once these difficult factual matters had been marshalled, experts were employed to interpret the data; to calculate fibre counts and adjust these calculations for level of dispersal; to assess a probable measure of fibremil years of exposure; to calculate a relative risk and to adjust calculations, taking account of the synergistic relationship of cigarette smoking and asbestos inhalation.

This was a highly complex exercise, made exceedingly difficult by the fact that the experts differed widely as to their calculations, and more fundamentally, because the worker is deceased and his potential exposure bridged a period of thirty years.

4. Work History 1960-1990

The first task which confronted the applicant was to provide a cogent and convincing history of her husband’s working life from about 1960, until he ceased work in October 1989 and retired in April 1990. She and her daughter, Angela (who was born in July 1963, and therefore could not provide evidence of her father’s working conditions at least for the 1960’s), both searched their memories for details of the deceased’s employment as a painter and docker, principally at Cockatoo Island, and as ironworker, mainly at a number of Sydney oil refineries.

The deceased and his wife Maria met in March 1961 and were married in September the same year. Angela and her mother, as far as they could, provided generalised, fuzzy evidence as to the extent of the deceased’s work pattern and the locations of his work. Indeed they painted a somewhat blurry picture, though it contained such details as the state of the deceased’s overalls and working clothes, the dusty colouration of his hair, providing some basis for a general inference as to the extent of asbestos exposure.

Maria Restuccia appeared to me to be a gentle, quiet, unsophisticated style of woman. She was able to provide only limited and impressionistic evidence in support of her claims. She seemed reluctant to make admissions against her interest, even in the face of records, though her reluctance in the end, as we shall see, proved to be well-founded. She appeared unable to grasp the significance of documents presented to her and became lost in the presence of paper. In her evidence, she tended to globalise rather than provide details, and to exaggerate the employment periods during which her husband was possibly exposed to asbestos. Her memory was understandably unreliable, and her evidence oblique, though she contributed to the complex mosaic of lay evidence. She said that from the time of her marriage, the deceased had given her housekeeping money in cash, each week, even

during winter when he was not fishing. While some days her husband had come home earlier because he had no work, this had not happened often. They had three children and she herself did not work outside the home. The mortgage on their Leichardt home was paid regularly from before September 1961. Her husband's working clothes and shoes were often covered in white, sometimes also black, "stuff" or dust.

Angela Restuccia was more persuasive, though again she was able to provide only a somewhat minor part of the mosaic. She provided good, general, overall evidence of her father's work patterns, and of his physical appearance on his return from work. As I have observed, because of her age, she was unable to speak of his early employment. She told of the dust on her father's shoes, on his hair, on his ears when he returned from work, and of the dusty, filthy duffle bag he would bring home from work from about 1977. Her job, when she was fourteen or fifteen, was to remove her father's things from his work bag and to shake them out into the grass in the backyard. She told of the disgusting condition of this bag.

(a) The Other Lay Evidence

A number of other lay witnesses were able to give some helpful evidence as to the deceased's employment and the conditions of work at Cockatoo Island; others at various dockyards in Sydney; and finally, others as to working as an ironworker at refinery sites in Sydney.

Dominic Losurdo was a brother-in-law of the deceased. He worked with him both in the fishing industry for a few years and as a painter and docker on naval and commercial vessels, as well as on shut-downs of refineries with World Services. They lived close to one another in Sydney and were good mates. These two worked together at Cockatoo Island for a period in the 1960's (probably from 1960 or 1961 until 1966), and for a further period of about 10 years from June 1976 to February 1986 (Exs 10, 1 and 2).

While Dominic Losurdo appeared anxious to support the applicant, he nevertheless provided persuasive evidence. He was understandably vague on detail (I would have been suspicious of excessively detailed recollection of events and conditions as far back as the early 1960's), but he was strong on the substance of his evidence. He appeared to me to be a serious and careful witness, somewhat anxious, and uncommonly attentive. He was a workman of vast experience; a simple, uncomplicated person without formal training or education, and well positioned to provide supportive evidence of the applicant's claim.

According to Mr Losurdo, his friend, the deceased, had worked mostly inside ships and submarines and was sometimes exposed to asbestos dust in closed spaces. He had worked casually as a painter and docker, performing a number of different tasks.

Santo Losurdo was another friend of the deceased who worked with him in the fishing industry, and as a painter and docker from about the middle of 1962 until the middle of 1968, from 1969 to 1973 and again from 1988 to 1990.

Santo Losurdo appeared to possess an uncommonly accurate memory, especially for someone without formal education. He demonstrated a level of compulsion to be accurate, and a tendency to interpret questions literally. He seemed able to admit where his memory failed, or where he was unable to answer some questions, but when he answered questions, he showed an extraordinary recollection after such a long time. While there seemed to be a serious contradiction between his evidence as to, on the one hand, the deceased's attendance at work and his exposure to asbestos, and on the other, the deceased's tax returns based on records from Cockatoo Island, the documentation available to the parties in the end proved seriously inadequate and certainly not able to present an accurate picture of employment.

Santo Losurdo gave evidence that he had worked with Dominic Restuccia in winter time, and that he had been exposed to asbestos in various forms on various ships and in different circumstances.

John Panuccio had been a member of the Painter and Dockers Union from 1972 until 1990. He had

also been a union representative from 1978. He was therefore able to give some relevant information both as to the employment of the deceased, and as to the working conditions at Cockatoo Island. He said that in 1974 he "could have" worked on the Ocean Monarch for seven days with the deceased, who "could have" been cleaning or lagging in the boiler room. He had been on the Supply on 27th July 1997 - the day on which Mr Panuccio's father had died. Panuccio said that on that occasion the asbestos had been all over the ship. There were ropes, pieces of asbestos and powder which had to be cleared up and removed. Restuccia had been "constantly clearing up". There had been a lot of stuff floating around and the air had been pretty miserable. Mr Panuccio said that on the Supply, asbestos had been mixed by the contractors, not the painters and dockers who were sometimes not present when the delagging had been carried out. When they were present, they could be only three or five meters away from the delagging. Together, they had been exposed to asbestos over the years.

Robert Galleghan (Ex 11) worked initially as a member of the Painter and Dockers Union from November 1956 to 1964, and again from 1966 to about December 1972 or 73. Thereafter he became a full time union official and eventually secretary of the union. He knew the deceased and was able to provide some rather imprecise information as to his employment, and particularly as to the conditions of work at Cockatoo Island. He spoke of exposure to white and blue asbestos, to exposure on the Melbourne and on the Empress of Australia. He said he knew the deceased and had seen him at work up until 1989.

Mr Galleghan was somewhat of a laconic, taciturn witness, cool and easy-going in the witness box. He seemed to me to be a good, vigorous, committed, sometimes aggressive, union representative. He left little doubt that he wanted to give full blooded support to the application of the deceased's widow.

Peter Connellan is deceased. Exhibit J is a transcript of the evidence which he gave before me in Helen Portelli v Workers Compensation (Dust Diseases) Board on 16 January 1999; and Exhibit 42/J is a statement he prepared. It is dated 10th February 1999. Mr Connellan was not a member of the Painter and Dockers Union but worked as a foreman/fitter at Cockatoo Island from about July 1966 to July 1988. John Portelli was also a fitter and turner. Mr Connellan, however, was able to provide some evidence as to the working conditions on board naval vessels, and particularly the exposure of workmen to asbestos dust.

In the main engine and boiler rooms "all exposed surfaces were covered with asbestos or heat resistant material". A fitter (like Portelli) "would use a big hammer to bang away all of the asbestos insulation to remove a part" The iron worker would assist by removing and cleaning up asbestos insulation".

"While this work was carrying on it looked like there was a snow storm. This is because the areas that the fitter used to work in was very confined. It had no artificial ventilation and as the ship contained closed water tight doors the only ventilation that was available in the engine rooms was natural ventilation.

The exposure to asbestos onboard naval surface ships while refit work was being carried out was daily.

Fitters were provided with blue overalls. They looked like a white man at the end of the day. They were covered in dust. Everybody was covered in dust."

"At the end of a days work different parts of the naval ship we would be working on and particularly the boiler room would be full of asbestos dust. I being a foreman would make sure that the mess was swept up at the end of the day. The iron workers would sweep up the asbestos lagging material on the floor of the ships. The sweeping created a lot of dust. In some areas there were a couple of inches thick of asbestos dust and material on the floor. If you walked through these areas it was like mud on your boots. You had to shake yourself before you got off the ship given that there was so much dust over your body. You would get dust in your ears, face and up your nose. The asbestos dust was like talcum powder which floated in the air for some time. You could see it in the sunlight. If you had a bit of a draft in the area you were

working in it would keep the dust in the air and you would breath the dust in. it was one big cloud of dust. It was very dusty work.”[Ex 42/J]

The method of handling asbestos, according to Mr Connellan, changed radically in the 1980’s.

“Q I think towards the end of the eighties there was a different sort of mask.
A Yes I suddenly – suddenly the complete method of handling asbestos was all completely changed, it suddenly became from what you throw around at one another to don’t touch, it will kill you.” [Ex J p. 123.].

However, the substance of the observations which he made in his statement was simply repeated in his sworn evidence.

Patrick Johnston worked as a shipwright at Cockatoo Island from 1962 to 1978, and was a full time union official in 1978. He knew the deceased and saw him at work. He spoke of conditions of work on the Empress of Australia, for example, and on the Supply, especially in 1977. Mr Johnston appeared to me to be very knowledgeable, and to possess a good memory. He did not appear to be constructing his evidence, simply recording his memories.

Mr Johnston said the delagging was the worst aspect of the work of painters and dockers, considerably worse than lagging. He said it was not unusual for delaggers to have asbestos all over them – on their berets, on their overalls. Delagging and lagging were part and parcel of refitting vessels. It was normal procedure. Painters and dockers, according to him, were involved. Asbestos was a normal facet of ship repair. Any sort of repair work, using hammers, or electric power guns, hand saws, always seemed to stir up the asbestos, a residue of which was everywhere inside the ship. He made reference to a “snow storm” which occurred when a worker was cutting asbestos blocks with a grinder or power saw.

Then the applicant called evidence as to the deceased’s employment by, and exposure to asbestos, with Middlemass and other companies, again as a member of the Painter and Dockers Union. He regularly performed sweeping and cleaning work, duties of a dirtier nature than the work he generally carried out at Cockatoo Island.

Victor Maxwell Osborne had been employed by Middlemass from about 1969 to 1972 or 73. He remembered working with Dominic Restuccia. They worked together as workmates for three or four years, in about 1969. Mr Osborne had been employed as a charge hand. While his memory seemed poor and rather vague, he was able to say that he had worked with the deceased in winter-time, that they had worked on different jobs on various ships, including cleaning up asbestos. The cleaners used to work quite close to ladders, within 20 or 10 feet, and at times Dominic’s clothes had been covered in asbestos. He also said that the air was at times heavy.

The deceased had also worked for extended periods, on a number of occasions, as an ironworker at refinery sites in various parts of Sydney. These periods can be identified from documentary evidence, especially tax returns and group certificates (Ex 4), and a number of witnesses were called to provide some impressions and imprecise details as to the condition of work on these sites.

Wesley T. Dunn, for example, had been a boilermaker who worked on many industrial sites in Sydney from 1966 until about the mid 1980’s. He worked at Shell and Caltex, at ICI and other places. While he had not known Dominic Restuccia, he was able to say that asbestos had been used extensively on these sites, and in various forms. He spoke of asbestos work being done in the open, sometimes in windy conditions. I formed the impression that Mr Dunn possessed a good memory, that he was careful and attentive, and that he was not tending to exaggerate or embellish his evidence.

Nicola de Gennaro also worked for World Services between 1977 and 1989, as an ironworker. He had worked at Shell, Caltex and ICI, as an assistant to tradesmen on shut-down work and he had known Dominic Restuccia. He remembered working on the same site as the deceased, though they had not worked together. He said that the deceased had not been involved with removal of asbestos or its replacement, but that he had been in areas while such work was going on. While he was unable

to give any precise evidence as to the day-to-day duties for any one individual, Mr Gennaro provided a general picture of duties, periods of work, and especially an account of probable exposure to asbestos. He too tended to interpret questions literally and, given the passage of time, he seemed to have a good, reliable memory.

To provide some balance to the cumulative evidence of the applicant's lay witnesses, the respondent called Jim Morton who had been employed on Cockatoo Island from January 1952 to 1991, and his grandfather before him, from 1912 to 1974. Even to this day, he continues to have charge of the archive records. He has had a lifetime of association with Cockatoo Island, and therefore was in an excellent position to give details as to the yellow card system on the island, for example, and the business records of the company kept by himself.

Mr Morton gave a detailed description of docking work, for example, of construction of ships such as the Torrens and the Stalwart, especially the process of lagging and delagging, and of refits of various vessels. He had begun his career as an apprentice fitter and turner in 1952, and ended it in 1991 as the production manager where he had been since 1978.

Mr Morton has been a regular witness called to provide evidence of exposure to asbestos on workmen at Cockatoo Island. Exhibit L is an affidavit sworn by him and originally read in the proceedings commenced by David Browne. Paragraphs 41 to 54, which deal with asbestos use at the dockyard, were also read in these proceedings and provide a good overview of the use of asbestos product and the exposure of workers.

“ 43. Pipework lagging insulation was the main source of asbestos dust and airborne particles on Navy vessels because:

- (a) most of the Navy's ships were entirely steam-powered and consequently there were large numbers of pipes requiring insulation in virtually all parts of such vessels;
- (b) the areas where the work had to be performed were very small and constricted; and
- (c) the practice on Naval vessels was to remove much more lagging than would be removed in working on commercial vessels.”

Exhibit M and 18 is a statement in answer to interrogatories verified by Mr Morton on 23 February 2003 and originally tendered in the claim of David Lake. It consists of over 70 pages of questions and verified answers, and again presents details of use of asbestos on board naval vessels as well as exposure of fitters to asbestos products. Step by small step the questioner sought information as to what ships were built or refitted; when; the nature of the work carried out for each vessel; on what vessels asbestos was used (4B (c)); who did the cleaning-up work (6B (c)) (namely the painters and dockers); the removal of asbestos insulation, and from where; how insulation work was done, and by whom; how asbestos dust and fibre were given off during the various procedures [31B, 33B, 35B]

The defendant “did permit some but not all fitters to work in the vicinity of Painter and Dockers cleaning up workplaces and structures such as scaffolding contaminated with debris from asbestos insulation” [15B (e)].

Much of the information provided related especially to the period up to 1973, though *mutatis mutandis*, the work situation continued thereafter in a similar way, but with some effort to implement some safety measures.

Mr Morton was extremely knowledgeable, with an exceptional, truly amazing memory. He seemed to inspire confidence in the accuracy and truthfulness of his evidence. He showed a marked anxiety to be accurate and this generated a confidence that his evidence was trustworthy. It was suggested to him that he was attempting to minimise the exposure of workers on Cockatoo Island to the damaging effects of asbestos. While he showed a loyalty over many years to his employer, and a dedication to preserve its reputation, I do not believe he was constructing his evidence, or deliberately loading it in favour of his employer. There was no doubt, after he had given his evidence over many days, that asbestos had been used throughout naval vessels and on other ships, especially in steam ships and especially in engine and boiler rooms, and elsewhere. Workers had been exposed to asbestos dust

during construction and refitting of vessels, mainly at certain periods of the work cycle, some workers more than others, and for limited periods during which work with asbestos was being carried out. Exhibits L, M and 18 were of great assistance.

(b) The Limited Documentary Evidence

In addition to the lay evidence as to the extent of the deceased's work over the years, there was a number of documents which, while creating some problems in themselves, were of assistance in developing more idea as to the probable days, months and years worked by the deceased, both as a painter and docker and as a ironworker.

Exhibit 4 is a series of tax returns and group certificates relating to the period from July 1969 to June 1984. The documents for the year ending 1981 were missing. These records provide basic information in themselves, and were further used, rather creatively, by Ms Bateman, a chartered accountant, together with award decisions of the Industrial Commission and what she would regard as reasonable inferences, to calculate days of employment between 1960 and about the end of 1982. [Ex BB – FF]

Exhibits 8 and 13 are a series of history cards which record employment of the deceased at Cockatoo Island. These cards show, for example, employment for 8 days in March 1966; 28 days in March/April 1968; 11 days in July 1972; four months from May to August 1974; six days in September 1974; six months from May to October 1977; five days in May 1982; one day in June 1982; 38 days from June to July 1982; and permanent employment from March 1983 until retirement in April 1990. One might think these cards would constitute the best evidence of the deceased's employment. However, it is clear from a superficial examination of the tax returns (Ex 4) that these attendance cards do not in any way constitute an accurate history of his employment. The deceased clearly worked for more extended periods than those reflected in these cards. That is not to say that they were not valuable for another reason to which I will come shortly.

Exhibit 3 includes a claim of the deceased for work-induced deafness which records that from 22nd March 1983 until 14th April 1986 (when the claim is made), the deceased had been "intermittently" working on Cockatoo Island.

The applicant claims that for a period [identified as period 29 – 4th March 1983 to 2nd April 1990] the deceased was employed as a painter and docker on a permanent basis, with some periods away from work on sick leave or compensation. She alleges that in total her husband worked 5.7 years in a 7 year period; that he last worked on 25th October 1989; and that he had not worked between 26th October 1989 and 2nd April 1990 when he had been made redundant with other workers. She calculates a period of 1,368 days being 5.7 years multiplied by 48 working weeks per year. This claim can hardly stand shoulder to shoulder with the statement of the deceased that between March 1983 and April 1986, he worked "intermittently", - whatever "intermittently" may mean.

Exhibit 5, the deceased's claim for disablement, states that he had been working as a painter and docker when last exposed to asbestos, and that his then "present occupation" was as a commercial fisherman retired. In the claim form, the deceased provided an employment history- working as a fisherman from 1951 to 1999, and as a painter and docker from 1981 to 1989. The form was completed some short time before his death on the 24th May 1999. This history is clearly not accurate, which perhaps can be explained by the fact that it was provided so shortly before his death. The history cannot stand with the days of work identified in Exhibits 8 and 13, or with the tax returns and group certificates contained in Exhibit 4.

In Exhibit HH, dated 17 July 1999, a member of the Dust Diseases Board recorded an industrial history in respect to the deceased. It is the same history as contained in Exhibit 5 and therefore subject to the same comments and qualifications.

(c) The Schedules

The parties made a series of valiant efforts to calculate the days worked by the deceased over the

years of his employment. Because of the paucity of documentation and its conflicting content, this was a difficult task. However, both parties went about the exercise with great fervour, using all available information, including the lay evidence and the available documentary evidence.

Exhibit 26, for example, was a document prepared by the respondent, setting out in great detail the evidence, references and inferences, in an attempt to identify where the deceased had worked; what duties he had performed at various work stations; what hours he had worked; how many hours were spent in work related to asbestos dust and fibre and various other matters relating to asbestos products and exposure.

From Exhibit R/1 (a report of Dr Eva Francis dated 22nd May 2004), it is clear from the first paragraph that Turner Freeman, solicitors, had prepared a detailed chronology in a letter to Dr Francis dated 26 April 2004. This chronology (further revised) was set out in paragraph 2, identifying 29 (in fact 30) periods of employment. This document entitled "Applicant's Chronology" then formed the basis of further revisions, assumptions, inferences and details. Exhibit R/3, for example, contains a further revised working in respect of each one of the 30 periods, indentifying the periods, the original assumptions, the evidentiary material, and the revised assumptions based on the unfolding of the evidence.

Then the extensive written submissions of the applicant (in annexure 1) presents a complicated schedule attempting to identify the number of standard working days in each of the 30 periods. The schedule contains four columns – the first identifying the period and description of the work performed during the period; the second setting out the applicant's submissions with references to transcript and documents; the third column contains the respondent's calculations of working days based on the assumptions given to the respondent's experts; and the fourth column providing reasons as to why the applicant's submissions should be preferred to the respondent's.

Annexure 2A of the applicant's written submissions provides a schedule of standard working days extracted from annexure 1.

These schedules are witness in themselves to a vast amount of work in an attempt to assist the Court. I found them and their systematic presentation of some limited assistance.

I agree with the respondent's submissions (paragraph 16) that as the mathematics proceeded (and as the months of the hearing unfolded) "the "artificiality of the exercise" conducted by the applicant in Ex R (and I should add – also by the respondent) became apparent.

For example, while the applicant alleged that for the period 1960-1966 (period 1), the deceased worked approximately 666 days, this figure was reduced by the respondent to a maximum of 50–60 days (Submissions para 79). Furthermore, for the periods 2,4,11,14,16, 25,26 & 27, and based on Exhibits 3 and 8, a series of discreet periods of working days over 17 years, from March 1966 to July 1982 (a period of approximately 6,000 days), added up to working days of 165 days.

The respondent, in its cross-examination and submissions, examined each period of work as alleged by the applicant and analysed the claim almost out of existence. It concluded that the number of alleged working days was "mysterious" (para 144 and 195), "pure speculation" (para 146 and 196), "illogical" (para 149), and concluded that it was unsafe to assume work where no records existed (para 153). Consequently, it would seem that the respondent sought to submit that the deceased, though a painter and docker and ironworker for a long period of time, did not work very much at all. Quoting Kirby J in Ahmedi-v Ahmedi (1981) 23 NSWLR 288&292, the respondent submitted that logic and likelihood were a far safer guide than the appearance of a witness in a witness box, to the process of analysis and fact finding (para 131).

As to periods the deceased worked at Cockatoo Island, the respondent submitted that the records speak for themselves – that there was a convergence between the history cards, the docking records, the appendices in Jeremy's book, the group certificates and the processes of shift work as described by Professor Morton (para 130). This convergence was not at all obvious.

The history cards were not accurate, and did not reflect the information contained in the deceased's tax returns. There were no tax returns available for the early periods in the 1960's. The thirty-year period the court was examining began in 1960 and concluded more than 10 years ago, for the whole of which period there did not seem to be any adequate records. Even though the work at Cockatoo Island had been somewhat irregular, as appeared from the evidence of Dominic Losurdo, I consider the following observations obvious and quite compelling. The deceased was a painter and docker throughout the whole period, and worked as such during the winter months. He was also an ironworker for a number of years, and worked at that occupation. He was not an alcoholic; not disabled; and he seemed to have been willing to work. There is no evidence that he worked elsewhere, or in any other occupation. He had a family to support, and his wife had the impression that her husband had been almost daily engaged at his job. These general observations add weight to the respondent's submission that the mathematical exercise had an air of artificiality.

In the end, I concluded that the schedules were too mathematical, too calculated and artificial to be followed. There were far too many variables and imponderables – too many gaps to be confident that the calculations in the schedules demonstrated a true picture of the deceased's employment. They were in themselves a convincing argument as to why such an approach was not feasible.

(d) Some Conclusions as to Employment

Consequently, on the basis of all the evidence and calculations, conflicting and inadequate as they were, I believe a more realistic picture can be presented in these broad conclusions.

(1) The deceased was employed as a commercial fisherman during the summer months, and consequently was available for other work only in the winter-time. The year was divided for him conveniently into approximately six months fishing, and six months other work.

(2) The deceased worked as a painter and docker from about 1960 until about late October 1989.

(3) There is no record of his employment from 1960 until December 1965.

(4) He was employed "intermittently" for the three years from March 1983 until April 1986, as a casual painter and docker.

(5) During the winter-months, the deceased used to work as a painter and docker on Cockatoo Island, for Middlemass and similar companies, and on about four occasions for extended periods (weeks, months) for World Constructions.

(6) Exhibit 3 provides a window into the various jobs which the deceased performed, at least from 1983 to 1987. In June 1983 he was shot blasting; and again in June 1985, when he was off work till October 1985; in May 1984, he was painting the ship; in July 1984, scraping the side of a ship; and in August 1984, painting the deck head; in April 1987, he injured his back when entering a fresh water tank through the manhole. He performed general duties.

(7) The deceased worked on a casual basis as a painter and docker until March 1983 and, as Dominic Losurdo observed, sometimes a week or two would pass without him being picked up for work.

(8) The deceased performed general labouring works in a variety of jobs which were often dirty, such as cleaning out the bilge tanks, and sometimes dusty. He did docking, cleaning and scraping paint particles from the hull; shot blasting with water or sand and especially cleaning up afterwards; painting; cleaning and removing rubbish; cleaning and rotating anchor cables and general sweeping. It would seem that the deceased did not build or dismantle scaffolding as this job was reserved for those who had special skills as a painter and docker.

(9) The deceased was sometimes exposed to heavy concentration of asbestos dust, sometime to light concentration and sometimes to none. Exposure was not constant, or even regular.

(10) The deceased worked at Cockatoo Island on naval vessels and merchant vessels. He also worked on submarines. He was employed, doing particularly dirty work, as a painter and docker by Middlemass (for example, for the periods from July 1969 to June 1970, from July 1970 to 26 November 1971). These periods are set out in column 1 of annexure 1 to the applicant's written submissions. He also worked as an ironworker and general labourer for World Services Construction Pty Ltd in May to October 1979, 1980, 1981, 1982.

(11) When he was working, whether on naval vessels or in refineries, he was regularly surrounded by groups of other workers and tradesmen performing a multiplicity of tasks, including working with asbestos.

(e) Conclusion

In the light of the conglomeration of the evidence, in view of the length of time of employment, the spread of tasks, the fading of memories, the tendency to exaggerate, the patchiness of the documentation, I have concluded that the most realistic approach to the task of assessing the probable extent of the deceased's employment as a painter and docker and as an ironworker, is to consider all the evidence, and then to make a general, safe, conservative assessment as to the probable extent of the deceased's employment.

The applicant's legal advisers have calculated a work period of approximately 13.7 years. For the purpose of his calculations, Mr Rogers relied on a work history of approximately 14.35 years, which is the sum total of 8.25 years or 7.45 years for the period 1960 – August 1978; 14 weeks or .27 years with World Services from May 1978 to October 1981; and 5.83 years for the period March 1983 to April 1990. [cf. Ex 32]. Mr Pickford, on the other hand, based his calculations on 7.46 years, being 1.2 years as a casual painter and docker from 4 March 1966 to July 1982; 5.7 years as a permanent employee from March 1983 to April 1990; and .56 years with World Services [cf. Ex 34].

The deceased's relevant working life began in about 1960 and concluded in October 1989, - a period of approximately 30 years. Since he worked half the year as a painter and docker as well as sometimes an ironworker, the possible overall period of employment in such occupations would have been 15 years. For some period he worked as a casual employee and not always on a completely regular basis, though he was clearly a good worker and provided for his family. While not picked up for work every single available day, his pattern of employment was not noticeably patchy.

I consider it more than safe, in the circumstances, to estimate that over the 15 years, the deceased would have been employed for at least 10 years.

Bearing in mind the variety of duties performed by the deceased as a painter and docker and as an ironworker, and considering the variety of circumstances in which he worked, and the extent of asbestos lagging on ships and on refinery sites, I believe it is safe to estimate that for at least half of his working years the deceased would have been exposed to some level of asbestos dust in his working places – this is, for approximately 5 years of his working life. That level would have varied from heavy to light, but was generally moderate.

5. Assessing Exposure to Asbestos

However difficult it is to estimate years of work in industries where Dominic Restuccia would have been exposed to asbestos, it is even more difficult to assess a probable level of exposure over a reasonable period. Such an assessment demands a balancing of two general variables (namely time of exposure and level of exposure), as well as an assessment of an almost infinite series of workplace variables.

The material which forms a basis for such an assessment of exposure is threefold – the lay evidence; the documentary evidence; and scholarly published articles. It is with these three categories of information that a number of occupational hygienists were invited to grapple in order to arrive at an assessment of asbestos exposure in terms of f/ml yrs.

One f/ml year is equivalent to an exposure to one fibre per millimetre of asbestos for eight hours each day, five working days each week, over a period of a year, or over 240 days each year.

(a) The Lay Evidence

Some witnesses described the working conditions on board ship in rather graphic detail. They spoke of clouds of asbestos dust hovering in the air while special asbestos workers were lagging, and particularly while they were delagging. There were lagged pipes and equipment throughout each vessel, in the boiler and engine rooms – and of course, delagging. I have earlier reviewed this evidence at more length under the heading 4Work History 1960-1990.

(b) The Documents

Both parties tendered large files of documents in support of either heavy, dramatic exposure, or light, minimal, almost negligible levels of exposure. (Exhibits M. P. Q. S/1-2. 18.19.)

(c) The Occupational Hygienists

The lay evidence and the available documentary information were provided to four occupational hygienists who, assisted by international scholarly published articles, attempted to absorb a mountain of complex and often conflicting information and a series of almost limitless variables in order to estimate probable exposure in f/ml yrs. The resulting estimates varied between 190 f/ml yrs (Francis - October 2003) and .5 f/ml yrs (Pickford).

The field of occupational hygienists, if it be a science at all, is obviously a very imprecise one. It seems to me that these experts experience some difficulty presenting their figures as anything more than a wild guess. If one is to accept their work, it can only be as a very blunt instrument, a ball-park type exercise based on assumptions provided by lay people, estimates or guesstimates, scientific literature, experience, and a considerable degree of art rather than science. The dramatic difference in estimates in this case can be explained by a number of factors, including hundreds of possible sources of exposure, many estimates of concentration of asbestos dust, different circumstances such as direct exposure or bystander exposure, levels of dispersal, the accuracy of different measuring devices, allowances made for ventilation and wind flow, and more basically, ideological choice as to what to accept, what to reject, where to position the average, where to place the emphasis.

In his report dated 21st April 2002, Associate Professor David Bryant describes the path through which a qualified occupational hygienist travels to make an assessment of asbestos fibre exposure as “often a relatively inaccurate process”.

“Having received many such reports while on the Medical Authority of the Dust Diseases Board, it is my observation that estimates of probable asbestos exposure, based on an identical work history, commonly vary between different occupational hygienists by factors of 100 fold or more. It is my further observation that some occupational hygienists typically always estimate high levels of asbestos exposure whereas other typically estimate extremely low levels of exposure, all having been provided with an identical work history. It is my further observation that these differences arise partly as the result of different reference data used to predict probable asbestos exposure during asbestos related activities and partly to different assumptions made regarding likely work practices.” [Ex 35]

After hearing the various experts, these observations ring true.

The applicant’s occupational hygiene evidence was presented by Gordon Stewart and Eva Francis, the respondent’s was prepared by Alan Rogers and Geoffrey Pickford.

(i) Gordon Stewart

Gordon Stewart produced several reports - 17th October 2001, 3rd June 2004 and 6th and 7th June 2004. They are Exhibits Y/1-4 and Exhibit 31/4-5. Between October 2001 and June 2004, Mr Stewart refined the assumptions and information to be used to assess the occupational exposure of the deceased. In October 2001, he assessed 40-80 f/ml yrs; in October 2003, 95.7 – 190.6 f/ml yrs; and finally in June 2004 93 f/ml yrs. In October 2001 he relied on figures produced by Balzar and Cooper (Ex T/1), whereas later, in October 2004, his reliance fell on the figures as recorded in Harries articles (Ex R/10,11,13). While his reasons for his reliance finally on the Harries figures were explained, it seemed to me that he should have consulted far more widely in the scholarly literature.

Gordon Stewart is an industrial chemist by training and profession. Over the years he developed a speciality in ventilation and air conditioning. He conceded that he had quite limited expertise in the area under examination, and very limited experience in the area of asbestos. Throughout his professional life, he has been involved in scientific work involving, inter alia, dust, gasses, asbestos, and has been responsible for the testing, inspection and analysis by other scientists. However, his experience in sampling, testing, analysis, inspecting factories, power stations etc was limited, and his experience with naval vessels, negligible. He has published no articles dealing with asbestos; he has not served on any government or industry bodies in relation to asbestos; his expertise and experience is now somewhat out of date and he has demonstrated little attempt to keep on top of the area in question. In his defence, I should add that he is an elderly man, long retired. Since he seemed to me to be significantly out of date, I cannot confidently rely on his opinion and assessment. I consider it was unsafe for him to rely simply on the figures of the Harries article to make his assessment of such a variety of circumstances, especially since the Harries readings were not recordings from the circumstances as related to Restuccia.

When he was confronted in cross-examination as to the dramatic difference between his assessments and those of Dr Eva Francis, he was unable to provide any satisfactory explanation. However, when confronted with the variations even in his own reports, he observed that he was continually rethinking his old assumption; he had been reading the transcript, he was founding his opinion on new and revised assumptions; and finally he had moved from the figures in Balzar's report to the Harries article.

I found Mr Stewart's assessments unconvincing.

(ii) Dr Eva Francis

Dr Francis's reports are Exhibit R, 22,23,24, Exhibit 28/1-2 and Exhibit W/1-2. She was cross-examined extensively over a number of days. In the end, I concluded that her assessments of exposure were seriously compromised, especially by the cross-examination on the basis of Exhibit 28 when she was confronted by the tests she had conducted over almost 20 years, from 1971 to the 1980's. In some of the documents recording her tests, with similar duties as the deceased carried out, generally similar activities and environment, there did not seem to be any support for readings such as 50 f/ml, 20 f/ml or 15 f/ml, which were the readings she used in paragraphs 5.1.1, 5.1.2, and 5.3 of her report. These seemed to be assessments of exposure based on her experience, or plucked out of the air. They did not appear to me to be figures which I could confidently accept, knowing the basis on which they were arrived at.

Furthermore, Dr Francis seemed artificially to allot tasks and days to exposure, and artificially calculate the extent of such exposure. During her cross-examination, I was constantly attempting to determine whether the extent of exposure assessments she made was reasonable in the light of other assessments in similar and dissimilar circumstances. I did not consider that her allotment of tasks or her calculations of days of exposure as against non exposure reflected the general thrust of the lay evidence.

In the final analysis, I concluded that Dr Francis appeared too ready to defend the applicant's position and to argue her case.

Her assessment in Exhibit R/1 dated 22nd May 2004 was 47.1 f/ml yrs; in Exhibit 22 dated 2nd May

2002, the assessment was 139.5 f/ml yrs and in the report of 10 September 2003 (Ex 23), her assessment was 52.7 f/ml yrs.

(iii) The reports and evidence of Alan Rogers and Geoffrey Pickford

While I found the occupational hygienists called on behalf of the respondent to be careful and well informed, their expert assessments were in considerably marked contrast to those of the applicant.

In Exhibit 32, Alan Rogers' of 8th August 2002 assessed .27 f/ml yrs and in his later report of 4th May 2004, 1.2 f/ml yrs.

Mr Pickford (Ex 34) in his report of 9th August 2002, assessed .5 f/ml yrs, and later, on 24th May 2004, increased his assessment by .06 - .56 f/ml yrs.

However, in the light of the scholarly articles published, and particularly the work of Balzar and Cooper, I am not at all confident that the general assessments of either Rogers or Pickford were near the mark. Pickford, for example, has chosen not to estimate any exposure for the period 1960-1965 (period 1); for the work periods until June 1967; from 1st July 1967 to 18th April 1974; from 12th September 1974 to 1st July 1976 - in fact for periods 1, 2, 2A, 3, 5-13, 15-19, 21, 25-27, nil exposure. This hardly seems credible. Furthermore, for the periods in which he did make some calculation, he used low exposure rates.

Mr Rogers, on the other hand, made an assessment for all the relevant periods as identified in the applicant's revised schedule which sets out, in Exhibit R3, various periods of work in order to assess the number of standard working days over the deceased's lifetime. However, his assessment of exposure at .06 f/ml [which was used as a standard figure throughout the calculations of exposure as a painter and docker], and at .6 f/ml [when the deceased was working as an ironworker with World Services Construction Pty Ltd], in the circumstances, seemed to be excessively reduced.

I concluded that allowance should be made for the variation of exposure in a multiplicity of tasks and circumstances, so that a better guide to exposure can be drawn from the published literature.

(d) The Scholarly Literature

The deceased's activities each day and throughout the years of his employment were extremely variable, and the circumstances in which he worked in and around asbestos were also variable. There were several and often many men working in one confined space; the size of the space varied; as did the ventilation; the periods of work; whether he was working inside or outside ships or tanks; how close he was working to ladders and deladders; whether the asbestos dust was dispersed and to what extent; and whether it had gradually accumulated over 8 hours of work created by the deceased in his own work, and by others in his environment. Consequently, estimates of exposure were extremely problematic since they needed to allow for almost infinite variables. Apart from a simulation test carried out by Jones on the 22nd September 1971 (Ex 6), a test taken in artificial circumstances which did not allow for the wide variation of exposure, no readings of exposure where the deceased was working were ever taken. All the experts, and the Court therefore, must depend to some extent on readings and estimates from other studies and samplings in situations similar to the deceased's duties, such as, for example, the readings in Balzar and Cooper, or alternatively in the Harries articles.

The work of an insulator is described in some detail in the article of G.L. Leathart and J.T. Sanderson "Some Observations of Asbestosis" (Ex T/4) . The authors used thermal precipitated samples of dust counts during installation of a new heating system in a local hospital. Often the work had to be done in confined spaces, similar to work performed between bulk heads in a ship or in long ducts beneath the floor of a factory. A certain amount of asbestos dust was seen to settle on the workmen's hair and overalls. The authors observed that at times the dust count rose above 177 particles per cubic centimetre during the mixing process, but that this was only a localised dust cloud.

“It can also be seen that a small portion of the asbestos dust floated in the air for a long time and travelled quite a distance. During the sweeping up of stripped lagging in the duct.....there was little asbestos dust in the air. Counts of between 2 and 23 particles per centimetre cubed were recorded. Visual inspection of other aspects of the lagger's work suggested that high counts were not likely to be obtained in any other process.”

The authors stressed that their observations were not extensive and were limited to one particular building. While they observed that the dust counts they obtained suggested that prolonged exposure to high concentration was not occurring, nevertheless asbestosis was occurring among men in similar work.

“ It is possible that conditions (especially ventilation) are worse on board ship (where much more asbestos cloth is used, and is torn into strips by hand) or in other buildings.”

In Spring 1975, Irving J Selikoff published an article entitled “The Asbestos Exposure of Insulation Workmen” (Ex T/2) in which he referred to the first research which quantified asbestos insulation exposures using membrane filter techniques. This testing had been carried out by Balzar and Cooper. Using the information provided on dust concentrations and percentage of time a worker was engaged in a particular practice, a time weighted average of 2.7 f/ml was calculated for exposures during asbestos insulation work in light and heavy destruction, and 6.6 f/ml in marine construction and repair. Selikoff observes that environmental evaluation of insulation work by the Mt Sinai School of Medicine (under the auspices of the Insulation Industry Hygiene Research Program) revealed asbestos air concentrations somewhat higher than those measured by Balzar and Cooper. The information on measured asbestos air concentrations obtained during commercial and industrial construction concluded the estimated time weighted average exposure of approximately 6/fml for insulators when working with asbestos.

In his paper, Selikoff concluded that studies on asbestos concentration from 1965 to 1971, by 5 different research groups in two countries, had indicated that “recent” average exposures of insulation workers to asbestos were between 3-9 f/ml when working with asbestos.

In Table IV, Selikoff sets out the findings reported by Harries (“Asbestos Dust Concentration Ship Repair : A Practical Approach to Improving Asbestos Hygiene in Naval Dockyards”) as to the measurements of asbestos dust concentration during the application and removal of insulation aboard ships. During the application of insulation material, fibre concentration between 2.1 and 22.4 f/ml were found in the general atmosphere in the engine room and boiler room. The breathing zone concentration of 7.3 f/ml were found in the engine room, and 16.8 in the boiler room. On the removal of insulation from pipes and machinery, 88 f/ml were measured in the engine room, and 171f/ml in the boiler room, in the general atmosphere. These were mean average readings.

In their article “The Work Environment of Insulating Workers” (Ex T/1), Balzar and Cooper attempted to survey a number of work situations, including small commercial buildings, major industrial constructions and marine operations. They followed the activity of 401 workers involved in asbestos – 100 employed in commercial buildings; 236 employed in heavy industrial building; and 65 in marine construction and repair. The authors classified all the jobs performed by the insulation workers into six major categories – prefabrications; applications; finishing; tearing out; mixing; and general. The general category consisted in cleaning up old insulation and transporting the materials. In Table VI of the article, the authors set out the fibre concentration based on membrane filter samples by job classifications. The mean average for the finishing work was 2.7 f/ml; for tearing out 8.9f/ml; and for general work 4.8 f/ml. The range of exposure for general work was from .1 to 22.9 f/ml. I found the reading for general work persuasive.

(e) General Observations

In coming to a conclusion as to a time weighted average of asbestos exposure for the deceased, in addition to the above material, I have kept in mind the following considerations –

(1) Dominic Restuccia never worked as a lagger or was involved directly in asbestos work. He was

essentially a general labourer, often engaged in cleaning. He performed his duties mostly inside the vessels.

(1) From about the mid 1970's onwards, asbestos work began to be performed in the silent hours, behind plastic protection barriers. From about 1983 onwards there were radical improvements implemented into the health and safety of the industry.

(2) The deceased was certainly exposed to asbestos dust in the course of his work, both at Cockatoo Island, on ships in general and when working in refineries.

(3) Asbestos was very wide spread in naval vessels.

(4) Dominic Restuccia was mainly exposed to amacite. Perhaps 80% of the asbestos was amacite, maybe even more, and sometimes in a friable form.

(5) Many ships were very large structures with big spaces and many areas for work.

(6) The exposure of the deceased to asbestos was at times heavy, sometimes light and often non existent.

(7) There were innumerable variables in the situations and circumstances of the deceased's employment.

In the circumstances it seems impossible and unhelpful to identify the various levels of asbestos exposure and the various tasks. It seems more practical and, more realistic, to strike a safe average time weighted average level which would seem to best reflect the vast amount of evidence presented and which would be struck as a conservative assessment.

I have concluded that an overall safe time weighted average level for the deceased would have been 5f/ml across the broad spectrum of his employment, both in the refineries and on board naval vessels. Furthermore, it would seem safe to me also to assess that he would have spent approximately half the time of his period of employment in the general situation of exposure – that is half of the estimated 10 years of employment.

Consequently, I have calculated a level of exposure to asbestos of the deceased, over the whole period of his employment (1960 – October 1989) at 25 f/ml yrs.

6 The Helsinki Report

In January 1997 Professor Henderson chaired a meeting of scientists in Helsinki to develop a consensus report which would identify criteria for attributing lung cancer to asbestos exposure. The scientific mechanism by which normal cells change into cancerous ones has not yet been determined by scientists. However, in the meantime, for the assistance of occupational health authorities, practical guidelines or criteria were identified in Helsinki.

According to the Helsinki report, the presence of asbestosis is not necessary in order to attribute lung cancer to asbestos exposure. The criteria focus on the cumulative exposure of asbestos, assessed either clinically or pathologically. Because of the high incidence of lung cancer across the population, it is not possible scientifically to demonstrate that in any individual patient, inhalation of asbestos is a contributing factor to lung cancer, even when the patient is shown to have asbestosis. Consequently, any attribution of lung cancer to asbestos inhalation demands reasonable medical certainty, on a probability basis, that asbestos has contributed materially to the disease. The probability that asbestos exposure has made such a contribution of course increases when the exposure increases.

The Helsinki scientists estimated that the relative risk of cancer being caused by asbestos inhalation is approximately doubled when a person is exposed to asbestos fibres at a cumulative dosage of 25 f/mls per year, or with an equivalent occupational history. This is true whether asbestosis is detectable

or not.

The criteria established by the Helsinki meeting include –

(1) The presence of asbestosis. This was considered to be indicative of a cumulative exposure comparable to the exposure required to establish the probability of a causal relationship between lung cancer and asbestos.

OR

(2) A count of 5,000 to 15,000 asbestos bodies or more per gram of dry lung tissue, or an equivalent uncoated fibre burden of 2 million or more amphibole fibres per gram of dry lung tissue.

OR

(3) An estimated cumulative exposure to asbestos of 25 f/ml yrs or more.

OR

(4) An occupational history of one year of heavy exposure to asbestos, or 5- 10 years of moderate exposure.

AND

(5) A minimum lag time of 10 years.

According to the Helsinki criteria, pleural plaques by themselves are inadequate to establish a probable relationship between lung cancer and the inhalation of asbestos. However, since bilateral diffuse pleural thickening is often associated with moderate to heavy exposure sufficient to induce asbestosis in some individuals, such pleural thickening is considered to be similar to the presence of asbestosis for the purposes of attribution.[Ex JJ p. 533].

There was some dispute between the parties to this litigation, as there is between the experts, as to the significance of the Helsinki report, as to the weight to be accorded to it. Professor Henderson and Dr Leigh place great weight on this international statement forged between many experts from different countries. Dr Julian Lee, on the other hand, was quite wary of its significance, alleging it was forged by like-minded experts, without the benefit of the opinions of dissenting scientists, therefore to be approached with caution.

These critics accept that the extent of asbestos exposure is clearly related to the mutation of normal cells to cancerous ones, and that this can occur even where asbestosis is not present. The criticism of the Helsinki 25 threshold, more particularly, is that this is the level of exposure at which asbestosis CAN occur, rather than the point at which it will probably occur. They consider the probability threshold should rather be set at 100 f/ml years, if not 200.

Despite these qualifications, and despite the modifications to the criterion supplied by Adelaide Workshop and Asbestos Related Diseases (AWARD) on the basis of the conclusions by Hodgson and Darnton, the Helsinki criteria in general, and the 25 f/ml years level of exposure, still have real legal significance in that they at least point up the possibility that in certain circumstances (namely with exposure equivalent to 25 f/ml years) asbestos exposure can and does cause lung cancer.

The consensus was the result of contributions of many eminent scientific experts. It was only ever meant to be a blunt instrument by way of a guide, to establish a practical set of indicia or criteria to determine, though not with scientific accuracy, the likely relationship between lung cancer and exposure to asbestos.

While Professor Breslin initially gave a qualified endorsement to the Helsinki criteria and then withdrew his acceptance of it (Ex 40), Associate Professor David Bryant, in paragraph 5 of his report (Ex 35), observed –

“At the present time I believe the use of 25 fibre/ml years.... is a reasonable working basis on which to assess attribution of lung cancer to asbestos exposure even though I am aware that there is not universal acceptance of these criteria by all experts in this field

I have given some consideration to these criteria, and some weight to some of them, in coming to my conclusions. They form part of the mix of considerations, though they were not in themselves determinative or decisive.

7. Epidemiology

Epidemiology is concerned with the study of diseases and examines the distribution and permanence of diseases in human population. The study is based on the assumption that a disease is not distributed randomly in a group of individuals, so sub groups may be identified which are at increased risk of contracting particular diseases.

Epidemiologists make judgments about whether a statistical association represents a cause - effect relationship. Such judgments only focus on the question as to whether or not a particular factor is capable of "causing" a disease. Science cannot, and does not answer the question as to whether a particular factor has in fact caused the disease in an individual case. Epidemiology is not directed to the circumstances of any individual case. It only provides evidence of possibility, and often identifies the strength of any association by a measure known as a "relative risk" (RR).

A relative risk is simply the ratio of the incidence of a disease in exposed individuals compared to the incidence in unexposed individuals. If the RR equals 1.0, the risk in exposed individuals is the same as that in unexposed individuals. It follows that if the RR is identified as greater than 1.0, the risk in exposed individuals (for example, people exposed to asbestos) is greater than the risk in unexposed individuals.

When the Court comes to the exercise of determining whether this or that factor was the cause, or a cause, of a certain condition or event, or a contributing factor, evidence of possibility is a factor which can be weighed in the balance, together with other factors, when determining whether or not, on the balance of probabilities, an inference of causation in any specific case can be drawn. However, evidence which does no more than establish a possibility does not satisfy the common law test that any inference as to causation must be drawn on the balance of probabilities.

As Glass J A stated in Fernandez -v- Tubemakers of Australia (1975) 2 NSWLR 190 at 197, "the evidence will be sufficient if, but only if, the materials offered justify an inference of probable connection."

The law draws a distinction between a guess or conjecture on the one hand, and a permissible inference on the other, though the line between a conjecture and inference is often difficult to draw. If facts go no further than showing that the existence of a further factor is possible, the existence of that fact does not go beyond conjecture. An inference, on the other hand, is a deduction from evidence which is made because it is reasonable.

Spigelman CJ in Seltsam -v- McGuinness (2000) 49 NSWLR 262 observed that "causation, like any other fact can be established by a process of inference which combines primary facts like "strands in a cable" rather than "links in the chain" (p 276 at para 91). He went on to observe that epidemiological studies and expert opinions based on such studies are able to form "strands in the cable" of a circumstantial case. (p 278).

In analysing the relationship between increased risk and mere possibility Spigelman CJ refers to the decision of Mason P in Bendix Mintex Pty Ltd -v- Barnes (1997) 42 NSWLR 307 at 315-16 in which he concluded that the law did not regard an increase of risk as satisfying the legal requirements to establish the cause of, or any material contribution to, an injury. He goes on to analyse the observation of McHugh J in Chappel v Hart (1998) 195 CLR 232 (at pp 244-245) and notes that both Gaudron and Callinan JJ, in Naxakis -v- Western General Hospital (162 ALR 540 at 547 and 574) referred to McHugh J's dissenting opinion with approval. Spigelman CJ then observes –

"there is tension between the suggestion that any increased risk is sufficient to constitute a "material contribution", and a clear line of authority that a mere possibility

is not sufficient to establish causation for legal purposes. The latter is too well established to be qualified by the former. The reconciliation between the two kinds of references is to be found in the fact that, as in Chappel v Hart and in the cases that suggest the former, the actual risk had materialised. The “possibility” or “risk” that X might cause Y had in fact eventuated, not in the sense that X happened and Y had also happened, but that it was undisputed that Y had happened because of X. (para 119)

The epidemiological evidence in Mc Guinness was expressed in terms of “increased risk”.

“However, in its application to determining causation in the specific case of the Respondent, that evidence never rises above the level of possibility. Whether or not the increased risk “eventuated”, is the issue which must be determined. The Respondent’s reliance on the passage from McHugh J was, in my opinion, misplaced”(para 120)

Further in his judgment, Spigelman CJ observed that

“in Australian law, the test of actual persuasion does not require epidemiological studies to reach the level of a Relative Risk of 2.0, even where that is the only evidence available for the court. Nevertheless, the closer the ratio approaches 2.0, the greater the significance that can be attached to the studies for the purpose of drawing an inference of causation in an individual case. The “strands in the cable” must be capable of bearing the weight of the ultimate inference.” (paragraph 137)

One of the key principles for interpreting epidemiological studies, apart from the strength of the association, the time sequence and other principles, is that of “biological coherence” or “biological plausibility”. When interpreting these studies, one should examine: whether the exposure - disease association makes biological sense given what is known of the natural history of the disease? Do other types of collateral evidence, for example, support the association? Informational background by which to judge biological coherence is often limited because for many diseases, little is known about their aetiologies (para. 139).

Biological plausibility, like most of the other principles to be considered, is simply a guideline which a court may take into account in determining whether or not to infer, on the balance of probabilities, that the asbestos exposure caused the injury in a specific case.

Finally, having considered the epidemiological studies and the expert epidemiological opinion together with all the other matters bearing on the question of causation, the dictates of commonsense must be applied to determine whether, in view of the evidence as to possibility, all the circumstances justify an inference as to causation on the probabilities.

8. Relative Risk

A relative risk (RR) is the ratio of two risks. It is in our context, a ratio between the risk to a group of those who have been exposed to a substance such as asbestos, compared to a group who have not been exposed to that substance.

The magnitude of a RR does not of itself indicate any causal relationship, or anything else other than a relative change in risk. However, a finding of a large RR generally provides some assurance that one can confidently, without error, infer causation from an epidemiological study. A RR of 2, for example, represents a doubling of the risk, whereas a RR of 1.1 means an increase of the relative risk of 10%.

Epidemiological studies have established that, at a population level, not at an individual level, exposure to asbestos is related to lung cancer, allowing for other factors, and that there is a dose response relationship, that is, the greater the exposure, the more likely it is that the lung cancer is the

result of the dust inhalation.

The deceased was a moderately heavy smoker. Consequently, tobacco could be regarded as a potent cause of his lung cancer. However, a lengthy exposure to asbestos might have been an additional, significant and independent risk factor which would have acted synergistically with tobacco in causing the cancer. While the precise mechanism of any interaction between asbestos and tobacco smoke in causing lung cancer is not known, though attempts have been made to analyse the interaction, it is generally agreed in the medical profession that there is a synergistic action, probably based on a multiplicative model. Consequently, given a certain level of asbestos inhalation, lung cancer can be the result of two factors acting together. However, it remains true that exposure to either factor alone is capable of causing lung cancer.

(a) The Hodgson- Darnton Model

The Hodgson and Darnton study summarised lung cancer mortality data and exposure to asbestos, providing estimates of specific risk. ("The Quantitative Risks of Mesothelioma and Lung Cancer in relation to Asbestos Exposure" Ann. Occup. Hyg. (2000) 44/565ff).

The all amphibole cohorts supported a finding that lung cancer risk increased by 4.8% per f/ml yr.; and the pure chrysotile cohort supported a similar estimate of an increased lung cancer risk of .06% per f/ml. yr. Consequently, the risk doubled at approximately 20 f/ml years for amphiboles.

Given that the deceased was exposed to 25 f/ml yrs in his working lifetime, and further given that he was exposed to 80% amphibole and 20% chrysotile, I calculate the RR of his exposure to asbestos causing the lung cancer at 96.3%.

Given that the deceased was exposed to 85% amphibole, and 15% chrysotile, throughout his lifetime, I calculate the RR at 102.225%.

As Professor Henderson pointed out in his report of 3rd November 2003, there is "persuasive and compelling scientific evidence" that multiple casual factors can combine to cause lung cancer. Altogether, smoking is a much more potent factor in the development of lung cancer, but asbestos is also an established cause. The interaction between smoking and asbestos inhalation in the development of cancer is a matter of discussion and dispute among the scientists. Professor Henderson considers that most authorities have now accepted a multiplicative relationship between smoking and asbestos, observing that the relationship was reaffirmed more recently by the professor of occupational medicine and epidemiology at Harvard University, David Christiani in his joint article with .N. Gong "Lung Cancer" in a publication entitled " Occupational Disorders of the Lung: Recognition, Management, and Prevention." London, Saunders, 2002, pp 305-26. Consequently, both smoking and the asbestos inhalation augment the effect of the other, so that the combined effect is greater than the sum of the two separate effects. Whatever the precise calculation, there does seem to be a consensus among experts that even if the joint effect is less than multiplicative, a simple additive process does not fit the data either.

The RR of smoking, based on the annual and daily consumption of the deceased, has been estimated by the respondent at 13 - that is, a smoker of one packet a day for many years can expect an increase of the risk of contracting lung disease as a result of smoking by 12 times. So, if 13 people who smoke are found to have lung cancer, statistically, 12 of these cases can be attributed to lung cancer. This would give a probability factor of contracting lung cancer from smoking of 92.3%. This calculation would change if one was to accept the applicant's estimation of RR of 8 [Respondent's Submissions, para. 597]

Given that the deceased was exposed to asbestos dust inhalation of 80% amphibole and 20% chrysotile in the course of his working life, and given therefore that the RR is 96.3% or .963, I have calculated the probability of contracting cancer as a result of asbestos at 49%.

Given that he was exposed to 95% amphibole and 15% chrysotile, the probability would be increased to 50.49%.

If one simply adds the two attributable fractions together, they amount to either 141.3% or 142.8%. Of course, the probability of causation from all causes cannot exceed 100%, though it is acceptable among experts that the attributable fractions of disease in someone exposed to multiple causes can amount to more than 100%, especially when there is more than an added relationship.

(b) A Calculation Pursuant to The Chase Model

In their article “Evaluation for Compensation of Asbestos – Exposed Individuals - II Apportionment of Risk for Lung Cancer and Mesothelioma” [Journal of Occupational Medicine Vol 27, No. 3, 1985, pp189 ff], (Ex 33), Gerald Chase and others developed a method of apportioning the risk of cigarette smoking and of asbestos exposure to the development of lung cancer. This method was used to facilitate decisions as to compensation and to ensure an equitable scheme based on the evidence of the possible underlying causes of lung cancer.

“the finding that tobacco and asbestos act multiplicatively in causing lung cancer means that a simple dichotomy into “caused by asbestos” and “caused by other than asbestos” is not practically achievable”.

| | |
|--------------------------------|-----------|
| RR from asbestos | 2.0 |
| RR from smoking | 13.0 |
| Total Risk (13.0 x 2.0) | 26 |

Components –

| | |
|----------------------------|-----------|
| Background risk | 1.00 |
| Risk due to smoking alone | 12.00 |
| Risk due to asbestos alone | 1.00 |
| Synergistic effect | 12 |
| Total Risk | 26 |

The Synergistic Effect Divided Into Its Components

| | |
|------------------------------|---------------|
| For smoking (12.00 x 12/13) | 11.076 |
| For asbestos (12.00 x 1/13) | <u>.923</u> |
| | 11.999 |

The risk and proportion due to smoking :-

| | | |
|-----------------------------|-------|----------------|
| Background risk | 1.000 | 3.85% |
| Smoking risk (12.00 + 11) | 23.00 | 88.5% |
| Asbestos risk (1.00 + 1.00) | 2.00 | <u>7.7%</u> |
| Total Risk | | 100.05% |

These related calculations would vary if the RR from smoking was 8, as the applicant claims. It would reduce the smoking percentage risk to 82% and increase the asbestos risk to 11.7%.

A relative risk of 2.00 has some significance. It has been equated by some with a “probability of causation” of .5 in the individual or of 50%. However, there is nothing particularly magical about a relative risk of 2.00 which simply represents a doubling of the relative risk, whereas a relative risk of 1.1 represents an increase in relative risk of 10%.

9.The Central Question

So finally, how does one determine in law that this caused that –or that this materially contributed to the production of that – or that some condition or state of being is reasonably attributable to some other force or source? How does one finally decide whether the inhalation of asbestos caused Dominic Restuccia’s death?

The question of causation is in law always a question of fact - a matter to be determined by applying the dictates of common sense to all the relevant circumstances. So legally, causation is not a philosophical consideration or a scientific finding, but a conclusion based on the dictates of experience. And it must be conceded that considerations of policy and value judgments do often enter into the question of causation.

It is well accepted that there can be two, or many causes of one outcome. The court can choose between two or three possible causes - for example in this case, between a lifetime of cigarette smoking as the cause of the lung cancer, or asbestos dust inhalation over thirty years of employment as the cause. Or it can decide that two or three factors acting together, caused the one result.

Sometimes a court must take a robust approach to the question of causation, though it must always rely solely on the available evidence. In coming to a conclusion as to causation, especially in situations where the cause is not immediately obvious, the court will utilize many tests, including logic, science (which may sometimes give an indication of biological plausibility, or of the likelihood or probabilities based on epidemiological studies), experience and common sense, sequences such as temporal connections, and finally inferences drawn from multiple "strands" of evidence.

I have come to the conclusion that in the circumstances of this case, the deceased's exposure to asbestos over a number of years and in different circumstances made a material contribution to the development of the disease of lung cancer which in turn resulted in his death. In other words, I consider that the death of the deceased is reasonably attributable to the exposure to asbestos which he experienced over his working life. In coming to this conclusion I have borne in mind the following basic factors.

- (1) There are many possible causes of lung cancer, some well established, some only suspected, and, as the state of scientific knowledge presently stands, some not yet identified.
- (2) Smoking is a well recognised cause of lung cancer, especially of squamous cancers.
- (3) Asbestos inhalation is also well recognised as a cause of lung cancer.
- (4) The deceased was exposed to asbestos dust over a prolonged period of his working life. I have estimated that exposure to be in the vicinity of five years.
- (5) The deceased died of adeno carcinoma cancer.
- (6) There was no evidence of asbestosis in the deceased lungs.
- (7) There was however evidence of bi-lateral pleural plaques.
- (8) There was no histological evidence of asbestos fibres in the lungs since there was no examination of any lung tissue.
- (9) The deceased was a smoker. It is agreed that he consumed approximately one packet of cigarettes per day over his working life.
- (10) Cigarette smoking and asbestos inhalation are thought to interact synergistically (though the dynamics or mechanism of this interaction is not yet known) so that the RR of contracting lung cancer of a person who smokes and who inhales asbestos is more accurately calculated by multiplying the RR of smoking with the relative risk of inhalation of asbestos, rather than simply adding the risks together.

(11) The extent of the exposure to asbestos over the years of his employment is approximately 25 f/ml yrs.

(12) Pursuant to the Helsinki criteria a cumulative exposure to asbestos at which clinically asbestosis can occur is 25 f/ml yrs or alternatively an occupational history of exposure equivalent to five to ten years.

(13) In the case of the deceased, the calculated RR of cancer caused by asbestos, according to the Hodgson and Darnton analysis (Exhibit U/6), is 1.96 or 2.02

(14) The Chase Model allows us to calculate the synergistic effect of smoking and asbestos inhalation in causing lung cancer. Given a RR of asbestos of 2, and of smoking , of 13, the synergistic effect of smoking is 11.076, and of asbestos is .923, so that proportion of risk due to smoking is 88.5%, and due to asbestos would be 7.7%. It may even be 82% and 11.7% respectively. Both are, in any event, significant.

In the light of all these considerations, I have concluded that the work conditions of the deceased during which he was, over the years, exposed to a varying degree of asbestos inhalation, probably made a material contribution, or in the legal sense, caused, a lung cancer which lead to his death.

10. Finding

I find that it is more probable than not that the lung cancer which caused the death of Dominic Restuccia was itself caused, or materially contributed to, by two agents, namely cigarette smoking and asbestos dust inhalation, each not acting independently, but in a dynamic synergistic relationship.

Consequently, I find that the worker's death was reasonably attributable to his exposure to the inhalation of dust in an occupation to the nature of which the disease was due.

I order the respondent to pay the applicant's costs in both matters.

Judge C Geraghty