

SOUTH



AUSTRALIA

FINDING OF INQUEST

An Inquest taken on behalf of our Sovereign Lady the Queen at Adelaide in the State of South Australia, on the 27th day of November, and 12th day of January, 2001, before Wayne Cromwell Chivell, a Coroner for the said State, concerning the death of Sandra Lee Rothwell.

I, the said Coroner, do find that Sandra Lee Rothwell, aged 34 years, late of 3 Hone Street, Parkside, in the State of South Australia, died at 3 Hone Street, Parkside on the 16th day of November, 1999 as a result of incineration and inhalation of products of combustion. I find that the circumstances of death were as follows:-

1. **Introduction**

- 1.1 On 16 November 1999 a fire occurred at 3 Hone Street, Parkside. The Metropolitan Fire Service attended at 2.19p.m. They found all doors and windows locked. After breaking in, and using full breathing apparatus, officers found a person, obviously deceased, sitting in her Rollerchair motorised wheelchair in the kitchen.
- 1.2 Dr. Catherine McKenna, forensic odontologist, later identified the deceased as Sandra Lee Rothwell using dental records. (Exhibit C.1a).
- 1.3 Dr. J.D. Gilbert, Forensic Pathologist, conducted a post mortem examination on 17 November 1999. He established that the cause of death was incineration and inhalation of products of combustion (Exhibit C.2b, p1).
- 1.4 Dr. Gilbert commented:-

“1. Death was due to incineration and inhalation of products of combustion. The deceased was definitely alive at the time of the fire. This was indicated by the presence of moderate amounts of soot in the upper trachea and the presence of a toxic level of cyanide in the blood.

2. Therapeutic levels of codeine, paracetamol and diazepam were identified in the blood. Only 7% of the haemoglobin in the blood was in the form of carboxyhaemoglobin.
3. Neuropathological examination showed old abnormalities in the thalami consistent with the clinical history of cerebral palsy". (Exhibit C.2b, p4).

2. **Background**

- 2.1 Ms. Rothwell suffered from cerebral palsy. Her general practitioner, Dr. C.H.C. Moy, described her condition as follows:-

"Sandra suffered from Cerebral Palsy, or Spastic Quadriplegia; consequently I always made visits to her home at 3 Hone Street, Parkside. Sandra was fully wheelchair bound and unable to walk or care for herself. She had minimal movement of her hands and arms. She could operate her wheelchair by way of a hand control, and do very basic computer work. Sandra lived alone and was looked after by carers who called on her at home.

...

Although Sandra was totally physically incapacitated, she was by no means mentally impaired. She was, in fact, quite intelligent, however she had trouble communicating due to her state. It took some time to become accustomed to her speech, and she sometimes got one of her carers to 'interpret' for her. Sandra was born with Cerebral Palsy". (Exhibit C.9a, p1-2).

- 2.2 Ms. Rothwell's carer, Ms. J. Kirkman, saw her on the morning of 16 November 1999, and helped her get ready for the day. She noticed nothing unusual, although she said that Ms. Rothwell had been "a bit down over the last two months" (Exhibit C.8a, p2). She said that Ms. Rothwell was looking forward to joining her at the Arkaba Hotel for a drink that night.

- 2.3 Ms. Rothwell was driven to an appointment at 10.30a.m., and returned home at about 12.55p.m. The bus driver, Mr. J.C. Wilkie, said:-

"Sandy seemed much quieter on the way home, she would normally make conversation and have a joke". (Exhibit C.7a, p2).

On the evidence before me, Mr. Wilkie was the last person to see Ms. Rothwell alive.

3. **Cause of the fire**

- 3.1 Senior Constable GW Parker of SA Police Forensic Services Branch investigated the circumstances of the fire. He is well-qualified to express expert opinions on the subject.

3.2 Mr. Parker described the origin of the fire as follows:-

“The area of origin of the fire was clearly the wheelchair and occupant. The fire had not started elsewhere and spread to that area.

Nor had the fire in fact spread far away from the wheelchair itself. This lack of lateral spread is indicative of a reasonably slow as opposed to fierce, fire. This is typical of a fire in which the rate of release of radiant heat is relatively slow with the result that the radiant heat does not have the intensity to preheat the adjacent surfaces, which is a precursor to the fire spreading (photo 22).

There was however overhead damage evident directly above (photos 38 and 39). This occurs in such a fire as the preheating of the ceiling area is a result of heat travel by convection”. (Exhibit C.13a, p9).

3.3 The investigators could not identify the source of the fire. There was nothing to suggest that Ms. Rothwell may have lit the fire, either deliberately or accidentally. She was not a smoker.

3.4 The wheelchair was examined by Mr. Henry Kutek, a forensic metallurgist.

3.5 Mr. Kutek’s conclusions were as follows:-

“4.1 The available evidence suggests an area of origin at the right hand side of the battery box. The absence of internal oxide in either of the cables between the battery terminals and the circuit breaker precludes long term resistance heating of cables as a possible ignition source. Testing of similar cables at 35A indicates that the temperature reached was safely below the temperature rating of the insulation of the cables, so it is unlikely that a short term overload could have caused the insulation to ignite.

4.2 The possible degradation of the battery connection through corrosion by leakage from the battery cannot be confirmed from the after fire remains. High resistance battery terminals due to corrosion are a known problem with automotive batteries. Testing of a comparison battery resulted in the joint going open circuit, preventing any significant flow of current. The tested termination became arc eroded unlike those from the wheelchair. Thus it is unlikely that the fire was caused by a high resistance joint at the battery terminal.

4.3 While there were several instances of electrical damage to cables, all of the observed damage appeared to have been caused by fire damage to the insulation. There was no evidence to indicate that any of the electrical damage was the cause of the fire”. (Exhibit C.15, p10).

3.6 Mr Kutek performed a very careful and thorough examination. He has been unable to determine what caused the fire. He conceded that the fire may have obliterated evidence of a cause. (T26).

3.7 After the hearing had concluded, Mr Don Rothwell, father of the deceased, obtained a statement from his brother-in-law, Mr Norm Deane. Mr Deane is a retired Electrical Engineer who formerly held a very senior position with the Hydro-Electric Authority in Tasmania.

3.8 Mr Deane did not have the advantage of seeing the chair, nor did he have the transcript of Mr Kutek's evidence - all he had was a copy of the report, Exhibit C15. On the basis of that, Mr Deane concluded:-

1. the fire was most probably initiated by a high resistance joint at the negative terminal of the rear battery;
2. that the high resistance joint could have been caused either by an inadequately bolted joint or by acid attack on the joint by "spilt" battery acid;
3. the design of the battery makes it highly unlikely that acid would have been the cause;
4. it is probable, therefore, that a defect in the bolted joint caused the initiating high resistance. (The statement in 2.17 appears to support this).

3.9 Mrs Atkins, Counsel Assisting me, caused a copy of Mr Deane's report to be sent to Mr Kutek for further comment. Mr Kutek responded:-

'All four battery terminals had melted to some degree. The greater melting of one terminal indicates that it had received a greater heat input. Whether this was from electrical heating or from being exposed to a slightly hotter or longer fire could not be determined from the physical evidence. However, for a loose battery terminal to overheat to a degree where it may ignite combustible materials requires a considerable heat input. If Ms Rothwell had travelled a long distance or up a steep slope which would have caused a high current flow then such an occurrence becomes likely. However, I was informed that she had been delivered to her door by a taxi not long before the fire and had probably only used the wheelchair to enter the house and move about in the kitchen. The low current drawn during such movements is unlikely to cause a dangerous temperature rise in the battery terminal as verified in the tests conducted at the Australian Electrical Test Centre.

The battery terminal was attached to lead plates within the battery and lead is a relatively good conductor of heat. Therefore the battery terminal would have provided a significant heat sink to dissipate any heat generated by a loose terminal.

That one battery terminal had suffered more damage than the other three is a fact. The probability that this was caused by the fire remains the most likely as there was no evidence to support heating of the terminal by a loose connection.

In ten years of fire investigation I have yet to find one fire caused by a loose battery terminal, while I have seen many that have been caused by loose connections in switches and the like where the heat sinking effect of the battery is absent.'

- 3.10 Mrs Atkins spoke to Mr Deane again on 9 January 2001, having sent a copy of Mr Kutek's comments to him. Mrs Atkins reported to me that although Mr Deane finds it surprising that Mr Kutek found no evidence of arcing damage, he accepts Mr Kutek's conclusions. He told Mrs Atkins that Mr Kutek had conducted a "very thorough investigation" and that he had "examined all aspects that could be examined".
- 3.11 In view of these developments, I accept Mr Kutek's evidence that although the origin of the fire seems to have been at or near the right-hand side of the battery box, he is unable to state the precise cause of the fire.
- 3.12 In all the circumstances, I find that an electrical fault in the Rollerchair motorised wheelchair caused the fire which caused Mrs Rothwell's death. No other explanation is feasible. I am unable to state the precise nature of the fault. This is a cause of very great concern, since there are many of these wheelchairs being used in the community.

4. **Recommendation**

- 4.1 In view of Mr Kutek's inability to form definite conclusions about the cause of the fire, it is difficult to make useful recommendations. However, the tragic circumstances of Mrs Rothwell's death demand further action. Section 25(2) of the Coroners Act 1975 entitles me to make recommendations if I am of the opinion that to do so "might ... prevent or reduce the likelihood of ..." a recurrence of a similar event.
- 4.2 In that context, the most useful thing I can do is to recommend that the Minister for Disability Services arrange for his officers to liaise with the manufacturers of the chair in question (Rollerchair), with a view to examining whether further research into these motorised chairs is needed. This might disclose whether there is a latent fault which, in rare cases, may lead to a fire. I recommend accordingly.

Key Words: fire; motorised wheelchair; electricity.

In witness whereof the said Coroner has hereunto set and subscribed his hand and

Seal the 12th day of January, 2001.