

INQUEST INTO THE DEATH OF MICHAEL BROMSGROVE

On the 11th of April 2008 I heard the final witnesses in respect of my inquest into the death of Michael Bromsgrove. I then adjourned matters in order that I could consider all the evidence and give a reasoned decision.

Mr Bromsgrove died on the 16th of April 2006 when he was diving off the coast of the Isle of Man. He was found helpless by another diver, brought to the surface but unfortunately it was not possible to revive him. A post mortem examination was carried out by Doctor Christopher Clague who confirmed that in his expert opinion death was due to "salt water drowning". At the inquest various questions were raised and I have to try to determine as best I can exactly how the deceased came by his death.

At the Inquest, the manufacturers of the diving equipment used by the deceased were represented by Mr Weir. The family of the deceased were represented by Mr S Mann.

MICHAEL BROMSGROVE (THE DECEASED)

According to the evidence given to me Michael Bromsgrove, a 41 year old builder, had considerable experience of diving. He had attended and passed various courses and had been diving for over 10 years. His initial training had been using open circuit ("OC") equipment. He subsequently attended courses in respect of rebreather equipment. Although he had attended Advanced Nitrox Open Circuit training he had not undergone similar training in respect of the rebreather. He did have however very considerable experience "under his belt".

WITNESSES

At the hearing various witnesses were called to give their evidence on oath. In other cases their statements were read. As regards the witnesses who attended to be orally examined they were:-

1. Albert Edward Roberts – An experienced diver and close friend of the deceased.
2. Clive Ward – He undertook the same dive as Mr Bromsgrove having entered the water a few minutes earlier. Whilst checking to see if he could retrieve a possible piece of lost equipment, he came across the helpless and unconscious body of Mr Bromsgrove.
3. Scott Christopher Waterman – He was the charter boat skipper and the diving took place from his vessel.
4. Stephen Anthony Cowley – The owner of a diving centre, one of the services provided was that of replenishing diving cylinders.
5. Nicholas Bailey – Employed by the Health and Safety Laboratory to provide an expert report following examination of the equipment.
6. Dr Anthony Michael Wray – Ditto.
7. Dr Alex Deas – He presented himself as an independent expert.

8. Martin Parker – The Managing Director of the company that manufactured the equipment.

I will of course concentrate on those aspects I found to be of the most importance to my inquiry. The fact that I have not mentioned each or every part of a witness' evidence does not mean that I have ignored it.

REBREATHER EQUIPMENT

The equipment used by Mr Bromsgrove was called the "Inspiration" closed circuit rebreather (hereinafter "Inspiration"). Reference was made to the user instruction manual and I had the benefit of having a copy before me. The author of that manual is Martin Parker, who was one of the witness called before me. A closed circuit rebreather works differently to the conventional open circuit equipment. In the OC the diver inhales breathing gas and then exhales into the water. With a rebreather the diver's lungs become part of a closed loop within the equipment. Breathing gas is inhaled, part of the oxygen within it is metabolised, the gas is then exhaled back into the loop and a counter lung takes up the volume when the diver's own lungs are deflated. The gas which contains carbon dioxide (a by-product of breathing) plus a considerable amount of unused oxygen is then passed through a chemical scrubber (which takes out the carbon dioxide) and the gas then passes through the inhale counter lung before returning to the mouth piece. There is a facility for oxygen to be added into the breathing loop via a solenoid operated oxygen valve and also for a diluent gas to be added manually or through an automatic diluent valve. Within the manual is a diagram which I have attached – appendix1 – to this judgment. As I understand it, it is not the percentage of oxygen in the breathing gas that is the most important point but the partial pressure ("ppO2"). As the diver goes deeper he needs less and less oxygen to achieve the same ppO2 levels. The rebreather automatically maintains the ppO2 at a chosen set point, weakening the breathing mix as the diver descends and enriching it as he ascends.

Again, if I understand it correctly, the amount of gas used is low compared to the OC system. There is only the need for 2 small (3 litre) cylinders. The oxygen from one cylinder is mixed when necessary with a diluent gas such as air or an air/helium mix from the other cylinder. If the rebreather is working correctly the ideal gas mix is maintained at any given depth. The Inspiration has sophisticated electronic equipment in order to ensure that the diver is always given the right mix of gases at the right time and depth.

In this case, and in particular in relation to the Inspiration the volume of the loop itself may be of considerable importance. It is necessary to note the diluent gas used and also to have regard to the fact that the electronics were powered by 2 batteries contained within a battery box within the equipment itself. There were also other features of the Inspiration that may be of relevance and which I will refer to at a later stage.

I would also add that Mr Bromsgrove was carrying, separately from the Inspiration, a 7 litre gas cylinder, which was his "bail out" (i.e. he could use that in an emergency).

THE DIVE

On the day in question, the 16th of April 2006, the skipper of the "Locin 40" Scott Christopher Waterman took 12 divers at about 11 o'clock to the Clanmac Master, a ship wreck off the Calf Sound. Mr Waterman confirmed that all 12 divers entered the water and returned safely without incident. After a short period of time he then made way for the Citreen a small wreck situated just off Bradda Head. That wreck lay in about 14 metres of water and there was no tide around it. Although I do not profess to be an expert in diving, it appeared from all the evidence that this was a relatively simple and straight forward dive and that in the ordinary course of events there should have been no difficulty in Mr Bromsgrove or any other of his party successfully completing the same.

As Mr Waterman arrived at the site he deployed a shot line so as to allow divers to descend safely. The divers subsequently made their way into the water. If I understand the evidence correctly, the divers would have been able to enter the water from the stern and in effect "walk in". In other words they would leave from in effect a platform some 12 to 18 inches above the surface of the sea and merely walk from that straight into the water. Mr Bromsgrove was the last diver to enter the water. (Mr Roberts, his friend, had in fact decided that he would give this dive a miss.)

Within minutes of Mr Bromsgrove having entered the water, he was found by Clive Ward on the bottom and unconscious. At this time the rebreather mouth piece was out of his mouth. His face was blue and his eyes were open. Mr Ward believed that he was dead. He then took immediate action to try and bring the stricken diver to the surface. It was only after the body had been recovered that Mr Ward realised that the dead diver was in fact one of his party, Mr Bromsgrove.

In this particular case there were no actual eye witnesses to the incident. Mr Bromsgrove had not dived with a "buddy". However certain valuable information was obtained from equipment Mr Bromsgrove had on him so that when it was interrogated a profile of the dive could later be generated using a computer.

As stated it was possible to reconstruct a dive profile from the equipment being used by Mr Bromsgrove. However it should be noted that the equipment did not make a continuous record of the dive. Every 10 seconds a fix would be taken and by in effect "joining up the dots" the profile could be obtained. I am satisfied that the profile – within the limitations I have indicated – is accurate. However according to the profile Mr Bromsgrove never returned to within 2 metres or so of the surface. There was however evidence given to me by Mr Waterman that shortly after Mr Bromsgrove had entered the water he saw him break the surface, with only a couple of inches of his head showing. He could not see if Mr Bromsgrove was using any mouthpiece, either from the rebreather or from a "bail out". Mr Waterman referred to seeing various bubbles and he believed that Mr Bromsgrove had momentarily broken the surface, had become or was unconscious, that the mouthpiece had fallen out of his mouth, (causing the lungs in the unit to flood) and that as a result Mr Bromsgrove then sank down to the bottom. Pressure on the auto diluent "button" would cause a free flow of gas.

I accept unreservedly the evidence of Mr Waterman. The obvious explanation for the apparent "discrepancy" in his evidence and the dive profile is that Mr Bromsgrove was wearing the computing equipment on his wrist. If his hand had been by his side then it would have been at least a metre or so away from the surface. In addition Mr Bromsgrove may have broken surface and returned at a point between when the 10 second "fixes" were being taken.

INSPIRATION EQUIPMENT

A considerable amount of the Court's time was taken up with trying to establish the condition of Mr Bromsgrove's equipment at the time of the incident. According to Mr Roberts his friend was "very particular" about his equipment. Mrs Bromsgrove in her statement described that her husband maintained his equipment methodically and rigorously. He referred to it as his "life support equipment" and treated it accordingly, spending many hours before and after dives checking that all was well with it. He was fastidious as far as his equipment was concerned. In addition batteries were changed regularly.

Mrs Bromsgrove also indicated that she recently gave an old regulator of her husband's to be serviced. This regulator had not been used since her husband's days of using OC equipment. The equipment was pronounced to be in "mint condition". She was of the view that lack of maintenance could not be a factor in the death. In her view any defects that may have been subsequently found were as a result of the unit being flooded with salt water and a highly caustic solution being formed when the water came into contact with the chemicals in the scrubber unit. She did not profess to be an expert in these matters.

Mr Nicholas Bailey who examined the equipment made various observations. I do not propose to repeat them all here. Suffice it to say that the oxygen sensors were examined and the units were beyond their replacement date. However, although one of the cells gave cause for concern, it would still have been possible to have carried out that particular dive using them. The battery box was examined and was found to have cardboard wedges inserted. Initially it was thought that the springs that were positioned on a brass contact pin had ridden over the raised head. On closer inspection and lifting the wire connection end of the box it was discovered that the pins were seized in place by corrosion. Whilst attempting to switch on the unit, the handsets would not remain on unless the batteries were held under pressure to maintain contact. Whilst one of the batteries was still alive, the other was dead. Unfortunately it was not possible to say with certainty whether both batteries had been live at the time of the dive or, furthermore whether the corrosion had been present prior to the incident or had been caused as a result of it. Mr Bailey, in response to questioning by Mr Weir, did state that he believes the corroded state of the battery box had occurred prior to the accident and that the faults he found and referred to were "pre-existing".

It should also be noted that when he received the Inspiration, the mouthpiece for it was in the open position and both of the hand sets on the unit were found to have been physically switched off.

"BATTERY BOUNCE"

Reference was made during the course of the inquest to a phenomenon which Dr Deas and others referred to as a "battery bounce". Mr Parker would take issue with such a description and indeed maintained that if the equipment were properly maintained no such "bounce" (or whatever description one may choose) had occurred.

The Inspiration had 2 oxygen controllers which were located in separate handsets and had separate batteries powering them. The system in essence required the user to turn on one controller, which then became the Master, controlling the ppO₂ in the breathing loop by monitoring the oxygen partial pressure and opening the oxygen solenoid as and when necessary. The other controller would then be the Slave. If for any reason there was a failure with the Master controller, then the Slave should automatically then become the Master.

There were 2 batteries which were put side by side into the battery box. Each battery was connected to 2 spring loaded terminal pins. The battery was held square by the battery box door and was pushed against the door by the spring loaded pins. The battery and the pins should always be in contact. If however there were an interruption – even for milliseconds – and the contact was lost, this could have potentially serious consequences.

Dr Wray obtained a battery box from the manufacturers (although there was some subsequent dispute as to whether it was in fact fit for purpose i.e. was it just a piece of outdated equipment thrown into a box, without having ever been used or checked for quality control?). This battery box containing batteries was set up and under test conditions was dropped from a distance of 10cm onto a bench. From these tests Dr Wray indicated that there appeared to be a propensity for the loss of battery power under conditions of high acceleration. The tests were carried out under ideal conditions in as much as the batteries were new and so was the battery box (but see my earlier comment above). If the terminals of the battery and/or the battery box became tarnished, it was likely that the probability of an interruption occurring would increase.

On the information now before me, I regret it is impossible for me to say, with certainty, how far the experiments of dropping the battery box 10cm onto a hard surface replicates the conditions then obtaining in respect of the dive. For example, was the force greater or less or approximately the same as say a diver entering the water, or indeed carrying out manoeuvres in the water? Would the fact that the battery box was contained within the Inspiration unit require a greater or lesser degree of force to have caused disruption to the power supply?

Dr Wray also commented that whilst initially it was believed the corrosion could have played its part in the failure, it was now believed that the corrosion was the result, rather than the cause, of the incident.

Dr Deas gave evidence . He is very highly knowledgeable in the field of rebreathers. He holds various relevant degrees and is the lead technologist to a company that provides rebreathing equipment in respect of commercial diving and to the military, amongst others. At present his company was not involved in selling technology in respect of sports rebreathers.

Dr Deas was highly critical of the battery box design and maintained that he personally had experienced battery bounce. He also took various photographs which he maintained indicated that battery bounce had occurred in respect of Mr Bromgrove's Inspiration. He claimed that the battery compartment being used at the time suffered from 6 design faults of a fundamental nature.

1. In particular he stated that the box was too large for the batteries allowing them to slip sideways over the contact and to rock on the contact.
2. There was insufficient pressure on the battery contacts due to the spring being inadequate.
3. The battery compartment used Pogo pins which meant that the battery contact was extremely unreliable.
4. The Pogo pins moved up and down with a wire soldered onto the other side of the pins creating an unbalanced load.
5. The rear of the battery case was opened to breathing gases which with the high humidity present might cause corrosion of the wires and pins.
6. The contact shape was a wide hemisphere which slid easily over the battery contact causing voltage spikes and "brown outs of the handsets".

Dr Deas did indicate that the design had been recently modified which had addressed most of the faults but it was still not suitable for a life critical piece of equipment. There had been no recall announced by the manufacturers. He viewed this fact with suspicion.

Mr Parker is the Managing Director of the manufacturers of the Inspiration. He has considerable experience with rebreathers and had been personally involved with their development. For example, he invented the auto air (emergency valve). He had been diving since 1974, and had undertaken over 2200 dives, 970 of them using rebreathers.

(As with Dr Deas, I have not gone into his qualifications at any great length – suffice it to say that he too was regarded by me as an expert with impressive knowledge of rebreathers).

In his evidence, Mr Parker disputed that battery bounce was a known problem. He stated that the battery connections that had been used had proven to be extremely robust. If the diving equipment were well maintained then battery bounce could not and would not occur. As regards the suggestion of simultaneous power failure in which both batteries lost contact at the same time, he accepted that that might be a theoretical possibility but to his knowledge it had never happened to a unit correctly assembled and maintained. He had not known it happen in 10 years of use. In Dr Deas's report reference was made to certain emails claiming that other divers had experienced battery bounce. Mr Parker was somewhat sceptical as to whether this had in fact occurred and without viewing the equipment was unable to offer a proper and considered opinion on their complaints.

EXPERT OPINIONS – DR DEAS AND MR PARKER

On behalf of the manufacturers, Mr Parker maintained that there was no inherent defect in the design and operation of the Inspiration. He was of the view that Mr Bromsgrove had not properly serviced and maintained his equipment. He further pointed out that in the manual warnings were clearly given as to potential dangers

and that divers were told to regularly check the displays. For example, there was the following stark message “warning! If you fail to watch your ppO2 and understand the implications – you will die it is only a question where and when”.

Mr Bromsgrove in the Inspiration was carrying a 3 litre diluent cylinder which contained 10.5% oxygen. In normal circumstances he would not have regarded this as being inappropriate. However he did say that it was possible Mr Bromsgrove was on open circuit diluent when he went unconscious. If Mr Bromsgrove had used his bail out (7 litre air cylinder independent of the Inspiration) or had breathed from the 3 litre oxygen cylinder incorporated into the rebreather he should not have died. He examined the possible scenarios and gave his opinion as to the likely cause of death, which I will refer to later.

I heard the evidence of Dr Deas at some length. Can I make it clear that I did not commission any report from Dr Deas. I understand that he was approached by the family of the deceased and that once his report had been obtained, a copy was made available to me. In the circumstances I thought it appropriate that he be called to give his evidence. I have no doubt whatsoever that Dr Deas is an extremely well qualified individual. However I can not help but comment that the manner in which he gave evidence caused me at times a certain disquiet. It is obvious to me that Dr Deas is “a crusader”. I have no doubt that he personally and genuinely believes that the Inspiration has certain “fatal” design faults and should not be on open sale as matters now stand. He is obviously passionate. Having said that I would normally expect an expert witness to behave in a more clinical, detached and less aggressive manner. That is, of course, not to say that his evidence may not be correct. He does however leave himself open to the allegation that he has already made his mind up and is trying to “bend” the facts to suit his own theory, as opposed to clinically examining all the facts, drawing the proper and appropriate inferences therefrom, and then and only then reaching a balanced conclusion.

Dr Deas also accepted his report contained certain factual errors, but maintained these were not of any real significance and did not affect his overall conclusions.

Mr Weir complained that as he, Dr Deas, was a competitor (whether present or future), his evidence might be looked at with a degree of scepticism.

I will say at this juncture that this matter is far from easy and has been bedevilled with uncertainties. For example it is not clear what condition Mr Bromsgrove's equipment was in at the time of the dive and whether for example the corrosion afterwards discovered was a result of the accident (sea water entering the loop) or whether all or part of the corrosion was present beforehand. The only positive, irrefutable indication that matters may have been somewhat amiss was the finding of the cardboard wedge. Dr Deas and Mrs Bromsgrove in particular maintain the fact that a wedge had to be used was indicative of a general problem in the design whereby “battery bounce” could and did result.

Mr Parker on the other hand maintained that the presence of the wedge showed that the battery box had not been properly maintained. A properly maintained and serviced Inspiration would not require any artificial means such as a wedge. He was firmly of the view that at some time prior to the accident the pins – instead of having free movement so that they could move harmoniously with the battery contacts -

had been concreted into position making it possible that the battery connections may not have been as efficient as they should have been. He also strongly refuted the suggestion that the Inspiration did not comply with recognised safety standards. Dr Deas of course maintained the contrary. (It was difficult for me to reach any real conclusions on these competing safety standard claims).

AGREED OR UNDISPUTED FACTS

In this case there are matters that we know for certain or appear to be beyond serious dispute. On the 14th April 2006 Mr Bromsgrove and friends travelled to the Isle of Man for a diving weekend. Various dives took place on the Friday and the Saturday. On Sunday the 16th April 2006 there was a dive in respect of the Clanmac Master at Fleshwick. The final dive that afternoon was to be in respect of the Citreen. Mr Roberts, a friend, decided that he would not take part in the dive. Mr Bromsgrove did not appear to be particularly keen but decided that he would in fact make the dive.

According to Mr Waterman, and I have no reason to doubt it, Mr Bromsgrove was the last one to enter the water. At that time he was equipped with his Inspiration unit. It is not possible to say with certainty how long Mr Bromsgrove remained on the surface but it would have been for a very short period indeed. He then descended to approximately 11 metres and then returned. I am satisfied that he did in fact break the surface with his head although as I have explained earlier the dive profile does not fully show this. He then descended sharply to the sea bed and shortly afterwards was discovered by Mr Ward. The dive profile indicated that from the time he first commenced the dive to the time that he appeared momentarily on the surface was something like 2 minutes. It is quite clear that at some point very soon into the dive he encountered difficulties and that caused him to try and make an ascent. I am also satisfied that at the time part of his head broke surface Mr Bromsgrove was either dead, or he was dying and not in a position to save himself.

I am also satisfied that Mr Bromsgrove's death was linked to hypoxia (lack of oxygen).

CIRCUMSTANCES LEADING UP TO THE DEATH- CONFLICTING EXPERT OPINION

Various possible suggestions were canvassed. I have concentrated on the 2 most likely ones. Mr Parker strongly believed the correct version of events was that Mr Bromsgrove had quite simply forgotten to switch on the electronic control units of his Inspiration equipment.

Dr Deas was of the view that the equipment was on and that "battery bounce" had occurred. This may have occurred when Mr Bromsgrove entered the water or when he was subsequently diving. He believed that if both batteries had "bounced" at the same time then the operation from Master to Slave could not have been made. If there were battery bounce on entry which had caused the system to close down this would then have stopped the injection of oxygen. If no oxygen were being injected Mr Bromsgrove would only be able to breathe the oxygen then in the loop.

Dr Deas surmised that Mr Bromsgrove descended approximately 11 metres and he may then have realised he had a problem with his hand sets. He may well have switched them on and off to get them restarted and then decided to swim to the

surface. He did not apparently make any obvious use of his bail out. According to Dr Deas if in any event Mr Bromsgrove had breathed the tri-mix gas he should not have passed out in such a short period of time. If he did lose consciousness on the way back to the surface the mouthpiece would have fallen from his mouth and floated upwards. The bubbles seen by Mr Waterman were in Dr Deas's opinion caused by the auto diluent valve operating as Mr Bromsgrove sank down to the bottom, with his mouthpiece open, and detached from his mouth.

Dr Deas was vigorously challenged as to his conclusions. He stated that there was no other plausible explanation. The diver, when realising that there was a problem, had tried to switch his handsets on and off. He clearly and unequivocally attributed the cause of Mr Bromsgrove's death to "battery bounce".

Indeed, Dr Deas in his report dated 28th February 2008 stated "The only formal profile that results in severe hypoxia at around 2 minutes into the dive is one where the diver puts the rebreather on, that is the rebreather achieves a set point of 0.7 after initialisation, but the handsets stop working on entry to the water". I feel compelled to remark that is not factually correct. It is not the "**only** formal profile".

Under cross examination, Dr Deas stated it was possible the rebreather was not switched on, but he did not believe this to be the case.

He confirmed that there were several avenues open to Mr Bromsgrove to have obtained an adequate supply of oxygen had he encountered difficulties. When asked by Mr Mann, Dr Deas again stated he believed the fault lay with the power supply. He had eliminated all other explanations as vigorously as he could. He did not accept that the breathing loop would have contained a volume of some 11.4 litres. Dr Deas also referred to various case profiles in a subsequent report dated 7th March 2008 where various calculations had been made. For example "case 1: handsets are switched off before the dive with pre-breathe starting with ppO₂ of 0.7 in loop diver submerges after 30 seconds on surface. ADV off for all period diver on surface".

However, it was suggested by Mr Weir to Dr Deas that only one profile indeed squarely fitted the known facts (and the proper assumptions that could be drawn from them) - but that was not the one put forward by Dr Deas. It was suggested that Mr Bromsgrove had in fact not switched on his equipment and that the loop would therefore only have a ppO₂ of 0.21. Dr Deas did not think this was the likely cause of Mr Bromsgrove's death.

Mr Parker was firmly of the view that, unlikely as it may seem, Mr Bromsgrove had not switched on his equipment. If he had switched on the equipment (and it was working correctly at that time) and he then carried out the standard pre-dive procedures, there should have been an oxygen pressure in the loop of 0.7. He stated that it would have taken many minutes to breathe this down to hypoxic levels. He produced a profile showing an initial ppO₂ of level of 0.7 with no subsequent oxygen injections. He calculated it would have taken over 6 minutes to reduce the gas to a hypoxic level assuming the diver used 1 litre per minute. He also produced his appendix 3 – headed "dive profile where the initial ppO₂ was 0.21" (in other words, the scenario assuming the equipment had not been switched on at the outset). In this case Mr Bromsgrove would have been hypoxic within a very short period of time. The dive profile it was maintained, supported Mr Parker's conclusions that the equipment had not been switched on.

In addition to the profile, Mr Parker also referred to the written statement of Mark Brompton, who stated that he was at Port Erin when paramedics went on board and following tests, pronounced Mr Bromsgrove to be dead. "As they left the boat someone asked for the dive equipment to be taken off. I went to help as I did so I checked both handsets on Mike's AP Inspiration. They were both off. These are manually switched on or off there is no other way for them to be off. I mentioned that they were off out loud and nobody said they had turned them off".

Mr Parker would maintain that the fact that the switches were manually turned to off would indicate, strongly in his view, that they were never on in the first place. If they had been "on" and if there had subsequently been the alleged "battery bounce" then it might well have been that the switches remained in the "on" position (although the equipment would not be functioning correctly or at all). Against that Dr Deas has painted a picture of Mr Bromsgrove realising that there was a problem and possibly in panic switching the switches on and off. Why he should then unfortunately leave both of them in the off position is of course anyone's guess. Furthermore, Mr Bromsgrove was an experienced diver. Why would it be assumed he would 'panic?'. As the last resort, he always had his bail out readily to hand.

CONCLUSIONS

Mr Parker has painted a very persuasive picture of the re-breathing equipment never having been switched on in the first place. This would mean that Mr Bromsgrove would have a limited amount of oxygen available to him "in the loop" and that amount would quickly be exhausted. Mr Bromsgrove, according to the dive profile must have realised something was amiss very shortly into the dive (approximately 70 seconds). If he had exhausted his oxygen and was then starting to suffer the effects of hypoxia, this may account for him possibly becoming confused or uncertain and not resorting to his bail out or other sources of oxygen. If Mr Bromsgrove had carried out the correct procedures earlier and his equipment had been switched on but there later had been an unforeseen interruption with the battery and the pins, according to Mr Parker there would have been more than enough oxygen available in the loop for Mr Bromsgrove to have returned to the surface safely.

I accept that Mr Parker has made out a considerable case for the fact that the rebreather may not have been switched on at all. On the evidence before me, that, at first sight, may be the most likely cause. Having said that however I must have regard to the fact that Mr Bromsgrove was a very experienced diver and I would find it difficult, but not impossible, to accept that he would fail to take such an elementary step as to ensure that his equipment was switched on before he entered the water and undertook the dive. He had dived using the equipment on numerous occasions. There was no evidence to show, for example, that he had been distracted or was not concentrating. He had numerous diving qualifications and had vast diving experience. It may be that this was a relatively easy dive but I am not entirely convinced that in itself this fact would mean that Mr Bromsgrove would set aside all recognised, standard safety and other procedures.

Having said that I am not entirely satisfied with the suggestion that Mr Bromsgrove failed to switch on his equipment, I must also say that I have considerable reservations as to whether there was a battery bounce in this case. Furthermore, even if there were, I doubt whether it would have had the disastrous consequences envisaged by Dr Deas. Divers are warned and taught to make regular checks and to

monitor the screen of their controllers. If there had been a “battery bounce” and the system had in effect closed down, I find it difficult to believe that an experienced diver such as Mr Bromsgrove would not have been regularly checking and would not have realised in good time that there was a serious problem. It would then have been a relatively simple matter for him to have used his bail out (or one of the other “emergency” procedures available to him) and returned unharmed to the surface. One reason that he may not have used his bail out was possibly because of confusion and that he was falling into unconsciousness as a result of lack of oxygen. However if that were so, such a situation must have arisen within 70 seconds or so of his dive. Had he followed the pre breathing procedures correctly before the equipment shut down there should have been more than sufficient oxygen in the loop to have enabled him to return safely to the surface, without even considering having recourse to the side slung bail out cylinder.

As indicated previously, there was a degree of speculation as to the state of Mr Bromsgrove’s equipment.

One matter in particular did concern me. That was the use of the cardboard wedge. I cannot say whether that was because the design of the battery box was flawed and extra pressure was needed to maintain contact, or whether the pins at some time prior to the incident had become seized, so that they were not working properly. In any event, the use of a wedge is to be discouraged and I cannot condemn such a practice too strongly. If any diver is reduced to such measures, he should not dive and should have the equipment properly and professionally examined and serviced immediately.

I have listened carefully to the evidence in this case. I regret to say that whilst the various scenarios have varying degrees of persuasion, none to my mind really covers all the essential known facts and proper inferences to be drawn therefrom. I simply can not say with absolute certainty whether Mr Bromsgrove failed to switch on his equipment before commencing the dive or having properly switched it on, at some point after he left the vessel (and at what point is far from clear) the power ceased completely to the units, both to the Master and the Slave, leaving Mr Bromsgrove in a potentially parlous situation. I further cannot understand if the power had somehow switched itself off, leaving him powerless, why Mr Bromsgrove did not in good time realise this to be the case and why he did not take the appropriate prophylactic measures.

Mr Mann at a point during the inquest - inappropriately in my view – urged me in effect to condemn the Inspiration equipment. Having heard the evidence I do not feel it incumbent upon me to do so. If I were certain that the equipment had malfunctioned owing to an obvious design fault and that as a direct result Mr Bromsgrove had met his unfortunate death then I would not have hesitated to make that clear, although I would have to pay regard to Rule 33 (see below). The evidence I heard is not compelling on this point.

I remind myself that I am sitting as a Coroner. I am not sitting as a Deemster hearing a civil action. My duty is to explore the circumstances leading to the death of Mr Bromsgrove. I should not shirk from my duties nor, if I am satisfied, make what might be to some people unpalatable findings. However if I genuinely find that I am unable to draw positive conclusions on key facts, then so be it.

An inquest is a fact finding exercise. It is not a method of apportioning guilt, or civil liability. The procedures and rules of evidence which are suitable for one are unsuitable for the other. There are no parties, there is no indictment or statement of claim, there is no Prosecution, no Plaintiff, no defence and no trial.

Further, I am specifically forbidden from framing my verdict so as to appear to determine any question of civil liability (Rule 33 – Coroner of Inquests Rules 1988).

Bearing in mind what I have just said, in all the circumstances it appears to me that the proper course in this case is to record an open verdict namely that I am satisfied that Mr Bromsgrove died as a result of drowning but I am not satisfied as to the exact cause that led to his unfortunate demise.

Of course it goes without saying that I extend my deepest condolences to the family and friends of Mr Bromsgrove.

I would of course urge all divers, using whatever equipment they have, to ensure that it is properly maintained and serviced and in good working order at all times before embarking on potentially dangerous activities – that is a matter of simple common sense.

T M Moyle

Coroner

This 16th day of May 2008