PROVISIONAL REPORT ON THE 1982 DIVING-RELATED DEATHS (AUSTRALIA)

Douglas Walker

A total of nine (9) deaths were identified, involving all types of diving, one incident resulting in a double fatality. Of the two snorkel (breath-hold) divers, one was the victim of a shark and the other probably had a post-hyperventilation anoxic blackout. Of the five scuba divers, none were experienced and only two had received training. Hired tanks were a significant factor in three cases but there is no way to prevent the buddy from using a valid certificate to hire for another person. Only through the education of divers about the potential for disaster of making scuba available to the untrained can this problem be resolved.

Sudden catastrophic failure of a first stage regulator was the apparent trigger for the double fatality, one of the victims being on her first ever dive, the other was trained but inexperienced. The sudden death of one diver was the result of a heart attack, two previous "sentinel" post-exertion episodes of illness not having been recognized as of significance. The hookah (abalone) diver died when he ran out of luck and suffered fatal decompression sickness. He had many years of disregarding sensible diving practices and three spells in the recompression chamber before this episode. The user of the rebreathing set was taking part in an open sea military exercise and suffered a fatal "air embolism", having made a sudden ascent, possibly to escape "playful" seals though the true reason cannot be known.

CASE REPORTS

These reports are based on evidence presented at coronial inquests, with the exception of case RE 82/ 1 where the records are not yet available.

Sn 82/1

The victim was a member of a party of bushwalkers, one of whom had brought along a wet suit, weight belt, spear, etc. He was the third person to be given the use of the equipment. His friends started to call him back to the shore as they felt 50m was too far out and because a bag containing cleaned fish and abalone had been washed into the sea. A large fish with a fin was seen near the victim, a brief struggle was observed, and blood was seen in the water. The body was never recovered. Later, a large white pointer was seen in the vicinity of the incident area and was thought to be the fish responsible.

SHARK ATTACK

Sn 82/2

Both the divers involved were experienced breath-hold and scuba divers. The sea was calm and visibility was about 7m. They spearfished for a time, then the buddy returned to their boat to don his scuba while the victim made a further dive to a hole he had found. After 10 minutes, the buddy became alarmed by the non appearance of his friend at the boat and made a search. The victim was found on the sea bed in 12m deep water, the weight belt still in position. Hyperventilation before diving is usual in breath-hold spearfishers and in experienced divers can, by "washing out" carbon dioxide, lead to successful suppression of the urge to breathe, allowing hypoxia to compromise cerebral function. Only observation and rescue of the victim by an alert buddy can then prevent drowning from occurring.

SEPARATION (before the incident). HYPERVENTILATION BLACKOUT

SC 82/1

There were three divers; one of them trained and with his own scuba gear but the others were untrained and grossly ignorant and inexperienced. They were not closely acquainted and seem to have decided to go diving somewhat on impulse. Diver A used his Divers Card to hire two tanks, refusing the suggestion that buoyancy vests should also be hired. Diver B had used A's scuba once before, a solo dive while A remained on shore. There is no evidence that C, the victim, had ever used scuba previously.

The dive platform was a rock ledge about 0.5 - 1m above the moderately rough, 3m deep, water. A checked the kitting up of B and claimed to have checked C, but probably gave only a cursory glance at him. A entered the water first, immediately submerging to adjust a loose strap and so unable to observe his companions. Diver C was wearing A's wet suit and it was too tight, the hood constricting his neck. He was seen to surface in apparent trouble immediately after his water entry, trying to pull the hood from under his chin. He then became submerged again and was seen attempting to regain the rock ledge before being lost to observation. Two children on the shore thought that they had heard the victim try to persuade A that it was too rough to dive, but A denied that this conversation had occurred. Diver A was alerted to the trouble and made a search, finding the body on the rocky seabed. He ditched the tank and weight belt to assist him to surface with the body. Resuscitation was partially successful and the victim reached hospital, but died there from anoxia produced brain damage. Examination of the equipment showed that the regulator had been attached upside down, the hose leading over the victim's left shoulder. This is evidence of the victim's inexperience and of A's failure to make any real check.

DIVING RELATED DEATHS 1982.

CASE	AGE	EXPERIENCE VICTIM	EXPERIENCE BUDDY	WATER DEPTH OF DIVE	WATER DEPTH INCIDENT	EQUIPMENT SCUBA	EQUIPMENT VEST	COMMENTS
BH 82/1	32	Unknown	Not applicable	Unknown	Surface	Not applicable	No	Shark Attack
BH 82/2	27	Experienced	Experienced	12m	Unknown	Not applicable	No	Post Hyperventilation Blackout. Separation before incident.
SC 82/1	22	Nil	B: Trained C: Nil	3m	Surface	Hired	No	Divers Card used to hire 2 scuba for others. Refused to hire vests. Separation. Incorrect assembly equipment. Too tight hood. Poor choice dive platform. Rough sea.
SC 82/2	58	Trained but Inexperienced	Trained but Inexperienced	24m to 42m (?)	24m to 42m (?)	Hired	Not inf-lated	Separation when low air situation. Acute heart attack. Preceeding unexplained illness.
SC 82/3	19	Untrained	Trained but Inexperienced	12m	5m	Hired	No	Unknown problem caused incapacity. Divers card available to hire for other person. to hire Buddy valiant attempt to save.
SC 82/4	33	Trained but Inexperienced	Nil	7m	Unknown	Own	Not infl.	Diver card used to hire for other person. Error disconnection vest tank.
SC 82/5	27	Nil	Trained but Inexperienced	7m	7m	Hired	Not infl.	Explosive failure 1st stage. 1st Dive. No CO_2 cylinder in vest. Failure to attach scuba feed to vest.
H 82/1	41	Untrained but Experienced	None	20m to 25m	Not Applicable	Own	No	Decompression sickness. Severity DCS not recognized.
RB82/1	21	Trained	Trained	Unknown	5m ascent	Army (rebreathing)	Not applic	"Air Embolism"

GROSS IGNORANCE. ROUGH SEA. INAPPROPRIATE DIVE PLATFORM. USE OF ANOTHER'S "DIVERS CARD" TO HIRE SCUBA. NO VEST. SEPARATION. INCORRECT ASSEMBLY OF EQUIPMENT. TRAINED DIVER'S IRRESPONSIBLE LOAN OF EQUIPMENT AND USE OF DIVERS CARD.

SC 82/2

Though trained, the victim had found it necessary to take several courses of instruction before obtaining certification and was still inexperienced. The Coroner made strict investigation of the training and both Diving Schools were doubtless pleased that they had maintained good records. There was a history of two episodes during training where the victim had surfaced from a dive and then become cyanosed and "blacked out". She had neither attended a doctor nor told her husband, her buddy on this dive, concerning these events. It was a boat dive and the skipper checked that everyone was certified, correctly equipped, and had buddies. The site was a reef at 24m descending to 40m approximately. The victim and buddy were to remain at 24m, a depth condition given because of age and inexperience. They intended underwater photography. After 20 minutes, they decided to ascend as their contents gauges showed a low air situation. They started to leave the bottom together but immediately became separated and only one reached the surface. A search was instituted immediately the victim's absence was noted. The body was found still with all equipment intact and with the regulator in the mouth, buoyancy vest uninflated, at about 42m depth. The tank was showing empty on the contents gauge. Autopsy revealed the presence of significant coronary artery disease in one of the main vessels and it was suggested that a fatal cardiac arrhythmia had been triggered by an out-of-air stress, though this cannot be proved. It is suggested that the victim had lost part of her photographic apparatus and started a final search for it when she was expected to start the ascent.

SEPARATION. LOW AIR SITUATION. CORONARY ARTERY DISEASE. EXCEEDED PLANNED/ ADVISED DEPTH. RAN OUT OF AIR.

SC 82/3

As was their usual practice, the victim and his buddy hired scuba equipment before their camping holiday, the buddy using his "Divers Card" for this purpose. Neither was experienced, the victim indeed having been advised that he should not undertake scuba diving after he had attended a few diving lessons some time previously. His parents were unaware of this situation. They entered calm water together from a jetty and, after an initial difficulty with the victim's regulator had been resolved, started a slow swimming descent. When they were at about 15ft depth, the victim seemed to suffer some pain. The buddy assumed the cause to be cramps in the legs and started to rub them, but was kicked away. Realizing that something was wrong, he ditched the victim's weight belt, receiving another kick at this time. As the victim continued to sink and had let the regulator drop from his mouth, he next attempted to offer his own regulator but was repulsed. He therefore ditched the victim's back-pack and brought him to the surface. He was too fatigued during his efforts to tow his friend back to the jetty to call for help and it was only after the victim exerted a final flurry of activity and sank out of his grip that those watching from the jetty realized that this was a "for real" emergency. The body was recovered 15 minutes later, after the exhausted buddy reached the jetty. There was no air lack or other equipment problem.

INEXPERIENCED. UNTRAINED. HIRED TANKS USING BUDDY'S DIVERS CARD. NO BUOYANCY VEST. UNEXPLAINED PROBLEM CAUSED INCAPACITY. PANIC. VALIANT BUDDY ACTION. SURFACE TOW PROBLEM.

SC82/4 & SC82/5

These divers died in calm water soon after commencing their dive. There were no witnesses and the tragedy was discovered only when their bodies were found floating at the surface. It is believed that diver A had owned his twin tank scuba for 18 months to 2 years. He had bought it from a friend on the understanding that he intended to take a diving course. He is thought to have completed a course about six months before this incident and to have hired a scuba unit from the dive shop where he obtained his training in order to take his friend (diver B) for her first dive. Examination of the equipment indicates that shortly after leaving the surface, diver B's first stage explosively free flowed when the diaphragm disintegrated. This would have blown the regulator out of the victim's mouth, vented the tank's air, and produced immediate panic. Drowning probably ensued rapidly. Diver A is assumed to have attempted to give aid and to have drowned also, though his regulator was still in his mouth when the body was found. Diver B had a buoyancy vest but it did not have any CO2 cylinder and the tank hose supply was not connected. Diver A had a FENZY Vest but had, in error, turned the wrong tap and *disconnected* the air bottle rather than turning it on. Only 500psi had been used from the tank he was using (the other was turned off), indicating that the incident occurred early in the dive.

TANK HIRED USING BUDDY'S DIVERS CARD. FIRST DIVE. TRAINED BUT INEXPERIENCED BUDDY. CATASTROPHIC EQUIPMENT FAILURE. BUOYANCY TEST WITHOUT CO2 CYLINDER. BUOYANCY VEST USE ERROR (DISCONNECTION).

H82/1

He was a man respected in his community, an abalone diver with 15 years experience, but no training. He had received treatment for bends on three occasions, the most recent being 6 months previously. He followed the usual abalone diving practice of keeping no accurate note of the depth and duration of his dives but seems to have been working for 4-5 hours at a depth of 60-72 feet, though he stated the depth as 50ft. He had not left the water during this time though he had briefly surfaced each time (4-5) as a full bag was raised. No decompression stops were made. On reaching harbour he admitted excessive fatigue and seemed to be slow. However he denied that he was ill and returned home, arranging to dive again the next day. About 7 pm, four hours after he had surfaced for the last time, he telephoned a friend to say that he had the bends and needed treatment. He stated that the symptoms had commenced at 6.30 pm and that he was now finding breathing difficult. He was quickly taken to the local RCC and compressed to 60 fsw gauge. When seen by a doctor at 10.30 pm, he was seriously ill and an IV drip was started. His condition seemed to improve and he was taken from the chamber at 1.30 the next morning. Unfortunately, he suffered a relapse two hours later. Despite recompression to 165 fsw gauge death occurred as pressure was being reduced to 60 fsw gauge.

SEVERE DECOMPRESSION SICKNESS. TOTAL NEGLECT OF DIVE TABLES. DELAY IN RECOGNITION OF SEVERITY OF DCS.

RB 82/1

During an open water military exercise, the buddy pair of divers were aware of the presence nearby of seals. At one stage of the dive, the dive leader came to the surface to establish their position, leaving the victim at the depth of their buddy line. However, shortly later, the victim was seen to break the surface forcefully. The full details are still not available but it is presumed that an explosive ascent had been made and fatal cerebral "air embolism" resulted.

DISCUSSION

Shark attacks' are rare and this one was unpredictable. Film makers find difficulty in attracting sharks when they want to so the importance of the fish and abalone lost into the sea cannot be evaluated as a risk factor. Hyperventilation is a known risk to all experienced spearfishermen and this death illustrates that it is deadly when anoxic blackout occurs and there is no buddy watching and ready to effect rescue.

The scuba deaths illustrate the risks taken when scuba is obtained and used by untrained and inexperienced. Though the sudden equipment failure of case SC 82/5 could have resulted in the drowning of even a trained diver, the death of the buddy was at least in part a result of his inexperience. The hiring of the scuba in case SC 82/2 was completely legitimate. It is not known whether the victim had any awareness of her ill health and therefore the death can be considered as something which could have occurred at any time, anywhere, though the separation and underwater situation made a fatal outcome unavoidable. The value of keeping good records of training, and of correct diving procedures being followed, is thoroughly apparent, as severe adverse publicity would have affected the diving instructors in this case had they not been able to satisfy the Coroner. Nowadays the relatives of victims are more likely to seek to place responsibility on others than on the victim's own actions.

The hookah diver suffered the, thankfully rare, consequences of disbelief in decompression procedures. Unfortunately, the serious nature of his symptoms was not initially recognised and fatal changes proceeded despite the initial improvement.

Rebreathing units are full of problems and must NEVER be used unless special training has been received. Full details of this case are unavailable but it is known that immediate resuscitative attempts were unavailing. It illustrates that even an oxygen embolus can be fatal.

ACKNOWLEDGEMENTS

This report, like its predecessors, could not have been made without the ready support and assistance of the Attorney-General's and Justice (or Law) Department in each State, the co-operation of the Police in elucidating extra details in certain cases, and the active interest and assistance of several organizations and individual divers. The support over the years of the AUF and Instructor Organizations is noted with appreciation. It is hoped that such support will continue and increase.

UNUSUAL INCIDENTS FROM THE PAST

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"Three of us were waiting for a lull in the swell to get into the water easily when I saw a boy out beyond the waves frantically tear off his mask and flounder about desperately in about 20 feet of water. I immediately drew my friends' attention to him and off we went.

It was quite obvious what had happened to him when we reached him: his thick, long underwear, only held up by a belt, had fallen down and become entangled about his legs.

The moral of this story is - if you wear longjohns, wear your costume over the top of them."

Australian Skindiving and Spearfishing Digest, October 1955