

***Amana* – One Small Piece of Jigsaw**

By Grahame Higgs July 2007



P1789-0779-055 John Hopton

Four Engines Out

In an era when Australia was just warming to the concept of flight being a safe mode of transport, 24 passengers and five crewmembers boarded the Australian National Airways (ANA) flagship, the much feted DC-4 VH-ANA *Amana*, at Guildford airport, Perth, Western Australia. The time was about 9:30 pm on the 26th of June 1950. By 9:50 pm she was taxiing for Runway 29. Once airborne, *Amana* turned left to set heading overhead and to intercept the Perth-Cunderdin-Kalgoorlie track en-route to Adelaide and thence to her home base, Essendon Airport in Melbourne, almost 2000 miles away.

Unfortunately fate intervened less than 30 nautical miles later when at about 10:12 pm the aircraft inexplicably crashed in the West Australian bush.

Witnesses that night from along the route taken by *Amana* reported rough running, backfiring and even periods of silence from the engines. The Department of Civil Aviation accident investigation team determined that, earlier in the short flight, number four engine had been shut down by the flight crew and that subsequently the remaining three engines had all failed for indeterminate periods.

There was evidence that immediately prior to impact, number four engine had been un-feathered in an attempted restart, and that power had been restored to the other three. Additionally the aircraft had commenced a left turn, apparently returning to Guildford. Unfortunately it was all too late to save *Amana*. In the dark, in a 15 degree banked turn to port, the aircraft barely cleared a ridge line, struck a tree 30 feet off the ground and ploughed into a downward slope shredding itself and contents into small pieces as it went.



The Sun, 28 June 1950

The air accident investigation team learned that despite refuelling several times, most of *Amana*'s fuel tanks had not been checked for water contamination since she had left Sydney early that morning. This fact, along with corrosion found in the number one engine fuel passage intake, (below) led the investigating team to pursue a "water in the fuel" theory. However, there was another explanation.



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In their findings the investigators were not able to determine the source of the intake corrosion, nor were they able to explain the circumstances that caused an unusual crushing damage to the vapour vent floats in the strainer chamber of all four engine carburettors. This damage was described by the investigating team as being the result of "surge pressure". However, despite the best efforts of engine manufacturer Pratt & Whitney, the Australian Research Laboratories, the Department of Civil Aviation and the US Civil Aviation Authority, none of these respected institutions could identify what caused this "surge pressure", which remained one of the most perplexing of *Amana*'s mysteries.



National Archives of Australia: PP352/1, WA6297 PART 1

Amana's damaged Vapour Vent Floats compared to a serviceable unit on the right.

Gradually and inevitably *Amana* faded from public attention and by the time the airline was acquired by Ansett, she was remembered for the most part only by those souls touched by her untimely loss.

When I first became aware of the *Amana* story in 1975, there was very little in print regarding the accident and almost nothing available to a budding aviation historian. The rumours and folklore passed on in conversation by "those in the know" however, were tantalising in the extreme and I recall several times flying out of Perth looking down on the area from a comfortable airline seat wondering where she was and how could she, a four engine airliner, crash so suddenly and what, if anything, was left of her. And so I remained wondering until 1993 when, in a local bookshop, I couldn't believe my luck.

In the heady world of best selling literature the word "unputdownable" is tossed around with cavalier abandon when, clearly, the correct definition is *Air Crash* Volume Two by Macarthur Job. I'm not ashamed to admit that I disappeared from society for two days to read the book from cover to cover (and that was just the first time). At last many of my *Amana* questions were answered and I recommend that you read *Air Crash* Volume Two to learn the extraordinary, but plausible, chain of events that caused *Amana* to lose all engines.

Part of the story, well known to the staff of ANA at the time, came to light some time later and concerns the ground engineer who was checking the fuel drain valves for water in the tanks prior to her departure that night. In a classic case of "interrupted check list", he was called away to take a phone call from his wife who berated him over some domestic incident. Unfortunately he neglected to close the cross feed drain cock which he had previously opened as part of his checks.

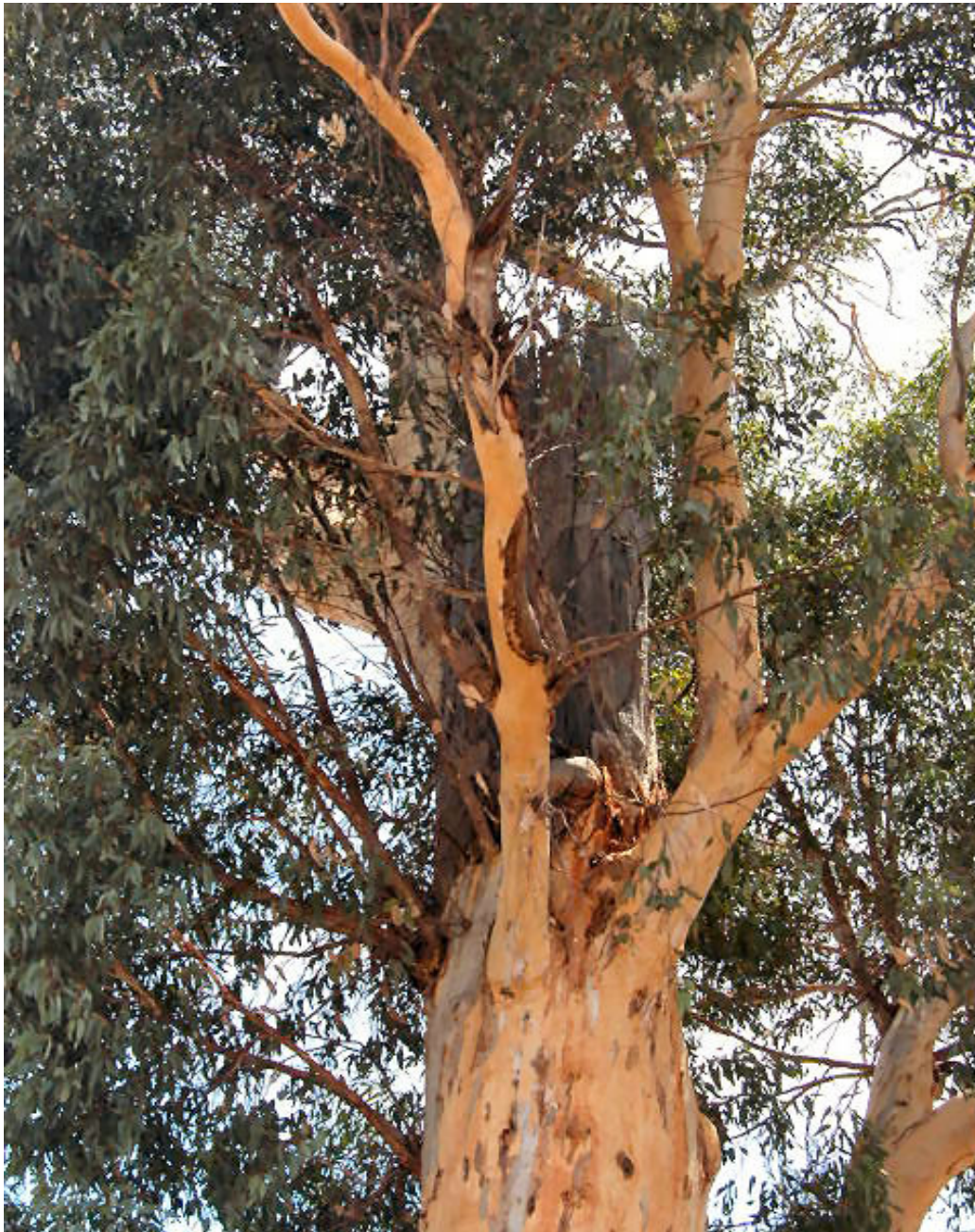
Amana duly departed on time and, for reasons known only to the crew, possibly rough running caused by faulty sparkplugs which were a problem at the time, they shutdown number four engine. When they went to balance the aircraft by opening the crossfeed valve to draw fuel from number four tank, now not required by that engine, the drain cock having been left open by the engineer drew in air. The result was the same as if there had been water in the tanks, the remaining engines all failed due to fuel starvation. Interestingly the investigation does not seem to have considered the possibility of air being the culprit.

Typically for me, more questions were triggered. "How about those crushed vapour vent floats, how could that happen?" I resolved then and there to learn more about *Amana's* final moments.

Eventually in 2001 my chance came. My good friend Harry and I were in Western Australia on a task for a previous employer of ours, the Royal Australian Air Force. With a free weekend, armed with only *Air Crash* Volume Two and a high degree of expectation we set off in search of *Amana*. After quite some hours, although not aware of it at the time, we were within one kilometre of the *Amana* crash site thanks to Harry's superior bush navigation skills. At that point we did what every crash-hound would do: we asked a local...a well-meaning gentleman, who promptly sent us three kilometres in the wrong direction! An hour of confusion later and we were back on track.

I knew that *Amana* had crashed in a forested area but that was 51 years previous and so it came as no surprise to find that the site is now a very active farm ably run by farmer, 'D', a top bloke if I ever met one. We told D what we knew about *Amana* and, much to Harry's delight (Harry is also a farmer), D showed us around the farm, including the now paddock but one-time crash site.

Despite years of cultivation, the signs of an aircraft accident are still there. Consider this tree for example, sheared off by *Amana* some 30 feet from the ground just prior to impact.



Even more graphic are the unmistakable remains of the port undercarriage.



New Wreckage – New Evidence

A year or so later I was back in Western Australia again and back in touch with farmer D whose first words were “Grahame I’ve just found some new wreckage from *Amana*, you need to see it”.

I certainly did need to see it: full marks to farmer D, the first person in 50 years to realise that this wreckage was something different.

The new wreckage was found about 1.5 kilometres from the crash site proper, well off the beaten track on a part of the farm seldom visited. As a consequence this was wreckage not seen by the original investigating team; they had little reason to suspect its existence or any cause to look for it.



The "new wreckage" in-situ.

There were five main pieces of *Amana* and a couple of smaller bits, all of which appeared to have been tossed onto a rocky outcrop when the small area around a nearby hill had been cleared for pasture many years previously. This was indeed fortunate because it had saved the wreckage from any bushfires that may have swept through the area.

A couple of the pieces seen below, as discovered, were particularly intriguing.



Obviously, if my sub-conscious was ever going to grant me another peaceful night's sleep, there was a need to find out what part of the aircraft they were from and how they came to be so far from the main crash site.

Typically, to find wreckage at some distance from the crash site it is reasonable to assume that it came off the aircraft in flight prior to the final event. Although the wreckage had some 50 years to migrate from the crash site to where it was found, there was no watercourse to carry it, no bush track or thoroughfare that would suggest that someone had chosen to dump the wreckage on that spot having become tired of carrying it, nor was there any evidence to suggest that the wreckage had been anywhere else in the previous five decades. In fact the moss growing in the folds and the organic debris that had collected in the concave sections suggested that the wreckage had been there for some considerable time.



The first piece we considered was quite startling to see. It consisted of some crumpled heavy-gauge alloy that, remarkably, contained a complete inspection hatch with a distinctive shape and latch design.



The inspection hatch and the area around it bore traces of black paint with distinct edges, paint that was quite rough to the touch, something akin to an anti skid walkway on the wing. However, it made no sense to have a walkway over a fragile inspection hatch so the reason for the black paint initially remained unresolved.

The “hatch” piece was also distinguished by having a double row of screws along one edge.



The DC-4 is fast becoming a rare bird globally; as a result there is only one handy to Australia, VH-PAF, actually a C54, the military version of the DC-4. VH-PAF is based at Archerfield airport in Queensland which, by a lucky coincidence is where my office is also located. So it was that some fascinating bits of *Amana* flew higher and faster than she ever had before, across the continent to Brisbane. The mission: *Identification*.

The DC-4 is covered with inspection hatches of a variety of designs, so we spent some time trying to match our double row of screws and hatch/latch design with something similar on VH-PAF. Eventually there was a very rewarding “eureka” moment when my colleague CJ discovered a perfect match under each wing.



Port Wing



Starboard Wing

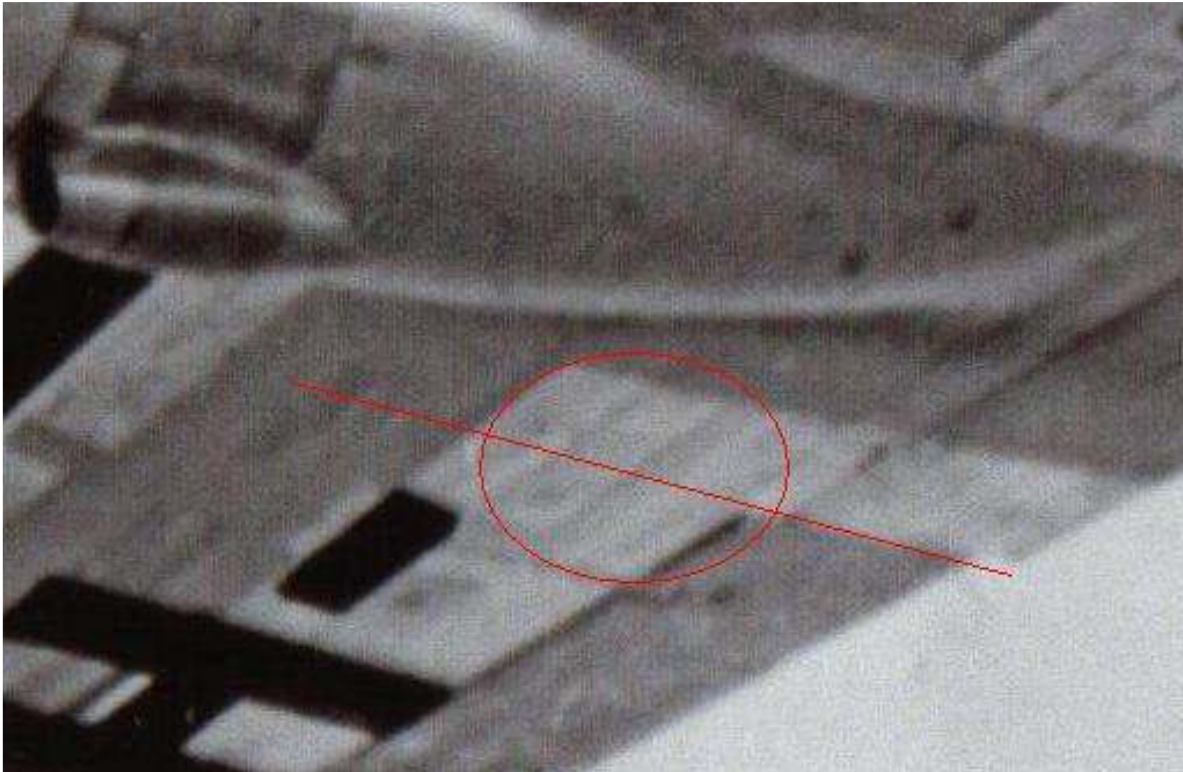
The port wing panel was about mid span between number one engine and the wing tip, between the third and fourth aileron hinges, while the starboard panel was closer to the number four engine nacelle opposite a notch where the aileron and flap abut. They both had the correct double screw edge and hatch/latch shape and orientation, so which was our piece? What we needed was a good under wing photo of *Amana*.

Being the ANA flagship, there are some great shots of *Amana* still about, albeit not many of the underside. Luckily there is this beauty from the John Hopton collection.

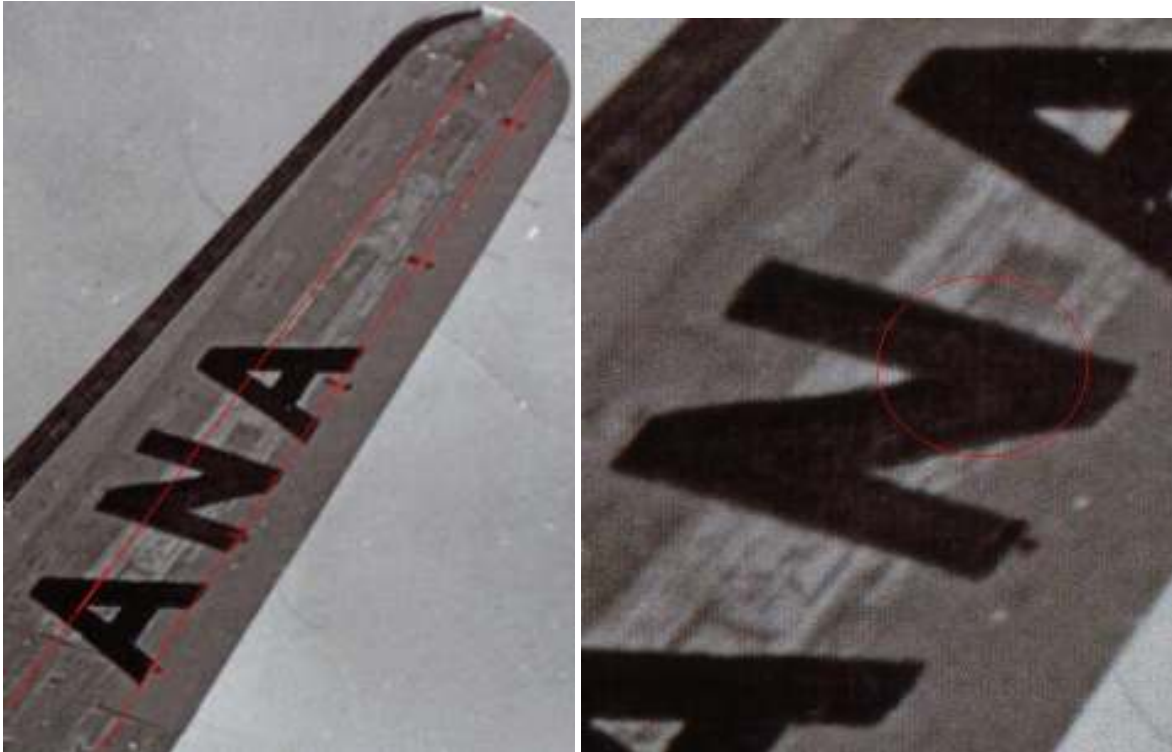


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Notice that the starboard wing opposite the aileron/flap notch is bare aluminium.



While the port wing between the third and fourth aileron hinges (counting from the wing tip inboard) proudly sports *Amana's* registration letters "ANA".



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Thus we concluded that our first piece is from the under surface of *Amana's* port wing and that the black paint is part of her registration.

The second piece, named the "Bow Tie" piece, is also of a heavy-gauge alloy that appears to have been folded "fan like" before being twisted off the aircraft.



It also shows traces of black paint on one side, established as being an external surface by the position of countersunk screw holes and screw heads.



On the inside surface it has a significant quantity of Mica trapped in the folds of the concertinaed “fan like” damage. The purpose of the Mica is yet to be determined.



Given the weight of this piece of wreckage, the gauge of aluminium and the traces of black paint, this is thought also to be a piece of wing skin, possibly (but not confirmed) from ahead of the inspection hatch piece towards the leading edge.

The third bit of wreckage, a small piece of the jigsaw, much less imposing than the previous two, proved to be the most interesting and revealing.

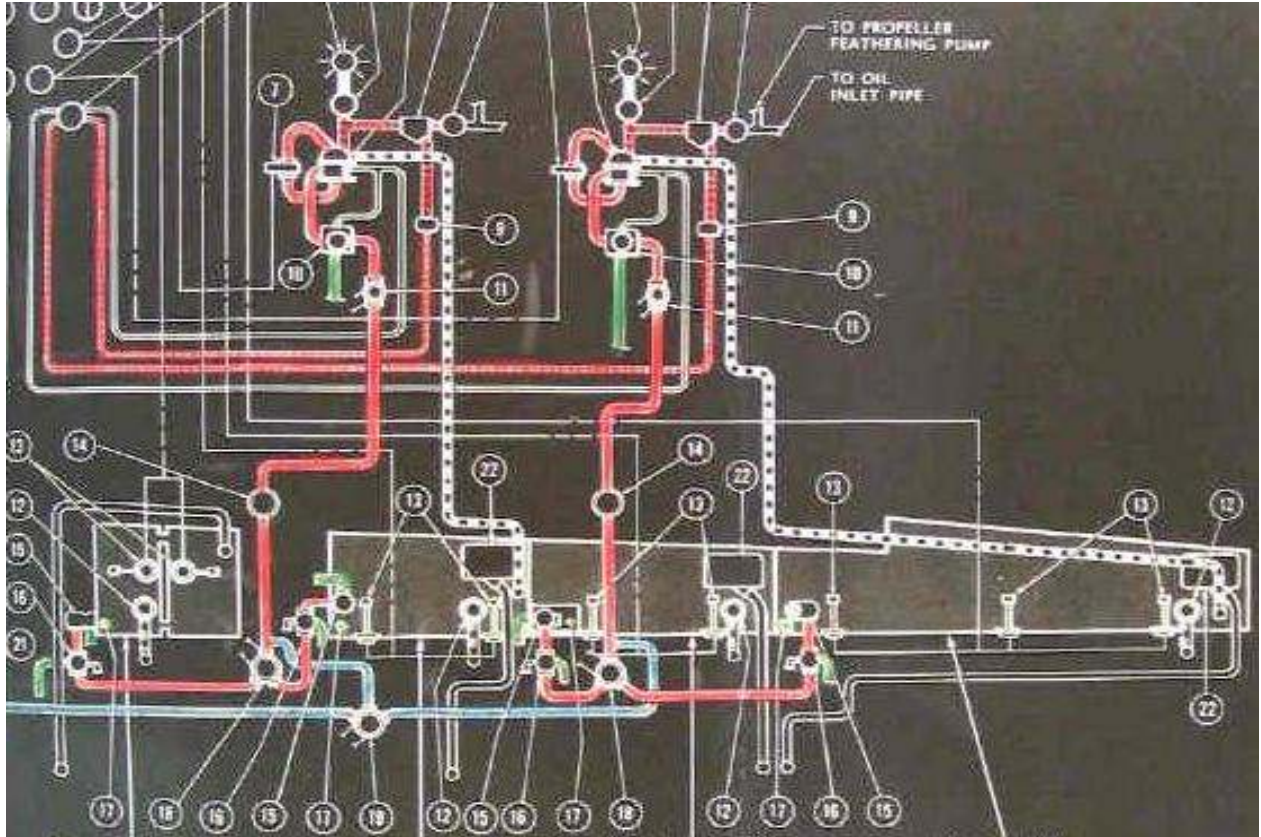


Made of much lighter-gauge aluminium than the wing skin wreckage, the third piece had a clear scorch mark across one face. Significantly, the scorch mark was uniform throughout the creases and wrinkles indicating that whatever the event that caused the burn mark, happened before the piece became crumpled. The other side of the wreckage showed no sign of being burnt. Were we just lucky or was it more than pure coincidence that on an edge of the wreckage, a solitary screw head remained trapped by a fortuitous fold?



The shank of the screw protruded into the burnt face, while the head rested against the un-burnt face. This told us that the burning process took place **inside** what ever this once was when intact.

Knowing where the inspection hatch piece had come from we felt it was reasonable to postulate that the scorched piece also came from the same general area on the wing. Reference to the fuel diagram for the DC-4 revealed that in the area that the inspection hatch came from, the wing housed the main fuel tank for number one engine.



National Archives of Australia: PP352/1, WA6297 PART 1

During the original accident investigation, five witnesses reported an explosion and, of those five, farmer R. Inkpen and beekeeper L.B. McNamara also reported seeing a small flash some 20 to 30 seconds prior to an enormous flash that lit the night sky.

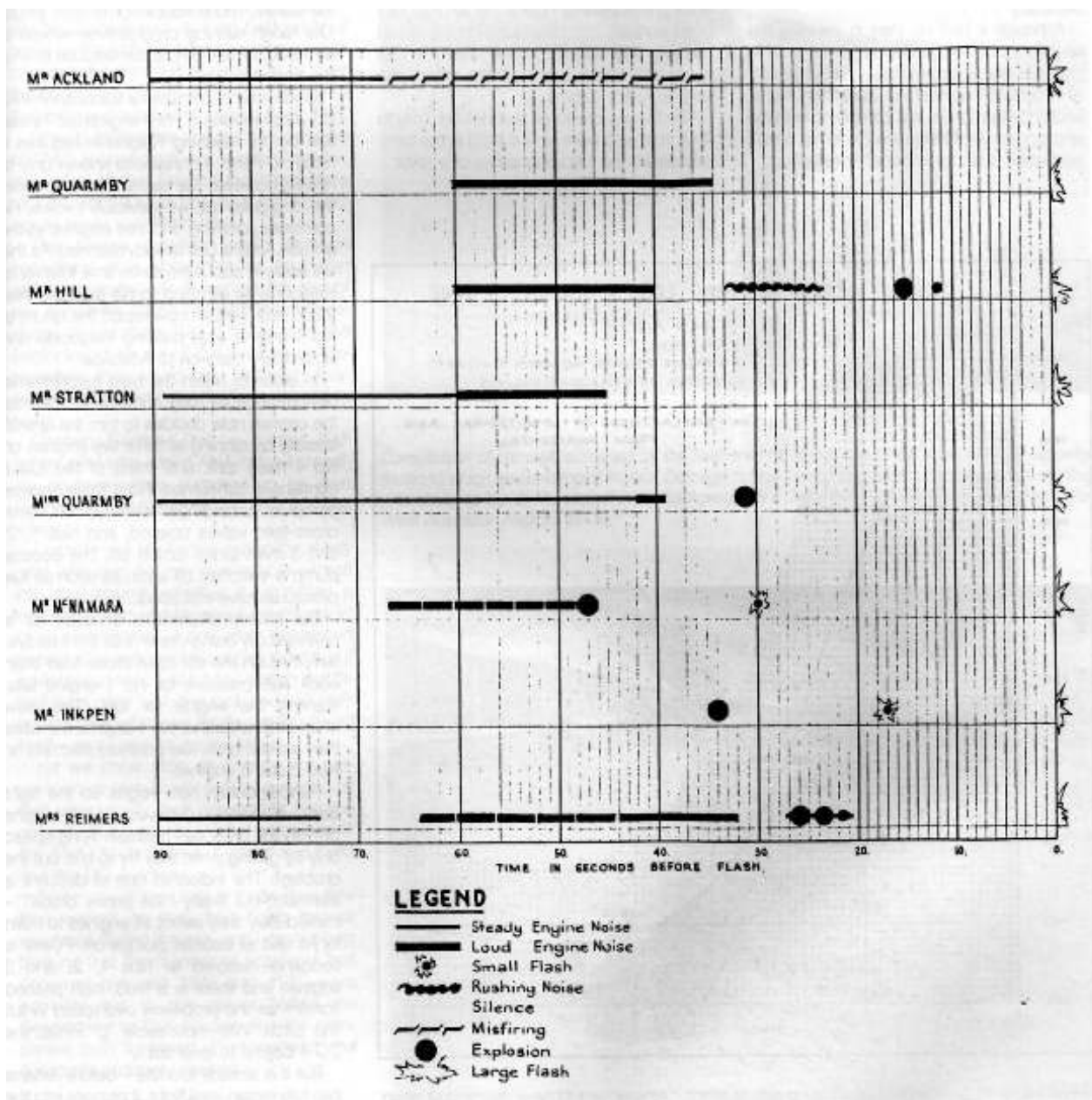


Diagram prepared by investigators graphically comparing evidence of witnesses in locality of accident. (BAS)

Final Moments – A Theory

Could it be that *Amana*, with three engines now running, and just pulling up out of the dive, first struck something much earlier than was initially determined and in doing so ruptured and ignited an outboard fuel tank (possibly number one main tank) which caused significant damage to the wing? The “new wreckage” would suggest that this scenario was quite possible and that this was the explosion and small flash reported by Inkpen and McNamara.

Additionally, if the damage was to the port wing as suggested by the inspection hatch wreckage, resulting in an equally significant loss of lift, and probable damage to the port aileron linkage, the subsequent turn 100 degrees to the left away from the direct Cunderdin track, as identified in the accident report, may not have been entirely intentional.

And finally, could the shock of the explosion have triggered a momentary intense pulse of high pressure into the fuel lines, the “hydraulic” effect of which caused the vapour floats to crush as the over-pressurised fuel

was forced through the vapour vent? In other words could this be the source of the investigating team's "surge pressure"? Without a small scorched piece of *Amana* jigsaw the best brains on the job in 1950 had only the Inkpen and McNamara testimony to even hint of this as a possibility.

Despite her loss, *Amana*'s status as a pinup girl secretly continued. Although ANA had apparently replaced *Amana* as flagship, her image was still promoting the airline disguised as VH-AND *Tatana* and eventually as VH-ANC *Warana* right to the last.



Post cards of the period with a versatile Amana playing herself and her two sisters.

And indeed like many a pin-up girl before her and since, *Amana*'s premature demise spawned questions and mysteries that are still waiting patiently for resolution. The puzzling case of the crushed vapour floats may have taken 57 years to solve however, while solved I believe it to be, I also believe that *Amana* has not disclosed all her secrets just yet.

Now, where did I put my copy of *Air Crash Vol Two* by Macarthur Job?

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- The National Archives of Australia for their Accident Report photos and data.
- Web site www.ADF-Serials.com for hosting the *Amana* story.
- The Civil Aviation Historical Society Museum at Essendon Airport Melbourne, fitting custodians of the *Amana* wreckage referred to in this article. www.airwaysmuseum.com

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Mr Peter Chapple, son of Amana's Captain R.J. "Jim" Chapple; author Grahame Higgs; Macarthur Job OAM; and Roger Meyer OAM, CAHS President, at the presentation of the Amana wreckage to the Airways Museum, 26 June 2007.