Pilot training and airline safety including consideration of the Transport Safety Investigation Amendment (Incident Reports) Bill 2010

Committee Secretary
Senate Standing Committee on Rural Affairs and Transport
Parliament House
CANBERRA ACT 2600
AUSTRALIA

Dear Secretary

This a submission to the pilot training and airline safety enquiry mentioned in the title of this document.

Unfortunately this submission is rushed I would need more time to provide evidence or science to support my opinions. If requested that can be provided. I have attached a short description of my history to establish credibility to make quality comments.

I wish to address the issues of;

- Competency versus experience in the performance of aviation skills, and

- Decision making processes in the establishment of aviation training standards within each state authority contracting to the Chicago Convention, and

- The need to provide legislative immunity for pilots and other crew who report on aviation safety matters.

I have been involved in the development and implementation of pilot training systems most of my working life, first as a flying instructor in the RAAF, then as an exchange flying instructor in the USAF, as a civil flying instructor in Australia teaching airline cadets and as the General Manager Personnel Licensing with the CASA.

My comments relate to abinitio pilot training and specifically to the skill development of airline cadet pilots.

Background Comments
Although there is a huge volume of scientific knowledge about skills training, the science is seldom permitted to penetrate into the practice of pilot training which generally lags the known science by sixty (60) years. Some pressure groups (motivated by self interest) lag by more than sixty years and the senate should make its own tests to identify these groups.

It is my experience that, if this enquiry makes decisions based on;
- the opinions of various vested interests and pressure groups, it is more likely;

- to take aviation training standards backwards than take it forward.

A decision that will enhance aviation safety can not be achieved by summing the squabbling opinions of vested interests.

The senate will need to apply known sciences from education and academic training experts from outside the aviation industry if it is to objectively assess the standards of training within the aviation industry.

The industry is far too inbred to provide an objective opinion of its own aviation practice.

Competency versus experience
I have studied the issue of competency versus experience since 1976.

I spent three years working in a USAF Human Resources Laboratory studying Human Information Processing, competency based training and assessment and skill transfer from training devices to an aircraft.

- **This was almost 40 years ago and the findings are still in advance of current practice.**

- **This demonstrates how slow this industry is to evolve and its resistance to the adoption of scientific fact.**

Unfortunate flying evolved in response to changing situations rather that fitting into some scientific design.

Aviation practice is a product of evolution and definitely not a result of intelligent design. Most of the training procedures and techniques have been passed on from generation to generation by way of verbal history. Many flying practices have their origins in world war one and two. At that time perceptions were formed without any objective science being applied.

Compounding the evolution problem was the fact that aircraft manufacturers improved the hardware and software to compensate for human piloting skill inadequacies so the humans have not been forced to evolve their training and understanding of flight because the technology has saved them from their own inherent weaknesses. Aeroplanes are now pilot friendly.

In the early days of aviation there was a nexus between experience and competency. This nexus was observed but the tools were not available to analyse cause and effect so the connection passed into folk law instead of science.

Let me explain my observation, because I conclude that the cause and effect are the opposite of that generally accepted in aviation today. Aviation began as a military activity. Pilots were the gunfighters of the day, they fought epic aerial battles, one on one or ten on ten, only the best survived, only the best became "experienced".

The early pilots were very poorly trained when they went into their first do or die encounter.
- the only thing that saved them was luck or natural competency.

Those who lived logged flying hours and learnt more in their first battle than they did in their in their entire training experience.

- So a fight to the death became on the job training.

The enemy tried to find new ways to kill pilots so only those who could learn rapidly survived.

- The average died the excellent survived to log flying hours.

Each experience provided more competency and pilots with 100 hours of combat experience were identified as super human beings and so the connection between experience, competency and learning rate was established.

Similar situations and observations occurred during World War Two.

After WW11 aviation started to boom and the Standards and Recommended Practices (SARPS) of the International Civil Aviation Organisation (ICAO) were written into history, but they were totally dependent on the lessons of the wars, where the nexus was established between competency and experience.

- The best lived, the average died; experience was a real statement of competency.

Even in civil aviation during these early times survival equalled competency, aeroplanes were difficult to fly, little was know about meteorology, aviation facilities and aircraft were not reliable, there were no navigation aids and again the competent survived to log flying hours and the incompetent died. But still gaining experience relied on the pilot's competency so in early civil aviation the nexus was valid.

But this validity of experience and competency is in the reverse sense of how it has come to be applied today where it is assumed that;

- experience brings competency and therefore;
- experience can be used as a measure of competency.

 In making these assumptions the cause and effect have been reversed.

After WW11 the hardware improved, the software improved, the maintenance improved, navigation aids proliferated, meteorological services improved, training took a step forward and covered most of the skills needed. Regulation improved such that pilots and operators were forced to implement safe procedures. It is often said that every aviation regulation is written in blood.

Over the sixty years after WW11 all of the aviation systems improved such that pilots need only do as they are told to survive. Many flying hours are logged while the aeroplane is on autopilot or while the pilot is sitting down the back managing personal business affairs.

In modern aviation the connection between hours of experience and pilot competency has been broken because death is not eliminating the incompetent, and they continue to log flying hours.

Now let us look with more precision into the question of experience and competency as a measure of standards.

Take an activity that is a little difficult to experience in an aircraft; for example ditching a regional airliner. (Note this is a hypothetical situation used to explain the difference between competency and hours of experience).

Pilot (A) has 12,000 flying hours most of this time was accrued as a crop duster during single pilot operations in the bush and while acting as a one man band. He is a skilled crop duster and competent in this environment. In recent years he completed regional airline training with a company that operates mostly overland and gives the minimum legal attention to ditching procedures. His training consisted of an aircraft simulating ditching and was flown down to 200 feet over water, plus water escape exercises in a swimming pool but no aircraft cabin was provided, **he only answered verbal questions about the company ditching procedure over the last 200 feet and impact with the water.** This pilot took several attempts to establish competency in ditching procedures because of difficulties with crew coordination and the passenger management.

Remember he was never required to consider these aspects of flying as a crop duster.

Pilot (B) has 2500 hours; 2000 of those hours were completed in the airline check and training on this aircraft type, his airline operates over water and provides quality training and assessment on ditching. This airline operates a modern flight simulator and a static part task trainer that allows full practice and assessment of ditching competencies including impact with the water and water escape procedures from a simulated aircraft cabin full of passengers. On numerous occasions this pilot has practiced ditching in the simulator and part task trainer all the way into the water. He has been assessed as competent on all occasions. He is very competent in the crew and passenger management aspects of ditching because all of his working life has been spent in a crew managing passengers.

If you were a passenger sitting through a ditching, which pilot would you like to be flying your aeroplane, the experienced crop duster or the competent inexperienced airline pilot?

Flying experience can lead to a negative transfer of skill from one activity to another; for example pilot (D) has been flying single pilot operations for 10,000 hours with various GA operators that have all operated to the minimum standard, he has learnt and practised how to take off over weight, how to cheat on his crew duty time, how to fly unserviceable aircraft, and how to operate below minimum legal fuel requirements.

We all know about pilots who chose to operate this way.

Let us consider what experience he brings to an airline.

A pilot who has competencies at illegal operations takes those attitude and competencies to the airline and is often worse than an inexperienced pilot who has been totally trained by the airline.

An airline operates in a multi-crew environment. Management of the crew is an important factor in safe airline operations. It is well know that pilots who have extensive single pilot time have difficulty delegating and performing competently as a crew member so, again, experience can bring a negative transfer into the aeroplane operation in a different environment.

Flying hours do not equate to competency they can bring a negative transfer and may be accrued while sitting watching an auto pilot or during very simple straight line activities that have little skill demands.

In military training all over the world the world 200hr pilots go straight to command of heavy high speed jets or into the crew of huge transport aircraft and within 4-5 years they are commanding those aircraft sometimes, in dangerous and difficult environments.

I have been involved in the training of airline cadets for many years and all of my graduates have passed theairline check and training and are progressing into command. Recently one of my low time graduates was forced to take over from his very experienced Captain who continued to operate below the lowest safe altitude despite several warnings from the inexperienced first officer.

- That airline is very fortunate that it had a competent yet inexperienced pilot on board.

- In the military and in airlines all over the world it has been proven that low time pilots can be trained to be competent.

Let me sight another example that is a common experience in aviation.

A B747 Captain with 25,000 hours of experience in heavy jet multi crew time decides to take up flying a light piston twin engine aeroplane as single pilot IFR. One would expect that if flying hours conferred competency this pilot would have no trouble with the slow light aeroplane. As a flying instructor I have often seen this situation and I can assure the Senate that every one of those pilots (that I have trained) struggled to demonstrate competency in the light aircraft.

It is my observation that, if a pilot has performed many competency checks while accruing the hours then the pilot's competency will be high, but, if they have flown the hours without the need to meet objective competency checks then the experienced pilot may be operating at a very low standard.

- Again the factor that drives the standards is the competency checks that have been completed on the pilot during his experiences, not the flying hours.

Pilots generally display resistance to incorporating other sciences in aviation, the science of Competency Based Training and assessment is well established and recognised by universities and vocation education authorities.

Under competency based training the exact skills are trained and assessed. While in an experience based system assumptions are made that experience has bought with it competency; this may or may not be correct depending upon the pilot experiences and the competency checks performed during those experiences.

- **It is not valid to claim that experience carries with it competency.**

The forging of flying hours by airline pilots
Let me now discuss another aspect of experience versus competency. That is the authentication of experience.

During flight test it is not possible to identify how many hours a person has experienced. Inexperienced pilots can fly as well and sometimes better than experienced pilots. When experience is set as the standard it leads to the forging of experience because this cannot be detected by the pilot's skill demonstrations.

False hours in the log books of pilots seeking airline entry is commonly accepted in the airline industry world wide and Australia is not isolated from this problem. I have often been told by my graduates that experienced airline pilots have told them to "do what we did, get yourself a log book and fill it with hours, nobody will know".

In the past this practice was referred as P51,time. Parker 51 the US pen manufacturer, not the P51 Mustang fighter of WW11. More recently it has become known as VH-BIC time where the BIC stands for a well known brand of ball point pen.

In the military and civil flying training the organisation must certify the correctness of the pilot's log book each month but no such requirement exists for a practising pilot in the civil aviation industry. Some commercial operators do this as part of their procedures but many do not and there is no legal requirement to certify the line pilot's log book. So log books are easy to forge and there is little chance of detection because it is not reflected in pilot competency.

It is my advice that if the Senate were to determine that flying hours do carry competency and that should be used as entry qualifications there must be procedures developed to require the authentication of the hours in the pilot's log books. One without the other is useless.

I was recently told that the Chinese CAAC conducted a log book check of one airline in ShenZhen and found that 40% of the pilots had forged log books. I do not know how the depth of this problem in Australia, but I do know that there are many reports of this happening in Australia.

If the forging of flying hours can not be detected through flying competency checks, then there is no connection between hours and competency.

Decision making processes in the establishment of aviation training standards within each state authority contracting to the Chicago Convention.

Each country publishes standards designed to protect aviation safety in that country. Usually these standards are developed as a result of consultation and often they are knee jerk reactions to accidents or incidents occurring in that country.

- In most situations they are developed from pilot opinion and not from science.

In each country the political, aviation, geographical, meteorological and airspace environments are different. Over the years refining the regulations and standards of each country means that if you change one part you stress another and cause a reaction that is unique to that country.

For example, a country that has minimal flying training structures and theory examination standards or no competency based criteria for entry standards may decide that because of inadequacies in their system they want airline pilots to have 1500 hours before entering an airline. That may not be the most scientific requirement but within the inadequacies of their system that is all they can do.

Such decisions are usually emotional reactions of the pilot body that are drawn from the perceptions formed in WW1 and WW11, then verbally passed on from generation to generation.

During WW1 and WW11 competency had a nexus with experience because the incompetent were killed, in today's aviation environment there is no connection that I have seen, between hours and competency.

It would be a backward step for Australia to adopt an experience based standard and just follow the knee jerk reaction of another country that has different pressures and a different aviation and legal environments.

If the other country can show an objective scientifically calculated connection to competency and hours then Australia should consider the application of the same or a similar objective criteria into the Australian aviation environment;

- if they cannot, then Australia must understand that the other countries unique decision is not applicable in Australia without aligning Australian to all of the stress factors to the country of origin.

- **Just picking parts of one aviation system and injecting it into another different system induces chaos and results in a reduction of aviation safety.**

Australia can do much more for aviation standards than just guess or base decisions on World War observations.

Australia has the expertise to set objective competencies criteria for airline entry. Australia is a world leader in the application of competency criteria through the establishment of The National Competency Standards that were developed from the competency of the Day VFR Syllabus. Licences such as the Multi-crew Pilot Licence and the Private IF Rating, place Australia as a world leader.

It would indeed be sad to see the World War 1 concept of competency by experience replace the science of competency based standards in Australia.

The Vocational Education and Training Board (VETAB) in NSW has provided outstanding assistance to me in developing competency assessment and training systems for my own training school.

The expertise is available but you must move outside the narrow attitudes of most of the aviation industry

It is my advice that aviation needs to look for expertise outside of aviation, because all aviators in Australia have been trained by the same WW1 and WW2 perceptions.

The scientists and educators won't understand aviation but they do understand assessment, education and training and some of us in aviation want to work with them to improve aviation. This opportunity must be exploited to take aviation forward in a scientifically validated manner.

The CASA is charged with setting entry standards and they must set them at the minimum safe standard otherwise competent persons will be excluded and this exposes administrative injustice.

CASA has no choice but to set the minimum entry standard. If there were to be an objective and non aviation aligned organisation that could certify pilots or flying training schools who reach higher levels of competencies, this could be used to drive standards and allow recognition of competencies suitable for airline entry.

This is a great opportunity to place a little intelligent design into flying training.

- Please do not evolve Australian Aviation backwards.

The process of consultation in the making of standards is not beyond corruption by public opinion generated by vested interests.

For example a union has the task of protecting its members, it has no responsibility for the safety of the aviation system only for the safety of its members. Pilot and maintenance engineer unions make a lot of noise under the cover of aviation safety but often safety is not their motive, and the Senate should be aware that this enquiry is exposed to this problem.

If for example, a new licensing procedure or competency is proposed and this system could identify that new entrants as more competent that the existing union membership;

- the union will fight this;

- on the grounds of aviation safety, yet their opposition may well be contrary to aviation safety.

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I have seen unions represented on aviation safety working groups who are political activists with no experience or knowledge in the areas they are representing. The expertise of people making submissions needs to be determined, opinions do not bring facts.

The need to provide legislative immunity for pilots and other crew who report on aviation safety matters

It is obvious there is a need to protect aviation participants who blow the whistle, but the question is how, this is a small industry and the backlash can be very damaging.

- Even with the CASA there can be a problem if you do not toe the line.

When I was the General Manager Personnel Licensing in CASA it was well known that the Paper Examinations, for Aircraft Maintenance Engineers (AME) were compromised and freely available in the industry.

The Chairman of the Board alerted me to this fact and asked me to phone around and obtain a copy of a stolen examination. I promised the persons they would not be identified. One paper turned up in the mail and I destroyed the envelope because the post mark would have identified the sender.

I provided this paper to my superiors who immediately began a Federal Police enquiry into who sent me the paper, how I obtained the paper and why I destroyed the evidence.

I was accused of taking it from the examination cabinet that I had no access to. Fortunately the paper had been stapled together with a rusty staple some years previously and the staple mark was on the first and last page and no paper in the CASA cabinet had such a mark.

I was given a redundancy and my career in the CASA terminated, to my knowledge nothing was done about the corruption in AME exams and I am told it still exists.

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