

THE ANTITHESIS OF SAFETY

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FENCES, COMPARTMENTALIZATION and AGENDAS LESSON LEARNED BUT NOT SHARED

TRUTH noun: The actual state of things in conformity with fact or reality;
A verified fact, proposition, principle, or an actuality or an actual existence.

THE CIVILIAN DESIGN PROCESS

The certification of air vehicles (aircraft and helicopters) by the Government of the United States is accomplished through two very different processes having to do with ultimate use of the air vehicle. The Government through the Department of Transportation's FAA oversees the process of civilian manufacturers bringing forward new vehicles for civilian usage.

In the conceptual and design phase of a new air vehicle the manufacturer has a great deal of latitude since the companies long term goal is to create a viable profitable and safe product for sale to the US and Worlds consumers. An aircraft destined for airline operation and passenger carrying must be many things. Design engineers would say that the aircraft need be safe, cost effective and fulfill a market place need better than its competition. The idea that a manufacturer has latitude to create an air vehicle is tempered with the fact that his air vehicle must demonstrate that it can meet and exceed certain minimum engineering standards set by the FAR engineering standards for air vehicles.

The civilian rules and stringency of requirements depends upon the size and use the contemplated vehicle is expected to fulfill. Airline and commuter vehicles have a higher standard than general aviation machines designed for small aircraft to be flown privately.

The distinction and differences are practical but arbitrary. The more stringent engineering requirements are for air machines that expose more persons to harm. Fixed wing standards are found in *FAR25* ⁽¹⁾ for large Transport Category aircraft and *FAR part 23*, ⁽²⁾ for small General aviation machines.

The Helicopter and rotorcraft naturally have different engineering standards found in *FAR PART 27*⁽³⁾ small and *FAR PART 29* ⁽⁴⁾ Transport helicopters.

THE MILITARY

The Military Services and NASA are empowered to order companies to design and build purely military and space oriented research vehicles and weapon systems under Conceptual and Full Scale Development [programs far different than the civilian process.] More over, the military is allowed to purchase civilian version equipment, slightly modified civilian equipment or hybrid

equipment that has been extensively changed and modified. These conceptual, development, testing and procurement programs for the government are controlled through a Federal Acquisition Regulations and a Department of Defense version of *FARS*. *See(5)(6)*

In either case, the design of air vehicles for the airline or for civilian use the truth is that the government and the military is incapable of designing or building air vehicles. In fact, they are notoriously incapable of that task. The military and civilians each employ think tanks and offices to conceptualize the needs of the service and the future of aviation in the viable marketplace. After that exercise the government is ill equipped to design or build much of anything when it comes to air vehicles. The government provides money and oversight in a procurement process. It generally does not design or build actual aviation product. It relies on civilian companies to design aircraft. Pierre Sprey the legendary co designer of the lightweight F-16 simply told us “The USAF does not design airplanes it buys them.” *(7) telephonic interview notes*

FAR ENGINEERING STANDARDS ARE OLD WHEN PROMULGATED

In the civilian world the FAA promulgates engineering standards that a designer /manufacturer must demonstrate compliance with in order to Type Certify a new aircraft as being worthy of being produced by a company for use in USA. The Engineering Standards and Performance standards a new machine must demonstrate represent compliance with old requirements and sometimes minimally sufficient safety

When an aviation manufacturer approaches the FAA with an application for a new aircraft Type certificate the proposal is date stamped and assigned a version of the FAR engineering standards the new machine must comply with. Naturally the Engineering standards generally improve over time. As such improvements or changes happen to the FAR engineering standard the TYPE certificate as issued need not adopt the newer higher standard.

Such standards are always behind state of the art because rules issued are issued based on tested engineering principles and represent standards that are tested and understood. Standards are not issued on speculation or guesses. Thus each engineering standard is already old and tested. These standards have been tested and approved...They are not State of the Art nor are they in any way a warranty of safety. The engineering Standards published in a particular version of *FARS* simply shows engineering standard in place on a particular date. *(8) (9) Example see 7 and 8 note autopilot rules changed in 1968 and then in 2006 ...a lot of aircraft were certificated under old rules.*

Also allowable and usual within the FAA DOT rules is the fact that aircraft have traditionally been grandfathered in to the standard their particular Type certificate reflects. This means the old aircraft can continue to be produced

even though the engineering standards may have been upgraded significantly. This rule does not enhance safety and sometimes it is detrimental to safety.

Examples abound... The Beechcraft Butterfly tail known as the V tail Bonanza was grandfathered in to old Civil Aeronautic Board engineering standards. The V tail was used in same or similar structure as the aircraft was stretched -made faster -made heavier and had increase service ceilings. The tail seemingly had a propensity to flutter or bend in aero elastic deformations. Beech craft refused to retest the tail in other than static loads required under CAR 3 standards. Finally after needless deaths the leading inboard portion of the tail was strengthened. *For full story see (10)A.B.C.D.*

Example: The MD -80 series aircraft was type certificated during 1979-1980. The DC-9 started the line with rollout in 1962. It created a Take off Warning system was designed allowing any of several single point failures could cause it to fail passively. This was because it was certificated under very old rules that preceded even the DC-9. Some engineers at DOUGLAS Aircraft did not believe that TOWS was not a critical item.

The old rules that were grandfathered in suggested that an airplane could fly without a configuration warning. Thus the warning was not critical to safety of flight. A safety department at Douglas other than the certification office wrote MEL lists that said the TOWS was a critical item and a “no go” item for dispatch. In 1987, 150 people died in Detroit partly because the TOWS system did not warn that the flaps and slats were not configured properly for Take off. The NTSB warned and recommended that the TOWS system should no longer fail passive. They wanted TOWs tested every flight not once a day. The FAA did nothing to retrofit changes but they did institute a rule change for future type certificates. Twenty years later another 150 people died in an MD-83 in Madrid Spain because the old Type Certificate had been grandfathered in. It is noteworthy that McDonnell built the second aircraft about 5 years after the certification Change. It is also noteworthy that a change was both state of art (technically feasible) and not costly. It is noteworthy that almost 1300 MD aircraft were built after the NTSB recommendation and that over 800 were still in service at the date of the crash. The Boeing B717 (MD-95) does have a different and safe TOWS system. *See 11, 11(A), 11(b),11(c,) 11(d.)*

It was 1988 and 1993 when the FAA got around to fixing things but of course they did make the new rules retroactive. Consequently 800 defective MD-80 series machines are considered airworthy and safe.

NTSB Chairman for NWA 255 said on affidavit from a hospital shortly before his death that he was saddened and upset to see that companies had not fixed discrepancies and defect that were discovered in the 1987 accident He said @#
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*“ In addition I am saddened to learn that McDonnell and Boeing did not take the safety recommendations to heart as written 21 years ago. I understand that the system has never been upgraded to monitor and annunciate a cockpit CAWS Failure light for a TOW system that is inoperative for internal reasons as well as external power circuitry problems. Had McDonnell Douglas or Boeing fixed the defect in line with our 1987 recommendation there would have been a cockpit warning that would have annunciated the failure of the CAWS /TOWS system”. (35)
JIM BURNETT AFFIDAVIT*

ANOTHER Example: The FAA relies on industry and industry’s committees to institute rules changes. That of course is because industry knows more than the regulatory agency trying to control the industry. The example includes the changes in Auto flight design between the 1960s and 1998. The FAA knew it knew little about autopilots, auto throttles and auto flight. The manufacturers knew the industry and what changes they could make. Thus, regulation was left to individual companies without regard to standardization, similarities, transference problems, and in general distrust. Man machine interface was left to the company’s imagination. The FAA simply let the manufacturers do their thing, and 1960s regulations and standards were left alone.

One should consider the ramifications of what is being said here as in the late sixties the auto flight rules were less than twenty pages long and generally spoke about how autopilots had to be easy to turn off. Autopilots had to never be designed to overstress the aircraft. Autopilots had to be demonstrated to be overpowered by pilot input. Later, after the Eastern L1011 flight 401 went into the Everglades autopilot were required to annunciate a warning every time they disconnected, were overpowered or were shut off. The rules dictated there would be two modes of autopilot operation -one called control wheel steering, the other fully automated. In the sixties and seventies The older Captains knew how to fly and distrusted autopilots’, Copilots trusted autopilots and knew how to fly...by the year 2000 Captains trusted auto flight and hardly ever flew by hand.

Between 1960 and 2000, auto throttles were added. Dual coupled and triple mixed autopilot combinations became standard on instrument approaches. Instrument approach limitations went from 200 overcast and ½mile visibility down to RVR 100 meters with auto touchdown and rollout. All this was done by individual companies melding their talents into disparate systems and then proving their capabilities to FAA observers.

The FAA approved many variants such as side stick controllers, controllers that did not move and tactile feed back was control pressures rather than control movement. Some autopilots, when in operation no longer moved controls or

throttles. Each new design created training and man machine interface differences. Boeing began standardizing their models after 757 and with an overall plan to make cockpit switch -display and Knobology similar in follow on types -Boeing standardization was especially noticeable in glass cockpit machines. Airbus was very different. Transitions between aircraft and differences in company design philosophies created problems and required added training.

More than thirty years later, after 6 years spent conferring with industry the FAA issued a new Engineering Standards concerning auto flight. It is about 100 pages long and has two chapters of Addendums. How many auto flight accidents were listed as pilot error and how much training was required as between differences in Boeing and Airbus Auto flight systems. How many accidents were called pilot errors and autopilots were exonerated. If we look at auto flight as a contributing factor the numbers are scary.

See 12 ,12 a, 12 b, and 12c

The point is that Industry dictates and the FAA is beholdng to industry. Hopefully Industry is interested in Safety -because if they are not the FAA and NTSB are reactive while incapable of doing little to promote aviation safety

The NTSB seemingly lacks the work force and the will power or interest to do much other than look at smoking holes with manufacturers' representatives and bless the results.

LESSONS LEARNED, LESSONS NOT LEARNED, LESSONS FORGOTTEN

THE CONCEPT of LEARNING from an ACCIDENT is meaningless unless until all truths are understood from the current accident as well as other earlier substantially similar events. Moreover, and most importantly, if a safety investigator and industry wait for accidents to occur in order to learn ...then opportunity is lost. It is paramount to not wait for an accident. Safety demands an honest attempt to prevent accidents. Prevention tool s include experience gained from similar earlier equipments, Predictions made through system safety designs and operational and field experiences documented ,analyzed and promulgated effectively.

Behind every accident chain there eventually is some human error. Behind every human error there still remains the question "Why."

It is important that the "something's" learned from accidents and incidents is transformed into action for safety to prevent future reoccurrences. System Safety Engineers know the concept of Lessons Learned and their potential value. System Safety suggests to aircraft designer as well as complex widget designers that the best time to design safety in is at the conceptual and initial design stages. It is during the time a new widget is a concept, not yet reduced

to an engineering sketch, that one should envision safety applications. It has been shown that designing safety in is far cheaper in money and lives than retrofitting safety. When investigators are at smoking holes or taking statements in hospitals safety has already been made victim. .

The discipline of System Safety relies on one variety of study called LESSONS LEARNED. That means that a system safety investigator or engineer is tasked and expected to more than remain abreast of his industries technological advances. He must also revisit the same or similar air vehicles and see if certain dangerous propensities had been discovered. Thus armed with a research of past mistakes the engineer is now expected to avoid the same or similar pitfalls in his new design

Herein lies a serious problem with ISASI and with Air Safety as conducted by our own government. The Field Air Safety Investigators believe their safety work is complete when their aspect of an investigation called information gathering has been conducted and is completed. In a major accident then facts gathered are studied and evaluated for materiality. Finally some hearings are held and then the Washington DC Board convenes and the final report issues and “probable cause” determined. It is released to the public in final form. It then is filed in a data base. The data base will reflect a Narrative and a Board report which typically is about 100 to 200 pages long. The real accident file is massive as an Example the full file from the 1987 NWA 255 is over 8,000 pages in length. *See 13*

A major question sits silently ignored... Has anyone in the pendency of this accident investigation made effort to track accidents and incidents for indications that lessons may have been documented earlier. Were there lessons or duplications of lessons that might have been learned earlier? Lessons learned suggest both the passage of time and at least one previous occurrence to have the recognized value. Data may lie dormant in strange places waiting to be rediscovered. Aviation is not the only slow learner about Lessons previously known. Lessons may be learned from many sources other than aircraft themselves.

Example: Eddie Rickenbacker flew with both seat belts and outside rear view mirrors. So did Baron Manfred Ricthofen. Seat belts were optional equipment in cars in 1960. Dual outside mounted rear view mirrors became standard on side windows about 1970. Cross-pollination of a lesson learned in aircraft did not transfer to automobiles for 36 years. *See 14*

Lessons not learned

In aviation twenty years passed from Detroit’s No Flap Tows Failure with 150 deaths, an NTSB recommendation to fix TOWS, and the MADRID No Flap Tows Failure with 150 deaths. **A lesson ignored** (15)(16) (17)

Very often Government sponsored safety groups do not speak to each other because of Jealousy and guarding their hen house with out regard to common good, safety or even common sense. That protective internalizing does occur and was particularly frequent as between different military groups using similar equipments as their civilian counterparts.

EXAMPLE A very serious example The USAF lost contact with itself regarding submersible fuel boost and transfer pumps used on numerous military and civilian aircraft the first example concerns a series of B-52 dry run pump fires and explosions.

To name a few accidents:

- o A B-52 ground accident at Loring AFB in 1970. - The submersible fuel boost pump bearing was faulted.

- o A B-52 on the ground at Warner Robbins AFB in 1978. - A faulty pump was the cause. In this case it was believed that an overhaul of the pump was to blame causing electrical sparks.

- o A B-52 airborne explosion near Minot South Dakota, was officially cause unknown - however, an intensive search was conducted in attempt to find a fuel pump blown free of the wreckage distribution path.

- o an Air National Guard KC-15 on the ground at Fairbanks Alaska. Taxiing in - suspect was a transfer pump.

- o An Air National Guard KC-135 accident on the ground at Milwaukee, Wisconsin. A defective fuel boost pump was run in a vapor atmosphere. The defect was an electrical short blamed on a pump overhaul procedure.

- o A KC-135 explosion over Joliet Illinois- different theories were expounded, ranging from static electricity, unauthorized smoking to a defective pump theory.

- o A KC-135 explosion returning to Loring AFB.

- o. A B-52 airborne explosion at K/I Sawyer AFB in Dec. 1989- The cause a pump overheated bearing or case was the suspected cause.

From these accidents it is obvious that some varieties failure modes can exist within fuel vapor tanks. It is further obvious that fuel vapor within the explosive range can exist within fuel tanks. It is also obvious that explosions from such tanks can an do cause massive structural damage. For instance in the B-52 explosion at K.I. Sawyer the tail was found to be far removed from the fuselage. Immediately surrounding the exploding tank, aircraft skin was blown down, outward and upward away from the epicenter.

The ground explosion and fire created at Warner AFB was a significant learning point. It happened on the ground in Georgia in about 1978. The suspect pumps were of 1958 design and were installed on B-52 aircraft. It was decided at that time that there were three possible sources of ignition in a dry running pump in a gaseous environment. They were bearing heat or skin heat in excess of 390 on the exposed pump, a spark in a fuel quantity device or another spark from a sneak circuit source. It was determined by the USAF in 1978 that no matter what the ignition source that if about 1200 lbs of fuel was left in tank all sources would be covered and explosion could not occur. (18) (19) Interviews

The USAF issued that to all USAF users of the Pump and in particular all B-52 wings.

That information remained in place until a KI sawyer B52 explosion. On December 6, 1988 - A USAF B-52H-150-BW, 60-0040, crashed on the runway at 1:15 a.m. EST at K.I. Sawyer AFB, Michigan, while doing touch-and-goes after a seven-hour training flight. The cause was that the forward boost pump was dry running and the tank exploded during the acceleration phase of the go portion of a go around maneuver. Immediately the Air Force increased unburned fuel requirement to 2,000 lbs. After testing they blamed the accident on upper bearing overheating as the ignition source. The Air Force knew but had forgotten in the 18 years since the fire at Maxwell. For the Air Force that was a lesson forgotten -not learned and not passed on to other operators. (20)USAF 110-14Jag Report

Now a very quiet thing happened off Long Island sound on July 17, 1996. A Boeing 747 blew up. It carried almost 300 people to their deaths. It was determined after a massive deep sea recovery operation that that the empty center tank of the 747 exploded. The FAA, NTSB and FBI were notified concerning the KI sawyer accident. Soon the accident was labeled a fuel tank explosion. The main transfer pump was found to be one of the earliest recovered objects. Because of the earlier KI Sawyer accident the TWA pumps were not be returned to the manufacturer or to USAF labs at Tinker. The reason said to be that the testing done there would be biased because of earlier results from KI sawyer. The pump might have been sent to a neutral lab at NASA Houston except the head pump man Mr. Paul Svejtkovsky had been involved as a plaintiff expert witness in the KI sawyer litigation. (21)(22)(23) Interviews

A remaining unbiased laboratory to send the pumps recovered from the ocean was located at NASA Huntsville, Alabama. It was looked at and determined that 2 months submerged made it un-testable in its as found condition. So Huntsville dismantled the pump and noted that the upper chrome shaft showed signs of bluing carbon bearing transfer. They cleaned the pumps, replaced some parts and then ran tests. The pump discoloration showed it had overheated internally to about 900degrees, but no one could pinpoint when that overheating

occurred. Moreover, the NTSB/FBI was told the pump hot had an explosive proof cap, and so bearing overheat was not a possible source of ignition.

To be on the safe side, however every air transport airplane in airline flying using those boost pumps and others were issued a recommendation to quit running boost pumps to tank empty. Instead turn off pumps and leave residual fuel to submerge and cool the pumps bearing. That was just to be sure. I personally had changed my own procedures after involvement with the B52 accident. *(24) FAA Issues 3rd Warning*

LESSONS NOT LEARNED -LESSONS NOT SHARED

November 15, 1982 Ted Harduvel, a Top gun, pilot died in an F-16 aircraft on the far side of a mountain in Korea on a dark and dreary Korean day. He died the same instant seven astronauts died on TV in the Challenger. All died from lessons not learned or ignored.

By the time Ted HARDUVEL'S aircraft was destroyed Kapton Flashover fires were well known to the United States Navy, and to the United States Air Force. Under stress the highly heat resistant and slippery insulation would burn fast and intensely once ignited. In the F-16 wire bundle chaffing and flashover was a known defect. The early F-16 was a disaster of chaffing incidents and fires. Luckily no one had been killed although several emergency landings had occurred due to wire fires. *(25)FOIA USAF Training*

The Navies problem was worse. Kapton flashover propensity was exacerbated in a salt air environment. All Navy carrier planes exist in precisely that environment. The minute replacement insulation was available Kapton was replaced throughout the Navy. The Navy Banned Kapton in 1986 in all its aircraft. The Air force followed suit...banning Kapton from areas of high stress and salt impingement such as wheel well areas. *(26)(ap) Wiring report*

The initial whistle blowers were the Navies Ed Block and Boeing's Patrick Price who discovered that Kapton had other characteristics as well. *(27) teleconference whistleblower Ed Block*

It was in On Wednesday, September 2, 1998, the aircraft a [McDonnell Douglas MD-11](#), Crashed because of a wire insulation fire. The aircraft had been manufactured in 1991. This was well after the military actions regarding such insulations. The aircraft was built 12 years after the NAVY banned Kapton. It was 16 years after Kapton had killed Ted

CHALLENGER MISSION 51L

I said the Challenger was another area where lessons were either not learned or forgotten. Challenger was no single item such as in improperly or defectively

designed O ring seal. Challenger was the result of complacency and arrogance replaced safety with launch schedule as a goal.

A typical CYA afterthought on an Accident where National Competence is being harshly reviewed there is very often a mindset of hiding the dirty laundry. A full blown Presidential Commission was formed and they were supposedly looking for a root cause

One problem that contributed to the accident was that NASA had been to the moon and back several times and the Shuttle had launched, flown and returned safely 24 times. The hazard of flying a Space Shuttle had been reduced to routine proportions according to some. NASA was running on a tight monetary basis while launch schedules and mission complexities were ever being increased

Systems safety was being overlooked and placed on hold. The lessons wrongfully being adopted suggested that because it had worked successfully 24 previous times it must be routine and System Safety warnings and protocols could therefore be overlooked as inconsequential. The Reasoner Theory suggests that an accident occurs at one time and place because several contributing factors are in place that allow the accident scenario to develop. According to Reasoner an accident can often be avoided by identifying and removing specific contributing factors. NASA failed.

What was being considered and then overlooked

NASA System Safety had pinpointed several potentially loss of aircraft loss of life failure modes since inception of Shuttle.

1. One was the prediction that an O ring burn through would be fatal (*Criticality 1: Loss of life or vehicle if the component fails.*)
2. Other dire failure modes were created by lowering structural weights in order to increase Shuttle launch payloads.

Environmental circumstances making this launch different

1. This was an exceptionally (record Breaking) cold day.
2. Ice to measurable depths had formed on shuttle boosters and gantry
3. In the upper atmosphere wind shear and turbulence would be higher than normal

Engineering circumstances making this launch different

1. The hazard of flying a Space Shuttle had been reduced to routine proportions according to some due to twenty five successful launches
2. What was forgotten here was that the Gantry was new and this was its first launch.

3. It was so cold that if launch was allowed to happen it would be in a regime where the rubber O rings had never been tested.
4. It was so cold that wired thermal sensing devices on the launch gantry had failed.
5. Thus Contract workers with hand held temperature measuring devices stood outside and pointed gun like sensors to estimate cold on the gantry.

Operational circumstances making this launch different

1. The original launch had been scheduled and scrubbed 24 hours earlier.
2. To complete the mission based on scientific projects the window required launch or almost a months.
3. Usually when you scrub a mission you de fuel all O2 and all liquid hydrogen..Then refuel it. This procedure takes longer.
4. When the decision was made to violate that cautionary rule the shuttle cold soaked all night because of fuel on board and coldest Florida weather in a decade.

Outside considerations making launching seem the thing to do.

1. There was a Chinese delegation going to a State dinner at the White House
2. Ronald Reagan was scheduled to speak with the teacher in space
3. The Chinese delegation would not wait a month to see a launch.

A little about shuttle booster construction. Imagine four ten feet in diameter, 30 feet tall packages of propellant stacked on top of each other. This makes a 120 ft tall -ten foot in diameter rocket. Attach a frustum on top and a rocket nozzle device at the bottom and you have a booster.

Imagine stacking 4 Coca Cola cans on each other up side down. Each can higher in the stack has a small overlap with the lower can. Imagine a two tiny rubber bands forced between can overlaps. Now imagine each upper can was bolted to the lower can. This is simplification of the defective design and O ring placement

What NASA and the Commission downplayed to the point of obscuration is a phenomenon known as Sprong. This is an archery term meaning shaft vibration when an arrow is improperly released. Well a little sprong happens in the booster rockets at every launch or penetrating turbulence. The Sprong witnessed at the previous O ring burn through of $\frac{1}{2}$ of a single ring was about two inches.

What really happened is that to launch shuttle a total of 24 explosive bolts are fired simultaneously, twelve each releasing, both boosters from the gantry at shuttle engine start power. The Shuttle starts fall of the Gantry and onto its back slightly and lifts off. (28) *COMMISSION REPORT*

What did not happen is that 8 of 12 explosive bolts on the iced over side of the gantry failed to fire and sheared. The shear created a sprong of immense proportions on the booster stack. The black puffing smoke seen at launch was from destruction of two O rings due to this destructive Sprong. Launching in cold weather was wrong because of ice on the gantry and bolts that did not work. It had little or nothing to do with the permeability of rubber rings.

NASA forgot safety and walked away from system safety that they had relied upon to design Shuttle to begin with. Success brings complacency. "It's a piece of cake" becomes food for the Wake

The idea that our government and safety investigators are working for the common good may be a goal.... but often lessons learned are not disseminated across barriers or they are forgotten too regularly.

I do not prefer to believe that safety is intentionally forgotten. I wish not to believe that a CYA mentality controls investigation outcome and intentionally hides truth. Instead I find the heart and words of safety professionals and of ISASI in the correct place. Its soul dormant and devoid of action with respect to its some of its described principles and potentials.

ISASI had the Capability to be Meaningful in investigation history and lessons

"Progress, far from consisting in change, depends on retentiveness. When change is absolute there remains no being to improve and no direction is set for possible improvement: and when experience is not retained, as among savages, infancy is perpetual. Those who cannot remember the past are condemned to repeat it"

(29) George Santayana

"Those that fail to learn from history, are doomed to repeat it"

(30)Winston Churchill

The ISASI CODE OF ETHICS SAYS:

4. LOGIC Each Member should develop all accident cause-effect relationships Meaningful to air safety based on logical application of facts.

Each Member shall:

4.1 Begin sufficiently upstream in each sequence of events so as to ascertain Practicable accident prevention information. (*Pappy's interpretation includes upstream to history of lessons learned*)

4.2 Continue downstream in a sequence of events sufficiently to include not only accident prevention information but also crash injury prevention, search and survival information.

4.3 Ensure that all safety-meaningful facts, however small are related, to all sequences of events.

4.4 Delineate those major facts deemed not to be safety-related, explaining why they should not be considered as critical in the sequences of events.

4.5. Be particularly alert to value judgments based upon personal experiences which may influence the analysis; and where suspect, turn to colleagues for independent assessment of the facts.

4.6 Express the sequences in simple, clear terms which may be understood by persons not specializing in a particular discipline.

Identify from the investigation those cause-effect relationships about which something can be done reasonably to prevent similar accidents.

5.2 Document those aviation system short comings learned during an investigation which, while not causative in the accident in question, are hazards requiring further study and/or remedial action.

5.3 Communicate facts, analyses and findings to those people or organizations which may use such information effectively; such communication to be constrained only by established policies and procedures of the employer of the Member.

5.4 Provide specific, practical recommendations for remedial action when supported by the findings of the accident having been investigated singly or as supported by other cases.

5.5 Communicate the above noted information in writing, properly identified as a matter of record.

5.6 Encourage retention of relevant investigation evidence within the aviation system in such a manner as to form an effective baseline for further investigation of the given accident and/or facilitate analysis in connection with future accidents. (*Pappy's interpretation includes annotating this filing this data with already existing history of lessons previously learned*)

(31) ISASI CODE OF ETHICS

PRECEPT 1), AIR SAFETY MUST LOOK AT CAUSE AND EFFECT IN A LOGICAL MANNER

If Air safety must look to cause and effect relationships in a logical manner, it is preposterous to imagine that history is without meaning and that only the present accident is capable of providing substantive and credible factual evidence. The idea that what occurred here to day in this smoking hole is somehow restricted to here and now fails in several critical aspects.

The James T. Reasoner Swiss cheese theory of Accident prevention suggests that many events and preceding situations must all occur sequentially and come together to form an accident sequence at a particular time and place. The lawyer takes this considerably further as he considers Product Liability and State of the Art improvements used in the same industry as well as in other industries. The timeline of an attorney's accident investigation may go back far greater in time than a typical SASI investigators is used to investigating. (32) James T Reasoner *The Swiss Cheese model*

A Lawyer wants to know about a product is what you knew of the defect, when you first learned of the defect and what you did about the defect after you learned about it. A lawyer wants to know accident and incident histories.

For a lawyer State of the Art moves far in advance of either State of the Industry or State of the Regulations regulating the industry. Lawyers know that regulations controlling devices and operations occur and change well after the device is already hardware and in use. The FAA never dictated airplanes will fly at even thousand feet while flying one direction and Odd thousand feet while flying the opposite. Those rules developed well after airplanes were flying. Thus rules are always reactive and changes retrospective.

For legal investigations the effects of cause and effect are similar to effects for SASI ...The effect is the smoking hole of hurt and tragedy. Legal investigations look far further in time and circumstance to find causes and contributing factors. Lawyers never fail to search for the Lessons not Learned. It is axiomatic that a legal investigator is obsessed with timelines because the greater the time is that a manufacturer or a company knew about a defect and did nothing the greater the egregious nature of the violation.

If a company has a defective product or continues a defective operation that causes many accidents the company is in a position where it may be punished in addition to paying regular compensations called damages. Large jury awards are not simply to compensate for losses, but usually to punish a wrong doer for wanton and willful disregard of the safety of others.

For a lawyer to obtain such damages it is usual that he need prove that a company with knowledge and malicious intent disregarded Lessons learned and continued a bad product or a bad operational practice Lessons not learned or heeded are paramount.

A problem is that Air Safety Investigators are skeptical of Attorney's agendas. Now admittedly attorneys involved as advocates for clients and their positions. They represent victim/clients or some defend Aircraft or component manufacturers, or their insurers. Rest assured that when attorneys are involved, they have an agenda dictated by their employer (sometimes a victim). The Advocacy position may not always enhance safety nor is it always adverse to safety. Often legal investigations may detract or slow down meaningful safety. One example is where a Company wishes to change and improve a product, but does not because he feels change would admit to a previous mistake.

Lawyer investigators have advantages compared to a field investigator or ISASI tin kicker participating in a localized accident investigation. Lawyers get to grade the papers of the investigation since lawyers' start where investigations finish. Lawyers get the added advantage of starting our investigation where ASI persons have completed their work. Lawyers are armed with twenty-twenty hind sight, with subpoena power and unbridled freedom to go wherever the evidence leads them. We go where normal investigations are barred. We are empowered to delve deeply and play havoc and sanction CYA attempts. The attorney investigator has tools to find that an investigator for a manufacturer provided his company data that he did not provide the NTSB. On occasion we find a company has been provided data different than the same investigator provided his government.

In my opinion, almost all field air safety investigators truly believe that their investigations are conducted to enhance safety. In the field the Government inspector completes his investigation according to past experience and current protocols. When this effort is complete the assumption is air safety will be enhanced. Such of course is not always the case. When lessons are learned and information disseminated then safety may benefit. The distribution of knowledge so lessons can be garnered is possibly where the system is not as good as it might be.

As an example, The USAF accident concerning the F-16 had two reports ...A JAG report and a BOARDS Safety report. The JAG report blamed the Pilot for error and disorientation. The not national secret - but privileged- (hidden) report blamed the attitude indicator calling it defective -g intolerant and recommended that the instruments should be replaced in all F-16 airplanes. The JAG report called it disorientation and pilot error with no mention of Indicators.

When it was noted that the Privileged Board had been released the Government was more interested in trying to discipline or courts martial a military person than they were in fixing the defects. After winning at trial we

petitioned the USAF to reconvene the same accident Board so they could correct their mistakes. *33 Harduvel V F General Dynamics*

It was reported that the USAF reported that the entire board reconvened for several weeks and reviewed old and new data including data introduced at trial and never before seen by the Board. This time the Board Commander explained to us that the real Board's revised report was still privileged and we still could not see it...but he sent a revision to the yearly data and revision of data for the accident year 1982 ...Under the F-16 accidents there was one fewer accident showing a cause of Pilot Error ---and there was one added F-16 accident with the words Cause-electrical malfunction initiating cause undetermined. His communication thanked us for the chance for the USAF to correct a mistake. He said it was the first and only time in USAF history a full board had ever been reconvened at civilian request.

ISASI SHOULD RE FORMATT AND BECOME PROACTIVE FOR SAFETY

The simple continuing of data rather than expanding data collection to include lessons learned from ALL sources is leading to a systemic collapse of lethargy and average results. Simultaneously one can have good investigations and less than perfect communication of the results that might have improved safety. The closeness of some investigators to manufacturer and the use of company Investigators was a Post WWII concept of General Smokey Caldera -Smoke was an Army -USAF safety center founders and early SASI co founders. Caldera looked for truth to prevent accidents. It was a mission his statement. The idea of immunity and secrecy afforded his Board investigators were from military discipline. It has now been extended to include disclosure to lawyers.

The ISASI principles suggest that the seeking of truth and the promotion of Safety is not beholding to governments, safety is not beholding to companies...Safety is and should be beholding to discovering truth -all the truth that is allowable. TRUTH can and should be found wherever it resides. It should be available to be found and analyzed across borders of time and different bureaucracies. Safety Data should be shared across international boundaries by adherence to treaties. [National defense issue military services issues accepted]. The truth holds the same no matter where the records reside.

When ISASI formed a corporate membership it opened the door for a professional look through accepting corporate donations. The potential problem of undue influence is obvious. We have today active corporate members and there is little doubt investigators from these companies are extremely well versed in their product. We have heard of the revolving door from one vocation leading to a similar vocation with a differing agenda. I have worked with experts who have retired from every military branch, (CG, USN, USAF, USA, Marines both soldier and civil servant) from Government offices of FAA, NTSB, and DOT and many company representatives who are

retired. I have also taken depositions of every imaginable safety representative of all types. I can say point blank I have never heard an ISASI member ever lie to me or try to mislead me. I have heard them tell me I was wrong and I was barking up a wrong tree. I have heard them be hushed and told not to answer by an attorney with a legal agenda to protect.

I can sort of figure that every SASI member and every Air Safety Investigator who has been to a smoking hole understands Sam Taylor when he said “Pappy this is where hurt happens”

I can not imagine an Air Safety Investigator wanting to go to another disaster scene. Instead, I believe that experience make each of us adherents to the higher calling of attempting to make air travel a little safer through our efforts. Anyone who peruses that smoking hole, or looks at deformed and burned metal at a salvage yard understands his own mortality. He also understands that he commuted to this scene by air and the people he loves and wants to see every holiday are often air travelers.

ISASI should welcome and in fact relish the idea that all air safety investigations are enhanced and expanded because of and through later legal investigations. Lawyers have keys that can unlock doors a normal investigation is not empowered to accomplish. Lawyers typically and routinely look to timelines of knowledge and understanding in more distant history to derive State of the Art and State of the Industry. This historical look routinely finds mistakes and historical lessons ignored or forgotten.

There is a reluctance of on scene investigators to embrace a legal investigator’s capability to unlock doors and to tread places where NTSB and military investigators can not go. They are somewhat afraid that the legal investigation may shed bad light on their current effort. The attitude should desire and applaud all efforts that result in truth and safety. They do not appreciate dirty laundry or the digging up bones exhuming things that’s better left alone (34)“*Randy Travis*

Now the joy I get from performing life’s function is not in courtroom settlements or verdicts. That pays the bills. My joy came from a 600 mph hour toy at 35,000 feet with a front window on the world. My joy was saying goodbye to Delta’s passengers and warning them about the danger they now faced on the highway going home.

My joy came from knowing I helped change pump down to dry run procedures on airlines. I find joy that I was involved in funding V tail Bonanza wind tunnel and independent flight tests. I am happy I helped get the USAF to reconvene a safety Board. I am proud to have been outspoken on many occasions speaking for Safety while even jeopardizing my employment. It is with some sadness

that I have come to understand that safety is too often the victim of bean counters.

Some things I have learned in the past 40 years, Give me an investigator from the past with experience and guts to mentor.

Tell the truth about what you see or do. Never lie... **Robert Rogers 1776**

Being surprised results from being unprepared... **Robert Rogers 1776**

The harder you work the more LUCK you will find. **Wayne fisher**

Ask a widow about acceptable risk not systems safety. **Jim Chappee**

It is better to be embarrassed than ashamed. **Capt. Bill Campbell USN**

Just because a government investigations says it is so does not make it so.
..**Sam Taylor**

Conduct investigations by elimination of possible causes until only one valid scenario remains as probable cause. **Chuck Miller**

Understand that most Independent Government investigations are neither Independent or unbiased ...Recognize the agendas of the investigation participants. **Ira Rimson**

Do not trust any expert who will not go to the field and get his hands dirty.
Gus Economy /Sam Taylor

Look at the entire herd before you chose the horse you buy. **Al Diehl**

You get better odds in Vegas... **Sam Taylor**

You can't win em all ...but its easy to lose em all. **Uncle Anthony**

You gotta know when to hold em - know when to fold em...and know when to run away...**The Gambler Kenny Rogers**

If it's stupid but works, it isn't stupid. **Uncle Anthony**

Try to learn from the mistakes of others. You won't live long enough to make all of them yourself. ?

The probability of winning is directly proportional to the amount of preparation, **Wayne Fisher**

Keep looking around. There's always something you've missed. ?

Experience is the knowledge that enables you to recognize a mistake when you make it again. **Uncle Anthony**

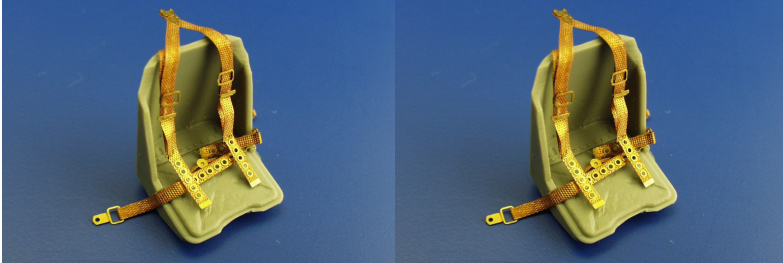
Always carry a pencil with an erasure... **Pappy**

CITATIONS

- (1) **Part 25** Part 25 contains airworthiness standards for airplanes in the Transport Category
 - (2) **Part 23** Part 23 contains airworthiness standards for airplanes in the normal, utility, aerobatic, and commuter categories.
 - (3) **Part 27** Part 27 contains airworthiness standards for rotorcraft in the normal category. Rotorcraft up to 7,000 lb
 - (4) **Part 29** Part 29 This part contains airworthiness standards for rotorcraft in the Transport Category
 - (5) VOLUME I—PARTS 1 TO 51 FEDERAL ACQUISITION REGULATION ISSUED MARCH 2005 BY THE: GENERAL SERVICES ADMINISTRATION
 - (6) VOLUME I—PARTS 1 TO 51 FEDERAL ACQUISITION REGULATION ISSUED DEPARTMENT OF DEFENSE DARS
 - (7) Telephonic interview notes with Piere Sprey in Va.
 - (8) AC No. 25.1329-1, dated October 1, 1965.
AC NO: 25.1329.1A Automatic pilots Approval 7/8/68
 - (9) AC No: 25.1329-1B Subject: Approval of Flight Guidance Systems 7/17/06
 - (10) A. Beech 35 Airframe Failure Report. "Richard B. Weeghman." The Aviation Consumer. December 1, 1985.
 - (10) B. "Instrumented Flight Test of the Beechcraft V-tail Bonanza." Coffey, Long, Moralez, McCullough, and Stecklein. Department of Aerospace Engineering and Engineering Mechanics, The University of Texas at Austin. May 1985
 - (10) C. "Reduction and Analysis of Flight Test Data for the Beechcraft V-tail Bonanza." Baade, Hazelhurst, and Lyons. Department of Aerospace Engineering and Engineering Mechanics, The University of Texas at Austin. [*appreciation is expressed to Capt Mike Papadakis for his encouragement and financial contributions to the project*]
 - (10) D. "The V-Tail Bonanza--Breaking of a Legend." Brent Silver. The Aviation Consumer. February 1980. [*Capt Mike Papadakis had retrieved certification and Vtail documents cited in article from Kansas City FAA office*]
 - (10) E "The V-Tail Bonanza." 60 MINUTES. Central Broadcasting Company, New York, NY. March 1983.
Out of the over 10,000 aircraft made, less than 250 were involved in fatal in-flight accidents. Some more landed with deformed tails after serious vibrations and a few crash landed with deformed tails. **After 35 years** In 1982 Beech stopped manufacturing the V-tail Bonanza.
 - (11) The DC-9 was first manufactured in 1965 with its first flight that year. The DC-9 was designed for frequent, short flights. The final DC-9 was delivered in October 1982. The MD-80 series continued under the same certificate. The MD-80 was the first to have CAWS but it too had single point failure because of the old certificate that allowed it
 - 11(a) TYPE CERTIFICATE A6WE, Revision 26 McDonnell Douglas, DC-9-11, DC-9-12, DC-9-13, DC-9-14, DC-9-15, DC-9-15F, DC-9-21, DC-9-31, DC-9-32, DC-9-32 (VC-9C), DC-9-32F, DC-9-32F (C-9A, C-9B), DC-9-33F, DC-9-34, DC-9-34F, DC-9-41, DC-9-51, DC-9-81 (MD-81), DC-9-82 (MD-82), DC-9-83 (MD-83), DC-9-87 (MD-87)
MD-88, MD-90-30, 717-200
 - 11(B) System design and analysis 6/21/88 Ac No: 25.1309.1a
 - 11(C) TAKEOFF CONFIGURATION Date: 3/1 7/93 ACNo: 25.703-1
WARNING SYSTEMS
 - 12 Autopilot rules changes 2 (A) AC No. 25.1329-1, dated October 1, 1965.
 - 12 (B) AC NO: 25.1329.1A AUTOMATIC PILOT SYSTEMS APPROVAL 7/8/68
 - 12(c.) AC No: 25.1329-1B APPROVAL OF FLIGHT GUIDANCE SYSTEMS 7/17/06
- See 13 NTSB full Board Report NWA 255- with committee reports, exhibits and Public Hearing Transcripts
- (14) Photographs of both Restraint systems and rear view mirrors in WWI aircraft
Lessons not learned in motor vehicles for 20 more years .



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- (15) NTSB NWA 255 88/05 August 16, 1987
- (16) CIAIAC A32-2008 Spanair Md-82 Madrid August 2008 Final
- (17) [SAFO 08021 Dept of Transportation DATE: 11/5/08](#) *The AD issued by EASA addresses SOP for DC-9 series, MD-80 series, MD-90 and B-717 airplanes. This AD revises Airplane Flight Manual SOP to require the crew to check the TOWS before engine start prior to every flight. This was previously recommended by McDonnell Douglas following a 1987 accident.*
- (18) Interview USAF Fire and explosion investigators Gus Economy
- (19) Interview with USAF investigator Sam Taylor
- (20) USAF 110-14 ACCIDENT REPORT, KI Sawyer B52Mishap. 6DEC 988 USAF B-52H, # 60-0040, "On 5 December 1988 the crew of K.I. Sawyer B-52 # 60-040 took off on a routine training mission After the third touch and go landing the aircraft experienced an explosion in the aft body fuel tank behind the wings.
- (21) Interview with **Paul Svejksky** ...NASA Houston Texas Pump Test expert
- (22) Interview with Bob Alexander NASA Safety
- (23) Telephonic Interview Jim Patten, Tinker AFB
- (24) [FAA Issues 3rd Warning on Fuel Pumps Associated Press ^](#) | LESLIE MILLER Posted on 11/27/2002 11:42:19 AM WASHINGTON (AP) - *The Federal Aviation Administration is requiring about 3,500 Boeing jets to fly with extra fuel to prevent fuel pumps from overheating and possibly causing an explosion. The FAA has sent airlines three safety warnings about the problem since August. The latest was issued last weekend after pumps in three planes overheated, the FAA said Tuesday. The warning is intended as a precaution while the FAA figures out what's causing the problem with the pumps, made by Hydro-Aire Inc. of Burbank, Calif. The warning will remain in effect until the agency determines what causes the fuel pumps to overheat. The order affects about 1,400 planes — 737s, 747s and 757s flown by U.S. carriers. The FAA is also sending the advisories to its counterpart agencies overseas, covering another 2,100 jets. The National Transportation Safety Board ruled that an explosion in the fuel tank of TWA Flight 800, a Boeing 747, caused it to crash off the coast of Long Island in 1996, killing 230 people.*
- (25) FOIA Certified of USAF Training for maintenance persons. F-16 Wire chaffing Slide show, F-16 Wire Chaffing movie, F-16 Wire Chaffing written Transcript (obtained FOIA from F-16 office Wright Patterson AFB)
- (26) WIRING INSULATION IMPLICATED IN FIGHTER, SHUTTLE FIRES ©
- AP, Associated Press Jul. 24, 1988 © *The (AP) reported insulation was implicated in at least 12 military and commercial aircraft models. The Ft Worth Star said Air Force was slow to notify its flight crews about dangers associated with the insulation, The Navy banned Kapton in 1986 after documenting in laboratory tests that it can explode in flames and disable crucial flight-control systems. The Air Force restricts Kapton use only in high-vibration areas The newspaper reviewed 265 field reports dealing with electrical problems on the Air Force F-16 and found at least 45 instances between 1978 and 1986 of wire fires or severe arcing. Navy laboratory studies in 1984 and 1985 found that Kapton, a carbon-based film, can explode under certain conditions when exposed to an electrical arc*
- (27) telconference whistleblower Ed Block then located in NADC Warminster area Pennsylvania
- (28) [Rogers Commission Report](#) :*The decision to launch the Challenger was flawed. Those who made that decision were unaware of the recent history of problems concerning the O-rings and the jointThey did not have a clear*

understanding of Rockwell's concern that it was not safe to launch because of ice on the pad. If the decision makers had known all of the facts, it is highly unlikely that they would have decided to launch 51-L on January 28, 1986.

(29) "The Life of Reason" (1905-1906) George Santayana

(30) Quote attributed to WINSTON CHURCHILL

(31) ISASI CODE OF ETHICS AND CONDUCT October 1983 sections 4 and 5

(32) James T Reasoner The Swiss Cheese model of accident causation is a model used in the risk analysis and management commonly in aviation

(33) Harduvel v. General Dynamics, Interviews Sam Taylor, Telephonic Interview Mel Underwood, Interview with USAF flight surgeon Dr. Carl Haller.

(34) "Randy Travis diggin up bones exhuming things that's better left alone © Universal Music Publishing Group, 34

(35) JIM BURNETT AFFIDAVIT @# 20. In addition I am saddened to learn that McDonnell and Boeing did not take the safety recommendations to heart as written 21 years ago. I understand that the system has never been upgraded to monitor and annunciate a cockpit CAWS Failure light for a TOW system that is inoperative for internal reasons as well as external power circuitry problems. Had McDonnell Douglas or Boeing fixed the defect in line with our 1987 recommendation there would have been a cockpit warning that would have annunciated the failure of the CAWS /TOWS system.