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The signs of Erosion of Aviation Safety by airlines to save money and due to lack of oversight by authorities are visible.

What I am about to explain to you is why AEI came to this shocking conclusion. AEI have worked out why, despite having seen much progress in the development of aircraft as well as equipment/infrastructure over the last 15-20 year aviation industry has not able been able to continue the downward trend of accident and incident rates we have seen dropped since World War 2 but have stagnated over the last 15 years. A number of reasons (not all, but those we consider most import) are in our AEI view root causes for this and I will explain and discuss them here.

Some history: In the beginning of passenger aviation, airlines had to do maintenance when the first aircraft broke down on the fields at which the first steps of Aviation where made. In the beginning with very simplified systems and mechanics anything broken or worn out could easily be spotted. When aviation became more mature and aircraft developed from the open frames structures that looked like of a bunch of wires and rods to something that looked like an aircraft we know today many accidents occurred due to failing parts, system's or equipment.



The first Mechanics operating soon learned that some redundancy could be very useful and lifesaving. During World War 1 Aviation quickly developed but also showed very sensitive to bullets shot between aircrafts and from the ground fire. With single cable systems operating flight controls, engines and landing gears that showed very vulnerable in operation any problem arising immediately resulted almost always in a crash since no back up existed. Aircraft were quickly replaced, Pilots took a lot longer to trains and especially in the beginning the expected life of pilots in battle was less the 20 minutes.

It took some time before those painful lessons were turned into a need for back-up systems and the use of double cable systems for especially flight control and Engine Power. From this moment on it became the standard in aviation building that major systems needed back-up, whether it would be double systems, indicators or any other form of backup, manually or electrically. At the same time technicians understood that the developed methods of check and re-check was a very useful way of working since Human Factors (although nobody at that time ever heard of this title) played a major role in preventing accidents.

Introduction of Lock wires, Split pin, Oval Nuts and many other safety enhancing means were introduced, all to reduce the failure /accident rates that were enormous in those days. Most airline maintenance was done in house because they had to, since experience was low, fleet varied enormously, standardization wasn't there at all and training, licensing, regulation etc was poor, if even existing.

The moment aviation grown into a more adult industry, with the number of aircraft manufacturers decreased (in the beginning anybody could invent and make its own plane) and manufacturing grew away from of the barns and workshops they started in. The maintenance complexity grew and with that the need for trained staff, for component workshops and standardized working practices started to be invented. From then on, almost all airlines had their in-house maintenance.

First of all, no (or hardly any) separated maintenance organization existed; maintenance was a very time consuming and crucial part of the operation of the airline since reliability was poor, and taking aircraft away from the airport of operation was out of the question, most of the time outsourcing of maintenance created more problems than solutions. Often even the maintenance had to be transported to where the aircraft was stuck on a field or harbour. With the high number of aircraft crashes that happened during and after WW1 when the cowboy pilots were doing their tricks most crashes happened as result of failing engine or aircraft parts, bad weather landings and or simply stupid pilots.



Regulation as well as procedures such as check and re-check, double inspection on flight and Engine controls was more or less invented as effective means to reduce errors and bring fewer casualties. (Accidents were bad advertising for this new way of transport) It brought some structure into operation and with that, the need for more specialized trained staff evolved. Redundancy that was built into major aircraft systems, as well as an increased complexity of aircraft system, demanded that. Since at that time it was simply nowhere available to buy, many airlines setup their own training schools trying to turn bicycle and car mechanics into something that looked like an aircraft mechanic.

At the same time the regulators developed a system in which Inspection, Control and Auditing became standard and the authorities were often visibly available at the airport, on the ramp and in the hangers. Most of the inspectors were taken from the workforces and therefore well-known with how maintenance was performed.

Airlines learned it the hard way that regular maintenance was a necessity for something that looked like a regular reliable schedule of operation. In these periods the mechanic was considered the dirty grease bag that fixed everything but was hardly recognised, poorly rewarded for the often bad working conditions and difficult work. Like in most airlines, pilots and cabin crew were more appreciated as well as better rewarded being the "Face" of the airlines.

With growing complexity of aircraft, maintenance moved away from poorly lighted workshops and bad shelters to modern hangers and high quality sophisticated computerized workshop. At this point in time end of the 1980's we reached a peak in aviation maintenance quality and work. This modern approach, and better trained staff costs more and then the "bean counters" came in.

Aviation is by nature an industry that is sensitive for economics headwinds. Airlines have had many problems as over the last decades. 40 years ago in most countries airlines were state owned (or at least partly) or subsidized, Since then, authorities in most countries suffered downsizing, industry was given more and more self-control, We had a number of oil crisis's, and economic crisis's, Wars and turmoil in the Middle east, the crash of the Iron Curtain, nine Eleven etc..

This almost always had a strong negative effect on airlines or temporary reduced passenger traffic in general. Since maintenance is responsible for a large amount of the expenses of running an airline, in times of trouble this is often looked at first, as one of the easiest targets for cutting down in costs.

We have seen the results of this:

1. in many down size staff cuts in the industry,
2. reduction of technical staff on outstations forcing pilots to take a stand against their airline if they want to delay an aircraft for technical reasons,
3. Certifying Engineers on outstation became a dying breed.
4. Pilots and engineers and maintenance managers are pressed to have on time departure set as main target, while forgetting every basic rule about safety first, & human factors.
5. The pressure from operators in cutting the learning times for Engineers and mechanics doing their training by up to 75%,
6. the tendency to seek the limits of the law while operating an airline.
7. Failing Authorities responsible

I will talk in detail about these issues during the remaining of my presentation.



AEI considers its main task is to uphold aviation safety.

Reasons AEI discovered a number of issues we see as being the largest contributors to this reduction in safety:

We speak in reduction of safety since we still get better aircraft, better radar and other waning systems however this is not shown in the figures when we talk about safety levels.

- 1) The staff cuts in item one can be best seen when looking at the number of technical staff needed to perform the standard maintenance package on aircraft that exist through the time of change. Looking at aircraft such as 747 DC10 MD11 a300 etc. we can see a reduction in staff, extended time between overhaul, reduced number of B1 or B2 qualified staff due to lower standards and more flexible regulation allowing low trained personnel to more and more take over tasks, previously performed by B1 or B2. If such a situation would have been done in a medical environment we would have nurses doing basic operations such as setting broken legs, sterilizing persons, etc. leaving only Open heart surgery and the like to the professional trained surgeon. Nobody would accept that but in aviation maintenance it has become standard. By taking away the check and re-check on must tasks and jobs the human error is increased as can be seen from the statistics.
- 2) Added to the Erosion of Aviation Safety by airlines is Pilots not reporting defects. Several years ago we began to notice that with the changes listed before such as pilots taking over Pre Flight checks at outstations (and for a number of major airlines even at home base) together with the reductions of company technical staff at major airports, we were confronted with more and more complaints disproportionately written in the logbook on the home bound flight. When investigation of a reported system defect we often found and still find that the reported defect does not only happen on the last flight the complaint was written but also during the previous flight or flight where nothing was written. Simple computer monitoring equipment registers this perfectly.

- 3) Another problem was the handed over notebook slips where defects known were written on just a piece of paper and handed over (or left behind on the cockpit) to the next crew. This illegal practise still exists today and is even extended more. The unbalanced logbook reporting was found everywhere, no exception found however the number differed. Most of the major airlines were around 80-20 and were noticed by us and when we investigated this the poorest one found was 6% written during outbound -94% written during homebound flights. We are not talking about the many cabin equipment defect, these are around 98-2% You can understand that when confronted with such figures we can only draw one conclusion, this happens purely intentional.



Statistically there should be about the same amount of defects found on out and inbound flights since the aircraft itself doesn't know it is flying in or outbound. A small deviation of a couple per cent is allowable but anything over 45-55% is suspicious. And we are not talking cabin snags or simple items like some paint damage to a door.

In addition when trouble shooting the reported defects we began to notice that more and more, when the computer system logged a fault, not only on the last flight (being the return flight into homebase) but often also on the flights before. Without the aircraft logbook being used to enter this defect in and crew (on their own decided or on command from the maintenance Control centres) or were pushed by the company to do ignore and not note in the logbook, When not in the logbook they are in a position to either act or ignore the limitation given by the MEL procedures.

What pilot often does not realize is that many defect are also logged on the flight data recorder systems and after an accident it shows that this was done. An unfortunate example you are all aware of was last year's Turkish Airlines Crash. Here the investigation showed clearly that prior to this last flight that ended in a crash the crew on previous flights the day before and 2 days before had exactly the same system defect, while the logbook did not show any defect reported. I must emphasize (I know this is sensitive) that this is not a Turkish problem, it happens everywhere. Only in this accident is was very clear, we have reasons to believe that a number of other crashes from other airlines have not reported system defects that played a role as well but this is often difficult to proof. Here it was clear.

We as AEI (together with our affiliates) want to stop this Safety abusing behaviour and so we reported many of such findings to the local NAA's in many countries via the, at that moment existing reporting systems, however without ever being taken seriously. When this happened we took a stronger approach and issued via a press release with the catching title: **Incorrect use of the Aircraft Minimum Equipment List causes increased threat to aviation Safety.** In addition we sent several letters with an international safety warning to known addresses of National and international Authorities.

In Europe for instance, we wrote our warning to all national authorities (including Turkey), as well as EASA were notified and surprise, surprise nobody was prepared to listen or when they did they did not believe us. We received a small response that the letter had arrived from around 30% of the European NAA's. The rest did not even bother to reply. (Including Turkey). Nobody took up the challenge to do what we did, Simple Sample check.

**Added to the Erosion of Aviation Safety by airlines is also:
Minimum Equipment List Abuses: explain the working of the MEL!!!.**

- 4) Following our international Aircraft investigation held amongst our member organisations, it has become clear to AEI that in addition and /or along this serious safety problem there are many **misinterpretations** about the obligation to use the Aircraft Minimum Equipment List when (en route) a system defect arises (MEL). In addition there are deliberate abuses off the Mel where In order to write an answer behind a defect in order to continue to fly, the “wrong” reference is made because the “right” reference would have created an AOG Aircraft on Ground or Aircraft limited in operation would arise.

Presently is has become more or less (**illegal**) standard practice by many pilots around the world that, when they operate their aircraft and system defects occur, it is simply a matter of checking the MEL and if no specific tasks are specified, pilots assume they can just continue to fly without the need to “write the defects in the Aircraft Technical Logbook” and more important “do troubleshooting” so that this results in taking necessary steps. These “**illegal**” practices contribute to the issues mentioned above about Pilots not reporting decreases the safety of flight. The illegality comes from clear statements that the source of a defect must be known before commencement of the flight. This is not often known or easily found in the Aircraft manufacturers manuals but it is there! This has resulted in crashes killing people, staff and passengers.

This happens in all airlines we have checked and those included the Major ones of the world. The Turkish Airlines



Crash (2009) report was very clear, the defect that resulted in initiation of the crash, had been noticed by other Turkish Airlines crew but they failed to report this trough the company logbook systems.

Had this been reported, action to repair or proper deactivation of the system would have prevented this accident to happen. Is this the result of a failure of the pilots, is this the result of pressure from management in the company, I don't know but it happened.

I realize this is a harsh statement but AEI is convinced this accident was avoidable when procedures would have been followed. I emphasize again, this is not a Turkish problem, it happens everywhere, and we should realize this. Here the Turkish people where unfortunately the victims. I am not putting blame but we have to learn from this accident and try to prevent future ones, If we fail this, people have died for nothing. If we learn and change the way we work, something good has come from this bad thing.

Having witnessed the continued erosion of aircraft maintenance and then especially away from home base AEI receives increasing numbers of questions from its members about the practices of operators around the world who due to lack of oversight from often (strong reduced in size) authorities. This result in aircraft returning to home base with defects that when investigated would have caused the aircraft to be grounded until maintenance actions have been taken.

Many (**pilots and engineers alike**) do not realize that the Master MEL does not stand on its own but is produced by the manufacturers as the result of the type certification process and part of the Part M process (in Europe or likewise regulation elsewhere). In addition the operator has to make his own company MEL based on this MMEL and have this one approved by his authority before they are allowed to operate to prove to his authority that he is in full control and fulfil the legal obligations for continued airworthiness.

As is stated in the various national regulations one cannot continue the flight when there is a defect without having properly troubleshoot to find the actual cause of the defect or system warning. This means in simple words, there is a need to do troubleshooting by authorized personnel to find the cause of the defect before the flight can be continued either with a repaired problem or a de-activated system.

As example: you can have the system defect indication showing your Airco system fails, however this is caused by a broken valve in another system that in the end could cause more problems than just the Airco. Most pilots do not have the knowledge, the license, and training to do this trouble shooting and from a distance (Maintenance control staff such as on home base) it is not properly possible to check or do meaningful trouble shooting, meaning those pilots cannot simply pull a circuit breaker or do other task to de-activate a system and continue to fly.

Presently hundreds of airlines operate to airports where there is no maintenance contract for **standard** assistance of technically trained staff during the turnaround but often only a so called "on call" contract where, only if needed, some maintenance organization can be called for assistance. This by experience almost always results in a delayed flight because due to the nature of the contract you have to wait for personnel to be available.

Knowing this, pilots often make their own decisions (breaking the rules, increasing the flight safety risks) and continue to fly with the increased risk available, in the **misguided** believe they are allowed continue to fly and do as allowed. Several aircraft accidents can be relate to such miss-behaviour or miss-interpretation and despite several attempt of AEI to activate authorities to take a more active approach, doing their work of oversight, this way of operation continues and even intensifies under the current financial restrain.



AEI will issue another safety warning demanding from the authorities we know, to declare how they see this problem and what the solution is, they propose to solve this safety issue, making sure all operators are under the same strict rules and follow the same procedures. Part of this process needs to be the oversight authority checking the ratio of defects written in logbooks to the number of outbound or inbound flights and a simple initial check that quickly shows whether an organisation follows the rule or not. Depending on the findings further investigation may be needed and could be easily focus on the problems areas.

We have documented evidence that confirms our statements that commercially operated aircraft are, on a daily basis, flying with defects that have not been properly assessed. The consequence is to deliberately pass on this increased risk factor to the unwitting fare paying passenger. AEI believes however that a passenger buying an airline ticket does so in the belief that airline's take their safety responsibilities seriously.

In addition we have found out that airlines are placing flight crews when confronted with technical problems en route under pressure to perform **maintenance actions** themselves although completely unqualified to do so.

Aircraft, of course, can be permitted to fly with certain defects, but only after following strict procedures which includes proper defect diagnosis by a qualified engineer prior to consulting the manufacturers dispatch deviation guide, the Minimum Equipment List (MEL).

This is endorsed by aircraft manufacturer's recommendations relating to the use of the MEL as per this quote from a Major Aircraft Manufacturer MMEL:

"The aim of the MEL is not to encourage aircraft operation with inoperative equipment, because it is not desirable for an aircraft to be dispatched in these conditions, and such a situation is permitted only as a result of careful analysis. The MEL should therefore, be consulted on the ground, and only when a failure has been identified and confirmed".

AEI believes the flying public should be both protected from and made aware of such maintenance malpractices. Safety can only be guaranteed as long as airlines strictly comply with airworthiness requirements which include the proper diagnosis of defects by qualified engineers before any flight continues. Commercial considerations must not be allowed, under any circumstances, to take precedent over flight safety issues. AEI cannot condone airlines using passenger safety as a hollow marketing slogan whilst undermining safety in areas normally hidden from passengers. Passenger safety must be paramount as aircraft are replaceable, human life is not.

**Added to the Erosion of Aviation Safety by airlines is also:
"Single event Authorization" as per Part 145.A.30 Paragraph J, sub-paragraph 5.**

Most of you may not have heard of this term Single event Authorization. To bring you up to date, it was a procedure that was invented in the JAA period (mid-eighties till 2003) for situations that aircraft had to deviate from a standard flight or in cases when an airline had to use a different type of aircraft (F100 instead of 737) then standardly operated to a regular airport and was confronted with a system defect on this aircraft.

In such a case it is understandable that the airline does not have the proper trained and qualified engineers available, the airline could, when they cannot find a properly qualified person on the airport to, after a specific check allow an engineer not familiar with the type of aircraft to release this A/C or make small repairs to fly back to home base again.

When an airline is confronted with such an issue it is obligated to report this to the authorities within 72 Hrs. And when the aircraft returned to home base the whole procedure had to be done again but now by properly trained staff.

Telling this you can imagine that this happens maybe only a few times a year for even the bigger airlines. Say 5 or 6 times for an average airline because these are exceptional situations.

It is interesting to note that AEI is aware of one European operator out of the many under the control of such an uninformed NAA having issued over 11,000 one off's.

This airline abused the system to save money by using this (exceptional) procedure on a day to day basis a situation which is completely out of order and even when we confronted the national authorities with this nothing was happening. The whole issue has developed into a loophole which operators now hide behind and use as a means of not having to ensure proper outstation line maintenance coverage saving money as the sole argument. This obviously alleviates the financial burden of maintaining a properly staffed outstation but as is often the case, does not take into account the serious effect on safety. Unfortunately these events should be made known to the authorities And when confronted they should have taken any redressing measures.

The regulation itself is also quite specific in that it clearly states “all such incidents must be reported to the competent authority within 3 days”. AEI therefore cannot understand that some NAA’s actually responded to our letter by stating that they did not know how many “one-off’s” have been issued. And again here the Authorities responded with disbelief, and therefore “no action”

- 5) Training of technical staff is reduced over time. The initial training for technical staff on for instance a 747 was around 3 month to get the type rated training as B1 staff. This has now been reduced to an average of around 6 weeks while the complexity has been increased. There are even training schools offering these type rated training for around 4 week. You can imagine the depth of training when the initial course has been reduced from 12 weeks classroom 10 weeks’ theory and 2 weeks practical down to 4 weeks theoretical on more complex aircraft. My own boss, not a technician only thinks he needs someone with the B1 approval on his licenses. How good the training received is not considered a major factor. This short sightness is seen everywhere in financial driven management since a large part of their own salary depend on the financial result so if my manager has to have 10 B1 737 engineers trained he will choose most likely the cheapest not the best. That the company may suffer financial from such a decision does not help since those negative results show up in delayed flight costs (rebooked flight, hotel costs, angry customers confronted with delays where other department have to foot the bill for these costs) as result of bad trouble shooting due to lack of training.

If maintenance organisations would better follow the often very expensive part that are replaced after system defect more careful they could find out that if most components are returned from maintenance with “no fault found” qualification and a huge bill attached telling them that would the trouble shooting be done better these costs could have been avoided saving more money for the company then was saved with the cheaper training.



- 6) **Added to the Erosion of Aviation Safety by airlines is also:**
Lack of use of Occurrence reports handed in by the various staff groups such as pilots and engineers

Being a normal citizen one would expect that if somebody reports about unsafe situations or gross neglect of safety, these report should force authorities to act since something is clearly wrong. Reporting systems exists and within many countries you have to report a large number of issues. The way airlines use this and how the regulation copes with the still present behaviour is a different story. Some companies still prefer shooting the messenger over solving the safety problems.

Protection of the reporter is more needed than ever before.

This cry for help to have these safety problems dealt with is not to be heard since like in banking and other industries, large groups of aviation management are generally interested in collecting the bonuses and not in costly repair of systematic organisational problems. We understand some of these problems are not easy to repair, but it is too simple to just give in.

Quote from a maintenance manager “No manager in its right mind would invest from his limited budget on solving or preventing future problems if I never benefit from them in a short time. When I as manager does not have a return on my investment in 1 years’ time showing the positive results I am not willing to make the investment. My Horizon for decisions with financial impact is next budget and no further” Unquote.

This phenomenon is not new but with recent economic downturn any excuse is used throughout industry to prevent “bad company” information being spread even at the costs of passenger’s safety. Industry should be proud on those individuals daring to bring out such information but of course that would be too good to be true. We have received information where airline staff is recently put under pressure to keep their mouth shut or get fired from countries such as UK, Portugal, Germany, Netherlands.

AEI action in protecting the travelling public by ensuring that safety is upheld has been shown to be justified, however it appears that some within the airlines still seem unable to accept that the reporters behaviour (which is a duty by Law for people working in the European aviation industry since beginning of 2007) is a requirement and a must and seem to have the intention on extracting revenge getting back at the reporter.

The regulation to protect the messenger is in place, brand new and shining, it is hardly ever used



7) Failing Authorities responsible for many persons killed in accidents

Based on the findings of our researches amongst our member affiliated organisation, AEI issued In September 2007 warning that European air safety could be compromised if the EU was not prepared to promptly tackle the 1600 plus audit findings at European Authorities raised by the European Aviation Safety Agency (EASA) as part of their oversight of European Aviation.

EU officials refused to confirm or deny the figures claiming that releasing such information into the public domain could jeopardize any potential legal proceedings against countries who fail to meet the required standards. Yet despite the EU’s apparent no compromise approach to air safety, not one single, National Aviation Authority is facing legal proceedings. Very worrying indeed once one examines the figures:

(2005) 675 findings related to airworthiness
(2006) 833 findings related to airworthiness
(2007) 521 findings related to airworthiness

269 of these are classed as findings “**which if not corrected promptly raise safety concerns**” whilst the issue of aircraft engineer maintenance licences brought this statement

The Standardisation reports clearly highlight that European Air Safety is not the absolute priority the EU claims it to be. **AEI says enough politics.** It is now time for the EU to get its act together.

Without urgent “no compromise” measures, it is only a question of time before the next avoidable accident. We accept that the Aviation Industry is under threat and therefore under financial pressure but safety must remain paramount. There is no excuse.

Just recently we had an Australian affiliate who had to fight its local NAA in court for 3 years to get access to the results of the so called “Audit results” of foreign MRO being the company doing the outsourced work.

We learned that despite many faults show up during this audit and in followed maintenance projects the National authorities did their utmost to defend that this particular MRO, often used for outsourced maintenance failed on so many items it was impossible to deny that the NAA in questions was more busy pleasing its national carrier Qantas with a cheap outsource facility than that CAA performing its main task, guarding safety for those who used the airline as passengers.

For instance: After a heavy maintenance on a 747 the aircraft left the facility with over 450 defects in the so called “released to service” condition. This came out in a heavily investigate newspaper investigation and became a huge scandal that probably will cost some civil service staff their job. However this is not an item on its own.

As a result of this opening of Pandora’s Box, we (AEI) have demanded from the European Agency EASA similar information about this company since we know that in Europe or for Europe airlines outsourcing to the same company happens and situations like this are very likely possible for us European Operators.



Your task as staff representatives is to investigate such situations as well and do not rely on too easily given statements by management like “it is an EASA approved MRO so no need to worry” It is a matter of protecting the flying public, as well as your colleagues crew and “the company” since one accident can crash even the best company like we have seen with Swiss Air as example.

Yesterday I received a 1st denial from EASA to access because the information is considered too sensitive and may damage the organisations involved. Well that actually should be the purpose: expose those organisations that form a risk for the flying public and undermine the standards of other by undercutting the price for “good” maintenance. How else can we change their behaviour other than exposure of the authorities are not capable or willing to change the dangerous behaviour.

To conclude, I know you may not agree to several of the things I have said, I can back up a lot with evidence (part of the problem is, if I do show the information many of my colleagues will be out of a job in no time. I know we have our own problems. It is easy to talk about the failures of others, I must admit that we make mistake as well.

If I point with 1 finger to you, I point with 3 to myself. I have to improve as well. I have to record unsafe conditions, I have to refuse doing work that is not considered safe, I have to make sure the aircraft I release to service is as safe as possible and I should be prepared to immediately put my wife and children on board without any hesitation because I am sure it is safe.

As I have told you during the last half hour, many things need more attention than they get now.



It is our combined responsibility we demand attention for the above subjects.

Aviation is sensitive to media attention and quickly the trust of the flying public can be lost if we do not do the right things, in the right way, no matter if this is done as a result of an accident or incident (not necessarily in our own organisation).

As we say in AEI.

If you think safety is expensive, try having an accident.

Fred Bruggeman
AEI Secretary General