Safety Matters

Issue No: 01/18

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Welcome to issue 1/2018 of 'Safety Matters'. This is the Isle of Man Aircraft Registry's safety magazine aimed at all personnel associated with the operation of aircraft registered in the Isle of Man. The intention of the magazine is to highlight pertinent safety events and news from around the world with the aim of improving flight safety. Some key themes in this edition include: pre-flight checks; approach and landing hazards; and portable electronic devices.

Key to enabling others to learn from safety events is reporting these events in the first place; therefore the final article on occurrence reporting is important – do you know how to submit an occurrence report to us?

Contributions to the magazine from any person connected to the operation of aircraft registered in the Isle of Man are always welcome and these can be published confidentially if preferred. Help others to learn from your own experiences by providing us with a "I learnt about flying / maintenance / etc" article.

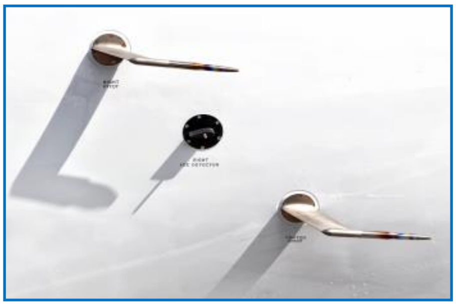
THE IMPORTANCE OF PRE-FLIGHT CHECKS

Pitot Checks Missed Before An-148 Crash

Investigators believe the crew of a crashed Antonov An-148 did not carry out a crucial checklist which should have included a deferred confirmation that the pitot-static heating system was active.

Domodedovo tower cleared the An-148 to continue taxiing to runway 14R, and the pilots turned their attention to two checklists, including that for line-up, which includes an item to check the activation of the pitot-static heating system. The Federal Air Transport Agency (Rosaviatsia) says that in the carrier's flight operations manual, this item is deferred to the "before take-off" checks.

Analysis of the FDR shows that, before take-off, the aircraft's integrated information system indicated "no heating" on any of the three pitot-static sensors. "Almost immediately after taxiing the aircraft to the runway, the crew received take-off clearance," says Rosaviatsia.



The report states that the "before take-off" checklist was "not performed", suggesting that the pilots did not confirm whether the pitot-heating was active. The crew instead commenced the take-off roll. Some 2min 30s into the flight the aircraft began to display unreliable airspeed indications, and the crew lost control of the jet. The Saratov Airlines twinjet came down a few minutes after departure from Moscow Domodedovo on 11 February 2018.

None of the 71 occupants survived.

Failure to Cross Check Performance Calculations

The AAIB said the wrong air temperature data is thought to have been inputted into the plane's FMS which meant it was slow to accelerate and lift off. The Boeing 737, registered in Canada but flying on behalf of a UK tour operator, hit a light almost 30m from the end of the runway.

Investigators said that "in slightly different circumstances, this event could have resulted in the loss of the aircraft with multiple fatalities". Had the plane taken off from a slightly shorter runway or encountered obstacles or had engine failure "with a decision by the commander to continue the take off", lives may have been lost.

Investigators found that the only way the incorrect thrust setting could have been programmed into the plane's computer system was for the outside air temperature to have been wrongly inputted. The report said the plane's software was not up-to-date adding that if it had been, an external temperature sensor would have alerted crew members to the incorrect temperature entry and deleted it.

Operators of M-Reg aircraft seeking EFB approval are required to assess and mitigate the operational risks associated with its use.

Particular attention should be given to the risks associated with performance and weight/balance calculations, as errors can easily lead to catastrophic outcomes.

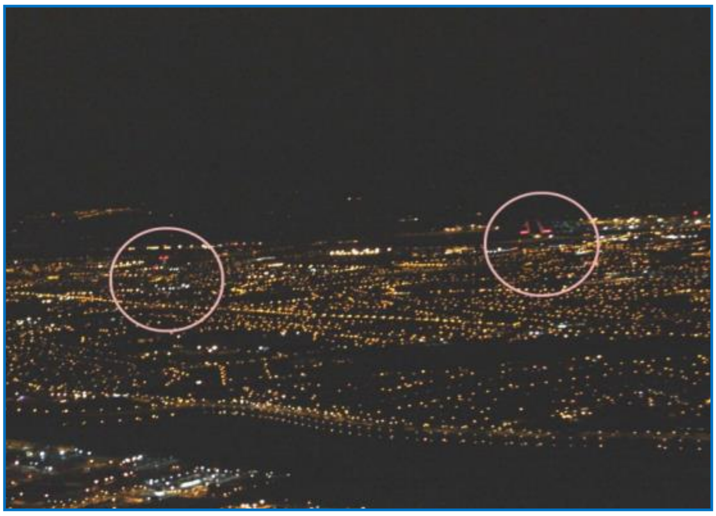
INCORRECT AIRPORT SURFACE APPROACHES & LANDINGS

The FAA and EASA have both issued safety advice regarding incorrect airfield approaches and landings. These followed a well-publicised occurrence at San Francisco International Airport in 2017 where a commercial airliner conducting a visual approach at night lined up on final approach with a taxiway instead of the runway. The late go-around resulted in the aircraft coming into close proximity with airliners awaiting take-off clearance.

EASA reported that there were a total of 82 events of incorrect airfield approaches and landings reported by European operators between 2007 and 2017, including the following 2 examples:

- In February 2016, during night time, an aeroplane was stabilized for a straight-in VOR approach for runway 04L with a final approach course offset from the centreline. At approximately 7nm from the airport, in visual contact with the runway, the crew elected to join the extended centreline instead of continuing to the minima. The crew incorrectly aligned the aeroplane with runway 04R centreline. The crew landed on runway 04R, realizing the error only after landing.
- In June 2017, an aeroplane was under radar vectors for an ILS approach to RWY 03L. When cleared to the approach, due to a wrong FMS configuration, the crew intercepted and followed the localiser of the ILS for RWY 03R. ATC realised the mistake and advised the crew, who promptly stabilised the aeroplane on the correct runway centreline. Landing was uneventful.

An article in this issue of Safety Matters regarding complacency and low level go-around describes a recent incident by a business jet flying an offset ILS approach where visual alignment with a disused runway was part of the sequence of events.



At Dublin in 2007 a MD83 aircraft at night came within 1700 feet laterally and 200 feet vertically of a hotel whose lights they had mistaken for the runway while completing a VOR-DME approach. The hotel lights are circled on the left in the picture above with the runway threshold circled to the right.

The EASA and FAA advice provides a number of particular threats and best practices. However, key aspects include but are not limited to:

Planning:

- Identify particular threats in advance. Brief the airfield diagram. Review airport lighting including any approach lights systems and lighting around the aerodrome.
- Consider available navigation aids – apply particular caution if a visual, non-precision or offset instrument approach is necessary.

CRM:

- Adhere to SOPs.
- Pilot Monitoring to conduct cross checks and highlight when something doesn't look right.

Technology:

- Use ILS and RNAV approaches where possible.
- Use aircraft automation appropriate to the situation.

Stabilised approach:

- A stabilised approach is critical to flight crew maintaining situational awareness.
- Identify and verify visual glide path information such as a Visual Approach Slope Indicator (VASI) or Precision Approach Path Indicator (PAPI) not only for glide path indications but also their location relative to the runway of intended landing.
- When in doubt go-around.

DID YOU KNOW...

- The Isle of Man Aircraft Registry (IOMAR) monitor any EU Ramp Inspection Programme reports on M-Registered aircraft and assist Operators to close Findings where necessary;
- IOMAR is re-drafting new subordinate legislation to replace the current Air Navigation Order, structured to ease access for the end user, with the ICAO Annex structure in mind;
- From the start of national aircraft registrations and until 1929 the nationality prefix 'M' was chosen by Spain. From 1929 the Spanish civil aircraft nationality prefix became 'EC' and 'M' was unused. Following the Chicago Convention and establishment of ICAO in 1947, ICAO Annex 7 set the display standard and the international prefixes were allocated by the International Telecommunication Union (ITU). 'M' was allocated, with a number of others, to the UK, due to its large number of overseas territories. 'M' was offered to the IOMAR by the UK prior to its establishment in 2007. The first aircraft on the register was M-ELON, a Cessna 525B.

New CPDLC procedure on the NAT

A new CPDLC procedure came into effect on some sectors of the NAT on 24th May 2018, its designed to prevent pilots from acting on any old CPDLC messages that might have been delayed in the network.

ICAO have published a new Bulletin for all the NAT Air Navigation Service Providers (ANSP's) to use as a basis for implementing this new procedure. They recommend that all aircraft should receive a message immediately after they enter each control area telling them to "SET MAX UPLINK DELAY VALUE TO [seconds] SEC".

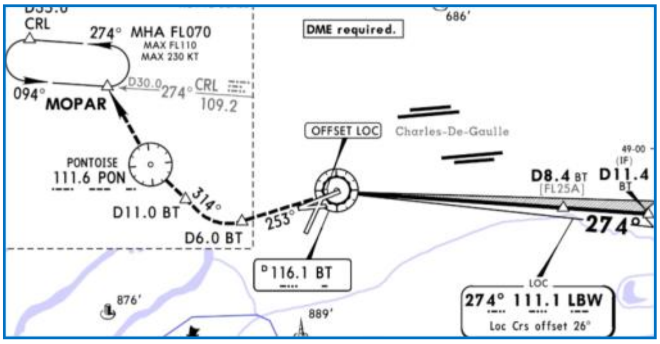
The idea is that this will prompt the pilot to enter the specified latency value into the aircraft avionics, so that it will ignore/reject any old CPDLC messages.

The latency monitor function varies from one aircraft type to another: some just automatically reject old CPDLC messages, some will display a warning to the pilot that the message has been delayed, some have deficient equipment, and some do not have the message latency monitor function implemented at all.

Because of this, ICAO note: "It is impossible for ATC to tailor the uplink of the message… to different aircraft types. It has therefore been decided among the NAT Air Navigation Service Providers (ANSPs) to uplink this message to all CPDLC connected aircraft immediately after they enter each control area. An aircraft may therefore receive this message multiple times during a flight."

Beware of complacency & low level go-arounds

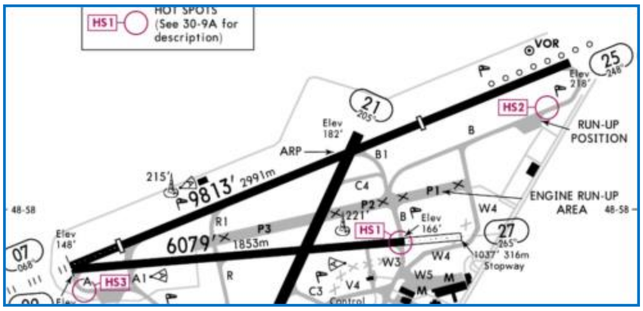
The aircraft, a Gulfstream GV-SP, struck a <u>right</u> side runway light with the <u>left</u> wing tip while attempting a landing/go-around on runway 25 at Paris Le Bourget. This event highlights the need for effective CRM, compliance with SOPs, and the need to make early go-around decisions.



Paris Le Bourget is a busy Category B airport and pilots and ATC often speak French language to each other which adds to the complexity for non-French speaking pilots. RWY25 has an offset localizer approach established to the south of the runway centreline due to the proximity of Paris Charles De Gaulle Airport to the north.

The visibility on the day was good with SW gusting winds. The captain and co-pilot were both very experienced, both holding over 1000hrs on type and were familiar with Paris Le Bourget having operated there numerous times before. The subsequent investigation identified that crew fatigue was not a factor.

On initial approach ATC issued a QNH of 1004 hPa but this was misheard and the crew read back and set 1014 hPa; the incorrect read back was not detected by ATC. This led to the aircraft indicating approximately 300ft higher than its actual vertical position. After establishing on the localiser they identified and started to line up with what they thought was RWY25 but which was actually a disused runway situated between RWY25 and RWY27. The flight crew realised this error at approximately 700ft barometric altitude (approximately 400ft above ground) and started to correct the aircraft to RWY25 by a right and then left turn. However, and exacerbated by southerly wind gusts, the aircraft positioned through the final approach path. A low level go-around was initiated below 50ft but the auto throttle had placed the engines to idle as is normal aircraft system behaviour, so it took several seconds for the engines to reach full thrust. Consequently, the aircraft was highly susceptible to any form of wind gusts. During the go-around the aircraft encountered a stall warning, stick shaker and stick pusher overridden by the manual inputs of the flight crew. After landing it was subsequently found the left wing tip had struck a runway light on the right runway edge causing surface damage to the wing.



Operator SOPs required the approach to be stabilised in VMC at least by 500ft above aerodrome elevation. The incorrect QNH setting contributed to the incorrect decision to continue the approach and attempt to realign with the correct runway at low altitude.

The investigation identified that:

- there was a lack of effective decision making during the approach and insufficient support from the Pilot Monitoring in terms of rechecking the aircraft's lateral and vertical position;
- the altimeter error could potentially have been identified by comparison with the earlier weather report and cross check against the radio altimeter;
- the low level manoeuvre to realign with RWY25 was an abnormal event outside the training of the flight crew;
- a missed approach should have been initiated as soon as it was established that they were approaching the wrong runway.

PORTABLE ELECTRONIC DEVICES

SO WHEN DOES A PED BECOME AN EFB?

An EFB is defined as: "An electronic information system, comprised of equipment & applications for flight crew, which allows for storing, updating, displaying and processing of EFB functions to support flight operations or duties".

A PED becomes an EFB when it is used:

- to display operational info during the flight;
- to calculate operational info relating to the flight, i.e. performance and/or weight & balance; or
- as a back-up for a Class 2 or 3 EFB.

For further information on EFBs, please see IOMAR Registry Publication 4 section 5.3.

DISTRACTING DEVICES - AVOID USE OF PEDS BEFORE & DURING FLIGHT

Despite this safety alert being over 2 years old it is still relevant as the use of smart phones, tablets, iPads and laptops becomes more prevalent on the flight deck.

Issued in Dec 2015, NTSB Safety Alert 025 details distractions caused by use of PEDs, particularly during pre-flight planning, preparation, cruise & whilst manoeuvring in flight. PED-related distraction has played a role, or at least been present, in accidents involving improper fuel management, loss of positional awareness/automation mode awareness, collision with obstacles, & loss of control.

For example: On 16 January 2013 an A109 helicopter flying over central London in conditions of reduced meteorological visibility collided with a crane attached to a tower block and crashed into the street near Vauxhall Bridge. The pilot, who was the sole occupant of the helicopter, and a pedestrian were fatally injured. The investigation established that the pilot had sent five text messages and received five text messages during the 25 minute flight. These messages, along with four before flight, were used to exchange information, some of which the pilot appeared to have used to make operational decisions. In its Safety Notice (SN-2013/003 - Flight Crew Distraction) published after the accident, the UK CAA commented that mobile phones are useful tools in aviation operations but stated that: 'flight crew members must not allow such devices to distract them from focusing on the duties and responsibilities related to the flight' and that 'except in emergency [mobile phones] should not be used in flight.'

What can pilots do?

- Recognize the potential for distraction arising from the use of PEDs;
- Avoid use of PEDs during pre-flight planning & preparation to focus attention on these critical tasks;
- Turn PEDs off before engine start;
- Ensure that EFBs that are used in flight are used for operational purposes only;

PORTABLE ELECTRONIC DEVICES

Be Aware of wear

A Smartwings Boeing 737-800, performing a flight from Ras al Khaimah (United Arab Emirates) to Warsaw (Poland), was enroute at FL360 near Tabriz (Iran) about 2.5 hours into the flight when the crew observed smoke and strong odour from the right hand side of the cockpit.

In response the first officer disconnected his iPad from the USB charger, the crew also pulled the related fuses to stop any further combustion. After ensuring that the smoke and odour had stopped, the crew continued the flight to Warsaw continuously monitoring the situation for a safe landing.

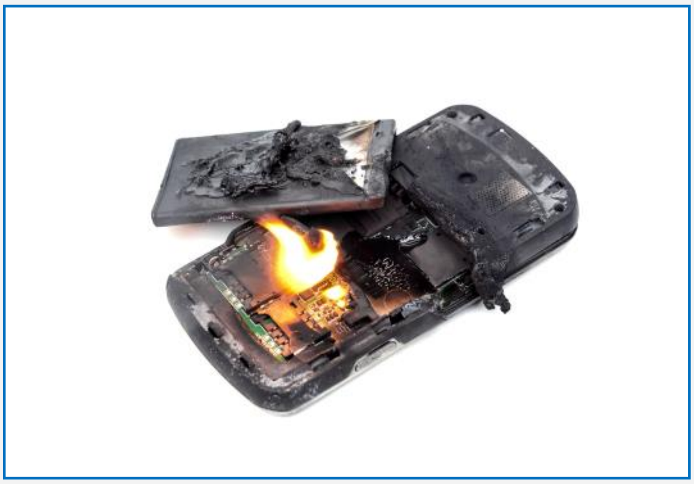
The USB power cable had created an electrical short circuit due to wear of the cable. The parts were replaced and a fleet wide inspection of all power cables was conducted. The operational documentation was changed as well on the base of this defect.

The chance of such occurrences can be reduced by pre-flight checks, correct cable routing and the use of certified accessories and equipment to ensure safe operation.

Fire Hazards

The widespread use of PEDs, including laptops, mobile phones and tablets, means that more people are travelling with items powered by lithium batteries.

Lithium batteries can catch fire if they have been damaged, subjected to short circuit, charged with a different charger to that supplied, or if a portable electronic device overheats.



Carriage of portable electronic devices only in the cabin is strongly recommended. If carriage within hold baggage proves necessary passengers and operators should ensure that devices are switched off completely (not left in stand-by mode), protected by using a rigid suitcase and/or cushioning material such as clothing, and not packed near to aerosols or perfumes or other permitted flammable products.

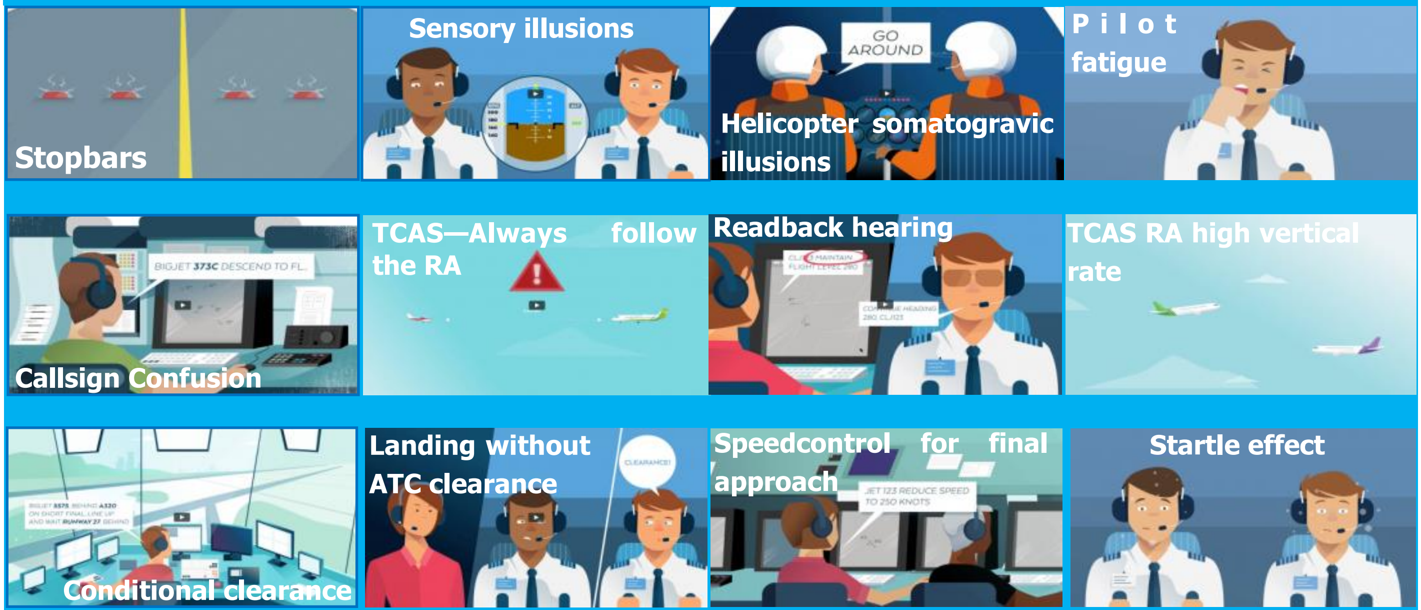
Identify risks early

During the EFB Approval process, M-Reg aircraft operators are required to perform an operational risk assessment to demonstrate that all the hazards arising from the use of an EFB system have been identified. In accordance with the operators SMS, these associated risks will have been assessed and mitigated as far as possible.

Guidance on generic hazards, risks and possible mitigation measures for various classifications of EFB can be found in Registry Publication 4 section 5.3.9—Appendix A

SKYCLIPS

Courtesy of www.skybrary.aero - some short animations of around 2 minutes duration which focus on a single safety topic in aviation.



Fuel Management Issues

It is essential that air traffic controllers and pilots have a common and clear understanding of low fuel situations. Do you know what phraseology to use?

ICAO has promulgated standard phraseology but there are continuing reports that this is not universally used and there have been accidents caused by fuel expiration. Only the following phraseology should be used by pilots with regard to fuel emergencies:

"MINIMUM FUEL" - The term used to advise ATC when having committed to land at a specific aerodrome, the pilot calculates that any change to the existing clearance to that aerodrome may result in landing with less than planned final reserve fuel. This is not an emergency situation but an indication that an emergency situation is possible should any additional delay occur.

"MAYDAY, MAYDAY, MAYDAY FUEL" - The term used to describe a situation when the calculated usable fuel predicted to be available upon landing at the nearest aerodrome where a safe landing can be made is less than the planned final reserve fuel.

The following is an extreme example of where communication between the flight crew and ATC on available fuel failed:

A BAe Avro RJ85 (CP 2933) declared a fuel related emergency shortly after encountering a traffic-related delay to its approach at destination. As ATC prioritised its approach from the south to runway 01 in night IMC, contact was lost and the aircraft was subsequently discovered to have crashed into terrain. There was no fire but the aircraft was destroyed and 71 of the 77 occupants were killed. FDR data showed that after almost 4 hours airborne, a LOW FUEL alert had been annunciated. At this point the aircraft was approximately 190 nm from destination but no mention of any fuel endurance concern was made to ATC. After 4 hours and 31 minutes airborne the flight crew asked ATC for "priority due to a fuel problem" - the first time ATC had been made aware of any fuel endurance concern.

The process for communicating a low fuel situation to ATC can basically be broken down into a 3 step approach:

Step 1 - Seek information from ATC concerning any expected delays;

Step 2 - Declare MINIMUM FUEL when committed to land at a specific aerodrome and any change in the existing clearance may result in a landing with less than planned final reserve fuel. This declaration is intended to convey to the applicable air traffic controller that so long as the current clearance is not modified, the flight should be able to proceed as cleared without compromising the PIC's responsibility to protect final reserve fuel;

Step 3 – broadcast MAYDAY, MAYDAY, MAYDAY, FUEL when the calculated usable fuel to be available upon landing at the nearest suitable aerodrome where a safe landing can be made will be less than the planned final reserve fuel. This declaration provides the clearest and most urgent expression of an emergency situation brought about by insufficient usable fuel remaining. It communicates that immediate action must be taken by the PIC and the air traffic control authority to ensure that the aeroplane can land as soon as possible.

Upset Recognition Prevention & Recovery Training

Loss of control in-flight remains one of the most significant contributors to fatal accidents worldwide and can result from a range of interferences including engine failures, icing, or stalls.

- As the C525 aircraft approached its cruising altitude of 43,000 the pilot was not monitoring the indicated airspeed and the aircraft stalled, departing from controlled flight in a series of five 360° rolls to the right. It was established that the pilot operated the aircraft in an autopilot mode which left it vulnerable to a stall and did not monitor the reducing airspeed as the aircraft reached its cruising altitude. The angle of attack sensing system had also 'stuck' in flight and the aircraft's stall warning system did not operate prior to the stall onset.
- The turn of the TBM700 aircraft onto final approach had been commenced from a relatively close downwind leg, requiring a higher angle of bank than usual to complete. In the latter stages of the turn, with flaps at the take-off setting, the bank angle was increased and there was a sudden and rapid departure from controlled flight that was consistent with a stall. The occupants were able to recover to an approximately level aircraft attitude but were unable to arrest the descent rate which ensued. The aircraft struck the ground and slid for a distance, sustaining extensive damage and causing injuries to both occupants.
- The flight crew of the Saab 2000 aircraft decided to discontinue their approach to the airport because of weather ahead. The commander made nose-up pitch inputs but perceived that the aircraft did not respond as expected. After reaching 4,000 ft amsl, the aircraft pitched nose-down to a minimum of 19° and the applicable maximum operating speed was exceeded by 80 Kts with a peak descent rate of 9,500 ft/min. The aircraft started to climb after reaching a minimum height of 1,100 ft amsl. Recorded data showed that the autopilot had remained engaged, and the pilots' nose-up pitch inputs were countered by the autopilot pitch trim function, which made a prolonged nose-down pitch trim input in an attempt to maintain its altitude-tracking function.
- The crew of an HS 125 lost control of their aircraft during an unstabilised non-precision approach when descent was continued below Minimum Descent Altitude without the prescribed visual reference. The airspeed decayed significantly below minimum safe so that a low level aerodynamic stall resulted from which recovery was not achieved. All nine occupants died. Upset recognition, prevention and recovery training is a key means of mitigating the risk of loss of control in flight.

The ICAO Airplane Upset Prevention and Recovery Training Aid available on the ICAO website is the result of a close collaboration between ICAO, Airbus, ATR, Boeing, Bombardier and Embraer.

The aim of the training aid is to:

- Understand basic airplane aerodynamics;
- Acquire the knowledge to recognize and avoid upset situations;
- Learn to take appropriate and timely measures to prevent further divergence;
- Learn airplane manoeuvring techniques throughout the operational flight envelope to perform recoveries from upsets.

MANDATORY AND VOLUNTARY OCCURRENCE REPORTING

'Your near-miss today could be someone else's accident tomorrow - let others learn from your occurrence experience.'

"Occurrence" means an operational interruption, defect, fault or other irregular circumstance that has or may have influenced flight safety and that has not resulted in an accident or serious incident.

The objective of occurrence reporting is the prevention of accidents and incidents and not to attribute blame or liability.

The benefits of a good reporting culture:

- engages the workforce at all levels in solving issues, giving ownership and increasing self-esteem;
- generates a positive safety attitude;
- enables pro-active hazard resolution, potentially saving costly or tragic occurrences for others.

Our experience with occurrence reporting has led to:

- improved ground handling procedures;
- facilitating manufacturers to improve hardware and software applications;
- increased flight crew education and awareness of potential problems.

The IOMAR recently updated Form 30 Occurrence Report to include additional data fields to enable trend analysis to create a pro-active approach. IOMAR also espouses a 'Just Culture' in the interests of the ongoing development of flight safety, meaning that the IOMAR supports the development, within all areas of the aviation community, of a culture in which individuals:

- are not punished for actions, omissions or decisions taken by them that are commensurate with their experience and training or that reflect accepted norms, but which result in a reportable event;
- accept that there may be circumstances where they are required to undertake additional training or be restricted in their activities to ensure safety;
- recognise that gross negligence, wilful violations and destructive acts are not tolerated.

An increase in reporting shows an improved safety culture, NOT a sign of a poor organization.

Reporting of Occurrences

In the event of an Occurrence, which endangered or which, if not corrected, may endanger an aircraft, the occupants or any other persons, must be reported to the Isle of Man Aircraft Registry **within 96 hours** using Form 30 Occurrence Report.

Further guidance can be found in:

Registry Publication 5 - Occurrence, Serious Incident and Accident Reporting.

Isle of Man AIRCRAFT REGISTRY