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Benefits of Incident Investigation to a Regional Operator.

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It is through organisations like the Society and it's working groups that I have seen the benefits of the investigation process in promoting a safer working environment. Through investigation we can look beyond the highlight and seek explanation of how and why. It is only then that we can provide a barrier to prevent recurrence.

My role within Eastern Australia Airlines is to initiate and promote safety management programs. One of these programs is the investigation of selected incidents to identify areas of weakness and to promote the initiation of change to reduce our exposure to unacceptable risk.

As many will be well aware, resources within a regional operation are limited. Multi-skilling is a fact of life to ensure commercial viability. Without that viability, we cannot exist. Among a group such as this I am truly an amateur among experienced professionals. It is through Eastern Australia Airlines relationship with it's parent Company that I have a professional resource to call upon when the depth is too great. It is however through my active flying role that I am able to maintain understanding and empathy of the airborne and operational environment.

It is not my intention to duplicate incident or accident investigation by other parties, but to identify events of a less serious nature and use the opportunity to test the resilience of Company practices and procedures.

Many Air Safety Incident Reports when completed by aircrew are very brief. These reports often hide vital supplemental information. One such report I will talk about in this presentation.

Having identified an incident for review, the fact finding starts. Regardless of the incident itself, Company documentation relating to the particular flight is reviewed. Where necessary, participants are interviewed and authoritative advice is sought.

The facts gathered, a report is generated primarily for Company management. Due to the non-flying background of some of these managers, time is taken in the report to identify aircraft systems and Company procedures. One of the pitfalls of airline operation is divisional segregation. We have managed to promote a co-operative culture between the operational divisions within our Company.

The factual portion of the report, including an analysis, is returned to the primary parties involved for review. Once it has been confirmed that the writer has correctly interpreted statements, we proceed to the safety actions.

Through trial and error we found a greater implementation success rate could be achieved by including responsible managers in creation of safety actions. Through face to face meetings in a workshop environment, the analysis is studied and recommended actions created.

The final report is then distributed and formal Safety Action Requests are issued to the responsible managers. These safety action requests are then tracked and monitored for response and action.

At three monthly intervals, management safety meetings are held in conjunction with our confidential reporting program. At this meeting all safety action requests and their response is held to scrutiny by all operational division managers.

There are two incident reports I would like to talk about today which will identify some of the lessons we have been able to address through this program. The first occurred on April 12, 2001.

The Air Safety Incident Report merely described a separation breakdown. It wasn't a near miss, because they did miss (just). The report did appear to contain some emotional statements about who should have done what, and when. The other operator made statements about professionalism. That was a quick way to get our attention.

The weather was clear, light winds and these two aircraft were the only ones in the circuit. The airport is within a mandatory broadcast zone, and they were aware of each other's presence. So how did they get so close to each other?

To help with this one, we were able to review the MBZ frequency transmissions. Recording of unmanned frequencies for nav' charging does have some benefits. I was also able to talk with the operator of the other aircraft and other operators from that airport. Co-operation between operators on safety issues is an extremely important tool.

Our aircraft was a 100 series Dash 8, the other aircraft involved is a Cessna 152 being operated by a local flight training school. The Dash had the normal two pilot crew compliment and a student pilot was flying the Cessna with an instructor seated in the right seat.

This was the first flight of the day for the Dash. The aircraft commenced taxi and established communication with the Cessna. During the short taxi to the runway holding point, two 'duct hot' caution lights illuminated indicating a failure of the air-cycle machine on the Dash 8. This fault was dealt with using the aircraft's quick reference handbook. It was found that during the engine start, the re-circulation fan had been left in the off position. The captain believed that the re-circulation fan had been responsible for the duct over heat and elected to reset all switching and continue preparation for departure.

In order to reach the threshold of the active runway the Dash was required to back track almost two-thirds of the runway's 5,600 feet. After the Cessna completed a touch and go and passed the holding point, the Dash entered the runway.

During the back track, the cautions again illuminated. Again the QRH was consulted and some faultfinding activity followed. The Dash was still occupying the active runway. With the Dash still sitting on the threshold and checks still to be completed, the Cessna was asked to report turning final. The response stated that the Cessna pilot was about to turn there now. The instructor had witnessed many Dash 8 departures before this one, but had never seen one so slow to commence a take off. At around 300 feet the Cessna commenced a missed approach and a simple statement was made on frequency: "it looks like we have to go round".

This call was not recognised by either of the Dash crew. Mindful that the Cessna must be getting close, the take off was initiated. As the Dash rotated at around 90 knots, the Cessna came into view directly above. The Dash was at almost twice the speed of the Cessna, which quickly fell behind and out of view. The take off could not be discontinued and the aircraft became airborne and was held low.

Only when separation was guaranteed did the Dash 8 recommence normal climb.

This is by no means the whole story, but what did we see as the major issues?

The analysis stated in part that:

- The engine start had been accomplished using an external battery cart. This is not an uncommon event, but it is not the norm. In combination with a delayed sign due to late arrival the previous night and a desire to minimise further delay, the re-circulation fan was unintentionally left in the off position. The re-circulation fan was not the actual cause of the overheat condition, but this started a mind set that the problem was operator induced. The air-cycle machine had actually failed.
- The subsequent departure was based upon sole reference to the quick reference handbook and an assumption that the crew had rectified the fault. At no time did the crew give consideration to the minimum equipment list.
- Separation with circuit traffic had been established, however through complexity of tasks associated with the system failure and poor communication techniques from both parties, situational awareness was lost.
- During the go-round, the Cessna maintained a track along the runway centre-line. When the Dash first transmitted concern to the Cessna above, the instructor initiated a turn to the right. Unfortunately, the Dash 8 crew kept asking the Cessna to turn left to avoid although they could no longer see the other aircraft.

Among the safety actions recommended in this event were:

- A greater awareness among flight crew of the appropriate timing and usage of the Quick Reference Handbook which is designed to allow for the safe completion of a flight following an abnormality, and the Minimum Equipment List providing detail on non-operative equipment that can be carried on a normal flight.
- Directive was issued requiring that crew not enter an uncontrolled runway until the aircraft was in a known state of readiness to take-off. Should any abnormality occur during occupation of the runway, the aircraft must vacate.
- Although TCAS is not a device capable of providing separation, all crew has been actively encouraged to utilise the benefits of TCAS for identifying possible conflict before entering a runway or commencing a take-off.
- And, the training operator recognised a need to maintain visual contact with traffic during the conduct of a missed approach.

The next event was more ‘in-house’. On the 12th December 2001, a 200 series Dash 8 was unable to extend the landing gear on arrival at Lord Howe Island. The aircraft subsequently diverted back to the mainland and landed safely. The Dash 8 is fitted with a Landing Gear Inhibit switch. This switch is designed to provide a realistic training system for alternate undercarriage extension. With this switch in the inhibit position, the landing gear down position in the selector handle is isolated. So how did this switch get into the inhibit position for the arrival at Lord Howe?

The aircraft had departed at the normal time of 11:35 local. During the climb out of Sydney, fluctuation of the right main hydraulic pressure gauge became evident. Following discussion with engineering, the captain elected to return to Sydney for repair. An M.E.L did exist that permitted continuation of the flight but this was rejected.

On arrival the engineering staff moved straight in. They commenced activity in the flight deck before the crew had completed shutdown duties. Similarly the crew returned to the aircraft before maintenance activity had been completed.

During the maintenance activity, the ‘inhibit’ switch was selected to inhibit. A side benefit to the function of this switch was that it prevents the main undercarriage doors from premature closure during ground maintenance in the nacelle. The maintenance control document

requires the use of gear door pins to achieve this measure of safety. Although the Inhibit switch may be considered to form an undeniable safety back up, its use on this occasion was a 'work-a-round' measure.

Engineering checklists were not used to reconfigure switching as the flight crew had entered the flight deck before this action could occur. The engineer involved assumed the pilots would take care of the inhibit switch.

Additionally, pilots are required to perform a geographic scan of the cockpit and perform prescribed drills in preparation for departure. The Inhibit switch is included in this scan and it is apparent that diligence did not prevail.

During taxi another clue was missed. The nose wheel steering failed. The crew did not associate this with the inhibit switch and in isolation, continued in accordance with the M.E.L.

Nothing else occurred during the flight to Lord Howe to indicate problem until gear down selection at the Island. Upon selection of gear down, three red lights illuminated and there was a distinct lack of expected sounds. Due to the earlier hydraulic system indicator failure, the crew suspected a significant hydraulic abnormality had developed.

After three attempts to select gear down using the normal system and with approximately one hundred and fifty pounds of fuel above the minimum to return to the mainland, a diversion was commenced. During the diversion engineering staff became aware of the anomaly and suggested a check of the inhibit switch. At this point, fuel state dictated a return to the mainland continue.

Again, not all the evidence or facts are portrayed here. The major points from analysis include:

- Interruption and distraction occurred during critical functions for both engineers and the flight crew.
- Flight crew failed to maintain diligence in a documented and regularly performed pre-flight tasks.
- Engineers failed to complete published tasks following maintenance activity.
- Company 'Originating' checklist includes the Inhibit switch as a check item. Use of this checklist is required at the first flight of the day or following hangar maintenance. On this occasion all maintenance was conducted on the tarmac and the checklist was not required.
- The severity of the outcomes to this event results from the remote location of Lord Howe Island.
- Engineering 'culture' had bent toward some work-a-round procedures. One of which was the use of the Inhibit switch in place of purpose designed pins.
- The flight crew did not recognize the association of nose steering failure with the position of the Inhibit switch. Pilot reference material is extremely brief in this regard and the only item showing a direct relationship is a diagram of the landing gear system.

In responding to the previous analytical points, the following formed some of the safety actions:

- Pilots and engineers must be provided with uninterrupted time to complete all their published procedures. Physical barriers and documented procedures must support this requirement.
- Warning tags be utilised when switches or circuit breakers are moved out of an expected condition.
- The 'Originating' checklist must be utilised after ALL maintenance activity.

- Pilot education material must provide greater information on the relationship of the Inhibit switch to other aircraft systems.
- Staff must be actively discouraged from performing work-a-round procedures.
- Through publication of this event to staff we promote the need for diligence in the conduct of drills, scans and checks.

The purpose of this presentation has been to promote the benefit of research, investigation and analysis in reviewing the conduct and adequacy of Company policies and procedures. It is my belief that this review will provide significant benefit to the long term safety and viability of our airline operation.

The Australian travelling public believes commercial air travel to be safe; it is our responsibility to justify that belief.