Confidential Human Factors Incident Reporting Programme

FEEDBACK

Issue No: 47 **July 1998**

Editorial

Level Busts. A number of reports have been submitted in response to the request in FEEDBACK 46 for information/comment on Level Bust incidents. Two items are published in this issue (Pages 5, 7). More details on the level bust initiative that is being sponsored by CAA (SRG) are provided on the information leaflet that has been distributed with this issue.

One of the principal objectives of the present initiative is to gain more information on the circumstances that lead pilots and ATCOs to make the types of error that can result in a level deviation. CHIRP is participating in this initiative and will be pleased to receive further information on incidents, or any comments on level busts, that will assist the team that is undertaking the review. All reports on Level Bust incidents that are submitted directly to us will be handled in accordance with our normal procedures. Reporters' details will not be released to third parties and reports will be suitably disidentified.

Aircraft Type Designators (ICAO Document 8643/25). A report in FEEDBACK 45 detailed a number of cases in which the latest revision to international aircraft type designators in Edition 25 of ICAO Document 8643/25 lacked clarity, as a result of grouping aircraft with different performance characteristics and/or wake vortex categorisations within a single type designator. The comments received on this subject were submitted to ICAO Air Navigation Bureau (ANB) for their consideration. In their response ICAO (ANB) agree in principle with many of the comments, which are under consideration for the next revision to the document. No changes are scheduled at this time. Other UK agencies and ASRS, the US confidential safety reporting programme, have made similar representations.

AIS on the Internet. Since the policy regarding the distribution of Aeronautical Information Circulars (AICs) was changed, a number of reports have been received seeking improvements in access to AIC information. National Air Traffic Services Ltd (NATS) has recently established a web-site, which contains Aerodrome Information, UK Daily Navigation Warnings, UK Daily Bulletins and Publications including AIP Supplements (SUP) and Aeronautical Information Circulars, as well as information on adjacent FIRs. The service can be found at: **http://www.ais.org.uk**.

Full details of the service are contained in NATS Document 30. Internet users should note that although the web-site pages, Navigation Warnings, Aerodrome Information and adjacent FIR information may be viewed using standard browser software, AICs and SUPs require Adobe Acrobat Reader 3.0 or later. This software is available free-of-charge from a link on the front page of the AIS Web-site.

INSIDE THIS ISSUE:

CHANGE OF ADDRESS?

Please notify us by:

- **POST:** FREEPOST, RAF SAM, Farnborough, Hants GU14 6BR

or **FAX:** 01252 543860

or **E-MAIL:** kirstyb@chirp.co.uk

A Reminder on the Magazine Format:

The following fonts are used:

- Disidentified reports. These are reproduced with minimum text changes
- *CHIRP Comments are italicised*
- Verbatim Third Party responses are printed in SWISS type

FEEDBACK - COMMENTS

We have continued to receive a number of interesting comments on the "Holding Procedures" reports published in FEEDBACK 45/46. The following items represent the range of views expressed:

Holding Procedures (FB46)

I sympathise with the author given a late holding instruction. I don't know which airfield he was routing to, but in the UK the majority of routes to the major airfields clear inbounds from the FIR boundary to a holding fix. If no clearance beyond that point is given, the pilot MUST hold.

I am surprised to see that a hold is not entered as standard on many routes. The number of times a pilot has asked me "Do I hold at XXXX?" with just a few miles to run is countless.

If that is your clearance you HOLD, so please put the information into the system and it will help us with correct holding patterns.

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(2)

Perhaps I will not be the only person to comment on the increasing reliance to use the FMC *(Flight Management Computer)* to input all aspects of a hold before actually flying the hold itself. As noted in FB45, there must also be a time when it is easier to "manually" fly the initial stages of the hold using a Heading mode, whilst the non-operating pilot programmes the necessary data into the aircraft's system.

After all, it is not too difficult to assess the type of join, initial heading and timings, especially as all FMCs will provide drift/groundspeed information. Why not utilise the HGM more? It is a feature of all cockpits, has no keyboard, and even has a voice recognition feature - it is more commonly known as the Human Grey Matter!

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(3)

I spent some time assisting in the liaison with my company's FMC navigation database supplier. Given the discussion in FEEDBACK at the moment, I thought it would be helpful to pass on some of what I had learnt to the wider pilot community.

The navigation database is the major variable part of the FMC. It is re-issued on a 28-day cycle. It contains, as well as holding patterns, all the SID's, STAR's, airways, navigation aids, runway approaches, airfield, runway, gate positions and company routes.

There are several important points that need to be made about the navigation database.

The biggest constraint on what goes into the database is the amount of memory available. On the aircraft I fly, the programmable FMC memory is 96 kilobytes, of which 2Kb are reserved for use in the current sector and for supplementary (semi-permanent) data. 94 Kb is less than 2% of the RAM *(Random Access Memory)* needed to run Windows 95. When I became involved with our supplier, the aircraft FMC was full to 92 Kb, and it was far from containing everything we might need.

Whilst the data is stored in the FMC in a very compact way, it will not be possible for an operator with a substantial route network to have a comprehensive navigation database, some filtering of the data will be necessary. The important thing is to make sure that the policy, which determines the data to be included, is sensible.

The database is programmed by people who don't make their living flying aeroplanes. They are highly professional people, and they are very good at translating the instructions contained in the AIPs *(Aeronautical Information Publications)* of the different countries into FMC code. They have quality processes, which should verify the code issued. However, they do not have the vital interest in ensuring that a turn is in the correct direction, or of the correct radius,

which a professional pilot would have. In other words, don't trust your life to the FMC navigation database! Also, if you think you have come across an error, feed the information back to your operations management, and try and ensure that it is fed back to the database supplier.

What is issued in the database on your aircraft is probably not selected in the first instance by the database provider. It is normally selected from a master database held by the provider by somebody in your company - probably from a department with a title like "Navigation Support Services". If you are lucky, the person who carries out this specification will be interested in improving the service he offers to the pilots, and will appreciate any constructive advice he receives.

I am no particular friend of the database suppliers, but I would say that they are being unjustly maligned. If a company does not ask for holding pattern information to be included, it won't be. In this case if you programme a hold, the FMC will calculate one, not from the database, but using the FMC manufacturer's rules. This is normally a turn in the standard direction, on the current inbound track, as one of your correspondents correctly stated.

My company decided to include holding patterns. My own view is that other things merit a higher priority for inclusion. If I am within three minutes or so of a holding facility and I have no onward clearance, it makes sense to programme the hold - it is the work of around 20 seconds, even if not in the FMC database. This isn't superstition or pessimism; it is conscientious and good airmanship. You then have the FMC set-up to relieve you of all the workload that flying a hold entry and pattern the old-fashioned way would have entailed, although speed limits/outbound DME limits are not normally included in the navigation database and these need to be sorted out by hand.

I have another concern about the FMC, and I wonder if it is shared by anybody else? The model used to calculate Magnetic Variation in our FMC's is up to 2° out in Western Europe. Positions of waypoints can be specified in several ways; as latitude and longitude, or as a range and bearing from a beacon, for example. Next time you construct a waypoint more than (say) 15 miles from a navaid, make a second version of the waypoint, constructed in a different way. How far apart are the two points? Has anybody investigated whether this could ever be a serious problem? Do other carriers have it, or other aircraft types?

The memory capacity of FMC navigation databases varies considerably between FMC equipment standards.

Also, the amount of basic navigation data that is required to be included for a particular aircraft type will be influenced by the operator's route structure. For example, one type of operation may require world-wide database coverage, whereas European coverage may be sufficient for another operator of the same aircraft type/database capacity.

These factors will determine the amount of spare memory capacity available to permit the inclusion of additional information such as specific holding patterns.

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Comments (FB46)

As a controller at the end of a long career who has been involved in teaching for several years, I read FEEDBACK with vigilance to ensure that what we are teaching controllers reflects current operational situations.

There were two reports in FEEDBACK 46, which particularly caught my eye. I have discussed the report on the question of Level Bust - "A Question of Pressure Difference" with colleagues and we are of one voice - when an altitude is not separated from the next Flight Level, don't use the Flight Level. If you instruct an aircraft to climb or descend to FL70 when the pressure is less than 1013.2mbs, it is all too easy to forget that it is not separated from aircraft climbing on a SID to 6,000ft. We teach that when the first available Flight Level above the Transition Altitude is less than 1,000ft and separation is involved - don't use it.

In relation to the report "Directed or Assumed" we teach that an instruction to "Report Heading" is not an instruction to "Continue Heading", and also to avoid a request to the pilot for a heading report unless you are going to give a heading

instruction immediately. I have to admit that many non-English speaking controllers that come to us for training do seem to think that if you ask a pilot his heading, he will continue on that heading. We emphasise that that this is NOT so, unless a subsequent instruction is given to continue on a specified heading.

Some ATS Units have procedures to restrict the use of the first available Flight Level above the Transition Altitude when the pressure is less than 1013.2mb.

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Fatigue/Third-Party Certification (FB46)

Yet again the problem of fatigue has arisen in your "FEEDBACK" report, issue 46. I was however very aware of the different response to the three separate reports. The two Flight Deck reports warranted the word "Tired" in bold headlines on Page Six whereas the article regarding overworking and fatigue in engineers was headlined as "Third-party Certification" when the article was solely about the danger of engineering staff working long hours.

Unfortunately, your response was typical of the crew orientated aviation industry, blaming the individual and employer rather than looking at the obvious need for regulated engineering duty periods. Quoting AWN 47 Para 3.2 isn't going to stop an employer dismissing my services as a contract inspector if I will only work a 40-hour week. Whilst it is nice to earn in excess of £1500 per week many contracts stipulate a minimum number of hours, quite often 12 hours a day seven days a week, I've yet to see one for a 40-hour week. Isn't it about time that engineering staff are recognised as professionals and the regulating authority protect all of us from mistakes made due to fatigue?

It does seem rather strange that hours can be regulated for cabin staff and yet a licensed inspector can be expected to work a 24 hour shift (termed a Ghoster) and return to work eight hours later. At any one time a Captain is only responsible for the capacity of one aircraft whereas a certifying engineer can be making decisions that directly influence flight safety on any number of aircraft.

You end your comment with the statement that "it is apparent that there is an increasing willingness on the part of many organisations to examine and to address some of these long-standing safety-related issues that Engineers, and others, have been reluctant to report in the past." It's a shame that doesn't include the Civil Aviation Authority.

Tony Ingham Chief Surveyor CAA (SRG) has provided the following comments:

CAA has initiated and continues to press home many safety-related issues to help improve the safety record. Some of these are:

- Human Factors maintenance errors analysed and publicised. CAA support for the extension of CHIRP to maintenance personnel to improve reporting of sensitive issues.
- Airworthiness Notice (AN) 12 (with 58 appendices) details experience from incidents. AN 47 provides guidance to individuals and organisations. AN 72 issued to address critical safety issues.
- Surveyors are paying special attention to JAR 145 organisations' planning and resources available and conduct out-of-hours visits to monitor these resources and standards of work.
- EU Working Time Directive has been publicised to AOC Holders and JAR145 organisations.
- Safety Management Systems developed in CAA are to be implemented, in conjunction with Industry, in 1999. This concept has been promoted in a series of eight "Roadshows". Consultation with AOC Holders and JAR 145 organisations is scheduled to commence this month.

If your correspondents want to discuss anything that we should be addressing but are not, they should speak to their local Regional Manager (See AN 29 Appendix 2 for contact details).

There are three salient points to make on the issue of Engineers' working hours:

- *Engineers, whose responsibilities include safety critical tasks, are not protected by any form of working hours regulation and little research-based guidance is available on the best ways of ameliorating the effects of fatigue during the shift patterns worked.*
- *Employers and contracting agencies have a responsibility, not least in the 'duty of care' provision in the Health and Safety at Work Regulations, to safeguard their staff from excessive working hours.*

- *Individuals have responsibilities to themselves, their employers and the profession to take adequate rest periods and not to carry out safety related tasks when impaired by fatigue.*

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ATC REPORTS

Level Busts - A Novel Improvement?

The CAA are rightly targeting level busts and trying to raise awareness, all round, about the problem and its potential for causing a serious incident. They are emphasising caution and care with read-backs etc in an attempt to reduce the incidents. One obvious cause is the confusion of levels and headings i.e. Heading 250° being mistaken for FL250.

I have proposed a solution, which seems easy, cheap and (to me) obvious, although at first sight appears a little strange. The CAA have rejected it without going out to consultation and I think they are wrong.

My solution is very simple. Controllers will never use headings ending in zero, i.e. the Heading 250° will always be transmitted as 251° and so on all the way through the compass.

As I have said, I know this sounds funny, but that is purely because it is novel. If all the controllers were trained to do this they would quickly master it. Aircrew would also be briefed (obviously). Frankly it would not matter if they flew 250° or 251° - the difference is negligible.

I was trained in ATC at a time when great emphasis was placed on avoiding confusion, at all cost, whenever possible. This seems an obvious solution to a dangerous problem (I accept that it would not stop all level busts), so why not consult aircrews and controllers?

Perhaps you can through FEEDBACK.

John Dancer Head ATS Standards Department CAA (SRG) has commented that the SRG Level Bust Working Group will be interested to hear controllers and pilot's views on this and other suggestions to reduce the incidence of level busts.

We will be pleased to pass on any comments received.

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Right Approach - Wrong Setting

In order to stay current on SRA's *(Surveillance Radar Approaches*) I had persuaded an aircraft to take an SRA to Runway ##. The flight was operating under IFR although the weather was CAVOK.

Our radar is presented to the controller by colour displays. Within the system is the ability to select various radar maps one of which is the RW## SRA (QNH) which sets the radar to the correct range and provides the range marks and altitudes imprinted on the map. Another facility available is the MAP OVERLAY SELECT, which enables controllers to select whatever element of the map they require and add or replace the information on the map display.

Having radar-directed the traffic to a 10 mile final I selected the RW## SRA (QNH) map and without further ado launched into the SRA procedure. I commenced the SRA as normal but after a couple of ranges I realised that something was wrong, namely I was reading out the heights based on QFE instead of QNH.

I checked the map selected which showed RW## SRA (QNH). Having burrowed into the system I selected the correct map and continued the SRA. At the end the aircraft Captain commented on the confusion at the initial part of the SRA.

Luckily it was a clear day and the error was realised, but it was in the dangerous direction i.e. the aircraft was always going to be the airfield elevation less than its supposed altitude, at our airfield this is relatively small but at others it could be much more.

Afterwards I realised that someone, who had previously selected RW## SRA (QNH), had realised he needed the QFE ranges and replaced the information using the MAP OVERLAY SELECT function. At the completion of the SRA he had reselected the normal 40-mile range on the console and the erroneous information was replaced in the computers memory ready for when I selected it.

Steps have been taken at my unit to ensure the information is more clearly marked for future use but the fact that the wrong information can be put in the

wrong "box" so simply is disturbing to say the least.

Finally of course it taught me the old adage - Never assume, always check. I am now meticulous in my preparations checking all the SRA selections as soon as possible after I have started my duty, so that if I am busy I will not be caught out again.

This potentially serious design feature would not appear to have been identified during the engineering safety assessment for this equipment.

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Contact?

The following incident occurred whilst I was working as Approach Radar controller. Traffic levels medium, radar very poor with weather suppression, SSR (*Secondary Surveillance Radar*) U/S and serious interference. Mixed weather with cloud 2-3000'.

A helicopter was established in the hold at 3000' QNH. A *business jet* entered the hold at 4000' (no chance to swap levels prior to join). Both aircraft under limited RIS *(Radar Information Service),* which was maintained in the hold as the *business jet's* declared intention was to make a joining procedure only and to go outbound for a non-precision approach. As the *business jet* approached the hold I called the helicopter as traffic information. No response. I called the *business jet's position* to the helicopter - "No contact, IMC".

There was no radar opportunity to change levels in the hold due other traffic so I cleared the *business jet* for a non-precision approach maintaining 4000' intending to drop him to the commencement level of 2000' after clearing the other traffic. Perhaps to be helpful and awaiting descent the *business jet* called "Contact the other traffic in the hold". I acknowledged but did not use this information and then became involved with other traffic. I went back to the *business jet* and asked if he still had visual contact with the helicopter three miles west of him, reciprocal? His reply was "Affirmative ... well I can see him on TCAS!!" *(Traffic Alert & Collision Avoidance System).*

This incident raises some very serious questions, such as:

a) Would a busy controller have queried the "Contact" call or allowed a VMC descent?

b) What if I had no reason to be suspicious of the "Contact" call as a result of the helicopter being IMC?

c) What if I had broken into the RT at the hesitation point after "Affirmative" and believed that the *business jet* was not just "contact", but visual with the helicopter?

d) How did the *business jet* know and was it not dangerous of him to assume that the TCAS response, was indeed the holding helicopter?

e) Even if correct in the assumption, did this represent some form of "radar identification to the pilot"?

The practice of giving unverified TCAS information, particularly in the guise of a visual sighting, to a busy controller who may be working procedurally, is quite alarming. Pilots need to be aware of the potential consequences of misleading RT messages.

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A Distracting Visit?

I was operating as the tower controller, when after being relieved, I was told to "escort" a party of visiting aviation enthusiasts to the tower for a brief view of our tower and procedures.

I had completed 90 minutes tower duty, then went straight into the walkabout with more than 10 visitors. After 45 minutes of discussions with the visitors (i.e. no proper break), I went straight back onto duty in the tower, where Low Visibility procedures were now in force.

The workload was high and the atmosphere among the visitors in the relative confines of the tower was similar to that of a football crowd. I subsequently departed an aircraft without the correct co-ordination, although no incident occurred.

I feel that all Units should establish procedures to ensure that visitors can be shown around the ATC environment in a sensible, constructive and orderly fashion. These should include the maximum

practical party size, visit schedule and nominated escorts throughout the visit to avoid this kind of ridiculous situation.

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FLIGHT DECK REPORTS

Level Busts

There's so much that could be done to reduce the frequency of the above. Sadly in Europe our authorities are unable to agree on anything, seriously reducing their effectiveness.

1. Establish a common Transition Altitude ideally of 18,000 feet. This will eliminate low QNH climbing busts, reduce late altimeter setting errors and after take-off workload. The UK is unable to agree a common TA even for this small country so there's little hope of this happening.

2. Eliminate the use of QFE and regional QNH to prevent incursions of controlled airspace from below and after take-off or go-around altimeter settings.

3. Prohibit pilot PA *(Passenger Address)* announcements during climb or descent and use other means for routine cabin crew signals.

4. Prohibit company VHF calls below cruising altitude unless they're essential for safety. Most of these are wholly unnecessary anyway.

5. Discourage listening to ATIS broadcasts during climb or descent, ATC to advise significant changes.

As this report highlights, there are a number of operating procedures that, if adopted, would eliminate several possible causes of crew distraction, which can lead to level bust events.

Given the ever-increasing growth in commercial air transport operations within the UK FIR and throughout Europe, an initiative to develop a simple, common set of altimeter setting procedures throughout Europe merits serious consideration.

The dissemination of ATIS information by ATC would be impractical in some cases, due to traffic densities, although data link may offer a solution to this matter.

CAA (SRG) Flight Operations Department commented as follows:

The Flight Operations Department agrees that non-pertinent activities should not take place while the aircraft is climbing or descending. These aspects were addressed specifically in Flight Operations Department Communication 2/97. All operators were encouraged to review their procedures and to make changes, where necessary.

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A Lesson to be Learned

We were vectored onto the localiser for final approach to #### *(Foreign Destination)*. The Captain was flying this sector (PF).

The approach was broken off at approximately 7nm due to our weather radar indicating a cell over the airfield.

We decided to enter a hold. Meanwhile the fuel was reducing towards the minimum for our diversion airfield. During the hold, #### ATC were not very helpful with weather reports and there was a language problem. They did indicate that the worst weather was over the approach end of the airfield and also that the surface wind was calm. The Captain then decided to make an approach to the opposite runway. This approach would be a VOR/DME approach as there was no ILS on this runway.

We had been holding for about 10 minutes before we started the approach to the opposite runway ##, during which time there was no briefing for the VOR/DME approach. As we made our way towards the Initial Approach Fix, I found the instrument approach charts for our diversion, as I knew we only had one chance at this approach. I am sure that the Captain was fully aware of our fuel state, as we had discussed the diversion airfield previously. During the entire approach the aircraft was being flown through the autopilot.

As we intercepted the final approach course I briefed myself on each of our roles (i.e. who was looking in and out etc.) I repeated them to the Captain, as he had not briefed the procedure for the non-precision approach. (After the event I realised that I had incorrectly briefed the roles for a precision approach procedure).

On reaching decision altitude, I called "####" *(Company call for Minimum Descent Altitude)* and he immediately said "Contact". When I looked up we were still

in cloud, there was no visual reference at all. About two or three seconds later we became visual and were actually quite well placed for a landing, the PF having to manoeuvre slightly left to regain the runway centre-line.

The following factors probably contributed to this incident. We were not acclimatised to either the departure or destination time zones and were at the end of a long night flight with weather at or below limits and our fuel state approaching the minimum for diversion. In addition, I am ashamed to say that I did not question the Captain between the Decision Altitude and becoming visual.

I thought long and hard about reporting this incident, but decided not to because it is my word against his, but I will never let this happen to me again. To this day, I still cannot believe that a Captain would commit the 'cardinal sin' of flying below decision height/altitude without adequate visual reference.

Investigations into a number of accidents and serious incidents have shown that in a complex, rapidly changing situation, when good crew management procedures are set aside by the aircraft commander or his decisions are adversely affected by a loss of situational awareness, other flight crew members are reluctant to question the commander's judgement. This incident reflects a similar reluctance.

The circumstances that led to this incident were not unusual, long FDP, crew not acclimatised, bad weather at destination, limited capability to hold. In this type of situation it is most important to give yourself the best chance of success. The importance of a good, comprehensive approach briefing in such circumstances to assist in the mental 'priming' process for both crewmembers and facilitate crew co-operation cannot be overstated.

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Reverting to Type

Towards the end of a long-haul return sector into a major UK airport, we were radar vectored to an ILS approach. When fully established on the ILS about 1800ft in IMC we received a Traffic Advisory from our TCAS. I looked to see traffic on our screens indicated at 700ft below us. Almost instantaneously afterwards we received a Resolution Advisory (RA) instructing us to climb. The normal procedure for a 'Climb' RA in the landing configuration is to disconnect the autopilot, then to press the TOGA *(Take-Off and Go-Around)* switches and to effectively carry out a go-around.

The Captain, who was handling at this stage, pressed the Autothrottle Disconnect switches instead of the TOGA switches. He instinctively followed the Flight Director and we continued down for what seemed another three or four seconds before he realised what had happened. We continued to close on the traffic at a fast rate and, at the point that we actually commenced the go-around, the traffic was indicating the same level at no discernible distance from ourselves.

Afterwards on the ground, the Captain was trying to understand why he had pressed the wrong switches; I came up with a reasonable explanation that he agreed with. Both the Captain and I had previously flown the #### *(twin jet-same manufacturer)*, which has a slightly different arrangement regarding the Go-Around and Autothrottle Disconnect switches. The Autothrottle Disconnect on the #### *(twin jet)* is a 'nipple' type switch on the side of the thrust levers and the TOGA switches, which are flat and ridged, are both in front of and behind the thrust levers. On this aircraft, the Autothrottle Disconnect switches are behind the thrust levers with the TOGA switches in front of the thrust levers, both sets of switches are identical in being flat and ridged.

I believe this to be the reason why in the heat of the moment the Captain pressed what felt to be a TOGA switch and on his previous type was one!

I have also made a similar mistake in the past by accidentally pressing the TOGA switch when all I meant to do was disconnect the autothrottles, luckily that time, the consequences were not life-threatening.

This type of error has happened many times before. Given the significant differences in switch design, function and location that exist between current aircraft types, it will continue to be a potential trap for the unwary.

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Equipment or Human Failure?

An incident occurred recently, in which an aircraft established on the glidepath, was instructed by ATC to turn in excess of 60deg to avoid a confliction with a departing aircraft, which had failed to follow the correct departure track. It subsequently transpired that the pilot of the departing aircraft had some sort of problem with his Flight Management System. *(The other aircraft involved in this incident had recently been fitted with BR Nav compatible equipment).*

My concern is that in the rush to implement BR Nav Operations to create more traffic capacity, some pilots have not received adequate training in the use of the new equipment, and Standard Operating Procedures for its safe use have not been fully developed.

It's all very well having the kit on board, but unless it can be used safely, it defeats the objective.

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Whose Discretion?

After an overnight stopover we completed the first sector of a three-sector day and were scheduled to operate the second sector approximately one and a half hours later.

The aircraft allocated for the second sector was not available due to unscheduled maintenance. This meant that we had to wait for the first batch of early morning arrivals for a replacement aircraft, which together with a delay due to slot time allocations made it 99% certain that discretion would be required to extend the Flying Duty Period (FDP)

When the Captain asked if I was happy about going into discretion I said "No", my feeling being that we were still at our home base and after an early start we had two long sectors ahead of us. He replied that this was a 24-hour day business and that I had to be flexible. He said that there were no standby crewmembers available. He also stated that he had sole discretion and only had to take my views into account. I said fair enough, but that I would be going under duress.

By flying the second and third sectors faster than normal, we ended up going into discretion by only a few minutes. When filling in the appropriate 'Extension of FDP form' he said that the CAA wouldn't even be interested in this.

The general provisions of CAP 371 (Para 18.1) permit an aircraft commander to exercise discretion to extend a FDP by up to three hours. However, in the case described, the decision to exercise discretion prior to the second sector of a three-sector schedule restricts the maximum extension of the FDP to only two hours (Para 18.2). The planned period of discretion was well within the maximum permitted.

Turning to the question of who has the responsibility for exercising discretion, CAA (SRG) clarified this point in NTAOCH 6/94 issued on 9 December 1994, Para 2.3, which states:

"……. All crew members are reminded that it is the Commander, on the day, who exercises discretion, after taking note of the circumstances of the rest of the crew. When away from base and the flight crew and cabin crew remain together, then it is the Commander who exercises discretion to extend an FDP and/or reduce a rest period. However, where an individual crew member separates from the crew, or the crew as a whole splits up, then any use of discretion to reduce rest becomes a decision for an individual crew member…….".

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Slot Frustration

I have operated Business jets for many years flying throughout Europe and in the USA.

The single biggest item in my working day that causes me constant anxiety, mental anguish and flight delays is slot times.

Over 90% of flying days are adversely affected by slot times later than the flight planned time. Even when airborne on a late slot, planned route or planned cruise altitude often cannot be achieved, thus adding time and fuel problems to the day's worries.

A recent busy three weeks on the crowded USA East Coast routes and airports, highlighted how awful flying in Europe has become since the imposition of Eurocontrol and slot times. We went in to such "sleepy hollows" as Atlanta and Kennedy several times with almost no prior notice. Just file an IFR plan with local Flight Service Station, walk directly to the aircraft with the passengers and get

airborne. The provision of ATC in the USA is a real service to the pilot. And it works. You can plan your flying day to the nearest five minutes sure in the knowledge that it will work.

Slots are not necessary in the USA, save for some scheduling into the busiest airports, and so should not be necessary in Europe.

As a start I suggest all aircraft filed as "G" in the flight plan should have no take-off restriction.

I know it's going to be a difficult case to argue because I sense a mind-set, which thinks that more control means more safety.

However, fatigue is central to flight safety. For me, slot times and all they invoke cause me the greatest fatigue in my daily work.

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Too Much of a Hurry

We had completed the outbound flight and were preparing to return home to #### airfield. I had flown the outbound leg, so it was XXXX's turn to fly the aircraft back.

There was some pressure to be quick as we would arrive only shortly before #### closed.

Permission was given to back track on reaching the active runway. A squawk *(transponder code)* was given together with the routing after take off.

I then heard clearance given to a light aircraft to cross the active runway at the intersection.

XXXX started to open the throttles. He had not heard the light aircraft clearance to cross the runway and he thought we had take off clearance.

I said, "We do not have take off clearance" and put my hand on top of his to prevent the throttles being opened. He said we were cleared for a left turn after take off. I said we were only cleared to line up NOT take off.

He closed the throttles and we both watched the light aircraft cross the runway directly ahead of us!

This incident is a good example of "the wish syndrome" in which individuals interpret information in a way that suits their prior intentions. In this type of situation it is sometimes known as Get-home-itis!

The incident is also a good example of the value of effective crew co-operation.

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ENGINEERING REPORTS

Undermanned and Stranded

The elevator gust lock had stuck in the 'off' position allowing the elevators to move in the wind. Only three staff members were on shift. The aircraft was parked in the hangar and an elevating platform trailer ("cherry picker") moved into position. Due to aircraft movements on the line (approx. one mile away), two staff members left to attend to the line, while I went up on the "cherry picker" to rectify the gust lock problem.

Whilst working on top of the tailplane (25ft up), the "cherry picker" developed an internal hydraulic leak and descended, uncontrolled, striking the tailfin on the right-hand side causing scoring and a dent, leaving me stranded on top of the tailplane. Eventually a staff member from another company came into the hangar (after 20 minutes) and moved the "cherry picker" away from the aircraft and positioned a de-icing rig to get me down, which took, in all, an hour.

Clearly, the principal cause of this incident was under-manning of the shift. Whereas care is usually taken to ensure staff are not left on their own during night shifts, this happened during a day shift; providing a reminder that health and safety risks are present at all times.

The good news is that, as a result of this and other problems related to under-manning that adversely affected the operation; the management has taken positive action to rectify the manning shortage.

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Not Enough Men ... Not Enough Tools

While moving an aircraft into the hangar the right hand aileron was struck by a crane, damaging the aileron. The new aileron was incomplete, missing trim tabs. The damaged trim tabs were removed and

sent for repair. When repaired and returned, there were only three staff members on shift, one staff member had been on shift for 14 hours, but stayed on to fit the trim tabs, before going home. The other two staff on shift attended the line after assisting with the installation of the trim tabs, but left before tidying up because of time pressures. The next day a small hammer and spanner were found on the runway. These had been missed and had been left on top of the wing.

The shift pattern we are supposed to work is a system of earlies, 0600-1400 hrs, and lates, 1330-2130 hrs, working Monday to Friday and, in rotation, covering Saturday and Sunday. However, in practice, due to staff numbers (at that time we normally had two per shift, occasionally three), we ended up working most days of the year with usually three days off a month and often swapping from lates to earlies and back. There have also been isolated cases where, because there is no one else to hand over to, we have started on a late shift and finished well into the following morning.

This type of lapse is to be anticipated if Engineers are required to work under time pressures for periods extending beyond their normal shift patterns. Once again inadequate manning levels were the principal cause of this incident. However, a strict system of tool control would have eliminated this error. Clearly such a system was not in operation.

Fortunately the tools fell clear. The possible consequences of them being lodged in the control surfaces do not bear thinking about.

As with the previous report, subsequent management action has resulted in adequate manning levels being achieved. But why weren't the manning issues addressed before the incidents occurred?

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Inspected or Seen?

I fly with a light aircraft group, and as the only licensed engineer with the group, I maintain it to LAMS *(Light Aircraft Maintenance Schedule).*

The Star annual was completed by an M3 *(Approved*) organisation and released. 14 days later, I removed some interior roof panels to rectify a harness reel defect. After rectifying the defect, I carried out an inspection of the area prior to re-fitting the panels. During this inspection, I found cables to the left wing flap twisted together in the area of the cable turnbarrel *(not immediately visible looking straight into the area, but off to one side).*

The aircraft had flown 4hrs 15mins since the Star annual, 10 sectors, three of those were multiple circuits at the base airfield.

Although this report concerned a light aircraft, it illustrates very well the importance of thorough area inspections. A photograph supplied with the report showed that, looking straight at the open space, the only clue was that the control wires were not parallel, but converging, leading the reporter to investigate further and discover the crossed control run. This was a sound piece of engineering inspection.

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The following report is reproduced with the kind permission of the Inspector Flight Safety (RAF).

It is relevant to note that although this incident relates to a military aircraft, a civilian CAA Approved maintenance provider maintained the aircraft in accordance with commercial documentation and procedures.

Are any of the deficiencies that led to this incident familiar to you in your organisation?

The Flight

Approximately 15 minutes after take off on a training sortie, the crew became aware of abnormal indications on all 4 engine oil contents gauges; shortly afterwards the Number 3 engine oil low pressure light illuminated. The engine was shut down and an immediate diversion to the nearest airfield requested.

During the recovery, Numbers 2 and 4 engine oil low pressure captions illuminated intermittently. Once established on the Instrument Landing System (ILS), the Number 1 engine was advanced to maximum thrust and Numbers 2 and 4 were throttled back to flight idle. Only 7 minutes had elapsed after the Mayday call before a safe landing was assured. Engine Number 2 was then shut down, followed by Number 4 during the landing roll.

The subsequent inquiry determined that the Magnetic Chip Detector Plugs (MCDPs) had been fitted without their associated seals to all 4 engines.

After landing 12 pints of oil were added to Number 1 engine and 20 pints to each of engines 2, 3 and 4; the oil content for each engine is normally 24.2 pints.

The Maintenance

Prior to the flight, routine Out-Of-Phase maintenance activities were completed on the night shift. Night shift manpower would normally be 1 Chargehand, 2 Senior Leading Hands, 3 Leading Hands and 6 fitters. On this particular night the shift was short of 3 supervisors - 2 Senior Leading Hands and one Leading Hand.

One of the remaining 2 Leading Hands was informed by his Chargehand that a MCDP change and Spectrometric Oil Analysis Programme (SOAP) samples were required on the aircraft. The Leading Hand was an ex-military airframe technician, and had received no formal engine training. Nevertheless, he had been authorised, after completing a year of on-the-job training, to carry out various engine tasks; these included specifying the extent of independent inspections, and second line maintenance on several aircraft types. He was unable to locate a pre-prepared MCDP change kit in either the hangar or the Engine Bay. Due to recent manpower cuts, the Engine Bay was only manned during the normal working day. When the requirement for MCDP change was notified in advance a kit was prepared and left on a rack in the Bay. A pre-prepared kit would contain serviced MCDPs, complete with fitted seals, and bottles for SOAP samples. On this occasion there were no prepared MCDP kits available nor orders or procedures for the production of one out of hours.

After consulting with the Chargehand by telephone, the Leading Hand prepared a kit from components he found in the Bay. The MCDPs he used were from an area that he believed to be marked "ready to use", but the actual wording was "clean #### *(engine type)* plugs" The MCDP serviceability checks, during which the seals would have been lubricated and fitted, had not been carried out.

The Leading Hand returned to the hangar, but no tradesman was immediately available to complete the task. Due to the manpower shortages he felt obliged to complete the MCDP change himself. The Leading Hand then persuaded an airframe/engine fitter, who had been working elsewhere, to sign for the task and the Leading Hand then signed as supervisor.

At no time did he refer to the Aircraft Maintenance Manual (AMM). The AMM procedure required seals (referred to as "packing") to be fitted to MCDPs and an engine ground run to be carried out. The tradesman and his Chargehand reported that the practice of not carrying out engine ground runs after MCDP changes had been passed to them by the previous RAF maintenance organisation.

The inquiry also found that the custom and practice used to take the SOAP samples were also not in accordance with the AMM. In particular, the samples were not taken from the oil tank nor within 15 minutes of engine shut down.

BREAK THE CHAIN

In this incident there were both organisational and individual failures. Could such an incident happen in your organisation and would you break the chain?

Shortage of manpower:

An inadequate number of supervisors for the tasks required the Supervisor who completed the work, to sign as producer and arrange an undersignature.

Inadequate planning:

No advance notice was given to prepare a MCDP kit.

Not following procedures:

A practice had evolved where SOAP samples were taken from the wrong location and not within 15 minutes of engine shut down.

Engine ground runs were not carried out after MCDP replacements.

Inadequate training and authorisation procedures:

Training and authorisation procedures for maintaining the engines on different types of aircraft were inadequate.

Poor communication:

Consultation over the telephone between the Chargehand and the Leading Hand on making up a MCDP kit was inadequate.

Poor husbandry:

Prepared and unprepared equipment was inadequately marked.

CHIRP Comment: The lessons to be learned from this incident are obvious, but why weren't the deficiencies recognised earlier?

As has been the case with several other recent maintenance related incidents, only prompt action by the flight crew and some good fortune averted an accident.

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CAA (SRG) Flight Operations Department Communications

No CAA (SRG) Flight Operations Department Communications have been issued since April 1998: