Confidential Human Factors Incident Reporting Programme

FEEDBACK

MARCH 1992 NUMBER 26

WHEN IS A HUMAN FACTOR NOT A HUMAN FACTOR?

In FEEDBACK #25 there was a report on EICAS messages called "75% said don't know...". Both the CAA and an airline have responded on the interpretation of messages. A Fleet Technical Manager of this aircraft type wrote;

"... I would like to raise the following issues:-

1. The co-pilot who sent the report obviously did not appreciate the procedures with regard to STATUS messages as recommended by the manufacturer and approved by the Aviation Authority. I have enclosed the introduction to my airline's DDM which makes clear when the various message criteria should be applied.

2.The STATUS message highlighted in the report was "MISC EQUIP CARD", on the latest IDS (Integrated Display System) known as "ECS MISC CARD". This card interfaces with and monitors numerous ECS (Environmental Control System) systems. Its salient features are that it **controls** the Forward Overboard Valve as well as the Humidifiers. The card provides the **Indications** (not Control) for the CMC (Central Maintenance Computer) for the Lav/Galley Vent Fans, the Forward and Aft Cargo Heaters, Cargo Fans and the PRVs (Pressure Relief Valves), please note that none of these indications appear on the EICAS as they are not considered important for inflight safety.

Humidification is obviously not a critical safety item, but is desirable on long flights. The Forward Overboard Valve is not a critical valve, it is commanded open when the aircraft is above 25,000 feet, provided at least two Packs are operating, the cabin is below around 9,000 feet, and there is no Cargo Fire Warning; its purpose is to aid equipment cooling. This valve is acceptable inoperative for dispatch. In the event that equipment cooling is detected as being insufficient, there is a suitable Caution message and associated procedure.

The card also sends signals to the pressurisation and air conditioning systems to aid their automatic operation. However, there are alternative back up facilities for both of these systems should the card be faulty in this respect and basically, within the DDM, the aircraft may be dispatched using these alternative systems.

From the above, it can be seen that though the "ECS MISC CARD" does interface with numerous systems, it is not the only means of control for any critical system and that there is always an alternative means of control.

I hope that I have managed to show that the aircraft's philosophy does stand up to scrutiny with regard to the above STATUS message which is No Dispatch prior to engine start, but may be ignored afterwards. I realise that I have given a detailed explanation regarding the "ECS MISC CARD" Status message. However, as in this case and with many Status messages, the associated causes and effects can be very complex. I can assure you that the manufacturer has audited every Status message and the philosophy is sound. Once the aircraft has dispatched, if there is a failure which is of a critical nature, then an Advisory or Caution message will be displayed on EICAS for which DDM guidance is required.

EXTRACT FROM ATTACHED TECHNICAL PAPER ON EICAS MESSAGES UNDER THE DESCRIPTION OF MESSAGES:

S T A T U S White messages displayed on secondary EICAS to indicate system conditions which may affect dispatch. Requires reference to the DDM prior to dispatch.

....

After engine start it is not necessary to check the status page for status messages other than those listed in the Flying Manual (00-00-00)

....

However, when departing (Home Base) it would be prudent to ask engineering advice as to whether the cause of a "No Dispatch" type of Status message should be attended to in the event that one does appear after engine start.

No Dispatch Dispatch is not allowed, unless the associated message is a Status message and:-

(a) The message appeared after engine start (other than those listed in the Flying

Manual 00-00-00)

OR

(b) The message is invalid (a nuisance message).

In such cases, DDM item 00-00-00 may be used to dispatch."

The view of the CAA is similar to that of the airline. For brevity only relevant extracts have been used:

....these comments are not specific to the -400 but are common to all aircraft incorporating a similar system and indeed, there are considerations for operation of an MMEL, or MEL, generally.

For legal purposes, an aircraft is considered to be in flight once it first starts to move under its own power for the purpose of becoming airborne; at that moment, the MEL becomes invalid.....

Further, the philosophy of the aircraft manufacturer is supported and borne out by Crew Manuals which state that once the aircraft is moving under its own power Status messages have no dispatch connotations.....

However,it is seen, to some degree, good airmanship to investigate the significance of messages prior to take-off, it is not, however, strictly necessary.

DO YOU USE YOUR DISCRETION?

I can confirm a recent article in Feedback, stating that profit driven operators are scheduling rosters right up to CAP371 limits (and beyond in my experience). In addition in an environment of ATC delays, poorly maintained aircraft, and individual incompetence, the use of "Captains discretion" is indeed required far too often. Safety is compromised, of that be in no doubt. Refusal to use discretion, in my own experience and observation, meets with all manner of pressures from the operator, to an IRRESISTIBLE extent. There is no protection of crews against such pressure, despite what the CAA may think. For "discretion" read "compulsory", therefore.

The ONLY way to improve safety is to REDUCE CAP371 LIMITS AND REDUCE "DISCRETIONARY" POWERS.

Close monitoring of operators compliance would be (is) essential.

In conclusion, I support the view expressed that ACCIDENTS WILL HAPPEN, unless CAP371 limits are reduced. HOW MANY accidents will be necessary before "pilot error" is seen in correct perspective depends upon our input and IAM/CAA "ACTION"!

The CAA say that they are monitoring the voyage reports and do become aware of the frequency of the use of this extension of duty by Captains. From the evidence which they have available they believe that this is not excessive. Although the limits in CAP371 are not as restrictive as those recommended by the RAFIAM, they were agreed by the representatives of all parties involved in commercial aviation.

* * * *

TOO MUCH AT A TIME

On returning to Base for the usual STAR as we arrived overhead the holding VOR we were asked, overhead the holding fix, to turn left xxx degrees, descend initially to FL70, reduce speed to 210knots and call Approach on (5 digit frequency). I was expecting something similar especially the change to a well known frequency, but the incident, although it caused no problem, served to remind me that it might be a good idea if we only received a maximum of 3 instructions at once from ATC. I personally feel that although 4 instructions CAN be handled at once, it is a situation which, when ATC is under pressure, can induce errors, or at least uncertainty about at least one of the things we are being asked to do. In the interests of Flight Safety, 3 instructions at once would seem to be best, especially when being vectored by ATC in a busy CTZ during a phase of flight which might already have a high pilot workload.

We have improved on the sort of messages used by New York ATC before the introduction of the SID but this problem is still with us. Please try to accommodate these well known limitations.

* * * *

"I'M IN CHARGE...."

The outcome of a recent incident has produced much crew room discussion, a lot of heat but no light.

In our Company, the alternate is selected by one of the following:- Operations Dept, Nav. Dept, the Captain, the Handling Agent (who may, or may not, have an AOC on our type of aircraft) or the Producer of the Computer Flight Plan.

In the event that two (or more) of the above disagree, there is no laid down priority in the Manuals.

1. Who chooses the alternate?

2. Where is it written down?

3. If the CAA have not given a ruling, don't you think that it is about time they did?

There is no doubt that the ANO Article 31 places the responsibility for having a satisfactory alternate squarely on the shoulders of the Aircraft Commander. Clearly, when away from Base, he cannot be expected to seek out individual bits of data, but expects the relevant information to be presented by the Airline Staff or Delegated Representatives. What information to consider is set out in the AOC. This is approved by the CAA and monitored in its operation by their Inspectors. The ANO takes no account of the fact that, as a senior manager in the airline, a Captain has a commercial responsibility to his employer, and the final arbiter in the decision must be aircraft safety. If a Captain believes that a fuel load is not right, or the weather at a commercially preferred alternate is not acceptable, then he has a legal

obligation to make the necessary changes before takeoff. He may later be able to exercise skill and judgment to make a commercially more advantageous decision, but must always satisfy the legal obligations.

* * * *

ALL ATC WORK AND NO PLAY....

There have been some interesting comments from Air Traffic Controllers, a few of which are produced below:

CRATCOH hopefully will save people working at these remote units from being abused for much longer. When people work such long hours safety must be in doubt due to fatigue.....

No matter HOW experienced you are, your performance is only as good as your brain wishes to give you, and if you are starting to struggle with keeping concentration, you are already too mentally tired and potentially dangerous.....

This is classed as normal by management who wish as much as possible to be done by as few as possible.....

* * * *

THE PSYCHOLOGICAL TRAP FOR US ALL

On take-off, for the second sector of the day, F/O handling, the under-carriage selected up, the Captain says he'll switch the "NO SMOKING" sign off. This I acknowledge, but instead of the sign being switched off the flaps were raised to zero at about 400ft.

A reduced flap setting was being used, as is usual at this particular airfield, and is in any case not an unusual practice. We discussed later at our destination as to why it happened. The Capt put it down to 2 factors:

1) distraction - the airfield DME not locking-on for the SID;

2) he was "triggered" into moving the flap lever at 400ft, as this is the usual height for flaps to be selected to a lower setting, (but not zero!).

This was the second leg of four for that day. Both of us had had plenty of rest before the duty period - the Capt very recently back from leave and myself from two days off.

This is a trap that even the skilled and relaxed pilot can fall into. Be aware that if the operation is non-standard, no matter how simple, this sort of trap can be sprung.

* * * *

"HOW CLOSE IS CLOSE(#25)....AGAIN?"

In my previous airline I flew 1-11s, and the 1-11 had to wait for 2 mins. from "the start of the take-off roll" before taking off after a heavy aircraft, 1 min. after a medium aircraft, and when I thought it was safe subject to ATC after a light aircraft.

Consequently the cause of the second 1-11s 60 sec. wait was for the first 1-11 not the preceding "heavy".

Stopwatches are started from the start of the take-off roll of the a/c taking off - not rotate, as in many instances rotate cannot be seen.

I would suggest that most if not all responsible public transport airlines use the above method.

If the Controller who submitted this article would contact the Flight Operations department of the respective airline, I am sure that they would be only too pleased to supply ATC information of this nature.

AND AGAIN!...

In my experience, he's not right. I and colleagues I have flown with, have always started a stopwatch from START OF ROLL of the Heavy, which if anything, given a generally longer ground roll time of a heavy, would reduce time between take-offs. I personally then look at the situation on the day into my own aircraft performance and any local wind effect together with the stated prevailing wind to perhaps reduce the separation time if appropriate.

It looks as if pilots are agreed that the stopwatch starts from the instant of roll start, but there may be an additional time delay if conditions on the day make vortex clearance slow; e.g. low relative density and no wind, little aircraft following big one.

SYMPATHETIC SIMULATOR CAUTION

I am responding to your request for comments re practice recoveries from unusual attitudes in the simulator.

In principle I am in favour of the proposal, but maybe that's because my basic training in Havards included spinning and recovery "under the hood" - although I'm not really getting sadistic in my old age! I think that if it is possible to get into any particular attitude in an aircraft, to have been there before, in a simulator, and have been safely shown how to recover in a logical and orderly fashion has got to be of good value.

However, my main point in writing is to say to any simulator instructors who may be contemplating this is please do NOT remove the motion.

I was a simulator instructor in the RAF when the first generation of visual attachments was fitted to our high performance fighter simulators. The two later marks of aircraft simulators had motion but the two Mk.1s did not. The former was OK but on the two non-motion simulators problems of unpleasant spatial disorientation were experienced by the students - especially the "old Hands" - and in one case at least, persisted for 24 hours or more. The simulator is an extremely powerful piece of training equipment and instructors should never underestimate its effects, both psychological and physiological. Trained pilots' responses to situations in flight are controlled by all sorts of visual, aural, and physical cues, and to remove any one of these is, I suggest, potentially dangerous.

* * * *

HE WHO TREATS HIMSELF HAS A FOOL FOR A DOCTOR

(Old Chinese proverb.)

The reports from Air Traffic Controllers are sometimes very difficult to disidentify. Here is a selection of snippets on a current problem which is producing reports from a variety of units.

Medication issued to an office worker may mean he/she is perfectly suited to return to work, but in the case of an operational ATCO it may not.....

If I have used up my five days self certification, what should I do? I have more confidence in my GP who gives me a medical examination than advice over the telephone from someone who is not fully conversant with my complaint, yet having taken this advice I felt it was ill-founded, and I should not have gone to work.....

My unit has recently negotiated a pay deal which resulted in a loss of pay when time is taken off for sickness. In my case this is more than £20+ per shift. I feel one of the main contributory factors in this incident was because I was unfit for work. As I had taken the previous day off sick and mindful of the loss of pay, I decided to attend work although I was suffering from a heavy cold. I had been on duty five and a half hours. I went home shortly after the incident unfit for work.....

Under these circumstances, who is prepared to issue me with a sick certificate? My licence is my livelihood, and if this means I must continue sick without a certificate and lose pay, that seems the only answer.....

.. It would be of great service to all ATCOs, if some guidelines could be laid down to prevent similar situations recurring .....

A recent amendment now legally enforces the requirement for an ATC Officer to ensure that he or she is fit to work when presenting themselves for work. At the same time some of the non-NATS operators seem to have negotiated a pay deal where the rule is "no work no pay". Perhaps a solution to this problem would be to renegotiate the terms and conditions, in view of the change to the regulation. It is certain that when consuting your GP you should always ensure that your GP is aware of the legal requirements of your profession when a certificate is required.

* * * *

FOOD FOR THOUGHT

My company provides no crew meals on any of its flights, and has refused to do so in spite of representations from crews on more than one occasion. This may or may not be remarkable in itself, but given the duties we're expected to operate, frankly I and many of my colleagues see this as exploitive and indicative of the esteem in which we are held. It is common to operate 5/6 sector days, with 30 minute turn rounds, that start after breakfast and end, not only in the evening,

but in most cases late enough for no food to be available, at the final destination hotel.

I recently flew with a fit and able young, first officer on his 6th consecutive day, at the end of which he'd completed 30 sectors. During this period he'd been unable to eat properly at all, in spite of inventive raiding of passenger meals, and on one weekend period of 2 days existed entirely on biscuits! The exceptions only being hotel breakfasts that the company do provide: they, I believe, numbered 3. Toward the end of the day after a number of very uncharacteristic errors he finally dozed off. The final straw had been a disturbed night's sleep in hotel accommodation the night before, but he had no reserves to draw on.

I have just finished a 4 day stint of 5 sectors per day, during which I was unable to eat properly once. These duties are exhausting enough, but coupled to a sequence of several days, AND no food they are debilitating, if you've any doubts ask the cabin staff!

Like many I'd hoped that with the advent of CAP371, complaints of this nature would be a thing of the past - it seems that we have been let down yet again. Were I writing about a small provincial airline perhaps the surprise would be less. Thus it seems that legislation IS needed, the hope that Management will operate the spirit of the rules is clearly without foundation.

We all accept that the A/C needs fuel, how about the driver? You of all people must be qualified to answer!

Hypoglycaemia is a most controversial subject surrounded by a great deal of flying folklore. The references normally quoted go back to the work done in the 1940s and 50s with later work mostly done on military aircrew.

Fisher and Atkinson, "Fasting or Feeding?" 1980, wrote about RAF fast jet crews: "It has long been held that aircrew should not miss meals - on the theory that hypoglycaemia might result and give rise to harmful symptoms degrading performance and affecting flight safety. ..... Indeed, some medical literature suggests that some 2 to 3 hours after a meal rich in carbohydrates, a proportion of individuals experience a rebound hypoglycaemia - the 'sticky bun' syndrome.....Coffee and tea are popular drinks...{but} *in excess, or in the susceptible,* may give *other symptoms - irritability, hand tremor, palpitations, sweating and, in the longer term, sleep difficulties. The effects could be confused with possible hypoglycaemic symptoms. .....Such symptoms must be considered an extra stress on aircrew and one which could have an additive effect in producing fatigue and degrading performance in the susceptible individual. We cannot predict which individual aircrew are prone to these symptoms since people appear to vary in their threshold for this stress, as they do for other stresses and fatigue."*

Reinhart writing in Business and Commercial Aviation Journal in 1986 had the following point to make: "Let's begin with definitions. Literally, 'hypo' means low, and 'glycaemia' means sugar (glyc) in the blood (emia) - - or, low blood sugar. Hypoglycaemia can be detected by determining the level of glucose, which is one of many constituents present in blood. When a blood profile is done, blood glucose levels along with those for cholesterol, triglycerides, electrolytes and many other components are measured, and their respective levels are important in determining what causes significant variation from the norm of each. Is the glucose level too high (hyper) or too low (hypo)? More importantly, why is it high or low, and what can be done to resolve the problem?

Glucose is an essential intermediate component in metabolising ingested carbohydrates into energy. Without an adequate glucose level in the blood, several symptoms - - including faintness, weakness, palpitations, tremors, sweating and nervousness - - often result. At best, these symptoms are merely distracting.

Although these symptoms can be the result of many causes, hypoglycaemia is probably the most common reason for these symptoms to occur in otherwise healthy pilots. .....When the body is expecting a good source of glucose over a period of time, such as that provided by a meal that is slowly digested, a large amount of insulin is produced for what is actually ingested, however, the glucose level will go down (hypoglycaemia). Therefore, in the case of the sugary breakfast, the glucose is quickly used up and the level of glucose in the blood drops (notwithstanding the persistent presence of insulin), leading to 'reactive hypoglycaemia' and its debilitating symptoms two to four hours after the 'quickie' breakfast has been absorbed. If you replenish the glucose with more candy bars, you can keep the level up, but this is obviously poor overall nutrition.

The main concern, therefore, with hypoglycaemia involves the symptoms that result. These symptoms obviously will vary from person to person and are unpredictable in different circumstances. Some days you may have very noticeable symptoms, and some days you may experience none. This unpredictable degree of potential disability or incapacitation is of major concern especially on a long trip. People who have recurring symptoms of hypoglycaemia, however, need to be checked for other causes of the disorder such as diabetes, pancreas tumours, etc."

GUARANTEE NO RECORD OF YOUR NAME AND ADDRESS WILL BE KEPT

NAME ----------

ADDRESS ----------

PHONE No

DATE OF RECEIPT AT THE RAF INSTITUTE OF AVIATION MEDICINE

ATC REPORT

We ask that you give your identity only to enable us to contact you if we are not clear about any part of your account. In any event this part of the form will be returned to you, as soon as possible, to confirm that we have received your report.

YOURSELF
HOW LONG AN ATCO
HOW LONG AT PRESENT UNIT
ON DUTY AS
HOW LONG VALIDATED ON THIS POSITION

THE INCIDENT	
DATE	ATC SERVICE(S) BEING PROVIDED
TIME	IN WHAT TYPE(S) OF AIRSPACE
LOCATION & NEAREST REPORTING POINT	USING WHAT TYPE(S) OF RADAR
TYPE(S) OF AIRCRAFT INVOLVED	WEATHER
AIRCRAFT IFR OR VFR	

Please use this space to write your account, using extra paper if you need to

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