focus

ON COMMERCIAL AVIATION SAFETY

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Front Cover: Embraer RJ 145 Regional Jet

New Millenium - New Image

The discerning reader probably noticed that the layout of the cover of this edition of FOCUS has changed. As you read on you will also see that the internal layout is different too. No doubt you will be asking yourself "Why the change?"

Some time ago the United Kingdom Flight Safety Committee's Communications Sub-Committee was given the mandate to look at improving the magazine. We wanted to make the magazine more eye catching and easier to read. As a result, much discussion and investigation has taken place and we believe that the end result achieves these aims and much more.

Some may say, "What was wrong with the old style magazine?" The answer to that is simply, "Nothing". It has served its purpose well and has been in existence for 39 issues over a period of 10 years. At the time it was a giant leap forward for the Flight Safety Committee and under the editorship of Roy Humphreyson, Executive Manager, it achieved an excellent reputation. It is acclaimed by some as "the best flight safety magazine in the world."

It was however felt that after 10 years it was in need of a revitalisation and face-lift. I hope that the readers will feel this has been achieved.

The name of the magazine is **FOCUS on Commercial Aviation Safety** and over the years it has become known as FOCUS. In order to strengthen this we have changed the emphasis of the text in the title to highlight this.

We will continue to change the picture on the front cover for each issue and are offering advertisers the opportunity to sponsor an issue at very good rates. For their sponsorship they will get to choose the front cover picture and have a full-page advertisement on the back cover. In addition they will have the opportunity to publish an article in the next issue of the magazine on condition that it has a relevant safety message and does not blatantly advertise their product.

You will find the inside layout more pleasing to the eye. This is achieved by having a masthead across the top of the page that incorporates the name FOCUS and focal point (the bright star). At the bottom of the page a band in our corporate colour containing the page number with the logo above completes the image. The text is laid out in three columns (left justified) and the spacing of the text allows more white space making it more inviting and easier to read.

The UKFSC logo will replace the FOCUS logo to signify the end of an article.

The move to full colour raised the overall image of the magazine to a higher plane. This now means that photographs and graphics will enhance the articles far more and will give a much more professional appearance.

We are pleased to announce that starting with this issue we will be featuring a regular article by our Legal Adviser - Peter Martin. Peter hopes to use this instrument to bring to the notice of our readers, legal matters of interest and importance. Peter has a unique style of conveying the "message". I hope that you enjoy reading them.

We do not intend to stop here in the development of FOCUS. It is our intention to attract more advertising in order to improve the magazine further. A laminated cover and the use of better quality paper would enhance its look and feel even more but these changes will be subject to the amount of advertising we can attract.

I hope you enjoy our 'new look' FOCUS!

Flight Data Monitoring

by Captain Tom Croke

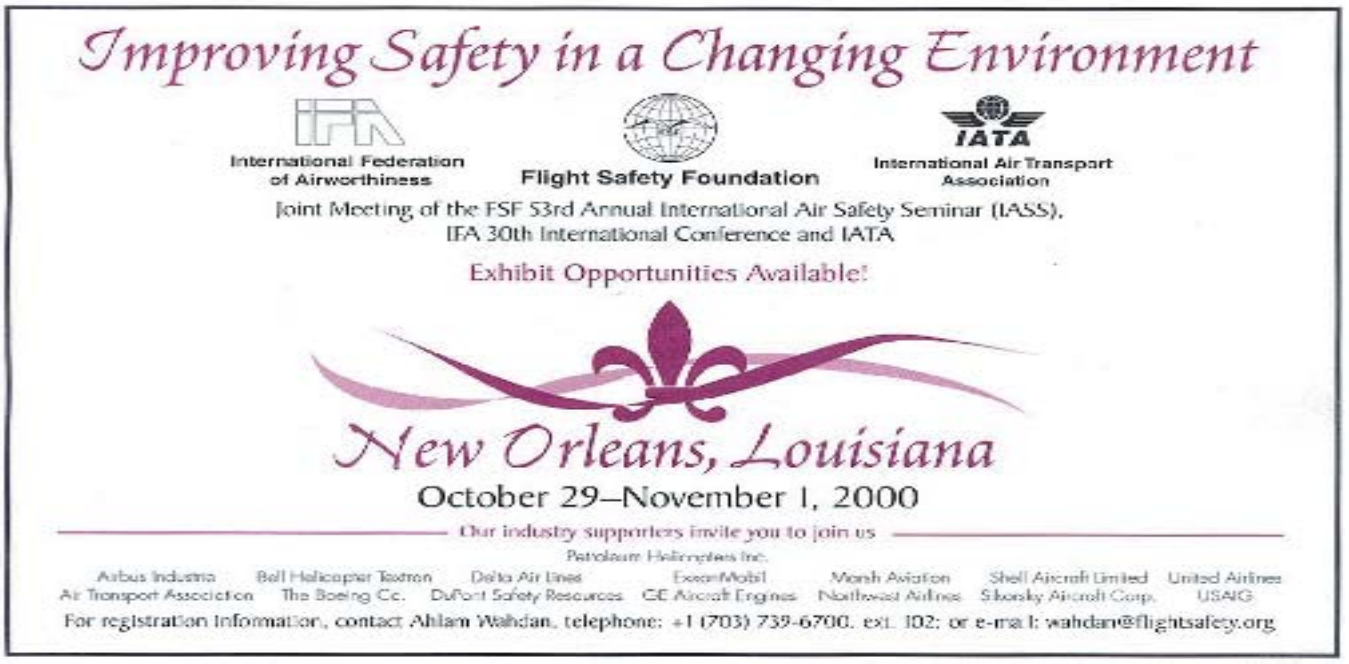
The current development in recording flight data has enabled greater capabilities in the area of Operational Monitoring, Flight Operations Quality Assurance and Flight Operations Data Analysis. The software and hardware developments have meant enormous advances in the scope of the data that can be recorded and also advanced the ease with which this data can now be read. The cost of such a facility is now within the reach of a greater number of airlines.

However, this is only one side of the equation. To allow such a system to operate requires a company to commit to the culture of retribution free reporting, and adequate resources to fully exploit the benefits of such data. There must be absolute trust between the pilots and the company before such a system can gain the confidence of line crews. The manner in which the analysed data is used and, more importantly, the manner in which the crews are dealt with in implementing the lessons learned, all have an important bearing on the way in which the system is viewed by those who use it.

The slow development in the adoption of this, probably the greatest single advance in safety ever, indicates the enormous sensitivities and anxieties that need to be resolved through understanding and dialogue before its acceptance. When coupled with corporate fears about the damage any leakage of such information may cause, it is probably unsurprising that we are as far along as we are at this point.

A recent move by one regulatory authority to obtain access to such information disturbs me. The threat it poses to the advances to date far outweigh any perceived safety dividend that might accrue to the wider aviation community. The reason I say this is that the parameters and filters set in such systems usually reflect the standard operating procedures and safety "thresholds" laid down by the individual operators. To take these and try to apply them, across the board, would be inappropriate. However, the potential to damage, or even destroy, those systems already operating is very real.

It is to be hoped that before any such proposals are advanced, full discussion will take place with those currently operating these invaluable safety tools lest unintended, but fatal, damage is inflicted.



Is My Top Management *"Safety Management Orientated" ?*

by Mike Overall

Much has been said recently about air operator's safety cultures and the need for a more formalised approach towards managing safety. The industry is grappling with the problem of how best to develop aviation safety management systems which meet the CAA's expectations. At the same time, the CAA is trying to clarify what its expectations mean in practical terms.

Safety Culture

It is much easier to talk about the concept of a *safety culture* than it is to identify what you have to do to ensure that your organisation has one that is both sound and sustainable. In the real world, it is a difficult concept to tackle head-on. Industrial history is littered with examples where huge amounts of funds and effort have been pumped into trying to change company cultures without a sustainable result.

Too many managers still perceive a company's culture as being mainly, or wholly, about the company's workplace culture. The reality is that an organisation's culture, especially as far as its *safety culture* is concerned, is a product of several things.

First, and most importantly, it is about the approach to safety taken by the organisation's top management (i.e. by its corporate board and executive management team). If an organisation does not have a sound top management safety culture, you cannot expect it to have an effective workplace safety culture.

Safety culture, in this context, should not be confused with *safety ethos*. Fortunately, in the aviation industry there is a strong workplace safety ethos. It often exists in organisations which have weak safety management. A good safety ethos, based on the professionalism inherent in the industry, can prevent accidents. It can also camouflage the inadequacies and sins of top management. However, it is a poor and unreliable substitute for an effective safety management system (SMS), which is driven by a competent top management team.

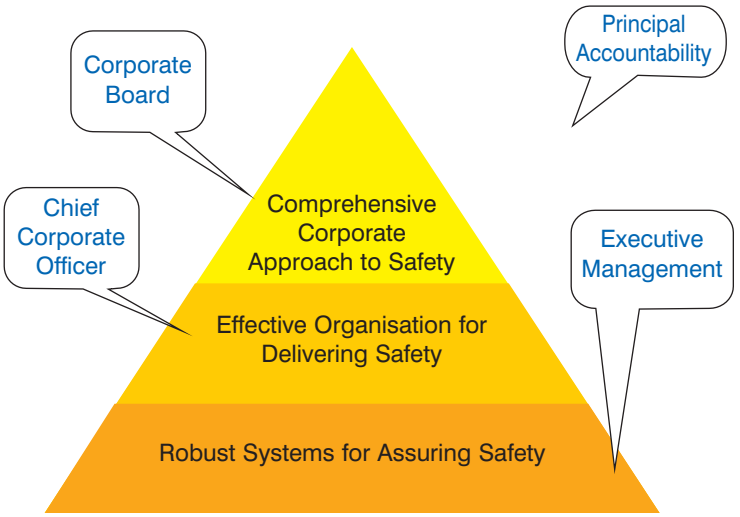
It would be unwise to regard a sound safety culture solely as some tangible outcome which can be project managed, like the introduction of a new aircraft type. It should be regarded as an outcome, a product, of good management. If an organisation does not have effective safety management, a sound safety culture is unlikely to be sustainable, even if it appears that an improved culture has been achieved.

Dangers of motherhood and apple pie

A safety management system is essentially about having effective management control over safety.

One must be wary of the danger of losing sight of this objective and being misled by common use jargon.

Motherhood statements about *"the commitment of management to safety"*, *"leadership"* and *"safety is paramount"*, although relevant, do not constitute an effective top management safety culture. A corporate *"Statement of Safety Policy"*, signed by the chairman and chief executive of the company, is an important element of an SMS. It may give encouragement to the workforce and the regulator, but will be no good unless it is backed-up by rigorous management systems that facilitate top managements active and continuous involvement in safety management control. Top management *"ownership of safety"* can only be as efficient as the company's



Three prerequisites for successful safety manager

safety information and management control systems allow it to be. The company's organisational arrangements for managing safety must be finely tuned to ensure that (only) relevant safety information reaches those that need to know it, in a manner that enables sound decisions to be made.

A Hazard and Risk Management System is an essential core component of an SMS. However, its effectiveness will be limited if it exists as a relatively isolated tool within a safety management framework which lacks an integrated approach and organisational structure. Care must be taken also to ensure that the risk management process does not take on a narrowly focused momentum of its own, which absorbs a vast amount of effort, possibly at the expense of other key elements of SMS development.

Prerequisites for successful safety management

If top management wants to design an effective SMS for controlling safety, it will help if it first focuses on the following three prerequisites for successful safety management:

1. A comprehensive corporate approach to safety.
2. An effective organisation for delivering safety.
3. Robust systems to provide safety assurance.

Effective control of safety requires clarity and coherence in the allocation of safety responsibilities and accountabilities throughout the organisation. It is vital therefore to be clear where responsibility rests for each of these key aspects of safety management and to ensure that the necessary management control systems are in place.

The Board of the organisation has to be responsible for establishing the company's corporate approach to safety. It will also need to agree the Board level organisational arrangements for safety management, but it will fall to the Chief Executive Officer to ensure that there is an effective organisation below Board level to deliver safety. He, through his executive management team, must also be responsible for making sure that the right systems are in place to provide safety assurance (i.e. assurance for the company's management team) and that

Characteristics of Top Management Safety Cultures

Compliance safety culture	Safety management culture
Reliance on demonstration of compliance with external regulations.	Committed to and operates a systematic approach to managing safety.
Has not taken a considered view on whether to operate at or above the regulatory minima.	Has decided to set company standards at or above the regulatory minima and, if above, has articulated how far above.
No specific funding for SMS development project.	Board has approved specific funding for SMS development.
Is [wholly] reactive about safety.	Is proactive about safety.
Safety dealt with at Board/Top Management level only on a reactive "when necessary" basis.	Safety demonstrably a matter in which the Board/top management is proactively involved in a routine and structured manner.
Does not review safety of existing operations unless there is a reactive reason for doing so.	Seeks to confirm safety of existing operations through systematic programme of safety assessments.
Has no specific targets for measuring safety performance.	Sets safety performance targets and monitors their achievement.
No self-generated approach to safety improvement.	Has instigated a safety improvement programme with Board approved targets.
No requirements or procedures to routinely assess the safety impact of changes.	Requires changes to be formally assessed for safety impact.
No formal requirements to guide the assessment of risks to safety.	Expects risk to be managed to ALARP principles/levels.
No standard procedures for assessing whether unbudgeted safety improvement proposals should be funded.	Has documented management procedures for deciding whether unbudgeted safety improvements should be funded.
Safety largely left to line managers, with little involvement/oversight from top management.	Safety actively driven from the top.

they are working properly. The objective of each system, how it fits within the SMS and who is accountable for delivering its objectives must be unambiguous.

A weakness in any one of these three prerequisites will undermine the integrity of the organisation's overall management of safety.

If an organisation is effective in all three aspects, then it should also have a good safety culture. On the other hand, if there is a poor safety culture in an organisation, it is likely that there are weaknesses in one or more of these three key aspects of safety management.

How a company's SMS is designed around the three prerequisites concept will depend on the company's nature, size and its existing organisational structure and management systems. The bottom line is to be clear as to whom is accountable for what - starting from the Board downwards!

Accountability for safety

The executive responsibility for safety management, on behalf of the Board, should rest with the Chief Executive Officer (the CEO), or his equivalent. The CEO is cornerstone of the organisation's whole safety system. He is the link between the Board and the executive, and he, more than anyone, has the power to deliver successful safety management. This Board level responsibility must be made compatible with any regulatory requirements relating to the *Accountable Manager* for safety (e.g. under JARs) or for a *Safety Director* (e.g. under FARs).

The reality is that the CEO cannot fulfil his safety management responsibilities without some dedicated senior management support to help him/her ensure that the company's SMS is effective and working properly. Hence the concept of a *SMS Custodian*, who acts as the guardian of the integrity of the SMS, on behalf of the CEO. For air operators, the SMS Custodian role, depending on the nature and size of the organisation, would normally be vested in the Safety Director, Flight Safety Manager or Flight Safety Officer function. Wherever the Custodian function is located, it is essential that the person fulfilling it has an effective working relationship with the CEO and the regulatory *Accountable Managers*, if different. He must also have the inter-personal skills to operate effectively at Board level and throughout the organisation. The design of the company's safety management policy and review systems and its safety committees and meetings will need to reflect these senior management accountabilities.

What safety culture are we operating under?

The days when an air operator's top management can be satisfied that the demonstration of compliance with the minimum safety regulatory requirements is adequate are fast coming to an end. The wider regulatory, legal and commercial world that the industry is now operating in will see to that. That said, there are still some companies which are operating under a top management safety culture that owes more to safety regulatory compliance than to systematic safety management.

Where does your company sit?

The summary on page 5 of some safety culture characteristics may give you some guidance.

Editorial note:

Mike Overall currently acts as an independent adviser on aviation regulation, strategy/organisation and safety management. He was well known to members of UKFSC in his previous role as Head of Licensing Standards Division in the CAA's Safety Regulation Group. His concept of the three prerequisites for successful safety management was reflected in the UKFSC's guidance material on developing an aviation SMS and has been adapted for similar use by Shell Aircraft.

Crew Resource Management: Stalled at a Crossroads and Seeking to Interpret the Markers?

by Pieter Hemsley

In the view of many, Crew Resource Management (CRM) has lost direction. After the enthusiasm of the early 1990s for initial CRM training for flight crew, UK aviation now appears less sanguine about embracing the subject wholeheartedly and there is the danger that a programme that offers so much could stall.

In part this reluctance is founded on the lack of precision associated with CRM; there are few universal truths and it requires an act of faith to accept its utility. Given the pessimism apparent in some quarters, I should like to spell out why there is now good reason to be positive about the future.

As a global industry, UK aviation is firmly embedded in the wider European scene. Until recently there has been no detailed supranational CRM initiative, but that has changed with the advent of the Joint Aviation Authorities (JAA) Notice of Proposed Amendment (NPA-OPS 16), a document negotiated between the Authorities, operators and pilot associations for more than two years. The NPA text has much more precision and clarity than the extant CRM wording in JAR-OPS 1 (Commercial Air Transportation (CAT) Aeroplanes), Subpart N that it will replace; much will read across to JAR-OPS 3 (CAT Helicopters) in due course. With circulation completed in April 2000, the NPA remains the preferred guidance of the JAA and could be formally adopted later this year. There is therefore some urgency for operators to re-examine their CRM training to ensure compliance before the JAA Rules become UK law, feasible by 2001.

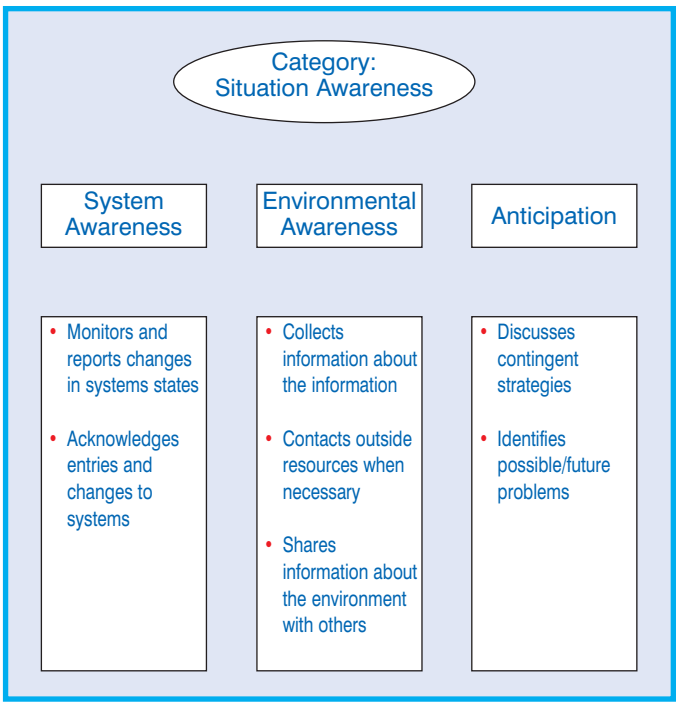
The impending requirements have raised genuine alarm among some operators, in particular the smaller companies, that there are few to whom they can turn for detailed advice to implement effective CRM training programmes and fewer still who can integrate such programmes with technical training, the ultimate goal.

The solution lies in three complementary fields - all addressed in the NPA - that collectively should restore confidence:

- Trainer competence standards,
- Trainer accreditation, and
- Use of performance indicators (PI).

Progress in the first two is well advanced. Critical to the success of CRM training is the competence of instructors, an issue long overdue. Competency criteria were published in 1998 in the *Guide to Performance Standards for Instructors of CRM Training in Commercial Aviation* produced jointly by the Royal Aeronautical Society, the Aviation Training Association and the CAA. Trainers who have examined the document have given enthusiastic support for the guidance proffered. Such informal evidence - and the fact that fewer than 15% of UK operators appear to have received the

Non-technical Skills (NOTECHS) Framework: Elements & Behaviours of Category - Situation Awareness



Guide - are, however, inadequate to give confidence in these standards as the bedrock for the next part of the programme, accrediting CRM trainers. Therefore, a formal survey has been undertaken this summer to validate the standards document. Such prudence in creating a suitable accreditation architecture is essential to instil confidence; an embryonic structure should be in place in the UK next year.

Despite the very powerful boost to providing quality CRM training that these measures will have, the success of such enterprise might be in jeopardy if greater precision regarding the efficacy of CRM activities is not fed back to organisations and crew alike, not least to appease the accountants. Historically, assessment of crew in non-technical or soft skills has relied upon feedback in categories of 'airmanship' and 'command' skills. Given that there are no agreed definitions for these terms, the weakness of such an approach is its subjectivity. What then of using observable behaviours as indicators of performance, the third element outlined above? I contend that this activity is not an optional extra but an integral part of the process, to lubricate the constituent parts and create a climate for synergy.

By their objectivity, these behavioural markers (BM), as they are known, can certainly overcome the major limitation of current assessment models. BM lend greater accuracy to the analysis of performance in a manner that promises to restore confidence in the whole CRM apparatus with customers, the line crews, who need to be 'on side' to provide a pool of willing advocates to assist in its development. These tools certainly cannot be imposed to gain genuine behavioural change.

One set of BM is the European Union NOTECHS (Non-Technical Skills) framework a PI already on trial but with as yet no conclusive evidence emerging of its validity. While NOTECHS can achieve a necessary uniformity within the JAA, they remain in their infancy and, because they rely upon bold headings only, I believe fail to provide sufficient detail for the practitioner to apply his skills. They need maturing and embellishing, issues to which I will return.

The NPA, CAA Aeronautical Information Circular 114/1998 and the *Guide* all refer to BM.

Non Technical Skills (NOTECHS) Framework: Categories & Elements

CATEGORIES	ELEMENTS
Co-operation	Team building and maintaining
	Consideration of others
	Supporting others
	Conflict solving
Leadership and managerial skills	Use of authority/assertiveness
	Maintaining standards
	Planning and co-operation
	Workload management
Situation awareness	System awareness
	Environmental awareness
	Anticipation
Decision Making	Problem definition/diagnosis
	Option generation
	Risk assessment/option choice
	Outcome review

Despite such ubiquity, that is no reason to rush into their use without ensuring a number of safeguards are in place. Naturally, the pilot associations are at the forefront of wanting such protection for their members. But, even if the unions were not cautious, BM must be introduced with care else the weaknesses of the present system might be replicated, undermining CRM programme credibility and giving sustenance to its critics. Accordingly, BM must be implemented at a measured pace and, at the outset, it is appropriate to use them for CRM syllabus review only. This will also create an opportunity for objective analysis of the instrument itself, to assure its validity and consistency in use.

To avoid sacrificing clarity, one of the very first steps must be for all parties to agree a terminology. In parallel, CRM trainers need to acquire the skills of accurately observing and recording individual and crew interpersonal behaviours - many of which are subsumed in the technical

activity - a task not to be underestimated given the myriad of roles already placed upon instructors, especially in the simulator. The induction training required could be protracted before instructors reach a satisfactory level of competence. However, once a quorum has the skills, BM could be used to provide feedback to training departments of the efficacy of core CRM programmes, particularly those in recurrent training.

The next step - and this may be some years downstream - is to bring the BM to bear in whole crew assessment, prior to extending the system to individual crewmembers' CRM skills. Such is the sensitivity of the latter that there is some unwillingness to set out on that course, but set out we must. Although I would support the view that it is the crew as an entity that operates the aircraft, inappropriate behaviours on the part of one individual can undermine the harmony and hence the safety of the operation. It is axiomatic that all training leads to assessment in some form and thus, ultimately, individuals must receive feedback on their own non-technical performance and the quality of their contributions to the CRM equation.

I promised to revisit the question of embellishing NOTECHS BM headings, by which I mean incorporating a spectrum of performance criteria. This is where I believe the necessary clarity will be achieved and confidence established. We should seek to adopt best practice when developing these instruments, customising them to reflect local cultures, be they national, company or fleet. One well-tried method is to craft a spectrum of word pictures.

An example that I helped advance which has been used by military flight crews and more recently adopted unofficially by some air traffic controllers. The greater the effort that is invested in customising these criteria, the greater the reward in terms of objectivity. The language must be comprehensive and include the core values of the CRM programme so that specificity of comment is available. All will need to be trialled to ensure universal understanding and to hone the text. Obviously, there must not be too many markers or too fulsome word pictures to overwhelm the busy instructor or confuse the crewmember for whom it can also be used for self-critique. The objective is to produce a user-friendly tool, not a burden.

The right-hand end of the spectrum indicates performance expected of experienced line crew and so BM can provide clear goals to which those entering the industry can also aspire. Conversely, markers could grant the instructor of ab initio student pilots a more precise vehicle through which to recourse or remove the candidate who has adequate technical ability but displays inappropriate and incurable interpersonal skills.

When all crewmembers exhibit the positive behaviours captured in BM – and instinctively the better ones already do – the psychological barriers to effective communication should be overcome, situational awareness will be enhanced and the consequent, higher-quality decisions made should lead to improved operational effectiveness. In the long term, operations should be inherently safer, an outcome clearly influencing the 'bottom line'.

Workload Management

Planning: Anticipates problems and prepares for unexpected eventualities.

Planning lacks organisation and structure and often fails to consider all circumstances pertaining to the task.	Usually plans in a logical and orderly way but sometimes fails to consider all eventualities.	Plans sytematically and thoroughly, taking full account of task needs and also preparing for unforseen eventualities.

Situational awareness; Continually monitors and analyses all relevant operational factors to develop and maintain situational awareness.

Prone to becoming preoccupied with minor tasks and often fails to resolve conflicting or ambiguous information.	Usually cross-checks essential systems and instruments but sometimes fixates on one aspect of the task.	Not only avoids fixation but also resolves ambiguities and discrepancies at the first opportunity; always "ahead of the curve".

Decision making; Understand and applies the elements of the decision-making loop.

Autocratic and directive, even in circumstances where consultation would result in a higher quality decision.	Sometimes acts over-hastily in reaching a decision and fails to make best use of all available resources.	Takes account of all available data; evaluates different options; involves others in the process when appropriate.

In sum, rather than having lost its way, I consider CRM training has emerged from a period of uncertainty more confident. Given the impetus of the NPA, an unambiguous activity path ahead is evident, transparency of which is I believe assured through the use of developed BM. Eventually, CRM training could mature to the point where behavioural *markers* become *standards*, comparable to technical standards.

Now there's a notion!

The views expressed are those of the author who served 31 years as RAF aircrew and 3 years with the CAA Flight Operations Department policy section, with responsibility for Crew Resource Management issues, before becoming an independent aviation consultant specialising in human factors in December 1999. He is secretary of the RAeS Accreditation Focus Group that produced the ***Guide to Performance Standards for Instructors of CRM Training in Commercial Aviation*** *and is progressing an accreditation framework for CRM trainers in the UK. As secretary to the JAA Flight Crew Study Group, he was intimately involved in the development of NPA-OPS 16 from 1997 to 1999.*

CRM?…It's For The Birds!

CRM, an acronym used vicariously in reference to Cockpit Resource Management or Crew Resource Management, has been a buzz word used in recent years by many psychologists and others to identify human factor limitations amongst aircrew when working together.

But the concept of CRM has been around for almost as long as life itself, certainly longer than the relatively new kid on the block - aviation. Consider birds for example, in particular the humble flock of geese.

1. In a flock of geese, as each bird flaps its wings it creates an uplift for the bird following. By flying in a V-formation, the whole flock adds about 71 percent longer flying range than if each bird flew alone.

Lesson: People who share a common direction and sense of togetherness can go where they are going quicker, easier and safer when they travel on the thrust of one another.

2. Whenever a goose falls out of formation, it suddenly feels the drag and resistance of trying to fly alone, and quickly gets back into formation to take advantage of the lifting power of the bird immediately in front.

Lesson: If we have as much sense as a goose, we will stay in formation with those who are headed where we want to go.

3. When the lead goose tires, it rotates back into the formation and another goose takes over as lead.

Lesson: It pays to take turns doing the hard tasks and sharing leadership because people, like geese, are interdependent upon each other.

4. The geese in formation honk from behind to encourage those up front to maintain their speed.

Lesson: We need to make sure our honking from behind is one of encouragement - not something less helpful.

5. When a goose gets sick or wounded or shot down two geese drop out of formation and follow it down to help and to protect it. Then, they stay with it until it is either able to fly again or dies. Then they launch out on their own, either with another formation or to catch up with the original flock.

Lesson: If we have as much sense as the geese, we'll stand by each other in the air like they do.

Reproduced with acknowledgement to 'Spotlight' courtesy of PIA Air Safety.

Corporate Killing - Directors Liabilities

by Steven Kay QC

The liabilities of Corporations for deaths caused as a result of commercial activities is an area of criminal law that is to be reformed and there will inevitably be an increase in the opportunities for prosecution of both companies and their directors. To better understand the implications of what is to happen it is worthwhile to consider the law of homicide generally and the development of the concept of corporate manslaughter.

English law has two general forms of homicide offence - murder and manslaughter. There are also some specific forms of statutory homicide, such as infanticide, but we do not need to consider those forms in this context.

To be guilty of murder it has to be proved that the accused intended to kill or intended to cause serious injury. If there are mitigating features within the allegation of murder, such as provocation (a temporary and sudden loss of self control causing the act) or diminished responsibility, then the offence is one of manslaughter. This form of manslaughter is known as voluntary manslaughter, because the act was intended, but caused by the mitigating features.

If someone kills but did not intend to cause death or serious injury, but was blameworthy in some other way, **involuntary manslaughter** is the form of homicide. It is in this area of involuntary manslaughter that we are concerned when discussing **corporate killing.**

Involuntary manslaughter has three different forms:

1. Unlawful act manslaughter

This is when a person who causes the death was engaged in a criminal act, which carried with it the risk of injury to some other person. For example, setting a fire to someone's dustbin beside their house because the smell of rubbish is offensive. The wind blows sparks that ignite curtains at an open window. Fire spreads into the house and kills someone within. This is an act of arson, or criminal damage, from which death results and could be unlawful act manslaughter.

2. Gross Negligence Manslaughter

This is when a death is caused by extreme carelessness or incompetence. For example a Doctor negligently injecting a patient with a serum that is lethal and is the wrong drug to administer.

3. Taking an Unreasonable Risk or Recklessness Manslaughter

This is when death is caused by a person who is aware that their conduct involves a risk of causing death (or probably serious injury) and unreasonably takes that risk. For example, a fun fair operator who permits a ride to travel at speeds that involve a risk of fracture of the metal that bolts the ride to a track, but continues to operate the ride at increased speed.

It is within 2 and 3 that we are concerned with Corporate Killing or the liabilities for directors when death occurs as a consequence of an undertaking by a company. The punishment able to be imposed upon a corporation for such an offence is a fine. Directors as individuals if proven also to be guilty personally, may be liable to imprisonment or any other sentence open to the Court. The offence itself is triable only upon indictment (jury trial).

Using modern research methods, I have been able to trace only six prosecutions of a corporation for manslaughter in the history of English criminal law. Of these only two have resulted in convictions, in 1994 and 1999. The other cases prosecuted which all resulted in acquittals were in 1927, 1965, 1991 *(The Herald of Free Enterprise case aka the Zeerbrugge Ferry disaster), 1999 (The Southall rail crash).*

However, there have been a number of recent disasters, that have been responsible for a call for a new approach to the law. As a result the Law Commission issued in 1996 a Report "Legislating the Criminal Code: Involuntary Manslaughter" and the Home Office have further issued in May 2000 a set of proposals for reform of the law under the title **"Reforming the Law on Involuntary Manslaughter: The Governments Proposals".**

Let us recall the incidents which have prompted the calls for reform, all of which were the subject of Public Inquiries, each of which was highly critical of the corporate bodies involved in the disasters, none of which ended in a successful prosecution.

1. November 1987 the Kings Cross Underground Station fire. Causing 31 people to be killed and many others seriously injured, including rescuers. The report of Desmond Fenell QC was critical of London Underground for not guarding against the unpredictability of the fire and for failures within their management system by not having any person in overall charge in the event of a disaster.

2. July 1988 the Piper Alpha oil platform disaster in the North Sea in which 167 people died and the inquest/inquiry in Scotland held it to be the responsibility of the platform operator.

3. December 1988 the Clapham Rail crash. Here, 35 people died, 500 injured when 3 trains collided as a result of signal failures. Anthony Hidden QC was critical of the dangerous working practices and failure to act upon safety concerns of British Rail. Responsibility for what occurred was beyond the operatives at ground level, but also stretched further and higher within the organisation.

The last two examples, both of which resulted in failed prosecutions, highlight the difficulty in the law with these cases.

4. Firstly, March 1987, the Herald of Free Enterprise car ferry disaster at the port of Zeerbrugge. There were, 187 deaths which were held by the verdicts of an inquest jury to have been as a result of unlawful killing. Mr. Justice Sheen in a report for the Department of Transport severely criticised Townsend Car Ferries Ltd., which was taken over by P&O European Ferries. In June 1989, the Director of Public Prosecutions brought prosecutions against P&O and seven individuals. However, the trial collapsed upon the ruling by Mr.Justice Turner, that there was no case to answer against the individual defendants and also the company.

5. Secondly, in September 1997 the Southall rail crash in which 7 died and 151 were injured. Great Western Trains pleaded guilty to failing to ensure the public were not exposed to risks to their health and safety. The trial Judge ruled a charge of manslaughter could not succeed because of the need to identify a person whose gross negligence was that of the company itself. The Judge had described the accident as being a serious fault of senior management. This ruling also served as an indicator there could be no successful prosecution for the recent Paddington rail crash.

Let us consider now the technicalities of these prosecutions. It is possible to prosecute a company, for it is deemed in law to exist as a distinct legal entity. The company acts through individuals who are its servant and agents. The failure of the prosecution in the Herald of Free Enterprise case against the corporation was because of the **identification doctrine.** In order to convict the company of manslaughter, individuals identified as the embodiment of the company would themselves have to have been responsible and guilty of manslaughter. If there is insufficient evidence to convict an individual or individuals the case against the company also fails. To successfully convict the company, the acts complained of have to be committed by those **identified as the embodiment of the company itself.**

It must be recognised that complex company structures in which there is great delegation of responsibility down the line, causes responsibility for many acts done in the company name to be too remote from those who embody the company. Failure to shut the doors properly on the ferry and to carry out sloppy and dangerous practices, if there is no-one with responsibility for safety on these matters within the body of the company avoids the company being liable. The successful prosecutions for corporate manslaughter that have been brought have been against small one man band companies where it was possible to identify the controlling mind within the company, responsible for the failures.

The pressure for **reform of the law** has been intense and it will arrive in the near future. The concern has been to ensure prosecutions against corporations involved in disasters resulting in large scale loss of life and to enforce Health and Safety at Work legislation, particularly on construction sites. However, once reformed, the law will be applied to all levels of potential offence regardless of scale.

The Governments proposals adopted from the Law Commission are to divide involuntary manslaughter into separate offences as follows:

1. Reckless killing: where death is caused by a person aware of a risk that his or her conduct will cause death or serious injury and it is unreasonable to take the risk having regard to the circumstances as the person knows or believes them to be.

2. Killing by gross carelessness: where death is caused by a person and the risk that their conduct will cause death or serious injury would be obvious to a reasonable person in his or her position, and the person is capable of appreciating that risk at the material time, but did not in fact do so - and either - (1) the person's conduct falls far below what can reasonably expected in the circumstances - or - (2) the person intends by their conduct to cause some injury, or is aware of, and unreasonably takes the risk that it may do so and the conduct causing (or intended to cause) the injury constitutes an offence. The less serious offence is that of failing to appreciate the consequences of an action (limb 1 of gross carelessness).

3. Death resulting from intentional or reckless causing of minor injury: reforming the dangerous and unlawful

act manslaughter. This reform being motivated to deal with the situation where a person causes the death of another, but the death was unforseeable.

4. Corporate Killing: an offence similar to that of gross carelessness. The offence would be committed only where the conduct of the corporation in causing death fell far below what could reasonably have been expected. The corporate offence should not (unlike the individual offence in 2 supra) require that the risk be obvious or that the defendant be capable of appreciating the risk.

   A death should be regarded as having been caused by the conduct of the corporation if it is caused by **management failure** by the way in which its activities are managed or organised and failed to ensure the health and safety of persons employed in or effected by its activities.
   Such a failure will be regarded as a cause of a person's death even if the immediate cause is the act or omission of an individual. The individuals within a company could still be liable for the offences of reckless killing and killing by gross carelessness as well as the company being liable for the offence of corporate killing.

The potential class of corporate Defendants are not limited to incorporated bodies but to those described as:**"Undertakings"**. This includes corporated and unincorporated bodies, local authorities, educational institutes, clubs, partnerships, trusts: any trade or business or other activity providing employment. **Jurisdiction** would be over any company doing business in the U.K. Overseas incorporation or registration would not be an exemption from prosecution.

Enforcement provisions against directors for management failure would include the power to disqualify from office or from acting in a managerial role.

Officers of undertakings might also be liable for imprisonment if they have contributed to the management failure.

These are proposals from the Government at this stage, but it is clear there will be an offence of corporate killing the only issue for debate is where it will stop.

This paper was presented at the Travel Industry Seminar - Gatwick 2 June 2000

Book Review

HUMAN FACTORS IN MULTI-CREW FLIGHT OPERATIONS

By Harry W.Orlady and Linda M.Orlady.
Forward by John K Lauber.

Published by ASHGATE PUBLISHING Ltd.

Gower House
Croft Road
Aldershot
Hants. GU11 3HR. UK

List price: £59.50

This impressive book at over 600 pages, 22 Chapters, 17 appendices and a glossary, is the long awaited compendium to the ever growing topic of Human Factors in Airline operations published by Ashgate. The valuable contribution the authors make to the science of understanding what Human Factors entails is in the vast library of references they have culled in order to create the most up to date work thus far published. Many other books have been written, throughout the world as the subject has unfolded and they are all referred to generously and accurately.

The book is structured in phases and it is a lengthy read to cover the whole book even allowing an hour a day for the task. The trick is to ask oneself what the problem they are analysing is and then find the relevant chapter to gain an incite or a reference for more detailed study. This reviewer finally found the purpose of the book in the conclusion of chapter19, in which he reads:

A final thought:

A purpose of this book has been to stimulate the type of awareness that will make all members of the operating team aware of their importance in accident/incident prevention and to help ensure that members of the operating team are not simply the victims of a

series of situations that make an accident or incident eventually inevitable. When an accident does occur, it is clear that in virtually all cases a total system approach should be used for the analysis of the accident. A total system approach makes it possible for the aviation system to take advantage of the lessons that may be learned. It is clear that all aspects of the social environment must be considered"

So many times in the past, which will no doubt continue ad infinitum, humans operating aircraft, both singly and in teams make mistakes, not of their own making but because of weak links in the infrastructure or "the holes lined up" in Prof. James Reason's 'Cheese' analogy. From Checklist skills to the rapidly growing human interface with the automated aircraft world, this book exposes and explores them all.

Throughout the book, the authors have guided the reader to further study, with essential forward and backward references and sensible footnotes. It has a very readable style of journalism, though sometimes the sentences get a bit long. They make no apology for the USA's bias in their work, for that is the region with which they are both most familiar. But, above all, they identify "Best Practices", wherever in the world they originated. In the chapter entitled The Worldwide Safety Challenge they do not shirk from grasping the nettle of how to effectively manage the emerging programmes known as Flight Operations Quality Assurance (FOQA), or Operational Flight Data Monitoring (OFDM) in the UK.

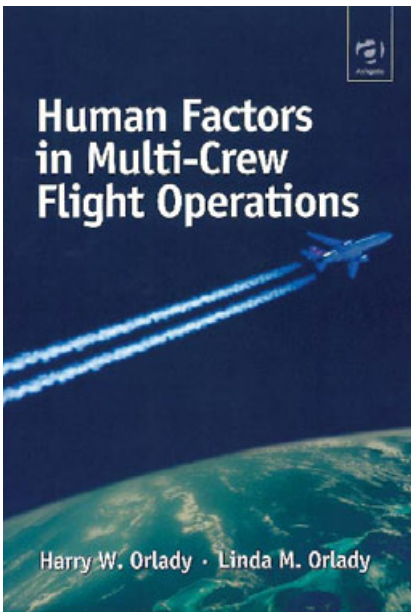
This is a reference book, aimed at anyone who has managerial responsibilities for any level of operation involving flight operations, flight and cabin crews, ground operations and air traffic systems, especially regulators and investigators, educators and anyone thinking of taking up a career in any of these disciplines.

In conclusion it could best be left to echo that in the Foreword by John Lauber, in which he writes:

"Careful reading of this book will help dispel common misconceptions of what 'human factors' is about, and will provide the reader with practical information that will help achieve the desired levels of human performance in the aviation system. That this is important is amply reflected in the accident data: human performance and human error continue to be the leading cause of such mishaps".

Peter G Richards I Eng MRAeS. RAeS' rep on the UK Flight Safety Committee.

Courtesy of The Aerospace Professional.



I Thought He Was Playing Chicken!!!!

I was reading one of your Vortex articles the other day and it caused me to think of an incident that occurred 17 years ago that almost cost me my life. I was working in Africa, along with a fixed wing aircraft, on a spraying contract. On the day of the incident, the weather was poor with low visibility and I had lost contact with the other aircraft, who was working a few miles away. I had just started a spray run when I saw a flash and heard the roar of an engine off my right side. I swung my head to the right just in time to see the Pilatus recovering from what was probably a 90^{o} high g turn. I continued with the spray contact but did not see or speak to the other pilot for a couple of days.

When we finally got together (over a beer), he said he had seen me from quite a distance but did not alter heading because he thought I was holding heading to play chicken with him. Fortunately for both of us he eventually did the correct thing and altered heading just in time to avoid a collision. He turned a light shade of white and had many more beers when I told him that I hadn't seen him till he had taken evasive action.

Assuming that the other aircraft has you visual just because you can see it could be a deadly error in judgement.

Reproduced from **Aviation Safety Vortex.**

The Quality Choice

by Captain Alan Munro
BSc(Eng) MRAeS MIQA

Quality Assurance (QA) arrived in European aviation as the means by which self regulation might be achieved. Of course, Quality is in itself nothing new. Airlines and maintenance organisations have always depended to a greater or lesser extent on strong management structures, dependable training and procedures and reliable documentation. But at the same time the regulator was always at the elbow to ensure compliance with aviation legislation and to ensure at least minimum safety standards on behalf of the travelling public.

The concept of Joint Aviation Requirements started more than 30 years ago when the cost of certification to individual national specification was becoming prohibitive. For example, a new Boeing 737 certified in the United Kingdom in 1968 was required to have 20 special conditions which cost in the order of $300K per aircraft. In fact the early JARs were Joint Airworthiness Requirements whose aim was to ensure that a new aircraft's certification was universal in Europe. JARs as we now know them go back to the Cyprus Arrangements of 1990, but descend from the earlier goals of common certification.

The stated justification for the requirement for QA is that active regulation of an expanding complex civil aviation industry is becoming too demanding and costly, that a self-regulating Quality System allows less active regulation and more self-control. It might be added that standardisation of safety standards in a de-regulated Europe is also fundamental to aviation safety and of course by introducing self-regulation each nation can interpret the rules within national culture and a tight set of guidelines set by harmonised National Authorities (NAAs).

This paper, therefore, is not about the JAAs or their quite incredible achievements to date, or even about the problems that do exist. It is rather about the opportunities that have been handed to the leaders of our industry, which have been overlooked by many, or quite deliberately ignored. I believe that we stand at the crossroads with vast opportunities for enhanced safety and profit in one direction and in the other what is seen increasingly as a costly regulatory burden. In other words, it is the difference between minimal compliance and the excellence which QA is capable of producing - The Quality Choice.

What we then mean by Quality needs to be carefully defined, for which probably the easiest version is straight 'Customer Satisfaction'. But of course this then poses the question as to who the customer actually is. Obviously this must be the airline itself for a maintenance organisation or the passenger or the freight forwarder for an airline, but even this is not straightforward. We may actually be selling to a tour operator or leasing to another airline, while code shares or alliances may also put us in the position of delivering a customer's service to their customers.

In this case the basic 'product', however, is relatively straightforward. At whatever level of comfort, for a passenger airline it means a safe punctual service with luggage on the same aircraft.

In the case of the regulator, the NAA is not so much a customer as the agent of the public, whose role is to ensure that all regulations regarding safety and airworthiness are met, so that 'customer's agent' is an appropriate definition in Quality terms, and the 'product' is then, by definition, safety and airworthiness.

In other industries where QA is increasingly seen as necessary for survival, the words of Peter Drucker, the Dutch management specialist well-known on both sides of the Atlantic are most appropriate:

". . . . the first duty of a business is to survive, and the guiding principle of business economics is not the maximisation of profit – it is the avoidance of loss . . . ."

That is what QA does, and in our industry that loss is not just financial. It means incident and accident, air and ground, damage, injury and death, with commensurate loss of public confidence.

In a manufacturing scenario loss through a lack of Quality means reprocessing, warranty claims, unplanned activities, overdue accounts, downtime, stock control problems, procedural failure, documentation errors, overtime, refunds and adverse publicity, and most of these apply to a maintenance organisation.

The proven 'Quality Costs' of a manufacturing company without QA are around 25% of its turnover.

In an airline loss means ramp damage, late departures, fuel wastage, flight time limitation problems, damaged freight, lost bags, missed connections, unplanned activities, sub-charters and compensation. But it also means the cost of resignations, inappropriate or lack of training, retraining, trade union activity, maintenance stock control, sub-contractor performance, flight safety, health & safety and security incidents, trouble with the NAA, lost business and again public loss of confidence.

The 'Quality Costs' of a service company without QA may be anything up to 40% of its turnover.

So in an airline, if only 10% of such wastage was recoverable through QA, what is 10% of your turnover? And what might it mean in terms of injury and damage?

Of course Quality is not free. Installing a Quality System, employing and training staff, planning, equipping and generally moving to a Quality culture all costs money, but then any new project requires investment. And that is currently where the vast majority of European airlines find themselves as we speak, told to re-equip with the QA tool, but unsure how to use it, unaware of its potential, begrudging its cost with the only apparent benefit as doing the minimum QA necessary to hold a JAR-OPS Air Operator's Certificate (AOC).

We are at a stage where some of the European National Authorities have greater or lesser understanding of what QA actually means and thus what its potential is for aviation safety, because by default a Quality System designed to assure Quality and Safety is already the basis of safety management. I believe that the basic

problem is the manner in which the JAR-OPS Quality requirement has been stated.

After all, a Quality System is only a documented business management system constructed for maximum business effectiveness. General Electric's own Six Sigma QA is exactly that, customised to what the corporation considers vital for customer approval.

So let us now take a passing glance at the ISO 9000 Quality Standard. We are looking quite simply at a model of a manufacturing or service delivery which has been made universally acceptable, and I am well aware of its limitations when misused. We are simply making a comparison.

The ISO 9000 standard model of a business organisation has 20 clauses and in the order of 170 actual requirements for a Quality delivery, and of course many Quality minded companies go much further than this basic model. Of these 20, about 14 are identifiable in JAR-145, and about 7 in JAR-OPS 1 and 3. Both are unacceptable as substitute Quality standards (although interestingly JAR-21 is acceptable). Roughly speaking these are the requirements for management, process control, internal auditing and corrective action, with elements of purchasing, document & record control and little else. But it is not even that good.

Corrective action is not required to eliminate root cause, the handling 'non-compliance' receives almost no direction and 'preventative action' is arguably just touched on. And yet the purpose of QA, enshrined in ISO, is always to be preventative and where things do go wrong, to eliminate the root cause quickly and totally.

JAR-OPS go on to compound the problem by splitting its minimal QA requirements from its requirements of management which are as ever comprehensive and demanding, but these almost entirely form the conditions for holding an AOC. The result is the current wisdom that *"Quality is reactive and nothing to do with Safety". "Trust us, we're the Safety experts"* and so on. And regrettably too many regulators agree, only wanting to see the documented minimum rather than a system for company excellence where QA is used to produce safety, airworthiness and continual business improvement.

The companies which have gone for minimum QA compliance, the vast majority, have thus imposed a burden on themselves with none of the potential advantages, while those who have grasped the challenge are now visibly pulling away. And even where meaningful QA is attempted, all too often senior management simply fails to see QA as a management responsibility which needs daily visible commitment from the top and indeed a cultural change in management style.

The Internal Quality Audit itself, for example, is a powerful tool by which management can receive accurate information on anything they want to know, but too often it is viewed as a check that all regulatory requirements have been satisfied rather than a check of overall management requirements. An example of this might be a cabin audit which reports on serviceability, a regulatory requirement, but not on cabin cleanliness which is not.

(The Wootton report, investigating the Quality Control incident where a Boeing 737 landed after 10 minutes flight with no engine oil remaining, made the recommendation that there should be compulsory Quality Management training for senior managers, now accepted by the UK CAA.)

Quality should be a consensual method by which the entire company is involved in management strategy, carefully devolved through a Quality System where everyone knows what to do and is doing exactly what management wants of them.

I believe that the solution initially lies in management understanding of what is being asked of them, of careful definition of the issues which drive their company business, and then of formulating the policies necessary to give full concentration on each of the areas of critical concern and the procedures necessary to achieve a Quality product.

An example of this is perhaps that of on-time departures, a mixture of operational and commercial issues which at first glance have no place in an Operations Quality System. And yet safety issues are quite fundamental, starting with stress on the operating air and ground crews and ending with flight time limitation problems, so that the solution is probably simply one of presentation. If we write our operational and maintenance manuals in such a way that the NAA regulator can see compliance with all QA requirements, there is no reason why we should not at the same time make these a part of a greater company QA initiative.

There are after all few operational issues without a commercial impact and even fewer commercial issues which do not impact directly on Operations and Maintenance. The helicopter operators flying for oil companies have recognised these simple truths for years, working operational Quality as part of a documented Quality and Safety System, usually within an ISO 9000 registration demanded by their employers.

So it is a matter of commitment and then presentation, offering each sub-part of company QA to the respective regulator, all working within an overall Quality System, designed to deliver everything that the company is trying to do with maximum proactivity and minimum loss. And of course a number of different regulators may be involved, with security, health and safety, company law and the environment all making individual demands on a hard pressed management, not to mention specialist medical, veterinary and other exceptional needs.

We have not so far mentioned the role of the airline or maintenance sub-contractor. It is a rule of life that what we purchase we pass on in the final product, which has always been recognised by maintenance. In operations our frequent dependence on sub-contractors is now making a significant impact. JAR-OPS 1 and 3 actually remind us that the final product is correctly and invariably the responsibility of the operator, nowhere more so than in ground operations.

In the past, however, we have put total faith in the Standard Ground Handling Agreement, based on the IATA AHM 810,

putting matters to right well after something has gone wrong, and as we all know to our cost, this can range from very expensive aircraft damage to the occasional fatality.

Increasingly as the operator is forced to demonstrate a minimum degree of QA compliance, auditing has become the only recognised tool in the Quality box for checking on a sub-contractor's performance, while it is not actually the specific JAR-OPS requirement. The result is severe over-auditing and a heavy drain on operator and sub-contractor resources for which the official solution is now audit pooling and horse trading of audit results, on the vague assumption that all operator requirements are identical.

It has all been tried before. As a result, the motor industry developed QS 9000, a Quality super-standard where all the specific needs of car manufacturers are independently audited periodically by a specialist company, with a resulting accreditation being internationally acceptable. And of course at the end of the road this will hopefully one day become the norm for our own industry. Others have already followed, for example the AS 9000 standard for Aerospace, but we seem to be at least 20 years behind in our own approach.

Long before then, there are many other Quality tools for the control of the sub-contractor, starting with performance evaluation on Quality grounds. All the advice needed is in the ISO 9000 standard which is in fact the only Quality check list in existence.

Then there is the matter of the airline which undergoes rapid expansion in size, fleets, bases, personnel and so on, where a highly motivated close knit body working together becomes increasingly dysfunctional through lack of planning, resource and solid sensible communication; otherwise known as a documented Quality System.

The Quality Manager is not, however, a substitute flight safety officer (FSO), and indeed the QM's role described in JARs is really that of an Audit Manager. The FSO will always remain the safety champion, frequently acting intuitively but now backed by company QA and a culture which should be designed to support flight safety proactively. Quality, like safety, must become everyone's concern, so that when we talk safety then Quality and Safety have to be one and the same. Increasingly as we move towards a Safety Management System, and risk auditing becomes the order of the day, then the management aims inevitably merge.

Beyond our first steps into QA is the road to Total Quality; the often misquoted TQM, always in the distance but just out of sight; the land of brilliant management, happy customers, sub-contractors working as business partners, delighted shareholders, harmony with the environment, contented workers and delighted regulators, where safety and airworthiness are absolute. An impossibility? I don't think so. In fact a TQM approach could even become essential for future survival as a more discerning public and regulator increasingly demand it.

In the JAAs I think that we have arrived at a cross-roads, where if we choose to do the minimum acceptable QA we saddle a monster. If we choose the harder road, as other industries already have, the combined rewards in terms of business and safety excellence are immeasurable.

The Quality Choice.

Alan Munro flew for 40 years, serving as an RAF pilot and FSO, instructing for many years in GA, flying commercially as an A320 Captain and working as an airline safety officer.

He now runs Airstaff Associates, an airline Quality & Safety consultancy and training organisation in the United Kingdom specialising in airline QA, (www.airstaff.co.uk), and is Director of the UK arm of AviaQ, an aviation auditing company (www.aviaq.com).

The views expressed in this paper are his own and do not necessarily reflect the policies or views of GE Capital Aviation Services.

Leading The Way Towards Safer Flying

by Dave Wright

By using information from every flight UK operators show the world how to improve flight safety. The pioneering 1970's co-operative research project of SRG and British Airways has become an important tool to help improve safety in the new millennium.

By routinely running flight data recorder information through analysis programs operators are able to detect departures from standard operating procedures or unusual situations that may have safety implications. Once detected, these are assessed and, where necessary, remedial action is taken. This may involve changes in procedures, technical action or crew education and retraining. This process is known in the UK as **Operational Flight Data Monitoring (OFDM).**

SRG have been instrumental in encouraging and advising operators in this area and today over sixty percent of all UK jet airliners are monitored by such programs and this proportion is growing rapidly.

As part of this process, on the 28th June, a second very successful OFDM workshop was held at the Gatwick Europa Hotel. One hundred people attended this workshop that was aimed at assisting UK operators implement the pro-active analysis of FDR data to improve safety. The eighteen UK and five Foreign operators (plus twenty other organisations) learnt from advanced users such as British Airways, British Midland and Bristow Helicopters; watched technical presentations on Quick Access Recorders (QARs) for regional aircraft from BAES and SAGEM; listened intently to a presentation on legal aspects by CAA's Legal Adviser's Office; and saw demonstrations by a number of leading software and hardware companies.

The workshop was organised by SRG's Safety Analysis Unit assisted by Flight Operations Policy and International Services.

Discussions were opened into international developments, legal issues, organisational methods and operational experience. In the latter session a number of operators shared recent lessons learnt with the audience and this highlighted the potential benefits of a Web based OFDM user group that was proposed earlier in the day. A wide range of issues were raised that will be followed up by both industry and SRG.

Comments received after the event included.....

"found the event thoroughly stimulating and it gave us renewed confidence to find so many other operators at the same stage as ourselves" .....

"It was good to see such a healthy dialogue between the operators and the regulator"

"we need a forum where we can exchange views, information and lessons learnt, and a means for the Regulator to update operators"

Contact Dave Wright at David.Wright@srg.caa.co.uk

One-Size-Fits-All Maintenance Problem

In the past year several incidents have been reported to ASRS in which Boeing 737-100 and –200 wheel bearings were incorrectly installed on the series –300 aircraft. Now here's a Captain's report that describes the installation of a B-757 wheel bearing on a B737-300 wheel – with potentially catastrophic results:

Shortly after departure from Runway 34L the Tower controller informed us we had lost a wheel on the takeoff. In a very short period of time we were told we had lost either the right outboard main gear wheel, the right inboard main gear wheel, or even both right main gear wheels. I elected to stay in the local area and reduce fuel to an acceptable level (weight) for landing. The B737-300 does not have fuel dumping capabilities.

Since I did not know the integrity or even existence of the remaining wheel on the right side, I wanted to reduce the aircraft weight as much as possible for landing. We held outside the [airport] area for two hours. I realized that if we held for an extended period, we would be making an emergency landing, and quite possibly a passenger evacuation after sunset. With this consideration, I held until the time we could make a low pass, get a visual inspection from the Tower and return for landing just prior to sunset.

The low pass was conducted and the ATC personnel, as well as company mechanic, reported the right outboard wheel was intact, the inboard was missing. After the visual inspection, we returned for landing…..The approach and landing were uneventful…The aircraft was towed to the maintenance hangar where it was discovered that the main wheel bearing on the right inboard wheel had failed. The wheel departed the airplane, leaving the axle and the brake assembly intact on the landing gear…There was absolutely no indication on the takeoff roll that the wheel had failed. In fact, when the errant wheel was located, it too was intact and even still inflated.

The B737-300 wheel apparently will accept B737-100, 200 and B757 bearings and look like a correct installation. The underlying problem is that part numbers are on the bearing race are normally covered with grease. Unless maintenance technicians take time to verify the B737 part numbers, the wrong bearing may be installed on the wheel.

From the NASA Aviation Safety Reporting System *CALLBACK.*

They Were Just Little Problems – Nothing Major

The investigator was carefully picking over the pieces of what had once been a well-designed and well-constructed aircraft. Little remained that looked worthwhile. There was no obvious reason for the crash, and the detective work was going to take some effort. That's what he got paid for, he mused.

A bystander at the perimeter of the roped-off area had been standing there quietly for some time, and the investigator noted a reasonably relaxed, but slightly nervous, air – not your normal gawker.

When the investigator left the crash site for a moment, the bystander approached him, not anxiously but with a purpose.

After a few pleasantries, the bystander shuffled slightly and said "I don't know how to put this, whether I should say anything or not, or if it might help. I don't want to be named or held responsible for anything."

Assured that anything might help in the crash and that there was no danger of getting in trouble, the bystander relaxed slightly and continued.

"I flew this aircraft a lot, you know, over the last few years, and it had some peculiar habits. Everyone just put it down to being different, and no one ever formally wrote it up – we all knew about the problems." "Oh? What sort of problems?" the investigator asked.

"Lots of little ones; none of them seemed to be really enough to cause us to complain. The only one that scared me was the time the electric's all went off, but they came back on again almost immediately. In fact, they came back on before I had time to do anything about the problem."

"Had this happened to anyone else that you know of on this aircraft?" the inspector asked, doing his best to keep his voice calm and level.

"Never mentioned it to anyone else, and they didn't say anything to me either. Well, glad if any of this helped," he said, then he turned and walked away.

The investigator shook his head. The accident happened at night in poor weather to a pilot brand new to the operation and this aircraft.

Reproduced from **Aviation Safety Vortex.**

The least experienced press on while the more experienced turn back to join the most experienced, who never left the ground in the first place.

Full members

Chairman
Aer Lingus
Capt. Tom Croke

Vice-Chairman
Airclaims
John Dunne

Treasurer
CAA
Tony Ingham

Communications Officer
RAeS
Peter Richards

Aerostructures Hamble
Dr. Marvin Curtis

Airtours International
Capt. Tim Cheal

Air Contractors
Capt. Tony Barrett-Jolley

Air Foyle
Capt. Chris Fox

Air Mauritius
Roy Lomas

Air Seychelles
Capt.Alasdair Liddle

Air Transport Avionics
Colin Buck

Air 2000
Capt. Martin Pitt

ALAE
John Sawyer

BAA plc
Francis Richards

BAC Express
Capt. David Smith

BALPA
Carolyn Evans

Bristow Helicopters
Capt. Derek Whatling

Britannia Airways
Peter Naz

British Aerospace Reg. A/C
Dan Gurney

British Airways
Capt. Chris Tiffin

British European Airways
Stuart McKie-Smith

British Mediterranean
Capt. Peter Chinneck

British Midland
Capt. Mel Grievson

British Midland Commuter
Capt. Steve Saint

British Regional Airlines
Capt. Ed Pooley

British World Airlines
Capt. Shireen McVicker

Brymon Airways
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Chrys Hadjiantonis - Safety Data Dept
Keith Wilson - Intl . Services
Brian Synnott - Flight Ops.

CargoLux
Capt. David Martin

Cathay Pacific
Capt. David Mawdsley

Channel Express
Rob Trayhurn

City Flyer Express
Capt. Andy Walker

CityJet
Capt. Sean Burke-Daly

Delta Airlines
Evan Parsons

EasyJet
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Emerald Airways
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EVA Airways
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Ford Air
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Is Turning The Lights Down Low At Night A Safe Procedure?

by Peter Martin

Decisions of the US Courts of Appeals interpreting the Warsaw Convention do not bind the English courts but can be of persuasive authority in cases where the English courts have not yet themselves considered a particular issue. For this reason, an unusual case decided recently by the Second Circuit (New York) Court of Appeals is of particular interest to airlines.

Two male passengers sat between a Miss Wallace and the aisle on a Korean Airlines night flight from Seoul to Los Angeles on 17 August 1997. It being the middle of summer, Miss Wallace wore a Tee shirt and jean shorts with a belt. Initially the flight passed uneventfully and Miss Wallace fell asleep in the darkened aircraft after finishing her meal. She had no conversation with her neighbours and, in particular, a Mr Park who sat beside her. About three hours into the flight, Miss Wallace awoke to find that Mr Park had unbuckled her belt, unzipped and unbuttoned her shorts and had placed his hands into her knickers to fondle her. Miss Wallace awoke with a start, turned her body towards the window causing Mr Park to withdraw his hands. When Mr Park resumed his unwelcome attentions, Miss Wallace recovered from her shock and hit him hard. She then climbed out of her seat, jumped over the sleeping man in the aisle seat and made good her escape.

After reporting the matter to a flight attendant who allocated her another seat, Miss Wallace reported also to the police on arrival. Mr Park was arrested and pleaded guilty to a charge of engaging in unwelcome sexual conduct, an offence in the US, in the Federal District court in Los Angeles. Subsequently, Miss Wallace sued KAL alleging sexual assault not by the airline but on board its aircraft and, therefore, its responsibility in terms of compensation! To have made good her claim she would have to demonstrate that the assault was an "accident" for the purposes of the Warsaw Convention since, without there being an accident there can be no claim. In an earlier case the court had reasoned that sexual assault was not "a risk characteristic of air travel" and therefore did not constitute an "accident" as that term is generally understood. On this basis, KAL successfully denied the claim in the District Court, the Federal court of first instance, and Miss Wallace appealed.

The Court of Appeals held[1] that the characteristics of air travel increased Miss Wallace's vulnerability to Mr Park's assault. She was cramped into a confined space beside two strange men, one of whom turned out to be a sexual predator. The lights were turned down and the predator was left unsupervised. Mr Park's behaviour was not a five-second operation, and could not have been entirely inconspicuous. Yet, not a single flight attendant noticed what was happening. What is more, when Miss Wallace awoke, she could not get away at once but had to endure a renewed assault before clambering to safety in the aisle. The event was, therefore, an accident, namely, " an unexpected or unusual event or happening external to the passenger." As such it gave rise to a legitimate claim against the airline which could not escape liability for it. The case was remitted to the District Court where, no doubt, it will be or has been settled on payment of agreed compensation as it seems most unlikely KAL would risk a full trial and a jury award of damages in a case of this kind.

Lessons for airlines? It is no longer a safe procedure for airlines to turn the lights down low on night flights and for cabin crew to retreat to the galley for a few hours of rest and recreation of their own. If liberty comes only at the price of eternal vigilance, so also does freedom from sexual assault in today's libertine world. Airlines must be even more watchful, not least if alcohol may also be a factor.

[1]Wallace v Korean Air 27 Avi 17, 869

UNITED KINGDOM FLIGHT SAFETY COMMITTEE

SEMINAR 2000

AVIATION AT RISK

3rd OCTOBER 2000

RENAISSANCE LONDON HEATHROW HOTEL, LONDON

SEMINAR OBJECTIVE

Safe Flight is based on a knowledge and control of a wide variety of competing areas of Risk. This Seminar will provide management with robust tools and strategies to enable them to increase their knowledge and control.

PROGRAMME

MONDAY 2nd OCTOBER 2000

1530 - 1830 Registration
This will take place in the Hotel Foyer

2000hrs Seminar Dinner
Sponsored by Willis
After Dinner Speaker -
Rt Hon Lord Trefgarne, PC

TUESDAY 3rd OCTOBER 2000

0730 - 0845 **Registration**

Session Chairman - Ed Paintin UKFSC

0900 - 0910 **Opening Remarks**
- Capt.Tom Croke
Chairman UKFSC

0910 - 0920 **Keynote Speech**
Gwyneth Dunwoody MP

0920 - 0940 **Disaster Vs Risk**
Jacques Berghmans - DuPont

0940-1000 **Regulatory Style**
Clive Norris - HSE

1000 - 1030 **Failures & Shortcomings of Current Risk Management**
Matthew Day - Willis

1030 - 1100 *Refreshment Break*

1100 - 1130 **Risk Management in Relation to NATS Business Plan**
Euan Black - NATS

1130 - 1200 **Airport Influence on Flight Safety Risk Factors**
Paul Fox - BAA

1200 - 1245 **DISCUSSION**

1245 - 1400 *Lunch*

1400 - 1430 **Managing Safety Management**
Mike Overall

1430 - 1500 **Risk Management & Regulation**
Richie Profit - UK CAA

1500 - 1530 **Corporate Killing**
Peter Martin

1530 - 1615 **DISCUSSION**

1615 **Closing Remarks**
Chairman UKFSC

AVIATION AT RISK

SEMINAR INFORMATION

- **Hotel Accommodation**
  Hotel Accommodation is not included in the Seminar Registration Fee. A rate of £104 (room only) has been negotiated with the Renaissance Hotel. If you require a hotel booking form, please request one.

- **Seminar Dinner**
  Dress for Dinner – Lounge Suits

- **Cancellations/Refunds**
  Cancellations received prior to 18th September 2000 will incur a 50% cancellation fee. Refunds after this date will not be given.

  If you are unable to attend why not nominate a colleague to take your place. If so, please advise the UKFSC Fairoaks office of any changes prior to the Seminar.

✂----------

SEMINAR REGISTRATION FORM

Please complete one registration form per person (photocopies accepted).

REGISTRATION INFORMATION

(Please print clearly)

First Name: _____ Surname: _____

Company: _____ Job Title: _____

Address: _____

Tel No: _____ Fax No: _____ e-mail: _____

PAYMENT INFORMATION

Seminar Fee: £100 UKFSC Member ☐ £150 Non-Member ☐

This includes Dinner on the evening 2nd October, lunch, refreshments and car parking. This does not include hotel accommodation – please see above Seminar Information.

Payment is by sterling cheque only. No credit cards are accepted. Bank transfer is available, details on request (please note an additional cost of £6 will be added to cover handling charges). The UKFSC is not VAT Registered.

Sterling cheques should be made payable to UK Flight Safety Committee.

- Do you plan to attend the Seminar Dinner on Monday 2nd October? Yes ☐ No ☐
- Do you require a Vegetarian alternative? Yes ☐ No ☐

PLEASE SEND YOUR COMPLETED REGISTRATION FORM WITH YOUR CHEQUE TO:

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