focus

ON COMMERCIAL AVIATION SAFETY

SUMMER 2003

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UNITED KINGDOM FLIGHT SAFETY COMMITTEE

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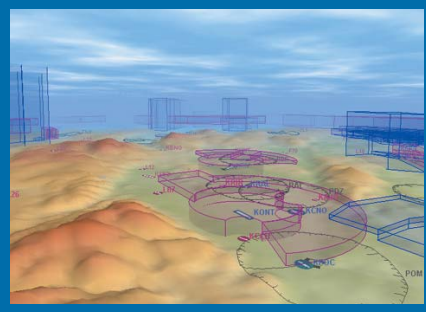

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The Official Publication of
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Front Cover: BAe 146 of Aegean Airlines

FOCUS *is a quarterly subscription journal devoted to the promotion of best practises in aviation safety. It includes articles, either original or reprinted from other sources, related to safety issues throughout all areas of air transport operations. Besides providing information on safety related matters,* ***FOCUS*** *aims to promote debate and improve networking within the industry. It must be emphasised that* ***FOCUS*** *aims to promote debate and improve networking within the industry. It must be emphasised that*

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These are tough times so tighten your belts

The US military involvement in Afghanistan may eventually be seen as the catalyst that has caused the upsurge in international terrorism. Their involvement may have directly led to the attack on the Twin Towers.

The events of 11th September 2001 caused a dramatic decline in passenger traffic for many airlines as passengers sought to reduce their personal risk to such events. This event saw a huge increase in security of airports, airliners and passengers. Airlines responded by reducing the frequency of their flights and cut back on staff in order to reduce their costs. It is difficult to find fault with this tactic, as business survival became the name of the game.

One could not expect the US government to accept this type of attack on its people without some retaliatory action. Pressure mounted on Iraq as the war clouds gathered, with the eventual invasion of Iraq earlier this year. This further affected the economics of airlines operating to and around this region with more flight reductions and cost cutting.

No sooner was the taking of Baghdad announced when SARS reared it ugly head in Mainland China and started spreading to Hong Kong, Canada, Taiwan and other countries around the world ably assisted by international travellers. This resulted in more reductions in flights as passengers stopped travelling in order to reduce contact with others and therefore reduce the risk of infection. These cutbacks have amounted to more that 50% for some carriers operating in and around Asia.

Then, as if the situation is not bad enough, on the 13th May 2003 three near simultaneous terrorist attacks in Saudi Arabia placed the focus back on security, as suicide bombers penetrated the security of ex-patriot compounds for the first time.

So what should those striving to improve the safe operation of the various airlines expect?

We should expect that any "available funds" will be directed at improving security and we should expect that the reducing revenue will make the likelihood of purchasing new systems, equipment or manpower to improve the effectiveness of the safety department ever more unlikely.

We will therefore, need to improve the utilisation of our existing resources in order to provide a greater level of risk management. Now, more than ever, we need to be on our guard as staff focus their attention on security and hope that the safety standards will be maintained.

It is time for the Flight Safety Manager to ensure that the safety department is working at its optimum level. Better communication, improved vigilance and innovation will be essential ingredients to maintaining the safe operation. It is time for us all to "tighten our belts" and work with our management to weather this storm. Hopefully your dedication and increased efforts will be rewarded when the financial state of the aviation industry improves.

Let us not forget that these are tough times for air operators. For some it is a matter of survival, your increased efforts could make all the difference.

UK FLIGHT SAFETY COMMITTEE OBJECTIVES

- To pursue the highest standards of aviation safety.
- To constitute a body of experienced aviation flight safety personnel available for consultation.
- To facilitate the free exchange of aviation safety data.
- To maintain an appropriate liaison with other bodies concerned with aviation safety.
- To provide assistance to operators establishing and maintaining a flight safety organisation.

Looking Forward

by John Dunne, Airclaims

I am pleased to report that the UKFSC continues to find itself in a healthy economic position with a strong and growing membership at the time of our 2003 AGM. Your executive committee supported by the Fairoaks office have worked hard behind the scenes throughout the year to ensure this position is maintained. This is at a time when our industry is going through its most difficult period ever. All of us need to continue to look to the future in order to ensure that the infrastructure we've all worked so hard to build remain intact and viable in this volatile period.

We are not alone in turning our focus to the future. The UK Government has unveiled in long-term strategic view on air transport. The projections identify the need for three new runways in the southeast within the next 30 years. This initiative gives heart to us all about the direction our industry will continue to take following this desperate period. Hopefully the review will allow a wider debate than just the Heathrow, Gatwick and Stansted options.

Three recent events remind us that aviation, like the sea, is always unmercifully seeking out the unwary.

A recent near CFIT event with an EGPWS equipped aircraft reminds us of the need for continued vigilance and the value of good old-fashioned airmanship. During approach, using a single VOR as the ground-based navigation authority the EGPWS updated its position as normal. Unfortunately the ground-based navigation aid was corrupted and the update resulted in a false position update. The result was a very close encounter with high ground some 6 miles out. Only the alertness and good airmanship of the crew saved the day. The crew felt uncomfortable and elected to go-around, this decision was rapidly followed by terrain warnings. The incident is under review by accident investigators, regulators and manufacturers – we had a lucky break and everyone is working hard ensuring that we learn the lesson.

The Beech 1900 crash at the beginning of the year in the USA has forced a detailed review of the average weight calculations used for passengers. How does average passenger weight calculations affect your organisation? Do you ever fly full package flights from warm destinations? Are your current procedures in respect of passenger weight calculations robust enough to ensure that aircraft performance isn't prejudiced?

The Shuttle Columbia accident investigation team is reviewing the over-reliance of ISO 9000 processes by NASA and it's role in the accident causal chain. The review of Safety Management Systems will no doubt be included in this review. The UKFSC's involvement in the development of SMS has proven to be an invaluable asset to the industry at large. We need to be able to continually review and challenge existing standards to ensure that they remain valid for our evolving operational needs and reflect the best current practices.

When flight safety is simply not enough

by Ian Marshall

It is well passed midnight and the arms of Morpheus are beckoning. The dog's been kicked off the duvet, the pillows have been pumped, and the ever perky alarm clock has been set.

You've been operations manager for many years now. It's been a slog, working up through the ranks, starting in crewing, then a spell in ground services, and then on to duty operations controller. In fairly recent times the flight safety portfolio was added to you brief as was emergency contingency planning.

You have put the airline to bed sometime back leaving two young but enthusiastic members of staff in operations to while away the wee small hours playing on the internet.

Three hundred miles away, waiting in her borrowed office, sipping a turgid cup of machine coffee, the only other on duty member of your team is hanging on for the 2 am arrival from Corfu. Bemoaning her fate to the friendly handling agent she prepares to disembark the two hundred inbound passengers with almost indecent haste. Today has gone well with few delays and little aggravation. Even the great travelling public seems to be in a good mood. Looking at the clock for the tenth time in as many minutes, our heroine reflects on the wisdom of working double shifts.

The familiar roar of the aircraft's thrust reversers announces the arrival of flight EHA 184 bringing with it a precious human cargo of sun burned, souvenir bedecked, and desperately underdressed holiday makers.

Walking up to the arrival gate, going home coat on, and ground radio left back in the office the sole representative of Euro Holiday Airlines notices an unusual intensity of blue lights on the ramp. In the distance, just beyond the fire station but before the perimeter wire, strangely reflected in the windows of a nearby petrol station, an eerie orange and blue flickering glow begins to fill the sky.

Within minutes your phone rings and your worst nightmare is about to begin.

Are you prepared?

Emergency Management Goals and what can really be achieved.

The management of any major incident or accident has one major goal. That is the preservation of your passengers' confidence in your ability to operate an airline safely and efficiently.

Post major accident this may seem to be a completely impossible task. However, history shows us that if an airline does it's utmost to alleviate suffering and, importantly, is seen to be as proactive as possible, then a positive result can be obtained.

So what are the systems and structures we need to put in place to achieve this?

Emergency Management Team

Led by a senior company officer with fiscal authority, a small team of managers should be assembled. Typically numbering some ten persons, this team will take responsibility for the direct management of the incident. This corporate isolation of the accident will leave Operations free to address business continuity issues.

Emergency Management Centre

The emergency management team will need a secure location to operate from. This facility should be equipped with computers, telecoms, duplicators, and media monitoring equipment. Access to the internet is a must. Secretarial and administration staff must be available as should basic catering facilities. Remember this centre will be open for a very minimum of a week and more probably two.

Very few airlines can justify a dedicated Emergency Management Centre; the majority cope well with either a plug and play upgrade of a conference room or a well equipped office.

Special Assistances Team

This team is the very centre of your humanitarian response. Formed from trained company volunteers these individuals are assigned duties ranging from supporting bereaved relatives, to collecting data, and basic trauma defusing.

The numbers of volunteers you require will depend on the size of the aircraft your company operates. As a rough guide take the seating capacity of the largest aircraft in your fleet, multiply that number by two and that will give you a working total. Frankly most airlines go with as many team members as they can get.

During practice team call outs only approximately thirty percent of the

volunteers have been shown to be in a position to respond. In addition you will need replacement team members within a few days. This is to avoid secondary trauma and the possibility of team members becoming too empathetic with the people they are helping. You can see from this that the number of Special Assistance team volunteers needs to be high.

Training is usually given in one or two day packages with annual recurrence being desirable. You will be pleasantly surprised at the numbers and quality of the volunteers who come forward.

Family Assistance Centre

You'll be thinking by now, where are all these special assistance team members going to be physically located? Well, an extremely good idea is to hire a large hotel near the crash site to act as the Family Assistance Centre. This hotel must be large enough to accommodate all the expected friends and relatives who will either wish to visit the crash site or to be near survivors presently residing in hospital. This location will be the vital work centre for all your humanitarian relief efforts.

Within these secure hotel walls, all human life has to be catered for. Travel desks, crèches, telephones, media monitoring, chapels and, God forbid, funeral arrangers need to be provided for. Quiet areas are a must as are, believe it or not, media interviewing facilities. Some people having survived trauma, bereavement, or some other ghastly event, use talking to the media as a kind of closure. It would be desirable for these individuals to be seen to be supported by your organisation. The alternative is to have images of a rainy street corner interviews being relayed around the world.

Passenger/Public/Staff Emergency Information System

The progress of any incident or accident will generate an enormous amount of public interest. Friends and relatives of anyone travelling on your airline that day will be seeking information. In addition your staff will require data to pass on to customers as well as allaying their own concerns about colleagues. To facilitate this train of information some sort of telephone enquiry centre needs to be provided as does an internet dark site.

Most airlines use either a service provider for their emergency public telephone information centre or utilize specially trained operators located within their reservations centre. However you will need a pretty big reservation centre to undertake this service as doing so will play havoc with the maintenance of normal business activity.

An Internet dark site is a web link waiting to be activated to replace your usual company web site. It can carry prepared statements and information as well as being able to be updated rapidly. It also replaces the glossy advertising which would normally dominate your site. The internet is rapidly taking over as the preferred route for general public enquires. It's a powerful tool but will not replace the personal touch required when dealing with the friends and relatives of victims and survivors.

Media Management

Two thoughts here. If you are doing your level best to alleviate distress and suffering to any individual caught up in an accident then it makes sense to make sure that the media knows. Secondly if you do not provide sensible information, at regular intervals, then the media will become speculative and maybe just a little imaginative.

Remember your prime concern is to eventually restore consumer confidence in your airline. Use the media as a positive asset to fulfil this goal.

Establish a small inbound call centre to handled media enquires. Prioritise requests for information and get Public Relations professionals to respond. Why

prioritise? Well I personally would rather handle CNN before worrying about the Hounslow Weekly Gleaner!

All press releases and statements must be approved by your senior executive in charge of the emergency management team. After issue make sure that this copy is available on your web site.

Trauma Counselling

Whilst it's not your airline's role to be responsible for the mental health of the travelling public, it is your problem if you've just scared the wits out of them and they then justifiably wish to sue. Get a trauma management programme together. Place a Mental Health service provider on contract and train senior members of your special assistance team to handle traumatic situations.

Personal Effects and Body Identification

In many parts of the world body identification is undertaken by the local Coroner's Office. If unfortunately your misfortune occurs outside of this area then this task is up to you. In addition personal effects will have to be retrieved from the aircraft wreckage, catalogued, maybe restored and then returned either to their original owner or their next of kin. Unclaimed items must be stored for 18 months. Not a job for the faint hearted so best done by a case hardened service provider.

Technical Specialists

To facilitate most of the above and prevent further corporate damage a small team of technical experts will be needed to aid the recovery process. Insurance experts, legal practitioners, company accident investigators, aircraft recovery engineers, and IT specialists will all be needed to travel to either the accident site or the Family Assistances Centre.

Local Accident Procedures

We shall be returning to our heroine before long but in the meantime what exactly do we expect her to do? I have a senior colleague who adamantly advises a one way ticket to Rio under these circumstances. As this does not contribute very much to the airline's business continuity plan we shall instead put together a robust but simple system of check lists to kick off the vital tasks that your staff will need to undertake.

First these tasks must be defined. No two accidents are the same but certain requirements are standard. Airline representation must be available at both the survivor's reception centre and the friends and relatives reception centre. Hopefully these reception facilities will be provided by the airport but if not the Family Assistance Centre will have to do.

Contact with your Operations Control and later, when established, with your Emergency Management Centre must be achieved and maintained. An administrator should be appointed to work within a small local accident centre. It is vital that the airport's telephone exchange and public information unit are kept informed. In particular the emergency public information telephone number you have established must be distributed.

A representative, preferably someone senior, should be dispatched to the accident site to liaise with the blue light emergency services. Additionally a company employee must report to the airport's Accident Management Centre to fulfil a similar function.

By providing a simple check list for all these tasks and any others that may be required, any member of staff can undertake any role. That individual does not necessarily even have to be in your company's employment. By opening up this process to workers supplied by other airport users, you will have immediately given yourself a much better chance of coping with the aftermath of any accident.

Let's now return to our accident. By now our dispatcher has hastily returned to the handling agent's office. Declaring it her Local Accident Centre she makes one

phone call to Operations Control. This activates the Emergency Management Team, the Special Assistance Team, the Air Accident Investigators, Company Technical Specialists, Service providers and Media teams. The handling agent provides two trained members of staff to act on behalf of your company within the various reception centres. Very shortly British Airways, Virgin Atlantic, bmi, and Monarch are on the phone offering assistance. The rest of the airline community rallies around and provides staff, facilities and much needed language skills.

Check lists are swiftly distributed and the effective management of your worst nightmare begins to look a distinct possibility.

But before we get too complacent about your handling of the situation how did all this help and expertise come about? The pre-planning, the training, the mutual aid, and the understanding of the local handling agents were not happenstance.

The United Kingdom Airlines Emergency Planners' Group

Four years ago the majority of airlines and charter operators within the UK established the succinctly named United Kingdom Airlines Emergency Planning Group.

The aims of this association are as follows;

- To provide support and guidance to participating airlines and in particular to those individuals holding the emergency management brief.
- To set standards and provide information on the best available working practices concerning emergency management.
- To provide third party training.
- To act as a lobby group.
- To liaise with the international bodies both governmental and NGOs concerned with emergency management and airline operations.
- To assist in the provision of mutual aid.

- To provide a two way information exchange between the airline community and the emergency services and local authorities.
- To assist and observe airport exercises.

The UKAEPG meets four times a year; each gathering is hosted by a member airline and costs are kept to an absolute minimum. Full membership is open to all UK and Irish airlines with an annual fee of just fifty pounds.

Associate membership is available to smaller aviation companies, airports, and logistics companies with an air transport division.

The group works within the airline community promoting awareness of the need for emergency management and provides support and training to airport authorities, police forces, and new airlines. A mentoring scheme is available to new emergency managers.

It has had a profound effect on the way airlines prepare for emergencies and is a driving force in the improvement of training and standards. Without the knowledge pooling, asset utilisation, third party training, exercise monitoring and emergency service liaison provided by the UKAERP, our lonely Euro Holiday Airlines dispatcher may well have availed herself of that one way ticket to Rio.

The UKAERG is delighted to assist, in any way it can, start up airlines and organisations just embarking on the establishment of their emergency management systems.

Please check out the UKAEPG web site www.ukaepg.org or feel free to contact me at ian.marshall@flybmi.com

Notes on the Author
Capt. Ian Marshall presently holds the chair of the UKAEPG , is a member of the IATA Emergency Planners' Working group and sits on the Star Alliance Emergency Advisory Group. He has been trained in post crash management by IATA, the Royal Air Force and the British Police.

Some Legal Issues Clarified

In March of this year the English High Court considered two cases which dealt with the recoverability of damages for persons on the ground arising out of aircraft operations. The first (Glen and others –v- Korean Airlines Company Ltd ("KAC")) considered whether damages for purely psychiatric injury could be recovered by a witness to an air crash. The second (Dennis and Dennis –v- Ministry of Defence) considered whether the owner of property could recover damages for the nuisance caused by the noise of aircraft operating from an adjacent RAF air base.

Glen –v- Korean Airlines

This case relates to the crash of a KAC B747 cargo aircraft shortly after takeoff from Stansted on 22 December 1999. The claimants all lived near the crash site at Great Hallingbury in Hertfordshire and sought to claim damages for psychiatric injuries, under the provisions of s76(2) of the Civil Aviation Act 1982 ("the 1982 Act").

The material parts of s.76(2) of the 1982 Act are as follows:
"…where material loss or damage is caused to any person ... by.….an aircraft while in flight, taking off or landing, then …damages in respect of the loss or damage shall be recovered without proof of negligence or intention or other cause of action as if the loss or damage had been caused by the wilful act, negligence or default of the owner of the aircraft."
The court was asked to determine preliminary issues which, if not resolved in the claimants' favour, would effectively terminate their claim. For the purpose of considering the preliminary issues it was assumed that the claimants either directly saw or heard the crash and the events following it and, as a result of those experiences, suffered psychiatric injuries.

Readers will be familiar with the debate over recoverability for psychiatric injury in air accident cases. It is important to appreciate that the legal basis for recovery in this instance, i.e. by people on the ground against the airline is different from that applicable to passengers. However, the interest lies in the interpretation of similar phraseology. Similar issues also arose in relation to the recoverability for psychiatric injuries in the 1920s, when the words which now appear in s.76(2) were first enacted. The court concluded that their irrecoverability then did not preclude recovery for such injury when the opposite is true now. Moreover, the parties were unable to identify any statutes where the phrase "personal injury" (as used in the 1982 Act to define "material loss or damage") was defined as excluding mental impairment and, in the absence of any apparent reason why Parliament should have intended to exclude the same in this instance, held that the "material loss or damage" referred to in s.76(2) included psychiatric injury. In support of this conclusion the court accepted that it was bound by the recent House of Lords decision in Morris –v- KLM which held that a person can recover on the basis that a "bodily injury" has been suffered if it can be established that the mental injury complained of is evidence of structural change to the brain or central nervous system.

The court also considered whether, if damages for psychiatric injury are recoverable under the 1982 Act, such recovery is limited by the common law rules in terms of the categories of people who may recover. The Court interpreted "wilful act" as meaning a deliberate act rather than "intentional wrong doing" and that, consequently, the normal rules as to foreseeability and remoteness of damage applicable to acts of negligence should apply. In other words, for the purpose of integrating S76(s), there was no material distinction between "…the wilful act of the aircraft owner or his, negligence or default" In the light of this the Court held that psychiatric loss or damage is only recoverable under s.76(2) if such loss or damage would be recoverable at common law.

This judgment provides helpful confirmation that the owner of an aircraft will face an exposure to claims for purely psychiatric injuries caused by circumstances falling within the ambit of s.76(2) of the 1982 Act. Consequently, although the provisions of this section relieve the claimant of the burden of proving negligence on the part of the aircraft owner, the ability to recover damages for purely psychiatric injuries will be limited to those classes of persons who would have such an entitlement under common law. In essence this only permits a recovery either where the person alleging the psychiatric injury physically witnesses the incident or its immediate aftermath and has a very close relationship with the victim of the Defendant's negligence, where the Claimant was personally endangered (or had reasonable grounds to believe so) by the incident or where the claimant was attempting to rescue victims.

Consequently, damages for psychiatric injury caused by simply witnessing at first hand an air crash which did not directly threaten the safety of that witness nor injure that person's loved ones (as

appears to be what was envisaged in the agreed factual matrix used for the determination of the preliminary issues) will not be recoverable under s76(2) of the 1982 Act.

Dennis and Dennis –v- Ministry of Defence

This was a claim brought by the owners of Walcot Hall, a large residential, sporting and agricultural estate approximately 2 miles east of RAF Wittering. Aircraft approaching the airfield into the prevailing westerly wind flew over the estate and almost over Walcot Hall itself. Moreover, by virtue of its status as a training base, an average of 70 landings took place daily, sometimes as late at 11:00pm, including some weekends.

After considering expert evidence the Court held that the level of noise experienced at Walcot Hall was a very serious interference with the ordinary enjoyment of the property which no one should be called upon to endure. The question was whether the owners could recover damages from the RAF in respect of this interference.

Claim in Nuisance at Common Law

The MoD sought to argue that using land to train pilots for the defence of the realm is a common and ordinary use and therefore did not constitute a nuisance. Moreover, even if such activity did constitute a nuisance, defence of the realm was to everyone's advantage and as such was of sufficient public interest and importance to amount to a complete defence.

The Court disagreed holding that whilst activities which generate extreme noise or other pollution may be justifiable on other grounds, these activities did not constitute "ordinary use" within the legal meaning of that phrase. Consequently the noise generated by the Harriers was a nuisance.

In relation to the public interest defence the court noted that occasionally the private rights of an individual had to be subjugated to the public interest, but in such circumstances it might be unjust for that individual to suffer damage for the benefit of all. In line with this the Court held that public interest clearly demanded that RAF Wittering should continue to be used to train Harrier pilots, but that the owners should receive compensation for the loss of enjoyment and diminution in value of the estate resulting from the nuisance generated by the Harriers.

Claim under the Human Rights Act 1998 ("the 1998 Act")

The owners also alleged that the noise from the Harriers interfered with their right to peaceful enjoyment of their possessions under article 1 of the 1998 Act and their right to respect for their private and family life, home and correspondence under article 8 of the 1998 Act. The Court agreed that these rights had been interfered with, but held that the public interest in allowing that interference to continue was greater than the individual private interests of the owners. However, the court regarded it as disproportionate to give effect to the public interest without compensation.

In line with this reasoning the Court assessed the damages payable to the owners to compensate for the nuisance at £950,000 and noted that if it was wrong on that issue, the same sum should be awarded in the alternative as compensation for the breaches of articles 1 and 8 of the 1998 Act.

The Court emphasised that this was an exceptional case with extreme facts which were not analogous to any of the other authorities which had been referred to it during the course of the hearing. Therefore it should not set a precedent for claims by other individuals who reside close to military air bases.

Aviation's relationship with its neighbours has not always been an easy one. These cases illustrate some of the issues the courts have to try to deal with in balancing competing interests. The financial consequences of the Korean Judgment should not be great, since the damages will generally be borne by insurers. What is, perhaps, slightly troubling is the acceptance that physiological damage to the brain may be accepted as "bodily injury". The wider concern for airlines is that if mental injury is recoverable by passengers, airlines will face claims – many of which will be spurious – for trauma on every occasion of a heavy landing, turbulence incident and so on.

Equally, the Dennis Judgment should not, at first sight, trouble civilian operators. They have the benefit of protection under S76(1) of the 1982 Act from any action in nuisance, allegedly sustained by virtue of [overflight at a reasonable height.]. What is of greater concern is the risk that it appears that exceptional aviation operations would find an action under the European Convention or Human Rights. If that cause of action lies independently, the protection in the 1982 Act may be of no use. While that ought not to pose a threat to commercial air transport operators the effect on the flying training sector or aerobatic operators may be more profound.

Keith Richardson
Barlow Lyde & Gilbert

Safety in Aviation Maintenance the US Navy way.

I was kindly invited to the United States Navy's first Annual Aviation Safety Conference which was held at the Navy Safety Centre, Naval Station Norfolk, Virginia between 23-25 April this year.

The aim of the Conference was to bring together safety representatives from the US Navy aviation community to share information, be briefed on the latest initiatives and tell a good few naval 'dits' which of course is the essence of good information sharing. There were more than 250 delegates from the whole range of air stations, squadrons, HQ organisations and carrier groups. The Aviation Maintenance division of the Safety Centre (Mission: to promote safety awareness and contribute to operational readiness through fleet interaction, support and service) undertakes between 75-100 Safety Surveys per year where a team of experienced aviation maintenance personnel will visit a unit (at the unit Commanding Officer's request) to undertake a review of the safety culture and practices, making recommendations where appropriate. It was the accumulated knowledge acquired as a result of the Surveys which was promulgated at the Conference.

The US Navy is at an advanced stage in taking account of Human Factors (HF) in the Aviation Maintenance environment. They teach an awareness of HF to all their tradespeople, reinforced at regular intervals, and collect HF information as an integral part of their 'mishap' reporting system. The importance of this is reflected in the recognition that 85% of incidents reported have a Human Factors input and as the technical causes of incidents tends to decrease, it is increasingly important to address the HF contribution to these incidents. It is noticeable that the US Navy personnel in the Aviation Maintenance world appear operate in an environment approaching a 'just culture' where honest mistakes are broadcast widely for all to learn from, rather than being punished and therefore lessons potentially being 'hushed up'.

Aviation Maintenance Managers are also trained in the '5 step, 4 principles' of Operational Risk Management – a simple approach to risk management to be used on a day to day basis for fairly routine decisions which would affect flight safety.

The 5 steps are:

- Identify Hazards
- Assess Hazards
- Make risk decisions
- Implement controls
- Supervise (watch for changes)

These are backed up by the 4 Principles:

- Accept risk where benefits outweigh the cost
- Accept no unnecessary risk
- Anticipate and manage risk by planning
- Make risk decisions at the right level

Coupled with this is an awareness of Ground Crew Co-ordination, which as a result of analysing ramp and maintenance mishaps showing that a lack of crew coordination and behavioural skill was a major factor, have developed the '7 Behavioural Skills of Effective Ground Crew Coordination'.

These are:

- Communication
- Assertiveness
- Mission Analysis
- Decision Making
- Situational Awareness
- Adaptability/flexibility
- Leadership

Whilst there may be nothing particularly new in the above, they are issues always worthy of reinforcement. All maintainers carry this information about their person in the form of a laminated 'aide memoire'. It all helps to maximise aviation safety in an environment (of multiple fast jet launches and recoveries at night on a heaving flight deck…..) which couldn't be designed to be any less safe!

(The writer, Commander Ian Peck RN, is the Engineering Policy desk officer at the UK MoD's Defence Aviation Safety Centre, and member of the Maintenance Standing Committee of the UKFSC).

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Aer Lingus
Capt. Tom Curran

Aerostructures Hamble
Dr. Marvin Curtiss

AIG Aviation
Jonathan Woodrow

Air Contractors
Capt. Tony Barrett-Jolley

Air Mauritius
Capt. Francois Marion

Air Scandic
Paul Ridgard

Air Seychelles
Capt. Curtis Allcorn

Air Transport Avionics
Colin Buck

ALAE
Dave Morrison

Astraeus Ltd
Capt. Nick Carter

BAA plc
Francis Richards

BAC Express
Capt. Steve Thursfield

BAE SYSTEMS Reg. A/C
Alistair Scott

BALPA
Carolyn Evans

bmi regional
Capt. Steve Saint

British Airways
Steve Hull

British Airways CitiExpress Ltd
Capt. Ed Pooley

British International
Capt. Terry Green

British Mediterranean Airways
Robin Berry

Buzz Stanstead Ltd
Peter Walton

CAA
Dave Lewis - MRPS
Chrys Hadjiantonis - Safety Data Dept.
Brian Synnott - Flight Operations
Alison Thomas - Intl. Services

Cardiff International Airport
Graeme Gamble

CargoLux
Capt. David Martin

Cathay Pacific
Capt. Richard Howell

Channel Express
Rob Trayhurn

CityJet
Capt. Mick O'Connor

Cougar Leasing
Capt. Shaun Harborne

DHL Air
Peter Naz

Dragonair
Alex Dawson

DUO Airways Ltd
Capt. Christopher Morley

Eastern Airways UK Ltd
Capt. Jacqueline Mills

easyJet
Capt. Tim Atkinson

Emerald Airways
Capt. Roley Bevan

European Aviation Air Charter
David Wilkinson

EVA Airways
Richard Lovegrove

Excel Airways
Peter Williams

FlightLine
Capt. Derek Murphy

FLS Aerospace (IRL)
Frank Buggie

Ford Air
Richard Newton

GATCO
Richard Dawson

Goodrich Actuation Ltd
Keith Joyner

Independent Pilots Association
Capt. Mike Nash

Irish Aviation Authority
Capt. Bob Tweedy

KLM UK Eng.
Andy Beale

LAD (Aviation) Ltd
Steve Flowers

Loganair
Doug Akhurst

London City Airport
Simon Butterworth

London-Manston Airport
Wally Walker

Manchester Airport plc
Peter Hampson

Monarch Airlines
Capt. Tony Wride

MyTravel
Phil Oakes

NATS
Paul Jones

PrivatAir
Capt. Boris Beuc

Ryanair
Capt. Gerry Conway

SBAC
John McCulloch - Secretariat
Vic Lockwood -FR Aviation

Servisair
Eric Nobbs

Shell Aircraft
Cliff Edwards

South African Airways
Tshepo Peage

The Boeing Co.
Thor Johansen

Thomas Cook Airlines
Capt. Graham Clarke

Virgin Atlantic Airways
Capt. Jason Holt

Willis Aerospace
Ian Crowe

Group members

bmi
Capt. Ian Mattimoe

bmi Eng.
Peter Horner

Bristow Helicopters
Capt. Derek Whatling

Bristow Helicopters Eng.
Richard Tudge

Britannia Airways
Jez Last

Britannia Airways Eng.
Adrian Vaughan

CHC Scotia
Peter Cork

CHC Scotia Eng.
Colin Brown

Eurocypria
Capt. Constantinos Pitsillides

Cyprus Airways
Capt. Spyros Papouis

flybe. british european
Stuart McKie-Smith

flybe. british european eng.
Chris Clark

GB Airways
Capt. Aaron Cambridge

GB Airways Eng.
Terry Scott

Lufthansa Cargo AG
Sybille Basto

Condor/Lufthansa & CityLine

MOD
DASC Col. Arthur Gibson
DASC Eng. Cdr. Ian Peck
HQ STC MOD - Wg. Cdr. Bob Nielsen

RAeS
Peter Richards

RAeS Eng.
Jack Carter

Co-opted Advisers

AAIB
Capt. Margaret Dean

CHIRP
Peter Tait

GASCo
John Campbell

Royal Met. Society
Dr John Stewart

Airframe Icing

by Graham Smith

If an aircraft is fitted with pneumatic de-icing boots and approved for flight in icing conditions it doesn't mean that prolonged flight in icing conditions is sustainable. It may enter conditions where ice could form; if it does it should leave the conditions. If it doesn't have de-icing equipment, it should not be flown in icing conditions, meaning any visible moisture when the temperature is close to or below freezing.

Ice won't stick to the airframe in flight if the super-cooled water droplets have already frozen, and it isn't easy to find out whether they have without paying them a visit. But if ice does form, it should not be assumed that de-icing boots can take care of it indefinitely. They buy enough time to get out of the icing conditions – at best. The boots seldom shed all of the ice and often leave fragments behind, which disturb the laminar flow of air over the forward part of the wing, creating turbulence in the boundary layer. This effect may be more pronounced on a clean, modern wing that retains laminar flow further aft. The disturbance reduces the stalling angle of attack and increases drag. Unfortunately, the pilot cannot know how much the stall, or loss of control speed, has increased. The fragments remaining are suitable projections to gather more ice. Sometimes, ice forms behind the inflatable boot.

31.10.94 ATR 72 Roselawn, Indiana.
09.01.97 Embraer 120 Brasilia, Michigan
15.03.02 Cessna 208 Caravan, Alma Wisconsin
07.04.98 Cessna 208 Caravan, Bismark ND, USA

The ice will continue to form relentlessly until the weather conditions are left. The boots will remove most but not all of the ice at intervals, but the bits that remain will grow. The propeller spinner(s), wing and tail tips, aerials, nose and other projections may not be de-iced. Windshield heat may not cover the whole windshield; fixed gear and lift struts are great ice collectors, increasing drag.

Leave the icing conditions

There are only four ways of doing this.

a) Climb above the cloud, which may not be possible.

b) Descend to a warmer altitude, if one exists above the MSA.

c) Turn to avoid high ground if necessary,

d) Increase indicated airspeed (IAS), if possible.

21.12.02 ATR 72 in the sea between Taiwan and Macao.
26.01.90 Mu-2b Western Australia
19.03.01 EMB 120 Brasilia, Florida
05.03.98 C208 Caravan, Bismark, ND, USA

These accidents occurred at fairly high altitudes when warmer conditions existed at safe altitudes lower down.

Airframe ice may rapidly reduce climb capability to zero. Allowing the IAS to fall below the normal cruise climb figure in an attempt to continue climbing will have a very short-lived effect and increase the ice accumulation. This has caused many fatal accidents.

15.10.87 ATR 42, Monte Crezzo, Italy.
21.12.92 Beech A60 Duke, Seattle, Washington, USA
29.01.90 C208 Caravan, Plattsburgh NY

An aircraft must have excellent climb performance to get out of icing conditions by climbing. The best rate and gradient of climb speeds do not apply to a contaminated airframe and may be below the point where loss of control occurs.

Descending improves performance and reduces angle of attack but will only remove ice build up if warmer levels exist at a safe altitude. It may be necessary to turn to avoid high ground, which could mean going back. That is perhaps the only course of action that could have saved the ATR 42 on 15.10.87 in Italy.

Increasing IAS may not always be an option either. If it is, 180 knots IAS gives about 3°C ram rise; since most icing occurs at temperatures at or just below freezing, that may just be enough to heat the super-cooled droplets above freezing on impact. They won't then stick, or not immediately. At 200 KIAS, there's about 5° ram rise and at 250, a useful 8°. This is the main reason why jet aircraft don't often get airframe ice; they don't spend

much time at low speeds in icing levels. By the time the Total Air Temperature (TAT) gets to zero at high speeds, the Surrounding Air Temperature (SAT) will be so low that most of the super-cooled droplets have probably frozen.

If the aircraft won't do 180 KIAS in the first place, this is of little comfort.

From the above, we can see that on some occasions there is no effective method of leaving the icing conditions. This is likely to be the case if the freezing level is close to the surface, the cloud layer is deep and the aircraft is slow.

Stall warning

The stall warning is set to operate at a pre-determined angle of attack for a given configuration. If the iced wing stalls at a lower angle, the warning may not operate. Loss of control may occur for reasons other than pure stall; for instance loss of roll control or even tail stall. Loss of roll control has been identified as a probable cause in accidents to the ATR 42, 72, Embraer Brazilia and, it would seem, the Cessna 208.

Modern aircraft usually have benign stall characteristics, but if the aircraft has ice accumulations on it, which may well be asymmetric, it isn't the same aeroplane! There is no knowing what form the loss of control will take. It has been estimated that the loss of control speed increases above the normal stall by the knots lost from normal cruising IAS. That has no scientific basis but sometimes seems to be in the right area.

Tail stall

Unlike wing stall, the tail is likely to stall when full flap is lowered at high speed, when negative angle of attack is greatest. Normally the horizontal stabiliser, or tail plane, doesn't stall because it is set at a lower angle of incidence than the wings or main-plane. Most propeller aircraft have a fixed tail-plane, which meets the airflow at an angle of attack, sometimes negative. When flaps are extended, the centre of lift moves aft, giving a nose-down pitching moment. The centre of drag moves down a little bit, again causing a nose-down pitching moment. The downwash over the tail-plane from the extended flaps gives a nose up pitching moment and sometimes the two balance each other nicely.

If flap is selected at a high speed, the angle of attack decreases over both the wings and the tail-plane, giving the latter it's maximum negative angle. The flap limiting speed considers this to prevent tail-plane stall, but if it's iced up, it will stall at a smaller (negative) angle of attack. Tail icing has been identified as a probable cause in several accidents. Although a fixed tail-plane will be de-iced, the pilot may not use it in time. Loss of pitch stability is instant rather than gradual.

Variable incidence stabilisers on jet aircraft aren't usually de-iced, because when in trim the stabiliser is pretty well in line with the airflow. If the stab picks up ice during an approach; it doesn't usually

make much difference because there is very little angle of attack on it.

29.10.94 Antonov An-12, Ilymsk, Russia.
24.02.94 Antonov An-12, Nalchik, Russia
26.12.89 Bae Jetstream 31, Pasco, Washington, USA
30.10.91 Bae Jetstream, Raleigh County, W. Virginia, USA
07.04.58 Viscount 700, Michigan USA
10.04.97 C208 Caravan, Wainwright, AK, USA

Jet aircraft are usually de-iced by means of hot bleed air heating the leading edges. At low altitudes, when low airspeed and weather conditions are most conducive to icing, they tend to have a surplus of available power and can afford to use this to heat the wing leading edges to evaporation point. Turbo-props don't usually have so much power to spare, so they get boots.

Taking-off with airframe ice

By far the most common factor in airframe icing accidents is taking-off with a contaminated airframe. Of 19 C208 icing accidents studied, this was a factor in 12. It's obviously stupid, so why do people go on doing it? The answer is obvious; de-icing is very expensive and may cause a substantial delay. The other reason is that sometimes pilots get away with it. Few if any jet aircraft have

crashed because of airframe icing accrued in flight, but plenty have because of ice on the airframe before they took-off.

Ice that's formed before take-off will affect the whole airframe, so leading edge de-icing is of limited help. In some cases, the fact that the aircraft wasn't adequately de-iced has been seen as the primary causal factor and tends to obscure the significance of subsequent icing after take-off.

Some of the Cessna Caravans, and one BN2 Islander (07.12.98 in Canada), reached a few hundred feet before loss of control, which may have been coincident with flap retraction. The contaminated wings could not accept the increase in angle of attack associated with flap retraction.

04.01.02 Challenger CL-600, Birmingham UK
10.03 89 F28, Dryden, Ontario
22.03.92 F28, La Guardia, NY
13.01.82 B737 Washington National.
04.12.94 C208 Caravan, Oslo, Norway. Reached 1300 ft agl.
18.01.95 C208 Caravan, Lubbock, Texas. Accidents for this reason run into hundreds.

Even if the aircraft has been de-iced, the procedure may not always be completely effective. That was found to be the case on 10.10.01, another C208 departure accident at Dillingham, Arkansas. The pilot was criticized for failing to touch the wing upper surface after de-icing. On large jets, also vulnerable to ice before take-off, this is impractical and seldom done.

Landing with ice on the airframe

If operating instructions and runway length permit, pilots of propeller aircraft may consider landing with less than full flap if ice is being carried on the airframe. Some Caravan operators recommend landing with no flap if any airframe ice is detected.

20.01.98 C208 Caravan, Grand Island, Nebraska, USA
02.01.93 Saab 340, Hibbing, Minnesota USA
25.11.97 C208 Caravan, North Bay, Canada

Weight

Not surprisingly, a heavily loaded aircraft will fare worse than a lightly loaded one of the same type in icing conditions. In 1988, two Shorts 360 aircraft departed Manchester on WAL departures a few minutes apart. One was empty and the other fully loaded with newspapers. The lighter aircraft reported light icing at FL60 and requested FL80, where it continued above the cloud. The heavy aircraft encountered icing, could not climb above FL50 and with full power descended at over 1,000 fpm to 3,000 ft. Pilot reports of icing will vary because it is an interaction between the aircraft and the elements, rather than a phenomenon that is either there or not there. Another higher performance aircraft reporting little or no icing doesn't mean that it couldn't happen if the conditions are right.

29.01.90 C208 Caravan, Burlington, Vermont

Cloud type

The severity of icing will depend on the water concentration of the cloud, and how much of that comprises super-cooled droplets. Cumuliform clouds will usually have a high water content and if the convection is strong, a large part of it

won't have had time to freeze. Icing could then be very rapid. In favourable conditions, little or no ice may form and if the icing is light, the aircraft systems may seem to cope with it adequately. Apparently similar weather on another day may be much more severe. In very cold weather, clouds may consist entirely of ice crystals and pilots may come to expect no icing. But it all depends upon how the cloud got there. It was -10°C in Alaska on 06.03.02 when a C208 Caravan crashed due to loss of control during approach. Investigators discovered airframe ice.

Understanding

Recently, moderate to severe icing was forecast between 1,000 ft and 10,000 ft; the surface temperature was about +1°C. The departure controller asked a departing large jet as it climbed through FL150 at 300 knots whether they had encountered any airframe icing and the reply was negative. The controller then passed this information to departing turbo-props, which would climb at about 150 knots IAS. At 250 – 300 knots airframe icing would have been very unlikely to occur, but the heavy precipitation the jet passed through indicated that the forecast was probably correct. No accident resulted, but it indicates that ATC on that night at least did not understand the relationship between speed and icing.

Taiwan's Aviation Safety Council recommends, following the accident to an ATR 72 on 21.12.02 that all turbo-prop operators review their training to ensure they have comprehensive instructions on flight in icing conditions. On that flight, icing started at FL180 some 20 minutes before loss of control. All they had to do was descend a few thousand feet and the icing would have stopped. Instead they used the de-icing system and eventually requested descent to FL160, just before control was lost.

If the ATR turbo-props have gained a poor reputation after three fatal accidents, the Embraer 120 and Bae Jetstream have had a few as well. But nothing gets near the record of the Cessna 208 in icing. Proponents of this certification note that they're already flying in parts of Europe, including Norway. Indeed so, one of those has crashed in icing conditions. A retractable gear, faster, pressurised machine with fewer ice collecting surfaces offers more defences against icing; better climb performance, higher speed, wider speed range and a greater choice of altitudes.

Have a plan

Over low terrain with a temperature around 10°C it might be reasonable to say that if icing occurs at 8000 feet, the plan is to descend and the ice will come off. If the surface temperature is close to freezing and the cloud base low, that plan obviously won't work. If there is high terrain on the route, the options again diminish. There's no workable plan for that situation except to hope! Hope that the rate of icing isn't too bad and hope that the pneumatic boots keep the aircraft flying, despite abundant evidence that they can't.

Cruising above the cloud, low level icing conditions at destination may affect the alternates as well. In this unenviable situation, it may be wise to descend at a high IAS and choose a long runway that can accommodate a speed increment on final approach.

Those who would certify a fixed gear, strut-braced, slow aircraft for flight in icing conditions at night might devise the plan now and regulate accordingly, with specific constraints regarding the freezing level and MSA.

27.02.90 C208 Caravan, Denver, Colorado.
06.11.93 C421, Greensburg, Indiana
01.12.93 Shorts 330, Umiujac, Quebec
02.03.95 C208 Caravan, USA.

Commercial factors

Imagine that the ATR 42 pilot, climbing towards the Alps on 15 October 1987 had encountered the icing conditions, turned around and returned to the departure point. What would the airline have said? Night mail companies understandably demand a high level of reliability. The pilot can't reasonably be expected to decide whether to go or not just before departure time; met information doesn't even include cloud tops. How can the pilot know whether icing will occur that night and how severe it will be? The decision to go has in effect been made by those who certified the aircraft. A pilot who won't go will be told:

"The plane is certified for flight in icing conditions"

Icing and night flying

It's colder at night and the pilot can't see the clouds or where the cloud free levels are. There's no possibility of flying VFR beneath the cloud or the MSA and there are fewer airfields open for an emergency landing. The C208 pilot at MSP (15.03.02) would probably have made it if there'd been an airfield nearby.
Perhaps no fixed gear, un-pressurised aircraft should be certified for icing conditions.

Single Engine Night IFR

by Graham Smith

Single engine (SE) night IFR is soon to be approved throughout Europe, the rationale being that a single turbo-prop engine, probably a PWC PT6, is safer than two piston engines. Piston light twins don't have a very good record of either reliability or safe flight after an engine failure; the probability of engine failure is reduced substantially by using a turbo-prop single. However it introduces an entirely new concept: if the engine fails at night, however unlikely this may be, the aircraft will probably crash. The estimated frequency and numbers involved mean this can be considered acceptable.

The comparison isn't really valid in Europe, because very little public transport night flying takes place in piston twins. They have a poor payload and aren't very attractive to night freight operators. The air taxi and executive market is small and mainly prefers turbo-props or jets. The Cessna 208 Caravan is very well suited to night freight and mail operations; once it's more widely approved it will proliferate. The safety case should not be made by comparison with obsolete aircraft that are little used, but with turbo-prop twins.

The safety case no doubt considered that most light aircraft flying takes place in daylight from choice, so the probability of engine failure occurring at night, which may account for only one tenth of a typical utilisation is very small. In the night mail and package delivery role for which these aircraft are apparently well suited, most of the flying will be at night.

Engine failure isn't the greatest hazard posed by night flying in these singles. Some19 Cessna 208 Caravans have crashed due to airframe icing, mostly at night, and that's a hell of a lot of accidents to a single type for a single reason. Those who advocate it's night certification would argue that airframe icing could just as easily occur by day as night. That is incorrect.

The most recent C208 icing accident was on 24th January this year, though it's a hazard for all types of course; another recent victim was an ATR 72 in China on 21.12.02. The following article may help to improve understanding of airframe icing.

RAeS Human Factors Group

by Pieter Hemsley - Chair RAeS Human Factors Group pieterhemsley@hotmail.com

The Royal Aeronautical Society (RAeS) Human Factors Group is one of the youngest of the Specialist Groups, having been formed in 1995, but is also one of the most active. Because the subject is so widely applicable within aviation, initially the Group had difficulty satisfying in one forum the demands of the various disciplines, such as operations, engineering, air traffic control, et al. The solution proved simple and now the main committee of some 30 members acts as a steering group to a number of Standing Groups (SG), each of which focuses on the needs of a specific discipline such as:

Crew Resource Management (CRM) for Flight Operations: Chair Carey Edwards (ce@lmq.co.uk)

Engineering & Maintenance: Chair Cliff Edwards (Cliff.Edwards@shell.com)

Air Traffic Control: Chair Dr Anthony Smoker (anthony.smoker@virgin.net)

In 1996, the CRM SG spawned a separate Focus Group on CRM instructor accreditation that has since become entirely independent as an advisory body - the CRM Advisory Panel - to the CAA Safety Regulation Group. This April the CAA introduced formal CRM Instructor accreditation for all UK Public Transport Aeroplane operators, a first in the aviation world. This is but one example of how the HFG has had a direct and significant influence on the industry well beyond the prestigious facilities where it meets in Hamilton Place, London.

Additionally, we have an SG dedicated to research, although as we have no funds – our activities are underpinned by voluntary help from all corners of the industry – this SG, chaired by Jo Davies (jo@ese-assoc.demon.co.uk), does not conduct research per se, but interfaces with others who do to ensure that the issues we believe are paramount are addressed. It also seeks to identify and stimulate funding where applicable, no mean feat in the present financial climate. And finally there is an SG for Training Evaluation that is currently dormant during the downturn, but which is seeking an industry partner to conduct studies into the return on investment from HF training interventions. If your company wants to explore the potential for such a study, please contact the chairman, Dr Phil Smith (smithpms@aol.com).

All the SGs are recruiting members: please contact the respective chairs if you have an interest or are willing to contribute to their activities.

Whilst the HFG meets quarterly at the Society's premises, our main activity in the public domain is organising conferences. More often than not we do this alone, but occasionally our wide remit means it is appropriate to act in concert with others. For example, we have worked closely with the Ergonomic Society to stimulate attendance at each other's conferences. Moreover, we liaise with a number of other specialist groups in the RAeS, as well as forging links with HF and safety bodies worldwide to mutual benefit.

This year marks the centenary of powered flight and the HF Group is celebrating with a special conference at the Society on Wednesday 15 October 2003 entitled **Mitigating Human Error**, in an effort to identify where we have succeeded and what remains to be accomplished in the next century in this dimension. We already have a platform of world-class speakers confirmed, including:

Professor Jim Reason, late of Manchester University, who will give the keynote address

Professor Helen Muir of Cranfield University, expert on cabin design and evacuation

Dr Anthony Smoker of National Air Traffic Services (NATS) at Swanwick

Captain Dan Maurino, ICAO Flight Safety & HF Manager

Captain Paddy Carver of CTC Aviation Group and formerly Head of Flight Operations Standards at the UK CAA Safety Regulation Group

Ms Nicole Svatek, HF Manager at Virgin Atlantic

If you would like to get on the mailing list for the flyer for October - which we expect to be available from July - please send me an email or contact the Society's conference office: +44(0)20 7670 4343, Nyree Jordan, Nyree.Jordan@raes.org.uk. Delegate fees are likely to be very competitive and the event should interest not just HF managers, trainers and practitioners in both civil and military aviation, but also those with a research interest and those of you in other safety-critical industries such as medicine, maritime and rail transport, nuclear power, energy generation and offshore exploration. And should you want to exhibit at our conference or just sponsor all or a part of the event, you will be most welcome! We look forward to seeing you in London in the autumn!

Finally, our website - www.raes-hfg.com - contains a wealth of information on HF and includes links to many other like-minded sites. I commend it to you!

Waging War Against Unsafe Operations - Part 2

by E. H. Paintin

The Principles of War

The principles of war, which form part of the conceptual component of fighting power, form the instinctive basis of thought when working out tactical problems at all levels. With the exception of the master principle, which is placed first, undue emphasis should not be accorded to the order in which the others appear. The phrase "Principles of War" may at first sound pompous and high level stuff. In reality the observance of the Principles is fundamental to the successful conduct of war at any level. All our tactical doctrine is based upon these principles.

The Selection and Maintenance of the Aim

In the conduct of war as a whole, and in every military operation, it is essential to select and define the aims clearly. This is not as easy as it sounds. Much may happen which, unless you are careful, will side-track you from your real aim, sometimes without even knowing about it. In any operation, however small, constantly ask yourself the question "what is my aim?", and test any plan of action by considering the effect it will have on the achievement of your aim. If it will not help, discard it.

Strategic Planning is an essential senior management function. The lack of adequate strategic planning in many Air Operators is a serious shortcoming. Some think that not having a strategic plan gives them more flexibility. This is merely a guise to camouflage the fact that they do not have an adequate strategic plan. Just because you have a plan does not mean that you lose the flexibility to take advantage of an opportunity.

At the middle management level it is easy to be side tracked from your core management tasks. A manager at this level should constantly ask himself "What is my aim" to ensure that he does the tasks for which he is held accountable.

Maintenance of Morale

Success in war depends as much on high morale as on anything else. Numbers, armament and resources cannot compensate for lack of courage, energy, determination and bold offensive spirit. These in turn cannot be achieved unless morale is high. High Morale is directly dependent on good leadership and good management, particularly at platoon level.

A manager should constantly be monitoring the morale of his staff. Working with them. Continuous communication and feedback is a good method of improving morale. The management activities of planning and controlling are two areas of the manager's task that allow ample opportunity for morale building. The more your staff are involved in these activities the better the morale will be.

Offensive Action

You cannot win battles unless you attack. This may well be delayed but, until the initiative is seized and offensive action taken, victory will be impossible. Furthermore, continued lack of offensive action has the most adverse effect on morale. Offensive action embodies a state of mind which breeds determination to gain and hold the initiative., it is essential for the creation of confidence and to establish an ascendancy over the enemy, and thus has an effect on morale.

Often in the workplace one hears staff say "I have not yet got round to it". This is a sure sign of lack of action and the resulting poor morale. Setting realistic deadlines for tasks to be completed is a sure way of improving both output and morale. Staff like to feel that they are achieving and those staff who consistently achieve their task deadlines should be praised in the presence of others (at staff meetings). This will increase their motivation but others will also see that their efforts do not go unnoticed. Motivated staff will eventually start to take the necessary action without management prompting once they understand that they will not be criticised for doing so. Actions need to be taken to prevent the recurrence of unsafe acts as soon as possible. Staff need to know that their manager expects them to resolve the issues promptly.

Surprise

Surprise has a most effective and powerful influence upon war at all levels in all operations. It can be achieved by, secrecy, concealment, audacity, deception, originality and speed. It causes confusion and paralysis in the enemy's chain of command and destroys the cohesion and morale of his troops.

It is necessary to ensure that once it is decided to carry out a plan of action the action is taken as soon as practical. Allowing discussions to drag on for extended periods inculcates "action paralysis". Find the problem, formulate the action plan and act as quickly as possible. This is particularly important where safety breaches are detected.

Security

Security is essential in order to achieve surprise. It does not mean undue caution but rather that we take whatever steps are necessary to guard against being surprised ourselves.

Those Air Operators who have not taken time to conduct a Hazard Analysis do not know where the incipient dangers lie in their organisations. A full Hazard Analysis will prevent you from being surprised by an occurrence of yet another unsafe incident. The continual gathering of safety related information and ongoing assessment thereof is one of the main tasks of the Safety Manager. He must ensure that he is monitoring all the available information and takes the necessary action to prevent the next incident from happening. His job is one of proactive management of safety.

Concentration of Force

To achieve successful war, it is essential to concentrate superior forces to that of the enemy at the decisive time and place. Concentration does not necessarily imply amassing forces, which can be hazardous, especially in general war., but rather having them so disposed as to be able to deliver the decisive blow when and where required or to counter similar blows from the enemy.

In order to ensure that the operation is safe it is necessary to have sufficient resources. This means that not only should the safety department be adequately manned but that other resources necessary to do the task effectively must be available. There is a tendency in the aviation industry for Safety to be a "Cinderella" department. Under resourced and over worked and the work undervalued.

Economy of Effort

This is complementary to concentration of force. In other words do not use a sledgehammer to crack a nut.

As with all things in life it is necessary to have a balance. 80% of results are achieved from 20% of the effort. The company Hazard Analysis will enable you to determine where you need to be expending the effort. Having a proper safety case and associated planning should determine what resources are necessary. It is better to have one well trained, highly motivated staff member than three poorly trained, de-motivated staff.

Flexibility

Flexibility must be both physical and mental. In war the situation changes rapidly and is even more likely to do so in the future. This calls for:

a. Mental flexibility
b. Physical flexibility

Within a safety department priorities may change rapidly for various reasons. It is essential that the Safety Manager and his staff are able to change from one task to the other without being hampered by bureaucracy. It is essential that they have autonomy and right of access to all parts of the organisation and all information in order for them to investigate incidents and to make changes to various procedures as quickly as possible. This includes access to key personnel whose authority may be required to ensure the implementation of the necessary changes.

Co-operation

Co-operation is based on team spirit and training, and entails the co-ordination of the activities of all arms of the service and of allies, for the optimum combined effort.

If within an organisation safety is seen as a high priority issue it will be necessary for the role of the safety department to be seen as one of preventing unsafe acts and not that of finding fault with, and threatening the jobs of, individuals. It is therefore necessary for the Safety Manager and his staff to work with the various departmental managers and their teams in a co-operative manner. To do

this they will need to discuss the shortcomings of a procedure and practice with the department and to agree how the shortcomings should best be overcome. The implementation of the necessary change must be left to the departmental manager. After all, it is his responsibility to ensure that his department functions effectively and it is he who has the authority to implement the change. The safety department should not undermine this authority.

Team building across the organisation should be one of the goals of both the Safety and Quality Departments. Without it there will be continual suspicion and mistrust of their activities.

Administration

Sound administration is a prerequisite for the success of any operation. Logistic considerations are often the deciding factor in assessing the feasibility of an operation.

The production of reports relating to incidents must be accurate, thorough but at the same time concise. Recommendations must be clear and should specify what action is to be taken, by whom and by when. The safety department must ensure that once the recommendations are accepted that they are put into action and that the incident is properly closed. It is unacceptable to do all the work to find that the corrective actions are not implemented.

Conclusion

The ruthless violence, squalor, noise, confusion and uncertainty, physical misery and, often intense boredom of war stands out in most accounts one reads. It is clear that even mere existence can be an ordeal. Fighting involves surviving in an alien environment. Whilst resisting the stress that an opponent is attempting to impose on us, we must impose on him so great a degree of physical and morale stress that he is compelled to abandon his objective. For this reason clear doctrine and all that stems from it is an important ingredient in that success. Although many point to the role that luck has to play in defining the outcome of conflict, luck tends to favour those who have prepared both mentally and physically for what they have to do.

In order to ensure that the operation is safe it is necessary to have a sound plan based on thorough analysis (the Safety Case), which needs to be endorsed by the Accountable Manager. The Safety Manager must ensure that armed with this plan he tackles the safety issues with fervour and whilst doing so motivates his team.

Disruptive Passenger - Feedback

On the 10th March 2003 a number of Celtic football supporters appeared in a Welsh court following an incident en route from Spain to Glasgow following a UEFA cap match between Celtic and Celta Vigo.

The privately chartered jet aircraft with 148 supporters on board made an emergency landing at Cardiff International Airport in December last year when cabin crew were confronted by what was described as “ugly scenes in the cabin”. The fans were greeted by 60 police, fire crews and paramedics on arrival.

Four supporters admitted charges including being drunk on board an aircraft and behaving abusively. They were together fined almost £700 including costs. Fortunately there was no serious injury to the cabin staff.

It is hoped that supporters of sporting teams will take note of this court action and that they will moderate their behaviour on future trips.

Universities Collaborate in Risk Perception Project

by Simon Bennett

The Engineering and Physical Sciences Research Council (EPSRC) has awarded the University of Bath and University of Leicester a 'Network Grant' to promote academic and industry collaboration in the matter of 'Risk Perception and Assessment in Design.'

The grant, amounting to £59,000, will pay for an administrator (to be based at Bath) and a series of regional seminars that will bring academia and industry together to share knowledge and insights.

Three seminars will be held in each of the project's three years. The overall purpose is to bridge the 'cultural gaps' between academia and industry, and between the social and natural sciences. The premise is that engineers, architects, ergonomists, sociologists, psychologists and others can share knowledge, information and skills to the mutual benefit of their respective disciplines and social roles.

For example, a major concern of both natural and social scientists is how to secure high-risk technological systems. Engineers often design and install additional safety back-ups to support the human operator. However, human nature being what it is, these back-ups can encourage or 'induce' the operator to disengage from the system. This leads to the negation of any safety benefit bestowed by the safety back-up and may make the system less safe.

Social science has much to say about human responses to systems intended to provide 'defence-in-depth. ' Of direct relevance is the social science theory of 'risk compensation.' This predicts that because the level of safety in any system tends towards 'homeostasis', new systems that improve safety margins encourage operators to disengage from supervisory duties. Feeling safer, the operator calculates that less effort is required on their part. They become more 'technology dependent'. The question of how safety engineers can retain the operator's attention, participation and commitment is one of the crucial safety-related questions that will be explored in the seminar series.

The project will be directed by Dr Jerry Busby and Dr Chris McMahon, both from the University of Bath's Department of Mechanical Engineering, with Dr Simon Bennett from the University of Leicester's Scarman Centre providing a social science perspective on engineering design issues and organising the University of Leicester's input. Dr Busby and Dr McMahon are leading lights in the study of engineered safety systems. Dr Bennett theorises on the social shaping of technology (SST) and sociology of scientific knowledge (SSK).

The seminars will commence in June 2003. There will be a number of outputs including, most importantly, a purpose-built website that will (to quote the Proposal to the EPSRC) "Maintain a database of the seminar proceedings; operate a discussion forum; establish an accumulating bibliography; keep records of members' details; provide regularly updated intelligence on funding sources and incorporate a portal to work going on in the area." In short, the website will provide 'common ground' for natural and social scientists to share ideas and insights in the matter of risk perception and assessment in design.
Says Dr Bennett: "This is a ground-breaking initiative intended to sweep away arbitrary and dysfunctional barriers between natural and social science in the matter of design. Each tradition has much to learn from the other. I am convinced that this dialogue will provide for safer technological systems. What better motivation can there be for academic research?"

Further information can be obtained from Dr Simon Bennett at the Scarman Centre, University of Leicester at sab22@le.ac.uk

UK FLIGHT SAFETY COMMITTEE

ANNUAL SEMINAR 2003

AVIATION SAFETY - THE BALANCE BETWEEN COST AND VALUE

29th/30th September 2003

The Radisson Edwardian Hotel Heathrow

Seminar Objective

Safety Management can be seen as expensive for all forms of Industry. Regulatory obligations notwithstanding, there are many choices that could be made. This Seminar will examine how value judgements are made and attempt to demonstrate how 'Best Practice' need not be 'Cost Prohibitive'.

Programme

29TH SEPTEMBER 2003

1530 – 1700 Registration
This will take place in the Hotel Foyer

2000hrs Seminar Dinner
After Dinner Speaker - **Mike Smethers - Dft**

30TH SEPTEMBER 2003

0800 – 0900	Registration	1210 - 1240	Discussion
Session Chairman - **Ian Crowe, Willis**		1245 – 1400	*Lunch*
0900 – 0910	Welcoming Introduction **John Dunne, Chairman UKFSC**	1400 – 1430	A Manufacturer's View **Thor Johansen - Boeing**
0910 – 0940	Keynote Speech **Mike Hirst - Loughborough University**	1430 –1500	Economic Considerations in Designing for Safety **Kwok Chan/Mike Carver** **Airbus S.A.S**
0940 – 1020	Regulatory Minima **Dave Chapman/Dave Wright - CAA**	1500 –1530	Development & Use of Non-Mandatory Safety Tools & the Benefits **John Savage - BA**
1020 – 1050	Board Decisions Cost v Benefits **Dave Henry - Consultant**		
1050 – 1110	*Refreshment Break*	1530 -1550	Discussion & Summary **Simon Phippard** **Barlow Lyde & Gilbert**
1110 – 1140	Development of an Affordable System **Mike Wood - flybe. british european**		
1140 – 1210	Examples from the Space Industry **Philip Smaje/Ian George - InSpace**	1550 -1600	Closing Remarks **John Dunne, Chairman UKFSC**

SEMINAR INFORMATION

- **Hotel Accommodation**

  Hotel Accommodation is not included in the Seminar Registration Fee. A rate of £145 (including breakfast & VAT) has been negotiated with the Radisson Edwardian Hotel (valid only until 22nd August). If you require accommodation please contact the hotel directly on Tel:(+44 (0) 20 8759 6311) and quote Block Booking Code 0929 UKF when making your reservation.

- **Seminar Dinner**

  Dress for Dinner – Black Tie

- **Cancellations/Refunds**

  Cancellations received prior to 22nd August 2003 will be refunded 50% of registration 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: ☐ £150 UKFSC Member ☐ £200 Non-UKFSC Member

This includes the Seminar Dinner on the evening 29th September, lunch, refreshments and car parking. This does not include hotel accommodation – **please see 'Seminar Information' above.**

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 29th September? Yes ☐ No ☐
- Do you require a Vegetarian alternative? Yes ☐ No ☐

PLEASE SEND YOUR COMPLETED REGISTRATION FORM WITH YOUR CHEQUE TO:

UK Flight Safety Committee, Graham Suite, Fairoaks Airport, Chobham, Woking, Surrey, GU24 8HX
Tel No: +44 (0) 1276 855193 Fax No: +44 (0) 1276 855195 e-mail: ukfsc@freezone.co.uk

Confirmation will be faxed to you on receipt of your Registration Form and payment.

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