Attitude Indicator

Quarterly Safety Newsletter

Message from Flight Safety Officer

Vision Air International is highly proud to be having carried out successful international Charter Operations for last six years. Apart from fleet of B737s, in 2011 we included a B747-200F aircraft on our AOC. With the induction B747 in to our fleet we have carried out plenty of cargo flights to and from Johannesburg, Nairobi, Bahrain, Baghdad, Aden, Mombasa and Muscat. By the grace of Allah Almighty, Vision Air International is in the process of inducting more B747s in to its fleet, which shall make Vision Air International a leading international Charter operator in Pakistan with the capacity of further expansion of its business. Vision Air is also in the process to commence air operations from Dubai.

We are also pleased to publicize that Vision Air International's surely stands up to the required international quality/safety and operational standards, as it has recently received an exceptional audit evaluation report from MBA, which is one of the world's seven leading auditor companies approved by IOSA. Vision Air audit by MBA was a third party audit, which was done on the expanses of our international client " The NAC" (National Air Cargo) from USA, which is extending air freight service to US lead NATO Forces around the globe. Here for the awareness of Vision Air crew and our vendors I have made an effort to present Human Factor problems contributing towards flight safety with special emphasis on human factor issues markers for better learning of aircrew.

With the increase in intensity of our flight operations with international community, we are seriously concerned to our flight safety and quality assurance program. Our Company's ultimate goal is to be safe and efficient in the world of aviation to satisfy the standards of our reputed international vendors. To keep up safety and quality standards Vision Air has incorporated in its Safety management program the independent operational and line management activities, which are being closely monitored by our safety staff to find and analyze information useful to identify operational hazards. We also have the process for investigation of internal irregularities, non-conformities and significant safety issues to identify hazards and to arrange corrective training for crew and staff to avoid human factors. Therefore for our reader this 4th quarterly safety news letter is presented to become aware of Human Factor study in aircraft accidents.

By:
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Vision Air International

HUMAN FACTOR IN AIRCRAFT ACCIDENTS

INTRODUCTION.

To understand the effect of human factors in aviation accidents we have to know the theory and history of Human Factors in Aviation and relate it to your job function. To minimize human factors it is imperative to manage the consequences and organizational impact of Human Factors for all aviation roles. The humans are; pilots, cabin crews, air traffic controllers, CAA, airport and aircraft maintenance staff, aircraft manufacturers and meteorologists.

I see human factors issues as they relate to incidents and accidents and considered essential elements to develop relative prevention strategies and personal lines-of-defense. Through universal studied of incidences and accidents it has been established that ultimately, human factors are involved in all incidents and accidents.

Whether crew-related, ATC-related, maintenance-related, organization-related or design-related; incidents / accidents, each link of the safety chain involves human beings, therefore, human decisions and potential human errors are the contributory factors. The chain is as strong as its weakest link; human factors need to be addressed in all domains (i.e., design, manufacturing, operations, maintenance and air traffic control).

The study performed by NASA ASRS in 1993 reveals that more than 60 % of incidents have their origin in the pre-flight phase of operations. These incidents were found to be the result of a perceived time-related pressure resulting in rushed actions and errors, and this condition is usually referred to as the “hurry-up syndrome”. Overall, high workload is a factor in 80 % of incidents and accidents resulting from crew errors.

HUMAN FACTOR ISSUES IN OPERATIONAL EVENTS

Operational and Human Factors Markers:

The operational and human factors analysis of operational events (as performed by Airbus) is based on a set of markers that are used to qualify the contribution of each operational and human factor to a given event. These markers are grouped into four clusters and nineteen domains, as follows:

- **Situation recognition and crew diagnosis:** Cockpit alerts, other cockpit / cabin effects, crew diagnosis, human-machine-interface aspects.
- **Procedures:** Type of procedure, access to procedure and procedure contents.
- **Human performance:** Execution of procedure by flight crew, other crew actions, threat management, crew-error management, aircraft attitude / flight path control and crew coordination.
- **Operating environment and circumstances:** Operational environment, weather conditions, runway conditions, aircraft systems condition / configuration, crew factors and organizational factors.

The observation of individual factors or patterns of factors involved in operational events is used to identify contributory factors and lessons-learned in to design procedures and training. These lessons-learned, along with the lessons-learned stemming from industry’s studies and incidents or accidents investigation reports, have been used to illustrate the various Flight Operations Briefing Notes. The following paragraphs have been extracted from Flight Operations Briefing Notes of an expert that contain reference to human factors issues, these notes are:

1. **Standard Operating Procedures (SOPs) :**

To ensure effective compliance with published SOPs associated normal checklists and standards calls, it is important to understand why pilots deviate from rules or standards. Pilots rarely deviate intentionally from SOPs (i.e., violation of SOPs), in most cases the procedure that was followed in place of the published procedure (i.e., deviation from SOPs) seemed to be more appropriate for the prevailing circumstances. Considering the information available following factors and conditions often are cited in discussing deviations from SOPs:

- Task saturation (i.e., task overload);
- Inadequate knowledge of and/or failure to understand the rule, procedure, quality of training, quality of wording or phrasing, perception of rules/procedure and action as inappropriate;

- Insufficient emphasis on strict adherence to SOPs during transition training and recurrent training;
- Lack of vigilance (e.g., fatigue);
- Distractions (e.g., due to cockpit activities);
- Interruptions (e.g., due to pilot/controller communications);
- Incorrect management of priorities (i.e., absence of decision-making model for time-critical situations);
- Reduced attention (tunnel vision) in abnormal or high-workload conditions;
- Incorrect CRM techniques (i.e., for effective cross-check, crew coordination or backup);
- Company policies (e.g., regarding schedules, costs, go-around and diversion events);
- Other policies (e.g., crew duty time);
- Personal desires or constraints (i.e. personal schedule, focus on mission completion);
- Complacency; that crew is contented and self-satisfied.
- Overconfidence; and/or,
- High time on aircraft type (i.e. condition possibly conducive to complacency and overconfidence).

2. **Use of Automation:**

Errors in using and managing automatic flight systems and/or lack of awareness of operating modes are observed as causal factors in more than 20 % of approach-and-landing accidents and near-accidents.

These factors can result in flying an unintended flight path, which - if not recognized - can cause a less-than-desired terrain separation or a CFIT.

The following common errors in handling auto-flight systems can increase the risk of accident during any flight phase, but particularly during approach-and-landing:

- Inadvertent selection of an incorrect mode;
- Failure to verify the selected mode by reference to the flight mode annunciator (FMA);
- Failure to arm a mode when required (e.g., failure to arm the localizer or approach mode, when cleared for LOC or ILS interception);
- Failure to select a required guidance target (e.g., failure to set the ILS final approach course);
- Inadvertent change of a guidance target (i.e., changing the speed target instead of changing the selected heading);
- Selection of an incorrect altitude and failure to confirm the selection

on the primary flight display (PFD);
- Selection of the altitude target to any altitude below the final approach intercept altitude during approach;
- Preoccupation with FMS programming during a critical flight phase, with consequent loss of situational awareness; and/o failure to monitor the automation, using raw data.
- Lack of situational / positional awareness;
- Interaction with automation, overreliance on automation and lack of crew crosscheck.

3. Briefings :

The importance of briefings and briefing techniques often is underestimated, although effective briefings contribute to enhance crew standardization and communication.

The routine and formal repetition of the same points on each sector may become counterproductive; adapting and expanding the briefing by highlighting the special aspects of the approach or the actual weather conditions and circumstances of the day result in more lively and effective briefings.

In a nutshell, briefings should attract the attention of the PNF. Briefings should help both the PF (giving the briefing) and the PNF (receiving and acknowledging the briefing) to understand the sequence of events and actions, the safety key points, specific threats / hazards and circumstances of the takeoff, departure, cruise segment, approach and landing.

An interactive briefing fulfills two important goals of the briefing: provide the PF and the PNF with an opportunity to share a common action plan; and set priorities and task sharing.

4. Pilot / Controller Communications :

Effective communication is achieved when our mental process for interpreting the information contained in a message accommodates the message being received. This mental process can be summarized as follows:
- How do we perceive the message?
- How do we reconstruct the information contained in the message?
- How do we link the information to an objective or an expectation? and,
- What bias or error is introduced in this process?

Crew Resource Management (CRM) researches highlight the importance of the context and expectations in this mental process. The following factors may affect the correct understanding of communications:
- High workload;
- Fatigue;
- Non-adherence to “sterile cockpit” rule;
- Distractions;
- Interruptions; and/or,
- Conflicts and pressures.

This may result in to incomplete communications, omission of call sign and/or use of an incorrect aircraft call sign, use of nonstandard phraseology and/or failure to listen or respond.

5. PF / PNF Communications :

Interruptions and distractions in the cockpit break the flow pattern of ongoing cockpit activities and cause disruption in actions or communications such as:
- Disregard to SOPs (Standard Operating Procedures)
- Take no notice of Normal checklists;
- Communications (i.e., listening, processing, responding);
- Monitoring tasks; and/or,
- Problem solving activities.

The diverted attention resulting from the interruption or distraction usually leaves the flight crew with the feeling of being rushed and being faced with competing or preempting tasks. Unless mitigated by adequate techniques in order to set priorities, this disruption and lapse of attention may result in:
- Not monitoring the flight path (possibly resulting in an altitude or course deviation or a controlled flight into terrain);
- Missing or misinterpreting an ATC instruction (i.e., possibly resulting in a traffic conflict or runway incursion);
- Omitting an action and failing to detect and correct the resulting abnormal condition or configuration, if interrupted during a normal checklist (e.g., altimeter setting); and/or,
- Leaving uncertainties unresolved (e.g., regarding an ATC instruction or an abnormal condition).

6. Altimeter Setting and Altitude Deviation Issues:

The incorrect setting of the altimeter reference more often resulting from one or more of the following:
- High workload;
- Inadequate pilot/system interface;
- Incorrect pilot/controller communication;
- Deviation from normal task sharing;
- Interruptions and distractions; and/or,
- Absence of effective backup between crewmembers.

Strict adherence to the defined task sharing (for normal, abnormal/emergency conditions) & correct use of normal checklists are the most effective lines-of-defense against altimeter setting errors.

7. Rushed and Un-stabilized Approaches :

The following circumstances, factors and errors often are cited when discussing rushed and un-stabilized approaches:
- Fatigue, regardless of short/medium-haul or long-haul operation; this highlights the need for developing countermeasures to restore the level of vigilance and alertness for the descent, approach and landing;
- Pressure of flight schedule (e.g., making up for takeoff delay).
- Any crew-induced or controller-induced circumstance resulting in insufficient time to plan, prepare and execute a safe approach; this includes accepting requests from ATC for flying higher and/or faster than desired and/over flying shorter routings than desired.
- Insufficient ATC awareness of crew or aircraft capability to accommodate a last-minute-change;
- Late takeover from automation (e.g., in case of AP failing to capture the GS, usually due to crew failing to arm the approach mode);
- Lack of awareness of tail wind component;
- Incorrect anticipation of aircraft deceleration characteristics in level-flight or on a 3-degree glide slope;
- Failure to recognize excessive parameter-deviations or to remember the excessive-parameter-deviation criteria;
- Belief that the aircraft will be stabilized at the stabilization height or shortly thereafter;
- PNF excessive confidence in the PF in achieving a timely stabilization;
- PF/PNF excessive reliance on each other in calling excessive deviations or in calling go-around; and/or,
- Visual illusions during the acquisition of visual references or during the visual segment.

8. Runway Excursions and Overruns :

The following factors are recurrent in runway excursions and overruns (i.e., highlighting human factors involving controllers, flight crew and maintenance personnel alike):

- No go-around decision, when warranted;
- Inaccurate weather information on surface wind and/or wind shear; and/or runway condition.
- Incorrect assessment of crosswind limit for prevailing runway conditions;
- Incorrect assessment of landing distance for prevailing wind and runway conditions or following a malfunction affecting the configuration or braking capability;
- Captain (when PNF) taking over control and landing following the call or initiation of a go-around by the First Officer (as PF);
- Late takeover from automation, when required (e.g., late take over from auto brake in case of system malfunction);
- Inoperative equipment not accounted for per MEL (e.g., one or more brake being inoperative); and/or,
- Undetected thrust asymmetry (i.e., forward / reverse asymmetric thrust condition).

9. Adverse Wind / Crosswind Landing :

The following human factors often are cited in discussing events involving adverse wind and / or crosswind conditions:

- Reluctance to recognize changes in landing data over time (e.g., wind direction shift, wind velocity change or wind gustiness increase);
- Seeking any evidence to confirm the initial information and initial options (i.e., reluctance to change pre-established plans);
- Reluctance to divert to an airport with less crosswind conditions; and/or,
- Lack of time to observe, evaluate and control the aircraft attitude and flight path in a highly dynamic situation.

KEY POINTS TO ADDRESS HUMAN FACTOR

- Defined company safety culture and policies;
- Related prevention strategies;
- Robust standard operating procedures;
- Effective CRM practices; and,
- Personal lines-of-defense.

HOW CAN WE ASSURE SAFETY?

Air safety is a term, which encompasses the theory, investigation and categorization of flight failures and the prevention of such failures. The management of safety is a documented process for managing risks that integrates operations and technical systems with the management and the management has to ensure that the human and the equipment are safely maintained. To achieve this, there is a definite requirement to maintain a safety management system. A safety management system shall include:

- Safety policy on which the system is based.
- Process for setting goals for the improvement of aviation safety and for measuring the attainment of those goals.
- Process for identifying hazards to aviation safety and for evaluating and managing the associated risks.
- Process for ensuring that personnel are trained and competent to perform their duties.
- Process for the internal reporting and analyzing of hazards, incidents and accidents and for taking corrective actions to prevent their recurrence
- Documents containing all safety management system processes and a process for making personnel aware of their responsibilities with respect to them.
- Process for conducting periodic reviews or audits of the safety management system and reviews or audits for cause of the safety management system; and
- Any additional requirements for the safety management system that are prescribed under these Regulations.

REGULATORY REFERENCES

- ICAO – Annex 6 – Operation of Aircraft, Part I – International Commercial Air Transport Airplanes, Appendix 2, 15.
- ICAO – Procedures for Air navigation Services – Aircraft operations (PANS-OPS, Doc 8168), Volume I – Flight Procedures (Post Amendment No 11, applicable Nov.1/2001).
- ICAO – Accident Prevention Manual (Doc 9422).
- ICAO – Human Factors Training Manual (Doc 9683).
- ICAO – Human Factors Digest No 8 – Human Factors in Air Traffic Control (Circular 241).
- FAR 121.406, 121.419, 121.421 or 121.422 - CRM Training for pilots, flight attendants and aircraft dispatchers.
- JAR-OPS 1.945, 1.955 or 1.965 - CRM Training.
- Ovivis, conlocum iam senterfer quitatum in ser ius aucons rei sum pro mus nonsum dem, num terem nihiliam dium pritus, quastus, qua noctam telissa portur. Mulabes ictora, se rei sendi, cleserox morei publinp raris.
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