BARS
BASIC AVIATION RISK STANDARD
FLIGHT SAFETY FOUNDATION

FLIGHT SAFETY FOUNDATION

Basic Aviation Risk Standard Implementation Guidelines

Volume One

Version 4

ICMM
International Council on Mining & Metals

ICMM supports the use of the Basic Aviation Risk Standard (BARS) to improve aviation safety. BARS is specifically aimed at contributing to improved aviation safety in the extractive industries and was developed by the Flight Safety Foundation in conjunction with a number of extractive industry companies, including several ICMM member companies.

The standard is developed from a risk-based model framed against the actual threats posed to aviation operations which are then directly linked to associated controls and recovery and mitigation measures. BARS is a useful resource for any organization wanting to develop new flight safety requirements or review existing ones.

"Risk management is a more realistic term than safety. It implies that hazards are ever-present, that they must be identified, analyzed, evaluated and controlled - or rationally accepted."

Jerome Lederer (1902–2004), founding director Flight Safety Foundation

BARS IMPLEMENTATION GUIDELINES – VOLUME 1

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A. Introduction

A.1 Purpose

The Flight Safety Foundation (FSF) Basic Aviation Risk Standard was developed as a resource industry-supported safety standard aimed at resource sector aviation operations.

The BARS Implementation Guidelines complement the standard by providing additional context to the controls and defences presented against each threat. As a reference document, it assists resource Companies ('Company'), Aircraft Operators ('Operator') and BARS Registered Audit Companies in understanding what evidence is required to validate the control and defence design and operating effectiveness. These guidelines will assist both the Operator and the Company with the implementation of the BAR Standard in any aviation operation supporting the resource sector.

All national and international regulations pertaining to aviation operations must always be followed. The detail contained in the Standard and this guidance material is intended to supplement those requirements.

A.2 Document Structure

The BAR Standard is a risk-based standard that emphasizes the relationship between threats, controls required to prevent an event and mitigation measures.

The guidelines are presented in two parts. Volume 1 covers threats and controls applicable to all aircraft operations. Volume 2 addresses the role specific requirements peculiar to certain parts of the resource sector, such as external load and off shore operations.

These guidelines use the same risk-based format and same sections and control numbering as the BAR Standard to provide ease of cross-referencing. The information provided for every BARS Control is presented in this document in the following format:

0.0 Basic Aviation Risk Standard (BARS) Control Title

BARS Audit Checklist reference

Details the control as written in the BAR Standard.

Information to provide further context and background to the control, threat or defence that is being addressed by the subsection.

Expected manner in which the issue had been addressed by the Aircraft Operator (documents, procedures etc) which permit an assessment of whether the subject has been adequately addressed and implemented.

References presented as a 'quotation' are intended to highlight those aspects of particular relevance to resource Companies ('Company').

A.3 Variances

Any variance to the use of the BAR Standard is at the discretion of the resource Company in consultation with the Aircraft Operator. Nevertheless, it is recommended that any variance raised be risk-assessed to demonstrate that the risks are tolerable and warrant the safe continuation of operations. A schematic of the process is outlined in Figure 1.

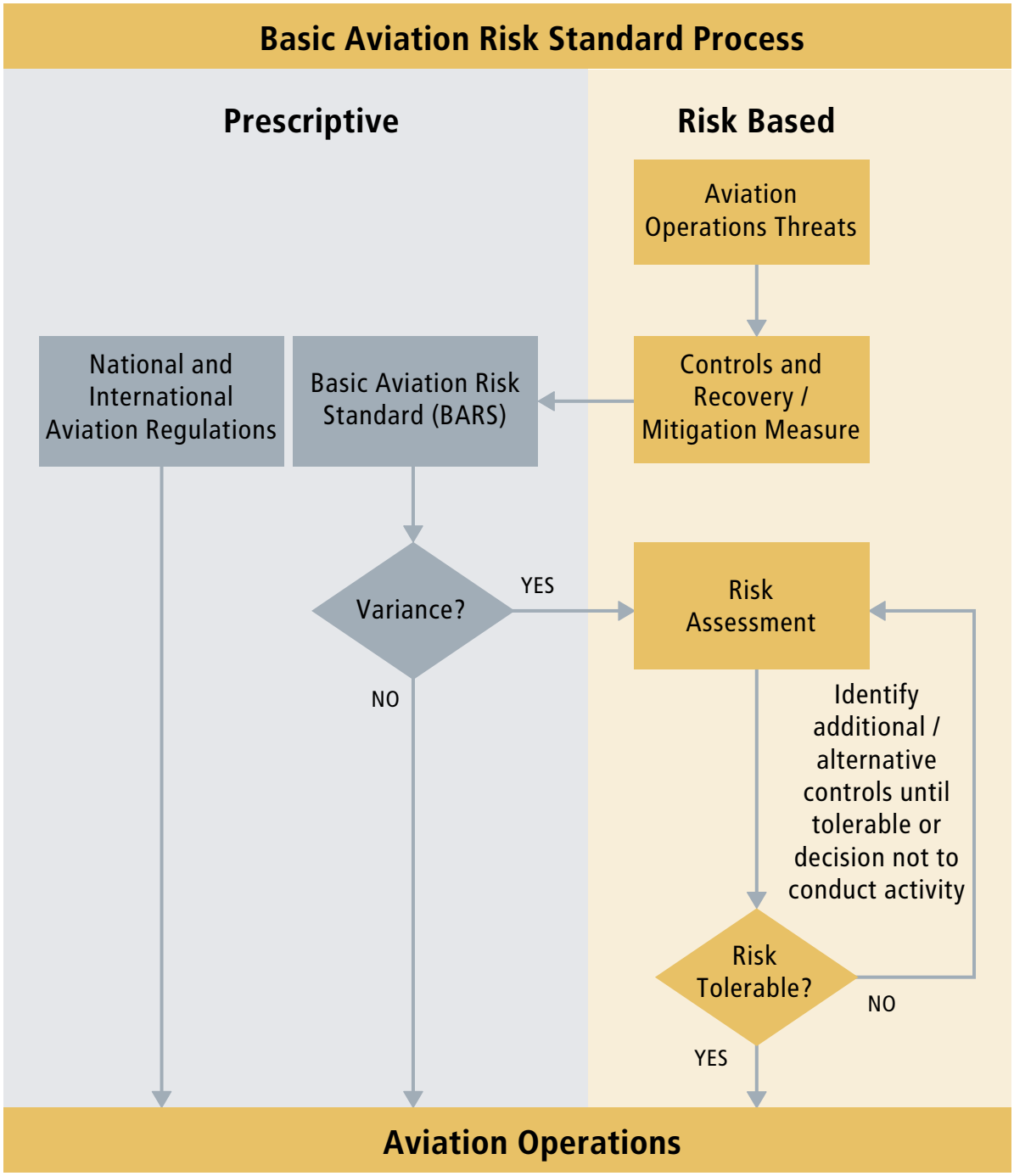


Figure 1: Variance Process

B. Audit and Operational Review

B.1 Two-dimensional Approach to Aviation Risk Management

To reinforce the difference between a BARS Audit and an Operational Review, an example of a two-dimensional approach to aviation risk management is presented in Figure 2.

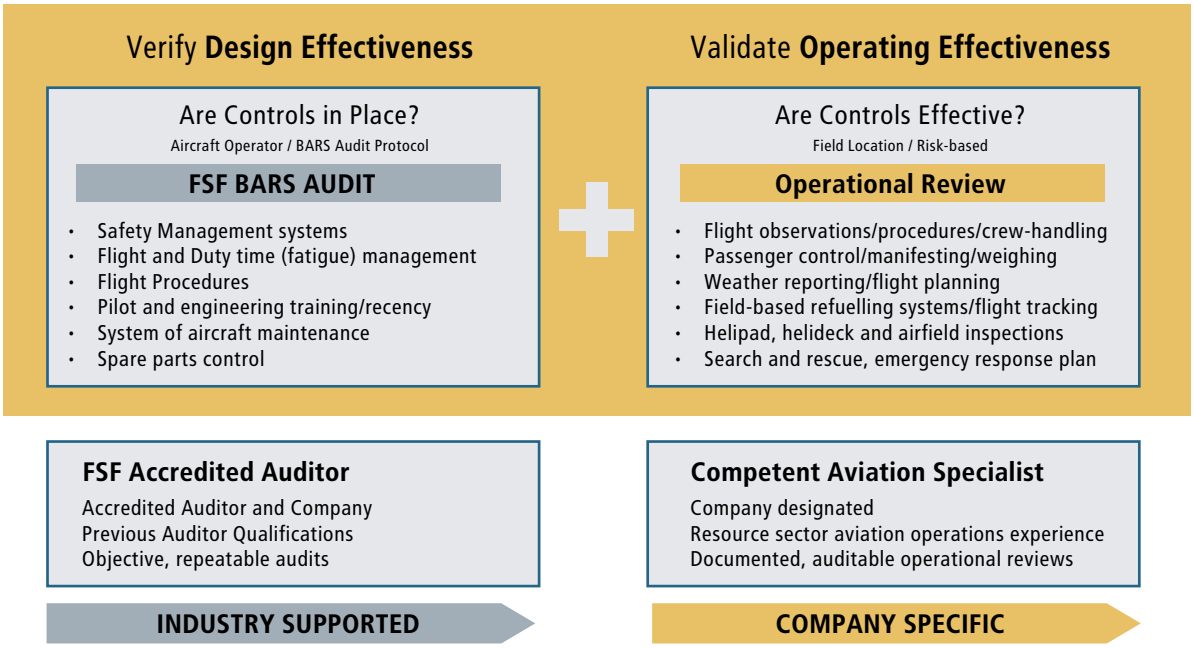


Figure 2: Two-dimensional approach to aviation risk management

The FSF BARS Audit ascertains 'design-effectiveness'. It is an objective and transparent Audit of the Aircraft Operator using FSF trained and accredited Auditors and a defined Audit protocol mapped to the BAR Standard. The Operational Review assesses control-effectiveness and is risk-based, focusing on Company specific activities. It is not always essential or practical to perform an Operational Review and tends to be associated with long-term contracts particularly in hostile conditions and/or conducting role specific activities (such as helicopter external load operations). The conduct and frequency should be determined by the resource Company in consultation with aviation specialist advice.

B.2 BARS Accredited Audit

A BARS Audit using accredited Audit companies and accredited Auditors provides an Audit of the operations and technical management systems of an aviation operator. It is a deep-dive Audit using accredited Auditors to clearly articulate and verify what procedures, processes and systems the aircraft operator has in place.

B.3 Company Specific Operational Review

An Operational Review is Company specific, and entirely at the discretion of the resource Company using in-house or contracted specialists and is not always necessary or practical. The Operational Review does not repeat the management systems portion of the BARS Audit, but is a risk-based focus on the relevant threats to a particular aviation activity. The Operational Review is conducted as a field-based activity to ensure that standards and practices reviewed during the BARS Audit are also embedded into actual operations supporting the resource sector.

1.0: All Threats: Common Controls

Common controls that apply to all threats outlined in the BAR Standard

Threats to aviation must be managed in an ongoing and continuous manner to provide the necessary assurance for continued safe operations at all times.

A risk-based standard provides the ability to identify those critical controls essential to be effective in order to prevent an incident from occurring. Those controls are outlined in the BAR Standard.

Some controls have a single role to play in managing a specific threat. There are however, a number of controls required to be effective against all threats encountered in resource sector aviation operations. These common controls are discussed further in this section.

1.1: Approved Aircraft Operators

Only appropriately licensed aircraft operators who have been reviewed and endorsed for use by a competent aviation specialist are to be used in support of Company activities.

An Operator must be in possession of a valid Air Operator Certificate (AOC) or equivalent document issued by the responsible regulatory authority of the state of the Operator.

The issue of an AOC by the responsible regulatory authority will require the Operator to demonstrate an adequate management organization structure, method of control and supervision of flight operations, training programs as well as ground handling and maintenance arrangements appropriate for the operations specified.

The Operator shall have clearly defined roles and responsibilities for the following positions, or their equivalent:

- Head of Flight Operations; and
- Head of Check and Training.

Where required by the state of the Operator, the persons appointed to these key positions shall be approved by the responsible regulatory authority.

The Operator should have documented Job Descriptions for the key positions including; roles and responsibilities, reporting lines and interfaces.

Where applicable, the responsible regulatory authority should provide the Operator with a copy of any document approving a person to a key position.

The Operator has a person appointed and approved in all key positions, and the organizational structure reflects the accountabilities and level of responsibility assigned to the positions.

1.2: Aircrew Qualifications and Recency

FLT 1.05.01
FLT 1.05.03
FLT 2.01.01
FLT 2.01.02

Aircrew are to meet the minimum experience requirements presented in Appendix 1 of the BAR Standard.

Minimum Qualifications

The Operator shall have a system that ensures all aircrew assigned to participating BARS Member Organization flights have a current license that meets both the minimum requirements defined by the responsible regulatory authority and those specified in Appendix 1 of the BAR Standard.

The Operator shall maintain records of pilot qualifications, complete with copies of flight crew licenses and summaries of experience and type ratings. A documented control mechanism must be in place to ensure that pilots are qualified and experienced to meet the task requirements when assigned to flights.

Information contained on files maintained by the Operator for each individual flight crew should provide a record of flight crew qualifications.

Minimum Experience

The Operator shall have defined selection criteria and procedures for all flight crew appointments, including full-time, free-lance/part-time and casual flight crew. This should include minimum licensing and flying experience criteria.

Key to resource sector operations is the requirement for aircrew to have 12-months experience in topographical areas similar to where the activity is being conducted. The duration of 12-months is aimed at ensuring all seasonal variations are experienced by aircrew enhancing their decision-making process. Examples of specific topographical areas include PNG, South American Andes, Indonesia, Canadian and Russian Federation arctic operations, hostile off shore environments and remote African environments. See page 3 of the BAR Standard for definition of hostile and non-hostile environments.

The Operator shall document minimum experience requirements for all flight crew positions that reflect both the minimum standard for the roles as defined in the BAR Standard and the minimum experience requirements of the local regulatory authority. Where the BAR Standard is not used for all operations, there should be a statement indicating that crew who do not meet the BARS requirements are excluded from BARS operations until such time as the minimum qualification and experience requirements are met.

Information contained on pilot files and rostering records maintained by the Operator should show that the stated BARS requirements have been met or that the individual is excluded from BARS operations until meeting the minimum qualification and experience requirements.

Minimum Recency

The Operator shall not assign a Pilot-in-Command or a co-pilot as operating aircrew on a flight unless they meet the minimum pilot recency requirements of either the BAR Standard or the responsible regulatory authority (whichever is the more stringent).

The Operator shall have a records management system for recording and monitoring all relevant aircrew recency parameters including, but not limited to:

- Day and night take-offs and landings;
- Flight time;
- Instrument flight time;
- Instrument approaches; and
- Requirements of the Operators training and checking program.

The rationale behind minimum recency requirements rests largely on assuring aircrew manipulative skills continue to be of the required standard. Variances to recency skills may be considered when simulator training can be demonstrated as an effective alternative and endorsed by the applicable regulatory authority.

The Operator shall document the method by which recency requirements are tracked. Manual, paper-based systems are acceptable however computer programs that more accurately track the varying limits are readily available and are the preferred option. Where BARS is not used for all operations, a statement indicating that crew who do not meet BARS recency requirements are excluded from BARS operations until such time as these requirements are met.

A paper-based or electronic recency tracking system should be in place with the Operator. Associated records should confirm that pilots are maintaining the required recency in all aspects and that the rostering system has attended to upcoming requirements prior to expiry. Flight crew files and rostering records confirm appropriate implementation.

1.3: Aircrew Check and Training

FLT 1.05.02
FLT 2.01.03
FLT 2.03.01
FLT 2.03.02
FLT 2.05.02

All aircrew shall receive annual recurrent training to the standards of the appropriate civil aviation authorities, and a minimum of two flight checks annually at not less than a frequency of every six months for long-term contracted operations. These flight checks at minimum shall include a combination of a proficiency check (non-revenue) and a route check (revenue-flight permissible).

Where distinct climatic seasons are experienced, such as snow/ice winter conditions, training related to the seasonal change is recommended. Before commencing flight duties in a new location on long-term contract, all crew members shall receive a documented line check that includes orientation of local procedures and environment.

A check and training program shall be provided to ensure that aircrew are provided with appropriate training prior to commencing and while engaged in activities supporting BARS Member Organizations. The program is to assure individual competencies and the Operator's flight standards are being maintained.

Aircrew Check and Training – Personnel

Where the local regulatory authority has provided the Operator with delegated authority to conduct check and training, the Operator shall ensure that selection of personnel is merit-based and they are able to demonstrate consistent application of standards, ethics and objectiveness.

The Operator shall document the minimum experience requirements and selection criteria applicable for positions within the Operator's check and training program. Records should confirm that the documented requirements have been applied in the selection of personnel appointed to positions within the Operator's check and training program, and the method of selection.

The Operator's check and training Captains shall:

- Receive initial and periodic training evaluation;
- Be approved by the responsible regulatory authority; and
- Follow established check and training criteria.

Where possible the crew providing the training should be independent (different) to those conducting the checking of the pilots.

Details of the Operator's check and training program should be published in the Operations Manual and follow established criteria. The syllabuses and procedures for initial training and approval along with the processes for conducting periodic training, evaluation and on-going standardization of check and training pilots should also be documented. Check and training Captains' records should confirm that the documented requirements have been applied in the training, approval and on-going evaluation of personnel appointed to positions within the Operator's check and training program.

Aircrew Check and Training – Program

The Operator shall not assign a Pilot-in-Command or a co-pilot as an operating crew member of a flight unless that person has satisfactorily completed all necessary requirements of the Operator's training and checking program and has been certified by a check pilot as being competent to act as an operating crew member. Such requirements are to be applied to all aircrew likely to be assigned to a BARS Member Organization flight regardless of employment basis (e.g. full-time, free-lance/part-time or casual).

Ground Training

The Operator's flight crew ground training program shall cover all the aspects of normal operations and include:

- Altitude and terrain awareness, including items highlighted in the FSF ALAR Briefing Note 3.2 — Altitude Deviations and Briefing Note 5.2 — Terrain;
- Aircraft performance, including the requirements of the responsible Regulatory Authority, Original Equipment Manufacturer (OEM) and Operator's Standard Operating Procedures (SOPs). This training should address items such as how the performance is calculated and the applicable procedural controls that apply (e.g. obstacle clearance calculations, runway performance, helicopter in-ground/out-of-ground effect performance etc);
- Rejected take-off, including runway performance theory to provide an increased understanding of V speeds and how Balanced Field Length/Rejected Take-Off criteria are determined;
- Understanding of Performance Class 1. Class 2, Class 2 Enhanced and Class 3 performance with Category A and B certified helicopters. An understanding of flyway performance for on shore operations and profiles for off shore operations;

- All instrument approaches used by the Operator, including instrument approach aids and procedures that are in use in the Operator's area of operation; and
- English Language Proficiency for aircrew where it is deemed necessary by the local regulatory authority and where international operations are being conducted. Where applicable, the program should provide assessment and where required, training, to the standard required by International Civil Aviation Organization (ICAO), Standards and Recommendation Practices (SARPs), to ensure that all flight crew hold a minimum English Language Proficiency qualification of ICAO Level 4.

Syllabus of training for these topics should be published in the Operations Manual and follow established check and training criteria. The syllabus for initial training and processes for conducting periodic training and on-going evaluation should also be documented. Pilot training records should confirm that these training requirements have been applied in the induction training of new pilots and where applicable, in the on-going evaluation of pilot competency.

Flight Training

The Operator's check and training program shall provide for initial and recurrent training and a minimum of two flight checks annually, at a frequency not greater than once every six months. These flight checks, as a minimum should include a combination of a proficiency check (non-revenue) and a route check (revenue-flight permissible).

Details of the Operator's check and training program should be published in the Operations Manual and follow established check and training criteria. The documented program should cover requirements and procedures for initial training and approval along with the processes for conducting periodic recurrent training and checking. Pilot training records should confirm that the requirements of the training program have been applied in the induction training of new pilots and the on-going evaluation of pilot competency.

Courtesy: Karratha Flying Services

Aircrew Check and Training – Procedures

Documentation of the Operator's check and training program shall cover all requirements and procedures relating to pilot training, and on-going evaluation of pilot competency.

The Operator's documentation must provide details of all ground training and flight training that are relevant to the operations. The documentation must also provide adequate guidance to check and training staff regarding the acceptable standards for flight crew performance along with the policy and procedures for dealing with unsatisfactory flight crew performance.

A system should be established by the Operator to ensure that records are maintained of all training and checking sequences that flight crew have been subject to (both ground and flight training) and the associated outcomes.

Details of the Operator's check and training program should be published in the Operations Manual and follow established check and training criteria. The syllabus and procedures for conducting initial and recurrent ground and flight training along with guidance regarding the acceptable standards for flight crew performance and policy and procedures for dealing with unsatisfactory performance should be documented.

Pilot training records shall be available and confirm that the documented requirements of the Operator's training and checking program have been applied consistently in the training and on-going evaluation of flight crew performance.

Aircrew Check and Training – Synthetic Flight Training

If the Operator utilizes flight simulators and training devices as a component of its training and checking program, it shall ensure that these are appropriately configured to reflect the Operator's applicable aircraft type(s) and have been approved by the responsible regulatory authority.

Where the Operator's check and training program utilizes flight simulators, the Operations Manual shall contain documented procedures for their use. The documented program should follow established criteria and cover requirements and procedures for the use of simulators in the conduct of initial and recurrent check and training.

Pilot training records shall confirm that requirements of the training program applicable to the use of flight simulators have been appropriately applied in the initial and recurrent training of pilots and the on-going evaluation of pilot competency.

The Operator should be able to demonstrate the regulatory approval of the flight training device.

1.4: Maintenance Personnel Qualification

MNT 1.01.03
MNT 1.01.04

Maintenance personnel are to meet the minimum experience requirements detailed in Appendix 1 of the BARS Standard.

The Operator and/or maintenance service provider shall ensure its Maintenance Controller, Chief Engineer and all other line maintenance personnel meet the minimum qualification and experience requirements prescribed by the local regulatory authority and the BAR Standard.

Oversight of maintenance service providers is critical for ensuring standards and expectations of the Aircraft Operator are being met.

The Operator and/or maintenance service provider shall document the minimum qualification and experience requirements and selection criteria applicable to applicants for all technical positions within the Maintenance Organization.

Records should confirm that the documented requirements have been applied in the selection of personnel appointed to positions within the Maintenance Organization and where required, the responsible regulatory authority has approved the individual appointed to a position.

1.5: Maintenance Training

MNT 1.04.01
MNT 1.04.02
MNT 1.04.03
MNT 1.04.04
MNT 1.04.05
MNT 1.04.06
MNT 1.04.07
MNT 1.04.08
MNT 1.04.09
MNT 1.04.11

The aircraft operator or maintenance service provider shall establish a recurrent training program for maintenance personnel at periods not exceeding three years. The training should at least include human factors in maintenance and company maintenance documentation and procedures, and where appropriate include technical components for aircraft and systems being maintained.

The Operator and/or maintenance service provider shall ensure that initial and recurrent maintenance training is provided to all applicable maintenance personnel, including the following topics:

- Aircraft specific training when new equipment is introduced;
- Human factors in maintenance;
- All relevant maintenance documentation including engineering procedures;
- Technical components for aircraft and systems being maintained; and
- Minimum Equipment List (MEL) training.

Syllabus of training and/or details of training arrangements for these topics should be published in the relevant maintenance manual.

Staff qualifications and experience and dates on which initial and recurrent training requirements were completed should be established.

Personnel training records shall record details of dates on which staff qualifications, training and/or experience lapse.

Where outsourced maintenance is in place, the Operator shall provide detail on how they ensure that the maintenance service provider is completing all necessary maintenance activity to the Operator's required standard. Audit records and maintenance documentation at a minimum should provide evidence of the work being performed and the oversight mechanisms in place.

1.6: Basic Aircraft Equipment Fit

MNT 2.08.01
MNT 3.01.01
MNT 3.04.01

Aircraft basic equipment fit shall meet the minimum requirements presented in Appendix 2 of the BARS Standard.

When operating for a BARS Member Organization, the Operator shall ensure that in addition to the minimum equipment that is required to be fitted to an aircraft by the responsible regulatory authority, aircraft are fitted or equipped with the equipment listed in Appendix 2 of the BAR Standard as application to their aircraft and operations.

The Operator shall provide documentation that acknowledges the requirements for the fitment of the minimum equipment listed in Appendix 2 of the BAR Standard for all relevant aircraft and operations.

1.7: Drug and Alcohol Policy

FLT 1.02.13

The aircraft operator shall have a Drug and Alcohol policy which meets all requirements of the local regulatory authority when such requirements exist. When no such regulatory requirements exist the operator shall at minimum meet the requirements of the contracting Company.

Aircraft Operators should have a documented and formal Drug and Alcohol policy that clearly articulates the minimum acceptable level of compliance. Guidance regarding the effects of readily available medications and drugs should be provided.

Details of the Operator's Drug and Alcohol Policy and the associated drug and alcohol management plan (where required by the local regulatory authority), should be published in the Operations Manual or other applicable manual. The Policy and plan shall cover all persons involved in safety sensitive aviation activities.

Records should confirm that applicable requirements of the drug and alcohol monitoring program are being routinely applied in relation to persons involved in safety sensitive aviation activities.

1.8: Flight Time Limits

FLT 1.04.01
FLT 1.04.02
FLT 1.04.03
FLT 1.04.04
FLT 1.05.04

Unless local regulatory requirements are more stringent, the flight time limits detailed in the BAR Standard are to be applied.

Single Pilot	Dual Pilot
8 hours daily flight time	10 hours daily flight time
40 hours in any 7-day consecutive period	45 hours in any 7-day consecutive period
100 hours in any 28-day consecutive period	120 hours in any 28-day consecutive period
1000 hours in any 365-day consecutive period	1200 hours in any 365-day consecutive period

Resource sector aviation operations may result in aircrew conducting tours of duty rotational in nature and extended in duration. In such circumstances, any flying undertaken during the break time away from the touring location should be appropriately recorded and informed to the Operator for their tracking and awareness.

Details of the Operator's fatigue management program should be published in the Operations Manual and be either specifically approved by the responsible Regulatory Authority or in compliance with that Authority's prescriptive fatigue management regulations. The documented program should cover daily, weekly, monthly and annual flight time limits.

The Operator should provide details in the Operations Manual regarding the system to be used for recording and tracking Flight and Duty Times as well as rest periods. While manual, paper based systems are acceptable, computer programs that comprehensively track the varying limits and predict excedences are readily available and are considered to be the preferred option.

Flight and Duty Time records are to confirm compliance with all requirements of the flight time limits that are applicable the Operator's flight time management program. The Flight and Duty Time records that are maintained should be consistent with information provided in other documents such as aircraft flight records.

1.9: Aircrew Duty Time

FLT 1.04.02
FLT 1.04.03
FLT 1.04.04

A duty day shall not exceed 14 hours and where 12 hours have been exceeded must be followed by a rest period of 10 hours. Crews on rotational assignments that arrive following overnight travel or travel exceeding four timezones change should not be rostered for flying duties until the 10-hour rest period is met.

Regulatory approved fatigue management programs may be used in lieu of the above limits when reviewed and endorsed by competent aviation specialist advice.

The Operator should provide details in the Operations Manual regarding the system to be used for recording and tracking duty times as well as rest periods. While manual, paper based systems are acceptable, computer programs that comprehensively track the varying limits and predict excedences are readily available and are preferable.

1.10: Maintenance Duty Time

MNT 1.07.02
MNT 1.07.03
MNT 1.07.04

The aircraft operator or maintenance service provider shall establish a fatigue management program to minimise the effects of acute and chronic fatigue amongst maintenance personnel. This shall include maximum working hours, minimum rest periods and roster schedules. The requirement to conduct overnight maintenance should be reviewed by a competent aviation specialist.

The safety of any aviation system is dependent upon all participants performing reliably and efficiently. As aircraft maintenance activities are routinely undertaken by technical personnel working a shift work system, it is important that these shifts be carefully managed by a program that will ensure that fatigue occurring during a shift or accumulated over a period of time due to the pattern of shifts worked and other tasks, does not endanger the safety of a flight.

The Operator, or its contracted Maintenance Organization(s), shall have fatigue management guidance for all maintenance personnel, which, as a minimum, meet the standards required by the responsible regulatory authority.

The Aircraft Operator or contracted Maintenance Organization(s) should provide fatigue management guidance for all maintenance personnel. This documentation should be in compliance with any associated regulatory guidance.

Records should confirm that aircraft maintenance personnel roster schedules, hours worked and rest periods are in accordance with any documented fatigue management guidance.

Engine Maintenance

1.11: Safety Management System

All aircraft operators shall have a Safety Management System (SMS) commensurate with the size and complexity of their operation. Additional information useful for operators' SMS development as follows:

- ***ICAO Safety Management Manual***
- ***Flight Safety Digest Volume 24 No 11 - 12, Nov - Dec 2005***
- ***International Helicopter Safety Team – SMS Toolkit.***

The Operator's SMS should include:

- A Safety Management System Manual;
- A Safety Policy;
- The appointment of a Safety Manager or Officer;
- The various sub-structures where more than one operating base is in use;
- A Just Culture Policy;
- The frequency and conduct of safety meetings;
- Hazard Reporting systems;
- Risk Assessment processes;
- Incident reporting;
- Occurrence investigation;
- Auditing;
- Safety training;
- Management of Change;
- Safety Performance; and
- Emergency Response.

The Operator's Safety Management System should be documented and include the necessary organizational structures, accountabilities, policies and procedures that will facilitate, amongst other things, a systematic process for the identification of hazards and minimization of risk.

Records are to confirm that the documented requirements, processes and procedures associated with the Operator's Safety Management System are being complied with and that continuous improvement is being tracked and monitored.

1.12: Accident Notification

ORG 3.06.03

As part of their Safety Management System, the aircraft operator shall advise the Company of any incident, accident or non-standard occurrence related to the services provided to the Company that has, or potentially has, disrupted operations or jeopardised safety.

International Civil Aviation Organization (ICAO) Annex 13 Aircraft Accident and Incident Investigation provides the definition of accident and incident.

The Operator must have procedures in place to ensure that details of any reportable events are provided to the responsible regulatory or safety investigation authority within specified time limits.

Additionally, the Operator's procedure should provide for ensuring that any incident, accident or non-standard occurrence that has the potential to disrupt operations or jeopardize safety is communicated to Company representatives in a timeframe previously agreed with the Company being supported.

The Operator should provide feedback to the Company regarding the investigation and close-out of significant incidents and whether any findings could be incorporated in risk mitigation strategies such as route or airfield assessments.

The Operator should have a documented procedure in place to ensure that the Operator's senior management, the responsible regulatory or safety investigation authority (as required) and where applicable the Company, are informed of any incident, accident or non-standard occurrence that has disrupted or has the potential to significantly disrupt operations or jeopardize safety.

Documented requirements and procedures associated with communication of non-standard events by the Aircraft Operator should be made available on request.

1.13: Operational Risk Assessment

ORG 3.04.03
ORG 3.04.04
ORG 3.04.05

Before commencing operations for any new or existing aviation activity a documented assessment of operational risks and their respective mitigation shall be conducted by the aircraft operator. Guidance for the conduct of a risk assessment can be obtained by the aircraft operator from the Flight Safety Foundation.

Risk assessments are an essential element in identifying and mitigating risks to any operation. The Aircraft Operator should have a well-developed risk assessment mechanism as part of their SMS and the process should be used to review all activities undertaken on both a routine and exceptional basis.

The Aircraft Operator's Safety Management System should detail the requirement for the assessment and management of operational risks to form an integral part of the planning and execution of any change within the operation.

Documented evidence shall be available to demonstrate the assessment and management of operational risks are being complied with before implementing changes within existing activities or commencing any new operations.

1.14: Helicopter External Loads and Offshore Operations

For companies involved in helicopter external loads, offshore and/or night vision Goggle (NVG) operations, additional controls addressing these activities are presented in Appendices 4, 5 and 6 of the BAR Standard respectively.

Helicopter External Load, off shore and NVG Operations are addressed separately in Volume 2 to the BARS Implementation Guidelines.

1.15: Airborne Geophysical Operations

Companies engaged in airborne geophysical operations shall ensure aircraft operators supporting this flight regime are members of the International Airborne Geophysics Safety Association (IAGSA) and comply with all requirements of the IAGSA Safety Manual if more restrictive than the BARS requirements. Any Notification of Difference held by the aircraft operator to the IAGSA standard must be made known to the Company prior to operational engagement.

The IAGSA promotes the safe operation of helicopters and fixed-wing aircraft on airborne geophysical survey operations. Aircraft Operators who are member companies follow the standards and recommended practices for the conduct of geophysical survey that are included in the IAGSA Safety Manual.

At times the Aircraft Operators will submit a Notification of Differences when their operating practices differ to that of the IAGSA Safety Manual. Copies of any Notification of Differences shall be provided to a BARS Member Organization when engaging with an Aircraft Operator for the conduct of geophysical operations.

The Operators documented procedures shall reflect the standards and recommended practices developed by IAGSA in relation to the operation of aircraft used in geophysical survey operations.

Evidence should be available to confirm the Operator as being a member of IAGSA, they have an active Safety Management System and they have a process to develop a Notification of Differences against the IAGSA Safety Manual.

2.0: Runway Excursions

The aircraft departs the runway during take-off or on landing and results in an aircraft accident

A runway excursion occurs when an aircraft departs the runway in use during the take-off or landing run and can be caused by a number of scenarios:

- A departing aircraft fails to become airborne or cannot complete a rejected take-off before reaching the end of the runway;
- A landing aircraft touches down in the undershoot area of the landing runway; or touches down too long and is unable to stop before reaching the end of the runway; or
- An aircraft landing, taking off or conducting a rejected take-off departs the side of the runway.

Establishing and adhering to SOPs including conducting appropriate standard approach and departure briefings will enhance flight crew decision making and reduce the risk of runway excursions.

A combination of risk factors will contribute to the risk of runway excursions. These factors include lack of accurate wind information, lack of awareness of contaminated runways (mud, rain, ice or snow), absence of procedures (stabilized approaches), technical issues (improper use of thrust reversers) or poor aircraft performance planning.

Many of these elements are associated with diligent and appropriate actions on the part of the aircrew. However the infrastructure required to support aircraft operations, such as runway preparation, weather reporting, ground-based communications, windsocks and pavement markings are outside the control of the Operator. This may need to be considered by the relevant resource Company.

Engine failure on take-off from mine site. Aircraft over-run.

2.1: Airfield and Helipad Design

Where local guidance is not acceptable to Company, ICAO Annex 14 Aerodromes, Volume I ('Aerodrome Design and Operation') and ICAO Annex 14, Volume II ('Heliports') are to be used for design considerations when constructing (or major rework) permanent long-term Company owned and operated airfields and helipads supporting production operations.

Prevailing winds and location of mining/facility infrastructure in relation to the proposed airfield or helipad departure and approach splays shall also be included in initial design considerations.

Bonikro Mine - Ivory Coast, Africa

Resource Company considerations in locating and designing airfield and helipads should always incorporate specialist aviation advice and must include consideration for the following:

- Prevailing wind direction;
- Obstacles – including mine infrastructure, towers and tailing mounds;
- Open cut mining – blasting operations in the vicinity;
- Flyways for helicopters (rejected take-off areas);
- Balanced field-length for aeroplanes (allowing for successful abort at decision speed);
- Two-way approaches to landing facility as a minimum design basis;
- Forecasted expansion plans of resource facility and resultant aircraft size increase; and
- All infrastructure requirements as articulated in the BAR Standard.

ICAO Annex 14 should be included in design considerations for any permanent airfield and helipad design facility when local guidance is not acceptable to the BARS Member Organization.

2.2: Airfield Inspections

In addition to any regulatory required reviews, all Company owned and/or operated airfields should have a minimum of an annual operational control and safety review by qualified airfield specialists.

Certain airfields may be subject to regulatory provisions that require periodic Audits to be completed as a result of certification status.

Additionally, resource Companies who own and operate airfields should conduct an annual operational review by a suitably qualified aviation specialist. This will address the entire aviation system on the airfield over and above regulatory inspections.

The annual review will complement any regulatory required inspection by focusing on all aspects of an aviation operation. A review of this nature will include passenger control, freight management, aircraft refueling, wildlife control, daily airfield inspections, airfield management, rescue fire fighting, perimeter fencing, weather reporting, runway taxi markings, Obstacle Limitation Surfaces, emergency response planning and preventative maintenance.

Where airfields are not registered and therefore not subject to requirements for changes in aerodrome information, the aerodrome operator must provide such details directly to relevant aircraft operators.

Additionally, resource Companies who own and operate airfields should conduct an annual operational review by a suitably qualified aviation specialist. This will address the entire aviation system on the airfield over and above regulatory inspections.

2.3: Landing Site Assessments

Aircraft operators shall have a means of conducting landing site assessments prior to commencing operations which must further be incorporated into the operational risk assessment (Control 1.13).

Conducting a landing site assessment prior to commencing operations to a new location provides a necessary level of assurance for the conduct of safe operations. This can be desk-top review using available and documented information, or for more routine and established operations consist of an actual site visit to review facilities, infrastructure and surrounding environment.

The Operator's documented procedures in preparation for commencement of operations to a new destination should prescribe that a landing site assessment be conducted. Completion of such an assessment will allow the Operator to determine the presence of any operational risks that will need to be addressed and facilitate the management of identified risks through the Operator's Safety Management System.

2.4: Balanced Field Length

All multi-engine aeroplanes shall meet balanced field requirements so that following an engine failure on take-off the aircraft will be able to stop on the remaining runway and stop-way, or continue (using the remaining runway and clearway) and climb achieving a net climb gradient greater than the take-off path obstacle gradient.

To optimize the safety benefits of multi-engine aircraft during take-off, a runway length should be sufficient to ensure that an aeroplane can safely stop (accelerate-stop) or safely take-off (accelerate-go) in the event that one engine fails. Aircraft manufacturers of aircraft in this category provide detailed performance analysis charts to allow for full performance analysis by the Operator.

The balanced field length is the minimum runway length required where both accelerate-stop and accelerate-go distances are achieved. The speed at which the decision whether to stop or go in the event of an engine failure is known as V1.

The take-off decision speed, V1, is not fixed and will be affected by a number of variables including temperature, wind, elevation, slope, runway contamination and aircraft weight and configuration. The easiest variable influenced by resource Companies is aircraft weight. To achieve balanced field length may mean the aircraft payload has to be reduced, and less passengers than seats available will be carried.

The resource Company should always (1) consider the performance expectations of aircraft prior to runway construction and (2) contract aircraft of adequate performance to assure balanced field length is attained in all cases.

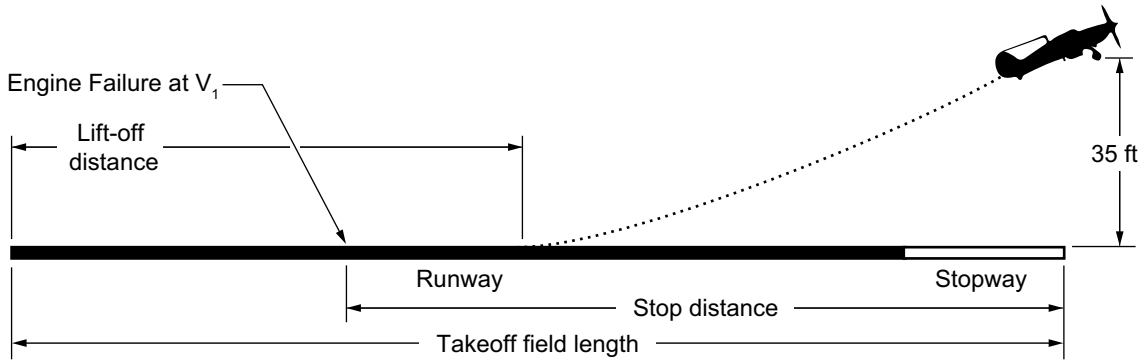


Figure 3: Balanced Field Length

The Operator should be able to demonstrate aircrew familiarity with balanced field length calculations and when they are required to calculate it. Crews should be initially trained in the performance aspects of their particular aircraft and the procedures for calculating performance should be clearly detailed in the Operations Manual. Where applicable, mandatory proficiency checks should examine crew competence in performance calculations and their application.

2.5: Balanced Field Length – No Performance Charts

Multi-engine aircraft that do not have the appropriate Flight Manual performance charts to achieve Control 2.4 of the BAR Standard shall restrict payload to ensure that in the event of an engine failure the net take-off path clears obstacles by 35 feet up to a height of 1500 feet above the aerodrome using the following conditions:

- ***Failure occurs when the aeroplane has reached published best Rate of Climb (V_Y) speed***
- ***Undercarriage up if retractable***
- ***Flaps are fully retracted***
- ***Propeller on inoperative engine feathered.***

Aircraft certificated to the requirements of United States Federal Aviation Regulation (FAR) Part 23 are in the 'commuter' category and not subject to the same rigorous certification standards that are applied to FAR Part 25 aircraft in the 'transport' category.

FAR	Category	Description	Examples
Part 23	Commuter	Maximum Take-Off Weight (MTOW) cannot exceed 19,000 pounds (8,618 kg).	King Air, Beech 1900
Part 25	Transport	Jets with 10 or more seats or a MTOW greater than 12,500 pounds (5,670 kg); or Propeller-driven aeroplanes with greater than 19-seats or a MTOW greater than 19,000 pounds (8,618 kg).	DHC-8, ATR-42, Fokker F-50, F-100, Boeing, Airbus, Gulfstream

Figure 4: Certification Standards

Unlike aircraft certificated under the requirements of Part 25 (where Control 2.4 applies), aircraft operating under a Part 23 certification will not be provided with the charts to enable assessment of aircraft performance in all stages of the take-off sequence. In these circumstances, Control 2.5 applies. The Aircraft Operator must have performance charts available that will allow performance to be predicted and loading adjusted as necessary in order to achieve compliance with the requirements of this control.

Each multi-engine aircraft must have the take-off performance charts available in Flight Manual or Pilots Operating Handbook that will permit the flight crew to make an analysis of take-off performance and adjust loading where necessary.

Procedures for calculating take-off performance should be clearly detailed in the Operations Manual and the initial training of flight crew should adequately cover the performance aspects of the particular aircraft type. Crew competence in performance calculations and their application should be assessed during proficiency checks.

2.6: Destination Weather Reporting

For Company owned and operated airfields and helidecks, the following data shall be communicated to arriving aircraft either by an Automatic Weather Observation System (AWOS) and/or trained weather observer:

- ***Wind direction and speed***
- ***Temperature***
- ***Barometric pressure***
- ***Cloud ceiling height and visibility.***

All equipment shall be maintained on a current calibration register.

Reporting of actual weather conditions at an airfield or helideck significantly enhances the safety of the aviation operation. The prevalence of AWOS equipment provides greater guarantees to the effectiveness of this control rather than relying on having trained weather observers on site at all times, however either option satisfies the intent of the control.

Considerations for resource Company owned and operated facilities:

The AWOS should have the capability of transmitting on a discrete frequency to arriving aircraft.

The ability to provide cloud base and visibility is an important aspect to an AWOS that should not be overlooked during equipment procurement.

Training required for a weather observer should include issuance of radio operator license for communication, training on all equipment required to take measurements and training associated with basic aviation meteorology. Any training course should ideally be recognized by the national meteorology bureau and although not prescribed is typically 3–5 days in duration. Recurrent training for weather observers should be considered.

2.7: Precision Approach Path Indicator (PAPI)

For Company owned and operated airfields Precision Approach Path Indicator (PAPI) lighting shall be installed.

An approach path lighting system is an invaluable tool that assists pilots of fixed-wing aircraft to fly the correct approach angle to the runway. It also has the added benefit of defining the center of the touchdown zone. Both aspects of the PAPI system assist in mitigating the risk of either touching down short of the touchdown zone (or undershooting the runway with the consequent risk of striking objects below the standard flight path) or touching down past the touchdown zone with the consequent risk of a landing runway excursion.

The Operator's documentation should detail how the PAPI system works, what acceptable approach parameters are and how the PAPI should be used during the conduct of a stabilized approach.

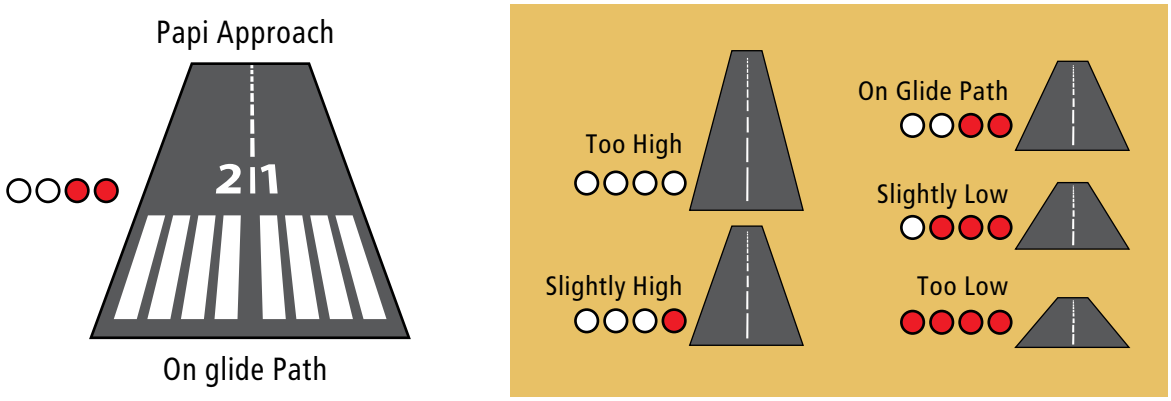


Figure 5: PAPI Lights – use of red and white provides glideslope indication

3.0: Fuel Exhaustion

Aircraft conducts a forced landing or ditching as a result of fuel exhaustion and leads to an aircraft accident

Assurance for safe flight depends on many factors, not least of which is guaranteed reliable power being produced when required. Fuel mismanagement leading to fuel starvation or exhaustion is a direct cause of power loss, and continues to be an issue in resource sector operations.

Two factors contribute to fuel mismanagement and loss of power:

- Fuel Exhaustion – no usable fuel remaining to supply the engine(s); or
- Fuel Starvation – fuel supply to engine(s) is interrupted although sufficient fuel remains on board (e.g. incorrect tank selection).

Basic fuel management principles required by an Operator must include the following:

- Knowing exactly how much fuel is being carried at the commencement of a flight;
- Knowing the fuel required to satisfy the flight plan route plus reserves;
- Knowing how much fuel is being consumed – taking into account all variables such as power settings, cruise levels and effect of wind and course deviations; and
- Aircrew knowledge of the aircraft fuel supply system and adhering to procedures when selecting tanks and fuel sources during all critical phases of flight.

Accurate fuel planning requires the resource Company to provide clear and unambiguous flight routing requests to the contracted Aircraft Operator. This will enable aircrew to address all basic fuel management principles.

3.1: Fuel Check

FLT 1.03.01
FLT 1.03.02

The aircraft operator shall have procedures in place that require the Pilot-in-Command to ensure the required amount of fuel is on board the aircraft prior to each flight.

The risk of fuel exhaustion is greatly reduced when aircrew accurately determine the amount of fuel on board prior to starting and confirm that quantities are sufficient for the flight planned. Determination of this quantity should be cross-checked using a minimum of two sources, such as:

- Fuel quantity gauges;
- Dipsticks;
- Flow meters/totalizers; and
- Calculations from previous refuels and fuel usages (regularly checked for accuracy).

Accurate knowledge of fuel quantity at the start of a flight is essential for any fuel critical operation. All subsequent assessments to the safety of flight are derived from that initial number. If only one fuel quantity measurement is used, then it is not possible to determine if the system is working properly because there is no reference point.

The Operator's procedures should require fuel quantity checks to be conducted prior to each flight and provide details of the acceptable methods by which such checks are to be undertaken. The Operator's procedures should provide for the quantity of fuel on board to be checked by two separate and independent methods.

In-flight Checks

Fuel burn will be constant for a consistent combination of altitude, power setting and mixture setting (where applicable). Changing winds and deviations due to weather conditions will vary the groundspeed and therefore the range. Aircrew should regularly update fuel status, at least every hour, to ensure adequate reserves are maintained.

The Operator should specify procedures for aircrew to monitor in-flight fuel quantity, to detect any anomalies that may appear in planned versus actual fuel burn. Fuel flows greater than planned, stronger headwinds, in-flight fuel leaks, course deviations have all contributed to past resource sector accidents. Constant monitoring of fuel quantity at designated time intervals or waypoints is critical to the safe progress of any flight.

The Operator must document SOPs that require the aircraft Pilot-in-Command to ensure the required amount of fuel is on board the aircraft prior to each flight. Such procedures should provide for the quantity of fuel on board to be checked by two separate methods and should state a maximum tolerance to apply to any difference in quantities determined by the two methods. SOPs should also cover the conduct of in-flight fuel progress checks that will enable the early detection of a fuel anomaly.

The flight record or similar document should demonstrate that the SOPs have been complied with and that the required preflight and in-flight fuel checking and monitoring has been conducted.

3.2: Flight-Plan Weather Data

FLT 1.06.01
FLT 1.06.02
FLT 1.06.04
FLT 1.13.02

All aircrew are to have access to reliable weather information when determining fuel loads in pre-flight planning.

Key flight safety considerations include ensuring relevant weather data and forecasts are made available to aircrew for flight planning purposes. Before commencing a flight, aircrew must have access to and assess the weather reports and forecasts for the route to be flown and the airfields to be used, including any airfields that may need to be considered as alternate destinations.

The Operator should retain operational records associated with any flight for a period of 90 days.

When aviation operations supporting the resource sector are conducted in remote areas outside the influence of reliable national meteorological coverage, every effort must be made by the Operator, assisted by the resource Company if necessary, to access forecasted weather data from global sources. Reliance on communication networks (internet, satellite phone etc) will be required.

Access to good quality weather data to support an aviation operation should always form part of a pre-mobilization risk-assessment.

The Operator must document a description of minimum expectations associated with weather forecast review used in support of preflight planning. Flight crew must ensure that they obtain and assess a weather forecast that covers the route to be flown, the planned destination and when required, the airfield that is to be provided for as an alternate destination.

Documentation associated with the flight should be retained for a minimum period of 90 days and this information should include any relevant meteorological forecasts.

3.3: Flight Plan

FLT 1.06.06
FLT 1.06.07

Wherever practical flights are to be conducted on an Instrument Flight Rules (IFR) flight plan lodged with the relevant regulatory agency. When not possible, use of Visual Flight Rules (VFR) flight plans is permitted but shall be lodged with a responsible party (regulatory authorities, aircraft operator or Company site representative) and flown under a flight-following regime.

An IFR flight plan requires greater prescription in the routes and altitudes flown and fuel contingency planning. Additionally it will provide a greater level of air traffic control services with the flight than would otherwise apply under a VFR flight plan.

Air traffic control services provided for IFR traffic will focus on traffic notification and positive separation services, and will also provide continuous flight following that enables continuous access to SAR (Search and Rescue) alerting services.

Where it is not possible to conduct a flight under the IFR, an Operator may elect to conduct the flight under the VFR (where authorized by the local regulatory authority). Where it is intended to operate a flight under the VFR, flight plan notification must be lodged with an organization that is responsible for SAR alerting. Flight notification may be submitted by any acceptable means that will ensure the agency responsible for SAR alerting accurately records the flight details including departure and destination, flight times and SAR alerting time.

The Operator should retain operational records associated with any flight for a period of 90 days.

The Operators shall document a policy requiring that wherever practical, all flights are to be conducted under a flight plan that has been filed in accordance with the requirements for IFR flights. Where an Operator's policy allows for flights to be conducted under the VFR in defined circumstances, the requirements for flight notification must be clearly stated. Associated flight records are to confirm that flights conducted at night or under the IFR for BARS Member Organizations (BMOs) are only conducted in compliance with IFR flight planning requirements.

3.4: IFR Fuel Plan

In addition to operational holding fuel requirements, fuel loads shall cover fuel used during start-up, taxi, en route, approach and transit to the alternate destination (if required). Additional variable reserves of 10% of the total trip fuel and 30 minutes as fixed reserve are to be carried.

FLT 1.07.01
FLT 1.07.02
FLT 1.07.03
FLT 1.07.04
FLT 1.07.05

An aircraft that carries only just enough fuel for the planned flight, but which encounters unanticipated headwinds and perhaps has to fly at a lower level must rely on the fuel reserves carried to safely complete the flight. Fuel reserves are designed to only be used in unforeseen circumstances, and many aircraft arrive safely at their destination having used a portion of the allocated variable reserve fuel. However an aircraft's fuel supply should not reach a state where fixed reserve fuel is being burned and upon arriving at its destination it cannot accept any further delay in landing.

For those Operators who have a fuel policy with a larger fixed reserve (>45 minutes) and a variable reserve not smaller than 5% of total trip fuel, this may be considered conforming with this control providing that the fuel policy is in accordance with local regulatory approvals and the flight time is less than five hours.

The Operator must document a clearly stated fuel policy for IFR flights that meets the minimum requirements legislated by the responsible Regulatory Authority or is consistent with their guidance. In circumstances where the fuel quantity required to be carried by the responsible regulatory authority may be less than that required by the BAR Standard, the Standard is to apply.

Associated records such as aircraft load-sheets, Flight Logs and fuel records should confirm that documented procedures and requirements for determining the amount of fuel to be carried on IFR flights have been applied appropriately.

3.5: VFR Fuel Plan

FLT 1.07.06
FLT 1.07.07

Fuel loads are to cover the planned route. An additional variable reserve of 10% of the total trip fuel and 30 minutes as fixed reserve is to be carried.

The responsible regulatory authority will specify the minimum fuel that is to be carried on a VFR flight either through provision of specific prescriptive regulations or guidance on determining minimum fuel requirements. In all situations, the minimum quantity of fuel to be carried is not to be less than that required by the BAR Standard.

The Operator must document a clearly stated fuel policy for VFR flights that meets the minimum requirements legislated by the responsible regulatory authority or is consistent with their guidance. In circumstances where the fuel quantity required to be carried by the responsible regulatory authority may be less than that required by the BAR Standard, the Standard is to apply.

Associated records such as aircraft load-sheets, Flight Logs and fuel records should confirm that documented procedures and requirements for determining the amount of fuel to be carried on VFR flights have been applied appropriately.

3.6: Hot Refueling

FLT 1.03.01

Hot refueling shall only be conducted when considered operationally necessary and must be approved by Company prior to use. Aircraft operator shall have documented procedures covering all aspects of hot refueling.

Hot refueling is the practice where the aircraft is refueled with the engine running and in the case of most helicopters with rotors rotating. Helicopter hot refueling poses the greatest risk. Accordingly the BAR Standard simply requires an Operator to have regulatory approval for fixed wing hot refueling per Note 2 of Control 3.6.

In helicopter operations, the noisy and dynamic environment complicated by added threat of 'hot'/active engine(s) in close proximity to the open refueling activity demands additional controls to be in place to ensure safe conduct.

Hot refueling of helicopters should only be performed when agreed to by both the Operator and the resource Company, and should be on the basis of an operational requirement and not convenience. Examples of operational requirements include:

- Seismic and External Load operations involving high movement cycles;
- Excessive wind speed make full shutdown impractical or dangerous;
- Medical evacuation requiring quick turn-around;
- Search and Rescue; and
- When the risk of a failed engine-start outweighs the risk of hot-refueling.

The documented procedures required by the Aircraft Operator should be in the approved Operations Manual and include as a minimum:

- The operational circumstances in which hot refueling may take place;
- The procedures to be followed during hot refueling;
- Three ground crew for helicopter hot-refueling operation (1) refueler, (2) emergency pump shut-off guard and (3) fireguard;

- All persons engaged in hot refueling must be trained in, and familiar with, the procedures to be followed during hot refueling or any emergency that may occur in relation to the refueling;
- Suitable and properly maintained fire fighting equipment must be readily available for use if an emergency occurs during the refueling;
- Before carrying out hot refueling on an off shore oil rig, gas rig or platform, a drilling ship or any other vessel, the approval of the operator or master of that installation or vessel must be obtained;
- The quantity of fuel to be loaded must be decided before hot refueling is commenced;
- A properly licensed pilot to remain at the controls of the aircraft throughout the hot refueling process and maintain contact with the person on the ground in charge of the refueling system by means of an electronic intercommunication system or by visual contact and an agreed system of signals;
- All passengers disembarked from the aircraft (helicopter) prior to commencement of refueling procedures, except in the case of a passenger who cannot, in the opinion of the pilot or on medical advice, be safely disembarked;
- Before the fuel filler cap is removed, the refueling equipment and aircraft must be earthed and connected so as to ensure they are of the same electrical potential;
- While hot refueling is taking place, radio transmissions must be restricted to the greatest extent practicable. HF radio and weather radar are not to be used;
- On completion of the refueling operation, the Pilot-in-Command confirms that all equipment has been removed from the vicinity of the helicopter prior to departure from the refuel point, the fuel cap has been securely replaced, the correct fuel quantity has been loaded and the aircraft is properly configured for flight; and
- The fuel supplied is managed by a fuel quality audit program and whose regular audit reports are checked by the Aircraft Operator.

Image provided by DSE

Where hot re-fueling is to be utilized for helicopter operations, the Aircraft Operator must have approved documented procedures. In addition to addressing applicable regulatory requirements, the documented procedures should articulate all minimum items contained in the BAR Standard and details contained within these guidelines.

4.0: Fuel Contamination

Aircraft forced to put down at unprepared sites with minimal warning as a result of contaminated fuel causing loss of engine power and results in aircraft accident

Aircraft engines are intolerant to fuel contamination and will readily fail if provided with out-of-specification fuel. Maintaining the quality and cleanliness of aviation fuels is fundamental to aviation safety.

Personnel responsible for the transportation, storage or dispensing of aviation fuels are a key part of the aviation safety equation. The guidelines, procedures and standards prescribed by the fuel manufacturer must be adhered to at all times.

All parties associated with flight operations – Operator and Company – must be cognizant of the requirement for high quality and tested fuel to ensure any potential contaminants are eliminated or separated out of fuel before the fuel is pumped into the aircraft. Fine sediment in fuel may block the aircraft fuel filters and erode critical parts in the engine and fuel control systems. Free water (water not dissolved in the fuel, but microscopic droplets held in suspension) may freeze at high altitudes or cold outside air temperatures and clog the fuel screens/filters, causing the engine(s) to cease operation.

Particular care should be taken to avoid contamination with the wrong types or grades of fuel as this can cause aircraft fuel system or engine damage and possible failure in-flight.

4.1: Fuel Testing

FLT 1.08.01

Testing of the fuel supplied shall include use of water detector capsules or any equivalent that is able to test for water in suspension. The Pilot-in-Command will ensure that the quality of the fuel being uplifted is acceptable for operation of the aircraft.

Aircraft fuel has the ability to hold water, thereby contaminating the fuel being supplied to the engine(s). Water can be held in the fuel in a number of states including dissolved, in suspension and free. There are a number of fuel testing regimes available, but it is the Operator's responsibility to document acceptable methods to confirm that the fuel is free of water contamination.

The Operator's SOPs should document the requirements and/or procedures for fueling of aircraft and performing fuel testing as part of the preflight preparation process. Where an accredited third party agency provides fuel they should have procedures in place that provide the equivalent level of compliance. In such cases, the Operator should have a quality assurance process to ensure that the third party provider is delivering fuel of an acceptable standard.

The Operator's SOPs and maintenance documentation should detail requirements for fueling of aircraft and performing fuel testing as part of the preflight preparation process. The Operator's documentation should also detail procedures, such as initial and routine audits to provide assurance of the on-going quality of fuel supplies routinely used.

Records such as audit schedule, audit checklists, audit reports and non-conformance/corrective action closeout records are to confirm that assurance of the on-going quality of fuel supplies is being provided.

4.2: Fuel Filtration

Fuel delivery systems including portable systems are to be fitted with water blocking filtration of the Go No-Go types. Filter canisters are to be marked with the next date of change or inspection cycle. All filters must be replaced at nominated pressure differentials as annotated on the filter housing or as recommended by the manufacturer, but as a minimum will be replaced annually.

The Operator should document the process by which fuel delivery systems including portable systems that are to be used in fueling the Operator's aircraft are assessed and determined to be suitable for use.

Where the fuel system is owned and/or operated by the Operator, the Operator's documentation should detail procedures, such as initial and routine audits, that ensure fuel delivery systems that are to be routinely used in fueling the Operator's aircraft meet the required standards.

Where fuel is supplied from a recognized third-party provider, the Operator's SMS should address how fuel quality control is guaranteed.

4.3: Fuel Sampling

When incorporating supply fuel tanks in Company owned and operated facilities, a slope at the base with a sump drain at the tank low point (or equivalent) for sampling purposes shall be specified for installation.

When using a dedicated fuel source, a sample from the source shall be retained in a clear jar with screw-top-lid, labelled with the current date and retained until completion of the daily flying activities.

The Operator's SOPs should document the requirements for fuel testing as part of the preflight preparation process. During the conduct of these procedures, aircrew may request to view the relevant fuel sample prior to commencement of fueling.

Daily fuel samples should be retained until completion of the daily flying activities as evidence that the fuel stored in the installation is fit for use in aircraft. Such samples enable demonstration of the fuel's chemical compliance with published standards following an aircraft incident that had received fuel from the installation.

The Operator's documentation should detail the requirements for performing fuel testing as part of the preflight preparation process.

The Operator's documented requirements for initial and routine audits of fuel delivery systems that are to be routinely used in fueling the Operator's aircraft should provide for assessment of compliance with the required storage and daily fuel sampling procedures.

The Operator's Audit program that applies to fuel supplies, including Audit schedule, Audit checklists, Audit reports and non-conformance/corrective action closeout records are to provide assurances of the on-going quality of fuel supplies (such as fuel installation daily product quality checks).

4.4: Fuel Storage

Prior to testing and approval for use, all fuel storage facilities shall be allowed to settle 1 hour for each 1 foot of fuel depth (or three hours per metre) after the tanks have been re-supplied, or in the case of drum-stock when the barrels have been moved to the vertical. Additional storage requirements include:

- ***Storage tanks should have floating suction or minimum standpipe***
- ***Bulk deliveries should be filtered into storage tanks***
- ***Fuel systems should be identified by placard during the settling period indicating the time when settling will be completed***
- ***All steel tanks should be lined with an approved epoxy liner unless the tanks are constructed of stainless steel***
- ***All Company new-build fuel systems should have stainless steel and connection welded plumbing.***

The Operator should document the process by which fuel delivery systems including portable systems that are to be used in fueling the Operator's aircraft are assessed and determined to be suitable for use.

evidence

The Operator's documentation should detail procedures, such as initial and routine audits, that ensure fuel delivery systems that are to be routinely used in fueling the Operator's aircraft and their associated operating procedures meet the required standards.

The Operator's audit program that applies to fuel supplies would normally be one component of the Safety and Quality Management System. Associated records such as audit schedule, audit checklists, audit reports and non-conformance/corrective action closeout records are to confirm that fuel delivery systems that are to be used in fueling the Operator's aircraft and their associated operating procedures meet the required standards.

4.5: Drummed Fuel

Aircraft Operator shall have procedures for the use of drum-stock that require:

- ***The seals to be tight and not broken prior to use***
- ***Fuel is to be consumed within 12 months of packaging date***
- ***Drums are to be stored horizontally with bungs at 3 and 9 o'clock, should have minimal contact with the ground (using wooden slats or equivalent) and covered where possible***
- ***Use of drummed fuel to be contingent on thorough sampling and testing procedures***
- ***Testing procedures to use water detector capsules or an approved equivalent***
- ***Before fuelling the aircraft, a small amount of fuel to be pumped into a container to remove any contaminants from the hose and nozzle.***

FLT 1.08.02

The Operator should document in their Operations Manual specific requirements and/or procedures that are to be followed for the storage and use of drummed fuel, whether it is under their control or that of a third-party. The procedures are to provide assurance of the quality of drummed fuel supplies that are to be used. The Operator's documented procedures are to be consistent with guidance provided by fuel manufacturer where these are more stringent than the BAR Standard.

The Operator's SOPs and maintenance documentation should detail the requirements and/or procedures that are to apply as part of the preflight preparation process where drummed fuel is to be used for fueling of aircraft. Such procedures should require the Pilot-in-Command to assess that the drum-stock to be used has been stored appropriately. The Operator's documentation should also detail procedures, such as initial and routine audits, that provide assurance of the on-going quality of fuel supplies that they are to routinely use.

Photo from Fotopedia.com

5.0: Controlled Flight Into Terrain (CFIT)

An airworthy aircraft under the control of crew is flown into the ground (or water) resulting in an accident

Controlled Flight into Terrain (CFIT) occurs when an airworthy aircraft under the control of the flight crew is flown unintentionally into terrain, obstacles or water, usually with no prior awareness by the crew.

CFIT has been associated with a large number of fatal accidents in the resource sector involving both fixed and rotary wing aircraft. In many industry accidents, a recurring root cause is aircraft operating under Visual Flight Rules in a degraded visual environment that otherwise might have been better suited for operations under Instrument Flight Rules. Unpressurized aircraft (both aeroplanes and helicopters), working below the weather to get in and out of mine sites in areas of mountainous terrain raise the risk of CFIT considerably.

Similarly, night helicopter off shore operations, or on shore in remote areas, have resulted in a high number of fatal accidents due to CFIT.

Although CFIT remains a significant cause of incident within the aviation industry, it is widely recognized that these accidents should be preventable. The following controls from the BAR Standard are aimed directly at preventing CFIT accidents.

Flight Operations – Andes Mountains, Chile

5.1: Night or Instrument Flight Rules (IFR) – Two crew operations

FLT 1.05.05
FLT 1.13.15

Flights flown at night or in IFR shall be crewed by two pilots who hold valid and current instrument and night flying ratings using Standard Operating Procedures (SOPs) contained in the operations Manual. For additional reference see FSF ALAR Toolkit (www.flightsafety.org).

Two qualified pilots following appropriately approved SOPs reduces the risk of human error in an environment dominated by incidents attributed to human factors. Key mitigation of two pilots include:

- Workload distribution: Single pilot operations require the pilot to perform the role of pilot, navigator, radio operator, systems manager, on-board meteorologist, record keeper and passenger control. The workload further increases when outside visual cues decrease, i.e. at night or when operating under the IFR in turn warranting an additional crew member;
- Error recognition and trapping: Appropriate and approved SOPs will require the non-handling pilot to monitor the actions of the handling-pilot with an aim to identify any error or omission made in operation of the aircraft. As a coordinated crew any identified error is discussed, rectified and monitored to negate any safety impacts; and
- Reduction in fatigue: With a decrease in outside visual cues at night or under IFR comes an increased use of instruments to provide necessary situational awareness. This requires an increase in levels of concentration required by a pilot and a greater risk of fatigue-related errors which can be mitigated by a second crew member.

The Operator shall have a documented procedure requiring that flights conducted at night or under the IFR are to be crewed by two appropriately qualified pilots when operating for a BARS Member Organization. The Operator's SOPs shall clearly specify the duties that are to be performed by the second pilot and adequately detail the crew coordination processes that are to apply. For aircraft that are certified to be operated by a single pilot and where the Operator chooses this option for day, VFR or non-resource company flights, a separate set of SOPs must be in place for the single pilot role.

Associated flight records should confirm that flights conducted at night/ IFR are crewed by two appropriately qualified pilots in accordance with the SOPS. Flight crew files and rostering records confirm appropriate implementation.

5.2: Special VFR Procedures

FLT 1.05.05

Planned use of Special VFR procedures shall only be used when endorsed by aviation specialist advice.

Special VFR procedures, where authorized for use, essentially allow visual flight operations to be conducted in what are technically Instrument Meteorological Conditions (IMC). Typically these occur where there are distinct changes to the meteorological conditions in close proximity to the airfield (e.g. coastal environments with low cloud along the coast and clear conditions off shore or inland and mountainous regions where low stratus may be encountered in valley airports, but where the airspace further away from the mountains is clear of weather). Air Traffic Control may authorize Special VFR procedures to be conducted in controlled terminal airspace in situations where weather conditions do not meet VMC criteria.

The adoption of Special VFR procedures substantially increases the risks of an operation and to fly Special VFR safely, it is essential that the pilot possess a thorough knowledge of the airport and its surrounding environment.

The Operator's SOPs should either detail that Special VFR is not authorized, or where the Operator has specifically authorized Special VFR operations there is a process whereby the contracting resource Company is advised and provided with the opportunity to agree to the practice. A risk assessment involving the resource Company's aviation specialist would normally accompany such approvals.

Resource Companies should be aware of the use of Special VFR supporting their activities and discussed during the conduct of Operations Reviews.

5.3: Night or IFR – Aircraft

Flights flown at night or under IFR shall be conducted in a multi-engine aircraft.

Night or IFR conditions are representative of environments in which a successful emergency landing may not be assured therefore twin-engine operations are recommended.

BARS Member Organizations contracting for night or IFR operations should require multi-engine aircraft on contract.

5.4: Night or IFR – Flight Planning

FLT 1.02.14

Flights flown at night or IFR shall be conducted in compliance with an IFR flight plan.

Operation of a flight under the provisions of an IFR flight plan imposes the most stringent requirements in relation to routes to be followed and the levels to be maintained to ensure adequate obstacle clearance throughout the flight.

The Operator shall have a documented policy requiring that flights operated at night or under the IFR for any BMO is only to be conducted under a flight plan that has been filed in accordance with the requirements for IFR flights. Associated flight records should confirm that flights conducted at night or under the IFR are only conducted in compliance with IFR flight planning requirements.

5.5: Night or IFR – Simulator Training

FLT 2.04.01

For long-term contracts, crews operating any aircraft at night or under IFR shall attend initial and recurrent type specific simulator training or Flight Training Devices when reasonably available for that aircraft type.

Use of simulators or Flight Training Devices enable crews to practice abnormal operations (engine and/or system emergencies) in conditions and situations that would present an unacceptable risk to train and practice in the aircraft. It further allows for them to become comfortable with the application of necessary procedures in critical or adverse situations that cannot be safely replicated in the aircraft during training.

The consideration of where simulators are considered 'reasonably available' should be discussed between the Operator and Company prior to contract award.

Where the Operator's check and training program utilizes flight simulators, the Operations Manual shall contain documented procedures for their use. The documented program should follow established criteria and cover requirements and procedures for the use of simulators in the conduct of initial and recurrent training and checking.

Pilot training records should confirm that requirements of the training program applicable to the use of flight simulators have been appropriately applied in the initial and recurrent training of pilots and the on-going evaluation of pilot competency.

The responsible regulatory authority should provide advice regarding the on-going approval status of flight simulators and flight training devices.

5.6: Night or IFR Approach/Landing Recency

FLT 2.06.02

IFR and night approach recency is to meet that of the local regulatory environment, but not less than three night take-off and landings for each pilot in the preceding 90 days.

Flight crew manipulative skills need to be practiced frequently to maintain minimum competencies. This is particularly true for night and instrument environments where a combination of manipulative skills and situational awareness require optimum performance from the aircrew. Recency requirements are commonly conducted during normal line operations with little disruption to normal schedules. However it may be necessary for the Operator to schedule either specific recency training flights or simulator exercises in order to maintain the stated requirements.

The Operator shall not assign aircrew to a flight unless they meet the minimum flight crew recency requirements of either the BAR Standard or the responsible regulatory authority (whichever is the more stringent).

The Operator shall have a records management system for recording and monitoring all relevant flight crew recency parameters including, but not limited to, day/night take-offs and landings and instrument approaches.

The Operator shall document the system by which recency requirements are tracked. While manual, paper-based systems are acceptable; computer programs that more accurately track the varying limits are readily available and are preferable.

Where the BAR Standard is not used for all operations, there should be a method for indicating that crew who fail to meet the Standard recency requirements are excluded from BMO operations until such time as these requirements are met.

Associated records are to confirm that pilots are maintaining the required recency in all aspects and that the rostering system has attended to upcoming requirements prior to expiry (aircrew files and rostering records confirm implementation).

5.7: Stabilised Approaches

FLT 1.02.04
FLT 1.13.19

Aircraft operators are to detail type-specific stabilised approach in the relevant section of the Operations Manual. For additional information see Flight Safety Foundation ALAR Briefing Note 7.1 (www.flightsafety.org)

Unstable approaches that do not meet standard approach tolerances are a root cause in approach and landing accidents and controlled flight into terrain (CFIT).

The stabilized approach is characterized by defined approach speeds, descent rate, vertical flight-path, and configuration through a series of defined approach gates to the landing touchdown point. The concept is primarily applicable to fixed wing operations, but IFR helicopters on instrument approaches will follow the same process.

Day VFR utility helicopter operations require less stringent approach parameters by the very nature of their operating environment. In this case, the Operator will define approach criteria requiring helipad reconnaissance, wind assessment and approach techniques involving in ground effect and out of ground effect considerations.

The Operator shall provide clear policy regarding the criteria to be met, guidance and requirements for the conduct of stabilized approach. A stabilized approach policy and the accompanying procedure should be developed for each type flown by the Operator. The policy should reference the aircraft manufacturer's recommendations and encompass the nine elements of the Flight Safety Foundation's Briefing Note on Stabilized Approaches and any other aircraft specific factors that need to be taken into consideration (e.g. minimum fan speeds on low bypass ratio engines, minimum propeller pitch settings etc).

The nine key elements of the FSF briefing note are reproduced below, and the full version can be accessed at: (*http://flightsafety.org/files/alar_bn7-1stablizedappr.pdf*).

Recommended Elements Of a Stabilized Approach

All flights must be stabilized by 1,000 feet above airport elevation in Instrument Meteorological Conditions (IMC) and by 500 feet above airport elevation in Visual Meteorological Conditions (VMC). An approach is stabilized when all of the following criteria are met:

1. The aircraft is on the correct flight path;
2. Only small changes in heading/pitch are required to maintain the correct flight path;
3. The aircraft speed is not more than VREF + 20 knots indicated airspeed and not less than VREF;
4. The aircraft is in the correct landing configuration;
5. Sink rate is no greater than 1,000 feet per minute; if an approach requires a sink rate greater than 1,000 feet per minute, a special briefing should be conducted;
6. Power setting is appropriate for the aircraft configuration and is not below the minimum power for approach as defined by the aircraft operating manual;
7. All briefings and checklists have been conducted;
8. Specific types of approaches are stabilized if they also fulfill the following: Instrument Landing System (ILS) approaches must be flown within one dot of the glideslope and localizer; a Category II or Category III ILS approach must be flown within the expanded localizer band; during a circling approach, wings should be level on final when the aircraft reaches 300 feet above airport elevation; and
9. Unique approach procedures or abnormal conditions requiring a deviation from the above elements of a stabilized approach require a special briefing.

An approach that becomes unstabilized below 1,000 feet above airport elevation in IMC or below 500 feet above airport elevation in VMC requires an immediate go-around.

The Operator shall document clear policy regarding the criteria to be met, guidance and requirements for the conduct of stabilized approach.

Operators are encouraged to develop and implement a policy for mandatory, internal reporting of occurrences involving approach destabilization and associated go-around. Tracking of such reports by the Operator's SMS will assist with identification of possible specific risks or considerations that may exist in the conduct of approaches.

5.8: Mandatory Go-around Procedures

FLT 1.02.05

Aircraft operators are to have mandatory no-fault go-around procedures in the relevant section of the Operations Manual.

The Operator's SOPs must include a policy regarding the circumstances under which the conduct of mandatory and no-fault go-around is to be carried out. The policy should contain a clear statement to the effect that the Operator supports the Pilot-in-Command's decision to go-around, regardless of the circumstances. The go-around policy should be based on the content of the Flight Safety Foundation's briefing notes 'Being Prepared to Go-Around' (*http://flightsafety.org/files/alar_bn6-1-goaroundprep.pdf*) and 'Manual Go-Around' (*http://flightsafety.org/files/alar_bn6-2-mangoaround.pdf*).

Industry safety discussions often cite the all-engines-operating go-around as being one of the most poorly conducted manoeuvres by aircrew. The Operator should ensure that the go-around manoeuvre and procedure forms part of its regular check and training regime to increase crew familiarity with the manoeuvre.

The Operator shall document and approve a clearly stated policy regarding the circumstances under which the conduct of mandatory and no-fault go-around is to be carried out. Operators should also include the conduct of an all engines operating go-around in their check and training regime.

Operators are encouraged to develop and implement a policy for mandatory, internal reporting of occurrences where a go-around has been conducted. Tracking of such reports by the Operator's SMS will assist with identification of possible specific risks that may exist in the conduct of approaches.

5.9: Flight Data Monitoring

FLT 1.02.15

When available for the aircraft type, contracts that are for duration of three-years or greater and which specify individual aircraft are to have operational Flight Data Monitoring capability that is routinely used to assess operational approach and landing standards.

Flight Data Monitoring (FDM) is considered to be an important component of an Operator's SMS and used as a means of monitoring and analyzing the safety and quality of flight operations. An effective program will encourage adherence to SOPs and deter non-standard operations as an adjunct to improving flight safety. Of particular significance is the detection of adverse trends in any part of the flight operations that require revision of the Operator's SOPs.

FDM is an effective tool for identifying any excedences of flight parameters that may indicate systemic issues (e.g. training, specific airport procedure requirements or incorrect flight parameters) or improper operating techniques.

Baseline flight data parameters are established following a data gathering exercise and variations are identified through flight data monitoring computer analysis program by comparison. Examples of FDM use include determination of whether an unstable approach was an isolated event, or symptomatic of a wider problem due to environmental influences, a weakness in ATC procedures or improper flight management.

Where FDM is available to an Operator, the Operator's Safety Management System manual should detail the processes by which FDM is integrated into the SMS. The process for regular reviews of the data and an investigative process for out of tolerance events should also be clearly documented.

5.10: Multi-Crew Operations

FLT 1.02.01
FLT 1.02.02
FLT 1.02.03
FLT 1.13.15

Procedures outlining duties and responsibilities of all crew members shall be prescribed by the aircraft operator in those cases where multi-crew operations are conducted.

The safety enhancement of utilizing multi-crew operations will only be fully realized if all crew members meet an established operational standard and perform their duties in a predictable and standardized manner.

This can be achieved by adherence to SOPs that outline the duties and responsibilities for each crew member. An Operator's SOPs should be formally documented and approved to supplement information provided in the aircraft manufacturer's approved Aircraft Flight Manual (AFM).

The Operator shall have SOPs that are consistent with the information provided in the aircraft manufacturer's AFM and should detail how the crew work together, including specific detail on duties and responsibilities of both pilot flying and pilot monitoring.

For aircraft that are certified single pilot and where the Operator chooses this option for day, VFR or non-BMO flights, a separate set of SOPs should be in place accompanied by appropriate training and checking for the single pilot role.

Associated flight records should be able to confirm that flights conducted at night or under the IFR are crewed by two appropriately qualified pilots in accordance with the Operator's policy. Aircrew files and rostering records confirm implementation.

5.11: CRM/ADM Training

FLT 2.02.01
FLT 2.02.02
FLT 2.06.04

All flight crew (including cabin attendants) shall have successfully completed Crew Resource Management (CRM) or Threat and Error Management (TEM) training at intervals not exceeding two years. Completion of an Aircrew Decision Making (ADM) course is acceptable for approved single pilot operations.

CRM focuses upon the management of resources by all crew members to enhance safety through goal setting, teamwork, awareness and both proactive and reactive feedback. The skills promoted by CRM training provide a significant defence against the threats to safety that routinely present within the aviation system and against human error and its consequences. Accordingly, training in threat and error management reinforces with crew that threats and errors are part of everyday aviation operations that crew must manage to achieve safe outcomes.

Evidence-based research indicates there are links between CRM and TEM making it acceptable for crew to successfully complete either course at regular intervals. Where the Operator flies aircraft that include cabin attendants, these staff should be included in joint CRM training courses and associated exercises.

While many of the concepts covered and focused on in CRM will apply to single pilot operations, these are most beneficial to personnel involved in multi-crew operations. An ADM course is an acceptable recommended alternative for pilots who are engaged solely in single pilot operations. ADM will encourage a systematic approach be used by pilots in the decision making process to consistently determine the best course of action in response to a given set of circumstances.

Syllabuses of training for CRM, TEM or ADM courses (as applicable) should be published in the Operations Manual and should include all assigned flight and cabin crew. The syllabuses for initial training and processes for conducting periodic training and on-going evaluation should also be documented.

Associated crew training records should confirm that these training requirements have been applied in the induction training of new crew and are repeated on an on-going basis at intervals not exceeding two years (or as required by the responsible regulatory authority, if more frequent training is required).

5.12: Night or IFR – Autopilot

FLT 1.02.16

For night or IFR flights, an autopilot or AFCS must be fitted and in normal operations coupled during the flight and approach.

The aircraft autopilot or Automatic Flight Control System (AFCS) provides assistance to the crew throughout the flight by relieving the Pilot Flying (PF) from routine manipulative tasks. Correct use of automated systems significantly reduces pilot workload enabling time and mental resources to be available for other flight management demands. The availability of an autopilot greatly increases a pilot's ability to maintain situational awareness, respond to unanticipated changes (e.g. ATC instruction, weather conditions etc) and correctly respond to and manage an abnormal/emergency situation.

A number of industry accidents have cited the failure of flight crew manipulative skills when automated systems have failed or been disabled. Retention of core flying skills remains a key component in the safe operation of an aircraft and flight crew should regularly practice maintenance of these skills when in a low-threat environment to avoid automation dependency. The Operator should have documentation that details the conditions under which automation systems may be disengaged and manual flight undertaken.

The Operator should have SOPs, consistent with the information provided in the aircraft and/or autopilot manufacturer's Aircraft Flight Manual (AFM)/ Pilots Operating Handbook (POH), that clearly specify policy for autopilot use and management.

The provisions relevant to auto flight systems in the Operator's Minimum Equipment List (MEL) should specify a requirement for the system to be serviceable for night or IFR flights.

5.13: Terrain Awareness and Warning System (TAWS)

FLT 1.11.01
FLT 2.03.14

Aircraft that may be tasked to provide flight under IFR or at night and on long-term contract shall be fitted with an approved and serviceable Class A TAWS when an approved modification exists for the aircraft type. The aircraft operator is to have corresponding procedures outlining the action to be taken by aircrew in the event of an alert.

CFIT represents a major risk to aircraft operations and accident investigations show the risk of CFIT increases for flight operated under IFR or at night. The primary function of Terrain Awareness and Warning Systems (TAWS) is to reduce CFIT by increasing crew situational awareness.

The term TAWS covers all types of terrain awareness systems that include the Enhanced Ground Proximity Warning System (EGPWS). The EGPWS has a worldwide digital terrain database, which, when combined with the GPS position data, provides real-time predication and terrain avoidance capability.

Class A TAWS is required by commercial air transport aircraft and uses inputs such as position, attitude, airspeed and glideslope, which along with internal terrain, obstacles, and airport databases predict a potential conflict between the aircraft's flight path and terrain or an obstacle. Class A TAWS provides an alert to flight crew permitting them to take appropriate evasive action, and is the higher standard of the two classes.

Class B TAWS provides basic functions and whilst not predictive gives indications of imminent contact with the ground as a result of excessive rates of descent, negative climb rate or altitude loss after take-off.

The Operator shall publish SOPs, consistent with the information provided in the aircraft and/or TAWS OEM data clearly specifying procedures and action to be taken by flight crew in the event of a TAWS alert.

Where TAWS is fitted to the Operator's aircraft, provisions relevant to TAWS should be included in the Operator's MEL and pilot training program.

6.0: Incorrect Loading

Incorrect loading of passengers and/or their lack of proper safety awareness results in an aircraft accident

Loading errors can present a major hazard to flight safety and there have been numerous accidents and incidents where control of aircraft has been either lost or compromised, due to incorrect loading.

To help ensure the safety of flight operations, aircraft loading must be conducted in a way that ensures the specified maximum allowable weights are not exceeded and that the load distribution results in the center of gravity being in, and remaining within, the permitted flight envelope for all stages of the intended flight.

It is crucial that the flight crew are aware of the aircraft's weight and center of gravity so that the aircraft equipment can be configured appropriately for take-off and performance calculations accurately completed. This is important to ensure that the aircraft can be rotated at the correct indicated airspeed with full control of the aircraft being retained and that any limitations imposed by the runway length and obstacles in the take-off path are determined and complied with.

The process of loading an aircraft is quite complex and requires coordination between all parties involved in the process. To help guard against common loading errors and coordination break downs that can lead to errors, Operators and companies contracting aviation services must develop and comply with a system of checks and cross checks by load personnel and flight crew members.

Courtesy: Cobham

6.1: Passenger Weight

GRH 1.04.01
GRH 1.04.03
GRH 1.04.05

For fixed wing aircraft that have less than 30 passenger seats and all helicopters, actual body weight (including hand luggage) is to be used.

If within regulatory and operator guidance, standard weights based on seasonal averages acceptable to Company may be used for fixed wing aircraft with 30 passenger seats or more, unless aviation specialist advice provides alternative guidance.

The use of standard passenger weights, as a means of determining the overall weight of passengers to be carried, relies on statistical data and the standard distribution of actual body weights amongst the general population. The ability to accurately predict the weight of a group of passengers relies on application to a significant number of people. The potential for overloading aircraft with only a small number of passenger seats is high if standard passenger weights were to be used.

The exception to this is for business jet aircraft, that operate with high power margins and a fewer seats relative to their Maximum All Up Weight. In these circumstances it is acceptable practice to use standard weights if so desired.

Where standard passenger weights are used, they are to be determined and used in accordance with procedures acceptable to the responsible regulatory authority. Where approved for use by the responsible regulatory authority, standard passenger weights will be published and/or an alternative procedure where Operators may conduct a survey of their own passenger base to determine the standard passenger weights that will be applied. The last point is critical where operations are conducted on a regional basis and differing body masses exist with differing ethnic populations.

Where approved by the local regulatory authority and the competent aviation specialist, examples of alternative procedures include:

- The construction of limiting case scenarios with associated load plans to support the approved loading procedures;
- The use of compartment weights on larger aircraft; and
- In the case of business jet operations with VIPs, an estimate of body weight.

Actual weights should be derived from calibrated scales provided by either the Company or the Operator. Regardless of the method used to determine passenger weights, the Pilot-in-Command is responsible for ensuring that the aircraft is loaded within its center of gravity and weight limits at all times.

The Operator's documented procedures should detail the method to be used to determine the weight of passengers to be carried on each flight.

Such procedures shall require determination and use of actual body weight (including hand luggage) for passengers to be carried on fixed wing aircraft with a seating capacity of less than thirty seats, and all helicopters.

Where standard passenger weights are to be used, the Operator should document the process used to determine those weights and be able to demonstrate the approval of the loading system by the local regulatory authority.

6.2: Cargo Weight

GRH 1.01.05
GRH 1.02.01
GRH 1.02.02
GRH 1.02.03
GRH 1.04.04

All baggage and cargo will be weighed separately and appear on the manifest and measures are to be taken to ensure that effects of rain do not alter the weight prior to loading. Cargo will not normally be carried inside the passenger compartment during passenger carrying operations. Should it be necessary, the cargo must be adequately secured using nets and straps, and must not obstruct normal or emergency exits and where practical should be placed forward of the passengers.

Appropriate measures are to be taken to protect all baggage and cargo from the effects of rain prior to loading on-board the aircraft. While this is obviously good practice to prevent damage to the baggage and cargo, it is particularly important that exposure to rain does not significantly increase the weight of items to be carried.

While the carriage of cargo in the passenger compartment during passenger carrying operations is to be generally discouraged, it is accepted that there may be times, particularly with some aircraft types, where this may be necessary. In providing for this eventuality and where an Operator has the agreement of the Company, guidance is to be readily available to flight crew and loading personnel regarding the area/s in the cabin that may be used and the means by which the cargo will be restrained. It is critical that only aviation certified restraint equipment is utilized for securing cargo.

The Operator's documented procedures should detail the requirements and processes that are to be used to determine the weight of all baggage and cargo that is to be carried on each flight. This includes approval of the loading system in use.

Where an Operator has the agreement of the Company for cargo to be carried in the passenger compartment during passenger carrying operations, the approval should be included in the Operations Manual and the Operator's documented procedures should detail the locations in the cabin that may be used and the method by which cargo will be restrained.

6.3: Weight and Balance Calculations

FLT 1.06.01
FLT 1.03.03
FLT 1.03.04

Prior to take-off the Pilot-in-Command (PIC) is to ensure that fuel and oil requirements are correct, and that weight and centre of gravity limits of the aircraft have been calculated and are within limits for flight. Use of an approved load-sheet is acceptable for use and must be available in the cockpit at all times.

The Operator's load management procedures should specify the calculation methods acceptable, the center of gravity limits and the requirement for the Pilot-in-Command to authorize the final load calculation. An approved load-sheet (or approved alternative) shall be completed prior to departure of the aircraft on each stage of every flight. Where a flight involves a number of stages, a supplementary load sheet reflecting the loading at the initial stage and accounting for all changes in the load may be used for each subsequent stage on the same day.

The Operator should retain records associated with flight for a period of 90 days.

The Operator's documented procedures should detail the requirements and processes that are to be used to determine the aircraft weight and balance for each flight and provide for a copy of the associated load sheet to be carried on the aircraft and available on the flight deck at all times during flight.

Documented procedures should also detail requirements for retention of load sheets and other documentation related to the weight and balance calculation for each flight for a minimum period for 90 days.

6.4: Manifest

GRH 1.01.02
GRH 1.01.03
GRH 1.01.06
GRH 1.01.07

A passenger manifest is to be raised for each flight or, where applicable, each sector. At a minimum the passenger's full name shall be recorded. The manifest shall always accurately reflect the occupants of an aircraft when in flight, and a copy must be accessible by flight following personnel at all times.

The Operator's load management procedures shall ensure that a passenger manifest is raised for each flight or each sector of a flight where passengers change. The load management procedures should provide for a check of names of passengers allocated a seat on a flight against the list of personnel cleared for travel on a flight by the Company.

It is important that the passenger manifest compiled for each flight accurately reflects the occupants of an aircraft when in-flight to provide full accountability at all times. Operator procedures must ensure that a copy of the completed passenger manifest is readily accessible by aircrew and by flight-following personnel at all times. The Operator's procedures must also ensure that a copy of each completed passenger manifest is retained on file for a minimum of 90 days after the completion of the flight.

The Operator's documented procedures should detail the requirements and processes that are to be used to compile a passenger manifest for each flight. Such procedures should require that passenger manifests contain the name of each passenger carried, the places of their embarkation and destination and clear details of the flight to which the manifest relates such as the date, estimated time of departure, flight route, and where applicable, flight number.

Passenger manifests should be retained with load sheets and other associated loading documentation and should be available in accordance with the Operator's documented retention procedures.

6.5: Dangerous Goods Cargo (Hazardous Materials)

FLT 1.02.01
FLT 2.03.11
FLT 2.03.12
FLT 2.06.05
GRH 1.03.01
GRH 1.03.02
GRH 1.03.03

Carriage of dangerous goods is to comply with current International Air Transport Association (IATA) guidance (or similar guidance such as Title 49 of the Code of Federal Regulations) associated with Dangerous Goods Regulations. The aircraft operator shall have appropriate procedures and trained personnel for the carriage and acceptance of dangerous goods. All aircrew are to have completed dangerous goods awareness training at intervals not exceeding two years.

Dangerous goods are solids, liquids, or gases that are:

- Explosive substances;
- Goods which, by reason of their nature, are liable to endanger the safety of an aircraft or persons on board an aircraft; and/or
- Goods that regulations declare to be dangerous goods.

Dangerous Goods may only be carried, where an Operator has meet the specific training, documentation, record keeping and incident reporting requirements of the responsible regulatory authority.

The safety and successful application of regulations concerning the transport of Dangerous Goods by air is largely dependent on the awareness of all individuals concerned of the risks involved and on a detailed understanding of the Regulations. This required awareness can only be achieved through the completion of initial and recurrent dangerous goods training programs for all personnel that may be involved in the handling of cargo which has been consigned for carriage on board an aircraft. This includes baggage checked-in or carried on-board by passengers.

Resource Company employees who are involved with the consignment or acceptance of cargo and baggage should be required to undertake applicable DG training. Arrangements between the Operator and Company to monitor and ensure that training requirements are met should be discussed and implemented.

The Operator shall be able to demonstrate the local regulatory approval for the carriage of Dangerous Goods (if applicable).

The Operator shall have a Dangerous Goods Manual (or equivalent document) to provide all personnel with the instructions and information that is necessary to enable them to safely perform the task of handling and carrying dangerous goods for the Operator. The manual shall provide such information as is required to ensure that DGs are only carried if packed, loaded and transported in accordance with responsible regulatory authority approvals and current IATA Dangerous Goods Regulations (or equivalent).

The Operator shall have a documented process detailing which personnel are required to be qualified in the packaging, consignment and acceptance of DGs (as applicable). The Operator should establish a tracking system (either manual or electronic is acceptable) detailing staff currency with respect to DG training. The tracking system should include a forward looking function to ensure that DG training events are planned with sufficient notification to meet the 24 month expiry requirement.

Retained loading documentation should be held for a minimum of 90 days. The documentation should be available in accordance with the Operator's documented procedures and in instances where dangerous goods have been carried; the documentation prescribed by the Operator's Dangerous Goods Manual (or equivalent document) is to be available.

6.6: Passenger Briefing

FLT 1.09.01
FLT 1.09.02
FLT 1.09.03
FLT 1.09.04
FLT 1.09.05
FLT 1.09.06
FLT 1.09.07
FLT 1.09.11
FLT 1.13.10
FLT 1.13.11

Passengers shall be briefed on emergency procedures and safety matters prior to flight. Minimum briefing requirements must include:

- ***No smoking around the aircraft and apron area, or at any stage during flight***
- ***General description of aircraft and specific avoid/danger areas***
- ***Location of non-smoking and fasten seatbelt signs and briefing cards***
- ***Use of seat belts and shoulder harnesses***
- ***Location and operation of oxygen masks, if applicable***
- ***Means of communication between crew and passengers and the BRACE position***
- ***Location and use of normal and emergency exits and all life-saving equipment***
- ***Guidance on the use of Personal Electronic Devices (PEDs)***
- ***Passengers must be briefed after any sudden descent, return to base or any other event that may cause concern.***

Regardless of previous flight experience, passengers maximize their chances of survival in situations where they have received an appropriate preflight safety briefing, retained the information passed to them and able to apply the relevant information in an emergency situation.

It is for this reason that all regulatory authorities require that a comprehensive safety briefing be completed prior to each flight.

A safety briefing and/or demonstration should be provided to passengers prior to each take-off and can be completed through personal briefing and actual demonstration or by means of a video presentation. For high capacity jet operations, the regulatory approved preflight safety demonstration meets the above requirements.

In resource sector operations where multi-sector flights utilizing the same passenger complement and crew occurs (e.g. exploration activities), one safety briefing for a 24-hour period is sufficient to satisfy the intent of this control.

The Operator's documented procedures should specify the content requirements and procedures that are to be followed to ensure that all passengers are properly briefed on emergency procedures and other matters of importance to their personal safety before flight. The content and delivery of the briefing will demonstrate that the above requirements have been met.

6.7: Multi-language Briefing

FLT 1.09.10

When the first language in the area of operations is not English, the aircraft operator is to provide emergency exit decals and briefing in the local language as well as English.

It is important to ensure that all preflight safety briefings and printed safety material that is provided to passengers is presented in both English and the language/s most applicable to the majority of passengers carried on a flight.

The Operator's documented procedures should ensure that where English is not the first language of passengers, decals, passenger briefings and passenger-briefing cards are provided in English and the local language. The content and delivery of the briefing will demonstrate that the above requirements have been met.

7.0: Collision on Ground

Aircraft and object collide on ground resulting in aircraft accident

The term 'collision on ground' covers a wide range of safety scenarios relating to damage arising from aircraft either colliding with obstacles while maneuvering on the ground or the collision of people or equipment with a stationary aircraft (including propellers and rotors that may be in motion).

Based on data developed by the International Air Transport Association (IATA), the FSF estimates that 27,000 ramp accidents and incidents — one per 1,000 departures — occur worldwide every year. About 243,000 people are injured each year in these accidents and incidents; the injury rate is 9 per 1,000 departures.

Appropriate measures are to be taken to address and minimize the possibility of aircraft being involved in a collision on the ground. Such measures start with the design and layout of the airfield or landing area and extend to controlling the movement of personnel and equipment around aircraft movement areas.

Particular care needs to be taken in situations where an aircraft is being readied for departure or arrivals and departures of multiple aircraft are occurring.

The Flight Safety Foundation website contains a wealth of information on ground incident prevention at: *http://flightsafety.org/archives-and-resources/ground-accident-prevention-gap*.

7.1: Passenger Terminal Area

Company owned and operated airfields shall have a waiting area for passengers offering security, basic amenities, protection from the elements and a barrier from the aircraft movement area. Separation between incoming and outgoing passengers should be designated.

Written safety material that reinforces key aircraft safety information should be displayed in the waiting area, which may also serve for video briefing and check-in process.

The Company shall provide facilities and features and implement procedures at airfields or landing sites under their control to ensure the safety of persons using those facilities. Such facilities and features must address the safety, security and operational practices related to control of access to and movement on aircraft movement areas.

Accordingly, facilities and features provided in terminal areas and the associated procedures for their use should ensure the efficiency of passenger processing through maintaining separation where possible, between incoming and outgoing passengers. This is particularly important in locations where specific procedures such as passenger security screening are required.

The resource Company should have documented information regarding the facilities available and the procedures that are to be followed for each airfield or landing site under their control. All relevant information should be provided to Operators for incorporation as necessary into their site-specific SOPs.

Appropriate safety information is to be provided in passenger waiting areas.

7.2: Designated Freight Areas

Company owned and operated airfields, helipads and helidecks shall have a designated and secure freight area that provides a controlled environment clear of the aircraft movement area and public thoroughfare.

The Company shall provide facilities and implement procedures at airfields or landing sites under their control that provide for designated areas to be used for the acceptance, storage and/or consolidation of cargo. Such areas should be located clear of the aircraft movement area and positioned to avoid the effects of aircraft prop-wash, jet blast or helicopter down-wash.

Designated freight areas should also be positioned in locations that are away from public thoroughfares and provide for restricted access to enhance safety and security.

The resource Company should have designated areas to be used for the acceptance, storage and/or consolidation of cargo for each airfield or landing site under their control. All relevant information should be provided to Operators for incorporation as necessary into their site-specific SOPs.

The storage location should be adequately designated.

7.3: Passenger Control

GRH 1.01.08
GRH 1.01.09

All passenger movements to and from the designated aircraft movement area are to be conducted under the control of a designated Passenger Control Officer (PCO) or Helideck Landing Officer (HLO) who are in a position to signal or communicate with the crew at all times. The PCO can be provided by the Company or the aircraft operator, and if required may be a crew member in a multi-crew operation.

If not a crew member of the aircraft, the PCO and HLO position must be identified by a distinguishing vest.

Appropriate measures are to be taken to provide adequate control of all passenger movements to and from designated aircraft movement areas. Both the Company and Operator must have complete awareness of whose responsibility it is to provide a PCO or HLO for any operation and what roles and responsibilities are to be fulfilled by a person carrying out this function.

The Operator and/or Company should publish a syllabus for the initial and recurrent training of staff appointed to PCO or HLO positions and detail the process for certification of competency.

If the resource Company is responsible for passenger control to and from designated aircraft movement areas, the personnel must be suitably trained and equipped with all necessary PPE including a high visibility vest with appropriate markings.

Procedures should also be defined that clearly detail who is to fulfill the role of PCO or HLO at each airfield or landing site articulating all roles and responsibilities.

The Operator's operational risk assessment process should specify the passenger control procedures that are to apply at each airfield or landing site used prior to the commencement of operations.

The Operator's SOPs should detail the passenger handling procedures where the PCO duties are carried out by a flight crew member.

7.4: Ground Procedures

GRH 1.01.01

The Operations Manual must include reference to ground handling and manoeuvring of aircraft.

To ensure the safety of aircraft, equipment and personnel, the Operator must document procedures relevant to the ramp or ground handling and maneuvering of each applicable aircraft type, expanding on the information provided in the aircraft manufacturer's approved AFM and/or Ground Handling Manual (where available).

Such procedures should be developed to avoid errors that can occur during ground handling processes and create unsafe situations that may lead to accidents or incidents either directly involving ground handling personnel or the aircraft.

The Operator's documented procedures are to be made available, as applicable, to all personnel who are allocated duties associated with ramp or ground handling of aircraft.

The Operator should document procedures relevant to the ramp or ground handling and manoeuvring of each applicable aircraft type. Where necessary, such procedures should detail any specific procedures or requirements that may apply at each airfield or landing site that is used.

7.5: Rotors Running Load/Unload

FLT1.03.07
FLT5.03.06

When loading or unloading passengers from helicopters with rotors running, the pilot at the controls is only to be engaged in essential cockpit duties associated with identification of external hazards and passenger movement around the aircraft. Rotors running passenger transfer must only be conducted under the supervision of a designated PCO or HLO.

The practice of loading or unloading helicopters with the rotors turning introduces the risk of personnel and obstacles impact with any of the dynamic components of the helicopter.

Operator shall document the circumstances under which loading and/or unloading operations for helicopters with the rotors turning is authorized to occur which should be accompanied with an operation specific risk assessment. The associated procedures shall require that:

- A pilot must remain at the controls at all times and is only to be engaged in essential cockpit duties associated with identification of external hazards and monitoring of passenger movement around the aircraft;
- Passengers are provided with an appropriate briefing prior to approaching the helicopter; and
- Passengers are to be escorted to/from the helicopter by an appropriately trained and authorized person (either the co-pilot or HLO/PCO).

The Operator should document the circumstances under which loading and/or unloading operations for helicopters with the rotors turning is authorized to occur, and the training requirements and procedures that are to apply to safely undertake the operation.

The Operator's documented procedures are to be made available, as applicable, to all personnel who are allocated duties associated with these operations.

The Company and Operator should have an Audit and review process in place to ensure that all loading and unloading operations involving helicopters with rotors running is conducted in accordance with published procedures.

7.6: Parking Apron

For all Company owned and operated airfields, the parking apron area shall be assessed by the aircraft operator as being suitable for operation of their aircraft type. This shall also include consideration of other transient aircraft traffic, helicopter operations, refuelling considerations and Pavement Classification Number (PCN). For long-term operations and where practical, taxi lines specific to the contracted aircraft type should be painted in the apron area for obstacle-clearance manoeuvring purposes.

Aircraft apron areas are to be provided as necessary on airfields they own or operate to permit the loading and unloading of passengers and cargo as well as the servicing of aircraft. Apron areas are to be of sufficient size to safely permit the expeditious handling of aircraft at the maximum anticipated traffic density and accommodate the expected requirements for transient and longer term parking of aircraft. In some locations, consideration must be given to providing suitable area/s that allow for the conduct of safe and efficient De-icing/Anti-icing operations.

Each part of an apron should be constructed to give a pavement load bearing capacity that is capable of sustaining the effects of loads imposed by the aircraft it is intended to serve. Due consideration is to be given to the fact that some portions of the apron may be subjected to a higher density of traffic and, as a result of slow moving or stationary aircraft, to higher stresses than a runway.

Apron marking requirements will be determined primarily by the size of aircraft that are to be accommodated and the level of regulatory authority certification that is to apply to the airfield. However, sufficient guidance markings should be provided to minimize the risk of an aircraft colliding with an obstacle on the ground and facilitate the safe and efficient movement of persons and equipment around aircraft on the apron areas.

evidence

The Operator's Safety Management System manual should detail the requirement for the assessment and management of operational risks to form an integral part of the planning and execution of any change within the operation. The Operator should document the requirement and procedures to be followed in conducting airfield assessments prior to commencing operations to a new airfield. Such procedures shall provide for the assessment of parking apron areas and their suitability for the intended operation. Documented records of assessments of airfields and associated apron areas that have been undertaken should be available for review.

7.7: Perimeter Fence

A perimeter fence aimed at preventing access by livestock, animals and itinerant pedestrian traffic shall be constructed around all Company owned and operated airfields.

A perimeter fence or other suitable barrier is intended to prevent:

- Access to the movement area by animals large enough to be a hazard to aircraft; and
- Access of unauthorized personnel to non-public areas of the aerodrome.

The Company should appoint a person as responsible for the performance of aerodrome serviceability inspections and reporting functions. A person appointed to this position is to ensure that the Operator is advised of possible or known changes to airfield conditions that may present a hazard to aircraft operations, including circumstances where the perimeter fence is not controlling the hazard.

The inspections of aerodrome serviceability that are to be performed must ensure that perimeter fencing and operational areas of the aerodrome are checked for damage, open gates or signs of attempted or actual entry by either animals or humans. The Company should establish procedures that are to be followed in such circumstances, including the completion of a daily checklist, which records any such activity.

The resource Company should document in the airfield operations procedures manual (or other suitable document), requirements for the conduct of routine inspections of airfield facilities and the role and responsibilities of persons appointed to fulfil that function. The Company's documented airfield procedures and requirements should also provide for communication of relevant information to the Operator in a timely manner.

7.8: Airfield Control

All Company owned and operated airfields shall have personnel assigned the responsibility of providing oversight and management of the airfield and operating standards. Duties will include having a basic understanding of the local aviation regulatory system, certification requirements of the airfield and daily airfield reporting officer duties.

Personnel should be appointed as responsible for the oversight and management of the airfield and operating standards of airfield facilities. These functions shall be documented by the Company and will include:

- Inspections of aircraft movement areas to checking surface condition and possible presence of foreign objects;
- Inspections of aerodrome markers and markings, lighting, wind direction indicators and ground signals;
- Monitoring obstacles that may infringe the take-off, approach and transitional surfaces;
- Inspections to determine if any birds or animals are near the aircraft movement areas;
- Inspections of measures, such as perimeter fencing, that are in place to control the inadvertent entry of persons or animals into the movement area; and
- Management of airfield works to ensure the safety of aircraft operations and aerodrome personnel.

Documented procedures for the conduct of daily airfield serviceability inspections prior to the first aircraft movement, after significant wind or rain storms, or when specifically requested by the Operator are required. The use of checklists is encouraged and a written record of the completed inspection and any defects discovered required.

A person appointed to carry out aerodrome serviceability inspections is to be appropriately trained in the conduct of all documented requirements.

The Aircraft Operator must be advised of possible or known changes to airfield conditions which may present a hazard to aircraft operations.

The Company should document in the airfield operations procedures manual (or other suitable document), requirements for the oversight and management of the airfield including the role and responsibilities of persons appointed to fulfil that function. The Company's procedures must also mandate communication of relevant operational information to the Operator in a timely manner.

8.0: Collision in Air

Aircraft and object collide in air resulting in an aircraft accident

The threat of collision in the air most commonly refers to other aircraft however also includes birdlife. The significance to Resource Sector aviation operations, particularly during development and construction phases, is illustrated by multiple aircraft from different Aircraft Operators all utilizing the one airstrip and quite often in uncontrolled airspace. Appropriate controls must be in place and adhered to for the risk to be well controlled.

8.1: Cruising Altitudes

All operations will attempt to comply with the ICAO cruising altitudes for both VFR and IFR flight unless circumstances, such as weather, demand non-standard procedures. Where known bird migratory routes are identified, practical attempts are to be made to plan cruise altitudes above 3000 feet above ground level.

The Operator's SOPs should specify a policy that requires flights to be conducted, unless otherwise assigned a contrary altitude or flight level by an by the appropriate ATC authority, at an altitude or flight level appropriate to the track being flown as specified in the tables of cruising levels provided in Appendix 3 of ICAO Annex 2 – Rules of the Air.

Adherence to the specified tables of cruising levels according the direction of flight improves separation from conflicting traffic during cruising flight and reduces the risk of collision.

While the risk of in-flight collision with birds cannot be eliminated, it is recommended that strategies be considered by aircrew to minimize exposure to this threat when operating in areas of known migratory routes. Statistics reveal that the risk of birdstrike significantly reduces when aircraft are operated at altitudes above 3,000 feet above ground level.

The Operator should document a cruise policy that requires flights to be conducted at an altitude or flight level appropriate to the track being flown as specified in the tables of cruising levels provided in Appendix 3 of ICAO Annex 2 – Rules of the Air (unless otherwise assigned by the appropriate ATC authority).

Where applicable, the Operator's policies should also promote avoidance of areas of known or expected significant bird activity if possible but where aircraft are required to be operated through or over these areas, cruising flight at altitudes above 3,000 feet above ground level are to be recommended where practicable.

8.2: Radar Controlled Airspace

Consideration in using radar controlled airspace when determining cruising altitudes shall be made by the Pilot-in-Command.

Maximizing the extent to which aircraft are operated in controlled airspace optimizes the safety benefits provided by radar-controlled traffic separation.

The Operator's SOPs should outline the requirement for aircrew to consider operating aircraft at an altitude or flight level applicable to the track that will ensure that the flight is operated in radar controlled airspace.

8.3: Airfield Bird Control

When required, active bird control shall be conducted at all Company owned and operated airfields and the presence of birds recorded on a periodic basis. Where possible, birds are to be dispersed or removed in accordance with local wildlife regulatory standards. Seeding grass, open waste disposal and water ponds should be restricted to remove attractions for birds.

Where bird activity is known to exist, aircraft operators are to minimise the risk of bird strike during all operations.

Individual airfields attract birds for a variety of reasons resulting in differing bird control challenges at every location. Variables such as migratory routes, seasonal changes, bird species and local feeding influences, availability of water, freshly cut grass and close proximity of refuse sites will all play a part in the presence of bird life. The availability of nesting habitats provided by hangars compounds the problem.

Airfield bird control programs require consideration of the following controls:

- Airfield habitat management: Management of grass and surface water (including transient accumulations), exclusion of roosting opportunities in buildings and trees within the airport perimeter;
- Airfield locality habitat review: An assessment of bird attractants or related bird activity within the ICAO defined 13km bird circle around the airfield, paying particular attention to sites that have the potential to directly affect the operational safety of aircraft such as in the approach and departure corridors; and
- Active on-airfield control systems: Bird activity monitoring and/or implementation of active bird deterrence methods.

The key to any successful airfield bird control program is habitat control - making the airfield less attractive to birds. This will require determining why a given species of bird may be present in the area and around the aerodrome.

In those cases where the problem is significant, specialist wildlife and bird control advice should be sought by the Company.

The resource Company should ensure that all reports of birdstrikes are relayed back to airfield management from the Aircraft Operator. Where applicable, a bird hazard management plan should be documented as part of the airfield management documentation.

The Operator should document the requirement to inform airfield management and the relevant owner, details of any bird hazards that are known to be present and any procedures that are to be applied as an element of a bird hazard management plan.

8.4: Traffic Collision Avoidance System (TCAS)

FLT 1.11.02
FLT 2.03.14
MNT 3.01.01

Aircraft capable of being flown at night, under the IFR and on long-term contract shall be fitted with a TCAS. The aircraft operator shall have documented procedures describing the action to be taken in the event of TCAS alert.

While ATC procedures and the 'see and avoid concept' shall continue to be the primary means of ensuring aircraft separation, the provision of TCAS (also known as Airborne Collision Avoidance System or ACAS) is a significant control to prevent airborne collision. This is particularly true in degraded visual environments of night and instrument conditions.

For the control to be effective, aircrew must respond to the TCAS in a timely and predictable manner compatible with the system design. Correct response is dependent on the Operator's applicable SOPs and the effectiveness of initial and recurrent training in TCAS procedures.

The Operator shall document clearly stated procedures for the use of TCAS equipment and the specific check and training requirements applicable to the equipment used. The documented procedures shall complement the information provided in the aircraft AFM, POH and OEM instructions.

The check and training program is to cover elements required by the responsible regulatory authority or as recommended by ICAO.

Pilot training records are to confirm that requirements of the training program applicable to the use of TCAS have been appropriately applied in the initial and recurrent training of pilots and the on-going evaluation of pilot competency.

8.5: High Intensity Strobe Lights

MNT 3.01.03

Aircraft on long-term contract operating in airspace without radar coverage and where the potential for conflicting traffic is assessed as being high shall have high intensity strobe or pulse lights fitted. Potential conflicting activities will include low level VFR flights and high density operations in uncontrolled airspace.

Regardless of the type of aircraft flown or the classification of airspace being operated in, it is the responsibility of all aircrew to avoid in-flight collisions with other aircraft through visual contact. Although a simple premise, the 'see and avoid' concept is the last line of defence.

The provision of high intensity strobe or pulse lights on aircraft reduces the risks of in-flight collision by making an aircraft a positive target to other aircrew at earlier stages of a potential conflict. As an added control to the final defence, this is particularly true when an aircraft being observed against terrain, a dark sky or in conditions of low light.

The Operator shall document a procedure for the use of aircraft lighting and where applicable, this procedure shall be reflected in the flight check system for each aircraft type. Aircraft fitted with conforming light systems should be regularly checked for correct functioning of the lights.

9.0: Structural or Mechanical Failure

Structural or mechanical failure of the aircraft resulting in loss of control and crash

Certification of aircraft and their component parts by aviation regulating bodies ensures that commercial and general aviation aircraft meet the highest safety standards, from the time of their initial design to retirement from service. The certification process ensures that the particular design of an aircraft, engine, or other component has demonstrated compliance with current, applicable regulations and successful completion for an aircraft design results in a Type Certificate being issued.

During the conduct of the type certification process, the aircraft manufacturer will develop the maintenance program that is to apply to that aircraft type to support and ensure the continuing airworthiness of the aircraft design.

Once the aircraft has entered into service, it is subject to operational wear and tear that may cause performance degradations or lead to structural or mechanical failure. The approved maintenance program must be followed to ensure the continuing airworthiness of the aircraft and to maintain their aircraft's airworthiness certificate.

9.1: Single-engine Aircraft

Single-engine aircraft shall only be used for passenger flights in a non-hostile environment under day visual conditions.

All single-engine aircraft used for passenger carrying operations are to have turbine engines.

The greater reliability of turbine engines over reciprocating engines is well documented and results in less risk of experiencing an engine failure when operating turbine powered aircraft.

A single-engine aircraft having experienced an engine failure will require a forced landing area within its immediate vicinity. If hostile, the safety, recovery or survivability of the occupants will not be assured.

Use of turbine powered, single-engine aircraft is considered acceptable for passenger carrying operations during day visual conditions over non-hostile environments.

9.2: Multi-engine Aircraft

Multi-engine aircraft capable of sustaining a 1% net climb gradient above the route lowest safe altitude or 500 feet above the terrain in the area of operations with One Engine Inoperative (OEI) shall be used whenever the following conditions exist:

- ***When operating in a hostile environment***
- ***Any portion of the flight will be in instrument (non-visual) or night conditions***
- ***When operating on extended over water flights.***

Engine reliability continues to increase with advances in material and design technology; however engines will continue to fail, albeit at increasingly lower frequency. As a consequence use of multi-engine aircraft will provide a level of redundancy in the event of an engine failure.

What is not often realized is that some multi-engine aircraft when operating at, or near, their performance limits will not be able to maintain higher altitudes with a failed engine. The Aircraft Operator in this case, is required to limit the payload so that terrain clearance, when in the cruise, can be assured in the event of engine failure.

The resource Company must be prepared to accept that not all passenger seats can be utilized to achieve the full One Engine Inoperative (OEI) accountability that Control 9.2 requires. This is particularly true when operating multi-engine helicopters at high temperatures and high density altitudes as found throughout the resource industry.

The Operator shall ensure that it provides resource Companies with any payload restrictions that are required to enable continuation of flight with One Engine Inoperative (OEI) and sustain a 1% net climb gradient above the applicable route lowest safe altitude or 500 feet above the terrain in the area of operations:

- When operating over hostile environments; and/or
- At night or in instrument (non-visual) conditions.

9.3: Supply of Spares

Maintenance organisations are to have a list of Approved Suppliers who are listed in a Quality Assurance surveillance program to ensure that parts received conform to FAA-approved (or equivalent) design data, and are in a condition for safe operation.

For an aircraft to maintain the standard set by initial certification basis, a critical control is to ensure that all spare parts used in the continued airworthiness of the aircraft are traceable, approved and manufactured to the same standard as those components originally fitted to the aircraft.

Aircraft spare parts must be genuine, procured from an approved supplier, traceable to the original manufacturer and stored in an enclosed area free of dust, moisture or any other agent that may compromise integrity and serviceability. Items in the stores area must be listed on an inventory and must be fully tagged with any expiry dates clearly noted.

There must be clear segregation of aircraft serviceable and non-serviceable parts.

MNT 1.03.05
MNT 1.05.01
MNT 1.05.02
MNT 1.05.04
MNT 1.05.05
MNT 2.03.01
MNT 2.03.03
MNT 2.03.04
MNT 2.03.06
MNT 2.03.07
MNT 2.03.08
MNT 2.03.09
MNT 2.03.10

Aircraft maintenance organizations are to have appropriate Quality Assurance procedures in place to ensure that all parts and components to be used in aircraft maintenance are purchased through a recognized source and are accompanied by the necessary supporting documentation or engineering substantiation.

The Operator must have a form of Quality Assurance process established to verify that the maintenance organization is providing an appropriate level of quality and reliability. This will require the maintenance organization forming part of the Operator's audit schedule, unless an equivalent process is in place to guarantee the level of service provided (such as third party audit or applicable industry body certification).

Possible forms of oversight are presented below as examples of the methods available:

- Appointment of a Director Maintenance/Responsible Person: Oversees maintenance activities of the AMO on behalf of the AOC holder to ensure maintenance is conducted in accordance with the AOC Maintenance Control Manual or equivalent;
- Second Party Audit: The Operator undertakes an audit of the service providers before or during the contract time using established audit checklists to examine the contractor against defined criteria or standards;
- Third party Audit: The Operator engages a third-party to carry out an independent Audit of the contractor using established Audit checklists to examine the contractor against defined criteria or standards;
- Survey: The maintenance service provider completes a survey before or during the contract period to provide information on their internal methods of delivering a satisfactory product or service to the Operator; and
- Self-Audit: The maintenance service provider carries out a self-audit (scope of which is agreed with the Operator) before or during the contract period to examine the method of delivering satisfactory service to the Operator.

This level of oversight remains true regardless whether the maintenance is provided in-house or contracted to a third-party maintenance service provider. It remains the responsibility of the Aircraft Operator to provide the necessary assurance that the maintenance provider is completing all tasks to satisfy both the regulatory airworthiness requirements and the Operator's quality and safety requirements. The Operator must clearly define, document and demonstrate how this interface is being managed.

The Operator or its Maintenance Organization(s) shall have a documented Quality Assurance surveillance program that verifies approved parts suppliers hold current FAA-approval(s) (or equivalent) of their design data, meet industry quality and safety standards and are stored appropriately.

Details of the surveillance program shall be published and records of surveillance activity shall be available for review.

Operator or its appointed Maintenance Organization(s) shall have a process for tracking all parts held in its stores facility to verify their source and serviceability status.

9.4: Hangar Facilities

MNT 1.03.02
MNT 1.03.06
MNT 1.03.08

Hangar facilities suitable for the level of activity performed are to be accessible for aircraft operating on all long-term contracts. Long-term field operations, particularly in high rainfall, arctic or desert environments, shall at a minimum have sheltered arrangements for the conduct of scheduled and non-scheduled field aircraft servicing.

Permanent hangars must be fitted with fire extinguishers and fire alarms which are regularly tested according to relevant fire regulations and records of such tests made available on request.

The Operator in consultation with the contracting resource Company shall ensure that aircraft fixed base locations have access to suitable hangars. Protection of the aircraft or helicopter from the elements will substantially increase the life of certain components and will importantly allow maintenance personnel to focus all of their attention on maintenance tasks without being distracted by poor weather, fading light, strong winds, high rainfall, snow etc.

Approvals granted to aircraft Maintenance Organizations will commonly reflect the locations at which maintenance activities can be undertaken and where compliance with the regulatory standards set by the responsible regulatory authority has been demonstrated.

Consideration should be given to provision of suitable facilities for the conduct of foreseeable maintenance activities at locations that are subject to long-term (greater than six-months) or frequent use. Where permanent facilities are in use, they should be equipped with fire alarms, fire extinguishers, lighting, ventilation systems, eyewash facilities, appropriate spare parts storage, flammable stores and have a form of tool control and calibration register.

For all helicopter operations, consideration ought to be given for the provision of overhead lifting equipment that can handle transmission and engine change requirements if necessary.

For all other locations, procedures must be in place to assess the suitability of facilities and address the facility needs for undertaking any non-scheduled maintenance activity that may arise.

Resource Companies should engage with Aircraft Operators pre-mobilization to discuss provision of suitable hangars supporting their contracted activities. This becomes particularly important in long-term field environment where portable hangars can be easily mobilized to provide adequate control effectiveness.

Courtesy: Alliance Airlines

Certificates of approval issued to approved maintenance providers should document the locations at which specified maintenance activities can be routinely undertaken.

The Operator or its appointed Maintenance Organization(s) should have documented procedures that address the suitability of facilities at any location at which non-scheduled maintenance activities may need to be performed.

Facilities should be regularly inspected to ensure that all required equipment is in installed and serviceable.

9.5: Helicopter Vibration Monitoring

MNT 2.08.03
MNT 3.01.01

Helicopters on long-term contracts shall have a plan endorsed by an aviation specialist to fit Health Usage Monitoring System (HUMS) or airframe and engine Vibration Monitoring System (VMS), where systems have been developed and approved for the helicopter type. The aircraft operator shall follow documented procedures to routinely download and analyse data.

HUMS and VMS are used as post-flight diagnostic tools, where the data is collected and recorded from sensors and accelerometers for routine analysis. This analysis is aimed at providing early detection of potential component failure – particularly within the helicopter transmission.

Where an Operator has either HUMS or VMS in use, the System of Maintenance should address procedures for routine data download and analysis of the data.

Personnel training and HUMS go no-go criteria should also be addressed by the Operator.

9.6: Engine Trend Monitoring

FLT 1.13.18
MNT 2.08.01
MNT 2.08.02
MNT 3.01.01

All single-engine turbine aircraft on long-term contract shall have a plan endorsed by an aviation specialist to fit automatic electronic engine trend monitoring system when available for the aircraft type. The aircraft operator shall follow documented procedures to routinely download and analyse engine trend data.

Engine Condition Trend Monitoring (ECTM) provides early detection of poor engine performance through trend analysis. Early intervention to any powerplant issues and subsequent rectification is a critical control in the prevention of engine failure. This is particularly relevant when associated with passenger carrying operations in single-engine aircraft.

The ability of ECTM to provide meaningful information relies on consistent and reliable data. This is best achieved through use of automatic data acquisition systems.

When ECTM is used, the Operator should document the system that ensures engine condition trend monitoring is effectively carried out through:

- Articulating relevant personnel training and qualification requirements;
- Stipulating ECTM data is accessed at specified intervals;
- Stipulating ECTM data is only interpreted by an appropriately trained person;
- Ensuring all ECTM procedures meet OEM and regulatory requirements; and
- Outlining actions to be taken in response to detection of adverse trend data.

Associated records such as trend data print-outs/graphs and staff training records are to confirm that requirements of the ECTM program are being appropriately carried out.

9.7: Minimum Equipment List (MEL)

FLT 1.01.04
FLT 2.03.13
MNT 1.04.08
MNT 2.05.02

Aircraft operators shall develop an MEL for all long-term contracted aircraft. All equipment installed on an aircraft should be operational unless operated in accordance with an approved MEL, or otherwise as approved by the appropriate civil aviation authority under an established program for deferred defects.

Most aircraft are designed and certified with an amount of redundancy in their systems such that the minimum required airworthiness standards are exceeded by a substantial margin. Not all instruments, systems and equipment on board an aircraft are required for safe operation of the aircraft all of the time. For example, instrument lighting is not necessary for operations in day visual conditions and heating systems may be inoperable in hot environments.

The MEL is a document which provides a regulatory approved framework allowing the Operator's personnel to determine what items of equipment under what conditions are allowed to be inoperative at the time of dispatch for the intended flight. An approved MEL consists of an approved list of the specific inoperative equipment for a particular make and model of aircraft by serial and registration mark.

The MEL will define any operational or maintenance procedures and/or limitations that may be required to be applied prior to dispatch and/or during subsequent flight to maintain safe operations. Key to the use of the MEL is the understanding that varying time limits exists for how long an aircraft may be operated between the deferral of an inoperative item and its repair. The Operator should always ensure that the continued operation of an aircraft with inoperative equipment is minimized.

It is essential that training in the applicability and use of the MEL and associated documentation should be provided to both the Operator's flight crew and the maintenance personnel.

evidence

Where required, the Operator shall have approved MELs for the relevant aircraft. The Operator's MEL should be consistent with the Master MEL and approved by the responsible regulatory authority.

The Operations and Maintenance Control Manuals should detail MEL training requirements for all aircrew and technical personnel who have the operational expectation to utilize an MEL. Training records should be available to as supporting evidence.

9.8: Sub-chartering Aircraft

ORG 1.02.02

Sub-chartering (cross-hiring) by the aircraft operator shall not be undertaken unless with the documented approval of the contracting Company. Regardless of ownership, contracted aircraft must be operated and controlled in accordance with the Air Operators Certificate they are operated under.

The requirement to sub-charter (cross-hire) generally arises when an Operator is unable to fulfill a task with their own aircraft and crew due to unscheduled unserviceability or last minute tasking by the resource Company and resort to bringing in an alternative aircraft from another Operator.

To ensure that all standard technical and operational expectations of the service to be provided are being met, such as BARS requirements, the Operator must have a process in place whereby the contracting resource Company is made aware of the potential cross-hire situation as soon as possible. This will enable a review of the alternative service being proposed, and agreement by the client that the alternate service provider will be acceptable.

evidence

The Operator should document the process that is to be followed to procure sub-chartered (cross-hired) aircraft or aircraft services. Such procedures should detail the process to be followed to ensure the operation is suitably authorized under AOC permissions, to advise the Company that the requirement has occurred and to gain their written approval for the activity to proceed.

Operators should be prepared for the possible need to sub-charter (cross-hire) aircraft or aircraft services and develop a list of suppliers for cross-hire operations who have been pre-approved for use by the Company. Letters of authorization from the Company should be available where permission has been sought and granted to utilize cross-hire services.

Courtesy: Cobham

10.0: Weather

Weather conditions force the aircraft to deviate from original flight path and cause an aircraft accident

Weather is a prime consideration in the planning and execution of all flight operations. With respect to clients, every weather assessment made by aircrew must be protected from external pressures intended on influencing their decision to commence or continue a flight. The resource sector has experienced many fatal accidents associated with aircraft continuing into deteriorating weather conditions for the category of flight undertaken. Independent weather assessment and decision-making is an area that only aircrew can make in the safe continuation of flight.

The supporting framework to resource sector aviation operations must include ensuring aircrew have access to appropriate weather information for preflight planning, enroute and destination planning purposes. In the first instance it will be the Operator's responsibility to provide access to this information. However in some remote areas, there may be a role for the Company in making internet and satellite telephone capabilities available to crew members for obtaining the necessary information.

Weather analysis, interpretation and decision-making is an important skill-set for any crew, and the Operator must provide all training, tools and procedures necessary for the crew to perform their duties within the safe operating envelope of the aircraft and their own abilities.

10.1: Adverse Weather Policy

When weather conditions have the potential to make normal aircraft operations, or the ability to provide suitable rescue and response capability marginal, an Adverse Weather Policy shall be developed to provide a formalised process between the aircraft operator and the Company about when flying operations should be restricted or temporarily halted.

The purpose of an Adverse Weather Policy is to formalize an agreement between the Aircraft Operator and the resource Company as to when weather conditions are such that aircraft operations are stopped, or are continued albeit with an increased level of approval authority.

Typically a policy of this nature is only required when the deteriorating weather conditions can have an impact on non-aviation safety issues. Examples include:

- Excessively high wind speeds for personnel movement on helidecks;
- Sea-state conditions that would prevent any search and rescue; and
- Excessive temperature extremes for arriving or departing passengers.

Typically put in place for off shore operations, an adverse weather policy can have an impact for on shore desert and arctic operations. In all cases the policy should provide clear guidance on the conditions jointly agreed between the Operator and the Company under which flying operations should be restricted or temporarily halted.

The requirement for an Adverse Weather Policy will be identified during the pre-mobilization start-up operational risk-assessment involving the Operator and resource Company representatives.

10.2: Wind Shear Training

Aircrew operating aeroplanes on long-term contracts are to have ongoing training addressing the identification and recovery measures associated during microburst and windshear phenomenon.

Windshear has the ability to impact on all aviation operations, both fixed and rotary wing aircraft, and awareness by all aircrew is essential.

The Operator should have in place information, guidance and procedures regarding the recognition, avoidance and recovery from windshear and microburst conditions. Specific training and checking requirements should also be developed and implemented to ensure flight crew develop and maintain:

- The knowledge needed to identify the actual or potential presence of windshear; and
- The competencies required to successfully perform windshear escape procedures following windshear being encountered.

The documented procedures shall, where necessary, expand on and be consistent with information and procedures provided by the aircraft manufacturer regarding recovery from windshear encounter that may be contained in the aircraft approved flight manual or pilot operating handbook.

Where available, check and training of aircrew on windshear recovery procedures should be conducted in an approved flight simulator using windshear profiles recorded during actual windshear encounters.

FSF ALAR Briefing Note 5.4 — Wind Shear (http://flightsafety.org/files/alar_bn5-4-windshear.pdf

The Operator shall document clear policy regarding the recognition, avoidance and recovery from windshear and microburst conditions. Documented procedures shall be consistent with information and procedures provided by the aircraft manufacturer in the aircraft approved AFM or POH.

Pilot training records should confirm that requirements of the training program applicable to windshear identification and recovery have been appropriately applied in the initial and recurrent training of pilots and the on-going evaluation of pilot competency.

Operators are encouraged to develop and implement a policy for mandatory, internal reporting of occurrences involving approach destabilization and associated go-around as would be experienced with windshear encounter. Tracking of such reports by the Operator's SMS will assist with identification of possible specific risks that may exist.

10.3: VFR Minimums

FLT 1.03.05

Aircraft operating under VFR shall be flown in accordance with the local regulatory minimums for flight under the VFR for departure, enroute and destination legs. Localised Standard Operating Procedures are to be developed for those areas, such as mountainous jungle operations, where rapidly changing VFR conditions can be prevalent.

Each Operator should establish weather minimums, which will meet or exceed the minimums prescribed by the local regulatory authority for VFR flight.

In some cases where the local conditions are dynamic and constantly changing, there may be a requirement for a conservative approach of increasing the weather minimums depending on the experience and skill level of the aircrew. Examples of these areas are the high density-altitude mountainous jungle environments as experienced in PNG, South American Andes operations, parts of South East Asia and Africa.

As an alternative or in addition to publishing defined weather minimums, an Operator may elect to adopt a process based on risk assessment methodology as promoted in some ADM programs.

(*http://www.faa.gov/training_testing/training/fits/guidance/media/Pers%20Wx%20Risk%20Assessment%20Guide-V1.0.pdf*)

During the start-up Operational Risk Assessment prior to supporting resource sector activities, the Aircraft Operator is to review the VFR weather minimum criteria for the area of operations.

The Operator shall document clear policy regarding the minimum weather conditions that are to apply for the conduct of a VFR flight particularly where local conditions are dynamic and constantly changing due to local topography or other conditions.

10.4: Cold Weather Training

FLT 2.03.16

Aircrew who operate aircraft in a cold weather environment (ground snow and ice) shall undergo annual training prior to the onset of the winter season that addresses:

- ***Pre-take off inspections***
- ***Anti-icing and De-icing including use of holdover time tables***
- ***In-flight icing and associated hazards***
- ***Cold weather operational take-off, approach and landing***
- ***Runway visibility, contamination and performance considerations.***

Free online courses addressing the above that are readily available include NASA aircraft on-line icing courses (*http://aircrafticing.grc.nasa.gov/*

The hazards associated with frost, snow, ice and freezing rain must be understood by all aircrew and constantly assessed throughout the flight activity.

Where aircraft are operated in a cold weather environment, an Operator must have in place procedures that address ground and flight icing conditions. Initial and annual refresher training for all aircrew, relevant ground handling and engineering staff addressing cold weather operations is required for those areas impacted by these hazards.

Winter operations training packages should be periodically reviewed by operators to incorporate the latest relevant information associated with the threats and hazards associated with cold weather operations.

Training programs for cold weather operations, including review of recent industry incidents associated with icing, is typically scheduled for all relevant personnel prior to the onset of the winter season.

evidence

Policies and procedures for De-icing and Anti-icing of aircraft on the ground and other activities associated with cold weather operations should be published in the Operations Manual when applicable. The syllabus for initial training and processes for conducting periodic training and on-going evaluation of relevant staff should also be documented.

Associated training records should confirm that these training requirements have been applied in the induction training of new staff and are repeated on an on-going annual basis prior to the onset of winter in the area of operation.

10.5: Thunderstorm Avoidance

FLT 1.10.01

Aircraft operators shall have thunderstorm avoidance techniques outlined in the Operations Manual.

Thunderstorms have the ability to impact on all aviation operations, both fixed and rotary wing aircraft, and the threat must be understood by all aircrew.

The Operator shall document all techniques relevant to the aircraft type operated associated with navigating around thunderstorms and avoiding the worst of the conditions that are associated with these systems.

Information will include:

- Avoidance techniques applicable to operations with or without serviceable weather radar equipment;
- Most likely location of severe turbulence around the thunderstorm and the separation standards to be applied to avoid this;
- Precautions to be taken when overflying small but building storms;
- Minimum height at which to fly over a mature storm when clear of cloud;
- The minimum lateral separation to be applied when avoiding upwind and downwind sides of storm cells both above and below the freezing level.

The Operator is to ensure that information contained in the Operations Manual provides crews with adequate guidance on the techniques to be adopted to avoid the severe weather associated with thunderstorms.

10.6: Weather Radar

All aircraft contracted to be able to operate under IFR or at night shall be fitted with serviceable weather radar. In the event the weather radar becomes unserviceable, the aircraft may be flown in Visual Meteorological Conditions (VMC) only and must not be flown in Instrument Meteorological Conditions (IMC), or at night unless the weather forecasts indicate there is no likelihood of thunderstorms, lightning, turbulence or icing.

Weather radars fitted to aircraft are designed for the active detection of adverse weather conditions and allow aircrew to determine appropriate course changes to avoid the adverse weather.

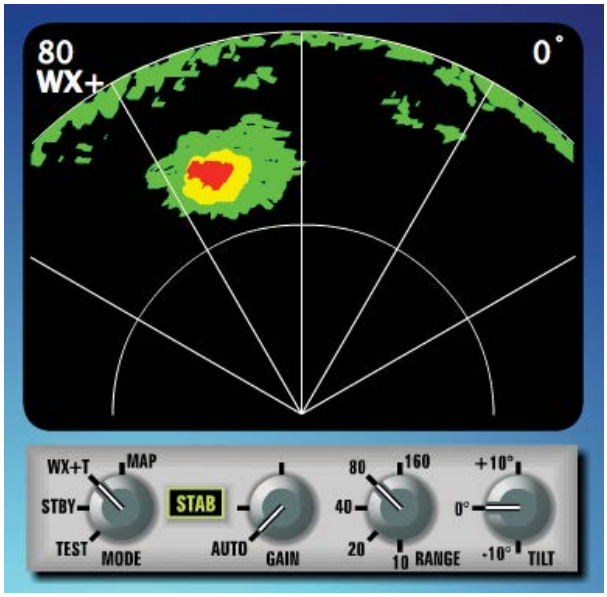
Despite airborne weather radars being fitted to aircraft, incursions into very active cells still occur. It is important that Operators ensure adequate training is provided to cover weather radar capabilities, limitations, operating procedures and interpretation in order to ensure crew understanding of the system.

evidence

The Operator shall provide SOPs, consistent with the information provided in the aircraft and/or radar manufacturer's AFM/POH, that specify procedures for use and management of the weather radar.

The provisions relevant to weather radar systems in the Operator's MEL or OM should specify a requirement for the system to be serviceable for night or IFR flights unless operations are able to be conducted on routes where weather forecasts indicate there is no likelihood of significant convective cloud thunderstorms, lightning, turbulence or icing.

Syllabuses for training relating to weather radar capabilities, limitations, operating procedures and interpretation should be published. Training records are to confirm that training requirements have been applied in the training of staff.



11.0: Medical Evacuation

In addition to the Controls and Defences detailed in the BAR Standard, the following specific additional requirements apply to Medical Evacuation (Medevac) flights

A medical evacuation by air (medevac) is the emergency evacuation of a sick or injured person to a location where suitable medical facilities and care are available. In the resource sector this typically occurs from mine sites, off shore facilities, exploration camps and remote areas to pre-determined locations.

The medical condition of a patient and the level of enroute care that may be required to be administered by medical personnel may have a bearing on the capability of aircraft type to be used. Use of specifically equipped aircraft may be required when requiring life-support systems, oxygen, defibrillators and multiple stretcher configurations.

Resource sector personnel involved in the medevac call-out and approval process need to remain aware that the decision by aircrew affecting safe flight operations must remain independent to the medical urgency of the evacuation underway.

Medical evacuation (medevac) occasionally requires the use of aircraft within a timescale where achieving prior approval of an Aircraft Operator may not be in the best interests of the affected personnel. However, there is a balance to be struck between responding to an emergency and the additional risks of using sub-standard Operators which might put the aircraft (and all those aboard) at risk.

In an emergency, all reasonable effort must be made to obtain input from the designated aviation specialist prior to management decision in using a non-compliant Aircraft Operator. The associated risk assessment must consider comparative risks to personnel health or safety from using a non-compliant Aircraft Operator or delaying until an approved Operator can be on-scene.

11.1: Securing of Medical Equipment

FLT 4.01.01

The aircraft operator must have a procedure that outlines the methodology associated with securing medical equipment in aircraft.

The Operator must ensure that any medical equipment loaded onto an aircraft is appropriately fitted and secured for all phases of flight including take-off and landing. This should include secure storage locations within the cabin of the aircraft to enable medical stores to be accessible in-flight. Equipment such as oxygen bottles, stretchers and associated life support systems if carried must have a load plan addressing correct fitment and securing methods.

The Operator shall provide documented procedures to be followed during the conduct of medevac flights that will ensure all equipment is adequately fitted and secured during flight. Where the Operator provides specific storage locations and/or equipment, the Operations Manual must provide instructions to ensure correct usage.

11.2: Weight and Balance

FLT 4.01.02

The aircraft operator must have a procedure that requires weight and balance calculations to be conducted for all stretcher-carrying operations.

In addition to clear loading instructions regarding correct fitment and restraint of stretchers within the aircraft discussed in 11.1, the Operator must have load information available for aircrew to accurately complete weight and balance calculations in the medevac configuration.

The Operator's Operations Manual shall contain procedures to be used to determine the aircraft weight and balance for each medevac flight where stretchers and ancillary equipment are carried.

11.3: Medical Transfers

FLT 4.01.04

The aircraft operator must have a procedure for operating aircraft at Sea Level cabin pressure for medical transfers when required.

Certain medical conditions will require that the patient is maintained at, or as near as possible to, a sea level atmospheric pressure. Accordingly, aircraft used for the medical transfer of patients who are subject to these conditions should be equipped with a passenger cabin that can be adequately pressurized to enable a sea level cabin environment to be maintained throughout the flight.

For aircraft such as helicopters that do not have a pressurized cabin, operation at low altitudes maybe the only option to deal with the medical emergency being experienced.

The Operator's Operations Manual shall contain documented policy and procedures regarding conduct of medevac operations where the patient's medical condition requires that the pressure of the aircraft cabin be maintained at that equivalent to sea level.

11.4: Communications

FLT 4.01.03

The aircraft operator must have the capability (such as headsets) to allow communications between the medical team and the pilots for each aircraft type considered.

Medevac operations can involve periods of high workload for both the flight crew operating the flight and the medical personnel providing the in-flight care of a patient. This can be particularly common where the medical transfer of a critical care patient is being conducted in adverse weather conditions. In these situations it can be vital for both the safety of the flight and the patient being transferred, that all personnel are able to engage in immediate and unrestricted communication. To facilitate this, aircraft used in medevac operations should be equipped with an effective intercommunication system between the medical team and aircrew.

The Operator's Operations Manual shall outline provision and use of aircraft intercommunication systems for the medical team and aircrew. The Operations Manual should also provide procedural guidance on when 'sterile cockpit' procedures are required to be enforced.

11.5: Risk Assessment

FLT 4.01.05

The aircraft operator must have a risk assessment process that ensures the urgency of medical evacuation is separated from the safety-of-flight decision-making process.

The assessment of risks for medevac flights is a complex process given the competing priorities – safe conduct of the flight versus expedient retrieval involving a potentially life threatening situation. In all cases, safe conduct of the flight must take priority.

A review of industry fatal accidents in the medical evacuation role presents numerous accidents that resulted from the conduct or continuation of flight operations past safe operating parameters due to a fixation on patient well-being. When resulting in fatal accidents it more than often resulted in loss of more than just the patient being retrieved.

A fundamental foundation to a safe and successful medevac activity (as opposed to patient outcome), is having a risk assessment process that enables flight go no-go decisions to be made independent of the ensuing medical emergency. The resource Company should recognize and support this process.

The Operator shall provide documented policy regarding the risk assessment process that is to apply to decisions that have a bearing on the overall safety of a flight operation. Such policy and procedures are to address the initial decision to undertake a flight and the in-flight decisional processes that determine whether a flight is continued as planned or diverted.

Operator records should confirm that the documented policies, processes and procedures associated with the Operator's Safety Management System are being complied with and that the required risk assessments have been completed.

11.6: Local Aviation Regulations

ORG 1.01.03
FLT 4.01.06

The aircraft operator must comply with all local air ambulance legislation and have documented processes in place verifying compliance.

The Operator must ensure compliance with the laws, regulations and procedures of the location in which the aircraft is operated including any legislation that may specifically apply to the conduct of air ambulance operations.

The Operator is to ensure that information contained in the Operations Manual provides crews with adequate guidance to enable compliance with any legislation that may specifically apply to the conduct of air ambulance operations for the location in which the aircraft is operated.

11.7: Equipment Documentation

MNT 5.01.01

The aircraft operator must have appropriate documentation, such as Supplemental Type Certificates (STC), for all medical equipment attached to the aircraft.

All aircraft modifications that provide for attachment of medical equipment to the aircraft are to be carried out in accordance with all applicable airworthiness requirements of the responsible regulatory authority.

All aircraft modifications that provide for attachment of medical equipment to the aircraft are to be appropriately documented with drawings, data and specifications and be subject to a Supplemental Type Certificate (STC) or equivalent.

The Operations Manual shall contain documented descriptions of the equipment fitted and the manner in which modifications to fit medical equipment may affect the normal and emergency operation of the aircraft and its systems. The equipment should be installed in the aircraft as per the specifications.

11.8: Equipment Inspection Schedule

MNT 5.01.02

All medical equipment (including oxygen cylinders) capable of being attached to the aircraft must be on an inspection schedule to ascertain serviceability.

The Operator's System of Maintenance for an aircraft used in medevac operations is to include details of the inspection schedule applicable for all medical equipment fitted to the aircraft and held by the Operator to ensure its ongoing serviceability. The inspection schedule should reflect any requirements or recommendation of the equipment manufacturer or any conditions that may be applicable to the STC (or equivalent) that addresses fitment of equipment to the aircraft.

The Operator's System of Maintenance (or equivalent) for an aircraft that is used in medevac operations is to include details of the inspection schedule that is to apply for all medical equipment fitted to the aircraft to ensure its ongoing serviceability.

Aircraft maintenance records are to confirm that documented requirements and procedures contained in the aircraft System of Maintenance (or equivalent) are being followed.

11.9: Provision of Oxygen

MNT 5.01.03

The aircraft operator must have a procedure that ensures any oxygen cylinders are filled to manufacturer specifications.

A necessary component of any aircraft used for the conduct of medevac flights is the provision of oxygen for patient use during flight. The provision of oxygen for medical use should be independent of that required to be carried for operational purposes.

Where aircraft to be used in medevac operations are permanently fitted with a medical oxygen supply source the Operator's Operations Manual shall contain documented descriptions of the equipment fitted and procedures that ensure oxygen cylinders are filled to and in accordance with manufacturer specifications.

Where portable oxygen equipment is to be used, the Operator's procedures should document the procedures that are to be followed to ensure that oxygen cylinders are filled to manufacturer specifications and safe for carriage on the aircraft.

The oxygen equipment must be fitted to the aircraft as per the manufacturer's data or the applicable engineering approval.

11.10: Aircrew Experience

FLT 2.01.01

All requirements of BARS Appendix 1 are to be met.

The Operator shall ensure that all flight crew members assigned to medevac flights have a current license and meet both the minimum qualification and experience requirements defined by the responsible regulatory authority and those specified in Appendix 1 of the BAR Standard.

The Operator shall maintain records of flight crew qualifications and experience. There must be a documented control mechanism in place to ensure that when crew are assigned to flights, crew pairings meet the task requirements.

Flight crew files and rostering records are to confirm that minimum experience requirements are being met and crew allocations are appropriate to meet the task requirements.

12.0: Aircraft Accident

Mitigating defences in the event of an aircraft accident

All aviation operations are to be conducted in a manner that manages and mitigates the known or identifiable risks involved to ensure that the residual risk is as low as reasonably practicable.

In the event critical control failure resulting in an event occurring, the BAR Standard identifies defence controls to mitigate the impact of the incident.

The defences identified in this section are recognized as the minimum expectation and resource Companies through risk assessment conducted jointly with their contracted service provider are encouraged to provide additional mitigation as warranted by localized conditions.

12.1: Aircraft Certification Standards

MNT 3.04.01

Aircraft designed to the latest certification standards have increased crashworthiness and survivability characteristics when compared to those aircraft certified to older standards. Consideration to the certification standard should be given when selecting aircraft for all long-term contracts.

Over time, the emphasis of aircraft certification standards has developed. From being initially focused on the airworthiness aspects of the aircraft design such as structural strength and handling qualities, the overall crashworthiness of a design has been given greater importance and emphasis in certification requirements.

The certification approach to crashworthiness principally involves ensuring that:

- Aircraft occupants are provided protection from crash impact;
- The possibility and severity of a potential post-impact fire is minimized; and
- Evacuation of occupants from the aircraft cabin can occur as quickly as possible.

Periodic upgrading of regulatory certification standards has led to developments that enhance the effectiveness of each of these factors.

Prior to any contract renewal or tender process, resource Companies should consult with specialist aviation advice in determining the availability and practicality of contracting aircraft to the latest certification standards.

12.2: Emergency Response Plan

ORG 3.11.01
ORG 3.11.02
ORG 3.11.03
ORG 3.11.04
ORG 3.11.05
ORG 3.11.06
ORG 3.11.07
ORG 3.11.08

All aircraft operations (including Company owned or operated airports) shall have an Emergency Response Plan (ERP) commensurate with the activity undertaken. Factors taken into account shall include documented land-before-last-light limitations, exposure considerations, local Search and Rescue (SAR) capabilities, hazards associated with the surrounding environment and reporting officials.

The ERP shall be exercised annually for all long-term operations, and include a bridging document detailing lines of communications between the Company and Aircraft Operator.

Aviation accidents/significant incidents are rare events and despite the importance of implementing immediate and positive action, evidence shows that very few organizations are prepared when such an event occurs. Initiation of timely and appropriate action is

extremely critical in situations where delays or the implementation of incorrect actions may affect the chances of someone's survival.

People who have been involved in the immediate response to an aircraft accident will readily agree that during the first few minutes (and maybe, hours) events can be confusing and chaotic. How an organization performs in the aftermath of an accident or other emergency can depend on how well it handles the immediate response during that time immediately following a major safety event.

Successful response to an emergency begins with effective planning. Both the Company and Operator should develop documented ERP detailing what should be done after an accident and who is responsible for completion of each action. The ERP provides the basis for adopting a systematic approach to managing the organization's affairs and operations following a significant and unplanned event and should be practiced and reviewed regularly.

The Operator shall document an ERP to provide instructions and guidance on the duties and obligations of personnel following an accident or significant incident.

The Company shall document an ERP in relation to each airfield they operate. An airfield ERP shall be appropriate to the aircraft operations and other activities conducted at that location and should provide for the coordination of actions to be taken in an emergency occurring at the airfield or in its vicinity.

An ERP appropriate to the size, nature and complexity of the operations being undertaken should be documented and available.

The ERP should adequately detail and provide for:

- A responsible and qualified person to lead the emergency response;
- The duties and responsibilities of key personnel in an emergency;
- Contact details for all relevant organizations and individuals including local search and rescue (SAR) capabilities;
- Effective communication between the Operator, Company and SAR resources;
- A process for periodically checking and updating emergency contact lists; and
- The conduct of periodic, scheduled emergency response drills, exercises and/or tests. (If the Operator conducts off shore operations, it should ensure emergency response drills include worst-case scenarios involving considerations such as last-light, significant weather and the time taken to search for missing aircraft).

The documented ERPs for both the Company and Operator should provide guidance to both organizations in pre-planning for emergencies, as well as detailing the protocols that will ensure appropriate coordination between the Company and Operator and other affected agencies.

12.3: Emergency Locator Transmitter

MNT 3.03.01
MNT 3.03.02

An Emergency Locator Transmitter (ELT) meeting the requirements of Technical Standard Order (TSO) 126 (406MHz) or equivalent shall be fitted to all contracted aircraft. The responsible party noted on ELT registration as the primary contact is also to be detailed in the aircraft operator's Emergency Response Plan.

ELTs are distress beacons that are activated following an aircraft accident either automatically using a crash sensitive switch that detects excessive force of deceleration or manually by a pilot or other person.

Each ELT has a discrete digital code that, when activated, transmits a position and identification signal that is detected by satellites within the international Cospas-Sarsat system. This information is then transmitted back down to ground stations where the code is read, enabling the source of the transmission to be identified (aircraft registration and location) and the owner of the aircraft determined. ELT registrations are required to be updated to reflect the current operator and contact details. The Operator's point of contact (normally a key member of the Emergency Response Team) should be registered with the applicable authority.

Documented procedures for the activation, serviceability testing and maintenance of ELTs should be provided in the Aircraft Flight Manual (AFM), Operator Manual (OM) and Maintenance Manual (MM) as required and applicable.

Each ELT should be registered with the appropriate authority and the details recorded in the ERP. The Operator should maintain ELT registration documents that ensure the operator contact details and applicable aircraft identification are up to date and correct.

Aircraft maintenance records shall detail the completion of serviceability testing and maintenance procedures of ELTs and devices are being maintained in accordance with the approved System of Maintenance.

12.4: Satellite Flight Following

FLT 1.12.01
FLT 2.07.02

All aircraft on long-term contracts operating in hostile environments shall be fitted with satellite flight following systems. The system shall be monitored by designated flight following personnel with no secondary duties and who, if required, are able to initiate the Emergency Response Plan. The system components shall comprise a cockpit distress function with corresponding audio at the base station, cockpit indication of functionality, satellite telephone with text back-up, internet-based monitoring system and ability to adjust reporting intervals based on altitude.

Satellite flight following equipment provides three dimensional coordinates of appropriately equipped aircraft to authorized ground stations via an associated satellite network. Aircraft GPS position information is transmitted to the satellite network and relayed to ground stations where this information is represented real-time on an internet-based graphical map showing the speed, altitude, direction and position of aircraft.

Satellite flight following significantly reduce the time required to locate an aircraft and respond to an emergency situation, in turn maximizing the chances of survival where aircraft operations are conducted in hostile environments.

Where an Operator has aircraft fitted with a satellite flight following system, the Operator should provide documented procedures that allow for the system to be monitored by designated flight following personnel, with no secondary duties, who if required, are authorized and able to initiate the Emergency Response Plan.

The Operator's Operations Manual (or equivalent document) should contain Job Descriptions that detail the roles and responsibilities for these positions along with details of the training that is to be provided to persons appointed to these positions and the process by which their on-going competencies are assured. The documented training requirements should adequately address management of the flight following function in both normal and emergency operations. Where personnel associated with flight following are to utilize radio communications equipment that transmits over the aeronautical radio communication network, documented requirements should detail the training and licensing requirements that are to apply.

12.5: Flight Following

FLT 1.06.07
FLT 1.12.02
FLT 2.07.02

Where flights are conducted outside of controlled airspace or are not subject to any form of position reporting, the aircraft operator in conjunction with the Company shall establish a system of flight following appropriate for the operation. At all times, an Emergency Response Plan must be able to be activated in the event of distress or loss of communications.

Flight following is normally a service provided by national air traffic control services which focuses on providing information about passing and surrounding traffic. An added benefit of the services provided is the monitoring of an aircraft's normal operations and the ability to initiate response actions in the event of an emergency.

In those situations where flights are authorized to be conducted without flight following being provided by ATC the Operator shall ensure that a system is in place for all such flights to closely monitor the safety and progress of flights and initiate the ERP in the event of an emergency situation developing or communications being lost.

Where an Operator conducts flight outside of controlled airspace or are not subject to any form of position reporting, the Operator should provide documented procedures that allow for such flights to be monitored by designated flight following personnel. Persons who are responsible for flight following will be tasked with no secondary duties and who, if required, are authorized and able to initiate the ERP and notify relevant SAR authorities.

The Operator's OM (or equivalent document) should contain Job Descriptions that detail the roles and responsibilities for these positions along with details of the training that is to be provided to persons appointed to these positions and the process by which their on-going competencies are assured. Where personnel associated with flight following are to utilize radio communications equipment that transmits over the aeronautical radio communication network, documented requirements must detail the training and licensing requirements that are to apply.

More on next page...

The Operator's documented SOPs provides for equipment requirements and procedures that will ensure that constant radio contact can be maintained and that routine position and altitude reporting occurs at intervals of 15 minutes but not exceeding 30 minutes.

12.6: Survival Kit

FLT 1.09.06
MNT 3.03.03

Survival kits appropriate for the geographical location and climatic conditions (offshore, jungle, arctic, desert etc) shall be carried for those operations where search and rescue response times would necessitate use of the equipment.

The ability for a search and rescue response will vary, and will always be affected by variables such as weather, availability of resources and time of day. Because of this every flight should be considered as a potential survival situation requiring survival equipment appropriate to the location and climatic conditions.

The Operator will have a documented procedure specifying what requirements are to be contained in a survival kit if requested by the BMO or when required by the local regulatory authority. Where a survival kit is not routinely carried on an aircraft, the Operator should have a documented procedure to be followed in circumstances where the fitment of survival kits is required. The condition and content of a survival kit should either form part of the System of Maintenance or be tracked and inspected using an equivalent process.

The content of the survival kit should be described in the Operator's documentation and shall be applicable to both the seating capacity of the aircraft to which it is fitted and the geographic and/or hostile environment in which operations are to be undertaken.

12.7: Aircrew Survival Vest with EPIRB

FLT 5.04.03

Aircrew operating helicopters in hostile environment shall wear a survival vest which at minimum contains a voice-capable GPS Emergency Position Indicating Radio Beacon (EPIRB).

The requirement for helicopter aircrew to wear a voice-capable EPIRB as mitigation addresses several lessons-learned from resource sector accidents:

- Back-up source of location in the event the ELT does not activate;
- Ability to communicate to searching aircraft to assist in locating survivors. This is particularly important in a jungle environment where the overhead canopy may prevent the searching aircraft from visually identifying the survivors below; and
- Ability to communicate the condition of the survivors to the searching aircraft, and whether there is a requirement to winch the critically injured out prior to last light before a ground party can reach the accident scene.

The requirement to have the EPIRB carried in a survival vest on the aircrew is to maximize the opportunity of its use in any accident scenario. Where the Operator elects to carry voice-capable EPIRBs in the cockpit, but not as part of an aircrew survival vest, a risk-based discussion demonstrating equivalent level of capability should be documented and available to the resource Company.

evidence

Where an Operator undertakes helicopter operations in hostile environments directions should be provided in the Operations Manual regarding the requirement for aircrew to wear a survival vest that, as a minimum, has a voice-capable, GPS EPIRB.

Maintenance records should detail the completion of serviceability testing and maintenance procedures of beacons fitted to survival vests.

The Operator should maintain registration documents for each beacon that appropriate identification and contact details are up to date and correct.

12.8: First-Aid Kit

MNT 3.03.04

A minimum of one first-aid kit is to be carried on all contracted aircraft.

The Operator must ensure that a minimum of one first-aid kit is carried on all aircraft that are used in support of resource sector operations. Where not defined by regulatory requirements, the contents of first-aid kit(s) should be determined by specialist medical advice and applicable for the type of activities being undertaken.

The first-aid kit(s) should be stored in an appropriate location in the aircraft to ensure ready access by the crew in-flight, and, in consideration of possible needed use outside the aircraft in an emergency situation, should be located near an exit.

evidence

The Operator's documented procedures shall require a minimum of one first-aid kit to be carried as aircraft equipment on all aircraft that are used in support of Company operations. The Operator should document a defined location where the first-aid kit(s) is retained on each aircraft and where the contents of a first-aid kit are not defined by regulatory requirements, a full description of the required contents of the kit carried on each aircraft.

The Operator should have a documented procedure in place to provide for the contents of first-aid kit(s) to be routinely inspected and ensure the required contents remain intact, serviceable and within the expiry date.

Crew change – Western Australia

12.9: Passenger Dress Requirements

GRH 1.01.10

Operators shall require passengers to wear clothing and footwear appropriate to the environment being flown over regardless of the flight duration.

With the exception of hard hats with chin straps, the wearing of caps and other headgear of any type in and around helicopters is prohibited. This does not apply to flight crew members inside the cockpit, conducting an aircraft inspection with rotors stopped or during rotors running with the cap secured by communication headset.

The ability to adjust the environmental conditions of a passenger cabin of an aircraft ensures that, despite the severity of ambient conditions outside the aircraft, passenger comfort can be maintained. While this level of comfort can enable passengers to wear clothing that is comfortable for the flight, what a passenger wears on a flight can significantly affect their chances of surviving an emergency where the aircraft may be required to make an emergency landing at a location other than the intended destination.

To maximize the chances of surviving an emergency landing, passengers shall be required to wear clothing and footwear appropriate to the environment being flown over based on a risk assessment. Transport Category fixed wing aircraft are generally excluded from this requirement, however at the discretion of the contracting resource Company these aircraft may continue to be included in the requirement.

Guidance associated with helicopter and commuter category aircraft typically includes:

- Long sleeve shirts and long trousers;
- Closed-toe shoes with skid-resistant soles;
- Avoid any synthetics that melt when exposed to intense heat; and
- Use of layers in cold, hostile environments.

The resource Company should develop guidance on passenger dress requirements, in consultation with the Aircraft Operator. The dress requirements established by the resource Company should be the minimum acceptable standard applied to the Operator's personnel also.

12.10: Cockpit Voice Recorder (CVR)/Flight Data Recorder (FDR)

MNT 3.01.01
MNT 3.04.01

Aircraft on long-term contract and certificated with a seating capacity of more than nine passenger seats shall be fitted with a Cockpit Voice Recorder and Flight Data Recorder when available for the aircraft type.

A cockpit voice recorder (CVR) records the audio environment in the flight deck of an aircraft and a Flight Data Recorder (FDR) monitors and records specific aircraft performance parameters. While outputs from the FDR may be used to support a Flight Data Monitoring (FDM) - or Flight Data Analysis Program (FDAP) - the prime purpose of both the CVR and FDR is to collect and record data associated with the conduct of flights for the purpose of investigation of accidents and incidents. Typically, data is recorded onto a medium designed to survive an accident and both devices are mounted in the tail section of an aircraft to maximize the likelihood of their survival in a crash.

Outputs from both the CVR and FDR are protected by regulations that ensure any data retrieved is for accident investigation purposes with the aim of improving safety.

evidence

Where fitted, relevant information regarding the CVR and FDR should be documented as applicable in the Operator's documentation as follows:

- The AFM and SOPs should articulate required operating procedures;
- The MM should detail the required maintenance procedures; and
- The MEL should specify the conditions under which flight can be undertaken with either piece of equipment unserviceable.

Maintenance records are to confirm that required and approved maintenance intervals and procedures are being followed.

12.11: Upper Torso Restraint

FLT 1.13.11
FLT 6.08.01
MNT 3.01.01
MNT 3.01.02

All helicopter and single-engine aeroplane crew and passenger seats shall be fitted with upper torso restraints and worn by crew and passengers at all times.

The use of seat belt extensions that interfere with the full effectiveness of the upper torso restraint is prohibited.

Survivability of an aircraft accident is influenced by the following aspects:

- A liveable structure during the impact sequence;
- The impact forces transmitted to the occupant;
- Occupant retention;
- Post-crash fire; and
- Evacuation.

The US National Transport Safety Board (NTSB) conducted a study regarding general aviation crashworthiness where analysis of data from 1,982 accidents revealed that shoulder harnesses:

- May have prevented 20 percent of the fatalities; and
- Significantly reduced 88 percent of the original serious injuries found in the survivable accident data (Refer to NTSB/SR-85/01 for details).

All aircraft must be equipped with restraint systems that meet the minimum certification standards for the specific aircraft. The restraint system for each forward-facing or aft-facing seat in all helicopter and single-engine aeroplanes must consist of a safety belt, and a shoulder harness (three-point or four-point system), with a metal-to-metal buckle or latching mechanism to provide the occupant adequate protection when exposed to dynamic loads to be expected in normal and emergency situations.

For helicopter operations, each front seat occupant is to be provided with, as a minimum, a restraint system that is fitted with a double-strap shoulder harness (four-point system). Aircraft may be fitted with a five-point system that provides an additional crotch strap.

Aircraft occupants, including aircrew, are to wear lap belts and shoulder harnesses during all phases of flight unless the Pilot-in-Command directs otherwise in consideration of a valid operational or safety reason.

The Operator's should provide directions regarding the mandatory wearing of seat belt/upper torso restraint (UTR) systems and the circumstances under which restraints for the upper torso can be removed. The Operator's documented information should also contain a recommendation or policy that passengers should ensure that restraints remain fastened at all times while seated. Correct donning, wearing and removal of the UTR must be addressed in any preflight safety briefing.

The certification standard of the UTR must be demonstrated either through OEM data or Supplemental Type Certificate.

12.12: Limitations in Sideways Seating

FLT 1.09.09
FLT 1.13.11

Sidewards facing seats are to be avoided during take-off and landing, unless regulatory approved shoulder restraints are used and passengers briefed on the importance of their use accordingly.

Research shows that the human body has less resistance to accelerative forces in the lateral than in the longitudinal direction. In an accident scenario occupants of sideways facing seats are more exposed to injury than occupants of forward or aft facing seats.

Tests conducted using sideways facing seats have shown that occupants of these seats cannot be adequately restrained during an accident sequence using the conventional lap seat belt. Unless a Regulatory approved harness is fitted, the seats are not to be used during take-off and landing.

Where an Operator is using aircraft fitted with sideways facing seats, the Operator is to document a requirement that these seats are not to be utilized during take-off and landing unless the aircraft is fitted with an approved sideways facing occupant restraint system. The Operator must provide adequate guidance for crew to enable them to ensure that the approved harness is fitted correctly for passengers seated in sideways facing seats.

12.13: Crash Boxes

Company owned and operated landing sites supporting long-term operations shall have a crash box accessible to personnel at the airfield or primary helipad supporting long-term operations. Contents of the crash box shall be tailored to the environment and aircraft type, but at a minimum should include:

- ***Rescue axe***
- ***Bolt cutters***
- ***Crowbar***
- ***Grab Hook***
- ***Hacksaw and six spare blades***
- ***Fire resistant blanket***
- ***Fire resistant gloves***
- ***Adjustable wrench.***

The equipment listed will be of use in the immediate response to an accident where rescue of personnel is required. The crash box must be readily accessible, located in the vicinity of the airfield or helideck and must be ready for use at all times.

The Company should ensure a suitably provisioned crash box is made available at an airfield or helipad. The relevant documentation must include a list of contents, the location of the crash box and the inspection schedule.

12.14: Rescue Fire Fighting

All Company owned or operated helipads or airfields shall have a means of extinguishing a fire with trained and experienced personnel that is commensurate with the potential risk.

A rescue fire fighting capability will focus on providing a first response capability that will assist in the rapid evacuation by an aircraft's crew and passengers in an emergency scenario. This capability will vary depending on the size of the aircraft being operated.

Key principles in the provision of a rescue fire-fighting capability supporting resource sector operations are:

- The level of fire-fighting capability is risk-assessed as being appropriate for the activity undertaken;

- Personnel tasked with a fire-fighting role should receive appropriate initial and recurrent training on the likely scenarios and the equipment being used;
- Annual exercises using the fire-fighting resources should be conducted;
- As close to contract start as possible, aircrew supporting long-term contracted operations should provide an overview of the contracted aircraft basic fire considerations to supporting rescue personnel. This should include location of aircraft fuel tanks, emergency exits and their external operation, wheel brake areas likely to get hot in high speed aborts and basic aircraft fuel isolation; and
- A discussion on the various types of fire suppression, including compressed air foam systems, and their relative merits should be conducted with fire-fighting specialists when required.

Where the airfield or helideck has a fire fighting capability established, the capability should be supported by a risk-assessment confirming acceptance of the capability.

Fire fighting equipment should be subject to regular inspection, tagging and testing and personnel should have initial and recurrent training appropriate to the tasks assigned to them.

12.15: Insurance

It is the responsibility of the contracting Company to determine the level of insurance required in line with Company risk management standards.

Each operator shall provide documentary evidence to the contracting Company of the required insurance coverage. Such insurance shall not be cancelled or changed materially during the course of the contract without at least 30-days written notice to the Company.

The Company shall be named as additional insured under the contract.

Insurance forms a necessary part of any recovery from an incident or accident. The resource Company should ensure sufficient insurance cover is in place and that aircraft operators have the necessary insurances in place as part of their AOC and approval to operate.

The resource Company should ensure that the Operators insurance meets their expectations and Company is nominated as additional insured.

The Aircraft Operator should have statements of insurance cover that state the level of insurance carried for both hull loss events and per passenger.

BARS

BASIC AVIATION RISK STANDARD

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