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
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A. Introduction

A.1 Purpose

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

Volume 1 of the BARS Implementation Guidelines provided additional context to the Controls and Defences applicable to all aviation operations supporting the resource sector. Volume 2 is designed to cover all role-specific applications that might require unique controls and defences tailored to the flight regime and activity being conducted. The nature of Volume 2 further allows for the collation of guidance material associated with some of the unique aspects to resource sector operations, such as remote airstrip guidance, geophysical flying and cold weather operations.

The BAR Standard and both volumes of the BARS Implementation Guidelines are intended to supplement all National Aviation Regulations which must always be followed, and International Civil Aviation Organization (ICAO) Standards and Recommendations which must also be followed if they have been adopted by the country of operation.

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.

Where Volume 2 of the Guidelines references the BAR Standard, the same control numbering is provided for ease of cross-referencing. The intent for each control is to provide either (1) evidence for the Aircraft Operator to use to satisfy the intent of the control, or (2) guidance for the resource Company to follow to meet the requirement. 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

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 BAR Standard is at the discretion of the resource Company in consultation with the Aircraft Operator and specialist aviation advice. Any variance raised should be assessed to demonstrate that the risks are acceptable for the continuation of operations.
1 HELICOPTER EXTERNAL LOAD OPERATIONS

The use of helicopters provides the operational flexibility to move cargo and/or perform low-level geophysical operations, using an external underslung load.

The critical controls essential for the conduct of minimum-risk external load operations are:

- Certified, in-date and serviceable external load equipment and rigging;
- Qualified, experienced, current and competent riggers and flight personnel;
- Serviceable helicopter suitable for the load/environment;
- Fuel management;
- Suitable pickup and set-down areas;
- Aircraft performance margins particularly when pick up and set down are at different density altitudes; and
- Standard Normal and Emergency Operating Procedures with accompanying training.

Amplification of these critical controls provides detailed standards to ensure risk mitigation can be applied in any external load activity, whether on shore or off shore. Through control self-assessment using the following standards, assurance of the localized controls required and how their effectiveness is assessed will be provided to the resource Company.
13.0: Fuel Exhaustion – External Load Operations

The helicopter operates on minimum fuel load to maximise lifting capability and runs out of fuel and suffers an engine flame-out resulting in an aircraft accident

To improve lifting capability, the helicopter’s operating weight is minimized in order to maximize the external load weight able to be carried. After the helicopter’s operating weight has been reduced to a minimum by the removal of non-mission critical equipment, the only variable remaining to reduce the operating weight is fuel.

External load activities are conducted in Visual Flight Rule (VFR) conditions and are generally:

- Within relatively short distances of the operating base; and
- In close proximity to accessible refueling points.

These factors support minimizing the reserve fuel carried to maximize the external load weight capability. However, operating with reduced fuel margins can only be conducted when all fuel management controls are risk-assessed and followed as briefed and planned.

13.1: Fuel Reserve

A minimum fuel reserve of 20 minutes is to be maintained at all times.

Unless more reserve fuel is required to be carried by the local regulator, flight crew engaged in external load operations shall ensure that a minimum “fixed” reserve of fuel is carried to allow for 20 minutes of operation (holding at 1,500 feet above the landing site at the ambient atmospheric conditions).

Carriage of this reserve fuel is intended to provide for unplanned maneuvering in the vicinity of the site at which a landing is to be undertaken. This reserve fuel would normally be retained in the helicopter upon final landing.

For those helicopter types where illumination of the low fuel light requires the helicopter to land immediately or “as soon as practicable”, a specific risk assessment should be conducted to ascertain appropriate minimum fuel requirements that satisfy the intent of this control.

The Operator shall document in the Operations Manual or SOPs the requirement for the PIC of a helicopter engaged in external load operations to ensure that sufficient fuel is on board the aircraft prior to each flight to provide a minimum reserve of 20 minutes (or greater amount if determined by risk assessment or local regulatory authority). The 20 minute fuel reserve shall be expressed in the same terms as the helicopter fuel gauges (pounds, kilograms, gallons, liters or percentage).
13.2: Low Level Light

*When available for the aircraft type, a fuel low level warning light is to be fitted.*

The fuel low level light, when illuminated, provides cautionary advice to the flight crew that the quantity of fuel on board has reduced to a low level and action must be taken to terminate the flight before fuel exhaustion. Flight Manual instructions on the matter may differ between helicopter types – typically requiring the flight crew to “land immediately”, “land as soon as possible” or “land as soon as practicable”.

Where a Supplement or STC is available, it is preferable that to have the fuel low level light linked to the Master Caution system to increase the alerting level provided to flight crew.

Whatever the Flight Manual requirements, at all times a clear understanding by flight crew on the actions required of them in the event of the illumination of the low level light must be understood. This includes having a detailed knowledge of the aircraft fuel system and how much usable fuel remains when the light illuminates.

When use of the low-level fuel light is relied upon, such as external load operations, annual calibration should occur and be part of the System of Maintenance of the aircraft.

Where a Fuel Low Level warning light system has been fitted to a helicopter, it should be referenced in the AFM (possibly as a Supplement or STC). The Operator shall document in the Operations Manual, clearly stated SOPs that address the actions required to be taken by the PIC of a helicopter in response to illumination of the Fuel Low Level warning light. The applicable MM and/or SoM are to address the on-going maintenance and calibration requirements (minimum annually) applicable to the system installed.
14.0: Failure of Lifting Equipment – External Load

The lifting equipment fails and drops the load, resulting in loss of the load and/or an accident on the ground

Certified, in-date and serviceable external load equipment is a critical control in any external load activity. External load equipment includes everything from the belly hook of the aircraft downwards. This incorporates the line, swivels, shackles, D-rings, straps, nets, baskets, welded lifting lugs, bags and anything used to secure or support a load.

A disciplined and rigorous assurance process using the following controls will assist in preventing failure of lifting equipment:

• Certified to manufacturer’s requirements by appropriately qualified personnel, and within the certification period (in-date);
• Periodic scheduled servicing by appropriately qualified personnel in accordance with the Operator’s maintenance schedule;
• Each item is stamped and/or “tagged” showing its certified load rating, and its compliance with certification dates and servicing cycles;
• Assessed as serviceable by maintenance personnel after each use before return to store;
• Maintained in the Operator’s maintenance system in accordance with the requirements of aircraft parts;
• Assessed as serviceable before use by ground/flight crew;
• Shackle pins must be secured (e.g. lock-wired) to prevent accidental load release; and
• The equipment must be returned to the Operator immediately after use and not used for any other purpose.

14.1: Lifting Equipment

Whether steel, Kevlar or other synthetic lifting devices are used, the aircraft operator is to ensure the serviceability and certified safe working load of the equipment is adequate for the task and appropriate to the material used for the line.

Failure of lifting equipment has been a significant cause in the loss of loads in flight.

Certification of the lifting lines by personnel who have been appropriately trained in the Original Equipment Manufacturer’s (OEM’s) requirements is essential. Use of lines not certified or without appropriate certification documents must not be permitted.

Based on industry standards the ultimate breaking strength of rigging must be 5 to 6 times the safe working load of that rigging. The safe working load limit of the line must be a minimum of 5:1 and pre-determined as being capable of lifting the planned load prior to use. Most certified rigging equipment will be provided with a 6:1 ratio. Work Load Limit charts are available from the lifting equipment OEMs.

The Operator shall retain records reflecting that any lifting equipment has been certified for use by the equipment manufacturer, has been tested and released to service by the maintenance provider and has been subject to a manufacturer’s approved maintenance program.

Associated records are to confirm that requirements of the lifting equipment manufacturer’s approved maintenance program are being appropriately carried out.
14.2: Servicing Schedule

Lifting equipment is to conform to a servicing schedule that provides all necessary documentation associated with inspections, certification and serviceability. Copies of this servicing schedule are to be made available to the aircraft operator’s representatives in the field.

All lifting equipment must be tracked by means of a documented and auditable servicing schedule. As with certification requirements of the lifting equipment, the servicing schedule is reliant on appropriate tagging of the equipment. Metal tags are the preferred method as synthetic nylon tags have been known to deteriorate. Most synthetic lines should not be color coded on the line itself (unless they are provided in a manufacturer’s color scheme), as long-term degradation of the material in contact with the paint can occur. Color coding on steel is acceptable.

Lines without any form of identification or tagging must not be used and must be taken out of service until re-certification can occur.

All re-certification, scheduled servicing and any other checks must be documented by the helicopter Operator on an external load lifting equipment register and the register must be available for reference by the staff operating in the field.

Where lifting equipment is provided by a third party, for example a contracting “client”, the Operator must ensure that any lifting equipment provided meets these maintenance, certification and tagging requirements.

The Operator shall maintain records, or have access to third party records, reflecting that all lifting equipment has been certified for use by the helicopter or equipment manufacturer has been tested and released to service by the maintenance provider and has been subject to a manufacturer’s approved maintenance program.

14.3: Visual Inspections

All lifting equipment (cables, lines, straps, baskets, swivels, clevises etc) shall be inspected by appropriately qualified personnel on a daily basis prior to flight. Any signs of wear, fraying, corrosion, kinks or deterioration should result in the equipment being discontinued for use.

To supplement the certification process, a daily inspection by appropriately qualified personnel such as the pilot, loadmaster or other suitably qualified and trained personnel in accordance with all OEM requirements will assist in mitigating the risk of equipment failure leading to an external load incident. Qualified personnel can include personnel trained by the Aircraft Operator, external load specialists or through accepted industry training programs. Early detection of impending equipment failure will ensure that defective equipment is removed from service and returned for repair or discarded.

All external load activities, schedules and plans must allow for adequate time for the helicopter Operator’s personnel to perform all necessary checks on load equipment prior to the day’s tasking.
The Operator shall document in the Operations Manual, policy and procedures that require all lifting equipment to be subject to a daily serviceability inspection by qualified personnel prior to use. Such procedures shall clearly state requirements for the removal of equipment from service if found to be not in a fully serviceable condition. Associated records are to confirm that requirements for daily inspection of lifting equipment are being appropriately carried out.

14.4: Shackles

The shackles used to connect the cable to the aircraft shall conform with specific Flight Manual supplements regarding the diameter of the shackle rings and their use with respective hook types on the aircraft.

Shackles provide a method of attaching load lines to the aircraft as well as the load line to the load itself. The shackle, ring or device used to connect the load to the hook must be compatible with the hook. A review of accidents involving under slung loads reveals that the use of the incorrect size and shape of the shackle that links the load to the hook has contributed to a number of dropped loads. An incompatible shackle raises the potential of:

- Unintended release (dynamic roll-out) where the shackle (or ring) collapses the hook “keeper”, allowing the load to detach from a closed hook; and
- The load not releasing when intended due to the ring jamming on the hook assembly.

If there is no Flight Manual supplement available a pre-start operational risk analysis should be conducted to confirm the correct shackle size is being used.

The Operator shall document procedures that are to be followed to ensure the shackle rings used in external load operations meet the design specification of the equipment fitted to the helicopter and as detailed in the applicable AFM supplement.
15.0: Inadvertent Load Release – External Load

The load is inadvertently released in flight, falls to the ground resulting in loss of the load and/or causes an accident

A dropped external load poses a serious risk to personnel and ground facilities and probable destruction of the load. The risk of part of the disconnected load or external load equipment striking part of the helicopter should also not be discounted. Risk mitigation strategies must consider both human failures as well as technical failures as both classes of failure have been well documented in previous incidents.

15.1: Manual and Electrical Release Mechanisms

*The aircraft is to have serviceable cockpit manual and electric release mechanism and an external manual release at the hook.*

Pilots releasing external loads will normally utilize the cyclic or collective mounted electrical release switch. However, in the event of an electrical release mechanism failure or even a total electrics failure, the alternate system of the cockpit mounted manual release system will have to be used by the pilot. Ground crews also have the capability of releasing the load from underneath the helicopter using the hook mounted release mechanism should the need arise.

Both the manual and electrical hook release systems should be checked and functionally tested before commencing hook operations each day, and each time the hook assembly is fitted to a helicopter.

The Operator shall document procedures that require all lifting equipment to be subject to a daily serviceability inspection by qualified personnel prior to use. Such procedures shall clearly state requirements for the daily inspection of manual and electrical hook releases to ensure the serviceability and correct operation of this equipment.

Associated records are to confirm that requirements for daily inspection requirements are being carried out.
15.2: Standardised Controls

*When practical, for aircraft of the same or similar type, the aircraft operator is to standardise the electrical load release switches, particularly when located on the cyclic and collective controls.*

Misidentification and selection of a cyclic or collective hook release switch has been a significant cause of inadvertent load release during external load activities.

Standardization of release switches will play an important role in minimizing the occurrence of human error. An Aircraft Operator should make every effort to standardize the switches in aircraft fleet able to be operated by the same pilots. At a minimum the same type and model of aircraft used on the same external load operation must have standardized switches, but this should also extend to all aircraft of the same model and type, and where practical, to different types of helicopter if the Operator’s flight crew are rated on more than one type.

In the event that standardization of switches has not yet been completed, or is in progress, detailed differences training must be conducted by all flight crew until such time as the standardization can occur.

*Where dedicated helicopters are to be used on an external load campaign, verification and assurance of standardized controls throughout the contracted fleet should occur prior to contract start.*

---

Evidence

Inspection of a representative sample of helicopters in an Operator’s fleet is to confirm that, in accordance with the Operator’s policy and equipment design requirements, the layout of all external load release switches is standardized on helicopters of the same or similar type. Where an electrical load release switch is fitted to a helicopter, it should be referenced in the AFM (possibly as a supplement or STC).

Differences training shall be provided where there is still a non-standard fitment throughout the Operator’s fleet.

15.3: Guarded Release Switch

*When possible for the type, all electrical release switches shall be guarded to prevent inadvertent activation.*

One of the design standards for aviation is that a two-stage activation process should protect critical systems. The two-stage process comes in many forms, and can involve the use of “gates” or lift-and-throw type switches. The primary design philosophy is to protect against inadvertent selection by introducing the requirement for the Operator to go through two separate and distinct processes before a system can be activated.

To protect against inadvertent activation of the external load release switches, guards should be fitted to all electrical release switches where possible.

Whenever non-standard conditions within company operations or equipment exist, appropriate differences training on the equipment type must be developed and documented as having occurred by all flight crew involved in the external load operation.

*Where dedicated helicopters are to be used on an external load campaign, verification and assurance that guarded release switches are in place should occur prior to contract start.*
Inspection of a representative sample of aircraft in an Operator’s fleet is to confirm that, in accordance with the Operator’s policy and equipment design requirements, each electrical load release switch is guarded to prevent inadvertent activation. Where an electrical load release switch is fitted to a helicopter, it should be referenced in the AFM (possibly as a supplement or STC).

15.4: Load Construction

_The aircraft operator is to ensure that all loads are rigged by appropriately qualified personnel._

The integrity of an external load can be affected by many factors including the load’s rigging, shape, size, length and distribution. External loads are subject to a wide variety of forces in flight and the aerodynamic effects on loads cannot always be anticipated. Qualified personnel must always be used during the load preparation phase as they will be best able to anticipate the load construction and restraint requirements.

While the Pilot-In-Command of a helicopter performing a helicopter external load operation has final responsibility for the acceptance of any load to be carried, only personnel who have been appropriately trained and qualified shall be authorized to perform rigging of the load. Personnel such as qualified loadmasters or Aircraft Operator’s specialists must be trained and qualified using recognized industry training programs that utilize manufacturer standards and rigging procedures.

Electromagnetic or mechanical swivels must be used in conjunction with load equipment to allow rotational movement of the load and avoiding twisting. In an electromagnetic swivel, an electric current continuously passes through the rotary connector of the swivel. All swivels should be certified and appropriately rated for the load carried.

Operators documentation, or third party rigger’s documentation, must include guidance for rigging of loads carried by various means, especially loads carried on pallets within nets, long loads requiring the use of pipe-hooks, use of unequal lines for slender lengthy loads liable to swing, loads containing flammable liquids or other hazardous material, and loads likely to have aerodynamic characteristics.

The Operator’s Operations Manual shall detail the roles and responsibilities of personnel assigned to construction and rigging of loads that are to be carried in helicopter external load operations 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.

Associated records are to confirm that the documented requirements have been applied in the training and qualification of personnel who are allocated duties associated with construction and rigging of loads that are to be carried in helicopter external load operations.

Approved rigging manuals document correct rigging procedures for various load types.
16.0: In-Flight Loss of Control – External Load

Poor manipulative control in-flight results in loss of control and an aircraft accident

The safe carriage of an external load requires strict adherence to a number of controls. The manipulative handling of the aircraft by the pilot is equally as important as having certified, serviceable equipment supporting a well-constructed load.

The complexity of external load operations is further increased by engines and transmissions operating close to their limits, pilots being remotely located from the load and the lack of normal visual reference available during many operations.

The load itself can create handling issues for pilots especially if the load swings or oscillates, or tends to “fly” causing increased pilot responses that can sometimes become impossible for the pilot to manage.

The ability to perform external load work requires specific training by flight crew to ensure that all the necessary manipulative skills are developed as well as an understanding of how to deal with unexpected load deviations in flight.

16.1: Pilot Experience

The following minimum requirements are required for aircrew engaged in external load activities:

• Successful completion of operator’s external load training program tailored to the vertical reference, and the long-line (> 50 feet), or the short-line (< 50 feet), whichever is applicable
• 200 hours external load operations, 100 of which must be vertical referencing, if used in that role
• An annual long-line and/or external load base check with an operator’s check and training Pilot-in-Command.

(See also Common Control 1.2: Aircrew Qualifications and Recency.)

The Operator shall not assign a Pilot-in-Command as an operating crew member of a flight engaged in external load operation unless they meet the minimum experience and recency requirements of either the BAR Standard or the responsible regulatory authority (whichever is the more stringent).

The Operator shall document in the Operations Manual, minimum experience requirements for flight crew engaged in external load operations that reflect both the minimum standard for the roles as defined in the BAR Standard and the minimum experience that may be required by the local regulatory authority.

Details of the Operator’s training and checking program for external load training (long line/short line as applicable) shall be published in the Operations Manual and follow established training and checking criteria. The documented program shall cover requirements and procedures for initial training and approval along with the processes for conducting periodic recurrent training and checking (annual long-line and/or external load base check).

Associated pilot training records are to confirm that applicable requirements of the training program have been applied in the training of pilots engaged in external load operations and the on-going annual evaluation of pilot competency (long line and/or short line as applicable).

Flight crew files and rostering records are to confirm that crew assignments are appropriate to meet the task requirements.
### 16.2: Pilot Daily Flight Times

*Where the external load moves are more than three (3) per hour, the following flight times are to be adhered to:*

<table>
<thead>
<tr>
<th>Single Pilot Operation</th>
<th>Dual Pilot Operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-hour maximum flight time per flying period, followed by a 30-minute rest break. Hot refuelling does not constitute a rest break.</td>
<td>5-hour maximum flight time per flying period, followed by a 60-minute rest break.</td>
</tr>
<tr>
<td>6-hour maximum flight time per calendar day.</td>
<td>8-hour maximum flight time per calendar day.</td>
</tr>
</tbody>
</table>

High repetition external load work is considered more fatiguing than normal operations due to the high levels of concentration required by the flight crew. Limitations imposed on the flight times, duty periods and rest requirements for flight crew are established for the sole purpose of minimizing the effects of fatigue and ensuring that flight crew are performing at adequate alertness levels to enable safe flight operations.

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Details of the Operator’s Flight and Duty Time management program should be published in the Operations Manual and where helicopter external load operations are undertaken, are to reflect the limitations detailed in the BAR Standard (unless the local regulatory authority’s requirements are more stringent).

Associated Flight and Duty Time records are to confirm compliance with all requirements of the Flight and Duty Time limits that are applicable. The Flight and Duty Time records that are maintained shall be consistent with information provided in other documents such as aircraft flight records.

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### 16.3: Control Instrument Remote Indicators

*For single-pilot operations using vertical referencing techniques and where the aircraft instruments are not in the pilot’s scan, remote indication of fire warning light and torque gauge shall be fitted where possible for the aircraft type.*

Where single pilot, external load operations involving vertical referencing (long-line) are to be conducted, instruments and/or indicators that enable the pilot to monitor critical aircraft operational limits should be provided in a position that is within the pilot’s field of view when observing the load. Provision of a remote First Limit Indicator (FLI) or remote torque gauge and fire warning lights can considerably reduce risks and pilot workload during an operation that is, by its nature, demanding. Audio outputs indicating the same parameters routed through the pilot’s headset may be considered as an adequate alternative.

Inspection of the Operator’s helicopter fleet should confirm that remote FLI or fire warning light and torque gauge that facilitate monitoring during single pilot, vertical referencing external load operations are fitted. Where a remote FLI or fire light and torque gauge are fitted to a helicopter, it should be referenced in the AFM (possibly as a supplement or STC).
16.4: Aircraft Operator – Procedures

The helicopter operator shall have documented procedures addressing competency requirements of the aircrew and groundcrew (where applicable) engaged in the external load activity. Ability to operate in the environmental and terrain conditions where the activity is being conducted shall form part of the competency procedures.

Each Operator undertaking external load operations is to ensure training and checking programs are implemented to provide for initial and recurrent training and checking of all flight crew and ground personnel assigned external load duties.

The external load operations training and checking program shall be documented in the Operations Manual and follow established training and checking criteria. The Operator’s training policies and program should be tailored to suit the experience and aptitude of the individuals being trained as well as the equipment to be used in the proposed role. The training program must ensure that training objectives are achieved and that individual competencies and required safety standards are being maintained.

The program shall provide initial and recurrent training and checking for specific personnel that is commensurate with the duties they are to perform and should at minimum address:

- Equipment used;
- Inspection, overhaul and recertification of all applicable equipment;
- Load construction;
- Ambient conditions of the operating environment and the effect of density altitude;
- Crew duty and responsibilities;
- Communications – normal and abnormal (radio failure);
- Hand signals;
- Flying techniques, including load controllability assessment versus airspeed \(V_{NE}\) with a load attached; and
- External load in-flight emergency procedures.

The Operator shall not assign a pilot or ground crew to perform duties associated with an external load operation unless that person has satisfactorily completed all necessary requirements of the Operator’s training and checking program and has been confirmed as being competent to act in the assigned role. Such requirements are to be applied to all applicable personnel irrespective of their employment basis (e.g. full-time, free-lance/part-time or casual).

Details of the Operator’s external load training and checking program shall be published in the Operations Manual and follow established training and checking criteria. The syllabi and procedures for conducting initial and periodic external load training and checking shall also be documented.

Associated training records are to confirm that the documented requirements have been applied in the training, approval and on-going evaluation of competency for personnel assigned to duties associated with external load operations during both normal and emergency situations.
16.5: Aircraft External Mirrors

*Where available for the aircraft type, external mirrors showing the hook area shall be fitted to the aircraft.*

The provision of external mirrors enables flight crew to gain the necessary assurance that the hook area and line attachment are correctly configured and operating normally. Specifically it provides a final check to the flight crew that the load is securely attached and electrical connections (if fitted) are correctly made.

> **evidence**

Inspection of the Operator’s helicopter fleet should confirm that external mirrors that permit viewing of the hook area during external load operations are fitted in accordance with the Operator’s policy. Where external mirrors are fitted to a helicopter, they should be referenced in the AFM (possibly as a supplement or STC).

16.6: Load Weight

*All loads shall have accurate weights provided to the pilot before each lift. Standard load plans can be used as long as the weights are accurately known (compressors, rig breakdown, sample bags etc). When operationally necessary, a load meter should be fitted to the aircraft.*

(See also Control 6.2: Cargo Weight, Control 6.3: Weight and Balance Calculations.)

Control of the weight of external loads is essential for the safe conduct of each operation. The weight of external loads is to be made available to the Pilot-In-Command before each flight. Care must be taken to ensure that the weight of straps, slings, hooks, swivels etc is included in the total weight to be lifted.

When a load meter is fitted to the aircraft type, it must be positioned such that the load information is in view of the flight crew whilst maintaining control of the aircraft.

> **evidence**

The Operator’s documented procedures shall detail the requirements and processes that are to be used to determine the weight of the external load to be lifted for each flight and the procedure to be used to ensure that accurate weight information is provided to the pilot before each lift.

Where standard loads are carried, the Operator’s Operations Manual shall specify the circumstances under which standard load information may be used to ensure that standard load weights are only used when accurately known.
16.7: No Carriage of Passengers

*Only personnel who are employed or contracted by the aircraft operator to accomplish the work activity directly associated with that operation may be carried on helicopters during external load operations. This includes transit with an empty line attached.*

Passenger carrying activities and external load activities should be treated as two separate and independent tasks. Only personnel who are essential to the safe conduct of an operation must be carried on board the helicopter during external load operations. If a helicopter has a dual role of carrying passengers and external load activity, normal fuel reserves (BAR Standard Control 3.5) must be used for all passenger carrying activities.

The Operator should document in the Operations Manual a requirement that only personnel who have a role that is directly essential to the safe conduct of an external load operation are carried on helicopters during each flight, including those where no load is attached to the external line.

Observations of operations where possible, can confirm compliance with the Operator’s requirements that no passengers are to be carried during external load operations.

16.8: Anti-fouling Cable

*When available for the aircraft type, protective assemblies to prevent cables from chaffing and fouling on the skids/fuselage shall be installed.*

On some helicopter types, an approved modification is available that connects a cable from the rear of the skid assembly to the fuselage, thereby preventing the possibility of the external load line becoming tangled around the skid assembly.

Not all external load activities require this modification, particularly if sufficient ground personnel are available to ensure tangling does not occur. A risk-assessment should be used to determine whether the modification is required for that particular activity.

The AFM should contain information providing detail on the anti-fouling modification where it is installed. The System of Maintenance should detail any inspection and servicing requirements applicable.

Verify that the equipment has been installed and that the required maintenance activity has been undertaken. On the helicopter itself, verify that the cables are fitted in accordance with the documentation.
17.0: Line Fouling In Transit – External Load

The load becomes detached from the line, or the line is flown empty, which when above a certain speed causes it to stream up and rearwards into the tail rotor and results in an accident.

A long-line is any line that is 50 feet or greater in length.

A short-line by definition is less than 50 feet in length, but should also have the added restriction of not being able to reach the tail rotor of the aircraft type being flown.

Long lines are inherently unstable when flown above certain speeds. Unweighted lines will always drop vertically down from the hook when the helicopter is in the hover and will begin to trail behind the helicopter as the speed is increased. The angle at which they trail is proportional to the forward airspeed of the aircraft, as too is the instability of the line.

The aerodynamics of an unweighted line is unpredictable and there have been many accidents caused when the long line has streamed to a position where contact with the tail rotor has occurred with the subsequent loss of control of the helicopter.

17.1: Weighted Lines

The long-line shall be suitably weighted if to be flown without a load attached. Pre take-off checks, designed to ensure aircrew involved in repetitive loads are aware of when the line is attached, are to be implemented.

The most common risk mitigation strategy to prevent long line streaming into the tail rotor is to add a minimum weight to a long line, in order to alter the mass and aerodynamic characteristics.

The short-line should never be able to reach the tail rotor of the helicopter type being used, and should never be flown without a load attached.

The Operator should have published in its Operations Manual a restriction on flying with unladen long lines and publish a minimum mass that is required to be attached to a long line when the line is flown without a load attached.

Pre take-off checks shall include confirmation of a long line attachment to the aircraft.

Observation of flight operations where possible, can confirm compliance with the Operator’s published procedures and the limitation that transit with a long-line and no load attached is prohibited unless the minimum mandatory weight is attached.
17.2: Never Exceed Speeds ($V_{NE}$)

All applicable $V_{NE}$ speeds are to be briefed and understood by all aircrew prior to commencement of operations. If aircraft Air Speed Indicator (ASI) is calibrated in different units of measurement than the documented $V_{NE}$ speeds, a separate risk assessment shall be conducted and reviewed with specialist aviation personnel prior to start.

The maximum airspeed achievable with varied external cargo shapes is limited by controllability. Care should be taken when carrying external cargo as handling characteristics may be affected due to size, weight, and shape of cargo load.

The $V_{NE}$ for carriage of external loads set by the manufacturer is usually derived from the aircraft’s response after releasing a load in-flight due to emergency.

Some loads have a natural tendency to “fly”, such as boats or flat packs that can act like a wing. In these cases the stated $V_{NE}$ may be too excessive and the pilot must as necessary reduce the maximum forward airspeed. Maximum operational air speed with external loads is dependent upon the load configuration and sling length and it is the Aircraft Operator’s responsibility to establish the maximum operational speed for each specific configuration.

The Operator shall publish $V_{NE}$ speeds applicable to all helicopter types in its inventory capable of conducting external load operations. The $V_{NE}$ speeds published shall comply with manufacturer’s data, extracted from the AFM. The Operations Manual should also provide information on the process for determining a safe transit speed during all external load operations which details an incremental increase in airspeed based on load stability and recovery measures to be employed if the load becomes unstable.

Observation of flight operations where possible, can confirm compliance with the Operator’s published procedures and limitations.

17.3: Manoeuvre Boundary Envelope

All safe transit speeds, maximum angle of bank, maximum allowable rate of descent and general handling associated with stable load operations are to be briefed and understood by all aircrew prior to commencement of operations.

Carrying an external load attached to a helicopter degrades stability and handling qualities, and reduces the operational flight envelope by comparison to a helicopter with no load. The safety of an external load operation relies on flight crew having a full knowledge and understanding of the way in which carriage of an external load will affect the handling characteristics and limitations of the helicopter.
The Operator’s SOPs shall clearly specify a requirement for all flight crew to have a full knowledge and understanding of the way in which carriage of an external load will affect the handling characteristics and limitations of the helicopter. In multi-crew operations, the Operator’s documented SOPs should detail how the crew work together, including specific detail on the conduct and content of pre-flight briefings to ensure that crew members are aware of, and understand the effect of, an external load on the helicopter’s operational envelope. For single-pilot operations, the Operator’s SOPs should provide details of the relevant self-brief that should be completed by the pilot prior to commencing a flight. Load performance in flight should also be addressed during an Operator’s External Load training program.

Observations of flight operation where possible, can confirm the suitability of the Operator’s published procedures and compliance with these procedures.

17.4: Short-Line (< 50 feet)

*Transit with a short-line and no load attached is not permitted.*

A short-line by definition is less than 50 feet in length, but should also have the added restriction of not being able to reach the tail rotor of the aircraft type being flown. Transit with a short line without a load attached must not be conducted. Best practice is to consider a short line to be part of the load; dropping or picking up the load is achieved by releasing/attaching the short line to the aircraft cargo hook.

The Operator shall clearly specify a requirement in the Operations Manual that flight with a short-line and no load attached is prohibited.

Observation of flight operations where possible, can confirm compliance with the Operator’s published procedures and the limitation that transit with a short-line and no load attached is prohibited.
18.0: Ground Loss of Control – External Load

A departure from normal operations on the ground results in loss of control of the load and aircraft and results in an aircraft accident.

Helicopter external load operations by necessity are conducted while the helicopter is running. Risk factors such as noise, downwash, vibration, raised dust/snow/debris and turn-around time pressures all contribute to the high-risk nature of the activity.

Defences used in this high-risk environment include training, qualification, experience and awareness of all personnel – both ground and flight crew. To ensure the levels of situational awareness are adequate, a clear understanding of the activity’s purpose, associated procedures and individual and team accountabilities and responsibilities must be understood.

18.1: Ground Briefing

The Aircraft Pilot-in-Command is responsible for ensuring all personnel involved in the external load activity are thoroughly briefed in all aircraft operator expectations prior to commencement of operations. This brief is to include all aircraft emergency scenarios that could involve the groundcrew.

The Pilot-In-Command should ensure full and comprehensive pre-flight briefing is conducted with all personnel involved in an external load operation. An integral component of the briefing should be an assessment of identifiable risks that may be unique to that specific operation.

The briefing should include:

• All aircraft emergency scenarios and actions required by pilots and ground personnel;
• Assigned load master, hook-up person and marshaller (if required) and identification of same vests;
• Identify antennae, skid gear and other fuselage parts that can cause injury to personnel or damage to the helicopter;
• Discuss load sequence with load master, pilot and crew on size, shape and weight with respect to the fuel burn and turn-around time;
• Reiterate how sling gear can get entangled on skids or other obstacles;
• Discuss potential static discharge and how to avoid;
• Review wind direction and flight path;
• Discuss importance of area being clear of debris, loose materials that can blow away, be sucked into rotors or cause injury to personnel;
• Confirm hand signals procedures;
• Confirm radio terminology to be used;
• Emphasize no crew member should turn their back on the line or the load during all approach, hook-up and departure operations;
• All crewmember should maintain eye contact with the line and/or load at all times during the final approach, maneuvering, and departure phases of the operation;
• Ground personnel not essential to the hook up operation must stay in recognized safe areas when the helicopter is operating;
• The load must be securely attached, and all ground members must be clear before the signal is given for the pilot to depart; and
• All ground members must wear appropriate PPE.
The Operator’s Operations Manual shall specify a requirement that prior to commencement of external load operations, the Pilot-In-Command shall conduct a briefing with all personnel involved with the operation. This briefing should include all known aircraft emergency scenarios that could involve ground crew and encourage discussion of identifiable risks associated with the planned operation.

18.2: Aircraft Ground Control

A pilot is to remain at the controls of an operating helicopter under power and whilst on the ground at all times. The controls must not be left unattended with the aircraft under power under any circumstances, even to assist in activities such as hot refuelling or load attachment.

(See also Control 7.5: Rotors Running Load/Unload.)

Ground personnel in close proximity to a running helicopter on the ground have a high risk of being struck by helicopter main or tail rotors. During rotors turning operations, Operators are to minimize the risks to ground personnel by ensuring that a pilot remains at the controls at all times. The pilot is only to be engaged in essential cockpit duties and he can consequently devote his attention outside the cockpit to identify external hazards and monitor activities around the aircraft.

The Operator shall document in the Operations Manual the requirement for a pilot to remain at the controls of a helicopter that is under power and with the rotors turning at all times while on the ground.

18.3: Ground Personnel

Ground personnel are to wear appropriate Personal Protective Equipment (PPE) including hard hats with chin straps, impact resistant goggles, gloves, safety shoes and a means of ground-to-air communications with the aircrew, and high visibility vests.

Access to, and movements within, a lifting or dropping site should be strictly controlled and non-essential personnel shall not be allowed to work in, or cross, the operating area when external load operations are taking place. All ground personnel who are required to perform functions supporting the external load operation shall be provided with PPE to ensure that the risk of sustaining personal injuries during the operation is minimized. Although not stated in the control, the PPE requirements should include hearing protection such as helmets with incorporated hearing defenders.

The Operator shall document the PPE requirements that are to apply to ground personnel involved in external load operations. Such requirements should include hard hats with chin straps, impact resistant goggles, hearing protection, gloves and safety shoes and a high visibility vest.

Where operations are to be conducted in dusty conditions or if the load to be carried is likely to give rise to significant or harmful dust, ground personnel are to be provided with suitable respiratory protection.
19.0: Aircraft Accident – External Load Operations

Mitigating defences in the event of an aircraft accident

Every effort should be made to avoid incidents and accidents associated with external load operations and this includes the requirement to plan for a possible adverse outcome. The defences in Section 12.0 of the BAR Standard are applicable to external load operations, as are the additional defences listed below.

19.1: Aircrew Helmets

*Aircrew involved in external load activities shall wear serviceable flying helmets to appropriate industry standard.*

Operators should ensure that flight crew involved in external load operations wear an approved flight helmet with inbuilt communications capability and visor. The prime purpose of the helmet is to provide impact protection and thereby reduce the risk of head injury in the event of an accident.

Where external load operations are to be conducted, the Operator shall document a requirement that a serviceable industry standard helmet is to be worn by all flight crew while involved in such operations.

Observations of flight operations where possible, can confirm the requirements for serviceable flying helmets to be worn by flight crew involved in external load operations are being complied with.

19.2: Flight Following

*Positive continuous communication and flight following shall be maintained with the aircraft either by ground support crew or designated flight following personnel. Scheduled operations normal calls should be established for every 15 minutes but no later than 30 minutes.*

(See also Defence 12.5: Flight Following.)

The Operator shall ensure that where helicopter external load operations are being undertaken, continuous communication can be maintained with ground support personnel or designated flight following personnel. Flight following shall be maintained with the aircraft through provision of scheduled “operations normal” calls that shall be provided at intervals of 15 minutes but no greater than 30 minutes.

The ready availability of satellite flight following should lend itself to being the norm for all operations. In addition to assisting in locating downed aircraft, it can also provide useful coordination with multiple aircraft and drop schedules. In an external load environment, 1-minute reporting intervals for the satellite flight following is considered appropriate.

Where satellite flight following is in use (and operational), the frequency of scheduled operations normal calls should be addressed in the pre-start Operational Risk Assessment.

The Operator shall ensure that personnel who are assigned to maintain contact with aircraft in these operations closely monitor the safety and progress of flights and are able to initiate the ERP in the event of an emergency situation developing or communications being lost.
Where an Operator conducts helicopter external load operations, the Operations Manual should contain documented procedures that provide for such flights to be monitored by ground support personnel or designated flight following personnel.

The Operator’s documented SOPs provides for equipment requirements and procedures that will ensure that constant radio contact can be maintained and that “operations normal” reporting occurs at intervals of 15 minutes but not exceeding 30 minutes.

Available records should confirm that a log of required position reports is maintained as an integral component of the following of a flight’s progress.
The controls detailed in this section are in addition to applicable core requirements documented in Volume 1 of the Guidelines.

The added controls illustrate the unique operating environment offshore helicopter operations represent, and why additional preventative controls and defences are necessary.

Additional training for key staff can be sought through the two-day Flight Safety Foundation offshore Aviation Coordinator course that provides detailed instruction on the basics of offshore aviation operations and the background to all controls and defences.

Regardless of global location, an important first step in planning any offshore helicopter operation is to determine whether the environment is considered “hostile” or “non-hostile” (see BARS/ICAO definition). An understanding of the operating environment using this definition will influence the critical controls applicable to an offshore operation. Other factors unique to offshore operations that will influence both the resource Company and the Aircraft Operator’s implemented controls include:

- Specific patterns associated with turbulence and/or heat induced by the offshore superstructure or gas plumes from turbines and flare stacks;
- Rolling, pitching and heaving helidecks;
- Close proximity of obstacles surrounding the helideck, and below helideck level;
- Degraded visual conditions (including rain, mist and dust storms);
- Pilot techniques associated with changing between instrument and visual conditions;
- Availability and capability of search and rescue assets;
- Limitations of Night Visual Flight Rules when operating offshore;
- Hazards associated with offshore installations, such as H₂S, fire or gas alarms, and perforating operations; and
- Absence of regulatory guidance in some offshore regions.
20.0: Helicopter to Vessel Interface – Offshore Operations

Helicopter operates to a floating structure and crashes on deck

20.1: Helicopter/Ship Operations

*All helicopter-to-ship operations shall be conducted in accordance with the standards contained in the ICS Guide to Helicopter/Ship Operations.*

The ICS Guide to Helicopter/Ship Operations provides all interface requirements for ship to helicopter operations. As the primary reference document it is equally relevant to vessel owners, Aircraft Operators and the resource sector. Vessel activities typically include marine pilot transfer, tankers support, seismic crew transfer and medical evacuation.

*Resource Companies should reference the ICS guide in all contract technical requirements and at minimum understand what gaps, if any, exist in the ship-to-helicopter interface as is pertains to the ICS guide. This most likely will be facilitated by a risk-assessment involving representatives from the vessel, Aircraft Operator and client Company.*

20.2: Vessel Operations

*Floating vessels include Floating Production Storage Offload (FPSO), Mobile Drilling Unit (MODU), Diving Support Vessels (DSV), Derrick barges and seismic vessels.*

*The Pitch, Roll and Heave of floating vessels shall be measured as close to helideck level and centreline as possible to provide accurate readings that can be communicated to the helicopter from the vessel, and verified by the crew as being within limits before landing.*

Floating vessels move around a center of gravity due to wind and wave motion. The subsequent movement of the vessel’s helideck presents greater challenges to flight crew, particularly during the landing phase. To provide assurance that safe operating limitations are being maintained, accurate deck movement information must be passed to flight crew.

When the helideck is located away from the center of gravity of the vessel (e.g. bow or stern mounted helidecks), the movement is accentuated. The movement of the helideck defines safe landing limitations for the helicopter. It is therefore essential that the motion sensing accelerometers are located as close to the helideck as practicable, or have undergone software-based processing to provide accurate helideck pitch, roll and heave (PRH) information.

Communication of the helideck motion must be provided to the flight crew in a standardized format acceptable to the Aircraft Operator. In the event of a vessel course change, exceedance of PRH limits or any another event likely to influence landing or on-deck operations, the information must be able to be immediately communicated to the flight crew.

Where required by the OEM, all motion detecting equipment is to be calibrated and certificates of calibration are to be made available and verified by the Aircraft Operator.

Procedures must be agreed between the Operator and the vessel for the actions to be taken by vessel personnel around a helicopter which is required to make an emergency departure because of uncontrolled slippage while on the vessel’s helideck.
Small vessels may have rapid changes to PRH and consequently only pilots who have been formally qualified to do so should undertake operations to them. Operations to small vessels should only be conducted if the helicopter has out-of-ground-effect (OGE) power available.

Passengers should not be carried during small vessel operations unless they are deplaning or emplaning at that vessel.

The Operator and Vessel must conduct a safety brief before passenger operations begin, to align operating practices for all normal and emergency procedures. This should include:

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<th>Item</th>
<th>Briefing Requirement</th>
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<td>The process for vessel to request normal, freight and medevac flights</td>
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<td>2</td>
<td>Limitations of the helicopter provider to make these flights</td>
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<td>Limitations on night operations, winching, external loads</td>
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<td>Any other limitations imposed by resource Company</td>
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<td>On deck clearances for HLO</td>
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The Operations Manual documents the requirements for flight crew to obtain information regarding helideck movement prior to landing, what limits apply to the relevant helicopter type and guidance on the actions to be implemented when limits are exceeded.

The Operations Manual shall document the requirement for a formal briefing between the vessel and the Operator prior to commencement of passenger flights.

Operators shall have controls in place in regard to certification of pilots, carriage of passengers and power requirements, for small vessel operations.
20.3: Pitch, Roll and Heave (PRH) Limits for Landing

*For operations to floating helidecks, the aircraft operator shall have industry validated pitch, roll and heave landing limits (such as the Helideck Certification Agency Helideck Landing Limits) documented in their Operations Manual.*

Operators must have defined motion limits documented in their Operations Manual that detail acceptable limits for landing to, and departure from, vessels. These limits may be generic to aircraft types (such as OGP guidance), or type specific (such as HCA Helideck Landing Limits). Regardless of origin, the PRH limits documented by the Aircraft Operator must have industry validation or risk-assessed method assessed as being suitable to the Aircraft Operator.

The Operator shall document in the Operations Manual, specific operational limitations defined by the maximum allowable helideck pitch, roll and heave, including heave rate. The source of the limits must be stated. SOPs covering approach and landing to floating decks should ensure the crew are provided with the current PRH data.
21.0: Night Controlled Flight into Terrain/Water (CFIT/W) – Offshore Operations

The helicopter operating at night flies into the water whilst still in an airworthy and operational state

21.1: Night Recency

All offshore crews rostered for night support shall maintain a recency of 3 night deck landings every 90 days.

(See also Common Control 1.2: Aircrew Qualifications and Recency.)

Night off shore is a predominantly instrument environment complicated with a combination of instrument approaches, visual landings or instrument go-arounds and instrument take-offs. This mix of flight profiles may have to be conducted without reference to a horizon, ambient starlight, moonlight or surrounding visual cues other than the illuminated platform. The impact this can have on human sensory responses is well documented in many night off shore accident studies.

Clear and unambiguous crew coordination in all phases of flight is essential for the safe conduct of night operations. So too is the maintenance of high levels of instrument proficiency and manipulative control. To meet the instrument flying proficiency required, pilots must pass an annual flight check on, and must retain currency on, general instrument flight techniques, and on the specific instrument approach procedures relevant to the on shore and off shore locations.

The final part of the landing sequence must be performed by visual reference augmented by close scrutiny of cockpit indications. The night take-off is a combination of visual into instrument flight. Both these techniques require continual practice. To retain this level of proficiency, all flight crew rostered on a night schedule must meet a recency requirement of three night landings and take-offs every 90 days.

In operating environments (such as far northern latitudes) where limited hours of darkness may make 90-day currency impractical during the summer season, consideration can be given to maintaining recency by use of a simulator.

The Operator shall document in the Operations Manual the requirements for pilots to be flight checked annually, and to retain recency in, general instrument flying techniques and relevant instrument approach techniques in normal and emergency flight conditions.

The Operator shall document in the Operations Manual, the requirement for pilots to maintain a recency of the landings and take-offs at night at off shore helidecks in the previous 90 days and the method by which such recency requirements are tracked.

Paper-based or electronic recency tracking records are to confirm that pilots are maintaining the required recency for night landings and take-offs at off shore helidecks and that the rostering system has attended to upcoming requirements prior to expiry (flight crew files and rostering records confirm appropriate implementation).
21.2: Night Offshore Time

_Airc rew shall have 25 hours night offshore time before operating as Pilot-in-Command offshore at night._

The demanding nature of night off shore operations requires a level of experience and familiarity with the operating environment that can only be consolidated through real-time experience. Recognizing there must be a means by which flight crew can gain this experience, the onus is placed on the Operator providing assurance that the Pilot-in-Command has 25-hours night off shore time accrued as co-pilot, under instruction (dual) or In Command Under Supervision (ICUS).

The Aircraft Operator should also have a training program for pilots new to the night off shore environment that provides a competency-based approach prior to release to the operational night roster.

The Operator shall maintain records of flight crew experience including time logged as a crew member engaged in night off shore operations. There shall be a documented control mechanism in place to ensure that a pilot is not assigned as Pilot-In-Command of a flight to be conducted off shore at night unless they have achieved a minimum experience of 25 hours in such operations.

The Operator should also publish a competency-based syllabus for flight crews new to the night off shore environment and a record of training to confirm that an appropriate level of competency has been achieved.

Information contained on files maintained by the Operator for each individual flight crew provides a record of flight crew qualifications and experience. Flight crew files and rostering records confirm appropriate implementation and that crew pairings are appropriate to meet the task requirements.

21.3: Night Offshore Procedures

_Night offshore operations shall be flown with two qualified pilots, in a multi-engine aircraft to be operated and equipped for flight under Instrument Flight Rules. The aircraft operator is to have documented Standard Operating Procedures (SOPs) pertaining to night offshore operations which shall include reference to stabilised approach criteria and missed approach/go-around protocol._

The Aircraft Operator must have documented Standard Operating Procedures designed to ensure all flight crew know individual responsibilities and actions in the night environment. Details should include reference to stabilized approach procedures, go-around and missed approach procedures and instrument take-off procedures under both normal and abnormal/emergency situations.

(See also Control 5.1: Night or IFR – Two crew operations, Control 5.7: Stabilized Approaches, Control 5.8: Mandatory Go-around Procedures, Control 5.10: Multi Crew Operations, Control 5.11: CRM/ADM Training.)
The Operator’s SOPs shall provide policy and procedures relating to night, offshore operations with specific information to be provided in relation to the conduct of stabilised approaches to offshore facilities. The SOPs should at a minimum address:

- The minimum aircraft and crew requirements;
- Crew roles and responsibilities during both normal and emergency situations;
- The criteria to be met for a stabilized approach; and
- The circumstances under which the conduct of mandatory and no-fault go-around procedure is to be carried out.

The Operator’s SOPs shall clearly specify the duties that are to be performed by the pilots and adequately detail the crew coordination processes that are to apply.

21.4: Night Validation Flight

*Non-revenue night validation flights conducted by suitably qualified check and training personnel shall be conducted to all new-build platforms as close to operational start-up as practicable with the objective of validating helideck and platform lighting, and instrument/visual approaches to the platform in ambient surroundings.*

(See also Common Control 1.13: Operational Risk Assessment, Control 2.3: Landing Site Assessments.)

New-build and reworked installations will have helideck lighting assessed during acceptance testing in dry-dock or close by the construction site. This environment is typically surrounded by abundant ambient illumination and the acceptance performed at ground level rather than on a typical approach angle.
A non-revenue flight conducted by appropriately experienced flight crew will validate the effectiveness of an installation’s helideck night lighting, an detect glare from unshielded lights during the approach, poorly illuminated windsocks which may provide little or no information prior to landing, and rotating beacons which may provide a distraction to flight crew.

During the conduct of the non-revenue validation flight, review of the elements contained in Control 20.2 should also be covered, specifically involving all HLOs.

Although new build platforms can have their night lighting validated and accepted during shore-based acceptance testing from the deck, flight validation in a controlled environment using qualified crew who have briefed the nature of the task and conducted without passengers is recommended. The resource Company should make this request to an Aircraft Operator capable of completing the task.

### 21.5: Night Medical Evacuation (Medevac) Policy

Company in consultation with the aircraft operator shall develop a night Medevac policy when the capability is required. In recognition of the higher risk profile, night offshore Medevac flights shall only be requested in life threatening situations where patient stabilisation until first light is not considered an option by the Offshore Installation Manager (OIM) in consultation with medical staff.

(See also Threat 11: Medical Evacuation.)

OGP accident studies indicate that since 1990 the vast majority of night off shore fatal accidents that occurred during night medical evacuations were for non-life-threatening injuries.

Night off shore operations present a greater risk than day visual off shore operations. To avoid unnecessary night medical evacuations that could have been completed after the patient has been stabilized until first-light, a pre-determined set of expectations and call-out procedures shall be established prior to or during start-up phase of the activity. Any Medevac request instigated by the off shore facility is to involve advice from the medical staff (preferably a qualified medical doctor) as well as an independent risk-based assessment conducted by the Aircraft Operator.

The resource Company should initiate a risk-based review of night off shore medevac procedures to ensure that (1) when practicable non-life-threatening injuries are stabilized until first light for medical retrieval and (2) medical personnel (preferably a doctor) assist the OIM in the decision to medevac and (3) Aircraft Operators are able to make an independent and overriding decision on the ability to safely conduct a night off shore medevac.

### 21.6: Serviceable Radio Altimeters

All offshore helicopters are to be equipped with at least one radio altimeter with dual displays, both of which shall be serviceable for any flight at night or flight conducted under IFR. This requirement supersedes what may be outlined in the regulatory approved MEL.

The requirement for two-crew coordination whereby both crew members need ready access to accurate altitude information is amplified during night off shore operations.
Approach information required to determine landing decision points and departure information for the profile-type flown require precise altitude information to be clearly presented to both crew members. The aural alerting function of the radio altimeters provides an additional awareness capability and should be used as a last line of defence to prevent a Controlled Flight Into Terrain/Water (CFIT/W) accident.

The Operator shall document in the Operations Manual or MEL a requirement for at least one radio altimeter with dual displays, both of which shall be serviceable at the time of dispatch for any off shore flight at night or flight conducted under IFR. Operator procedures should address the requirement for setting any aural alerting systems on the radar altimeter and the procedures to be followed in the event of an unexpected alert.

Aircraft records and Maintenance Release documentation can confirm compliance with the documented requirements.

21.7: Weather Radar

All offshore helicopters flown at night or under IFR shall be fitted with colour weather radar having a minimum range scale of 2.5nm with one half nm range scale graduations.

The provision of serviceable weather radar for pilots operating at night or under IFR significantly improves the safety of operation in areas of hazardous weather.

Weather radars can provide for the conduct of procedures such as Off Shore Standard Approach Procedures (OSAP), Airborne Radar Approaches (ARA), and the Helicopter En Route Descent Areas (HEDA). These approach types require published procedures, training, checking and where possible approval by the local regulatory authority.

The reduction in range scale permits very accurate approaches to the off shore facility, but must be accompanied by published SOPs on how each type of approach and any subsequent go-around/missed approach is to be flown.

Color radars provide a more detailed and more easily interpreted presentation of actual weather conditions than the older monochrome radars.

The AFM for helicopters utilized for off shore operations at night or under the IFR should contain details of the weather radar fitted. The Operator shall document in the Operations Manual or MEL specific requirements that are to apply to the serviceability of airborne weather radar equipment for flight at night or flight conducted under IFR.

The Operator shall document in their Operations Manual, detailed requirements and procedures for the conduct of OSAP, ARA and HEDA, and produce, and distribute to pilots, certified Instrument Approach Plates for each procedure in accordance with local Civil Aviation requirements for such plates.

Aircraft records and Maintenance Release documentation can confirm compliance with the documented fitment and serviceability requirements. Pilot training records shall confirm compliance with documented requirements for the conduct of OSAP, ARA and HEDA (where approved).
22.0: Helideck Collision – Offshore Operations

The helicopter collides with an obstacle on the helideck and crashes into the water adjacent the platform

22.1: Helideck Control – Helicopter Landing Officer (HLO) and Assistants

All offshore installations shall have a trained HLO available for all helicopter movements with all relevant duties and responsibilities clearly outlined in a current and up-to-date HLO Manual. Recurrent training should be scheduled for every three years.

Any personnel designated as an assistant to the HLO shall receive formalised and documented training from an approved HLO, and where possible include participation in periodic emergency drills. In addition to standard PPE, all helideck personnel are to wear and be identified by a high visibility vest.

In addition to standard PPE, all helideck personnel are to wear and be identified by a high visibility vest.

(See also Control 7.3: Passenger Control.)

A Helicopter Landing Officer (HLO) is to be provided at all manned off shore helideck installations and available during the conduct of all helicopter operations. The HLO is responsible for a wide variety of tasks related to helicopter operations, each of which relate to ensuring the overall safety of helicopter operations and all personnel involved.

The offshore helideck Operator should ensure that policy and procedures relating to provision of HLOs at company facilities are appropriately documented. The documented policy and procedures shall cover requirements for initial HLO training and approval along with the processes for conducting periodic recurrent training and checking to assure on-going competencies.

These procedures shall clearly detail all relevant HLO procedures and responsibilities that are to apply at each location to ensure the adequate supervision of helideck operations and provision of serviceable helideck facilities. It should be clearly stated that a HLO is to have responsibility for the overall conduct and safety of helideck operations and that all personnel, when carrying out any duties in support of helicopter operations at that facility, shall be under the direct control of the HLO.

HLO training records are to be available to the Operator for review and shall confirm that the documented requirements of the HLO training and checking program have been applied consistently in the initial training and on-going assessment of HLO competency.
22.2: Helideck Inspection

All helidecks shall have an annual helideck inspection conducted by appropriately qualified aviation specialists or the aircraft operator. Documented findings and action plans resulting from any inspection shall be retained by the HLO.

Prior to commencing operations to a new helideck, or with a new operator to an existing helideck, experienced and qualified personnel from the aircraft operator shall perform an inspection and brief all relevant offshore personnel in the safe operating practices and procedures for the helicopter type being used.

(See also Control 2.2: Airfield Inspections.)

It is important that a qualified specialist or an approved person from the Aircraft Operator inspect the helideck to confirm that there has been no alteration to, or deterioration in the condition of the facilities that are provided in support of Company operations.

The HLO shall conduct and document a weekly walk around of the helideck to check the serviceability status of all associated equipment, to ensure no unauthorized work had been performed, or no equipment has been added that infringes the helideck or the helideck protected areas. Discrepancies noted shall be added to an action closeout plan.

All items on or associated with the helideck that require periodic scheduled maintenance shall be included in the vessel’s computerized maintenance program.

The resource Company’s assurance documentation relating to offshore helideck operations should detail the inspection program that is to be implemented to ensure that helideck facilities routinely used by the Operator’s helicopters continue to meet required standards. The standard (e.g. CAP 437) and the associated checklists used during routine inspections are to be fully documented. The reporting procedures are to ensure that all findings and action plans arising from helideck inspections are provided to and retained by the HLO and communicated to the Operator. In addition to aviation specialists, appropriately qualified (such as HCA or industry equivalent courses) personnel accepted by the Company may conduct annual inspections.

The Operator must have a system of oversight to ensure that the helideck meets their requirements. Completion of such an inspection or review of inspection records 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.

Associated records are to confirm that the documented inspection requirements, processes and procedures are being complied with and that the desired outcomes are being achieved.
22.3: Helideck Design

Unless local regulatory requirements specify otherwise, all new helidecks shall conform to the standards of ICAO Annex 14 Volume II Heliports and shall be designed to accommodate the largest helicopter anticipated for use in the life of the structure. For practical implementation, standards and practices, CAP 437 ‘Offshore Helicopter Landing Areas’ and the ICAO Heliport Manual should be used.

Bow mounted helidecks on FPSOs may require larger than normal diameter decks up to 1.5D (D = overall length of the helicopter with rotors turning) due to PRH considerations. Aviation advice shall be consulted prior to final design review.

The management of a helideck from its original design through to its routine use in operations will require the involvement of a variety of organizations and disciplines. Each of these will approach the issue of initial design and facility specifications from a different perspective. To ensure the helideck design achieves the best facilities and support arrangements that provide an environment for safe operations, it is important that all perspectives are given due consideration. ICAO Annex 14 Volume 2 and CAP 437 both contain detail on industry standards that have been accepted worldwide.

Where local regulations differ to the ICAO or CAP 437 design standards, a gap analysis should be conducted to ensure the more stringent requirement is applied – except when the local regulatory environment is insistent on their requirement.

Each resource Company should have the requirement in their design documentation for all new-builds (and major reworks) meet the requirements of ICAO Annex 14 Volume II and the CAP 437 from a design perspective. Where CAP 437 provides guidance using the word “should”, all items for design consideration shall be considered mandatory unless a variance process approved internally by the resource Company.

22.4: Helicopter Performance

Offshore helicopters are to be flown to minimise exposure time over the helideck edge and are to be operated to Performance Class 2 requirements, or better, at all times.

Helicopter performance is divided into three different classifications; Performance Classes 1, 2 and 3. Performance Class 1 (PC1) for a helicopter means the class of operations where, in the event of failure of an engine, performance is available to enable the helicopter to land within the rejected take-off distance available (e.g. the helideck) or safely continue the flight to an appropriate landing area, depending on when the failure occurs.

Performance Class 2 (PC2) is the class of operations where, in the event of failure of an engine, performance is available to enable the rotorcraft to safely continue the flight except when the failure occurs early during the take-off maneuver or late in the landing maneuver, in which case a forced landing may be required.

Performance Class 2 operations can be designed to operate with a permitted exposure time for the periods where safe continuation of flight or landing is not assured, or alternatively at all times with a safe forced landing capability (e.g. PC2 E and PC2 DLE). Further discussion with aviation specialist advice and/or Aircraft Operator during the Operational Risk Assessment should be conducted to further understand the benefits of limited exposure operations and the impact on payload.
Performance Class 3 (PC3) for helicopters means the class of operations where, in the event of failure of an engine at any time during the flight, a forced landing in case of a multi-engine aircraft may be required, and in the case of single engine aircraft will be required.

Operators of helicopters flying to Performance Class 2 standards should have in place detailed operating procedures that describe how to minimize the amount of time spent over the deck edge (approach and departure) where performance outcomes are not guaranteed. The procedures must be backed up by repetitive training (simulator preferable) and form part of every flight crew assessment.

22.5: Multiple Helicopters on Helideck Operations

A procedure for a second helicopter landing on a helideck must be included on the operator’s Standard Operating Procedures or Operations Manual.

Notwithstanding, operations requiring the landing of a second helicopter to an offshore helideck must be risk assessed and approved by a Company designated Aviation Specialist prior to the activity.

In the event a helicopter becomes unserviceable on the helideck, the only practical solutions to transport maintenance support to the site may either be to land a second helicopter on the already occupied deck, or to winch personnel and their equipment down to the helideck, or transport them by boat and use the platform crane to bring them and their equipment to the helideck. Each has its risks.

On larger helidecks where the land-on option is possible, it is only permissible when appropriate risk assessments are conducted and include:

- Helideck and second helicopter size (minimum separation distances on landing);
- Positioning of the disabled aircraft in relation to area of availability, wind direction and therefore approach direction of the rescue aircraft;
- Securing of disabled aircraft’s main rotor;
- Possibility of securing the disabled aircraft to the platform;
- Non-essential personnel not in the rescue aircraft during landing or departure;
- Non-essential persons not on helideck as the rescue aircraft is landing or departing;
- Which seat the rescue flying pilot will occupy during the operation - should be on the same side as the disabled aircraft when the rescue aircraft is on the approach;
- Carriage of a crewman to assist in rescue aircraft wheel/skid placement on helideck;
- Last light considerations (day only operations);
- Helideck load bearing capability (static and dynamic loads must be considered);
- Other options for transporting the required personnel (ship, barge, proximity of other helidecks, hoist, etc); and
- Removal of the disabled helicopter off the helideck by the platform crane if a suitable work area is available and aircraft maintenance personnel are available to supervise the move.
Resource Companies positioning off shore installations long distances off shore and in isolated areas should consider the requirement for two helicopter landings during the initial helideck design stage.

Where the Operator wishes to land a second helicopter on an already occupied helideck, it shall have documented procedures in place (local procedures or Operations Manual) that require the completion of a risk assessment prior to departure. The risk assessment must address the hazards and the procedures required to mitigate the risk to an acceptable level.

The Operator shall also confirm that the OIM authorizes the operation and that prior consultation between the OIM and the Aircraft Operator will take place.
23.0: Rescue Hoist Operations

The helicopter is required to perform hoisting operations and, through manipulative error, results in an abnormal situation resulting in an accident

23.1: Aircrew Hoist Experience

All aircrew assigned to hoist operations shall have completed an approved and documented training program reviewed by the Company aviation specialist personnel. To maintain currency, a minimum of 3 hoist cycles within the past 12 months is to form part of the training schedule for all aircrew.

Prior to commencing hoist operations, the Aircraft Operator shall ensure that all personnel are qualified to undertake the hoisting activity and are undergoing recency training at the intervals outlined in Control 23.1 of the BAR Standard.

Minimum winch areas are obstacles clearance shall be in accordance with CAP 437 and the ICS Guide.

Details of the Operator’s training and checking program for aircrew engaged in rescue hoist operations shall be published in the Operations Manual and follow established criteria. The documented program shall cover requirements and procedures for initial training and approval along with the processes for conducting periodic recurrent training and checking.

The Operator shall document in the Operations Manual minimum recency requirements for aircrew engaged in rescue hoist operations and the method by which these recency requirements are tracked. While manual, paper-based systems are acceptable; computer programs that more accurately track the limits are the preferred option.

Associated aircrew training records are to confirm that applicable requirements of the training program have been applied in the training of aircrew engaged in rescue hoist operations and the on-going evaluation of competency.

Associated records are to confirm that aircrew are maintaining the recency required for rescue hoist operations, or are competency checked immediately prior to conducting winch operations, and that the rostering system has attended to upcoming requirements prior to expiry.

23.2: Training Program

The aircraft operator will establish a documented training program and minimum qualification criteria for all personnel involved in hoist operations, including (but not limited to) the aircrew, hoist operator and down-the-wire swimmer (where applicable).

The training program shall include an initial competence course followed by annual refresher training.

All personnel who are likely to be assigned duties involving hoist operations are required to maintain both a qualification and competency in the role. This will include (1) Captains and co-pilots (2) hoist operator and (3) down-the-wire swimmer (if applicable).
The Aircraft Operator may develop an in-house training program or utilize third-party assistance to provide the required training. Regardless, there shall be a published and approved syllabus that leads to the award of the qualification.

To provide the company with assurance that all risks associated with hoist operations have been adequately addressed, specialist advice should be obtained to confirm suitability of the risk assessment and training syllabus. At minimum this should include:

- Helicopter performance requirements;
- Regulatory requirements (licensing, endorsement, operating approvals);
- Crew roles and responsibilities;
- Equipment standards;
- Weather minimums;
- Procedures (normal and emergency);
- Communications (internal and external requirements); and
- Minimum winching area requirements.

Operator Check and Training records shall document the initial qualification, as well as recency activity to ensure currency in all aspects of the hoisting activity.

Where hoisting is conducted on a regular basis to a specific vessel, consideration should be given to including vessel personnel in the training program. Additionally, where hoist training is conducted over water at night, a safety boat should be in attendance.

The Operator’s Operations Manual shall contain details of the minimum qualifications required for all personnel involved in hoist operations, the training program applicable to each role and the process by which on-going competencies are assured.

Details of the Operator’s training and checking program for aircrew engaged in rescue hoist operations shall be published in the Operations Manual and follow established training and checking criteria. The documented program shall cover requirements and procedures for initial training and approval along with the processes for conducting periodic recurrent training and checking. Training records are to be available and confirm that the documented requirements of the training and checking program applicable to each role have been applied consistently in the initial training and on-going competency assessment of personnel involved in rescue hoist operations.

23.3: Hoist Equipment

*All role specific equipment including the hoist, lifting device, harnesses, PPE and associated tools are, at minimum, to be maintained, tested and certified in accordance with the manufacturers approved maintenance program.*

All equipment used in hoisting shall fall under an inspection and maintenance program to ensure that it is fit for purpose. Technical logs for hoist usage should be maintained that capture hoist cycles and defects and the usage of all lifting devices. Maintenance records should track the equipment standard, incorporation of Service Bulletins or Airworthiness Directives, and life limited components (e.g. cable cutting/guillotine cartridge). There are very rarely secondary lines of defence during hoisting activity that will protect against an equipment failure and therefore it is critical that each component is fit for purpose when required for use.
Survivors who have been in the water for lengthy periods may need to be winched by stretcher in a horizontal position as their blood may rush to their legs once the water pressure on them is removed.

The Operator or maintenance provider shall maintain records reflecting that any role specific equipment to be used for rescue hoist operations is certified for use by the aircraft or equipment manufacturer, has been tested and released to service by the aircraft maintenance provider and has been subject to a manufacturer’s approved maintenance program.

Associated records are to confirm that requirements of the lifting equipment manufacturer’s approved maintenance program are being appropriately carried out.

Winching equipment and training must include use of stretchers.

23.4: Night Hoist Off Shore Operations

Night hoist operations shall only be conducted in an aircraft that is specifically equipped to do the task (including auto-hover capability) and with a crew specifically trained in night hoist operations.

Due to the acute lack of visual reference available during night hovering and night hoisting over water, this activity shall only be conducted in a helicopter that is appropriately equipped for the task. At a minimum, the helicopter should be capable of single-engine hover operations OGE, possess an auto-hover capability (4-axis) and have appropriate external illumination capability. Night hoisting shall therefore only be conducted in specifically equipped aircraft with crew who have been specifically trained and are current in the activity. To date, the ability to maintain a night hoisting capability has been regarded as a specific specialist role performed by personnel assigned solely to this task. Any deviation from this model of a specialist role should be subject to a risk-assessment involving all parties, prior to operational status being confirmed.

An Operator who is to undertake night rescue hoist operations shall document in the Operations Manual, the minimum aircraft equipment, training and recency requirements for aircrew engaged in night overwater rescue hoist operations.

Training records are to be available and confirm that the documented requirements of the training and checking program applicable to night overwater rescue hoist operations have been applied consistently in the initial training and on-going competency assessment of aircrew involved in night rescue hoist operations.

Associated records are to confirm that pilots and winch Operators are maintaining the recency required for night overwater rescue hoist operations.
24.0: Aircraft Fuel Complication – Offshore Operations

The helicopter experiences fuel supply complications resulting in engine flame-out and aircraft accident

24.1: Refuelling System Inspection

An initial and then annual inspection thereafter of offshore installation fuel system is to be conducted by the aviation specialist designated by the Company or aircraft operator. The inspection schedule shall include a review of refuelling procedures that encompasses daily testing, sampling and sample retention practices.

(See also Threat 4.0: Fuel Contamination.)

Fuel quality, on shore or off shore, is a critical control. In an off shore environment the added issue of potential salt water contamination heightens the requirement for all fuel controls to be rigorously followed. Initial fuel system design, inspection and on-going maintenance are key components of this critical control. Due to the regular transfer and incorporation of transportable fuel tanks to the off shore installation and fuel system, particular care is to be given to all practices and procedures associated with off shore refueling and fuel sample retention.

Fuel should be tested for quality and results documented at all stages of the fuel transport system, from arrival at the Operator’s land bulk depot, to testing when transferred to transportable tanks, to arrival off shore, to transfer from the off shore bulk storage to the fuel distribution system, at the fuel distribution system, and finally at the aircraft.

The vessel Operator shall include in the vessel’s computerized maintenance program, all items on or associated with the platform fuel system that require periodic scheduled maintenance.

The off shore facility’s documentation should detail the requirement for initial, intermediate and annual inspections, and scheduled maintenance designed to provide assurance of the on-going quality of fuel supplies.

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 requirements providing assurance of the on-going quality of fuel delivery systems and fuel supplies are being complied with.

24.2: Offshore Alternates

One-way fuel computations and offshore-only alternate diversion shall not be used unless the offshore destination has been approved for OEI landings by specialist aviation advice.

Off shore flight planning procedures shall require helicopters to be flown to a destination or alternate destination suitable for the conduct of One Engine Inoperative (OEI) landings. In normal operations this requires on shore alternates to be carried at all times.
In some circumstances, out of necessity, off shore alternates may be the only choice available. Risks associated with holding an off shore installation as an alternate include:

- Sudden deck closure (crane, cargo, weather, fire or gas alarms);
- Aircraft emergency requiring a running landing (hydraulics, tail rotor failures); and
- Aircraft emergency on an aircraft in turn threatening the off shore installation (fire).

An off shore alternate must only be authorized after the completion of a risk-assessed process involving Aircraft Operator representatives and company aviation specialist advice. When an off shore alternate is approved:

- OEI landings must be possible for the aircraft type, at its calculated arrival weight in the ambient conditions; and
- A “green” deck must be available, at that off shore alternate prior to the aircraft passing the Point of No Return (PNR) on the outbound flight.

The installation selected as suitable for nomination as an off shore alternate must have an approved aircraft refueling capability with all recent serviceability and fuel testing checks completed.

The Operator shall document in the Operations Manual, a clearly stated policy for flights to off shore destinations that provides for fuel planning requirements to address the issue of carriage of one-way fuel and off shore only alternate diversions (where applicable). Associated records such as aircraft load-sheets, Flight Logs and fuel records should confirm compliance with SOPs requiring provision to be made for all flights to be operated to a destination or alternative landing site that has been assessed as suitable for the conduct of OEI landings.

24.3: Fuel Testing

*Pilots are required to take (or witness the taking of) a fuel sample from the delivery side and as close to possible to the delivery nozzle of all offshore refuelling installations prior to each refuelling operation. The fuel sample should be tested for water and contaminants as in Control 4.1.*

(See also Control 3.1: Fuel Check, Control 3.2: Flight Plan Weather Data, Control 3.3: Flight Plan.)

The Pilot-In-Command is to ensure that the fuel being uplifted is free of water and visible contaminants, and is therefore acceptable for operation of the helicopter. The Aircraft Operator’s SOPs shall document the requirements and/or procedures for fuelling of aircraft and performing fuel testing as part of the pre-flight preparation process following completion of refueling operations. The PIC must inspect the fuel sample personally.

The Operator’s documented SOPs shall detail the requirements and/or procedures for fuelling of aircraft and performing fuel testing as part of the pre-flight preparation process following completion of refueling operations.

Where fuel is supplied by a third-party, the Operator shall have procedures in place to confirm that the quality of fuel being provided meets Operator and Company standards. In such cases, it would be normal to see the third-party provider addressed under the Operator’s and/or Company’s audit schedule with appropriate records.
25.0: Helicopter Accident – Offshore Operations

Mitigating defences in the event of an accident

25.1: Aircraft Flotation System

Offshore helicopters are to be fitted with a pop-out flotation system. Automatic inflation systems are to be installed on the aircraft when available for the aircraft type.

A ditching, either planned or unplanned, is one of the more significant risks facing offshore helicopters and their occupants.

Early flotation design relied on fixed floats and boat hulls that have evolved into fitment of deployable floatation systems as an industry standard. These systems are usually stored either on the skid assemblies or fixed to the underside of the helicopter fuselage. The activation is via the use of compressed gas initiated by the flight crew, or automatically upon water contact where this option is fitted.

The design of the flotation system is intended to keep the helicopter upright in the water at certain sea-states, despite the high aircraft Centre of Gravity which could otherwise roll the aircraft over. This functionality permits passengers and crew to evacuate the ditched helicopter and deploy life rafts in an orderly fashion if sea states are less than the maximum design limits. Companies should be aware of the sea-state certification of external floatation systems when contracting the aircraft for the specific area of operation.

Resource Companies should stipulate aircraft flotation systems with consideration of localized sea-state requirements, in the contract with the Aircraft Operator. Control 10.1 (Adverse Weather Policy) should also reference limitations to flight operations when sea-states exceed aircraft certification capability.

Operators of offshore helicopters must provide a helicopter type that is equipped with an acceptable floatation system. Crew training, operating procedures and the System of Maintenance should all reflect employment of this capability. Helicopter review should confirm that the floatation system is fitted and that it is well identified and included on the passenger briefing video/brief and the passenger safety cards.
25.2: Pop-out Windows

*When an approved modification exists, emergency pop-out windows are to be installed.*

Pop-out windows provide an alternate and readily accessible escape path for passengers in the event of a ditching where the helicopter floatation equipment does not keep the helicopter upright on the water, and door jettisoning or opening is not possible. The most common variety is where a tag is pulled to progressively remove a locking bead from around the window seal. The window can then be pushed out, permitting escape.

*Resource Companies should stipulate pop-out windows and all associated training requirements as part of the contract with the Aircraft Operator. This training should include escape training through pop out windows for both passenger and crew.*

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Operators of off shore helicopters must provide a helicopter equipped with pop-out windows. Crew training, operating procedures and the System of Maintenance should all reflect employment of this capability. Helicopter review should confirm that the pop-out windows are fitted and that they are well identified and included on the passenger briefing video/brief and the passenger safety cards.

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25.3: Emergency Exit Lighting System

*When an approved modification exists, an emergency exit lighting system is to be fitted to the aircraft.*

Emergency Exit Lighting Systems illuminate during a ditching to provide visual confirmation of the emergency exits for passengers. The marking of emergency exits greatly assists passengers to exit the aircraft after an emergency, particularly at night. Emergency exit lighting is generally self-illuminating luminescent strips or powered from a self-contained battery packs. Self-powered (glow in the dark) or Tritium type luminescence signs should have a scheduled inspection program that ensures adequate brightness levels are being maintained over time.

*Resource Companies should stipulate emergency exit lighting as part of the contract with the Aircraft Operator.*

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Operators of off shore helicopters must provide a helicopter type that is equipped with an Emergency Exit Lighting System. Crew training, operating procedures and the System of Maintenance should all reflect employment of this capability. Helicopter review should confirm that the Emergency Exit Lighting System is fitted and that the system is well identified and included on the passenger briefing video/brief and the passenger safety cards.
25.4: Liferafts

Two approved liferafts that are reversible or self-righting, double chambered and capable of being tethered to the aircraft, shall be carried and be readily accessible in the event of ditching. Each liferaft is to have an overload capacity that is equal or greater to the total occupants carried in the aircraft.

A ditching scenario ideally allows the helicopter occupants to be able to enter life rafts while they are tethered to the helicopter. Once all occupants are aboard, the tethers should be cut with the special knives provided in the raft kits and the life rafts moved away from the aircraft in case it sinks. The tether should incorporate a “weak link” so that if the helicopter does sink before the tethers are cut, the life rafts can disengage and not be dragged down with it.

Acceptable life rafts should be self-righting (always floating correct side up) or reversible (either side is acceptable when first entering). Either life raft type will avoid the problems of survivors unsuccessfully attempting to flip a life raft in high sea states or high wind conditions.

Life raft design certification rules mean that each life raft has a “standard” and “overload” survivor capacity. The overload capacity is for use when one of the life rafts is not accessible and allows for all occupants to be able to utilize the remaining life raft. Off shore survival kits including signaling devices should be carried in the life rafts and are typically tethered to the life raft by a lanyard.

Each helicopter used in the off shore role should have a clearly marked location for storage of the life rafts that complies with standard restraint criteria. Deployment and operation of the life raft should be addressed in the pre-flight safety video/briefing and on each passenger safety card.

Life rafts will have raft equipment, and survival kits, with contents approved by an Aviation Specialist.

25.5: Externally Mounted Liferafts

When an approved modification exists, externally mounted liferafts are to be fitted to the helicopter and able to be deployed internally or externally.

Externally mounted life rafts provide a better option than internally mounted life rafts by maximizing space in the cabin thus reducing obstacles to egress, avoiding inadvertent
activation inside the cabin, and ensuring that the raft always makes it outside of the cabin despite any possible structural deformation of the cabin after impact. Where an approved modification exists, the life rafts should be fitted externally. Dual activation options should always be provided so that the life rafts can be deployed either by the flight crew in the cockpit or externally by any personnel using activation handles in place near the life raft location, regardless of whether the helicopter is upright or inverted.

When fitted the Operator’s SOPs or Emergency procedures shall cover the deployment of externally mounted life rafts and the situations where internal vs. external deployment is preferred. Each helicopter used in the off shore role should have a clearly marked location for storage of the life rafts and their respective activation handles. Deployment and operation of the life raft should be addressed in the pre-flight safety video/briefing and on each passenger safety card.

25.6: Life Jackets

*Constant wear, single chambered (minimum) passenger life vests manufactured to an aviation authority approved TSO must be worn at all times in offshore operations. Where approved by the local authority, life vests with crotch strap designs are preferred over those without.*

Life jackets are an essential survival tool in any ditching scenario. Life jackets come in many sizes, shapes and standards and it is important that life jackets of an appropriate standard, manufactured to meet strict TSO requirements are in use.

Crotch straps prevent the life jacket from riding up over the survivors in the water thereby reducing the risks of fatigue and/or drowning and are therefore a minimum requirement.

Spray hoods are a requirement as they provide an effective method of preventing progressive drowning from wind induced spray and waves relentlessly pounding a survivor’s face.

Other items that should be carried on lifejackets include:
- A life line to enable survivors to tie themselves together;
- A light to attract attention, preferably a strobe light;
- A whistle to enable survivors to locate each other;
- A grab handle to enable rescuers to more easily bring survivors into a rescue craft; and
- Reflective tape to improve visibility to rescuers at night.

In non-hostile situations where time to rescue may be extended, but where survivors not in a raft may become well scattered due to wind and/or current, considerations should be given to the addition of a “smart” GPS Personal Locator Beacon (PLB) to each lifejacket. These allow automated sequential emergency transmissions by multiple survivors, thus extending transmission time, and preventing interference from multiple PLBs that would otherwise operate at the same time.

Crewmembers’ lifejackets should also include a PLB with a voice capability and day/night flares.
Resource Companies in conjunction with the Aircraft Operator should consider common life jacket types employed in the off shore field local to the activity to strive towards compatibility with the surrounding workforce and Operators.

Operators of off shore helicopters must provide an appropriate standard of life jacket. Crew training, operating procedures and the System of Maintenance should all reflect employment of this capability.

Operator review should confirm that the life jackets are provided and that they are well identified and included on the passenger briefing video/brief and the passenger safety cards.

Lifejacket equipment is provided in accordance with Company requirements.

25.7: Survival Suits

Survival suits certified for use by the local regulatory authority shall be provided to crews and passengers for helicopter offshore operations in hostile environments and when required by risk assessment.

Survival suits greatly increase the chance of survival in cold sea conditions through the delay in the onset of hypothermia. The normal calculation of survival times involves a combination of air and water temperatures; hence survival suits may only be required at certain times of the year. Survival suits shall be worn where a risk assessment indicates their use will significantly increase the chances of survival following a ditching, particularly if there is no localized Search and Rescue (SAR) capability that can guarantee the timely recovery of an aircraft’s occupants.

Survival suits are available in a variety of differing standards, designed for a range of environmental conditions. Where the local regulatory authority does not specify a standard, the outcome of the risk assessment should define the applicable standard of suit required. At minimum, the risk assessment should consider the expected time in the water and address the following factors:

- SAR capability
  - Helicopter – performance, size, day/night hoist capable, maximum number of survivors that can be winched with regard to aircraft weight and fuel limitations and winch duty cycles;
  - Survivors – maximum number requiring retrieval (including crew);
  - Vessel – availability, methods of retrieval, communications compatibility with search aircraft;
  - Response time (including time to launch, transit and on-station times);
  - Navigation capability (detection of all survivors - likely spread of survivors); and
  - Dropping of supplies/survival equipment (ability to drop linked life rafts);
- Weather and sea state (particularly sea temperature and wind);
- Last light considerations;
- Medical capability on board the SAR helicopter or vessel; and
- Availability of appropriate survival suits.

Resource Companies operating in cold water and/or hostile environments should ensure the use of survival suits is considered in the operational risk assessment performed prior to operational start-up.
25.8: Helicopter Underwater Escape Training (HUET)

All flight crews and passengers shall complete a HUET course that includes use of a Modular Egress Training Simulator (METS) at least every four years unless local regulation requires greater frequency or an established internal variance process is in place.

Having the knowledge and skills necessary to assist with survival in an off shore environment, significantly increases the chances of surviving such an emergency situation. HUET courses will increase an individual’s knowledge of safety procedures and ability to successfully exit an actual ditching involving a submerged helicopter. The ability of a METS trainer to submerge, and then roll inverted, provides a very realistic training environment and is the minimum standard considered acceptable for off shore operations.

HUET training should be representative of the escape paths and exit types for the helicopter model being flown. HUET training facilities that can replicate spray/wave and day/night conditions are preferred.

The Company and Operator shall have documented policies requiring that all flight crew and passengers involved in off shore operations shall undertake an accepted HUET course as an element of their initial training and then to be repeated every four years (or more frequently if required by the local regulatory authority).

Associated training records are to confirm that the documented requirements, processes and procedures associated with the Company’s and Operator’s HUET program are being complied with consistently in initial training and on a routine basis. Personnel files and rostering records confirm appropriate implementation of training programs.

The Operator should have a process to confirm current HUET credentials at check in.

25.9: Public Address (PA) System

The helicopter shall be fitted with a PA system of sufficient clarity and volume so that passengers are capable of understanding instructions from the crew at all times during flight.

It is important that the helicopter flight crew have the capability to pass information onto passengers, not only of a general nature, but also when faced with diversions, holding or when declaring an emergency and adopting the brace position.

The provision of multiple plug-in headsets is not a recommended option as headset cords may hinder emergency egress by snagging exiting passengers. Use of the PA system (when available for the aircraft type) is considered the most effective solution if it can be set at an appropriate level and is clear enough to be heard and understood by all passengers.

Alternatively, infra-red headsets without cords may be considered.

In the event that double hearing protection (ear plugs and ear defenders) is being employed and the public address system is not loud enough to be heard, either the designated passenger on headset (see 25.10) could pass on information verbally to other passengers, or the flight crew could alert passengers to remove ear defenders before making the PA announcement.
PA announcements provide information to passengers and the Operator should have a documented regime in place that directs PA announcements to be made at certain stages of flight, but in particular a standardized approach to making emergency announcements and alerting passengers.

25.10: Passenger to Crew Communication

A means by which the passengers are able to communicate with the crew is to be made available. Where possible, this should consist of providing at least one two-way headset to a designated passenger.

In-flight issues originating from the rear of the aircraft (for example from the baggage compartment or engine bay), such as a sudden onset of unusual noise, vibration, smoke or over-heating electrical odors may occur where it is noticeable to passengers before flight crew. Passengers may also experience distress, illness or chronic air sickness. Under these circumstances, the ability to pass any safety-related information to the flight crew is required. Typically the capability will comprise of a headset connected into the crew inter-communication system (ICS).

The passenger headset would normally be allocated to a specific seat occupied by a suitably experienced and briefed passenger identified during the check-in process. If this is not practicable because of a lack of space, ICS access, issues with chords blocking egress or headset damage, an alternate means of verbal communication should be considered.

Where the passenger to crew communication facility is available, the Operator shall have procedures in place to brief the senior passenger who will be using the headset. The required brief should cover the critical times of flight (e.g. take-off, approach and landing) when no communication should be undertaken with the flight crew unless a critical cabin emergency is underway (e.g. cabin fire with visible naked flame).

25.11: Additional Off Shore Safety Briefing

When the actual aircraft used for an offshore flight is configured differently to that shown in the video safety briefing, a verbal briefing covering the differences between the actual aircraft and the one shown in the video must be provided to all passengers prior to departure.

In addition to the briefing requirements contained in 6.6, the following aspects (but not limited to) are to be provided via video brief prior to boarding the aircraft for both onshore and offshore legs:

- Demonstration on the use of the lifejackets used in that helicopter
- Briefed on the proper use of survival suits, including the need to have suits fully zipped with hoods and gloves ON during take-off and landing or otherwise advised by the Pilot-in-Command
- Demonstration of liferaft deployment and boarding
- Demonstration of deployment of all survival equipment
- Boarding and disembarkation instructions.
Research has demonstrated that passengers who receive a pre-departure safety briefing exhibit better response to an evacuation command and therefore have a better chance of survival. Where the briefing covers the specific detail of the aircraft or helicopter in use, the passenger response is further enhanced.

Where differences in fleet standard exist or where the pre-flight safety briefing does not reflect the current fleet standard, the Operator should document the requirement for a specific off shore safety briefing to be conducted by the flight crew. The content of the briefing should be detailed in the Operations Manual such that all crew deliver a consistent message.

25.12: Cabin Baggage

Only soft cover books or securely bound magazines are permitted as carry-on baggage. Briefcases, laptop computers and newspapers are specifically prohibited as carry-on baggage and must be secured in the baggage compartment.

Loose cabin baggage presents a hazard during emergency landing or ditching, either acting as a flying object that could cause serious head injury due to rapid deceleration or by impeding egress through emergency exits. Floating baggage (particularly newspapers) can obscure escape paths in a submerged ditching scenario.

Resource Companies should inform intending passengers of these requirements prior to their arrival at the departure point, which should also display clear guidance as to the expectations associated with cabin baggage. Where the Aircraft Operator has more rigid guidelines, these should be adhered to.

The Operator should have instructions and signage in place that prohibit cabin baggage other than soft cover books and securely bound magazines. This information should be provided to passengers at check-in.

During the check-in process, attending staff should ensure that the requirement for passengers to carry only soft cover books and securely bound magazines is enforced.

25.13: Flight Following

Dedicated aircraft flight following shall be provided by a responsible person capable of initiating the Emergency Response Plan. The flight following at minimum must consist of constant radio contact being maintained, with aircraft reporting intervals detailing the aircraft position and altitude not to exceed 15 minutes.

Where possible, and available for the aircraft type flown, an approved satellite system shall be provided to augment the flight following system. Satellite reporting intervals should be increased to two-minute intervals with higher reporting frequencies encouraged at lower levels, and can be used in lieu of the scheduled radio transmissions.

(See also Defence 12.4: Satellite Flight Following, Defence 12.5: Flight Following.)

Knowledge of the location of an off shore helicopter is critical in the event of ditching, particularly when occupant survival depends on response times.
Disciplined radio reporting schedules provide this capability, but the prevalence of lightweight satellite transmitting devices that provide a much greater level of accuracy and do not require crew interaction are the preferred method of aircraft flight following. While two-minute updates are considered an industry norm, higher frequency updates should be considered when the aircraft descends from cruise levels in preparation for landing.

Operators of helicopters in the off shore environment shall have appropriate flight following facilities, equipment and procedures in place. The facilities should include a dedicated workstation for the staff member conducting flight following activity, with immediate interface available to the applicable search and rescue agencies. Where the equipment installation includes a satellite capability, this information should be displayed on a television monitor or computer screen.

Automated flight following systems must meet Company requirements.

25.14: Survival Kits

*Offshore-specific survival kits, that at a minimum, are to comply with local regulatory standards are to be carried and packed into the aircraft liferafts.*

Survival kits provide water, food and medical supplies to support long-term survival situations where survivors have to remain in a raft for an extended period of time. Survival kits also provide protection from the elements (sunscreen, sea sickness tablets etc.) and location aids to enhance raft visibility in a search situation.

The Operator shall detail the requirement for carriage and the content of off shore survival kits. The survival kits should form part of the internal audit program and the System of Maintenance, and should be tamper-proof.

25.15: Emergency Response Plan (ERP)

*Provision is to be made for aviation emergencies in offshore Emergency Response Plans.*

(See also Defence 12.2: Emergency Response Plan.)

The resource Company will have a number of emergency scenarios that will be used in the development of the Emergency Response Plan for an off shore field. Aviation scenarios present large risks to the safety of off shore personnel and should always be included in the development of the Company emergency response plans and exercises.

*Resource Companies should always ensure aviation scenarios are used when developing emergency response plans for the off shore field.*
Emergency Response Drills

Emergency drills (at minimum desk-top) with specific objectives shall be conducted within 30 days of a new project start, and annually thereafter for ongoing operations.

To test the integrity of the ERP, worst-case scenarios involving last-light, weather and aircraft disposition shall be designed for the exercise.

Bridging communications between the Company, the aircraft operator and all SAR resources shall be tested and validated during the drill.

The Company and Aircraft Operator shall ensure that an emergency response exercise is undertaken on a regular basis to test the capability and adequacy of the ERP. Completion of emergency response exercises will enable all personnel to practice the role that is assigned to them and help identify areas of the ERP or personal performance that may need improvement. Lessons learned from emergency exercises should be documented and used to revise the ERP and enhance training to improve proficiency in executing those plans.

The development and exercise of an emergency response bridging document between the resource Company and the Aircraft Operator should be a priority. This will ensure duplicated actions are not conducted and the flow of communications is appropriate for the emergency.

The initial ERP may be pre-planned to enable participants time to prepare, and to give the plan, as formulated, every chance of success. This will enable the plan itself to be validated, and personnel to be trained in the responses required. Subsequent ERPs should be unannounced to test the participants as well as the plan.

The Operator shall ensure that the documented ERP provides for emergency response exercises to be conducted within 30 days of a new project start, and on an annual basis to validate and practice applicable emergency drills. These should not be desk-top exercises, and where at all possible, should exercise all the search and rescue assets as well as the bridging documents in place between the Operator and resource Company.

Desktop exercises should be used to augment the actual exercises as required, especially if failures in documentation have been identified in the actual exercises.

The documented procedures should require that each emergency response exercise is to be designed to achieve a specific objective and enable the associated communications and coordination procedures to be evaluated and practiced in complex and restrictive scenarios. Post exercise reports are to confirm that the documented inspection requirements, processes and procedures are being complied with and that the desired outcomes are being achieved.
25.17: Last Light Limitations

Daytime flights offshore are to be scheduled so that helicopters land 30 minutes prior to official sunset. Daytime flights offshore, where a ditching prior to darkness would limit the ability to provide a rescue within the anticipated occupant survival time, should be further reduced in duration to allow for appropriate response.

This requirement is only applicable to aircraft being operated to Performance Class 3 – multi-engine helicopters not capable of maintaining flight in the event of an engine failure, and all single engine helicopters.

Resource Companies scheduling flights returning on shore after last light should require the Aircraft Operators to ensure the activity is conducted to a minimum of Performance Class 2.

25.18: Night Time Off Shore Passenger Flights

Night passenger flights shall only be conducted after risk assessment that involves the aircraft operator. At minimum, this RA should include:

1. the existence, availability and effectiveness of available night SAR resources;
2. SAR response times; and
3. survival time of personnel given environmental conditions and mitigating measures (such as survival suits). In this review it is expected that dedicated night SAR helicopters with full night hoisting capability would be available.

Night off shore flight increases the complexity of successfully locating and recovering personnel in the event of ditching.

If routine night passenger flights are conducted, the SAR plan must be risk assessed using all worse-case localized conditions anticipated. This includes potential ditching locations at the furthest point from both on shore and off shore rescue resources.

Resource Companies considering the use of night off shore passenger flights should conduct a thorough risk assessment involving the contracted Aircraft Operator, the Company, an Aviation specialist and all available SAR resources prior to approval being given.

A dedicated appropriately equipped SAR aircraft and trained crew must be on standby on operational readiness at all times when night passenger flights are airborne.

A standby vessel capable of night retrieval of survivors should be on readiness whenever night passenger flights are airborne.

25.19: Linked Liferaft

For long-term operations consideration ought to be given to request the aircraft operator establish a linked liferaft capability to supplement any hoist or other means of rescue, particularly if anticipated sea survival times are marginal.

In addition to initial crew training, an annual currency requirement is to be maintained.

Known also as the Helicopter Emergency Rescue Deployment System (HERDS) or Air Sea Rescue Kit (ASRK).
In hostile conditions, retrieval of personnel from the water will be driven by time pressures before the onset of hypothermia impacts the survivors. This will dictate a SAR plan to use helicopter provided with a hoist, or closely located vessel.

The linked life raft system consists of two (or more) life rafts joined together by a length of buoyant rope. The linked life raft assembly can be loaded on any operational helicopter that has a sliding door. The linked life raft system is then dropped upwind of the survivors, with the rope extended between the two rafts. The wind then blows the assembly down to the survivors, with the intention that the rafts and rope straddle the survivors. The survivors can then pull themselves along the rope to either of the life rafts.

Linked life rafts also provide a better visual target for SAR crews as well as keeping survivors in rafts in close proximity to one another.

*Resource Companies should ascertain through risk assessment what method of search and rescue will be acceptable to them. If linked life rafts are part of the recovery plan, the requirement to maintain them, service them and train in their use should be stipulated contractually with the Aircraft Operator.*

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If the Operator has a linked life raft capability is place, they should also have SOPs covering linked life raft deployment, including considerations of sea state, wind and drop position. Crew training records should indicate that crews have been trained in the deployment of a linked life raft on an initial and recurrent basis (minimum annually).

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### 25.20: Acoustic Beacon

*All offshore helicopters shall have an underwater acoustic beacon (pinger) that transmits when submerged. If equipped with a CVR, the pinger should be attached to that CVR.*

Acoustic beacons provide the ability to locate submerged aircraft by recovery crews. These beacons are normally powered from an internal battery and activate as part of the ditching sequence. To complement any recovery and accident investigation, the pinger should be attached to the cockpit voice recorder (CVR).

*Resource Companies during combined emergency response exercises with the contracted Aircraft Operator should ensure homing equipment used to locate pingers is readily available, including personnel trained in its use. In some remote locations, this may require contractually stipulating the Aircraft Operator to maintain this capability.*

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Confirm the pinger is fitted to the helicopter and is attached to the CVR if fitted. Ensure that the pinger falls under the System of Maintenance.
25.21: Re-breathers

Approved non-pressurised re-breathing equipment may only be used when aircrew and passengers have received training in its use and the deployment covered in pre-flight safety briefings.

A re-breather is a type of Emergency Breathing System (EBS) that uses a closed-circuit breathing apparatus which collects exhaled breath to permit the rebreathing (recycling) of the substantially unused oxygen content of each breath. Consequently, in a submerged helicopter scenario, re-breathers provide additional breathing time underwater, and have the additional benefit of defending against the cold shock breathing impulse.

There are important techniques and limitations that need to be trained for when using re-breathers, not least of which is breathing style (inhalation and exhalation) and control of the breathing rate. Untrained personnel shall not be provided with rebreathing equipment.

When employed, re-breathers should also be incorporated into HUET.

Resource Companies using re-breathers as an emergency breathing system for their off shore personnel should ensure that appropriate training for all personnel using the device type has been conducted.

The Operator should have instructions in place that prohibit the issue of rebreathing equipment to passengers who are not trained in its use.

During the check-in process, attending staff should ensure that rebreathing equipment is only provided to accredited passengers.
3 AIRBORNE GEOPHYSICAL OPERATIONS

Airborne geophysical flying represents an increased exposure to aviation risk primarily due to conduct of flying operations close to the ground

In order to achieve the data quality required from the sensor packages either installed on or towed from the platform, airborne geophysical flying requires tight line tracking and adherence to height tolerances.

Often these operations require all available aircraft performance. Operation in this flight regime leaves little room for error in a high workload environment. As a consequence, manipulative skill by the flight crew coupled with appropriate fatigue management of the activity become very important controls for the safe conduct of the operation and is applicable to both fixed and rotary wing aircraft.

To reflect the increase in difficulty of this type of flying, geophysical operations demand greater role experience and more stringent risk controls than those contained in the generic requirements of the BAR Standard.

The assurance process for geophysical operations is no different to other specialist role flying activities and will comprise of a combination of (1) BARS Audits of the Aircraft Operator, (2) detailed risk assessment prior to the activity and (3) start-up operational review when considered necessary from a risk-based perspective.

Critical controls for airborne geophysical flying will always include:

- Equipment;
- Personnel;
- Fatigue Management; and
- Operational Requirements.

3.1 Equipment

Both fixed wing and rotary wing aircraft must have the following equipment:

- All requirements outlined in the BAR Standard Appendix 2;
- Clear, unscratched and serviceable transparencies;
- Upper torso restraints for all occupants;
- Continuous oxygen capability if unpressurized and operating above 10,000ft AMSL; and
- Role specific equipment installed under an STC or Engineering Order.

Aircraft instrumentation must include:

- Radio Altimeter (with dual display if crewed by two-pilots); and
- Appropriate securing of additional instrumentation that does not obstruct crew field of view (such as course deviation indication and any heads-up instrumentation).

Emergency equipment must include:

- Survival pack suited to the operating environment;
- Life rafts and lifejackets for all crew members if the survey is being conducted beyond autorotative or gliding distance from land; and
- Flying helmets manufactured to appropriate industry standards for all crew members (unless risk assessment documents otherwise).
External load equipment, such as towed arrays and other such devices must:

- Follow all requirements contained within “External Load Operations” of this guideline;
- Have all load-bearing cables and connecting shackles designed by an appropriately qualified engineer or approved design organization;
- Have certified design and documented procedures that at minimum include:
  - Inspection schedule for the towed devices, load-bearing cables and shackles;
  - Maintenance procedures, in the event of part damage and/or wear;
  - All relevant part numbers and critical design specifications of the device;
  - All certification and design approval authorities (basis for design) of the equipment and devices;
  - All applicable failure modes of the load-bearing device and any associated aerodynamic effects; and
  - All applicable emergency actions in the event of device load-bearing failure or ground/vegetation contact; and
- For helicopter towed arrays:
  - Use a 360-degree electromagnetic swivel rated for the load carried;
  - Have a weak link installed in the load–bearing line as close as practicable to the cargo hook that has a breaking strain approved by appropriately technical qualified personnel; and
  - Have data and electrical cables that do not interfere with normal helicopter cargo hook operation and which also must release from the aircraft when subjected to half the total mass of the towed device.

3.2 Personnel

The following experience requirements should be required in addition to Appendix 1 of the BAR Standard:

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<th>Co-Pilot</th>
<th>Other crew</th>
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1. Alternatively successful completion of a geophysical line check of at least 2-hours (excluding use of ferry time within the preceding 90-days. Flight crew competency against established criteria should be documented.

2. Successful (and documented) completion of a geophysical training program and where applicable a mountain flying course. Flight crew competency against established criteria should be documented. Where the aircraft is operating with a fuel system that has been modified from the original certification criteria, a specific training module on fuel system management must be included.

3. In addition to training on the actual aircraft, when practicable flight crew should undergo biennial simulator training that includes handling of emergencies low-level and in marginal performance situations (including $V_{MCA}$).

4. HUET training should be conducted for all crew involved in over-water ferry flights and off shore geophysical operations.
Additional personnel requirements to be reviewed as part of the pre-start risk assessment include:

- To avoid artificial pressures on the conduct of the activity, flight crews are not to be paid on the basis of hours or distance flown;
- The minimum standard crew complement for any airborne geophysical operation to be a pilot and geophysical Operator. Single-pilot only operations are non-standard and should only be accepted after risk-assessment involving all parties delivers mitigation measures acceptable to all parties; and
- Two-pilot operations should be considered after following catalysts:
  - Anytime when recommended through risk-assessment;
  - Performing low-level off shore surveys;
  - Night surveys; and
  - High workload associated with managing traffic and/or airspace.

### 3.3 Fatigue Management

Geophysical flying operations are fatiguing due to the high levels of concentration associated with line and height tolerances, coupled with aircraft performance management in relation to maintaining suitable terrain clearance. In addition to BARS Control 1.8 and 1.9 (flight and duty limits), the following fatigue management areas are to be followed:

- Single-pilot operations are limited to 5-hours per day on actual survey (transit time excluded);
- Two-pilot operations are limited to 8-hours per day on actual survey (transit time excluded);
- Fatigue management is to be covered as part of the pre-start risk assessment to assess all localized influences. Such influences include:
  - Crew rotation;
  - Time zone changes during rotation travel;
  - Extreme climate;
  - Effect of altitude;
  - Camp conditions; and
  - Rest facilities;
- Appropriate accommodation, (including single rooms when possible - no sharing) should be the particular focus of the pre-start risk-assessment for fatigue management, and must take into account the ability to gain uninterrupted rest considering temperature, noise, darkness and any other applicable local condition; and
- When sole occupant surveys are conducted (i.e. single pilot with no equipment operator), the duties of the flight crew member shall not be increased because of the absence of an on-board operator.
3.4 Operational Requirements

The following operational requirements must be applied in addition to any local regulatory requirements:

- Minimum Survey Height: The survey height is defined as the height above obstacle level. This would be jungle canopy in a tropical environment, or ground level in desert conditions. Where the survey height is nominated below 100 meters for fixed wing, 60 meters for helicopters or 50 meters for a towed object, approval must be based on risk-assessment;

- Fixed Wing minimum survey speed: For all fixed wing aircraft the minimum safe survey speed is to be calculated using the greatest of:
  - 130% of clean stall speed (VS);
  - 110% of best single engine rate of climb speed (VYSE) if applicable; or
  - Minimum safe single engine speed (VSS) if published;

- Helicopter minimum survey speed: With the exception of take-off and landings, helicopters should not be flown inside the avoid curve of the published height velocity diagram;

- Turning Radius: All turns at low-level should be limited to a maximum angle of bank of 30 degrees and conducted at a constant altitude. If the surrounding terrain demands the aircraft to be climbed, the aircraft should be climbed to the required height prior to commencing the turn. Descent back to survey height should only be established after wings level attitude is established;

- All survey aircraft are to be tracked during survey using a satellite-based tracking system set at 2-minute reporting intervals and which is continuously monitored on the ground. Voice communications equipment must be available as back-up. In the event of a failure of the satellite tracking system, an alternate means of flight following must be established that is acceptable to the Aircraft Operator and the Company;

- Emergency Response Procedures must be developed for each survey, and included as part of the pre-start risk assessment; and

- All night surveys must be in accordance with all night, IFR requirements detailed in the BAR Standard.
4 SHORT-TERM OR EMERGENCY-USE AIRSTRIP OPERATIONS

Aerodrome requirements outlined in the BAR Standard are considered appropriate for long-term (greater than 6-months) facilities owned and/or operated by resource Companies and are associated with production operations.

This section is aimed at addressing short-term and emergency-use only airstrip requirements, where it is not generally practical or possible to impose the higher level of requirements that exists for regular use aerodromes. Specifically, this guidance is aimed at those owned and operated airstrips supporting exploration and construction operations, or airstrips whose sole purpose is for emergency medical evacuation (medevac).

The guidance contained within this section is provided as a minimum standard for such airstrip operations that have the following characteristics:
- Owned, and/or operated by the resource Company, supports exploration and/or short-term construction and/or emergency use;
- For use during day, visual operations for passenger, freight or aerial work;
- Night, visual operations for emergency medevac only (see 5.6 for lighting requirements);
- Instrument approach procedures to a landing minima for the airstrip are not available; and
- Aircraft used are limited to those less than 5,700kg maximum take-off weight, unless reviewed as being suitable for the dimensions presented (for example King Air 350, Twin Otter, Beech 1900).

All other circumstances should refer to BAR Standard requirements for aerodrome operations (see Section 7).

The six critical controls associated with remote airstrip operations are:
1. Design
2. Obstacle clearance
3. Siting
4. Construction
5. Operations
6. Maintenance

Where the resource Company is utilizing a government or third-party owned strip for short-term purposes, this section is intended to provide a baseline for risk assessment purposes by the resource Company and Aircraft Operator.

Resource Companies should conduct a thorough risk assessment dedicated to the design, use and expectations of a remote airstrip supporting any resource sector activity. The assessment must involve representatives from the Aircraft Operator likely to use the airstrip, in addition to resource Company and aviation specialist involvement.

The assessment should be conducted with sufficient time remaining for any actions to be incorporated prior to operational start-up and first use.
4.1 Design of the Short-term Airstrip

Minimum airstrip design comprises six main elements that combine to create a safe area for aircraft to land, take-off, park and taxi (ground maneuver).

- **Runway** – The only part of the aerodrome on which, aircraft can land and take-off. It consists of a rectangle of land constructed or cleared to be a smooth, firm surface of sufficient size to accommodate an operating aircraft;

- **Runway Strip** – This is the area surrounding the runway that acts as a buffer zone for aircraft that may veer off the centerline, either while on the ground or in the air. The surface of the runway strip needs to be smooth and free from objects sticking into the air. The portion of the runway strip beyond the end of the runway is also commonly known as the clearway;

- **Taxiway** – This area provides a link between the runway and the apron. It is typically constructed or cleared in the same manner as the runway;

- **Apron** – This is where aircraft park to board and de-board passengers, handle baggage and freight, and for refueling. The apron is generally the same construction as the runway and taxiway, although consideration may be given to increasing the strength of parking pads due to the increased static standing loads of parked aircraft. It also needs to be big enough for the number and type of aircraft which use the airstrip;

- **Wind Indicator** – The wind indicator or windsock consists of a sleeve of conspicuous color attached to a pole in a manner that enables it to indicate the wind direction;

- **Signal Circle** – This is a small circular area near the wind indicator that is black and marked with cones. In this area, signals to aircraft are positioned when airstrip serviceability is compromised; and

Airstrip Dimensions

![Geometric layout of short-term or emergency use airstrip.](image-url)
The above facilities should meet standards relative to the size of the aircraft which use the airstrip. While standards vary according to different systems of categorizing aircraft (for example the ICAO code reference system), the following dimensions are offered as a guideline for aircraft operating in the ICAO Aerodrome Reference Code 2 classification (e.g. Beechcraft King Air 200, DHC-6 Twin Otter, Cessna 441 Conquest etc).

<table>
<thead>
<tr>
<th>Airstrip Facility</th>
<th>Dimension</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Runway</strong></td>
<td></td>
</tr>
<tr>
<td>Length (m)</td>
<td>1,200(m)</td>
</tr>
<tr>
<td>Width (m)</td>
<td>23(m)</td>
</tr>
<tr>
<td>Turning Node (m x m)</td>
<td>25x25(mxm)</td>
</tr>
<tr>
<td><strong>Runway Strip</strong></td>
<td></td>
</tr>
<tr>
<td>Length (m)</td>
<td>1,320(m)</td>
</tr>
<tr>
<td>Additional Length at each end (m)</td>
<td>60(m)</td>
</tr>
<tr>
<td>Width (m)</td>
<td>80(m)</td>
</tr>
<tr>
<td><strong>Taxiway</strong></td>
<td></td>
</tr>
<tr>
<td>Width (m)</td>
<td>10.5(m)</td>
</tr>
<tr>
<td><strong>Apron</strong></td>
<td></td>
</tr>
<tr>
<td>Size (m x m)</td>
<td>30x50(mxm)</td>
</tr>
</tbody>
</table>

Aircraft of ICAO Aerodrome Reference Code 3 (e.g. Metro 23, Jetstream 31/32, etc.) may require a larger runway to support their operations.

Resource Companies should consult with identified Aircraft Operators and/or aviation specialist advice prior to contracting a specific aircraft type or proceeding with airfield construction. This will ensure all relevant factors are considered.

4.2 Obstacle Clearance

In addition to physical aspects of the airstrip, obstacle clearance requirements from the end and the sides of the airstrip ought to be considered during airstrip siting and be met during construction and maintenance. The prescribed areas should aim to be clear of objects that project higher than the clearance surfaces.

These clearance areas project out from each end and from the sides of the runway strip. The take-off/approach areas (TOAA) protect the aircraft during climb-out and approach. The transitional areas protect aircraft that deviate off the runway centerline.
Take-off/Approach Area Dimensions

Figure 2: Take-off/approach area (TOAA) schematic.

Transitional Area Dimensions

Figure 3: Transitional area schematic.
Much like the physical design standards, obstacle clearance requirements vary depending on aircraft size and performance capability. The following table sets out minimum clearance standards for the typical aircraft used:

<table>
<thead>
<tr>
<th>Clearance Area</th>
<th>Schematic</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Take-off/Approach Areas</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inner Edge (m)</td>
<td>A</td>
<td>80m</td>
</tr>
<tr>
<td>Divergence (%)</td>
<td>B</td>
<td>10%</td>
</tr>
<tr>
<td>Length (m)</td>
<td>D</td>
<td>2,500m</td>
</tr>
<tr>
<td>Gradient (%)</td>
<td>E</td>
<td>4%</td>
</tr>
<tr>
<td><strong>Transitional Areas</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gradient (%)</td>
<td>F</td>
<td>20%</td>
</tr>
<tr>
<td>Final Height (m)</td>
<td>G</td>
<td>45m</td>
</tr>
</tbody>
</table>

Objects above 45m outside of these areas and within 2.5km of the airstrip also need to be identified for marking and/or lighting.

### 4.3 Airstrip Siting

Using the above dimensions as a template, siting an airstrip must consider the following:

- **Prevailing wind direction:** The runway should be aligned, as much as possible, to the dominant wind direction;
- **Surrounding terrain and other potential obstacles:**
  - Obstacle clearance requirements must be met according to the standards set out above; and
  - Power-lines and radio antenna siting require special consideration;
- **Surface characteristics:**
  - Natural surface qualities such as strength, smoothness and slope should be considered prior to construction:
  - Areas with effective drainage, gentle and consistent slopes, and surfaces that are capable of withstanding regular traffic should be assessed; and
  - Sandy and rocky surfaces as well as those surfaces that become slippery when wet should be avoided;
- **Proximity to mining operations:**
  - The airstrip should be sited in a position where mining operations will not impact on aircraft safety and vice versa; and
  - The take-off and approach tracks must be clear of mining activity, with particular consideration given to any blasting activity that may produce fly rock; and
- **Site access:** Safe and efficient access to the airstrip is critical, especially in an emergency situation.
4.4 **Airstrip Construction**

Construction of the airstrip will involve clearing, shaping land and installing markers as a minimum standard. Optional work may include constructing a pavement and installing lights if the airstrip is to be used for night medevac flights.

The construction of each area should meet the following requirements.

**Runway**

The runway should be cleared, made smooth and provided with a shape that promotes drainage of surface water. The objective of the runway is to consistently support aircraft movements.

A central crown is preferred although a cross-fall within the limits detailed in the table presented at the end of the section is also permitted. A cross-fall is when the slope of the runway (or road) surface falls from one side to the other rather than falling away from the center. Longitudinal slopes should also remain within these limits and abrupt changes must be minimized.

While natural surfaces can accommodate smaller aircraft, a constructed surface can improve operating condition and resistance to weather.

For dry-land-based runways, gravel pavements provide good support and should consist of a mixture of stone sizes no larger than 25mm with fines/dust such that a tightly bound surface results. Sealing the runway surface is also an option to provide wet weather capability.

For other types of runway surfaces (for example, ice or lake-bed), a suitably qualified airport engineer should be engaged to assess the natural surface and provide advice on constructed pavements.

Regardless of the final surface, the runway should be free of defects that may impact aircraft ride and controllability. Surface smoothness can be tested with a stiffly-sprung vehicle travelling at speed (approximately 70-80km/h), if the ride is comfortable, the surface is smooth enough for aircraft.
Runway Strip
The runway strip should also be cleared, made smooth and shaped to provide drainage. The objective of this surface is to support aircraft in the event of it departing the runway. The aircraft should come through such an event undamaged.

The transition from the runway to the runway strip should be near seamless with a minimum drop-off from sealed runways to the runway strip. Wind-rows and subsidence should be eliminated.

The shape of the runway strip should fall away from the runway within the limits outlined below. Open drains should not be established within the runway strip and abrupt changes in slope minimized.

Taxiway
Much like the runway, the taxiway is a cleared, smooth and shaped area, clear of obstacles and capable of supporting the aircraft during taxi. Slopes should be within the limits set for runways and special consideration should be made of runway strip slopes in the vicinity of the taxiway.

Apron
Aprons too are cleared, smoothed and graded for drainage. Consideration should be given to constructing an apron of a suitable size, able to support the static loads of a parked aircraft and protect propeller blades from stone damage when aircraft are stationary.

<table>
<thead>
<tr>
<th>Airstrip Facility</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Runway, Taxiway &amp; Apron</strong></td>
<td></td>
</tr>
<tr>
<td>Maximum Longitudinal Slope (%)</td>
<td>2%</td>
</tr>
<tr>
<td>Maximum Transverse Slope (%)</td>
<td>2%</td>
</tr>
<tr>
<td>Minimum Transverse Slope (%)</td>
<td>1%</td>
</tr>
<tr>
<td><strong>Runway Strip</strong></td>
<td></td>
</tr>
<tr>
<td>Maximum Transverse Slope (%)</td>
<td>3%</td>
</tr>
<tr>
<td><strong>Wind Indicator</strong></td>
<td></td>
</tr>
<tr>
<td>Height (m)</td>
<td>6.5(m)</td>
</tr>
<tr>
<td>Sleeve Length (m)</td>
<td>3.65(m)</td>
</tr>
<tr>
<td>Ground Circle Diameter (m)</td>
<td>15(m)</td>
</tr>
<tr>
<td><strong>Signal Circle</strong></td>
<td></td>
</tr>
<tr>
<td>Ground Circle Diameter (m)</td>
<td>9(m)</td>
</tr>
</tbody>
</table>

Wind Indicator
The wind indicator consists of a conspicuous color PVC sleeve attached via hinge to a vertical pole according to the requirements below. The ground surface surrounding the pole is blackened and marked. The wind indicator is to be positioned such that it is visible from the apron and runway ends.
Signal Circle
The signal circle is simply a blackened circle of the required diameter that is positioned near (and typically on the runway side of) the wind indicator.

Obstacle Clearance Areas
Trees in the designated Obstacle Clearance Areas should be cleared such that obstacle clearance requirements are maintained. The distance out from the runway strip that clearing must extend will depend on the height of the trees and whether the ground rises or falls from the runway.

Markers
All aircraft facilities must be marked in accordance with the following requirements: If markers cannot be positioned flush with the surrounding surface, they must be constructed of frangible material and are normally cone shaped. Markers will be either white or yellow in color. Smaller cones are used on the runway and taxiway edges and larger cones on the runway strip, apron, wind indicator and signal circle. The specific dimensions are:

- Small Cones – 400mm base diameter and 300mm height; and
- Large Cones – 750mm base diameter and 500mm height.

These cones are laid out on the corners and along the edges of the airstrip’s facilities as follows:

- Corners consist of an “L” pattern of five cones;
- Edges with markers spaced at 90m for runway/runway strip edges and 10m for taxiway/apron edges;
- White cones are used on the runway and strip; and
- Yellow cones are used on the taxiway and apron.

Large white cones are also placed around the wind indicator and signal circle with 15 and six cones used respectively.

Remote Airstrip Marker and Signal Specifications

![Figure 4: Marker and signal specifications.](image-url)
Lighting

Lighting should only be used where night medevac operations are planned. The lighting system should consist of a set of quality lights which are suited to the environment, durable and colored as per below.

A network of discrete lights appropriately secured in place provides a good mix of output quality and flexibility in design and maintenance. A fixed system with a ground wire fed by mains or on-site generator should be designed and constructed to international or local standards appropriate for larger aerodromes.

The basic guidelines for airstrip lighting are:

- Runway Ends: Thresholds are identified by a pattern of six lights spread about the runway centerline. The pattern consists of six bi-directional red/green lights with the red lights facing the runway;
- Runway Edge: Edge lights consist of white lights spaced 30m laterally and approximately 90m longitudinally, although they must be evenly spaced from runway end to end;
- Taxiway and Apron Edge Lights: These are blue lights spaced at 14m laterally and approximately 10m longitudinally;
- Wind Indicator Lighting: The windsock must be lit by appropriate floodlighting; and
- Obstacle Lights: All obstacles above 45m within 4,000m of the airstrip should be lit by steady red lights.

All light fittings must be frangible to avoid damage to the aircraft in the event of runway/taxiway excursion.
Remote Airstrip Lighting Layout

Figure 6: Lighting Layout.

**Fencing**
Due to the risk to aircraft posed by wildlife, some form of airport fencing should be installed unless formal risk assessment dictates otherwise. The specifics of the fencing will vary depending on the hazards present, but care must be taken to ensure the fence does not infringe the obstacle clearance areas.

**4.5 Airstrip Operations**
Successful short-term airstrip operation depends on pre-flight airstrip inspections and documented reporting of its serviceability. Flight monitoring, passenger control, weather reporting and emergency response in varying forms will also need to be considered.

**Pre-Flight Inspections**
Prior to each aircraft movement, the airstrip should be inspected and confirmed serviceable.

The inspection should be conducted by a suitably trained person driving a vehicle to assess the condition of the airstrip. The results of all inspections must be recorded in a logbook or appropriate file. Specifically, the airstrip inspection should look at:

- The runway surface to confirm that it is smooth and firm with minimal loose material, no vegetation and no standing water;
- The runway strip should be relatively smooth and firm with limited loose material, vegetation and standing water;
- The taxiway and apron surfaces should be in a similar condition to the runway and surface transitions observed to be within limits;
- Airstrip markers to ensure they are in position, visible and secure;
- Lights serviceability and availability (if applicable);
- The wind indicator to confirm serviceability;
- That the signal circle shows the airport’s current status;
- Obstacle clearances to ensure that they have not been compromised; and
- The presence of bird and/or animals and confirm that they do not pose a risk to aircraft operations.
The following table outlines specific standards for surface serviceability:

<table>
<thead>
<tr>
<th>Airstrip Facility – Inspection Item</th>
<th>Required Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Runway, Taxiway and Apron</strong></td>
<td></td>
</tr>
<tr>
<td>Surface Softness</td>
<td>Vehicle ruts no greater than 25mm</td>
</tr>
<tr>
<td>Debris/Loose Material</td>
<td>No greater than 25mm in diameter</td>
</tr>
<tr>
<td>Surface Defects</td>
<td>No greater than 50mm wide and 25mm deep</td>
</tr>
<tr>
<td>Vegetation</td>
<td>Nil</td>
</tr>
<tr>
<td>Standing Water</td>
<td>Nil</td>
</tr>
<tr>
<td>Surface Roughness</td>
<td>Comfortable @ 70–80km/h whilst driving a vehicle (preferably 3-tonne)</td>
</tr>
<tr>
<td><strong>Runway Strip</strong></td>
<td></td>
</tr>
<tr>
<td>Debris/Loose Material</td>
<td>No greater than 50mm in diameter</td>
</tr>
<tr>
<td>Surface Defects</td>
<td>No greater than 80mm wide</td>
</tr>
</tbody>
</table>
| Vegetation – should be no obstruction to markers or lights | If Lush – no more than 100mm high  
If Thin – no more than 250mm high  
If Sparse – no more than 450mm high |
| Runway Surface Transition to runway strip | No greater than 25mm drop |

**Surface Test**

If conditions at the airstrip (recent rain etc) indicate a strong likelihood that the runway surface is unserviceable, the surface test exercise should not be attempted as it may lead to long-term surface damage.

In marginal conditions, surface strength can be tested using a test vehicle (ideally, a 3-tonne truck) along a portion of the runway surface and checking the ruts left in the runway. The areas selected for testing should be those most likely to degrade first.

The typical maximum rut depth is outlined in the table. However, care should be taken when dealing with aircraft with small, high-pressure tires as the maximum rut depth may be lower.

Other methods, such as dry-to-depth and Clegg Hammers/penetrometers may also be used, and specialist advice should be sought to investigate use if required.

**Unserviceability**

When serviceability issues are encountered, the individual designated as accountable for the airstrip should attempt to rectify the problem immediately. If rectification is not possible and the issue is significant enough to warrant closure of the airstrip, the airstrip is to be marked as unavailable with a white cross in the signal circle and at each end of the runway. The Aircraft Operator contracted to support the activity must be notified.

The white cross consists of two rectangles 6m x 0.9m secured to the ground.

**Reporting**

The condition of the airstrip should be reported (whether serviceable or not) to the Aircraft Operator prior to any operation. This reporting should involve direct communication, which can include phone calls prior to departure, or via air-band radio to the pilot prior to arrival. If fax or email is used for communication purposes, a positive reply acknowledging receipt must be obtained by the individual sending the serviceability report.

**Annual Checks**

Longer term airstrips (for example, emergency use airstrips supporting production operations) should be inspected by a qualified person on an annual basis. This inspection should involve:

- Checking the accuracy of aerodrome information provided to pilots;
• Looking into matters of a volatile nature, e.g. new obstacles or tree growth, changes in the movement area or the marking and lighting of the movement area, as a result of new aerodrome development;
• Inspecting matters that are subject to damage or deterioration;
• Checking the competency of aerodrome personnel involved in safety functions, and whether they are clear of their duties and responsibilities;
• Reviewing any concerns raised by aircraft operator and pilots; and
• Reviewing whether there is any deficiency in the day to day operation of the aerodrome.

The output of this inspection should be a formalized documented report (1) providing a clear status of the airstrip, (2) detailing any rectification works and (3) providing succinct recommendations for improvement.

**Flight Monitoring**
Responsible personnel should be in attendance for all flights 30 minutes before the scheduled arrival through to 15 minutes following departure.

**Passenger Control**
The airport officer, while in attendance, should monitor the activity of passengers and intervene where safety is compromised. Access on the “airside” apron area should be strictly managed and passengers escorted at all times.

**Weather Reporting**
Using appropriate weather equipment, the responsible personnel may be requested to provide a weather report to incoming aircraft over the radio. It must be made clear what the basis of this information is prior to the flight.

**Emergency Response**
The responsible personnel may be required to assist in and coordinate an emergency response. The airport officer should be provided with appropriate tools, relevant information and necessary training to carry out this task. They should also be supported with appropriate procedures.

Responsible personnel located at the airstrip may be required to assist in and coordinate an emergency response. Support must be provided in the form of:

• Up to date and current Emergency Response Plan;
• Crash Box (BAR Standard 12.13);
• Rescue Fire Fighting (BAR Standard 12.14);
• Communication (satellite phone or other); and
• Aircraft Operator contact details (or ERP Bridging Document).

**4.6 Maintenance**
Maintenance works should be carried out both on a scheduled basis and as the result of a pre-flight inspection or annual check. These tasks will vary but may involve:

• Dragging unsealed surfaces to repair minor defects;
• Grading unsealed surface to repair larger defects (such as scouring);
• Slashing/mowing vegetation to ensure surface smoothness and marker/light visibility;
• Cleaning markers and lights;
• Replacing broken markers, lights and worn windsocks;
• Repairing fences; and
• Clearing and trimming trees.

These works should be planned and conduct in a manner that does not impact on aircraft operations. Works should be conducted outside of flight periods with the airstrip marked as closed.
5  BARS MEMBER ORGANIZATION (BMO) – RELEVANT CONTROLS

5.1 Definitions:

Variations

Any variation to the BAR Standard is at the discretion of each individual Company. It is recommended that each variation be assessed to demonstrate that the risks associated with the variation are tolerable and justify safe continuation of operations.

Basic Aviation Risk Standard Process

<table>
<thead>
<tr>
<th>Prescriptive</th>
<th>Risk Based</th>
</tr>
</thead>
<tbody>
<tr>
<td>National and International Aviation Regulations</td>
<td>Aviation Operations Threats</td>
</tr>
<tr>
<td>Basic Aviation Risk Standard (BARS)</td>
<td>Controls and Recovery / Mitigation Measure</td>
</tr>
<tr>
<td>Variance? NO</td>
<td>Risk Assessment</td>
</tr>
<tr>
<td>YES</td>
<td>Identify additional / alternative controls until tolerable or decision not to conduct activity</td>
</tr>
<tr>
<td>NO</td>
<td>Risk Tolerable? NO</td>
</tr>
<tr>
<td>YES</td>
<td></td>
</tr>
</tbody>
</table>

Figure 7: Variance Process
Hostile Environment
An environment in which a successful emergency landing cannot be assured, or the occupants of the aircraft cannot be adequately protected from the elements, or search and rescue response/capability cannot be provided consistent with the anticipated exposure.

Non-Hostile Environment
An environment in which a successful emergency landing can be reasonably assured, and the occupants of the aircraft can be adequately protected from the elements, and search and rescue response/capability can be provided consistent with the anticipated exposure.

5.2 Company Awareness

Accident and Incident Notification
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 jeopardized safety.

Aircraft Operator Operational Risk Assessment
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.

Night Medical Evacuation (Medevac) Policy
Company in consultation with the Aircraft Operator shall develop a night medevac policy when the capability is required. In recognition of the higher risk profile, night off shore medevac flights shall only be requested in life threatening situations where patient stabilization until first light is not considered an option by the Off Shore Installation Manager (OIM) in consultation with medical staff.

5.3 Airfield and Helipad Requirements

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 splay shall also be included in initial design considerations.

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.
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.

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

All equipment shall be maintained on a current calibration register.

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.

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.

Passenger Control
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.

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, refueling 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 maneuvering purposes.
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.

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 minimize the risk of bird strike during all operations.

Emergency Response Plan

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.

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; and
- Adjustable wrench.

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.
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Contact:

BAR Standard Program Office
Flight Safety Foundation
Regional Office
GPO Box 3026
Melbourne, Victoria 3001, Australia
Telephone: +61 1300 557 162
Fax: +61 1300 557 182
Email: BARS@flightsafety.org
Web: www.flightsafety.org

Flight Safety Foundation
Headquarters
801 N. Fairfax Street, Suite 400
Alexandria, Virginia US 22314-1774
Telephone: +1 703 739 6770
Fax: +1 703 739 6708