



Aircraft management guidelines

Report No. 390

July 2008, updated August 2013





Global experience

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Aircraft management guidelines

Report No: 390

July 2008, updated August 2013

The *Aircraft management guidelines* were developed by the Aviation Subcommittee.

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Table of Contents

1	Introduction	5
1.1	Purpose	7
1.2	Document structure	7
1.3	OGP guidelines	7
1.4	Setting an aviation policy	7
2	Aviation operation review requirements	9
2.1	Contracted air operators	11
2.2	One-time acceptances	11
2.3	Principles of review	11
3	Safety & quality management	13
3.1	Regulatory requirements	15
3.2	OGP requirements	16
3.3	Safety management system elements	17
3.4	Hazard/risk management process	19
3.5	Incident & accident reporting requirements	20
3.6	Quality assurance	20
3.7	Environmental management	20
4	Aircraft operations general	21
4.1	Contractual	23
4.2	Operating categories & usage	24
4.3	Pilots	26
4.4	Maintenance personnel	27
4.5	Maintenance requirements	28
4.6	Drugs & alcohol policy	30
5	Helicopter operations	31
5.1	Helicopter standards	33
5.2	Helicopter performance classes	34
5.3	Fuel planning	34
5.4	Use of offshore alternatives	35
5.5	Composition of flight crew	36
5.6	Flight & duty time	36
5.7	Offshore helicopter life-jackets & aircraft homing devices	38
5.8	Rotors Running Refuelling (RRRF)/helicopter rapid refuelling	38
5.9	Crane-helicopter operational procedures	38
5.10	Radio silence - perforating operations	38
5.11	Specialist roles	39
6	Fixed-wing operations – public transport & aerial work	41
6.1	Fixed-wing aircraft standards	43
6.2	Airfields - minimum requirements	44
6.3	Fuel planning	44
6.4	Composition of flight crew	45
6.5	Flying hour limits - recommended maximum	45
6.6	Aircrew life-jackets & aircraft homing devices	45
6.7	Sideways facing seats	45
6.8	Specialist roles	46
7	Fuel system design & management	47
7.1	Design, operation & inspection references	49
7.2	Design & periodic review	49

7.3	Variances.....	49
7.4	Fuel quality control.....	49
7.5	Rapid refuelling (refuelling with engines running).....	51
7.6	Portable offshore fuel transport tanks.....	52
8	Training & experience	53
8.1	Flight crew training.....	55
8.2	Support & technical personnel requirements.....	60
8.3	Training records & programmes.....	60
9	Passengers & freight	61
9.1	General.....	63
9.2	Cargo.....	63
9.3	Manifests.....	64
9.4	Passenger weights.....	64
9.5	Passenger briefings.....	65
9.6	Video briefing.....	66
9.7	Multi-language operations.....	66
9.8	Passenger marshalling areas.....	67
9.9	Passenger training.....	67
9.10	Passenger dress requirements.....	67
9.11	Passenger & cargo management on helidecks.....	68
9.12	Passenger seating.....	68
9.13	Survival equipment.....	68
10	Aircraft equipment standards	71
10.1	Introduction & equipment fit tables.....	73
10.2	Minimum aircraft equipment - general.....	73
10.3	Helicopter equipment.....	75
10.4	Fixed-wing equipment.....	77
11	Airbases	79
11.1	Definition.....	81
11.2	Airbase design reference.....	81
11.3	Airbase design reviews.....	81
11.4	Variances.....	81
11.5	Weather monitoring systems.....	81
11.6	Airbase rescue equipment.....	82
11.7	Airbase fire protection & equipment.....	82
11.8	Non-directional beacons (NDB).....	83
11.9	Helicopters & helidecks.....	83
11.10	Airports & airstrips.....	85
12	Emergency response planning	87
12.1	Introduction.....	89
12.2	Aircraft in the emergency response role.....	89
12.3	Scenario-based drills.....	89
12.4	Helicopters used for medical evacuations.....	90
12.5	Search & Rescue (SAR) services & equipment.....	90
12.6	Survival equipment.....	91
12.7	Emergency flights.....	95
12.8	Overdue aircraft.....	95
12.9	Accident, incident, hazard & near miss reporting.....	96

13	Appendices	97
A1	Risk assessment & risk reduction opportunity ranking	99
A2	[WITHDRAWN]	105
A3	Duties & responsibilities of the Air Operations Supervisor	107
A4	Training courses - air operations supervisor	109
A4.1	Introduction	111
A4.2	Advisory familiarisation & training.....	111
A4.3	Flight safety & aircraft accident investigation courses	111
A4.4	UK airworthiness course.....	112
A4.5	Safety management system.....	112
A4.6	Crew resource management.....	112
A4.7	Familiarisation/refresher/conversion flying training.....	112
A4.8	Role experience	112
A4.9	Basic fire course.....	112
A4.10	Helicopter fire course	112
A4.11	HLO training course.....	112
A4.12	Fuel quality course	113
A4.13	Seismic course.....	113
A4.14	Quality assurance course	113
A4.15	Weather observer course	113
A4.16	Dangerous goods course.....	113
A5	Training courses - air operations supervisor	115
A5A	Experience & Qualification Levels	117
A5B	INITIO & low experience pilot training & progression for multi-crew offshore helicopter pilots	120
A5C	Pilot Aircraft Conversion Syllabus and Minimum Hours.....	121
A5D	Engineering, load master, helideck personnel, aerial observer and dispatcher qualifications & experience .	126
A6	Aviation weather guidelines	129
A6.1	General.....	131
A6.2	Operating environment & weather	131
A6.3	Flight rules & weather	131
A6.4	Offshore helicopter weather limits & reporting	133
A6.5	Offshore helicopter adverse weather operational limitations	135
A7	Recommended aircraft equipment fit	139
A8	Heliportable land seismic operations (<i>issued as OGP Report N° 420</i>)	145
A9	Winching (hoisting) operations	147
A9.1	Personnel transfer by winch	149
A9.2	Helicopter performance.....	149
A9.3	Operational procedures.....	149
A9.4	Personnel (pilots & winch operator) guidelines	150
A9.5	Required equipment standards.....	150
A10	Airborne geophysical survey	153
A10.1	Risk analysis.....	155
A10.2	Aircraft equipment standards.....	155
A10.3	Personal equipment standards	155
A10.4	Minimum crew	155
A10.5	General pilot experience	156

A10.6	Pilot flight & duty times	156
A10.7	Minimum survey height	156
A10.8	Minimum survey speed.....	157
A10.9	SAR coverage.....	157
A10.10	Minimum fuel reserves	157
A10.11	Fuel quality & procedures	157
A10.12	Helicopter procedures	158
A11	Aerial pipeline inspection	159
A11.1	General.....	161
A11.2	General guidelines.....	161
A11.3	Single-engine aircraft	161
A11.4	Aircraft configuration	162
A11.5	Aircraft maintenance for long-term operations.....	162
A11.6	General pilot and/or observer requirements.....	165
A11.7	Pipeline patrol specific pilot role experience.....	165
A11.8	Pilot flight & duty time.....	167
A11.9	Collision avoidance	167
A11.10	Passengers – crew members	167
A11.11	Exemptions/Low Altitude Waivers.....	168
A11.12	Inadvertent entry into Instrument Meteorological Conditions	168
A11.13	Flight following	168
A11.14	Flights over urban areas.....	172
A11.15	Landings and low altitude inspections en-route (helicopters only)	172
A12	Helicopters as a secondary Search & Rescue task	173
A12.1	Introduction	175
A12.2	Management.....	175
A12.3	Operating standards	175
A12.4	Aircraft & equipment fit	176
A12.5	SAR equipment.....	177
A12.6	Aircrew	177
A12.7	SAR crew	178
A13	Cold weather aircraft operations	183
A13.1	Introduction	183
A13.2	Aircraft certification standards & equipment fit.....	185
A13.3	Flight operations - general	186
A13.4	Helicopter-specific operations	189
A13.5	Airplane-specific operations.....	190
A13.6	Maintenance procedures.....	191
A13.7	De-ice/anti-ice	193
A13.8	Survival equipment	194
A13.9	Facilities.....	195
A13.10	Personnel	197
A13.11	References.....	198
A13.12	Annexes	199
A14	Night operations	Published as Report 390-A14

Section I Contents

1	Introduction	7
1.1	Purpose	7
1.2	Document structure	7
1.3	OGP guidelines	7
1.4	Setting an aviation policy	7

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I Introduction

I.1 Purpose

The purpose of these guidelines is to provide a ready reference for the management of aviation. It deals with operations from the conceptual phase onwards. In doing so it addresses the factors to be taken into account when contemplating aircraft operations, the tendering and contractual process, the setting up of support facilities and the expectations required of our contractors.

Most governments have some form of National (Civil) Aviation Authority, the function of which is to lay down standards and requirements for both the aircraft and the manner in which they are operated. However, Aviation Authorities vary in their effectiveness as well as their requirements and standards, although a good aircraft operator may apply guidelines that are more exacting than legislated requirements. Indeed, even the best Aviation Authority can only lay down minimum requirements; the ultimate responsibility for safety in the air lies with the aircraft operator.

These guidelines and the readily available support from Aviation Advisers should assist those responsible for managing aviation, particularly if they are not aviation specialists, to plan, develop and control, safely and efficiently, air transport operations that are best suited to their needs.

I.2 Document structure

These guidelines are divided into two parts:

- Part 1 contains the current guidelines for aircraft operations.
- Part 2 contains additional guidance and explanatory material describing how the defined guidelines and policies can best be applied.

Part 2 of the document is still under development.

It is emphasised that nothing in this document is intended to contravene national or international regulations.

I.3 OGP guidelines

OGP has developed the set of safety guidelines contained in this manual based on a number of core guidelines and recognised industry best practices. The guidelines are largely based on existing international legislation and safety codes but, where appropriate are further developed as described in this manual. The regulatory basis for these guidelines is summarised in Part 2.

Where these guidelines cannot be achieved fully for practical reasons, an aviation adviser should, wherever practicable, seek mitigating measures with a view to achieving an equivalent level of safety.

For specific operations, these guidelines may need to be augmented with specified additional guidelines to reflect the local circumstances and operating conditions.

I.4 Setting an aviation policy

Companies should consider the establishment of an aviation policy to provide guidelines for the safe, economic and efficient use of aircraft in support of company operations. Such a policy would apply equally to company and contractors' personnel.

As an example, the aviation policy could require that:

- Preference is given to the use of those international airlines and regional carriers with low accident rates. Where any doubt exists, advice should be sought from an aviation adviser.
- Exposure to high-risk operations should be minimised.
- For all aviation activities, other than scheduled airline travel, only aircraft operators and aircraft types approved for use by an aviation adviser should be used.

- Contracted aircraft are to be operated only by aircrew, and maintained by engineers, meeting specified minimum qualifications, and experience and currency requirements.
- Aircraft operators are to meet company insurance requirements.
- Specific operational restrictions may be applied, taking account of the contractor and local environment; amongst these will be the requirement to operate to public transport standards and to meet published aircraft performance criteria.
- The decision to use aircraft should be weighed against the alternatives of using other forms of travel, taking full account of operational, economic and, above all, safety implications.

Section 2 Contents

2	Aviation operation review requirements	11
2.1	Contracted air operations.....	II
2.2	One-time acceptances.....	II
2.3	Principles of review	II

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2 Aviation operation review requirements

2.1 Contracted air operators

Any aircraft operator invited to tender should be reviewed and accepted in accordance with the relevant procedures of the OGP member company. Subsequently, all such operators should be reviewed on a regular basis, at a frequency determined by risk, exposure, usage and performance of the air operation on the previous review, and should not be used without a current acceptance.

- All ongoing/long-term operations (those exceeding one year in length) should be subject to initial and thereafter annuals reviews.
- Start-up operations or those with a high level of activity may require more frequent oversight.

2.2 One-time acceptances

Operators used for ad-hoc charter flights are also subject to an on-site review. Should this not be practical, an exceptional “one-time acceptance” based solely on documentation provided by the operator may be given subject to certain criteria being met and accepted by the OGP member company. It must be recognised that such a one-time acceptance provides less assurance about the safety of the operation and the contractor’s suitability for the proposed task. Aircraft operators receiving a “one-time acceptance” should not be used subsequently until they are subjected to a full review as explained above.

2.3 Principles of review

The purpose of an OGP Member Company review of an aircraft operator is to determine the suitability as an aircraft operator in terms of safety and capability and, where appropriate, to make recommendations for improvements. The OGP member company interfaces such as owned/maintained assets (airfields, passenger services, flight following, helidecks, refuelling equipment, scheduling arrangements, *etc.*), should also be reviewed.

Reviews must be carried out in accordance with defined terms of reference. The standards applied will be those established by the OGP member company, except where the requirements of the National Aviation Regulations of the air operator concerned are more restrictive or otherwise exceed the standards specified by the OGP member company. A review report will be delivered to the customer, typically by the end user within the OGP member company, within an agreed period after the review debrief.

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Section 3 Contents

3	Safety & quality management	15
3.1	Regulatory requirements	15
3.2	OGP requiremnts.....	16
3.3	Safety management system elements.....	17
3.4	Hazard/risk management process.....	19
3.5	Incident & accident reporting requirements	20
3.6	Quality assurance	20
3.7	Environmental managment	20

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3 Safety management

3.1 Regulatory requirements

Safety Management Systems (SMS) are increasingly being expressed as a regulatory requirement. The International Civil Aviation Organization (ICAO) is driving the shift in regulatory position:

“From 01 January 2009 each applicant for the grant of an air operator’s certificate shall establish a safety management system appropriate to the size and complexity of the operation, for the proactive management of safety, that integrates the management of operations and technical systems with financial and human resource management, and that reflects quality assurance principles”.

The following regulatory guidance applies:

- ICAO Safety Management Manual (Doc 9859-AN/474) Second Edition 2009;
- ICAO Annex 6, (Operation of Aircraft) requires that States, as part of their State Safety programme, shall require an operator to implement a safety management system;
- ICAO Annex 11, (Air Traffic Services) requires member States to have certificated international airports establish a SMS;
- ICAO Annex 14, Volume I (Aerodrome Design and Operations) requires member States to have certificated international airports establish a SMS;
- EASA/JAA – Ops.001 Group are in process of determining how SMS can be implemented, and therefore embedded within the regulations;
- FAA – Advisory Circular, AC 120-92A, Safety Management Systems for Aviation Service Providers;
- FAA – Advisory Circular, AC 150/5200-37, Introduction to Safety Management Systems (SMS) for Airport Operators;
- FAA – Advisory Circular, AC 120-59A, Air Carrier Internal Evaluation Programs;
- Transport Canada – Civil Aviation Directive 31 (Safety Management Systems);
- CASA – Safety Management Systems Information Pack;
- UK CAA, Civil Aviation Publication CAP 726 (Guidance for Developing and Auditing a Formal Safety Management System)

3.2 OGP requirements

OGP Members and their contracted aircraft operators shall comply with applicable national safety management system regulations, as these relate to air operator and associated air operations infrastructure.

However, as a minimum or where national regulations have not yet been mandated for safety management systems, OGP Members should require of owned or contracted aircraft operators, the SMS requirements detailed in table 1 below.

Table 1 SMS Requirements for Owned and Contracted Aircraft Operators

Services	Exposure	SMS Requirement
Helicopter: <ul style="list-style-type: none"> Personnel and cargo transport onshore and offshore; External load carriage including Heli-Assist Seismic and Helirig operations; Pipeline survey and other inspection and survey operations onshore and offshore; Geophysical survey; Helicopter External Transport Service (HETS) Class D helicopter evacuation; Medical evacuation (Medevac). Fixed-wing: <ul style="list-style-type: none"> Personnel and cargo transport; Pipeline survey and other inspection and survey operations; Geophysical survey; Medical evacuation (Medevac) 	Standard Contract Total flight exposure to an operator for single or combined Business Units of 100 hrs or more per year for all RW and for FW survey ops and 200hrs or more per year for FW passenger ops.	An SMS that as a minimum contains the functional elements detailed in section 3.3 and a Hazard/Risk Management process i.a.w. paragraph 3.4 covering the contracted and related aviation activities, implemented effectively within 6 months of contract award or as specified. Additionally: Airborne Geophysical Survey complete and document a project specific IAGSA Risk Assessment for review by the OGP Member prior to commencing operations. Seismic, Helirig, or HETS , complete and document a project specific OGP Risk Assessment for review by the OGP Member prior to commencing operations. Pipeline Survey complete and document a project specific hazard assessment that includes location, route and type/activity specific content for review by the OGP Member prior to commencing operations. For Business Executive Jet Charter Operations a SMS/Hazard Assessment meeting IS-BAO requirements is acceptable.
	Call Off contract Total flight exposure to an operator for single or combined Business Units. Less than 100hrs per year for RW and FW survey ops and less than 200hrs per year for FW passenger ops.	A corporate SMS, including a Hazard/Risk Management process i.a.w. paragraph 3.4 shall be preferred when selecting an operator, but recognising the possible short term use of the operator and low exposure, a commitment to develop an SMS, with sustained progress, measured through the audit process, is acceptable. Airborne Geophysical Survey, Pipeline Survey, Seismic, Helirig, or HETS requirements as stated above.
	One Time Charter	Corporate SMS, with Hazard/Risk management process i.a.w. paragraph 3.4 preferred, but not required. A robust flight safety program will be assessed alongside the other requirements for One Time charter.

3.3 Safety management system elements

The range of SMS guidance documentation detailed at 3.1 describes an SMS in a number of different ways and lists many elements for an effective SMS.

Those different requirements have been reviewed and for the purpose of this document, condensed into 10 elements. Individual OGP Members may describe the elements in different terms in their own company documentation, but those should include the content detailed below.

Subject to the requirements defined at Table 1 (SMS requirements for Owned and Contracted aircraft operators), OGP Members should require the following SMS elements and relationships to be effectively implemented within their own and contracted aircraft operators.

It is recognised that the size and complexity of the aircraft operator will be reflected in the structure and complexity of the elements of the SMS.

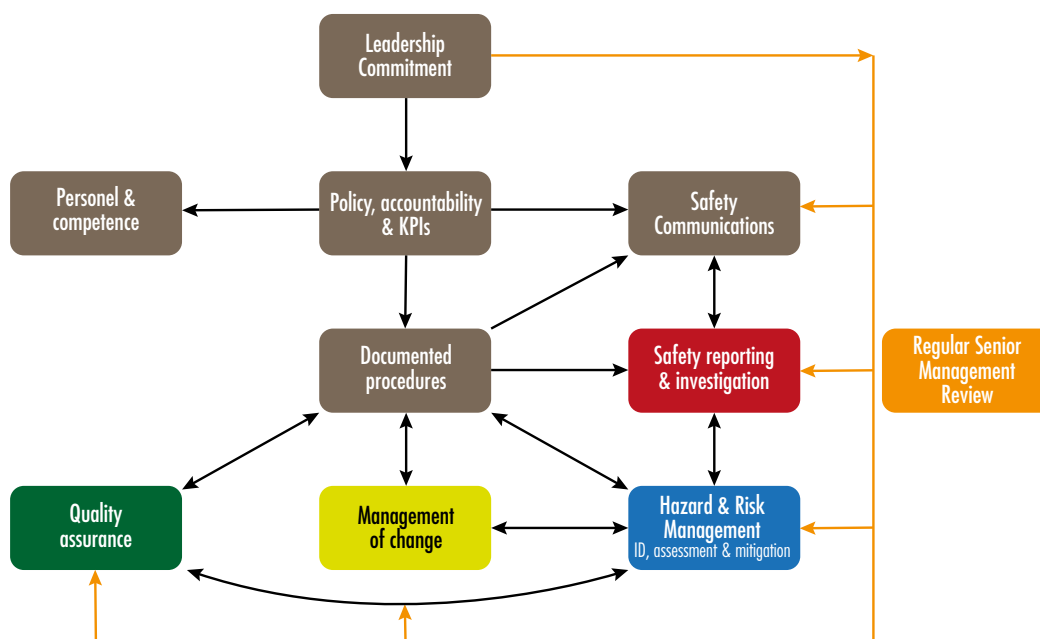
Required SMS Elements & Relationships

- 1) **Leadership Commitment** – Active SMS involvement and support from an informed company leadership.
- 2) **Policy, accountabilities & KPIs** – A defined HSE policy, based on a “Just” culture, defined responsibilities for safety management and Key Performance Indicators (KPIs).
- 3) **Documented Procedures** - Documented, detailed procedures covering all SMS activities and processes and more broadly documented procedures for safety critical tasks related to aircraft operations, including flight operations, aircraft maintenance and ground operations.
- 4) **Personnel & Competence** – Appointment of key safety personnel, with defined competence requirements. Sufficient resources to manage and operate an effective SMS.
- 5) **Safety Communications** – A range and hierarchy of safety communication processes to enable an effective, two way flow of safety information throughout the company.

- 6) *Safety Reporting & Investigation* – Safety reporting procedures covering regulatory required reports and lower level incidents and occurrences and an investigation process to generate and follow to closure, internal recommendations.
- 7) *Management of Change* – A defined procedure to manage the risks associated with significant change related to aircraft operations, including key personnel.
- 8) *Hazard/Risk Management* – See section 3.4 for more detail.
- 9) *Quality Assurance (QA)* – An internal process focused on providing confidence that the risk controls specified through regulation, company operating procedures and the risk management process are effective within all flight operations, maintenance and ground operations activities. See *Section 3.6* for more details.
- 10) *Senior Management Review* – A management review process, based on a defined meeting schedule, that gives senior managers visibility of the SMS activity, in particular safety reporting, hazard management and QA issues.

Relevant elements should also be co-ordinated to ensure actions complement one another and support the effectiveness of the whole SMS.

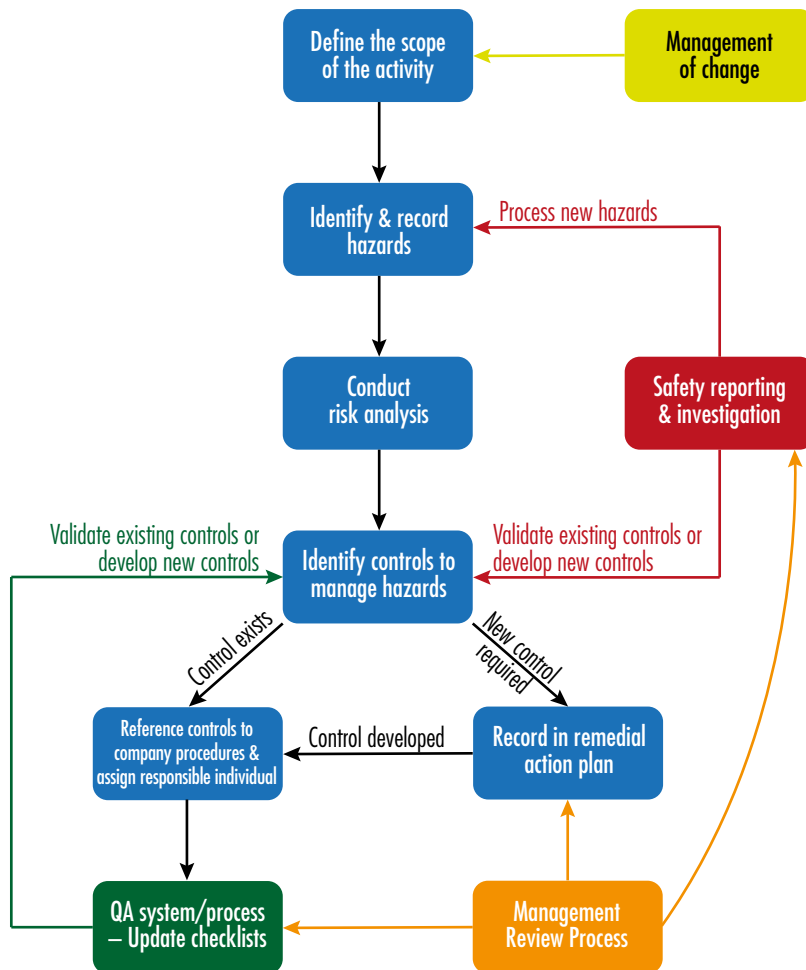
Required SMS elements & relationships



3.4 Hazard/risk management process

The hazard management process, previously and sometimes referred to as a Safety Case, is not generally well defined within the reference guidance or well understood by a number of operators, but forms an essential element in managing risk to as low as reasonably practicable (ALARP). Further guidance is therefore provided in this section.

Regardless of the size of the operator, its SMS is required to include a Hazard/Risk Management Process. Although the systems and procedures used will vary by operator and need to be aligned to complement the other elements of the SMS, the Hazard/Risk Management Process should contain the elements and links shown below. Like the SMS, the size and complexity of the elements is likely to reflect the size and complexity of the operator.



More detail and explanation of the use of a Risk Assessment Matrix (RAM) for the risk analysis stage and bow tie analysis for the identification of controls stage, is found at Appendix 1.

The Hazard/Risk Management process must identify and address both generic, mission specific and location specific hazards. The hazards should be recorded in a hazard register in a format that:

- shows the risk assessment score assigned to each hazard;
- links the hazards to specific controls and (bowtie) recovery measures;
- provides a document reference for the control and recovery measure;
- assigns a responsible individual to each control.

The hazard register can be within the SMS Manual, in an appendix, in a separate document or in a software tool, as suits the operator.

An operator may have one generic hazard register covering its whole operation or a number of location or mission specific hazard registers. In either case, controls identified for location specific hazards are to be assigned local responsibility.

The Hazard/Risk Management process should be demonstrably linked to the operators Safety Reporting and Investigation process, its Management of Change process, and to the QA function. This ensures that the hazard/risk management process is triggered by reported incidents and occurrences, by relevant changes within the company, and that the controls developed by the process are verified by QA audit and by the investigation process. Those parts of the process indicated, should also be subject to periodic management review.

3.5 Incident and accident reporting requirements

Notwithstanding the air operator's regulatory, local and/or national legislative Mandatory Occurrence Reporting obligations, OGP Members should, by contract, require that owned and contracted aircraft operators provide notification and relevant available details to the OGP Member (within 24 hours) in the event of the following occurrences:

- Aircraft Accident
- Serious or Significant Incident
- Near Miss
- Air Safety Reports (having imminent Airworthiness or Safety of Flight implications)

Aircraft accidents and serious incidents will normally be notified, investigated and reported in accordance with the international standards and recommended practices contained in ICAO Annex 13, which provides the necessary framework for the Investigation. OGP Members may observe and participate if allowed by the Governing State of Occurrence and specialist assistance may be provided by the OGP Members Aviation Advisor to local in-house investigations, following notification.

OGP's *Health & safety incident reporting system users' guide* should also be consulted to determine if injuries sustained in the course of OGP Members aviation related activities are reportable to the OGP.

3.5.1. Accident definition

For the purposes of consistency across different national regulatory authorities and to enable accurate statistics to be compiled, the following definition of accident, taken from ICAO, will be assumed for all OGP reporting purposes:

Accident – An occurrence associated with the operation of an aircraft which, in the case of a manned aircraft, takes place between the time any person boards the aircraft with the intention of flight until such time as all such persons have disembarked, or in the case of an unmanned aircraft, takes place between the time the aircraft is ready to move with the purpose of flight until such time as it comes to rest at the end of the flight and the primary propulsion system is shut down, in which:

- a) a person is fatally or seriously injured as a result of:
 - being in the aircraft, or
 - direct contact with any part of the aircraft, including parts which have become detached from the aircraft, or
 - direct exposure to jet blast or rotor downwash, except when the injuries are from natural causes, self-inflicted or inflicted by other persons, or when the injuries are to stowaways hiding outside the areas normally available to the passengers and crew; or
- b) the aircraft sustains damage or structural failure which:
 - adversely affects the structural strength, performance or flight characteristics of the aircraft, and
 - would normally require major repair or replacement of the affected component, except for engine failure or damage, when the damage is limited to a single engine, (including its cowlings or accessories), to propellers, wing tips, antennas, probes, vanes, tyres, brakes, wheels, fairings, panels, landing gear doors, windscreens, the aircraft skin (such as small dents or puncture holes), or for minor damages to main rotor blades, tail rotor blades, landing gear, and those resulting from hail or bird strike (including holes in the radome); or
- c) the aircraft is missing or is completely inaccessible.

Because the ICAO definition is aimed primarily at fixed-wing flights terminating on land, the following is added for clarity over the particular area of ditching or water landing. Where the aircraft intentionally or unintentionally ditches or lands on water as the result of a mechanical/

system failure or aircrew error, and the aircraft cannot regain flight or is not subsequently recovered without sustaining the damage detailed in b) above, it will be considered an accident for the purposes of the OGP aviation safety statistics.

For example, a ditching that resulted in a subsequent, but not necessarily immediate, rollover and/or sinking and major repair due to water damage, would be considered an accident for OGP statistics. A ditching where the aircraft remains upright on its floats and is recovered with only minimal damage, including the damage due to water ingress, would not be considered an accident, unless paragraph a) applied.

3.6. Quality assurance

OGP Members should require aircraft operators to develop, document and implement a quality assurance system (or process) modelled to provide confidence that the risk controls specified through regulation, company operating procedures and the risk management process are effective within all flight operations, ground operations and maintenance activities.

This should include:

- An internal evaluation/audit programme encompassing all safety and quality critical activities within flight operations, ground operations and maintenance.
- Auditing of processes, procedures, documentation, training and records.
- Audit activities should be scheduled and conducted at planned intervals to establish conformity with regulatory and management system requirements. Results of previous audits, including implementation and effectiveness of corrective action, should be included within the scope of the programme.
- The programme should be managed at the local operational level and be subject to periodic review by the air operator's management. QA departmental procedures, duties, responsibilities, and reporting relationships should be described in the Operations Manual, Maintenance Management Manual (MMM), Management System Manual or a separate QA manual as appropriate.

3.7 Environmental management

Environmental management controls should at all times be in compliance with local and or national regulatory requirements.

Controlled companies and their contracted aircraft operators shall demonstrate to an acceptable level how the hazard of aircraft noise is effectively managed within their operations.

Section 4 Contents

4	Aircraft operations general	23
4.1	Contractual.....	23
4.1.1	Contract management - Aviation Advisor support.....	23
4.1.2	The role of the Air Operations Supervisor (AOS) focal point.....	23
4.1.3	Aircraft insurance and indemnity.....	23
4.1.4	Use of third-party (turnkey) contracts.....	24
4.2	Operating categories and usage	24
4.2.1	Use of scheduled airlines and airline safety.....	24
4.2.2	Use of non-scheduled Aircraft	24
4.2.3	Use of private or non-accepted aircraft	25
4.2.4	Use of public sector aircraft	25
4.2.5	The use of unapproved aircraft for emergency and med-rescue flights.....	25
4.3	Pilots.....	26
4.3.1	Qualifications and experience levels.....	26
4.3.2	Alternatives to OGP recommended experience levels.....	26
4.3.3	Use of freelance pilots	27
4.3.4	Pilots flying more than one aircraft type	27
4.3.5	Medicals	27
4.3.6	Payroll/salary.....	27
4.4	Maintenance personnel.....	28
4.4.1	Qualifications	28
4.4.2	Experience levels.....	28
4.4.3	Avoidance of fatigue in maintenance personnel.....	28
4.5	Maintenance requirements.....	29
4.5.1	Quality assurance and quality control	29
4.5.2	Requirement for duplicate inspections/Required Inspection Items (RII).....	29
4.5.3	Aircraft Minimum Equipment List (MEL).....	30
4.6	Drugs & alcohol policy	30

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4 Aircraft operations general

4.1 Contractual

4.1.1 Contract management – Aviation Advisor support

In the early stages of planning a new venture where air transport is being considered, the involvement of an Aviation Advisor has proved invaluable in determining the optimal solution for aviation transport requirements. In such cases, Aviation Advisor representation on the scouting team provides the necessary expertise to evaluate influencing factors such as terrain, distances, climate, SAR facilities, and make timely recommendations including advice on design criteria for remote airfields or for helipads or helidecks. In remote and developing areas, a considerable lead time (typically a minimum of six months) may be required to ensure availability of suitable aircraft operated by an approved contractor.

For longer-term contracts and contract renewal, advice should also be sought from the Aviation Advisor on the detailed contract terms to ensure that individual OGP Member's standards are included in the contract.

Where the air support requirements on a contract are particularly complex or extensive in their scope, consideration should be given to appointing a professionally qualified aviation supervisor for the specific operation.

All OGP Member's using aircraft should have a nominated Air Operations Supervisor (AOS) focal point, responsible for overseeing aviation activities in accordance with the advice laid down in this manual. Advice is available at all times from the nominated Aviation Advisor, and this advice is supplemented by the *Guidance to Air Operations Supervisors* booklet issued by the OGP.

4.1.2 The role of the Air Operations Supervisor (AOS) focal point

Those responsible for the supervision of air transport within OGP Member's business units typically range from Heads of Aircraft Services, who may be qualified pilots or professional aircraft maintenance engineers to others, with no previous knowledge of aviation. Other variations include EP ventures, where the Operations Manager, Logistics Manager, or a member of their staff, looks after air transport support, often in conjunction with other responsibilities.

The scope of work varies enormously: from simply chartering aircraft to meet specific tasks, with passenger handling undertaken by the aircraft operator or an agent; to operating an owned fleet of aircraft, with company owned facilities including airfields, helipads, helidecks, passenger scheduling and handling. The running of facilities will require the setting up of in-house procedures, establishing competencies training personnel, provisioning equipment and putting in place a safety management system.

Air Operations Supervisor (AOS) will be used as the generic term for the purpose of this publication be they an 'Aviation Co-ordinator', 'focal point', or other localised or OGP Member specific term (Terms of Reference at *Appendix 3*).

The training needs of an AOS should be tailored to the experience level and qualifications of the person selected to be an AOS taking into consideration the scope of the work required to be undertaken. Examples of courses available are at *Appendix 4*.

4.1.3 Aircraft insurance & indemnity

Level of Insurance

The OGP Member should determine the level of insurance required in line with its company risk management guidelines.

Evidence of insurance

OGP Members should require that:

- a) Each aircraft operator provide documentary evidence of the required insurance coverage.
- b) Such insurance not be cancelled or changed materially during the course of the contract without at least thirty days written notice to the OGP Member.

Subrogation, cross liability & additional insured

- a) To the extent necessary to reflect indemnities given by an aircraft operator under the contract, insurers should waive rights of action/subrogation against the OGP Member and the OGP Member should be named as an additional insured under the policy.
- b) Liability insurance should contain a severability clause (Cross Liabilities).

Additional cost

The OGP Member's Risk Management and or Insurance specialists/advisors should be consulted if there will be a cost associated with the requirement to name the OGP Member as additional insured or to obtain a waiver of subrogation.

4.1.4 Use of third-party (turnkey) contracts

The following points are stressed should an OGP Member choose to use turnkey contractors:

- a) OGP Member's personnel on company business who in the course of their work are expected to use aircraft owned by other companies or chartered by third parties/other companies should exercise caution and should consult with the OGP Member's Aviation Advisory staff before using the aircraft.
- b) Third-party aircraft should meet standards of safety/technical quality comparable to those of the OGP Member; they should provide an adequate level of liability coverage (see previous comments above) and the crew/staff should meet OGP Member equivalent competence standards.
- c) While emergency situations may not allow sufficient notice for advance evaluation, employees should liaise with their OGP Member's Aviation Advisor, either directly or through locally designated contacts, whenever possible.
- d) Included are aircraft operating to OGP Member contracted facilities and provided through third-parties as a "turn-key" contract operation for other services such as seismic, barge, geophysical survey, cargo, mobile offshore drilling units (MODUs), *etc.*
- e) Reviews of the aviation contractor by the Aviation Advisor should still be required, whether or not a turn-key contract is in place.
- f) Supervision of the aviation services should be maintained and the aviation contractor's performance continuously monitored.
- g) The Aviation Advisor's review of the contractor would also specifically cover the local OGP Member's business unit's ability to monitor and maintain standards.

4.2 Operating categories & usage

4.2.1 Use of scheduled airlines & airline safety

OGP Members should endeavour to provide information that allows its business travellers to select and use those airlines representing the lowest risk for the route to be flown.

The OGP has developed an *Airline safety assessment mechanism* (OGP Report № 418) which can be used by OGP Members to compare the relative risks of travelling on scheduled airlines and decide whether the risks associated with airline travel are compatible with the business need. The Mechanism takes into account a significant number of factors that contribute to the relative risk of an airline.

4.2.2 Use of non-scheduled Aircraft

When travel by non-scheduled aeroplane or helicopter is deemed appropriate, this may be on dedicated contract aircraft, by spot charter or on aircraft of joint venture partners. In these cases, advice should be sought from the Aviation Advisor regarding the status, with respect to the OGP Member's policies and requirements, of the aircraft operator and aircraft type, and the qualifications of the pilots to be used.

Paragraph 2.2 of this manual provides further details in respect of 'One Time Acceptance' and subsequent review requirements.

4.2.3 Use of private or non-accepted aircraft

During the course of conducting company business, personnel are sometimes offered 'lifts' in private aircraft or in aircraft operated by non-reviewed or non-accepted companies, often at very short notice. Providing time permits, the Aviation Advisor may be able to offer advice in respect of non-reviewed companies. OGP Members should consider using a 'One Time Acceptance process' (*paragraph 2.2*) as a guide to the operator's ability and to assist management in the risk assessment of such flights.

4.2.4 Use of public sector aircraft

In the course of conducting its activities the OGP Member may be offered the use of public sector aircraft, for example those operated by law enforcement or other government agencies. The aircraft offered may be military types or civil aircraft that may not otherwise conform with civil airworthiness requirements. It is also possible that these aircraft are operated outside of the civil aviation regulations. There may be situations or locations where the use of a public sector aircraft by an OGP Member is warranted in which case advice from the Aviation Advisor should be sought to determine how to assess whether use of these aircraft can be accepted or should be declined.

4.2.5 The use of unapproved aircraft for emergency & med-rescue flights

Whenever OGP Members have ongoing operations within any given area, they should pre-plan, prequalify and proactively contract for aircraft services necessary to provide emergency evacuations, especially medical evacuations, where the time required to get patients to competent and comprehensive medical care can make the difference between life and death. Helicopters on long-term contract to provide medical evacuation services should at least comply with the requirements for transport helicopters used in the same environment. See *Section 12.4 Helicopters used for medical evacuations* for more details. The option of auditing all the possible med-rescue aircraft operators around the world (e.g. SOS, AXA or similar companies) that are available to respond to an air ambulance flight is likely to be beyond the resources available to most OGP Members. However, where there is a dedicated aircraft operator that is approved and suitably equipped, then that operator should be used for the task, such as in the case where an injured person is evacuated from an offshore platform, for which the OGP Member has a contracted support helicopter.

A good source for standards for Air Ambulance operations are summarised in the Transport Canada, *Guide to air ambulance operations* (TP10839E) available on website: <http://www.tc.gc.ca/CivilAviation/commerce/manuals/tp10839/menu.htm>.

At the time of requiring a Med-rescue flight, the OGP Member may not be able to pick and choose whose aircraft will be called to respond and therefore is forced to accept the service as provided. The only alternate would be to use local medical facilities, or wait for commercial airline flights; neither of these options may be practicable or acceptable for real medical emergencies in remote locations where the medical support is less than the desirable standard.

Therefore the following process should apply:

- a) Controls should be in place to ensure that the OGP Member management and medical advisors only call for Med-rescue flights when the level of illness/injury warrants the evacuation of the patient. These controls should form one part of the Emergency Response Plans for the operation or site.

- b) Wherever possible, contracts should be in place with Med-rescue service companies such as those with known international reputations.
- c) The use of aircraft, as supplied, is accepted on the basis that the exposure and risk of using unaudited/unapproved aircraft is outweighed by the risk of further suffering or loss of life to the patient who is the focus of the medical emergency.

4.3 Pilots

4.3.1 Qualifications & experience levels

The tables at Appendix 5A detail the recommended flying experience and qualifications of pilots before they can fly OGP Member or Contractor(s) personnel. Where these requirements cannot be met a mechanism to obtain a dispensation providing mitigating factors should be set in place. Where this is requested, full details of an individual's experience and qualifications under the headings shown in the tables should be submitted to the Aviation Advisor for assessment and consideration prior to agreeing or otherwise such a dispensation.

Some operators have a basic pilot training scheme involving carefully structured modules from selection through to basic, ab-initio training, conversion training, supervised line training, and captaincy. For the graduates of such a scheme, dispensation may be given for acceptance as captains or co-pilots on OGP Member flights, in accordance with *paragraph 4.3.2* below for multi-crew aircraft.

Some civil aviation authorities allow "captaincy under supervision", or "P1 U/S" as it is sometimes called, to count towards captaincy time, usually counting as half captaincy time. Before such an arrangement can be agreed during the progression of a co-pilot towards captaincy on an OGP Member contract, guidance should be sought from the Aviation Advisor to ensure the validity of that flying. See *paragraph 8.1.6*.

In some countries air taxi and helicopter pilots may not be entitled to an Air Transport Pilot's Licence (ATPL) or equivalent. If this is the case then a Commercial Pilot's Licence (CPL), or equivalent in the country of operation, is considered acceptable.

4.3.2 Alternatives to OGP recommended experience levels

As an alternative to the pilot experience levels detailed at *Appendix 5A*, it is possible to replace the requirement for defined pilot experience levels with an approved operator's competency based Training Management System.

In order for this to be achieved the following conditions must be met:

- a) Establishment of a formal modular competency based progression scheme for pilots from basic (ab-initio/new-hire/conversion) to command and for aircraft type conversion, which will:
 - i) Be based on the guidelines at *Appendix 5B* and *5C* as applicable.
 - ii) Include an ATPL Theory examination and elements for role specific training (i.e. offshore, vertical reference, etc) at the Stage 2 level of *Appendix B* for Commercial Pilot License (CPL) training.
- b) An "In depth" audit of the operator's training system and effectiveness of the implementation of the competency based training program should be conducted by the Aviation Advisor to include as a minimum the following:
 - i) Content of the training syllabus, to include comprehensive ground and flight training, particularly for entry at the CPL stage (see paragraph e. below), based on the best practices from both the JAA and FAA training schemes.

- ii) Formal progression scheme for pilots from basic (ab-initio) to command. Observation of Crew Resource Management (CRM) and simulator programs including Line Oriented Flight Training (LOFT).
- iii) Examination of training records with emphasis on a structured command course, competencies to be achieved and the associated checking process.
- iv) Base and Line training staff with defined competencies who themselves are regularly checked.
- c) An ongoing Aviation Advisor audit plan to ensure continued compliance with the above.
- d) Additionally, when a new aircraft type is introduced on contract, it may be necessary to reduce total time on type. This must be considered only after approval of the contractor's type conversion scheme based on the requirements of Appendix 5C, and will be reviewed on a case-by-case basis as noted above and in *paragraph 8.1.2.3*.
- e) The entry level for the competency based Training Management System will normally be at the ab-initio level (*Appendix 5B, Stage 1*), but can also be with a CPL (*Appendix 5B, Stage 4*) providing the following conditions are met:
 - i) Aptitude testing is completed in accordance with *Appendix 5B, Stage 1*.
 - ii) The candidate holds an ATPL theory qualification
 - iii) Full training records are held for the CPL training including records of stage and final check flights and total hours are validated by the training provider.
 - iv) The training provider has been assessed and approved by the Helicopter Operator's QA or Training organisation and the following factors taken into account:
 - Instructor experience and oversight.
 - Instructor competency check process.
 - The content of the CPL training (ground and flight), which should include an element of role specific training dependant on the type of flying to be performed (i.e. Offshore, vertical reference).

4.3.3 Use of freelance pilots

Freelance pilots may be used provided they have received proper company Induction/Conversion/line training before initial engagement, are included as part of the company's recurrent training programme, and have OPC/LPC (or equivalent) conversion training in accordance with national regulations. If time between engagements exceeds time between required OPCs, a training programme applicable to all company pilots, being away from flying for whatever reason, should apply to the freelancer.

Their competence and suitability should be formally endorsed by the senior management of the company and must meet all OGP Member flying qualifications and experience level requirements. They are also to be identified to and accepted by the OGP Member Company prior to use.

4.3.4 Pilots flying more than one aircraft type

Aircraft operator policy regarding how many types of aircraft their pilots may fly varies significantly from company to company. The advisability of pilots flying more than one type will vary with the types involved, the experience level and ability of the individual pilot. Nevertheless, because flying several types on a day-to-day basis inevitably increases the danger of incorrect responses in the case of emergency, and the likelihood of handling errors or errors of omission, a limit must be placed on the practice.

It is expected that aircraft operators have a written policy on the subject, which applies across their operations. While pilots are quite correctly endorsed on a number of aircraft types, it is recommended that only in exceptional circumstances would more than 2 types be flown on a day-to-day basis, with a preference to see a single type flown, or scheduling in blocks of days on a particular type. If more than one type is flown, recency flying and type training must be closely monitored both by individual pilots and by a nominated member of the flying, training or operations staff.

4.3.5 Medicals

All pilots should hold a valid medical certificate; appropriate to their age and licence (e.g. CPL, ATPL) requirements. The frequency of medical examinations is determined by the local National Aviation Authority and/or company policy, however the maximum interval between medical examinations should not exceed 12 months.

4.3.6 Payroll/salary

Aircrew personnel should not receive remuneration solely on a basis of hours or miles flown. The method of remuneration preferred by the OGP is fixed salary.

4.4 Maintenance personnel

4.4.1 Qualifications

Personnel carrying out aircraft maintenance should hold appropriate Licences and Endorsements (see Appendix 5D1-3). These should permit them to carry out aircraft maintenance or act in a supervisory or management capacity of an approved Maintenance organization as required by the governing regulatory authority of the jurisdiction in which operations are being conducted.

In addition, a system of local approvals should exist whereby the operator or maintenance organisation systematically approves the individual to exercise the privileges granted by the licence &/or endorsements held on the range of equipment operated or maintained by that organisation. Such approvals may be granted following formal type training and/or local on-the-job training/evaluation as appropriate.

4.4.2 Experience levels

Except in the case of incumbent supervisory/management personnel already employed in an organization introducing a new aircraft type, where additional manufacturer or other qualified support may be required during the introductory and early operational phases, the experience level requirements at *Appendix 5D1-3* should be applied.

4.4.2.1 Unlicensed and recently licensed maintenance personnel

Where organisations employ a mix of licenced and unlicensed or recently licenced personnel, the proportion of personnel having Certificate of Release to Service (CRS) privileges to others should be sufficiently high to ensure adequate supervision of work is provided at all times.

4.4.2.2 Trainee aircraft maintenance engineer/technician/mechanic

Where trainees are sponsored or employed directly, the requirements for unlicensed and recently licenced maintenance personnel equally applies. In addition, there will be a documented training plan that includes:

- a) Formal training – must hold basic educational qualifications for entry into regulator approved maintenance training course(s) in respect of the licence categories desired. Training must be provided by an approved training organisation.
- b) On-the-job training – must be relevant and provide adequately supervised experience.

4.4.3 Avoidance of fatigue in maintenance personnel

Other than any specific labor laws that may be applicable locally, maintenance personnel are not regulated by duty hour limitations. The following should be applied to all engineering staff as a minimum standard:

4.4.3.1 Total work period

Total work periods should not exceed 12 hours in any 24-hour period. Where, exceptionally, it is essential that the working period is extended; the Head of Maintenance should approve it on a case-by-case basis.

4.4.3.2 Night Shifts

Where shifts are regularly rostered with a heavy maintenance workload to be completed through the night, the length of the duty period may be reduced from the 12 hour maximum.

Ideally, if night maintenance is necessary, the bulk of work should be completed by the shifts on duty up to midnight with the residue completed by a swing shift covering the period from approximately 2300 to 0700 hrs.

4.4.3.3 Rest

Each full working shift should be followed by a minimum 8-hour rest period. When working a 24-hour split shift on line operations, at least 6 hours rest should be provided excluding travel. The entitlement for days off should be a minimum of 7 per month of which at least 4 should be in a minimum of 2-day periods. When the location or climate is arduous then this should be increased to minimize fatigue.

4.4.3.4 Remote camps

On locations such as seismic camps, where it is not feasible to provide other than the bare accommodation necessities, a regular “time on site, time off site” routine should be set up to ensure that maintenance personnel working under these conditions do not stay in the field for prolonged periods. The minimum recommended ratio of time on site to time off site is considered to be 2:1 with a maximum period on site not to exceed 2 months.

4.5 Maintenance requirements

4.5.1 Quality assurance & quality control

Quality Assurance requirements are given at *paragraph 3.4*. Quality Control procedures are normally a regulatory requirement, and should adopt a form similar to those expressed in EASA Ops 1/EASA 145. However, where there is an absence of regulatory control in this respect, the requirements expressed in *paragraphs 4.5.2 and 4.5.3* should be satisfied by all operators/maintenance organisations on contract to the OGP Member.

4.5.2 Requirement for duplicate inspections/Required Inspection Items (RII)

After any disturbance or dis-assembly of a control system or vital point in an aircraft, most but not all Regulators call for independent inspections to be made and certified by two appropriately qualified persons, before the next flight. The inspections are to include correct assembly, locking, and free and correct movement of control systems over the full range. Such requirements extend to electrically activated “fly-by-wire” systems and their connections as well as to mechanical linkages.

This procedure is known as duplicate inspection/required inspection item and, although not all authorities have a similar requirement, it is recommended that companies require such inspections. Therefore, whenever a contract is drawn up this requirement should be included.

Independent Duplicate/Required Inspection Item (RII) inspections are to be carried out by appropriately qualified technicians, the required qualifications normally being determined by the Regulator, e.g. FAA Inspection Authorisation (IA). In the event that the qualification of these persons is not regulated, then they would normally be a licensed engineer, technician or equivalent, holding a type approval for maintaining the engines and airframe of the aircraft concerned.

In all cases, the operator or maintenance organisation is to ensure that sufficient persons appropriately qualified are available at all main operating &/or maintenance bases. When away from the normal

maintenance facilities, and only minor adjustment of a control is required, a pilot may, if approved by appropriate aviation authorities, exceptionally act as the second signatory. The licensed engineer/technician should instruct the pilot on which controls have been disturbed and the limits of the area to be checked, but should include freedom and sense of movement, as well as simple assembly and locking. The full procedure, which should be defined in the organisation's Maintenance Exposition or Procedures Manual, is then to be adopted on return to base.

The written statement heading the certification should include a description of the disturbance to the control and a range that is to be checked, *ie* from point to point.

Note 1: It should be noted that duplicate inspections are not a requirement under EASA-145 or EASA-OPS. However due to UK CAA requirements, maintenance carried out on UK registered aircraft by other national maintenance bases includes the requirement for duplicate inspections and it is the operator's responsibility to ensure compliance.

Note 2: FAA requirements for RII differentiate between aircraft types certificated for 9 seats or less, subject to an Approved Aircraft Inspection Programme (AAIP) and those of 10 seats or more, subject to Continuing Analysis and Surveillance. The AAIP does not require RII/duplicate inspection. Further information can be found in 14CFR Part 135.411/419/429/431. Nevertheless, it is recommended that OGP Member standards require that the maintenance of aircraft subject to AAIP when on contract to the OGP Member include RIIs. Furthermore, those operators providing services that are not contracted should be encouraged to adopt a RII policy in respect of their aircraft that are subject to the less restrictive AAIP.

Note 3: The requirement for an operator to complete duplicate inspections after disturbing a control may be mandated in the contract where it is not required by the local regulator.

4.5.3 Aircraft Minimum Equipment List (MEL)

Flight crews and maintenance personnel must always have available for reference an aircraft Minimum Equipment List (MEL) or Minimum Departure Standard (MDS) for the appropriate aircraft type and the local airworthiness authority should approve these. Where a MEL is not available, full equipment serviceability will be required. See *Section 5.1 Helicopter standards*.

4.6 Drugs & alcohol policy

Contractors and Sub-Contractors should have formally documented policies on the use/abuse of alcohol, medical drugs and narcotics. Guidance is to be provided on what the company considers to be acceptable by way of alcohol consumption. Additionally, guidance should be given to staff on which commonly available medical drugs, prescribed or otherwise, may impair an individual's ability to perform in the cockpit or workplace. In all cases the air operator shall comply with any National legislation/guidelines.

Section 5 Contents

5	Helicopter operations	33
5.1	Helicopter standards.....	33
5.1.1	Minimum operational & role-specific equipment.....	33
5.1.2	Piston-engine helicopters	33
5.1.3	Multi-engine helicopters with single-engine performance.....	33
5.1.4	Multi-engine helicopters without single-engine climb performance, or single-engine helicopters, or single pilot.....	33
5.1.5	Helicopters operating in a hostile sea environment	33
5.2	Helicopter performance classes	34
5.3	Fuel planning.....	34
5.3.1	IFR flight plan	34
5.3.2	VFR flight plan.....	34
5.4	Use of offshore alternates.....	35
5.5	Composition of flight crew	36
5.5.1	Two pilot operations.....	36
5.5.2	Single pilot operations	36
5.6	Flight and duty time	36
5.6.1	Limits.....	36
5.6.2	Fatigue-related work.....	37
5.6.3	Maximum flight times	37
5.6.4	Maximum duty and minimum rest times	37
5.6.5	Rest for rotating crews	37
5.6.6	Night standby duty	37
5.7	Offshore helicopter life-jackets and aircraft homing devices	38
5.8	Rotors Running Refuelling (RRRF)/helicopter rapid refuelling.....	38
5.9	Crane-helicopter operational procedures.....	38
5.10	Radio silence - perforating operations	38
5.10.1	Nature of hazard.....	38
5.10.2	Radio silence.....	38
5.11	Specialist roles	39
5.11.1	Land seismic operations.....	39
5.11.2	Winch operations.....	39
5.11.3	Airborne geophysical survey requirements	39
5.11.4	Aerial pipeline inspection	39

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5 Helicopter operations

5.1 Helicopter standards

5.1.1 Minimum operational & role-specific equipment

In addition to the minimum equipment recommendations of *Appendix 7* and role-specific equipment specified in other sections of this guide, the requirements in the following paragraphs should also be considered.

5.1.2 Piston-engine helicopters

Piston-engine helicopters should not be used.

5.1.3 Multi-engine helicopters with single-engine performance

Multi-engine helicopters capable of sustaining a 1% net climb gradient at or above the lowest safe altitude with one engine inoperative (OEI) and flown with two pilots should be used when any of the following conditions exist:

- a) The environment is hostile (see *Appendix 6.2.3*).
- b) Any portion of the flight is performed at night.
- c) Any portion of the flight will be in instrument (non-visual) conditions.

5.1.4 Multi-engine helicopters without single-engine climb performance, or single-engine helicopters, or single pilot

Multi-engine helicopters without single-engine climb performance in cruise, or single-engine helicopters, or single pilot should ONLY be used when the following conditions are met:

- a) When permitted by local regulatory authorities.
- b) The environment is determined to be non-hostile (see *Appendix 6.2.4*).
- c) Operations are Day VFR only, and for single-engine helicopters, the aircraft is landed 30 minutes prior to official sunset.
- d) Acceptable Search & Rescue Services are available (see *Section 12* and *Appendix 12*).
- e) Continuous Flight Following is maintained.

5.1.5 Helicopters operating in a hostile sea environment

If the sea temperature will be less than 10°C during the flight a risk assessment should be completed to determine if exposure suits should be worn by occupants (see *Appendix 6*).

5.2 Helicopter performance classes

Helicopters are operated in accordance with a comprehensive and detailed code of performance in compliance with ICAO Annex 6, Part III, Section II, Chapter 3. Since Performance Classes are often misunderstood or misquoted, a description based on ICAO Annex 6 are provided in the following table:

Class 1	If an engine fails, the helicopter is able to land within the rejected takeoff area or to safely continue flight to an appropriate landing area.	General Instructions: 1) Helicopters must be certificated in Category A.
Class 2	If an engine fails, the helicopter is able to safely continue the flight, except when the failure occurs early during takeoff or late in landing, in which case a forced landing may be required.	General Instructions: 1) Helicopters must be certificated in Category A. 2) Operations must not be conducted from/to elevated heliports or helidecks at night or in a hostile environment unless it can be demonstrated that the probability of power unit failure during the exposure time at take off and landing is no greater than 5×10^{-8} per take-off or landing.
Class 3	If an engine fails, a forced landing is required for single-engine and may be required for multi-engine helicopters.	General Instructions: 1) Helicopters must be certificated in Category A or B. 2) Operations are allowed only in a non-hostile environment, except that flights over-water in a hostile environment for up to 10 mins per flight are permitted. 3) Operations are not allowed at night or when the ceiling is less than 600 ft above the local surface, or the visibility is less than 800 metres. 4) Operations must not be conducted from/to elevated heliports in a non-hostile environment unless it can be demonstrated that the probability of power unit failure during take off and landing is no greater than 5×10^{-8} per take off or landing.

The Performance Classes should not be confused with Categories A & B which denote the build/certification standard of the aircraft out of which a performance capability is derived (see also 14 CFR/JAR 27/29). In general, the majority of present generation helicopters are not designed to full Category A and unlimited Performance Class 1 standards. Therefore, for operations in a hostile environment, Performance Class 2 helicopters are accepted by OGP although preference will be given to Performance Class 1, if available. In some operating environments it may be possible to operate Performance Class 2 helicopters to Performance Class 1 standards with minimal impact on payload. Such an approach is strongly encouraged. Where Performance Class 2 helicopters are taken on contract, the operation should be able to demonstrate, either separately, or as part of its Safety Case that the probability of power unit failure during the exposure time at take off and landing from elevated helidecks is no greater than 5×10^{-8} per take-off or landing.

5.3 Fuel planning

While parameters covering all circumstances cannot be clearly laid down, the following should be used as guidance for fuel planning unless otherwise stated in relevant regulations or Operating Manuals.

5.3.1 IFR flight plan

Fuel should be sufficient for the leg to destination plus the leg to an alternate plus 10% trip fuel plus 30 minutes. An allowance should also be made for start-up and taxi.

Note: Fuel computations for the leg to the alternate should be calculated at the low altitude cruise fuel consumption if this is likely to be the case.

5.3.2 VFR flight plan

Fuel should be sufficient for the proposed route plus 30 minutes at the cruising speed consumption. An allowance should also be made for start-up and taxi.

Note: The above requirements are in addition to unusable fuel as listed in the aircraft Flight Manual.

5.4 Use of offshore alternates

The reliance on offshore installations as alternates should be avoided wherever possible and is only acceptable in certain circumstances when the onshore alternative is equally unacceptable. Advice should be sought from the OGP Member's Aviation Advisor, especially for long-term requirements. As a minimum, the following conditions need to be met:

- An offshore alternate shall be used only after a Point of No Return (PNR). Prior to PNR, onshore alternates shall be used.
- One engine inoperative landing capability shall be attainable at the alternate.
- Deck availability shall be guaranteed. The dimensions, configuration and obstacle clearance of individual helidecks or other sites shall be assessed in order to establish operational suitability for use as an alternate by each helicopter type proposed to be used.
- Weather minima shall be established taking accuracy and reliability of meteorological information into account.
- The helicopter Minimum Equipment List shall reflect essential requirements for this type of operation.
- An offshore alternate shall not be selected unless the operator has published a procedure in the Operations Manual approved or accepted by the regulatory Authority.
- When operating offshore, any spare payload capacity should be used to carry additional fuel if it would facilitate the use of an onshore alternate.

The offshore landing environment of a helideck that is proposed for use as an Offshore Alternate should be pre-surveyed and, as well as the physical characteristics, the effect of the wind direction and strength, and turbulence established. This information, which should be available to the aircraft captain at the planning stage and in flight, should be published in an appropriate form in the Operations Manual (including the orientation of the helideck) such that the suitability of the helideck for use as an offshore alternate can be assessed. The alternate helideck should meet the criteria for size and obstacle clearance appropriate to the performance requirements of the type of helicopter concerned.

The use of an offshore alternate is restricted to helicopters that can achieve one engine inoperative (OEI) in ground effect (IGE) hover at an appropriate power rating at the offshore alternate. Where the surface of the offshore alternate helideck, or prevailing conditions (especially wind velocity), precludes an OEI in ground effect (IGE) hover, OEI out of ground effect (OGE) hover performance at an appropriate power rating should be used to compute the landing mass/gross weight. The landing mass/gross weight should be calculated from graphs provided in the relevant part of the Aircraft Flight Manual. When arriving at this landing mass, due account should be taken of helicopter configuration, environmental conditions and the operation of systems that have an adverse effect on performance. The planned landing mass of the helicopter including crew, passengers, baggage, cargo plus 30 minutes of Final Reserve fuel, should not exceed the OEI landing mass at the time of approach to the offshore alternate.

When the use of an offshore alternate is planned, an operator should not select a helideck as a destination or offshore alternate unless:

- The aerodrome forecast indicates that, during a period commencing one hour after the expected arrival at the destination and offshore alternate the weather conditions will be at or above the following planning minima:
 - cloud base 600 ft (180 m) day/800 ft (240 m) night
 - visibility 4 km (2.5 miles) day/5km (3 miles) night
- Where fog is forecast, or has been observed within the last two hours within 60 nm of the destination or alternate, offshore alternates should not be used.
- Before passing the point of no return (PNR), which should not be more than 30 minutes from the destination, the following actions should have been completed:
 - confirmation that navigation to the destination and offshore alternate can be assured;

- radio contact with the destination and offshore alternate (or master station) has been established;
- the landing forecast at the destination and offshore alternate has been obtained and confirmed to be above the required minima;
- the requirement for One Engine Inoperative (OEI) landing has been checked to ensure that they can be met;
- to the extent possible, having regard to information on current and forecast use of the offshore alternate and on conditions prevailing, the availability of the offshore alternate should be guaranteed by the rig operator in the case of fixed installations and the owner in the case of mobiles until landing at the destination, or the offshore alternate, has been achieved (or until offshore shuttling has been completed).

5.5 Composition of flight crew

	VFR	IFR and Night
Single-engine	1†	Not permitted on OGP Operations
Multi-engine <5,700 kg (12,500 lbs)	2†‡	2
Multi-engine >5,700 kg (12,500 lbs)	2	2

† Under no circumstances should the controls of a helicopter be left unattended while either engines are running or rotors are turning.

‡ Exceptionally one pilot may be utilised for “non-hostile” operations provided the aircraft is certified for single pilot operations and performance/requirements dictate. All cases of proposed single pilot operation should be referred to the Aviation Advisor.

5.5.1 Two pilot operations

Two pilot operations will always be required for:

- IFR or night operations.
- Operations into an offshore “hostile” environment as defined in *Appendix 6 – 2.3*.
- Where the maximum approved passenger seating configuration is more than nine (9).

5.5.2 Single pilot operations

Where aircraft are certified for single pilot operations and in the view of the OGP Member’s Aviation Advisor are practical, then this mode of operation will be considered. Among the factors affecting the decision are:

- Workload.
- Flight Conditions.
- Whether flights are conducted by day or night.
- Whether flights are conducted under Instrument Flight Rules.
- Traffic density.
- Aircraft equipment (and the interface with approach and en-route aids) and whether an operative approved autopilot system is fitted.
- Length and nature of intended flights.

5.6 Flight & duty time

5.6.1 Limits

Limits are normally imposed upon the amount of flying time, total hours of duty, and mandatory rest requirements by the regulatory authorities.

Unless more stringent limits are imposed by regulatory authorities, the limits listed in this guide should apply for both flight and duty time.

Exceptions to the guidelines contained in this guide may be applied after consultation with OGP Member's Aviation Advisors for operations in remote field locations or where crews rotate on a scheduled basis.

5.6.2 Fatigue-related work

This type of work may be highly repetitive flight operations such as, external lift, inter-rig, or platform work requiring many landings/takeoffs per hour or single pilot operations in hot climates.

When these types of fatigue-causing operations are being flown it may be necessary to vary crew schedules to more conservative levels.

Operation-specific crew duty time limitations are listed in the applicable portions of this Section and the Appendices of this report for operations such as geophysical survey and external load operations.

5.6.3 Maximum flight times

Pilots should not fly in excess of the maximums listed below or those listed in mission specific portions of this guide, including time that might be flown in support of other companies/customers.

Single Pilot

- 8 hours daily flight time constitutes a flight period.
- 45 hours in any 7 consecutive day period.
- 100 hours in any 28 consecutive day period.
- 1,000 hours in any 365 consecutive day period.

Dual pilot

- 10 hours daily flight time constitutes a flight period.
- 60 hours in any 7 consecutive day period.
- 120 hours in any 28 consecutive day period.
- 1,200 hours in any 365 consecutive day period.

5.6.4 Maximum duty & minimum rest times:

- Rest:** A minimum of 10 Hours of consecutive rest available following a flight period, however this may not be sufficient after considering workload, roster schedules and duty start times. Notwithstanding an appropriate rest period will be established for all operations with guidance from the NAA and/or OGP Member's Aviation Advisors
- Duty:** 14 hour duty day includes: flight planning, pre-flight, flight time, post flight, completion of any associated maintenance or paperwork, any "non local" travel time, and commences when the pilot reports for duty and ends when is no longer on duty.

5.6.5 Rest for rotating crews

Crews on rotating assignments that arrive following prolonged travel flights should not, on arrival at their base of operations, be scheduled for duty on OGP Member's flights until the requirements detailed in *paragraph 5.6.4* have been met. Aviation Advisors should be consulted to review these requirements.

5.6.6 Night standby duty

Night stand-by duty may require additional pilots to be made available. The principles to be observed are:

- The requirements of the regulatory authority in terms of flight and duty limitations must be met.
- The maximum FDP/Flying Hours specified must be observed.
- After a day duty period, each pilot should not normally have less than 12 hours rest.

- If the pilots nominated for night standby duty (at their place of rest) are not used for such, then they may be considered available for duty on the following day period. Otherwise, they will normally be due for 12 hours rest before recommencing duty.

5.7 Offshore helicopter life-jackets & aircraft homing devices

Crew life-jackets should be of constant-wear type, fitted with a homing device transmitting on the appropriate international and/or national aeronautical distress frequencies in areas where suitable air and/or sea-borne homing equipment is available to Search & Rescue Services. In areas where such services are unreliable or nonexistent, management should consider the provision of homing equipment in contract aircraft. Such a decision should be taken in the context of the Aviation Safety Case.

5.8 Rotors Running Refuelling (RRRF)/helicopter rapid refuelling

Rotors running refuelling may be authorised for both on and offshore operations. However, local management should be aware of the additional risks involved and seek the OGP Member's Aviation Advisor advice, giving sufficient notice for comment or to render practical assistance.

If it is an operational requirement to carry out rotors running refuelling the operator shall ensure that there are written procedures and stipulate that all staff involved have formal training. The risks may be further minimised by using pressure (closed system) refuelling.

More detailed guidance is provided in *Section 7.5* of this guide.

5.9 Crane-helicopter operational procedures

When helicopters are approaching, manoeuvring, taking off or running on the helideck, cranes are to be shut down, with the crane operator vacating the cab.

5.10 Radio silence – perforating operations

5.10.1 Nature of hazard

To enable explosive operations to proceed safely and reduce disruption to other operations, it is essential to identify and minimise all significant potential sources of stray currents and voltages. This comprises perforating, sidewall sampling, formation interval testing, explosive cutting and explosive backing off.

5.10.2 Radio silence

Radio Silence not limited to telecommunications, but extended to cover all precautions taken to reduce or eliminate potential sources of stray currents and radio induced voltages.

The area in which transmissions are controlled will include all vessels and helicopters within 500 metres (1640 ft) of the installation.

Radio Silence will commence during the preparation of explosives and continue until the explosive device is more than 75 metres (250 ft) below the seabed. During this period no helicopter is permitted to operate within the 500-metre zone. "Receive only" radios can also remain in operation during radio silence.

5.11 Specialist roles

5.11.1 Land seismic operations

Only approved helicopter types, operated by Contractors approved by the OGP Member's Aviation Advisor, shall be used in support of seismic operations. In general, where a safe forced landing cannot be reasonably achieved, twin-engine types should be used. However, it is recognised that for certain high altitude operations particular single-engine types may be the safer option. In any event, further advice should be sought from the Aviation Advisor. Further guidance on seismic helicopter operations is to be found at *Appendix 8*.

5.11.2 Winch operations.

Winching operations, including training, should only be undertaken when judged operationally essential, and then strictly in accordance with the specified procedures.

Twin-engine helicopters shall always be used for winch operations and shall have a single-engine Out of Ground Effect (OGE) hover capability at all stages of the operation other than for actual life saving use.

Marine support operations e.g. ship pilot transfer should routinely be conducted in accordance with the recommendation of the International Chamber of Shipping Guide. Further detail is at *Appendix 9*.

It should be noted that training should always be carried out with full single-engine hover capabilities at the operator-designated heights ASL/AGL.

5.11.3 Airborne geophysical survey requirements

Geophysical survey flying is one of the more demanding flight regimes in which OGP contracted aircraft operate. This is applicable to both fixed and rotary wing aircraft. To reflect the increase in difficulty of this type of flying, the requirements at *Appendix 10* demand greater role experience and more stringent operational controls than those outlined in the standard conditions for helicopters.

5.11.4 Aerial pipeline inspection

Both helicopters and fixed-wing aircraft are employed in pipeline inspection work. They need to operate at altitudes lower than optimum for normal operations and are subject to greater hazards. Standards for the conduct of such inspection work are at *Appendix 11*.

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Section 6 Contents

6	Fixed-wing operations – public transport & aerial work	43
6.1	Fixed-wing aircraft standards.....	43
6.1.1	Minimum and operational role-specific equipment	43
6.1.2	Certification recommendations.....	43
6.1.3	Multi-engine aeroplanes with single-engine performance	43
6.1.4	Multi-engine aeroplanes without single-engine performance	43
6.1.5	Piston powered multi-engine aeroplanes	43
6.1.6	Single-engine aeroplanes	44
6.2	Airfields - minimum requirements.....	44
6.3	Fuel planning.....	44
6.3.1	IFR flight plan	44
6.3.2	VFR flight plan.....	44
6.4	Composition of flight crew	45
6.4.1	Two pilot operations.....	45
6.4.2	Single pilot operations	45
6.5	Flying hour limits - recommended maximum	45
6.6	Aircrew life-jackets and aircraft homing devices	45
6.7	Sideways facing seats.....	45
6.8	Specialist roles	46
6.8.1	Airborne geophysical survey requirements	46
6.8.2	Aerial pipelines inspection.....	46

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6 Fixed-wing operations – public transport & aerial work

6.1 Fixed-wing aircraft standards

6.1.1 Minimum & operational role-specific equipment

In addition to the minimum equipment recommendations contained in the Table of Equipment Fit and specific operational role equipment recommended in other Sections of this Guide, the following should be considered.

6.1.2 Certification recommendations

Wherever practical those aeroplanes that are certified to Federal Aviation Regulation US 14CFR Part 25 (or equivalent), or have documented and demonstrated single-engine performance which meet the criteria of Part 25, should be used.

Those aeroplanes certified to Part 25 (or equivalent) have higher performance criteria than those certified to US 14CFR Part 23 (or equivalent).

It should be understood that certification standards other than those in Part 25 (or equivalent) for twin-engine aeroplanes may vary significantly relative to demonstrated and documented performance criteria.

6.1.3 Multi-engine aeroplanes with single-engine performance

Multi-engine aeroplanes capable of sustaining a 1% net climb gradient at or above lowest safe altitude with one engine inoperative (OEI) and flown using two pilots should be used whenever any of the following conditions exist:

- When operating in a hostile environment (see *Appendix 6*).
- Any portion of the flight will be in instrument (non-visual) conditions.
- When operating on an extended over water flight.
- Any portion of the flight is planned for, or performed, at night.

6.1.4 Multi-engine aeroplanes without single-engine performance

Multi-engine aeroplanes without single-engine performance (as described in *paragraph 6.1.3* above) or Piston powered aeroplanes should ONLY be used when the following conditions are met:

- When permitted by local regulatory authorities.
- The environment is determined to be non-hostile (see *Appendix 6*).
- Flights are conducted over reasonably short distances and favourable terrain.
- Operations are in Day Visual conditions (VMC), and the aircraft is landed 30 minutes prior to official sunset.
- Acceptable Search & Rescue Services are available (see *Section 12* and *Appendix 12*).
- Continuous Flight Following is maintained.

6.1.5 Piston-powered multi-engine aeroplanes

In some regions access to turbine-powered multi-engine aeroplanes is limited which may necessitate the use of piston-powered aeroplanes when all of the conditions in *paragraph 6.1.4* above cannot be met, particularly for short notice or infrequent flights. In such cases the following criteria should be considered:

- Restrict aircraft loading to ensure a net take-off flight path to clear obstacles by not less than 35 feet to a height of 1500 feet above the landing aerodrome, assuming the loss of an engine on

achieving V-Broc (VY) (speed for best rate of climb) with retraction of the undercarriage and flaps complete and the propeller on the inoperative engine feathered. (In practice this means a gross single-engine climb rate of at least 200 feet per minute.) If the climb out criteria cannot be met, followed by a safe single-engine circuit to land, then management must be made aware of this and continued use should only follow a formal risk assessment. This would include a review of the area ahead of the runway into which the forced landing would have to be made.

- En-route performance planning for all flights must ensure the capability of maintaining the minimum safe altitude for IFR flight over the route to be flown or any diversion from it, with one power unit inoperative.

6.1.6 Single-engine aeroplanes

If single-engine aeroplane operations are considered:

- preference should be given to single-engine turbine powered aeroplanes;
- the conditions contained in *paragraph 6.1.4* should be met;
- the aeroplane should comply with all the minimum equipment recommendations in the Equipment Fit Table and other sections of this guide (where applicable); and
- a risk assessment should be completed with identified risk reduction measures implemented to reduce the risk to that As Low As Reasonably Practicable (ALARP).

6.2 Airfields – minimum requirements

As the general requirements imposed by National Aviation Authorities (NAA) vary widely from country to country local airfield standards should be assessed by the OGP Member's Aviation Advisor. If assessed as being acceptable the general requirements imposed by the NAA should be considered the minimum standard which must be satisfied.

Where there is no locally provided guidance available the minimum requirements contained in ICAO Annex 14 Part 1 (Aerodromes) should be applied.

6.3 Fuel planning

While parameters covering all circumstances cannot be clearly laid down, the following should be used as guidance for fuel planning unless otherwise stated in relevant regulations or Operating Manuals.

6.3.1 IFR flight plan

Fuel should be sufficient for the leg to destination plus the leg to an alternate, plus 10% of the above as a navigation contingency, plus 45 minutes holding fuel (30 minutes for turbine aircraft). A contingency should also be allowed for start-up and taxi.

6.3.2 VFR flight plan

Fuel should be sufficient for the proposed route plus 10% of the route fuel, plus 30 minutes at the cruising speed consumption.

Note The above requirements are in addition to unusable fuel as listed in the aircraft Flight Manual.

6.4 Composition of flight crew

	VFR	IFR and Night
Single-engine	1	Not recommended on OGP operations
Propeller driven <5,700 kg (12,500 lbs)	2†	2
Pure jet and propeller driven >5,700 kg (12,500 lbs)	2	2

† All cases of proposed single pilot operation should be referred to the OGP Member's Aviation Advisor

6.4.1 Two pilot operations

Two pilot operations are usually required when operating in support of the OGP Member, and will always be required for:

- IFR or night operations.
- When mandated by the regulatory authority.

6.4.2 Single pilot operations

Where aircraft are certified for single pilot operations and in the view of the OGP Member's Aviation Advisor are practically operable by a single pilot under the local operating conditions, then this mode of operation may be considered. Among the factors affecting the decision are:

- Workload.
- Flight Conditions.
- Whether flights are conducted by day or night (single pilot not recommended for night operations).
- Whether flights are conducted under Instrument Flight Rules (single pilot operations not recommended).
- Traffic density.
- Length and nature of intended flights.
- Whether flights involve departure or arrival at major Control Zones.
- Whether traffic flow is managed and STARS/SIDS apply.

6.5 Flying hour limits – recommended maximum

Flying hour limitations for pilots are usually specified by the local Regulatory Authority. However, the limitations imposed are often set at a level greater than that at which fatigue may set in. To ensure that pilots are not overly exposed to fatigue while in support of an OGP Member's operations, the flight and duty time limitations specified in *Section 5 Helicopter Operations (paragraph 5.6)* of this Guide are also applicable to aeroplane operations.

6.6 Aircrew life-jackets & aircraft homing devices

See *Section 5 Helicopter Operations (paragraph 5.7)* for operations over water where life-jackets are required to be worn by the aircrew.

6.7 Sideways facing seats

Wherever possible, when chartering fixed-wing aircraft, those without sideways facing seats are to be preferred. If this is not practical and the seats cannot be repositioned in either the forward or aft position, use of these seats should be avoided during take-off and landing, unless shoulder restraints are used and tightened properly, passengers are briefed accordingly and this is an approved modification or configuration.

6.8 Specialist roles

6.8.1 Airborne geophysical survey requirements

Geophysical survey flying is one of the more demanding flight regimes in which OGP contracted aircraft operate. This is applicable to both fixed and rotary wing aircraft. To reflect the increase in difficulty of this type of flying, the requirements at *Appendix 10* demand greater role experience and more stringent operational controls than those outlined in the standard conditions for fixed-wing aircraft and helicopters.

6.8.2 Aerial pipeline inspection

Both helicopters and fixed-wing aircraft are employed in pipeline inspection work. They need to operate at altitudes lower than optimum for normal operations and are subject to greater hazards. Standards for the conduct of such inspection work are at *Appendix 11*.

Section 7 Contents

7	Fuel system design & management	49
7.1	Design, operation & inspection references	49
7.2	Design & periodic review	49
7.3	Variances.....	49
7.4	Fuel quality control	49
7.4.1	General responsibilities & guidelines.....	49
7.4.2	Aircraft fuel system sampling guidelines	50
7.4.3	Bulk fuel guidelines.....	50
7.4.4	Drummed fuel guidelines	51
7.5	Rapid refuelling (refuelling with engines running).....	51
7.5.1	Approvals & procedures	51
7.5.2	Guidelines.....	52
7.6	Portable offshore fuel transport tanks	52
7.6.1	Recommended minimum maintenance	52

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7 Fuel system design & management

7.1 Design, operation & inspection references

The following should be used as the basic reference documents for airbase fuelling system design/inspection/operational considerations, and construction or major rework of existing airbases where no local guidance exists.

- a) National Fire Protection Association (NFPA) NFPA 407.
- b) UK CAP 437 (for helidecks).

7.2 Design & periodic review

In all cases, a review by an OGP Member's Aviation Advisor should be incorporated into all preliminary and critical design processes for Company airbase refuelling system construction or modification.

All fuel and supporting fire suppression systems, including those provided by airports or fixed base operators should have annual safety, technical and quality assurance reviews by appropriate regulatory authority or an OGP Member's Aviation Advisor and reviews every six months by the Operator. Records of such reviews and any remedial actions taken should be maintained.

7.3 Variances

Any variation to the above references should be forwarded to the OGP Member's Aviation Advisor for considerations as early as possible.

7.4 Fuel quality control

7.4.1 General responsibilities & guidelines

It is essential that the operator prepares formal procedures detailing all necessary equipment checks and fuel system quality control.

The ultimate responsibility for the quality of fuel loaded onto an aircraft is the Captain of the aircraft.

All fuel delivery systems, including portable systems, will be fitted with filtration of the water blocking (Go-No-Go) type meeting the specifications of API 1583, which locks fuel flow when water is present.

Fuel filter canisters should be clearly marked with the next date of change or inspection cycle, and data recorded in an appropriate inspection record.

All filters should be replaced at nominated pressure differentials as annotated on the filter housing or as recommended by the manufacturer, but as a minimum will be replaced annually.

All fuel storage supplies, including drums, should be allowed to settle 1 hour for each 1 foot of fuel depth after the tanks have been resupplied or barrels moved to vertical, before samples are taken and fuel is approved for use. Fuel tanks should have a sign placed on the tank during settling, indicating the time at which the tank can be used (settling is complete). If the fuel system is serviced by only one tank, the fuel dispensing unit will also have a sign with wording as noted for the bulk tank.

All steel tanks should be lined with an approved epoxy liner unless the tanks are constructed of stainless steel.

All fuel supply tanks should be installed with a slope and have a sump drain at the tank low point for sampling purposes and should have a fuel quantity sight gauge.

The preferred plumbing for fuel systems is stainless steel and connections welded. If common steel is used it must be lined with an approved epoxy.

Only personnel who have received formal documented initial and recurrent training should be used for refuelling aircraft. Aviation services can be of assistance in providing a sample training programme.

All fuel system static grounds should have continuity checks performed periodically, annually as a minimum.

It is recommended that frangible “witness” seals be used on tank openings, especially transport tanks, after filling to allow verification that contents are untampered.

7.4.2 Aircraft fuel system sampling guidelines

All required fuel samples as noted in the paragraphs below should be retained until flights are completed for that day. At remote locations, when refuelled by a commercial fuel vendor, it may not be practicable to retain fuel samples.

The following should be sampled daily, with a minimum individual sample size as noted below into a clear jar with a screw top, each tested for water, and marked with the sample source:

- a) Aircraft fuel tank sumps drained and sampled into one container prior to the first flight of each day (½ litre minimum sample size, unless specified differently by the airframe or water detection device manufacturer).
- b) Each fuel tank sump (2.0 litres).
- c) Each fuel filter and monitor (2.0 litres).
- d) Each fuel nozzle, prior to first refuelling of the day (2.0 litres).

It is also recommended that the water test capsule results be retained with the samples.

Transport fuel tanks

Fuel going into the fuel transport tanks from fuel trucks/bulk systems must be “certified” (see *paragraph 7.4.3.e* below) fuel, before filling the tanks a clear/bright and water test should be completed, and results noted on the tank records. If the fuel does not pass these tests or is not from a “certified” source, then it should be rejected.

Bulk fuel sampling

See *paragraph 7.4.3.e* below.

7.4.3 Bulk fuel guidelines

The following inspection items should be used as a minimum guide for a fuel quality control system:

- A daily log will be used to record the following items:
 - a) The age and delivery date of storage fuel.
 - b) Sample and water test results from the fuel tank sumps, all filters and monitors, and all fuel nozzles.
 - c) Differential pressure readings.
 - d) Fuel Filter changes – annual as a minimum.
 - e) Certification of fuel. Bulk delivery fuel should always be accompanied by a Certificate of Release. Fuel should be sampled, visually inspected for appearance and contaminants, chemically tested for water and measured for density, before delivery into storage tanks. Maximum variance of the density compared to the density on the Certificate of Release should not exceed 0.003.
- The interior of all tanks, tank seals, and pressure relief valves should be inspected on an annual basis, and all gauges/pressure relief valves should be calibrated annually unless the manufacturer specifies differently.
- Microbe growth testing

- a) Initial testing to establish “normal” microbe level: adopt a random routine testing of a few tanks on a quarterly basis. This should include primary supply tank(s), and several mobile tanks (if used).
- b) Long-term testing: once the “normal” microbe level is established as noted above, it is recommended that fuel supplies be tested on a six-month interval.
- c) Fuel quality indicators: if any contra-indications from tank drains are apparent, such as dark coloured (brown, black) water, sulphide smells, water and fuel with a frothy or lacy interface, immediately conduct a test, as these strongly indicate microbial activity within the recent time span.
- Microbe growth treatment

If the microbe growth test is positive, use of the affected tank(s) should be suspended and the following protocol followed. Once the protocol has been followed then a repeat microbe presence test should be completed.

 - a) Bulk or transport tanks: full tank cleaning including disinfecting the tank surfaces with Chlorex bleach (or equivalent) followed by fresh water rinsing, inspect and replace all downstream contaminated filter elements.
 - b) Aircraft tanks and filters: filters should be replaced and tanks drained and cleaned following the manufacturer recommendations.
 - c) Use of microbes treatments: any microbe treatments, such as “BioBar” or equivalent should be used with caution and the aircraft manufacturer contacted to determine if use of such treatments are allowed for that model aircraft’s fuel.

7.4.4 Drummed fuel guidelines

The following precautions are applicable to operations that involve the use and storage of drummed fuel:

- Drums should be tight with no broken seals prior to use.
- Drum stock should be consumed within 12 months of packaging date.
- Drums will be stored with the bungs horizontally at the 9 and 3 o’clock positions, with the bung end tilted slightly lower than the opposite end (non-opening), to prevent moisture/rust formation inside the bung end of the barrel.
- Each drum of fuel should be sampled and tested with water detector capsules or an approved paste to confirm no water contamination is present and visually inspected for proper colour and contaminants.
- Pumps used for drum refuelling should be equipped with water blocking filtration system.
- Pump standpipes should extend no closer than 50mm (2 inches) of the drum bottom.
- Before fuelling the aircraft, a small amount of fuel should be pumped into a container to remove any contaminants from the hose and nozzle.
- The standard marking for a contaminated drum is an “X” marked on the bung end.

7.5 Rapid refuelling (refuelling with engines running)

7.5.1 Approvals & procedures

If an operational requirement to conduct rapid refuelling exists the following should be in place:

- a) Approvals: company management should approve the specific circumstances in which rapid refuelling may be conducted.
- b) Training: the operator’s approved Operations Manual will include written procedures to be followed for the refuelling operation. The aircrew and ground support staff should have completed the operator’s training programme before refuelling is considered.

7.5.2 Guidelines

In addition to any local regulatory requirements the following minimal guidelines will be used for rapid refuelling:

- a) A pilot shall remain at the controls at all times.
- b) A minimum of three individuals are required for the refuelling operation, one for refuelling, one for pump shut-off, and one for fire watch (with appropriate extinguisher).
- c) Passengers are to disembark prior to the refuelling operation commencing.
 - i) If for safety reasons the Pilot-in-Command decides to refuel with the passengers on-board the aircraft the passengers should be informed of this decision and actions to take in the event of a fire.
 - ii) All seat-belts are to be opened, the main exit door away from the side where refuelling is occurring should be opened, and no smoking will be allowed.
 - iii) Radios are not to be used during refuelling, and all anti-collision lights, radar, radio altimeter, transponder and DME equipment should be switched OFF.
 - iv) Prior to removing the fuel cap and inserting the fuel nozzle into the aircraft fuel tank, grounding wires running from the fuel station and from the fuel hose to the aircraft should be connected.
 - v) When refuelling is completed the Pilot-in-Command should verify that all equipment is removed, the fuel cap has been securely replaced and the aircraft is properly configured for flight.

7.6 Portable offshore fuel transport tanks

If no local regulatory guidelines are available, information may be obtained from the Combined Federal Regulations (U.S. CFR 49, Part 173.32) or from the Air Transport Association (ATA 103, Paragraph 2-11).

7.6.1 Recommended minimum maintenance

Where local authority has established a more stringent guideline, the most stringent should be used.

- A 5-year hydrostatic test required on the transporters. The data plate on the tank should state the test pressure requirement.
- An annual test on the pressure relief valve.
- Tanks should be inspected every 12 months;
 - a) Check for build-up of sediment or evidence of microbial growth.
 - b) If inspection reveals such growth or build-up of sediment exceeding 1/10 of the area of the tank bottom surface, cleaning should be accomplished.
 - c) If the tank has an internal epoxy coating, inspect coating for evidence of chipping, flaking, or other deterioration.
- Jet fuel tanks should be cleaned with high pressure water or steam only. Under no circumstances should solvents, chemicals, or detergents be used.
- After cleaning with water, use squeegees and lint free mops to dry the tank surfaces. Assure removal of all free water, and allow the tank to dry thoroughly through natural ventilation as long as practicable.
- Maintain a record of tank inspection and cleaning using ATA Form 103.07 or similar.
- Dates indicating the inspection/test dates as prescribed in *paragraphs 7.6.1.1-3* should be stencilled on the tank.

Section 8 Contents

8	Training & experience	55
8.1	Flight crew training	55
8.1.1	Introduction	55
8.1.2	Use of Synthetic Training Devices.....	56
8.1.3	Recurrent training	56
8.1.4	Crew Resource Management training	56
8.1.5	Dangerous goods training.....	56
8.1.6	In Command Under Supervision (ICUS) Flight Time	56
8.1.7	Helicopter offshore night operations & training.....	56
8.1.8	Helicopter Underwater Escape Training (HUET)	57
8.1.9	Single pilot operations	57
8.1.10	Role-specific requirements	57
8.1.11	Recency checks after absence.....	59
8.2	Support & technical personnel requirements	59
8.2.1	Maintenance personnel	59
8.2.2	Helideck attendant & personnel	59
8.2.3	Refuelling personnel	59
8.2.4	Air traffic controller	59
8.2.5	Radio operator	60
8.2.6	Certified weather observers	60
8.2.7	Cabin attendants.....	60
8.2.8	Dispatchers/traffic clerks.....	60
8.2.9	Load master.....	60
8.3	Training records & programmes.....	60

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8 Training & experience

8.1 Flight crew training

8.1.1 Introduction

Initial and recurrent training is a vital factor in flight safety and must be carried out to ensure that high professional standards are set and maintained. The required experience levels are tabulated in *Appendix 5* of this guide.

8.1.2 Use of Synthetic Training Devices

Flight crew training should be conducted in a Synthetic Training Device (STD) that replicates the model of aircraft being flown as closely as possible. It is preferred that the device be full motion with a visual screen that provides forward and peripheral imaging.

8.1.2.1 Categories

STDs fall into the following categories:

Flight Simulator (FS)

A full size replica of a specific type or make, model and series helicopter flight deck/cockpit, including the assemblage of all equipment and computer programmes necessary to represent the helicopter in ground and flight operations, a visual system providing an out of the flight deck/cockpit view, and a force cueing motion system. It is in compliance with the minimum standards for Flight Simulator certification.

Flight Training Device (FTD)

A full size replica of a specific helicopter type's instruments, equipment, panels, and controls in an open flight deck/cockpit area or an enclosed helicopter cockpit/flight deck, including the assemblage of equipment and computer programmes necessary to represent the helicopter in ground and flight conditions to the extent of the systems installed in the device. It does not require a force cueing motion or visual system for some levels of qualification.

Flight Navigation Procedures Trainer (FNPT)

A training device which represents the flight deck/cockpit environment including the assemblage of equipment and computer programmes necessary to represent a helicopter in flight conditions to the extent that the systems appear to function as in a helicopter. It is in compliance with the minimum standards for a specific FNPT Level of Qualification.

8.1.2.2 Applicability

Where available for the type, the use of approved Synthetic Training Devices for aircrew on sole-use long term contracts at a preferred frequency of 12 months and not more than 24 months. Level C or Level D Flight Simulators are preferred.

Where a Flight Simulator is not available for the helicopter type or where the configuration of the Flight Simulator is not sufficiently representative of the commercial aircraft in use, the use of FTDs as an alternative may be accepted by the individual OGP Member Company in accordance with the following guidelines.

It is recommended that Synthetic Training Devices should include landing area visual simulations that are representative of those being used for landings by the respective operator. For example, offshore simulation training should include helideck visuals with markings representative of those being used in daily operations.

- Flight Training Device Level 3 standards or equivalent for medium rotorcraft above 3175kg (7,000lb).
- Flight Training Device Level 2 for small rotorcraft with a maximum weight of 3175kg (7,000lb) or less and certified with nine or less passenger seats.
- See 8.17 for application regarding offshore training.

While it is recognised that the use of simulators allows practice in handling emergencies that cannot be practiced in the air, the emphasis of this training should be in the development of Crew Resource Management (CRM) for multi-crew aircraft or Aeronautical Decision Making (ADM) for single-piloted aircraft, including practice of CRM/ADM principles. When appropriate, this should be in the form of Line Oriented Flight Training (LOFT), the exercises for which shall be developed between the aircraft and the simulator operators themselves to provide 'real time' exercises using simulated local operational, weather and environmental conditions.

8.1.2.3 Conversion to new type

Current OGP guidelines specify 100 hours time on type for commanders and 50 hours on type for co-pilots. Simulator training, if provided, can reduce this time by 50%. However, when introducing new types into service or when changing to alternate types, to improve the benefits from the experience building element to meet this standard, it is more appropriate to have an integrated structured training program. Content of this program should be in accordance with *Appendix 5A* and *5C* and *Paragraph 4.3.2*. This should consist of a dedicated training package that, through the benefits of the training, should enable a reduction of the overall hours required. A significant element of such a structured training program will involve STD training, which should include a minimum of 25% in the simulator and 25% in the aircraft with the remainder in either the aircraft or simulator. Further guidance is available from the OGP Member's aviation adviser.

8.1.3 Recurrent training

All pilots should receive annual recurrent training to the standards of appropriate civil aviation authorities, and flight checks at not less than a frequency of every six months for long-term operations. These flight checks should include an annual instrument rating proficiency check/renewal (where applicable), a proficiency check (including emergency drills) and an annual route check.

Where distinct climatic seasons exist, training related to the seasonal change is recommended.

Before being scheduled for flight duties in a new location, all crewmembers should receive as a minimum a documented Line Check, which includes an orientation of local procedures/policies.

8.1.4 Crew Resource Management training

An acceptable crew resource management (CRM) training programme should be required for all two pilot operations in airplanes and helicopters. Aeronautical Decision Making (ADM) training programs should be established for single pilot operations.

8.1.5 Dangerous goods training

Dangerous Goods Awareness training should be required for all pilots to ensure that they are aware of the requirements for the carriage of hazardous materials including relevant legislation, limitations and documentation. Even where dangerous goods are not carried by the aircraft operator such training also serves to highlight the hazard posed by undeclared dangerous goods that can often be carried in passengers' baggage and consigned freight.

8.1.6 In Command Under Supervision (ICUS) Flight Time

Pilots may log ICUS time, where allowed by local CAA. This time will be recognised as Command Flight Time in meeting the requirements of *Appendix 5A*, provided:

- 1) The flight time is logged while flying in the Captain's designated position.
- 2) Training records and the pilot's logs are maintained documenting each flight performed.
- 3) The Operator has a written ICUS training program establishing the syllabus and progression program.

8.1.7 Helicopter offshore night operations & training

A high degree of pilot training including cockpit resource management (CRM), specified night operating procedures, dual pilots and suitably equipped aircraft are essential for safe operations.

Where there is a requirement to carry out routine (or emergency) flights at night, then the operator shall establish appropriate training programs.

Only dual pilot crews should be used and both pilots will be qualified and hold a current instrument rating for the helicopter type being flown. For night operations Captains should, in the addition to the requirements specified in *Appendix 5* of this guide, have the following qualifications:

- 1) Minimum of 25 hours of night offshore time.
- 2) Completed within the last 12 months initial or recurrent offshore night/IFR/CRM/deck landing proficiency training.

All pilots will maintain night/instrument recency of 3 offshore approaches and departures, including takeoff and landing, every 90 days. In latitudes where night time is limited during summer months, OGP Member Companies may adjust the currency requirement on an individual contract basis for that period. Use of a simulator level D or FTD-3 of the same type or series being flown can be used in to meet the 3 offshore approaches and departures provided this is acceptable under the national legislation being flown. It must have the visual capability to simulate landing to an offshore facility. In addition the specific device to be used must be approved for that use by national authorities and is acceptable to the member company aviation advisor. See 8.1.22 for further guidance on simulator use.

8.1.8 Helicopter Underwater Escape Training (HUET)

HUET should be completed using an underwater escape simulator for all aircrew and frequent flying offshore passengers at intervals not to exceed 4 years if engaged in floatplane or offshore helicopter operations. This training should be completed in conjunction with wet dingy drills using emergency equipment similar to that installed on the aircraft.

The initial course of training should be scheduled for a minimum of one day.

HUET facilities should have the emergency exit mechanisms representative of the aircraft flown in offshore or water-borne operations.

All HUET trained personnel or their companies should maintain a documented record of the training completed.

Emergency Breathing Systems (EBS)

- 1) OGP Members should complete a risk assessment for each offshore helicopter or overwater floatplane operation to determine whether an emergency breathing system is required to provide occupants time to perform underwater egress in the event of ditching.
- 2) Compressed air EBS, PFD with integrated rebreather and exposure suits with integrated rebreather designed to provide additional time for underwater egress should be considered.
- 3) Where EBS is designated for use, HUET should include training in the use of the EBS to ensure user proficiency.
- 4) See 12.5.3 for additional guidance on EBS risk assessments and training.

8.1.9 Single pilot operations

Single pilot operations should only be used in a non-hostile environment during day VFR operations, and only after consultation with an Aviation Advisor.

Where aircraft operators/Company operations have single pilot and dual crew requirements, the preferred pilot progression is Co-Pilot in the multi-crew environment before progressing to Captain in single pilot aircraft. Then, back to multi-crew for ICUS training (see *paragraph 8.1.6*) before moving to Captain in multi-crew.

8.1.10 Role-specific requirements

Types of role-specific operations often undertaken by operator's aircraft in support of the company include but are not limited to: offshore, low-level geophysical survey, external load-lifting, seismic, and pipeline survey.

Due to the specialised nature of many roles required to support OGP Members' activities, additional qualifications and experience is usually required. The additional qualification and experience requirements for a number of role specific operations are summarised in *Appendix 5*.

External (sling) load operations

Where external load operations are likely to be required, this should be specified in the contract, with a requirement that sufficient crews for the cover demanded are line-checked in this role before contract commencement. Pilots nominated for external load work should have the competence check formally signed off by a designated check and training captain.

Pilots should have 300 hours of external load experience, or 300 hours of long-lining, whichever is applicable.

Unless at least ten hours practical application has been achieved in the preceding six months, competence should be re-checked during Visual Base Check procedures, or an additional External Load Competence Check should be completed.

Spraying operations

Aircraft operators conducting spraying operations, for example in support of offshore oil spill response, should have a written syllabus for conversion and recurrent training of aircrew engaged in spraying. The training and recency requirements should be assessed by the OGP Member's Aviation Advisor.

SAR winch/hoist operations

Pilot training

- 1) Pilots will have completed a formal and recorded training scheme, plus a minimum of 10 hours of winching operations (50 hours where an exclusive SAR contract exists).
- 2) Recurrent training should include a minimum of three winch rescue operations every 90 days utilising a winch operator and the recovery of equipment such as a "cruciform" by grappling hook.

Crewman training

All personnel employed as winch operators, whether full time or part time, should:

- 1) be an employee or direct contractor of the helicopter operator.
- 2) have completed a formal and recorded training scheme specifically for winchmen, including the following items:
 - a) Basic weight and balance.
 - b) Aircraft safety and survival equipment.
 - c) Emergency procedures – to include winch problems, fouling of the cable, severing of the cable, use of bolt croppers etc.
 - d) Technical details of winch operation.
 - e) First-Aid and cold water recovery techniques including cold shock and hypothermia.
 - f) Wet dinghy drill.
 - g) Search & Rescue/coastguard local organisation.

Wet and dry winching practical instruction which shall include at least twenty lifts as the winch operator and twenty lifts as the winchman, and have completed recurrent training every 90 days to include an aircraft safety and survival check.

Winch operator techniques may be practised either overland or water, providing the note above is taken into account, but over water training will be necessary for pilots and crewmen to practice the approach and lower into position in reduced visual reference conditions.

Seismic operations

For seismic operations, see OGP Report № 351 *Helicopter guidelines for seismic operations*.

Airborne geophysical survey operations

Comprehensive recommended practices including aircrew training, the International Airborne Geophysical Safety Association has developed a comprehensive set of guidelines for low level airborne geophysical survey operations. An extract of IAGSA's recommended practices is contained in *Appendix 10*.

8.1.11 Recency checks after absence

Recency checks for all pilots should be carried out after 28 or more days absence from flying and may be carried out by any suitable Senior/Line Check Captain but preferably, the Chief Pilot or Training Captain.

8.2 Support & technical personnel requirements

Technical and support personnel such as licenced/unlicenced engineers, loadmasters, and dispatchers, helideck attendants, aerial observers, cabin crew and radio operators should meet the minimum qualification and experience requirements presented in *Appendix 5D1-3*.

8.2.1 Maintenance personnel

8.2.1.1 Initial training

It is considered essential that all maintenance personnel receive formal training and have a minimum of 2 year's experience on type before issue of licenses or type approval for the type(s) of helicopters/airplanes to be covered. In countries where this is not required by the national licensing authority, then the aircraft operator must provide formal, general and type training for its certifying staff to meet the minimum requirements of *Section 4.4* and *Appendix 5D*.

8.2.1.2 Continuation/recurrent training

Continuation/recurrent training will be conducted at a minimum period of every three-years and should include but not be limited to the following: changes in relevant regulatory requirements, organization procedures, the standard for the products being maintained; human factors issues identified from any internal or external analyses of incidents; and information on relevant airworthiness directives/bulletins or similar documents issues since the last training session.

8.2.2 Helideck attendant & personnel

Personnel engaged on helideck related duties should be provided with training that includes the provisions of the OPITO Training Guide and the experience as shown in *Appendix 5D1-3*.

8.2.3 Refuelling personnel

These persons shall have completed a formal training course at an approved/recommended training facility. It is recommended that a refresher-training course be undertaken at intervals not exceeding two years.

8.2.4 Air traffic controller

Controllers shall be licensed or unlicensed in accordance with the requirements of the country in which operations are taking place. In any case they must undertake formal training in handling and recording radio transmissions and any actions that may be required for normal and emergency

operations. They should also be familiar with the company emergency and call-out procedures, and are required to keep a log of air traffic control radio transmissions.

8.2.5 Radio operator

Radio operators shall be VHF/HF licensed where applicable, with relevant experience of aircraft operations and procedures, and be completely familiar with aviation R/T terminology. Additionally, they should be completely familiar with company emergency and call-out procedures. They are responsible for flight watch and the R/T log of all aircraft communications. It is highly desirable that all communications and radio logs shall be in the English language.

8.2.6 Certified weather observers

When certified weather observers are required for operations under IFR or night conditions, the observers will attend periodic training to maintain certification in accordance with local requirements.

8.2.7 Cabin attendants

Cabin attendants shall have completed a formal and recorded course of training which should include coverage of the following items: Safety Equipment, First Aid, aircraft knowledge, Emergency Procedures, Loading Procedures, Documentation and the Handling of Dangerous Goods. Formal training shall be carried out annually. The operator may conduct the training course but it should be recorded formally and a syllabus should be available for reference. Training should include the full range of Emergency & Survival training as completed by pilots.

8.2.8 Dispatchers/traffic clerks

Such persons shall be completely familiar with the operation of aeroplanes or helicopters. They should also have a good understanding of basic weight and balance problems and manifest documentation.

8.2.9 Load master

For operational (and sometimes commercial) reasons, it is expedient to carry “load masters” who are not trained aircrew, for the control of passengers and freight during flight and while the aircraft is on the ground. These personnel should always be given basic training as defined under “Crew” above and then should be given crew status. Load Masters must have completed a formal and recorded course of training which should include coverage of the following items: Safety Equipment, First Aid, Aircraft Knowledge, Emergency Procedures, Loading Procedures, Documentation and the Handling of Dangerous Goods. The operator may run the training course, but it should be formally recorded and a syllabus should be available for reference. Formal recurrent training should be carried out yearly. Where Load Masters are used to calculate and supervise the loading, they must be trained for load and balance on the aircraft type in use. However, in every case, the Captain remains responsible for checking and accepting the loading and balance calculations.

8.3 Training records & programmes

Aircraft operators should be expected to maintain comprehensive training documentation that includes details of the training programmes provided to their personnel and required training frequency. Individual training records should be maintained for each person.

For long term or sole use contracts, aircraft operators should be expected to provide to the OGP Member:

- a) a listing of personnel that meet the OGP Member’s requirements, and
- b) details of personnel changes which should be reviewed and accepted by the OGP Member’s Aviation Advisor before they commence work.

Training records should be periodically reviewed by the OGP Member’s Aviation Advisor. The aircraft operator will make these records and its training programmes available upon request.

Section 9 Contents

9	Passengers & freight	63
9.1	General.....	63
9.1.1	Smoking.....	63
9.1.2	Alcohol & drugs.....	63
9.1.3	Operation of portable electronic devices.....	63
9.1.4	Weight & balance.....	63
9.2	Cargo.....	63
9.2.1	Weighing & documentation.....	63
9.2.2	Cabin area cargo.....	63
9.2.3	Hazardous materials (dangerous goods).....	63
9.3	Manifests.....	64
9.3.1	Information to be recorded.....	64
9.3.2	Additional information.....	64
9.3.3	Manifest changes/additions.....	64
9.3.4	Passenger verification.....	64
9.4	Passenger weights.....	64
9.4.1	Aeroplanes under 5700kg and all helicopters.....	64
9.4.2	Aeroplanes over 5700kg.....	64
9.4.3	Baggage.....	64
9.5	Passenger briefings.....	65
9.5.1	Briefing frequency.....	65
9.5.2	Language.....	65
9.5.3	Minimum briefing requirements.....	65
9.5.4	Additional helicopter briefing requirements.....	65
9.5.5	Additional helicopter briefing items for offshore flights.....	66
9.5.6	Additional float plane briefing items.....	66
9.6	Video briefing.....	66
9.7	Multi-language operations.....	66
9.7.1	Translation requirements.....	66
9.7.2	Briefing cards.....	66
9.8	Passenger marshalling areas.....	67
9.8.1	Onshore & offshore.....	67
9.8.2	Offshore.....	67
9.9	Passenger training.....	67
9.9.1	Helicopter Underwater Escape Training (HUET).....	67
9.10	Passenger dress requirements.....	67
9.10.1	Field, remote & inhospitable areas.....	67
9.10.2	Hostile environment offshore helicopter or float plane flights.....	67
9.10.3	Non-hostile environment offshore helicopter or float plane flights.....	67
9.11	Passenger & cargo management on helidecks.....	68
9.11.1	Clear helideck policy.....	68
9.11.2	High winds or adverse weather.....	68
9.11.3	Passenger control.....	68
9.12	Passenger seating.....	68
9.13	Survival equipment.....	68
9.13.1	General.....	68
9.13.2	Over-water flights.....	69
9.13.3	Decision to use exposure suits.....	69
9.13.4	Personal locator beacons.....	69
9.13.5	Life-jackets.....	69

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9 Passengers & freight

9.1 General

9.1.1 Smoking

It is strongly recommended that smoking be prohibited at all times in aircraft

9.1.2 Alcohol & drugs

Personnel under the influence of alcohol or drugs must not be allowed to board any aircraft unless under medical supervision. The operator's check-in staff should be trained to recognise the signs of substance abuse and alert their management for appropriate action to remove the passenger from the flight manifest.

9.1.3 Operation of portable electronic devices

The use of small (laptop/notebook) portable computers by passengers in business aircraft may be permitted with the following provisions:

- The flight crew have been advised and agreed to their use.
- The equipment is switched off during take-off and landing.
- Any wireless transmitting devices installed on the computer (*eg* Wi-Fi, GPRS) are switched off before take-off and remain off for the duration of the flight.
- When not in use, the equipment should be securely stowed.

Due to the confined space in helicopter cabins, the use of laptop/notebook computers is not recommended.

Passenger operated devices specifically prohibited during flight include any transmitting device which radiates radio frequency signals such as Citizen Band radios, cellular/mobile telephones, wireless network cards in laptop computers (Wi-Fi, GPRS), and wireless email devices (*e.g.* Blackberry®). At the discretion of the aircraft operator use of equipment with these devices fitted may be permitted 'off-line' in flight if they have a 'flight mode' or the wireless device can be turned off before flight and remain off for the duration of the flight.

9.1.4 Weight & balance

Prior to takeoff, the pilot in command (PIC) should verify that fuel and oil requirements are correct, and weight and centre of gravity limits of the aircraft have been calculated and within the limits for flight.

9.2 Cargo

9.2.1 Weighing & documentation

Operators will verify the contents of each piece of cargo offered for transport by air. All cargo will be weighed separately and manifested.

9.2.2 Cabin area cargo

Cargo carried inside the passenger compartment should be adequately secured using cargo nets, seatbelts, and/or tie-down straps, and must not obstruct normal or emergency exits.

9.2.3 Hazardous materials (dangerous goods)

Passenger Flights

Most hazardous materials are prohibited onboard passenger flights including certain explosives, flammable fluids and gases, chemicals, and radioactive materials. Some items for example liquefied acetylene are forbidden for transport by air, whilst others are subject to very specific quantity, packaging and segregation limitations and in some instances may be allowed on passenger flights or restricted to cargo only flights.

Minimum requirements

Operators should provide pilots with guidance regarding all aspects of transporting dangerous goods. These instructions should not be contrary to the pertinent regulatory documents. Where regulatory guidance is lacking, the book 'Dangerous Goods Regulations' (DGR), published by the International Air Transport Association (IATA) is an acceptable substitute. The IATA DGR provides detailed information on what hazardous materials can be carried on passenger or cargo only flights including maximum quantities and packaging requirements. Operators must have approved procedures and personnel trained to IATA (or equivalent) standards in the event dangerous goods are to be transported.

Documentation

If hazardous materials are carried, the Pilot-In-Command should be provided with a 'Shippers Declaration of Dangerous Goods' form and comply with the Operator's Operations Manual.

9.3 Manifests

9.3.1 Information to be recorded

A passenger manifest should be raised for each flight and should have the following minimum information recorded: name of each passenger, passenger's company affiliation, passenger weight and that of personal baggage, the aircraft registration, and the weight of cargo. A computer-based manifesting system may be used, provided the pilot can be given the information.

9.3.2 Additional information

The form may also include a charge allocation and flight number if applicable.

9.3.3 Manifest changes/additions

If additions or deletions occur, the manifest will be revised to accurately reflect the names of the persons on board. This manifest should be left with or relayed to a responsible party, prior to departure, with instructions to retain until the trip is completed.

9.3.4 Passenger verification

Pilots and/or designated personnel should check the actual passenger names versus the pre-planned listing of personnel to be transported to verify only authorised passengers are carried.

9.4 Passenger weights

9.4.1 Aeroplanes under 5700 kg & all Helicopters

For aeroplanes with a maximum gross takeoff weight (MGTOW) less than 5700kg, and all helicopters regardless of MGTOW, actual body weights (including hand carried baggage) should be used.

9.4.2 Aeroplanes over 5700kg

At the discretion of both the company and operator (if authorised to do so by appropriate CAA), standard weights based on seasonal averages may be used when preparing a manifest for aeroplanes having a maximum gross takeoff weight in excess of 5700kg.

9.4.3 Baggage

All checked baggage will be manifested at actual weight for all aircraft.

9.5 Passenger briefings

9.5.1 Briefing frequency

Passengers should be properly briefed on emergency procedures, and other safety matters, prior to flight. If permitted by regulation, the pilot briefing may be abbreviated if a video briefing is provided or if on stopover flights.

9.5.2 Language

Where the dominant language is not English, the operator should provide a briefing in the local language as well as English.

9.5.3 Minimum briefing requirements

The passenger safety briefing should include, but not be limited to, the following:

- A general description of the aircraft and the danger areas of jet engines, and turning propellers on aeroplanes, and the dangers of helicopter main and tail rotors.
- Procedures for boarding and exiting the aircraft.
- Smoking is not permitted around the aircraft/tarmac area, or during flight.
- Location of non-smoking and fasten seat-belt illuminating signs.
- Seat-belts and shoulder harnesses:
 - Location and use of seat-belts which should be worn at all times, and the location and use of shoulder harnesses which when fitted should be worn during all landings and takeoffs for aeroplanes and at all times for helicopters.
 - Passengers should be briefed not to invert the seat-belt buckle (clasp opening device against the body). Operators may consider marking the outside of the seat-belt clasps to improve ability to check for proper fastening. On configurations with upper torso restraints this may not be necessary if the clasp cannot be inverted.
 - The location and operation of oxygen masks as applicable.
 - Means of communication between the crew and the passengers, and actions in the event of an emergency.
 - Location and operation of doors, emergency exits emergency and life saving equipment such as fire extinguishers, first aid kit(s), life-vests, life-rafts, survival gear, and emergency radio equipment (ELT and EPIRBs).
 - Brace position for emergency landings.
 - Passengers to remain seated until the crew/ground crew open the doors and the captain tells them to disembark.
 - Location and review of passenger briefing card. Information contained in the briefing card should focus on safety equipment and emergency procedures.
 - Proper stowage of any hand carried items.
 - Use of personal electronic devices (laptops, personal organisers, etc.) and guidelines for use.

9.5.4 Additional helicopter briefing requirements

The following additional points should be covered with all helicopter passengers:

- Passengers should not disembark until instructed by the pilot, Helideck Landing Officer (HLO) (or Helideck Attendant), or other designated personnel.
- Never approach a helicopter from the rear. Do not proceed any further aft of the baggage compartment door than is necessary for the retrieval of baggage or freight.
- Always approach and leave the helicopter from the side, within view of the pilot or crewmember.
- Hand carry hats, glasses, and caps to prevent them from being blown away by the main rotor wash.

- Long objects over 1 meter must be carried flat to avoid contacting the main rotor blade.
- Under no circumstances will passengers depart or approach a helicopter on the up-slope (high) side when departing on slope landings.
- Under no circumstance, depart or approach a helicopter during start-up or shutdown.
- Passengers should be provided hearing protection and be instructed on its use.
- Only small, soft items such as a paperback book should be carried inside the passenger cabin of helicopters; hard-cased items that could be missile hazards or loose items that could be blown away such as newspapers should not be carried.

9.5.5 Additional helicopter briefing items for offshore flights

- Passengers who have completed helicopter underwater escape training (HUET) should sit adjacent to exits and, if possible, assist non-HUET trained passengers in the event of a ditching.
- If survival suits are worn (see *paragraph 9.13.2*), passengers should have suits FULLY zipped with hood on (if equipped with integral hood) during take-off and landing over water, when flying below 500 feet over water, and as advised by the Pilot-In-Command.
- Passengers should be advised that in the event of an emergency landing on the water, the helicopter should not be evacuated until the rotor has stopped, unless instructed otherwise by the Pilot in Command.
- Passengers should be told not to inflate life-vests until they are outside the helicopter.
- Passengers should be familiar with and know the location of emergency equipment such as life-rafts, and know how to jettison the emergency exits, pop out windows, and deploy the life-rafts outside the helicopter.
- Passengers should be briefed on the proper use of reference points for orientation during the event of a rollover ditching.
- Carriage of loose articles in the aircraft that could present Foreign Object Damage (FOD) risk or impede egress in the event of ditching (such as newspapers) should be discouraged.
- Passengers should be briefed on “NO STEP” areas.

9.5.6 Additional float plane briefing items

- All floatplane occupants should wear an approved life-vest when operating over water.
- Passengers will be briefed on ditching procedures to include use of emergency exits, use of life-vests, location and use of emergency equipment.

9.6 Video briefing

On long-term operations out of a fixed-base facility, a video briefing is recommended and should be shown to passengers periodically. If the video brief is the only form of briefing, it should be shown prior to each flight.

9.7 Multi-language operations

9.7.1 Translation requirements

It may be necessary to provide a translator for verbal briefing (can be a bilingual passenger) or prepare written or video instructions in the appropriate language (or alternatively subtitles).

9.7.2 Briefing cards

Graphics with international symbols or multi-language briefing cards should be used to convey briefing information to all passengers.

9.8 Passenger marshalling areas

9.8.1 Onshore & offshore

Secure waiting areas should be designated for aircraft passengers.

If a long term dedicated operation, written and graphic material should be displayed in those areas relative to aircraft safety and localised procedures.

The designated area may serve as a viewing room for video safety briefings and provide an area to weigh and manifest all outgoing passengers, baggage and freight on calibrated scales.

For all operations a clearly defined holding area should be designated for both incoming and outgoing passengers and freight.

9.8.2 Offshore

For all offshore operations, a suitable area should be identified to provide a safe passenger waiting area to prevent passenger loitering at the helideck or in the helideck stairwell.

An area should also be provided for changing into/from survival suits if worn, in order to minimise turn around time.

9.9 Passenger training

9.9.1 Helicopter Underwater Escape Training (HUET)

Please refer to *Section 8.1.8* for passenger training requirements of Helicopter Underwater Escape Training.

9.10 Passenger dress requirements

9.10.1 Field, remote & inhospitable areas

Passengers should wear clothing and footwear, appropriate to the environment, regardless of the flight duration.

9.10.2 Hostile environment offshore helicopter or float plane flights

For offshore helicopter or for floatplanes flights over hostile cold water areas (*Appendix 6*) passengers may be required to wear survival suits.

9.10.3 Non-hostile environment offshore helicopter or float plane flights

For offshore helicopter flights or for float plane flights over non-hostile waters (*Appendix 6*), to improve survivability in the event of a ditching, long leg pants, shirts with sleeves, and closed-toed shoes with skid-resistant soles are recommended.

9.11 Passenger & cargo management on helidecks

9.11.1 Clear helideck policy

Onshore helipads and heliports, and offshore helidecks are to be clear of all cargo and passengers that are being off loaded prior to passengers or cargo coming onto helideck/heliport to board the helicopter.

Cargo may only be left on a helideck if formalized procedures are established in writing and followed. These must include procedures for securing the cargo. Aviation advisory personnel should review the procedures prior to implementation.

9.11.2 High winds or adverse weather

In high winds (above 40 knots) or other adverse weather conditions, it may be necessary to have additional passenger and handling procedures in place for passenger movements.

9.11.3 Passenger control

A Helideck Landing Officer (HLO), (sometimes referred to as a Helideck Attendant) should be used to control passenger movement on helidecks. Alternatively one pilot may perform the HLO functions if there are two pilots onboard.

For single-piloted helicopters landing to a helideck with no HLO or Helideck Attendant, the helicopter should be equipped with a loud hailer (external speaker) and the pilot will land in a position that allows positive eye contact with the passengers as they approach the helicopter.

When offloading or loading passengers with the rotors turning, the pilot at the controls shall engage in essential cockpit duties only. Not included in essential cockpit duties are the following: manifesting, weight and balance calculations or customer paperwork. Primary attention will be given to the aircraft controls and identification of hazards and passenger movement in the vicinity of the aircraft.

9.12 Passenger seating

No passenger should occupy any aircraft seat where flight controls are installed, unless the passenger is thoroughly briefed regarding precautions against inadvertent movement of the flight controls, use of crew emergency exits, and specific reference should be made to any switches or controls that may be vulnerable to interference.

Aeroplanes

If readily removable, the flight controls should be removed from pilot stations when occupied by passengers.

Helicopters

No passenger should occupy the front seat of any helicopter, unless the conditions below are met:

- the cyclic and collective sticks have been removed from that seat position; and
- the pedals have either been disconnected or blocked to prevent inadvertent control input; and
- the passenger is thoroughly briefed regarding precautions against inadvertent movement of the flight controls in the pilot's position.

9.13 Survival equipment

9.13.1 General

All aircraft should carry safety equipment and survival kits that, as a minimum, comply with local civil aviation authority or regulation.

When determined necessary by the Aviation Safety Case or otherwise considered necessary, the OGP Member should request additional survival equipment subject to the operating environment and appropriate for the geographical location and climatic conditions; for example, offshore, arctic, jungle or desert.

The capacity of each survival kit should be proportionate to the number of persons carried in the aircraft.

9.13.2 Over-water flights

Over-water operations require special considerations for safety and survival equipment such as life-jackets, immersion suits and emergency rafts.

9.13.3 Decision to use exposure suits

Immersion suits certified for use by the regulatory authority should be provided to crews and passengers for helicopter overwater operations in cold water hostile environments.

In the event that local regulatory controls do not address the issue of wearing exposure suits, all necessary details and requirements should be stipulated by the OGP Member.

These requirements should be reviewed and a decision made prior to commencement of operations.

Several studies and regulatory documents providing information on estimated survival time based on water temperatures versus survival time in varying kinds of dress can be used as background material for making decisions on use of survival suits. OGP Members should be able to access these documents through their respective Aviation Advisors.

9.13.4 Personal locator beacons

Where Search & Rescue services are not readily available, companies may wish to consider the provision of Personal Locator Beacons (PLBs) to passengers. Ideally PLBs should be both 121.5 MHz and 406 MHz capable, so that the signal may be detected by the global SAR satellite system. Companies will need to confirm that the countries of operation are members of the SATSAR system.

9.13.5 Life-jackets

On over water flights all aircrew and passengers will be provided with inflatable life-jackets approved for aircraft use. They will have a survivor locator light and each life-jacket must be stowed in a position easily accessible from the seat or berth of the person for whose use it is provided.

For offshore helicopter flights, these jackets will be fitted with constant wear covers, and will be worn at all times unless exposure suits are equipped with integral vests.

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Section 10 Contents

10	Aircraft equipment standards	73
10.1	Introduction & equipment fit tables	73
10.2	Minimum aircraft equipment - general	73
10.2.1	General description	73
10.2.2	Emergency Locator Transmitters (ELTs)	73
10.2.3	Underwater location beacons	73
10.2.4	Cockpit Voice Recorder (CVR)	73
10.2.5	Flight Data Recorder (FDR)	74
10.2.6	High Intensity Strobe Lights (HSILs)	74
10.2.7	Ground Proximity Warning Systems (GPWS)	74
10.2.8	Airborne Collision Avoidance System (ACAS)	74
10.2.9	Flight data analysis	74
10.2.10	Survival kit	75
10.2.11	Hand-held microphones	75
10.2.12	Cargo & cargo restraint system	75
10.2.13	Materials used in upholstery & internal trim	75
10.2.14	First-Aid kits	75
10.3	Helicopter equipment	75
10.3.1	Health & Usage Monitoring System (HUMS) & Vibration Health Monitoring (VHM) system guidelines	75
10.3.2	Life-rafts	76
10.3.3	Helicopter flotation gear	77
10.3.4	Cabin push-out windows, emergency lighting & seating layout	77
10.4	Fixed-wing equipment	77

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10 Aircraft equipment standards

10.1 Introduction & equipment fit tables

The equipment specification of all aircraft that are offered for use needs to be examined in detail to ensure that sufficient equipment is available for the tasks on which the aircraft will be used. This equipment is normally specified in the technical specification in the Invitations to Tender and subsequently, in the contract. The matrices for helicopters and fixed-wing aircraft are at *Appendix 7*. In this section information will be provided to help in addressing what equipment should be on board contract aircraft.

Note 1: This listed equipment may in some cases be unserviceable and deferred (if allowed in approved Minimum Equipment Lists (MEL)). In these cases it should be determined what impact that will have on contracted operations and a limit for being out of service set if authorized by the MEL.

Note 2: Where ad-hoc aircraft are brought onto an operation for short term use, e.g. to replace temporarily unserviceable contract aircraft or to meet short term surge requirements, they should as far as possible meet the long-term contract aircraft equipment requirements unless otherwise authorised by OGP Member Company's Aviation Advisor.

When several aircraft of the same type are contracted, the cockpit layouts should be standardised wherever practically possible.

10.2 Minimum aircraft equipment – general

10.2.1 General description

Whilst regulatory authorities will not always require the carriage of the items of equipment described in the following sections in all aircraft, the requirements contained within this guide should be applied to aircraft engaged on service contracts to OGP Member Companies as detailed in *Appendix 7*.

10.2.2 Emergency Locator Transmitters (ELTs)

ELTs are to be carried on all aircraft, and in some areas, such as offshore UK, an automatic deployment capability (ADELT) is mandatory. Ideally, such ELTs should be located in an area where they can easily be deployed or alternatively best protected in the case of an accident, e.g. dinghy packs and crew life-jackets.

If automatically deployed, features should include crash switches, immersion switches, and the unit should be buoyant. If portable, they should have integral and self-deployable aerials.

With their worldwide coverage and enhanced features ELTs with a satellite (406 MHz) signal transmission is recommended. See also *paragraph 12.4.2*.

10.2.3 Underwater location beacons

An example of the type of equipment commonly used by western operators is the Dukane (DK 100) beacon. With a six-year service life, the DK 100 once activated will “transmit” for a minimum period of 28 days. It is a requirement for the aircraft operator to have immediate access to receiving equipment and that this equipment may be quickly dispatched to the accident site. See also *paragraph 12.4.2*.

10.2.4 Cockpit Voice Recorder (CVR)

In countries where airworthiness authorities do not establish a requirement for CVRs in low capacity aeroplanes and helicopters, OGP considers that fitment is highly desirable in those aircraft for which proven systems are available. In the case of dedicated contract aircraft type certificated with a seating capacity of 10 seats or more, the OGP recommends installation if not mandated by the local CAA. Ideally, the CVR should have a 2 hour recording time.

Where possible, an underwater location device should be associated with the CVR as detailed in *paragraph 10.2.3*.

10.2.5 Flight Data Recorder (FDR)

In countries where airworthiness authorities do not establish a requirement for fitment of an FDR, OGP considers that fitment is highly desirable in those aircraft for which proven systems are available.

10.2.6 High Intensity Strobe Lights (HISLs)

Conspicuity of aircraft is significantly increased by the fitment and use of HISLs or equivalent forward recognition/pulse lights. These, generally white strobe lights, as distinct from the routinely fitted red anti-collision beacons, provide particular benefit when operations take place under VFR in congested airspace. They are an added benefit when lookout has to be shared between general surveillance and a particular task. Because of their intensity, restrictions should be placed on their use on the ground.

It would not be practical to insist on this equipment in remote areas, where visibility is almost unlimited and traffic is of low density. However, in congested airspace they are considered essential particularly at the lower levels where vertical separation and visibility is often reduced and radar surveillance may be poor or non-existent.

Accordingly, OGP recommends that HISLs should be fitted for flights within Europe and where low level VFR flying takes place in and around built-up areas or on other high collision risk operations such as aerial pipeline patrols. Areas of uncertainty should be referred to OGP Members' aviation advisors.

10.2.7 Ground Proximity Warning Systems (GPWS)

Controlled flight into terrain (CFIT) is responsible for a large proportion of accidents and OGP considers the fitment of GPWS or equivalent Terrain Awareness Warning System (TAWS) as highly desirable in those aircraft for which proven systems are available. It is essential that clear instructions and procedural guidance for crews on their response to the various GPWS alerts be laid down in Operations Manuals and/or Standing Operating Procedures. EGPWS is an enhanced version of GPWS.

10.2.8 Airborne Collision Avoidance System (ACAS)

Airborne collision avoidance systems (ACAS) are commonly referred to as TCAS or Traffic Alert & Collision Avoidance Systems.

An airborne collision avoidance system should be considered for fitment to all new long-term OGP Member Company aircraft contracts, particularly in high density areas or where radar coverage is limited.

10.2.9 Flight data analysis

Flight data analysis is variously known as Operational Flight Data Monitoring (OFDM), in its application to fixed-wing aircraft, and Helicopter Operational Monitoring Programme (HOMP) in rotary wing application.

The system enables air operators to identify, quantify, assess and address operational risks. It is compatible with a pro-active Safety Management System where it can provide assurance that safety levels are being met or improved.

OGP has supported the development of the HOMP and recommends these system be considered on all new aircraft long-term contracts, where available for the aircraft model.

10.2.10 Survival kit

A survival kit, suitable for the area of operation, is to be carried on flights, which are planned to over fly hostile terrain, including offshore operations. See *Appendix 7*.

10.2.11 Hand-held microphones

In some regions, intercom systems are rarely found in aeroplanes, and the use of hand-held microphones is widespread. This practice is not recommended even in the case of two-crew aircraft and the use of headsets is preferred. All single-pilot operated aircraft should be equipped with headsets and control column mounted transmission switches.

10.2.12 Cargo & cargo restraint system

Whenever possible, cargo should be carried in a compartment approved for carriage of cargo, and where available for the aircraft model equipped with an independent fire and smoke monitoring and extinguishing system. Apart from the considerations for the handling of dangerous goods it is essential that all cargo be securely tied down in the aircraft. Each item of freight must be weighed and manifested accordingly, to enable the pilot to calculate performance requirements correctly and thus ensure adequate safety margins in the event of engine or other system failure.

Only authorised aviation personnel should secure and remove cargo and baggage. This is particularly important during times when the aeroplane or helicopter has engines/propellers/rotors running.

10.2.13 Materials used in upholstery & internal trim

Most countries require that prior to installation of interior a Burn Certificate must be provided with the material to be installed. Prior to contract this certificate or an officially recognized equivalent should be presented. This is especially important for older refurbished aircraft. It is therefore important that aircraft offered to OGP Member Companies are not modified merely to give an attractive appearance, but embody only approved fire-blocking materials in their construction.

10.2.14 First-Aid kits

Suitable and comprehensive First-Aid kits should be carried on all aircraft. See *Appendix 7*.

10.3 Helicopter equipment

10.3.1 Health & Usage Monitoring System (HUMS) & Vibration Health Monitoring (VHM) system guidelines

HUMS

Typically a HUMS incorporates basic vibration analysis using a VHM system which includes the equipment, techniques and/or procedures by which incipient failure or degradation of the helicopter rotor and rotor drive system components can be determined and is coupled with the aircraft flight data recorder for monitoring of other aircraft systems including propulsion.

VHM

A VHM system will normally monitor vibration data of the following, using a combination of spectrum analysis and advanced diagnostic (proprietary signal processing) techniques. This will also include a diagnostic capability for every component in the drive train:

- Engine and engine to main gearbox input drive shafts.
- Main gearbox shafts, gears and bearings.
- Accessory gears, shafts and bearings.
- Tail rotor drive shafts and hanger bearings.
- Intermediate and tail gearbox gears, shafts and bearings.
- Main and tail rotor track and balance.

Helicopter fit

The OGP recommended equipment fit for offshore helicopters detailed in *Appendix 7* includes the availability of Vibration Health Monitoring (VHM) equipment and Engine Usage Monitoring Systems (UMS), if approved by the regulatory authority for the helicopter type.

Helicopters with 10 or More Seats

For helicopters type certificated for 10 seats or more it is recommended that a HUMS or, as minimum, VHM coupled with an engine UMS be fitted.

Helicopters with 9 or Less Seats

For helicopters type certificated for 9 seats or less it is recommended that a basic VHM of the drive line/turning components and an engine UMS be fitted.

Installation approval

Certification/approval of the fitment of HUMS/VHM by the local regulatory authority on a “no hazard/no credit” basis is acceptable.

Technical requirements

Operators of aircraft with vibration monitoring systems should establish a written list (MEL) of HUMS/VHM system components and identify those that are allowed to be inoperative and the time period, expressed in airframe hours.

In addition, where helicopters are operated in Performance Class 2, with exposure time during take-off and landing, or in Performance Class 3, it is recommended that the VHM should be augmented by a propulsion system Usage Monitoring System, where this is not already included in HUMS. Maintenance logs should provide details on inoperative vibration system components.

Daily assessments of HUMS/VHM and UMS downloads for warnings and trend analysis of the recorded data should be completed.

Inspection programmes should be written to require verification that vibration parameters are within tolerance at the beginning of a flying period, or appropriate maintenance actions are taken for exceedances before flight.

References

A basic reference for HUMS is CAP 693 and FAA Advisory Circular AC 29-2C, Chg 1, Chap 3 AC 29 MG15, and for UMS is Appendix 1 to JAR Ops 3.517(a) - para (b) (5).

10.3.2 Life-rafts

All life-rafts should be equipped with an emergency radio/beacon.

All life-rafts should be equipped with an approved offshore survival kit and be attached to the raft with a lanyard.

Exception: Single piloted helicopter survival kits may be located separately in the front cabin area to provide easy access by the pilot or front seat passenger.

Helicopters having a seat capacity for 10 or more passengers should have two life-rafts; each should be certified for 50% overload to enable any one life-raft to be used by all occupants.

Helicopters having a seat capacity for 9 or less passengers should have a minimum of one life-raft certified to carry all occupants.

Where available by helicopter model, externally mounted life-rafts are preferred over those internally mounted. The OGP recommends a helicopter installation whereby:

- Primary deployment is by single action from the normal crew positions;
- Secondary deployment is from the passenger compartment with the cabin in an upright attitude; and

- Deployment is possible from outside the helicopter when in either an upright or inverted attitude. In this case the life-raft is mounted externally on the helicopter. This is the preferred installation on long-term contracts.

10.3.3 Helicopter flotation gear

If helicopters are to be operated over the water, they should be capable of alighting on the surface of the water, either by virtue of inherent design features, e.g. boat hull, fixed floats, etc. or with the aid of flotation gear. It is a requirement that all offshore helicopters be fitted with flotation gear and it is recommended that this be automatically inflated on contact with water. For all new long-term contracts, automatically operated flotation gear is mandatory where a suitable modification is available for the helicopter type on contract.

10.3.4 Cabin push-out windows, emergency lighting & seating layout

As a result of a series of underwater egress trials conducted on representative offshore helicopters, OGP has identified additional requirements on all offshore helicopters:

- All apertures in passenger compartments suitable for the purpose of underwater escape shall be able to be opened in such an emergency. Push-out rubber mounted windows are the preferred standard where available for the aircraft model.
- Emergency exit marking systems (*ie* EXIS or HEEL path lighting) should be available on night flights and be automatically activated following the flooding of the cabin.
- Seat rows should be aligned with windows.

10.4 Fixed-wing equipment

See *Appendix 7*.

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Section II Contents

11	Airbases	81
11.1	Definition.....	81
11.2	Airbase design reference.....	81
11.3	Airbase design reviews.....	81
11.4	Variances.....	81
11.5	Weather monitoring systems	81
11.5.1	Wind indication systems.....	81
11.5.2	Weather observation requirements for VFR operations to manned facilities	81
11.5.3	Weather observation requirements for IFR/Night operations	82
11.5.4	Weather equipment maintenance	82
11.6	Airbase rescue equipment.....	82
11.7	Airbase fire protection & equipment	82
11.8	Non-directional beacons (NDB)	83
11.9	Helicopters & helidecks	83
11.9.1	General	83
11.9.2	Size - definition.....	83
11.9.3	Helidecks	84
11.9.4	Heliports	85
11.10	Airports & airstrips.....	85
11.10.1	Airstrips/remote runways.....	85

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II Airbases

II.1 Definition

An Airbase is an airport or airstrip (unpaved) used for aeroplanes and or helicopters, and heliport (onshore) or helideck (offshore) only for use by helicopters.

II.2 Airbase design reference

ICAO Annex 14, *Aerodromes, Volumes I & II*, should be used as the basic reference documents in all new airbase design considerations, construction or major rework of existing airbases where no local guidance is available.

Additional details are listed in the helideck, heliport and airstrip sections below.

II.3 Airbase design reviews

In all cases a qualified OGP Member's Aviation Advisor should participate in all preliminary and critical design reviews for company airbase construction or modification.

The airbase should in the design phase be planned to provide a clear area for a safe approach/ departure path into prevailing winds.

All airbases and supporting facilities (fuel systems, hangars, fire suppression, passenger handling areas, etc.) should have periodic (minimum of annual) safety, operational and quality assurance reviews by appropriate regulatory authority or a qualified Aviation Advisor, and by the operator, and records of such reviews and any remedial actions taken should be maintained. UK CAA CAP437 contains fuel system inspection guidelines.

II.4 Variances

Any variation to the above reference should be forwarded to OGP Member's Aviation Advisor for consideration as early as possible.

II.5 Weather monitoring systems

II.5.1 Wind indication systems

- 1) All airbases will be equipped with a wind indicating system that is clearly visible to the pilot and provides an indication of wind speed and direction.
- 2) Windsock systems are preferred over metal flag systems.
- 3) At any airbase where night operations may be conducted, the wind indicating system must be illuminated.
- 4) Helidecks shall be equipped with at least one windsock positioned so as to be visible for take-off and landings and shall be located outside the obstacle free zone.

II.5.2 Weather observation requirements for VFR operations to manned facilities

- 1) In addition to the wind indicating systems above, airports, airstrips and helidecks should be equipped with a weather station with the following:
 - a) a temperature gauge; and
 - b) a barometric gauge; and
 - c) a means of providing cloud ceiling height and visibility (either with a trained weather observer or Automated Weather Observation System (AWOS); and

- d) a means of relaying this information to the helicopter pilot.
- 2) Helideck weather stations should also have the following in addition to the items noted above:
 - a) ability to report sea state which may be estimated visually or by using wave measurement equipment; and
 - b) offshore floating facilities must also have a means of measuring helideck pitch, roll and heave.
- 3) For placement of weather observation stations, the following guidance from the FAA may be used where none is provided locally.
 - a) one weather station for each airbase area encompassing an area of 10 miles in radius or less; or
 - b) multiple weather stations for larger areas (two AWOS or one AWOS and one other weather station with a trained weather observer may cover field areas covering up to 60 x 80 miles).
 - c) In any case, for AWOS only stations, there should be a backup capability of a trained observer for AWOS only systems.

11.5.3 Weather observation requirements for IFR/Night operations

For areas where IFR or night operations are to be conducted, the weather station must provide all the items in A-C above and in addition the following will be provided:

- 1) the weather observer should be certified via training in an approved weather observation course; and
- 2) consideration should be given to providing AWOS with certified weather capabilities; and
- 3) dew point should also be provided.

11.5.4 Weather equipment maintenance

Equipment should be calibrated annually or as per manufacturer recommendations. Equipment should be maintained in accordance with manufacturer's instructions.

11.6 Airbase rescue equipment

The provision of airbase rescue equipment, if required by local authority, should be provided in a crash box protecting all components from the elements.

Inspection schedules of the equipment should be formulated and periodic inspections documented.

Examples of the required equipment can be found in CAP 437 for helidecks, and ICAO Annex 14 for airports, airstrips, heliports and helidecks.

11.7 Airbase fire protection & equipment

All airbases should have a means of extinguishing a fire that is commensurate with the potential risk.

Inspection schedules of the equipment should be formulated in accordance with the manufacturer's recommendations or local regulations. Periodic inspections should be documented.

Examples of the required equipment can be found in CAP 437 for helidecks; ICAO Annex 14 for airports, airstrips, heliports and helidecks; and The National Fire Protection Association *NFPA 418 Standard for Heliports*.

The following guidelines are presented as a minimum and are in accord with NFPA 418. Local regulations may differ. Airbases should comply with local regulatory requirements, but in absence of regulatory requirements, the following criteria apply:

- a) Flammable liquid storage tanks should be located at least 16 meters from the takeoff and landing area.
- b) Landing areas should be sloped to drain flammables and liquids away from passenger access and egress points.
- c) No smoking is allowed on airbases, other than in designated locations.
- d) Portable fire extinguishers may be used on unmanned airbases or areas when water is not available.
- e) At least one portable fire extinguisher as specified in the following table should be provided for each landing area, parking area, and fuel storage area, and the equipment should be tagged with the last inspection date.

Minimum Ratings of Portable Fire Extinguishers for Heliports:

Category	Helicopter overall length, including both rotors	Minimum rating
H-1	Up to but not including 15.2 meters (50 feet)	4-A:80-B
H-2	From 15.2 meters up to, but not including 24.4 meters (50 - 80 feet)	10-A:120-B

- f) Water/Foam Systems: For long term use/manned facilities a Water/Foam system is desirable that will provide fire protection to the landing/parking area. Industry tests indicate that 1% foam induction systems have frequent failures of finished foam concentrate levels, and 3% foam induction systems are preferred for new build or major rework.
 - These systems should be tested in accordance with NFPA 11 or British Standard 5306 or local national equivalent.
 - Tests should be completed on an annual basis with samples taken from the foam concentrate, produced (after nozzle finished) foam, and water.
 - Copies of testing results will be maintained for review.

II.8 Non-directional beacons (NDB)

NDBs should have a periodic maintenance programme, which includes annual calibration for proper output based on the specific Manufacturer's published procedures.

All NDBs, whether onshore or offshore, should have aeronautical navigation frequencies that have been provided by the specific country of operations CAA or authorized communications agency. Frequencies provided from other sources are not recommended for air navigation purposes.

II.9 Helicopters & helidecks

II.9.1 General

ICAO Annex 14, Volume II, *Heliports* should be used in all design considerations, construction or major rework of existing heliports or offshore helidecks, if no local regulatory guidance exists.

II.9.2 Size – definition

As a minimum any heliport or helideck should be sufficient in size to accommodate the largest helicopter using the helideck or heliport for single helicopter operations.

The 'D' value, where 'D' is the largest overall dimension of the helicopter with the rotors turning, will define the maximum size of helicopter able to use the helideck.

The "D" dimension will normally be measured from the most forward position of the tip path plane of the main rotor to the most rearward position of the tip path plane of the tail rotor.

11.9.3 Helidecks

Design references

- 1) All new helidecks should conform to the standards of ICAO *Aerodromes* Annex 14, Vol II, if no local regulatory guidance exists, and should be designed to accommodate the largest helicopter anticipated for use during the life of the structure. For practical implementation guidelines and practices CAP 437, *Offshore Helicopter Landing Areas* and the ICAO Heliport Manual should be used.
- 2) Criteria for mobile offshore drilling unit (MODU) helidecks are contained in the International Maritime Organization's (IMO) Code for the Construction and Equipment of Mobile Offshore Drilling Units. These criteria may be applied to other mobile offshore units.
- 3) Shipboard helidecks such as tankers and seismic vessels should conform to the International Chamber of Shipping's (ICS) *Guide to Helicopter/Ship Operations*.

Size

- 1) For all new-build helidecks
 - a) New build helidecks shall conform to the minimum size recommended in ICAO Annex 14, unless the local guidance provides for variances.
- 1) Helidecks mounted on the bow of FPSOs may require larger than normal diameters, up to 1.5 D (D = overall length of the helicopter with rotors turning), due to pitch, roll, and heave considerations. Advice from the OGP Member's Aviation Advisor should be sought before completing design on FPSO helidecks.

Second helicopter operations to obstructed helidecks

Include in local helideck procedures and/or Operator's Operations Manual procedures to be followed when landing a second helicopter on a helideck that is normally only approved for one helicopter (first helicopter has a maintenance fault, etc.). Items to be considered include the following:

- a) Determine if alternate means, vessel, etc. can fulfil requirements.
- b) Operations must be daylight only and must be allowed by the Operator's Operations Manual.
- c) Use smaller helicopter, if possible to fulfil requirements.
- d) Minimum obstruction clearance during landing or take-off must not be less than the greater of $\frac{1}{3}$ rd rotor diameter or 4 meters. Any such obstructions must be located within the area swept by the 8 o'clock forward through to the 4 o'clock position of the landing helicopter as viewed from the flight deck.
- e) The helicopter Captain has the final decision on whether or not to land on the obstructed deck.
- f) Before any flight takes place, the Operator will request confirmation from the installation that the helideck is structurally capable of supporting the weights of both the incoming helicopter and the helicopter or other obstruction on the helideck.
- g) Helicopter Operator and offshore manager shall discuss risks involved in the operation and reach agreement that the operation may be conducted safely when the applicable risk mitigation measures have been applied.

Operational hazard considerations

A number of hazards can exist at offshore facilities and the local helideck procedures manual or the Operator's Operations Manual should have written operational procedures for closing helidecks and have hazard warning systems for the hazards noted below. OGP Member Aviation Advisors can provide sample procedures if desired.

- a) Crane – helicopter operational procedures.
- b) Helicopter/tanker operation.
- c) Helideck/heliport operational hazard warning(s)/procedure(s).

- d) Perforating operations.
- e) Gas venting.
- f) Hydrogen sulphide gas (if applicable for the area).

Helideck Local Procedures Manual

OGP Members' operations with helidecks should have, for pilot use, a Local Procedures Manual detailing operational procedures, hazards, etc. for each helideck. These Manuals should include as a minimum the following: overhead and side views of the helideck, size/weight capability, markings, lighting (if installed), communications, weather capabilities, obstacles, turbulence issues, hazards, and any specific operational procedures. These often take the form of "approach" plates and, lacking other references, JAR Ops 3.220 with AMC 2 can be used.

HLO & HDA standards

The Oil & Gas UK (formerly UKOOA) publication *Guidelines for the Management of Offshore Helideck Operations* is a good source when considering requirements for management and operation of helidecks. This includes manning, competence and training of helideck personnel. Further guidance is available in the following documents:

- a) UK CAA Publication - CAP 437
- b) Offshore Petroleum Industry Training Organisation (OPITO) Training Manuals and Courses
- c) Helicopter Safety Advisory Conference - Recommended Practice.

11.9.4 Heliports

Design reference

ICAO Annex 14, Volume II, *Heliports*, should be used in all design considerations, construction or major rework of existing heliports, where no other local guidance exists.

Rejected takeoff area

- a) All heliports should have a rejected takeoff area or "Flyway" to allow for helicopter landing in the event of an aborted takeoff or return due to malfunction.
- b) The length of a flyway will vary by model helicopter, its gross takeoff weight, and the prevailing density altitude. These performance parameters are published in the applicable helicopter flight manual.
- c) Where possible, the rejected takeoff area should be paved or compacted surface that will sustain the weight of the helicopter in the event of a run on landing.

11.10 Airports & airstrips

11.10.1 Airstrips/remote runways

Remote runways/airstrips will be long enough to allow the aircraft to reach take-off decision speed (V1), abort, and remain on the runway.

Length, allowable slope of the airstrip, and other design criteria will be determined using aircraft performance data published by the aircraft manufacturer. If no performance data exists for the aircraft given the temperature and altitude of the airstrip, then a different aircraft model with suitable performance criteria should be selected.

Other dimensional and obstacle clearance dimensions should be determined using ICAO Annex 14, if no other local guidance exists.

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Section 12 Contents

12	Emergency response planning	89
12.1	Introduction	89
12.2	Aircraft in the emergency response role.....	89
12.2.1	Operator responsibilities	89
12.2.2	OGP Member responsibilities	89
12.2.3	Planning considerations	89
12.3	Scenario-based drills.....	89
12.3.1	General	89
12.3.2	Planning & conducting emergency response drills.....	90
12.4	Helicopters used for medical evacuations	90
12.4.1	General	90
12.4.2	Protocols for Medevac requests.....	90
12.4.3	Pilot responsibilities	91
12.4.4	Medical attendants	91
12.4.5	Training.....	91
12.4.5.1	Pilots.....	91
12.4.5.2	Medical attendants	92
12.4.6	Aircraft medical configuration - general.....	92
12.4.6.1	Patient restraint	93
12.4.6.2	Oxygen.....	93
12.4.6.3	IV fluids	93
12.4.6.4	Cardiac monitoring & defibrillating equipment	94
12.4.6.5	Lighting & electrical.....	94
12.4.6.6	Additional considerations.....	94
12.4.6.7	Seat-belts & shoulder harnesses	94
12.4.6.8	Hot loading & unloading (rotors turning).....	94
12.4.6.9	Hoisting.....	94
12.5	Search & Rescue (SAR) services & equipment	94
12.5.1	General	94
12.5.2	SAR supportive equipment.....	95
12.6	Survival equipment	96
12.6.1	Survival kits.....	96
12.6.2	Life-rafts	96
12.6.3	Life-jackets.....	97
12.6.4	Exposure suits for offshore helicopter & float plane flights	98
12.6.5	Linked raft rescue system	99
12.7	Emergency flights	100
12.7.1	Planning.....	100
12.7.2	Contingency aviation operators.....	100
12.8	Overdue aircraft.....	100
12.9	Accident, incident, hazard & near miss reporting.....	100

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12 Emergency response planning

12.1 Introduction

Each OGP Member's site, operation or asset using aviation services should make provisions for aviation emergencies in their Emergency Response Plans (ERP), and communicate these plans to all relevant personnel. The ERP should be developed in co-operation with the aircraft operator providing services to ensure that in the event of an aviation emergency any adverse outcome is minimised.

12.2 Aircraft in the emergency response role

12.2.1 Operator responsibilities

Where aircraft are designated for emergency response standby, the aircraft and crew should remain within the prescribed area of operations to provide a response time deemed satisfactory by the OGP Member.

Any change in the state of readiness of the aircraft or supporting emergency response equipment should be reported to relevant OGP Member personnel immediately.

12.2.2 OGP Member responsibilities

The specific role and duties of all aircraft utilised in the event of an emergency should be documented in the OGP Member's site or operation specific ERP.

Particular attention should be made in clearly outlining communication procedures between aviation and the marine vessels and/or ground resources involved.

ERPs should be regularly reviewed and modified when affected by regulatory or operational requirement changes.

12.2.3 Planning considerations

Search & Rescue capabilities by both aircraft and vessels are significantly limited at night, and should be taken into account if late afternoon or night flights are undertaken.

The OGP Member's Aviation Advisor should be contacted regarding guidelines and suitable aircraft for night Search & Rescue flights. *Appendix 12* also contains further information on the use of helicopters in a secondary Search & Rescue role.

12.3 Scenario based drills

12.3.1 General

Scenario-based emergency drills with specific objectives should be conducted within 30 days of a new project start and annually, as a minimum, for ongoing operations.

The drill should involve the aviation resource and include pilots, support staff, aircraft, and be integrated with marine or land surface resources.

Exercises involving aviation aspects of the ERP should test field and offshore communications capabilities where applicable, as well as aviation co-ordination with ground and marine resources.

The types of exercises that can be planned (but not be limited to) include the following:

- a) Fire – involving an aircraft, and/or heliport.
- b) Missing, or overdue aircraft.
- c) An aircraft forced landing, onshore and offshore.
- d) Search & Rescue operation, use of emergency equipment to include Linked Raft Rescue System.

- e) Helicopter winching exercises.
- f) Oil and fuel spill – air support and spray buckets.
- g) Medical evacuation, including stretcher drills.

12.3.2 Planning & conducting emergency response drills

The planning for the safe conduct of drills should be documented and discussed with the aviation participants prior to the conduct of any exercise.

Any safety restraints as a result of night operations or restrictions due to weather should be documented in this plan.

Active participation from the aircraft operator is expected in the determination of the weather minimums for the conduct of the drills.

Areas that should be taken into account include visibility, wind speed, temperature limits and sea states.

To validate the integrity of the specific scenario drill, the exercises should be varied with regard to the time of day, and the day of the week. When applicable to the activities of the OGP Member's site, asset or operation, this should include after-hours operations and on weekends.

At the conclusion of each exercise the drill should be critically assessed and all personnel fully debriefed. All subsequent recommendations should be documented for follow-up action.

12.4 Helicopters used for medical evacuations

12.4.1 General

Medical evacuation (medevac) flights conducted as part of a standard onshore or offshore contract may be considered an extension of normal flying activities. However they carry a number of risks which are not part of the day-to-day operation.

Such risks may be:

- Pressure on the aircrew to complete the task to save life and limb. Such pressure can arise within the crew themselves or be applied by external parties.
- Inadequate preparation of the aircraft in that the patient is not properly restrained and the medical equipment is not secured.
- The medical crew is not properly prepared for flying.
- Helicopter improperly equipped for type of flight to be undertaken: night, mountain, over water.
- Real or perceived pressure to complete the flight as necessary to 'save' the injured person(s).

In order to mitigate these risks the following guidelines are provided. In addition, aircraft operators expected to conduct medevac flights should proactively develop a mission risk assessment form/Job Safety Analysis (JSA) or equivalent for operations in their specific area, which should be completed by flight crews and the appropriate management before any medevac flights.

12.4.2 Protocols for medevac requests

A clear set of protocols should be established for requesting an aircraft for a medevac flight, particularly at night. Only a limited number of responsible people should be involved and they should be aware of the risks associated with night flights. They should also be aware of their company's guidelines, particularly for helicopters offshore. Approval for the flight should be a team decision involving the medic at the facility requesting the medevac, a doctor familiar with medevacs by air (if the medic is not a doctor), the Facility Manager, the Duty Manager, and the aircraft operator's Operations Manager or Chief Pilot as well as the flight crew.

Clear lines of communication should be established to ensure that time is not wasted in approving the flight. Flights by day are not likely to incur additional risk, if the flights are called to known operational areas, but requests for flights to previously unknown areas will involve additional levels of risk and as such should be treated with appropriate caution.

All requests for a night flight should be treated with caution. Consideration should be given to providing sufficient medical support at the facility in order to permit patient stabilization throughout night hours in order to reduce the requirement for night medevacs. It is recommended that the criteria for a medevac flight at night should be not lower than 'loss of life or limb'.

12.4.3 Pilot responsibilities

Pilots are primarily responsible for the safe and efficient conduct of the flight and this must be their primary focus.

Response to Pressure

Pilots should be encouraged to suppress any self-induced feelings that the medevac must be completed at all costs. They should be given the support necessary to refuse to take risks when asked to do so by other parties who do not understand the flight situation and whose focus is saving the patient. Pilot training should include this aspect (see 12.4.5).

12.4.4 Medical attendants

Medical attendants are responsible for the care of the patient. They are subordinate to the pilot in all matters concerning the conduct of the flight. Whilst their assistance with the conduct of the mission is undoubtedly of value, advice or comment shall be carefully considered before speaking to the pilots. It is vital that the medical attendants do not allow their concern for the patient to translate into pressure on the aircrew to take actions that might jeopardise the safety of the flight. A delicate balance can exist between medical concerns and flight safety.

- The number of medical attendants required to attend to a single patient is preferred to be two, but one is the minimum. Two offer better patient care and more hands to assist in patient evacuation in the event of a forced landing/ditching.
- Medical staff used to support medevac flights should undergo initial and recurrent flight training on a periodic basis (see 12.4.5). If medical personnel who have had no chance to undergo flight safety training are required to fly, then they should be accompanied by a person trained in aviation safety procedures to ensure operations are conducted safely. It should be noted that at times when an aircraft crew member is on board to provide logistical assistance in the cabin area during a medevac flight they are not responsible for providing medical assistance unless they are holding suitable certification/qualification.
- Unlike a dedicated medical service, the medical attendants for an ad hoc medevac are considered passengers and not crew members. Whenever possible, only a small number of suitably qualified medical staff should be allocated to medevac duties. This reduces the amount of training required, creates a better chance that an aviation trained medic/doctor is on the flight and reduces the despatch time due to a shorter briefing period. Medical staff will also be more familiar with the treatment of patients in the aircraft environment if the number of qualified persons is kept to a minimum.

12.4.5 Training

12.4.5.1 Pilots

Pilots should undergo an initial and annual refresher course which is designed to increase their awareness of the differences between normal and medevac flights. A typical syllabus would contain the following subjects:

- i) Crew Resource Management (CRM) or Aeronautical Decision Making (ADM) if single pilot, including a review of crew resistance to outside/internally generated pressure to complete the task.

Note: this training should be inclusive of any medical attendant staff.

- ii) Aircraft preparation for medevac.
- iii) Medical crew briefing.
- iv) Patient loading and unloading.
- v) Patient evacuation in the event of ditching or forced landing.
- vi) Potential flight profile and conditions impacting on patients (e.g. altitude and turbulence).
- vii) Helicopter Underwater Escape Training (HUET) when flights over water could be necessary.
- viii) Night vision goggles if used.

12.4.5.2 Medical Attendants

The medical personnel who are assigned to conduct medevacs should be kept to a small dedicated number who are thoroughly trained. They should undergo initial and annual refresher training along the lines of that undertaken by cabin crew (e.g., Safety and Emergency Procedures Training – SEPT). For offshore operations they must have HUET training. A typical syllabus would contain the following subjects:

- i) General knowledge:
 - The aircraft to be used; their capacity, performance, range, capabilities etc.
 - CRM training (see 12.4.5.1 above), including responsibilities of the pilots and medical staff, authority of the pilot, responsibility to notify pilots of potentially hazardous situations or conditions etc.
 - Altitude/turbulence impact on patients.
 - Dress.
- ii) Safety and definitive knowledge:
 - Danger areas.
 - Standard helicopter and fixed-wing safety rules.
 - Location and operation of safety equipment, fire extinguishers, emergency exits, ELT etc.
 - Location and operation of oxygen emergency shut-off valves.
 - Correct stowage of medical equipment.
 - Patient loading and unloading procedures.
 - Hot loading/unloading policy and procedures (see 12.4.6.7).
 - Aircraft emergency procedures as pertaining to medevac flights, securing oxygen, securing loose equipment, seat-belts, forced landing drills, patient evacuation etc.
 - Communications, normal and emergency.
 - Survival instruction, including (as applicable) life-jackets, life-rafts, the contents of packs, operation of flares and aircraft radios.
 - A clear understanding of the day and night flying limitations.
 - HUET, if offshore.
 - Winching/wireman training/responsibilities, if required (see 12.4.6.8).

12.4.6 Aircraft medical configuration - general

The aircraft should carry sufficient medical equipment appropriate to the identified patient problem. All aircraft of the same type should be outfitted in the same manner as far as is possible.

- i) All aircraft modifications shall be subject to the approval by the State of Registration.
- ii) All equipment and supplies must be properly secured to the extent that they will not break free in turbulence or in an accident.
- iii) Medical equipment must be able to function without interfering with the aircraft's avionics or electronics, nor should the avionics or electronics interfere with the functioning of the

medical equipment. Only equipment which is certified by the manufacturer as being fit for aircraft use shall be used. Equipment should be tested in the aircraft prior to use.

- iv) No item in the cabin shall be positioned so as to cause an injury to the occupants.
- v) No item shall be positioned in such a manner that restricts access or egress in an emergency, nor restrict access to emergency equipment.
- vi) Normal access to the cabin shall allow manoeuvring of the patient without compromising patient stability or the functioning of medical equipment.
- vii) All the equipment should be capable of rapid installation and removal.

12.4.6.1 Patient restraint

- i) Patient stretchers should be purpose made for air transport (e.g. Ferno or equivalent basket stretcher).
- ii) It is desirable that the head of the stretcher should be capable of being elevated up to 30° for heart patients.
- iii) Preferably, the stretcher shall be secured by means of hard mounting points rather than straps. It is recommended that if the aircraft configuration allows, a stretcher mount which fixes to the aircraft hard points and has quick release clamps to fix the stretcher itself is used to raise the stretcher off the cabin floor.
- iv) The stretcher and its mounting system must be strong enough to support a 120kg person and sufficiently rigid to withstand the forces incurred during cardio-pulmonary resuscitation.
- v) Stretchers shall be secured in such a manner that they can be rapidly removed from the aircraft in an emergency.
- vi) The pilots, aircraft controls and radios shall be physically protected from any intended or accidental interference by the patient, medical personnel or equipment.
- vii) In order for there to be access and space to ensure the patient's airway can be maintained and that adequate ventilation support can be given from the secured, seat-belted position of a medical attendant, the stretcher should ideally be positioned so that a medical attendant is able to sit behind the head of the patient.
- viii) Patients must be secured to the stretcher with straps complying with the requirements of the State of Registration. A 5-point restraint system is highly desirable to prevent a prone patient from sliding out from under lateral straps in the event of an accident.

12.4.6.2 Oxygen

- i) Gas cylinders are pressurised containers and may be classified as hazardous cargo in certain regulatory jurisdictions. The operator should be authorized to accept such items for shipment by air and have established procedures for flight crew. Any installation for mounting the cylinders must be approved by the State of Registration.
- ii) Portable cylinders must be firmly secured in a mount during flight; a loose pressurised gas cylinder is extremely hazardous. They must be positioned in such a way that no part of the fitment constitutes a hazard to the occupants. Pressure gauges must be visible to the user, and shut-off valves must be readily accessible, as must be any change-over valves.
- iii) Only cylinders that are certified by the manufacturer as being suitable for use at the aircraft's operating pressure altitude should be used. The aircraft operator or the medical provider (whichever is responsible) shall ensure that all oxygen and other gas cylinders are subject to an annual visual and five-yearly hydrostatic inspection by an approved testing facility. Records of this inspection routine should be kept.

12.4.6.3 IV Fluids

- i) IV fluids should preferably be positioned at a higher elevation than the patient and provision should be made for this. An adequate supply of conveniently placed hangars or hooks should be available which are quickly and easily installed and removed. All such

supports must be soft, padded or flush mounted to prevent head trauma to the occupants in the event of a hard landing or emergency. Hangars or hooks for IV fluids shall be designed so as not to accidentally release in the event of turbulence or a hard landing.

- ii) In the unlikely event that glass IV containers are requested, they shall not be used unless required by medical specifications and it is absolutely unavoidable.

12.4.6.4 Cardiac monitoring & defibrillating equipment

The cardiac monitor and defibrillator should be so positioned that the screen can easily be read and the machine is readily accessible.

12.4.6.5 Lighting & electrical

- i) Adequate lighting should be provided in the patient care area during night operations. Portable lighting for use in the event of a failure of the main system should be provided.
- ii) The cockpit shall be screened (using a quick install curtain or alternate means) from lights in the patient care area. If this is not possible then only a red light of low intensity shall be used in the cabin.
- iii) Depending on the length of flight envisaged compared with the battery life of the medical equipment, electrical outlets meeting the requirements of the specialised medical equipment should be provided (28v and 12v DC, and 115v AC). They shall have sufficient capacity to power the complete medical package without compromising the operation of the normal aircraft equipment.

12.4.6.6 Additional considerations

- i) A fire extinguisher should be located so as to be accessible to the medical attendants.
- ii) Some IV fluids, blood and other body fluids are corrosive. Consideration should be given to protecting the aircraft floor if spillage is likely (e.g. major trauma).

12.4.6.7 Seat-belts and shoulder harness

Medical attendants should always wear seat-belts and shoulder harness for take off and landing. Full restraint should be used as much as possible during flight, only being removed when patient care is impossible without doing so.

12.4.6.8 Hot loading & unloading (rotors turning)

Hot loading/unloading of patients is not recommended. It should only be performed:

- i) Under the most dire of emergencies, and then only after full consultation between the pilot and medical attendants.
- ii) If the operation is strictly controlled in accordance with the helicopter operator's procedure.

The helicopter operator should develop a procedure for hot loading/unloading and all personnel involved must be fully trained in that procedure.

12.4.6.9 Hoisting

In some scenarios, medical evacuations may require hoisting injured or sick personnel into the helicopter. In these cases, the guidelines for hoisting operations in the following *Section 12.5 Search & Rescue (SAR) services & equipment* should be followed.

12.5 Search & Rescue (SAR) services & equipment

12.5.1 General

Operators carrying OGP Member personnel should be equipped as necessary with SAR supportive equipment and be backed by an appropriate level of rescue service that can be directed to the operating

area without delay. The Aviation Advisor can assist with determination of which equipment and services may be necessary. Factors to be considered include the following:

- a) Environment of hostile versus non-hostile.
- b) Anticipated survival time of occupants versus anticipated rescue time.
- c) Local agency support.
- d) SAR Support Equipment.

12.5.2 SAR supportive equipment

Automated flight tracking systems

Flight tracking systems that utilise GPS and satellite technology for aircraft flight following may be utilised when appropriate to the environment and operation being conducted.

Emergency Locator Transmitters (ELT), personal beacons/radios, Search & Rescue Transponders (SART), and sonar pingers

- 1) **Recommended ELT.** The use of TSO 126 emergency transmitters which utilise 406 MHz signalling and satellite coverage to pinpoint its location geographically on land or in water, if the aircraft is floating, and identifies the aircraft by tail number is preferred by the OGP. Each transmitter requires registration of the unit's owner and contact details and in the case of fixed aircraft installations the registration includes the aircraft tail number. Points to note with respect to TSO 126 ELTs are:
 - a) The aircraft's country of registration needs to be registered with the COSPASS/SARSAT system before the aircraft can be registered.
 - b) The 406 MHz transmitters are preferred over the older TSO 91 & 91a transmitters, which do not include aircraft identification.
 - c) The 406 MHz ELT, beacons or radios should only be used where countries have registered for the satellite support.
 - d) See also *paragraph 10.2.2* for additional details.
- 2) **Personal locator beacons and emergency radios.** Small hand-held personal emergency beacons are available, and some models offer both voice capability and 406Mhz capability. Voice capable personal emergency radios are preferred over non-voice. The OGP recommends that:
 - a) Pilots for all offshore helicopters, geophysical aircraft, and low flying survey or patrol aircraft carry a personal locator beacon, with voice capability in their flight clothing, vest or constant wear life-jacket.
 - b) Pilots in all other categories, other than those listed above, are also encouraged to carry a personal locator beacon.
 - c) OGP Members with operations in remote areas or involved with offshore operations may consider providing personal locator beacons to passengers for carriage during flight with briefing instructions for use in the event of an emergency.
- 3) **Life-rafts – carriage of emergency beacons.**
 - a) All life-rafts should be equipped with an emergency beacon or radio that is waterproof (non-voice systems are acceptable).
 - b) The raft mounted emergency radios/beacons should be attached to the raft by a lanyard.
- 4) **Offshore helicopters – fitment of sonar pingers and SART.**
 - a) All offshore helicopters should have an underwater acoustic beacon (pinger) that transmits when submerged. See also *paragraph 10.2.3* for additional details.
 - b) If equipped with a Cockpit Voice Recorder (CVR), the pinger should be attached to the CVR.

- c) Portable Search & Rescue Transponders (SART) provide the ability for any aircraft or vessel equipped with radar to 'home' into the beacon, and these devices should be considered for inclusion either in life-raft or helicopter cabin.

Homing receivers

Three types of homing (direction finding) receivers are available to assist in locating missing aircraft or personnel transmitting on emergency frequencies.

- 1) Sonar Pinger homers are used for locating a submerged aircraft transmitting with a sonar pinger.
- 2) ELT and beacon homers are used for locating a downed aircraft on land or floating in water.
- 3) Radars on aircraft or vessels can be used to locate SARTs (see above).

If not available for either water or land in the country of operation, then these homing devices should be added as a contract specification or included in company-owned equipment.

Rescue hoists

The role of rescue hoists for Search & Rescue purposes in emergency response planning (ERP) should be carefully evaluated and a Risk Analysis completed by the OGP Member's Health, Safety & Environment (HSE) staff with the assistance of its Aviation Advisor.

When considering rescue hoisting as a secondary role for helicopters, consideration should be given to the overall ability of the operator to perform competently and to complete periodic training to support the hoisting role given the parameters established in the ERP. Such programmes for over water rescue should include training over open water without visual reference to land.

It may be more practicable to provide a linked life-raft system as noted in *paragraph 12.5.5 and Appendix 12, Section 5* rather than to provide a rescue hoist if the Risk Analysis supports this decision. Nonetheless, both are demanding tasks when conducted over open water and periodic training must be undertaken.

Warm-up clothing

Suitable clothing that rescued personnel can change into as soon as practicable after rescue, such as sweat suits or blankets should be located in a waterproof container with other rescue equipment.

12.6 Survival equipment

12.6.1 Survival kits

All aircraft should carry safety equipment and survival kits that, as a minimum, comply with local civil aviation authority or regulation.

When considered necessary, the company may request additional equipment subject to the operating environment. The items contained in survival kits should be appropriate for the geographical location and climatic conditions; for example, offshore, arctic, jungle or desert.

The capacity of each survival kit should be proportionate to the number of persons carried in the aircraft.

Over-water operations require special considerations for safety and survival equipment such as life-jackets, immersion suits and emergency rafts.

12.6.2 Life-rafts

All life-rafts should be equipped with an emergency radio/beacon.

All life-rafts should be equipped with an approved offshore survival kit and be attached to the raft with a lanyard.

- a) Exception - Single piloted helicopter survival kits may be located separately in the front cabin area to provide easy access by the pilot or front seat passenger.
- b) See also *paragraphs 10.3.2 and 12.4.2* for additional details.

The following life-raft requirements are recommended:

- a) Helicopters having a seat capacity for 10 or more passengers should have two life-rafts; each should be certified for 50% overload to enable any one life-raft to be used by all occupants.
- b) Helicopters having a seat capacity for 9 or less passengers should have a minimum of one life-raft certified to carry all occupants.
- c) Where available by helicopter model, externally mounted life-rafts are preferred over internally mounted.

12.6.3 Life-jackets

Approved types

Only those life-jackets that are manufactured to an aviation authority approved TSO and certificated for use by the regulatory authority should be used. The following points should be noted:

- a) Permanently buoyant vests should not be worn or provided to occupants on aircraft flights because these types significantly hinder egress from a submerged helicopter or aeroplane. This is the same reason why life-jackets should never be inflated until well outside of the helicopter or aeroplane cabin.
- b) Where approved by local authority, life-vests with crotch strap designs are preferred over those without.
- c) Rebreather systems and pressurised underwater breathing devices (collectively known as emergency breathing systems (EBS) for life-vests and/or exposure suits which are designed to provide additional time for underwater egress may be designated for use, but a suitable training programme will need to be established. These systems should have appropriate approval for use by the local regulatory authority. See 8.1.8 for additional guidance.

The decision to use EBS devices should only be made after a risk assessment to include at least the following topics:

- i) Environmental factors such as water temperatures, typical wave patterns, night or day flight, etc.
- ii) Aircraft ditching/egress history.
- iii) Compatibility with life-vests and/or survival suits.
- iv) Training risks versus benefits.
- v) Aircraft configuration factors such as the size of the aircraft, ease of underwater escapeability, fuselage floatation certification for differing wave conditions, and interior cabin lighting.
- vi) Other factors can include percentage of night flying carried out, the potential for EBS misuse, and added anxiety.

A suitable training programme will need to be established before use/issuance of EBS as it can pose additional risks if the user is not properly trained (EBS with compressed air in particular). Some systems do have provision for use of 'dry' training to allow use pending 'wet' dunker training with EBS. Consult with the manufacturer of the devices for specific requirements, but the following are the minimal 'wet' training requirements:

- i) Donning of an aviation lifejacket, emergency breathing system equipment and correct operation.
- ii) Verifying the integrity of the EBS equipment.
- iii) Carrying out breathing actions using EBS equipment at atmospheric pressure in dry conditions.

- iv) Carrying out breathing actions in a pool environment utilising personal air (must experience positive and negative pressure created by body orientation in the water).
- v) Occasions for use and correct sequence of operating the equipment.
- vi) Limitations.

Particular attention should be given to ensuring training devices are sanitized between use and any microbial residue completely neutralised. Involvement by member company Health Specialists should be considered for this aspect.

- d) Some exposure suits do not have integral life-vests and may lack adequate sustained floatation, and a separate life-vest may need to be worn externally. A crotch strap may be necessary for adequate security of these separately worn vests. The manufacturers and regulatory authority should be consulted as necessary for clarification.

Constant wear life-jackets

For operations where the vests are routinely worn, such as offshore helicopters, they should be covered with a durable fabric to reduce damage from constant handling. Life-jackets manufactured to an approved TSO for constant wear life-jackets are preferred.

Helicopters & float plane life-jackets

- a) For all helicopters and floatplanes over-water flights beyond gliding distance of land, the life-jacket should be worn in a readiness condition.
- b) Pilot life-vests for offshore helicopters or remote areas should contain an emergency radio (See also *paragraph 12.4.2*).

Aeroplane Life-jackets

For single-engine aeroplanes, and multi-engine aeroplanes that cannot maintain altitude on one engine, conducting operations over water beyond gliding distance of land, life-jackets should be worn by all occupants.

For all other aeroplane extended over water operations, life-jackets will be available and readily accessible for use by passengers and crew in the event of a ditching.

Night flights – life-jacket additional requirement

For night flights, life-jackets will be equipped with an integral light.

12.6.4 Exposure suits for offshore helicopter & float plane flights

Decision to use exposure suits

Immersion suits certified for use by the regulatory authority should be provided to crews and passengers for helicopter over water operations in cold water hostile environments.

In the event that local regulatory controls do not address the issue of wearing exposure suits, all necessary details and requirements should be stipulated by the company.

These requirements should be reviewed and a decision made prior to commencement of operations.

Several studies and regulatory documents providing information on estimated survival time based on water temperatures versus survival time in varying kinds of dress can be used as background material for making decisions on use of survival suits. These documents should be available from the OGP Member's Aviation Advisor.

Exposure-suit considerations

- 1) A detailed risk analysis should be completed when determining if survival suits should be worn.
- 2) Factors that should be considered in the analysis for exposure suits should include:
 - a) The availability and anticipated response time of Search & Rescue resources.
 - b) Realistic assumptions on search and/or rescue time should include:

- Distance offshore.
 - Worst-case visibility conditions.
 - Accuracy of aircraft navigation equipment.
 - Worst-case sea conditions.
 - Time to hoist each occupant.
 - Potential for in-sea assistance of occupants.
 - Dropping of survival equipment.
 - Estimated survival time for clothing being worn.
- c) The worst case scenario in terms of the most unfavourable location of a ditched aircraft and longest mobilization times for aircraft or vessels should be used when detailing minimum response times.
- d) Additional equipment and personnel factors such as, helicopter winching limitations, rescue helicopter capacity, crew expertise, guaranteed availability, and all-weather capabilities of the rescue aircraft/vessels need also to be considered
- e) Determination by local management that occupants can be rescued within the prescribed survival time.
- f) Compatibility of life-vests and rebreathing systems with exposure suits.
- 3) The following practical problems should also be considered.
- a) In certain areas, prevailing sea currents may result in water temperatures being sufficiently cold to make use of survival suits prudent. But high ambient air temperatures, combined with low air circulation within the suit can cause debilitating fatigue in crew members and discomfort for passengers.
- b) In such circumstances, efforts may be better directed at improving rescue response (vehicles, vessels or aircraft systems), and search capabilities rather than introducing survival suits.

12.6.5 Linked raft rescue system

Description

It is recommended that OGP Members, for long-term operations in conjunction with the operator, consider in their emergency response planning the use of a 'Linked Raft Rescue System' as a part of the survival equipment in the event helicopter hoisting is not readily available or when the possibility exists that personnel may not be recovered from the water within anticipated in-sea survival times.

Systems are available that can be deployed from helicopters or suitably equipped fixed-wing aircraft.

The system consists of:

- a) Two rafts are linked together with two fifty-meter lengths of buoyant nylon rope.
- b) Two floating smoke canisters.
- c) One knife for cutting the rope is necessary.
- d) Leather gloves for deployment.
- e) Positive intercom communications between the pilots and deployment person.

The rafts are air dropped up-wind from the rescue zone and drift in a semi-circular manner to surround those persons in the water.

The system assists in directing the person by means of the floatable rope to one of the two rafts.

The object is to secure personnel as quickly as possible into life-rafts as a first step in the recovery process. Additional information on this equipment and procedures for its use is available from the Aviation Advisor.

Training

This system should only be used if the aircraft crew have been trained in the physical deployment of the system over water, at periodic intervals, with annual recommended.

The system should only be deployed from a dual piloted, twin-engine helicopter or suitably equipped aeroplane and with an individual trained in its deployment in the rear of the aircraft.

12.7 Emergency flights

12.7.1 Planning

Activities conducted in remote areas should, as part of an emergency response plan, have a clear set of instructions on arranging and obtaining emergency flights for technical, political, security or medical reasons.

12.7.2 Contingency aviation operators

If acceptable aircraft are not available in the country or region of activity, contingency arrangements should be made in advance with approved operators specializing in emergency flights and medical evacuation operations.

12.8 Overdue aircraft

An aircraft which fails to contact Flight Following at required time intervals, or fails to respond to radio contact, is considered overdue.

If any aircraft is reported overdue through the Flight Following facility, or other means, actions detailed in the Emergency Response Plan should be initiated. A check-list sheet should be used from the first instance to ensure all appropriate actions are undertaken and to document all relevant information.

12.9 Accident, incident, hazard & near miss reporting

Information concerning an aircraft involved in an accident, incident or near miss while under contract to the company should be reported immediately to the company aviation representative on location. Definitions and recommendations relating to accident, incident, hazard and near miss reporting are contained in *Section 3* of this guide.

In any event, the adherence to a detailed Emergency Response Plan will assist in providing clear and co-ordinated procedures to deal with all possible scenarios.

13 Appendices

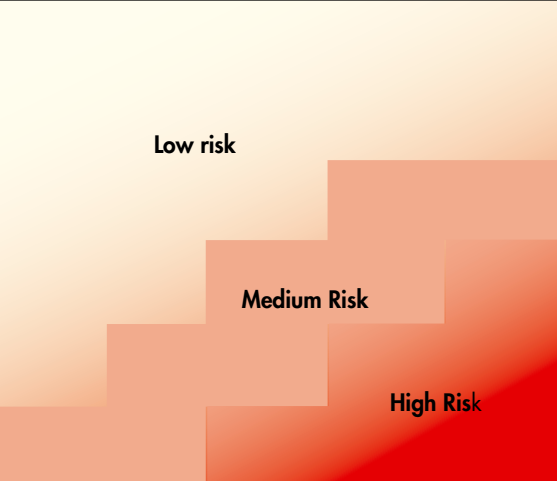
Appendix 1	Risk assessment & risk reduction opportunity ranking	103
Appendix 2	[WITHDRAWN]	109
Appendix 3	Duties & responsibilities of the Air Operations Supervisor (AOS)	111
Appendix 4	Training courses - Air Operations Supervisor (AOS)	113
Appendix 5	Experience & qualification levels	119
Appendix 6	Aviation weather guidelines	133
Appendix 7	Recommended aircraft equipment fit	143
Appendix 8	Heliportable land seismic operations – (<i>issued as OGP Report N° 420</i>)	149
Appendix 9	Winching (hoisting) operations	151
Appendix 10	Airborne geophysical survey	157
Appendix 11	Aerial pipeline inspection	163
Appendix 12	Helicopters as a secondary search & rescue task	177
Appendix 13	Cold weather operations	185
Appendix 14	Night operations – (<i>issued as a separate document</i>)	

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Appendix 1 Risk assessment & risk reduction opportunity ranking

With all businesses driven to get the most possible value from each and every expenditure, investments in safety should be guided by risk assessment and a structured process to ensure that the funds available are spent on the things that will do the most good to improve safety. The following guidelines describe a structured process for assessing risk and for ranking risk reduction opportunities in a way to manage risks to a level as low as reasonably practicable (ALARP).

Risk is the product of potential consequence (e.g., fatalities, asset loss, environmental damage) and probability (frequency or likelihood). Risk assessment is the act of judging and classifying the potential consequences and the likelihood of hazardous events. Many companies use similar matrices to the one shown below to assess risk.

Consequence					Increasing likelihood				
Severity	People	Assets	Environment	Reputation	A	B	C	D	E
					Never heard of in E&P industry	Heard of in E&P industry	Incident has occurred in our company	Happens several times per year in our company	Happens several times per year in a location
0	No health effect/injury	No damage	No effect	No impact					
1	Slight health effect/injury	Slight damage	Slight effect	Slight impact					
2	Minor health effect/injury	Minor damage	Minor effect	Limited impact					
3	Major health effect/injury	Localised damage	Localised effect	Considerable impact					
4	PTD or 1 to 3 fatalities	Major damage	Major effect	National impact					
5	Multiple fatalities	Extensive damage	Massive effect	International impact					

The vertical axis displays the potential consequence of an incident and the horizontal axis displays the likelihood of this consequence. The combination of potential consequence and likelihood defines the risk classification.

Potential Consequence is divided into levels running from '0' to '5', indicating increasing severity. A potential consequence should be reasonable and credible; something that could have developed upon the release of the hazard. It is very important to judge the potential consequences in addition to the actual ones. These are defined as the consequences that could have resulted from the released hazard if circumstances had been less favourable.

The overall potential consequence of an incident is established for four different scenarios. These are **People, Assets, Environment & Reputation**. A combination of these is possible, but the highest potential consequence is normally used for further analysis. For example, if an incident could have caused a single fatality (People 4) and minor damage to an aircraft (Assets 2), the potential Level 4 consequence is then used in the incident classification (e.g., Low Risk, Medium Risk, High Risk).

The following tables guide how to set severity levels one through five for potential consequences:

People consequences

The following table further defines the consequences to people:

	Effect	Description
0	None	No injury or damage to health
1	Slight	Slight injury or health effects (including first aid case and medical treatment case) - not affecting work performance or causing disability.
2	Minor	Minor injury or health effects (Lost Time Injury) – affecting work performance, such as restriction to activities (Restricted Work Case) or a need to take time off to recover (Lost Workdays Case). Limited health effects which are reversible, e.g. skin irritation, food poisoning.
3	Localized	Major injury or health effects (including Permanent Partial Disability & Occupational Illnesses) – affecting work performance in the longer term, such as a prolonged absence from work, irreversible health damage without loss of life, e.g. noise-induced hearing loss, chronic back injuries.
4	Major	Permanent Total Disability or one to three fatalities – from an accident or occupational illness. Irreversible health damage with serious disability or death, e.g. corrosive burns, heat-stroke, cancer (small population exposed).
5	Massive	Multiple fatalities – From an accident or occupational illness e.g. chemical asphyxiation or cancer (large population exposed).

Asset consequences

The following table further defines the consequences to assets:

	Effect	Description
0	None	Zero damage
1	Slight	Slight damage - costs <US\$10,000
2	Minor	Minor damage - costs <US\$100,000
3	Localized	Local damage - costs ≤US\$500,000
4	Major	Major damage - costs ≤US\$10,000,000
5	Massive	Extensive damage - costs > US\$10,000,000

Environmental effect

The following table further defines the consequences to the Environment:

	Effect	Description	
		Offshore	Onshore
0	None	Zero	Zero
1	Slight	<42 gallons (159 litres) fuel or oil spilled.	<210 gallons (795 litres) fuel or oil spilled.
2	Minor	42-210 gallons (159 - 795 litres) fuel or oil spilled.	≥210 gallons (795 litres) fuel or oil spilled.
3	Localized	≥210 gallons of fuel or oil spilled, or spill response required by regulator.	>2,100 gallons (7,949 litres) fuel or oil spilled, environmental fine; spill response required by regulator, or 210 gallons (795 litres) spilled to surface waters.
4	Major	>4,200 gallons (15,897 litres) of fuel or oil spilled. Spill response required.	Significant deployment of equipment or major environmental clean-up response required.
5	Massive	Severe environmental damage or severe nuisance over large area, and a major economic loss.	

Impact on reputation

The following table further defines the consequences to Reputation:

	Effect	Description
0	None	No impact - no public awareness.
1	Slight	Slight impact - public awareness may exist, but there is no public concern.
2	Minor	Limited impact - some local public concern. Some local media and/or local political attention with potentially adverse aspects for company operations.
3	Localized	Considerable impact - regional public concern. Extensive adverse attention in local media. Slight national media and/or local/regional political attention. Adverse stance of local government and/or action groups.
4	Major	National impact - national public concern. Extensive adverse attention in the national media. Regional/national policies with potentially restrictive measures and/or grant of licenses. Mobilization of action groups.
5	Massive	International impact - international public attention. Extensive adverse attention in international media. National/international policies with potentially severe impact on access to new areas, grants of licenses and/or tax legislation.

Likelihood is also divided into five levels, which run from, '*Never heard of in industry*' to '*Happens several times per year in a location.*' The likelihood is estimated on the basis of historical evidence or experience. In other words: 'Has the potential consequence actually resulted from a similar incident within the aviation industry, the company or at the location?' Actual consequences have, by definition, occurred and hence fall on Likelihood C, D, or E on the risk matrix for the actual consequence level.

Note: this should not be confused with the likelihood that the hazard is released – we are concerned with the likelihood of the potential consequences resulting from the incident in question.

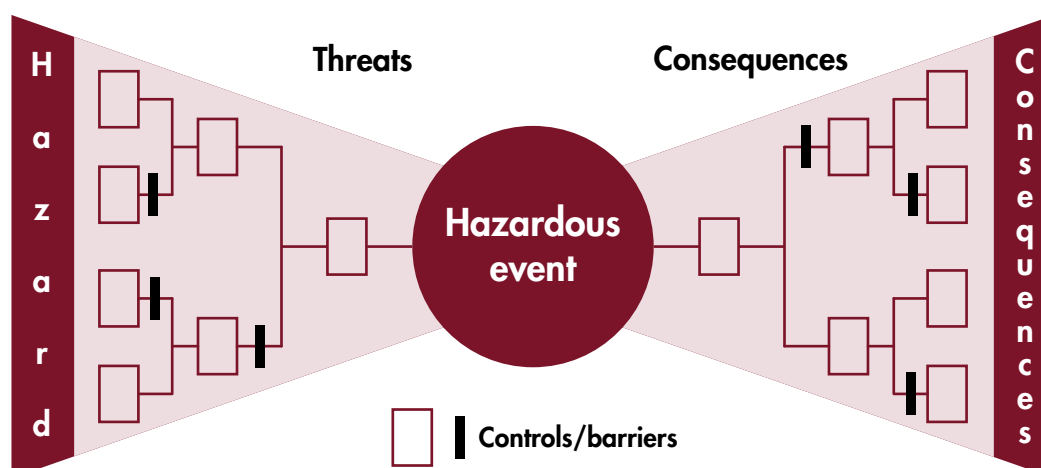
Example:

A helicopter rollover may be assessed as having a potential consequence of fatalities (severity level 4 or 5). The likelihood used for the risk assessment is that of a fatality resulting from the rollover, not the rollover itself. In other words, the key question is, 'how often are people killed or major damages caused by helicopter rollovers?' Not, 'could people be killed in a helicopter rollover?' Nor, 'how often do helicopters roll over?'

There is no specific time limit for when accidents occurred. The guiding rule is to count all accidents that have occurred using current barriers or controls; i.e., current technology and processes. Accidents that occurred before a significant change in technology or process may be ignored, if the current technology and process would likely have prevented them.

Risk management

The industry consensus is that risks assessed as ‘High’ on this matrix demand actions to reduce the risk. Many companies use a structured approach to ensure that the actions taken to reduce risks to a tolerable level are indeed adequate. The use of a ‘bow-tie’ in such a structured approach is an industry best practice. The figure below gives a graphic depiction of the ‘bow-tie’ concept.



Bow-ties should be developed for all High Risk hazards. In aviation, two generic hazardous events that should normally be addressed with a bow tie are release of an unairworthy aircraft and deviation from intended safe flight path. A bow-tie should concisely document the barriers and controls in place to prevent the release of a hazard, and the recovery measures in place to minimize the consequences should the hazard be released. Cross references should be provided to link the reader to any other documents that define processes and procedures used to ensure the effectiveness of these barriers, controls, and recovery measures. The figure below suggests how many independent and effective measures should be in place for High, Medium, and Low Risk hazards.

Risk acceptance criteria

Control/Barrier	High Risk (Intolerable)	Medium Risk (Incorporate Risk Reduction Measures)	Low Risk (Manage for Continuous Improvement)
Threat	Minimum of 3 independent, effective controls/barriers to be in place for each threat	Minimum of 2 independent effective controls/barriers for each threat	Minimum of 1 effective control/barrier for each threat
Consequence Recovery	Minimum of 3 independent, effective recovery measures for each consequence	Minimum of 2 independent, effective recovery measures for each consequence	Minimum of 1 effective recovery measure for each consequence
Escalation	Minimum of 2 independent effective controls/barriers for each escalation factor	Minimum of 1 effective control/barrier for each escalation factor	Minimum of 1 effective control/barrier for each escalation factor

The most important word in the above risk acceptance criteria is ‘effective.’ Effectiveness should be based on demonstrated performance. Where barriers and controls depend on human actions, they should be complemented by training and competence assurance processes.

Bow-ties not only assist in proactively establishing the barriers, controls, and recovery measures necessary to manage risks, they offer a frame of reference for understanding how hazardous events (incidents and accidents) occur and for refining the barriers, controls, and recovery measures to prevent recurrence. Used in this way, bow-ties can be continuously improved with experience.

Several points should be considered in evaluating opportunities to reduce risks including, codes and standards, best practices, expert judgment, risk-based analysis (e.g., quantitative risk assessment), company values, and societal values. The Oil & Gas UK publication, *Industry Guidelines on a*

Framework for Risk Related Decision Support gives an excellent description of how these factors should be considered in various decision contexts.

ISO 17776:2000 *Petroleum and Natural Gas Industries – Offshore Production Installations – Guidelines on Tools and Techniques for Hazard Identification and Risk Assessment* is also a useful industry specific reference document.

In addition to these guidelines, to ensure that money is spent where it will do the most good when faced with multiple risk reduction opportunities and insufficient funds to do them all, the opportunities should be ranked according to the benefit, cost, and effort required to implement.

The figure below depicts the process whereby benefit, cost, and effort estimates produce a ranking between 1 and 27, with 1 being the most beneficial, least expensive and most easily implemented opportunity.

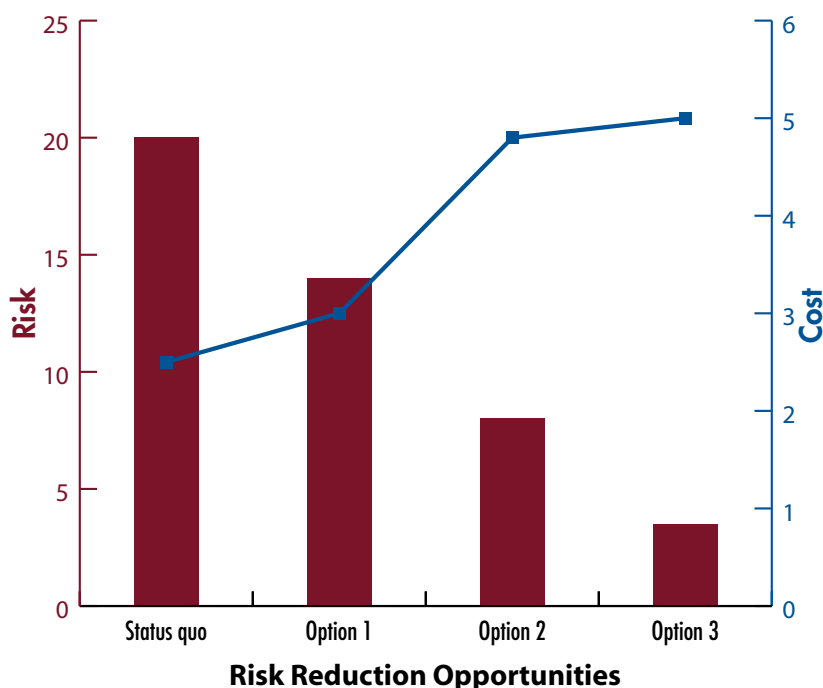
Take score on cost/benefit scale & multiply with effort

		Benefit			Effort			Score	
		H	M	L					
Cost	L	1	2	3	X	1	2	3	= From 1 to 27
	M	2	4	6					
	H	3	6	9					

Benefit, cost, and effort scores are given values of 1, 2, or 3 based on objective and logical criteria. For example, costs of less than \$50,000 might be assigned a 1, costs between \$50,000 and \$100,000 a 2, and costs over \$100,000 assigned a 3. The actual values should be set to make rational distinctions between the least and most expensive risk reduction opportunities. The same logic should be used to assign values of 1, 2, or 3 for the benefit and the effort associated with each opportunity. The final ranking number is the product of the benefit, cost, and effort values. An opportunity with high benefit, low cost, and low effort values will yield a ranking number of 1. An opportunity with low benefit, high cost, and high effort values will yield a ranking number 27.

While the above described process helps to rank risk reduction opportunities, it is not intended to override the judgements based on Oil & Gas UK's *Industry Guidelines on a Framework for Risk Related Decision Support*, which might dictate that all the risk reduction opportunities be employed. When on the other hand, it is not clear where to draw the line on the rank-ordered list of risk reduction opportunities, a plot like the one shown below can produce informed and healthy debate.

Risk Mitigation



The ultimate test in the evaluation of risk reduction opportunities is the ‘red face test’. If there was an accident caused by the lack of a risk reduction measure that you or your company chose not to employ, could you and your company’s senior management stand before the press or a court of law and explain your choices without having a red face from embarrassment?

Note that quantifying the financial losses likely to result from the lack of a safety feature and comparing that to the cost of the safety feature is highly discouraged. Ford Motor Company once did such an analysis and predicted that the cost of the deaths likely to result from fuel tank fires after rear-end collisions was less than the cost of the putting rubber bladders in the fuel tanks of its Pinto car model to prevent fuel release after rear-end collisions. In one class-action lawsuit alone, Ford was forced to pay over \$1 billion in damages. There could be great liability consequences for any company that knowingly and wilfully fails to take affordable safety measures that have proven effectiveness.

The most defensible process in making decisions about risk reduction opportunities appears to be the ALARP process, whereby a company should keep spending to improve safety until the spending necessary becomes disproportionate to the safety benefit gained. Of course, the ALARP process still poses the dilemma of deciding what constitutes ‘disproportionate.’ Fortunately, the risk reduction opportunities presented by the best practices incorporated in these guidelines clearly produce greater proportions of safety benefit than their cost.

Appendix 2 WITHDRAWN

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Appendix 3 Duties & responsibilities of the Air Operations Supervisor (AOS)

The person appointed as the Air Operations Supervisor (AOS) may be tasked to:

- a) Monitor the policy set in place by the OGP Member for the utilisation of aircraft; ensuring that only those operators approved by the Aviation Advisor staff are used and any conditions set out in the operator's contract or Operations Manual are followed.
- b) Maintain contact with those dealing with flight bookings, to ensure staff authorized to travel are only booked to travel.
- c) Maintain records of all flights including details of:
 - i) Sectors flown.
 - ii) Numbers of passengers and/or weight of freight by sector.
 - iii) Flying hours.
 - iv) Aircraft availability (delays and the causes).
 - v) Incidents and accidents.
- d) Verify that all passengers are appropriately authorised to travel on the flight.
- e) Confirm the numbers of Senior Executives or key personnel carried on a single flight fall within the OGP Member's guidelines
- f) Make periodic visits to the operator to verify operations are being performed in accordance with applicable regulations, Operations/Maintenance Manuals, OGP Member's aviation requirements, and contract language. Follow up outstanding audit recommendations to confirm action on compliance and advise the Aviation Advisor staff as necessary.
- g) Ensure all aircraft accidents and incidents that occur involving aircraft operated for the OGP Member are fully reported and copied to the Aviation Advisory staff. Investigate, as far as possible, the circumstances of aircraft accidents and incidents involving third parties, and also copy to Aviation Advisor staff.
- h) Take prevailing weather conditions in the area of operation into consideration when planning flights. Ensure the operator and aircraft customer have weighed adverse weather conditions and other factors against the importance of completing the flight, and the appropriate level of authorisation has been obtained.
- i) Closely monitor the utilisation of pilots to ensure that only those currently approved and within crew/duty time limits are assigned to flights.
- j) Track the status of Navigation Aids, weather instruments, fuel systems, and other support equipment.
- k) Where airfield/airstrip(s), heliport(s), or helideck(s) are provided, additional responsibilities may include:
 - i) Air-ground communication.
 - ii) Fire/rescue support.
 - iii) Provision of fuel.
 - iv) Airfield/airstrip/heliport management/preparation.
 - v) Passenger check in/out.
 - vi) Raising manifests/weighing passengers and freight.
 - vii) Control of security.
 - viii) Organisation of Customs/immigration as required.

In these cases the Aviation Advisor should be consulted to assist in developing the required support, based on the specific task, locality and situation.

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Appendix 4 Contents

A4	Training courses - air operations supervisor	115
A4.1	Introduction	115
A4.2	Advisory familiarisation & training.....	115
A4.3	Flight safety & aircraft accident investigation courses	115
A4.4	UK airworthiness course.....	116
A4.5	Safety management system.....	116
A4.6	Crew resource management.....	116
A4.7	Familiarisation/refreshers/conversion flying training.....	116
A4.8	Role experience	116
A4.9	Basic fire course.....	116
A4.10	Helicopter fire course	116
A4.11	HLO training course.....	116
A4.12	Fuel quality course	117
A4.13	Seismic course.....	117
A4.14	Quality assurance course	117
A4.15	Weather observer course	117
A4.16	Dangerous goods course.....	117

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Appendix 4

Training courses – air operations supervisor

A4.1 Introduction

The training requirements of a person nominated to the position of Aviation Operations Supervisor (AOS) will depend upon his experience and aviation technical ability, and the nature of the air transport requirement.

Where there is a sizeable air transport commitment, involving a large sole-use contract, supervising airfield or helideck activities or where the task is either complex or the exposure is assessed to be high, then a formal and structured period of training is recommended before taking up the post. Experience has shown that it is preferable for the OGP Member's Aviation Advisor to supervise this training.

This Appendix provides examples of the type of relevant training available, both generic and specialist.

A4.2 Advisory familiarisation & training

An AOS can be appointed from several sources. Whether the nominee is employed within the OGP Member's aviation staff, or from an outside source, the following areas should be addressed if necessary for the position and if not already provided in the person's previous experience:

- Managing HSE in the business.
- Contract management.
- Negotiating skills.
- Pilots may be required to do a short familiarisation or refresher course on the contract aircraft type.
- Engineers may need to undertake an airworthiness or quality assurance course.
- Other specialist courses:
 - Fire-fighting.
 - HLO training.
 - Refuelling.
 - Aircraft performance.
 - Seismic operations.
 - Computer training.

Where responsibility for aviation is a short-term requirement, little training may be required other than training in areas such as despatching and refuelling, provided that:

- a) the responsible person has previous relevant experience; and
- b) the OGP Member's Aviation Advisor is fully involved in the setting-up of the operation to ensure that the appropriate procedures and infrastructure are in place.

Each situation must be treated on its merits, recognising that thorough preparation and appropriate training will enhance safety and efficiency.

A4.3 Flight safety & aircraft accident investigation courses

Whilst not normally appropriate for an AOS, these courses are run by various institutions in the US and UK, e.g. University of Southern California and Cranfield University.

A4.4 UK airworthiness course

These three-week courses are run by the UK CAA and are designed to familiarise attendees with the concepts of airworthiness control from both the technical and procedural viewpoints. This course is for people appointed in a position where airworthiness aspects may be an issue.

A4.5 Safety management system

Industry has developed Safety Management Systems geared to the special needs of the Air Transport industry by applying the same principles as used for other activities in oil and gas industry. The Aviation Operations Supervisor should be able to brief and to help facilitate the introduction of the system with the contractor.

A4.6 Crew resource management

With emphasis being placed on human factors as the most prevalent ingredient of flying accidents, considerable effort is being placed on Crew Resource Management training. Whereas it was introduced primarily for flight-deck crews, the principle is being extended to embrace cabin crews, engineers, dispatchers, management staff, etc. These courses may be available through the major airlines or training organisations. They typically last two days and provide a good insight into human factors issues.

A4.7 Familiarisation/refresher/conversion flying training

This training, which includes simulator training, can be arranged with approved contractors through the Aviation Advisor.

A4.8 Role experience

A good introduction for a new AOS is a short attachment to the OGP Member's aviation department for familiarisation with the services available, methods of audit and the setting of standards. This also provides an excellent opportunity to fill any gaps in knowledge, to view air supervision in practice in an established OGP Member's business unit, to undertake some flying and to tie together preparatory training in a co-ordinated manner.

A4.9 Basic fire course

Aircraft-specific fire-fighting courses are regionally available.

A4.10 Helicopter fire course

This is a follow-up course to the basic course and deals with the helideck requirement. This is typically a 2-day course.

A4.11 HLO training course

HLO training courses are provided regionally by a number of organisations; however training should be compliant with OPITO requirements and is best followed up by an attachment to an offshore facility to gain familiarity with HLO practice.

A4.12 Fuel quality course

Where the aircraft operator or the AOS has responsibility for the fuel supplied, it is essential that there is a basic understanding of aviation fuel quality control. Courses are available regionally.

A4.13 Seismic course

Details are contained in *Appendix 8* of this guide (*from September 2007*).

A4.14 Quality assurance course

The quality assurance standard ISO 9000 and its sister application in aviation (EASA-145 and EASA-OPS) need to be understood if the AOS is supervising contractors who claim to abide by this standard.

A4.15 Weather observer course

At remote onshore and offshore sites an OGP Member may consider certified weather observer training for personnel associated with air operations. Accurate weather observations by an appropriately certified observer can be used by the government or regional meteorological agency in generating aviation weather forecasts for the site as well as providing up to date weather information to inbound aircraft. Training is available from government meteorological agencies and private training organisations.

On completion of training the individual should be certified to provide weather observations acceptable for aviation purposes.

A4.16 Dangerous goods course

Dangerous goods courses are aimed to enable the individual to:

- a) have a thorough understanding of dangerous goods regulations;
- b) be able to correctly prepare a consignment of dangerous goods for air transport; and
- c) know how to meet all the applicable requirements for classifying, packing, marking, labelling and documenting dangerous goods.

Courses are available regionally and the Aviation Advisor's advice should be sought on the most appropriate for the task.

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Appendix 5 Contents

A5	Training courses - air operations supervisor	121
A5A	Experience & qualification levels.....	121
A5B	INITIO & low experience pilot training & progression for multi-crew offshore helicopter pilots	124
A5C	Pilot Aircraft Conversion Syllabus and Minimum Hours.....	125
A5D	Engineering, load master, helideck personnel, aerial observer and dispatcher qualifications & experience .	130

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Appendix 5A Experience & qualification levels

	Aircraft		Airplanes		Helicopters	
	Over 5,700kgs CTOM ^{1,2} & all jets	Turbo prop less than 5,700kgs CTOM	Piston engine less than 5,700kgs CTOM	Multi-engine over 5,700kgs CTOM	Multi-engine under 5,700kgs CTOM	Single engine under 5,700kgs CTOM
Aircraft commander qualifications						
Licences	ATPL	ATPL	CPL	ATPL(H)	ATPL(H)	CPL(H)
Type rating on contract aircraft	Current	Current	Current	Current	Current	Current
Instrument rating on contract aircraft ³	Current	Current	Current ⁴	Current	Current	Current ⁴
Experience not less than						
Total hours	4,000 ⁸	3,000	1,500	3,000 ⁸	2,000	1,500
Total hours in command ⁵	2,500	1,500	1,000	1,500	1,000	1,000
Total hours in command – multi-eng ^{5,6}	2,000	1,200	750	1,200	500 ⁹	500 ⁹
Total hours in similar acft complexity ^{5,6}	500	500		500	500 ⁹	
Total hours command on contract type ⁹	100	100	100	100	100	100
Co-pilot qualifications						
Licences	CPL	CPL	CPL	CPL(H)	CPL(H)	CPL(H) ⁷
Instrument rating on contract aircraft ³	Current	Current	Current ⁴	Current	Current	Current ⁴
Type rating on contract aircraft	Current	Current	Current	Current	Current	Current
Experience not less than						
Total Hours	1,000	500	500	500	500	500
Total hours on multi - engine aircraft ⁵	500	250	250	500	250	
Total hours in command of multi-eng aircraft ^{4, 6}	100					
Total hours in command ⁵		100	100	100	100	100
Total hours on contract type ^{5,9}	50	50	50	50	50	50

Notes:

- 1 Maximum Certified Take-off Mass.
- 2 The requirements for Turboprop below 5700kg also apply to the following types that have a CTOM above 5700kg: King Air 300, Fairchild Metro III/23, SC7 Skyvan, Let 410/420, AN 28, Skytruck 28 & Dornier 228 series aircraft.
- 3 Instrument ratings are required to be tested at periods not exceeding 13 months. [Instrument base checks should be at 6 monthly intervals].
- 4 Requirement for Instrument Rating depends on role or task. However, in all cases, proven and current instrument competence (i.e. inadvertent IFR recovery training) is required.
- 5 These hours to be fully on either aeroplanes or helicopters as appropriate. Up to 10% may be achieved in a flight simulator approved for the purpose by the regulatory authority. For jets, 50% should be in Jet Command
- 6 For In Command Under Supervision multi-engine requirements see Section 8, paragraph 8.1.6. Co-pilots, who do not meet 100 hour captain experience, may be used provided that each co-pilot has successfully completed the following training which is documented in the pilot's training records:
 - An approved aircraft endorsement course for the aircraft type; and
 - A technical, emergencies and CRM course at the appropriate type-specific flight simulator prior to commencing operational flight operations; and
 - 50 flight hours of supervised operational flights with an approved Training Captain; and
 - A successful Line Check flight by a different Check and Training Captain.
- 7 It is unlikely that a co-pilot will be required.
- 8 Total hours may be reduced by 1000hrs when total hours in similar aircraft complexity exceeds 1000hrs and no dispensation has been granted in the other Aircraft Commander Qualifications.
- 9 For all aircraft types, dispensation can be given for Total hours in command on contract type, when a pilot has completed an Aircraft Type Conversion course, based on the guidelines at Appendix 5C and accepted by the OGP Member Company. For Helicopters under 3175kgs dispensation can also be given for Aircraft Commander Total hours in command multi engine and Total hours in similar aircraft complexity when a pilot has completed an Aircraft Type Conversion course, based on the guidelines at Appendix 5C and accepted by the OGP Member Company.

	Airplanes		Helicopters			
	Over 5,700kgs CTOM & all jets	Turbo prop less than 5,700kgs CTOM	Piston engine less than 5,700kgs CTOM	Multi-engine over 5,700kgs CTOM	Multi-engine under 5,700kgs CTOM	Single engine under 5,700kgs CTOM
Both aircraft commander & co-pilot qualifications						
Total Hours Previous 90 days ¹¹	50 hours in 90 days, 10 in Type Aircraft					
Medical Certificate appropriate for License	Current for ALL					
Night Recency Previous 90 days	3 cycles ¹²					
CRM or ADM, initial/refresh ¹³	Annual					
Dangerous Goods Awareness	Every 2 years ¹⁵					
Experience in the Topographical area and in the Type of Operations Specified ¹⁸	One year experience in areas similar to that specified in the contract (e.g. Arctic, offshore, mountain, desert, jungle or international operations)					
Helicopter Linked Life-raft Systems					Annual	
Hoist, within 12 month period ¹⁴					3 Cycles	
Helicopter Hook, within 12 month period ¹⁴					3 Cycles	
Helicopter Underwater Escape Training (HUET)	Every 4 Years (All crew members operating offshore)					
Accident & Violation Record	2 Years Accident Free for Human Error Causes, subject to review by the OGP Member Company					
Flight Engineers ¹⁰						
Licence	2 nd Class Licence			2 nd Class Licence		
Total flight hours	2,000			2,000		
Navigators ¹⁰						
Licence	1 st Class Licence			1 st Class Licence		
Total flight hours	2,000			2,000		
Minimum navigator hours	1,000			1,000		

Notes:

- 10 Flight Engineer and Navigator experience requirements are applicable to all Former Soviet Union aircraft when flown in or outside the Russian Federation (RF).
- 11 When 50 hours in previous 90 days is not met, a non-revenue check flight by a qualified company check pilot is to occur.
- 12 One Night Cycle consists of a night take-off and landing. For offshore helicopter operations, the cycles are to be conducted to an offshore installation. Night operations require two IFR pilots, IFR multi-engine aircraft and IFR procedures. Night operations in single engine aircraft are not to be conducted. For extreme latitudes, an alternative acceptable level compliance can be achieved through the application of the provisions at 8.1.7.
- 13 Cockpit Resource Management (CRM), or for single pilot aircraft Aeronautical Decision Making (ADM). Refresher can be short block of ground instruction and part of the annual route check.
- 14 If equipped for Hoisting, one cycle consists of one complete winch (out/in) or for External Loads (Hook) one load pickup and reposiion.
- 15 Every two years or in accordance with local regulatory requirements.
- 16 This recognizes that multi-engine hours are accumulated on gas turbine powered helicopters
- 17 Crew operating airplanes on long term contract operations with pressurized hulls should attend a one-time hypoxia course.
- 18 Co-pilots with less than one year of similar topographical experience may be used if following their initial ground school and competence based simulator courses, these co-pilots perform in the aircraft, and under the supervision of a Check and Training Captain the following, which will also be included in the Training Manual or other suitable document and documented upon completion of each task in the individual pilot training records.
- Fly as an observer in the jump seat or as a crew-member on a non-revenue flight for at least one flight into each of the airfields/helipads used regularly for operations, prior to a the new co-pilot acting as a crewmember in the co-pilot's seat; and
 - 5 role representative (confined high DA helipads, helidecks, contaminated runways, etc) takeoffs and landing by day prior to flying on line in the co-pilot seat by day; and
 - 5 takeoffs and landings by night, prior to flying on line in the co-pilot seat by night (if applicable); and
 - Fly in the co-pilot's seat with a Check and Training Captain or Line Training Captain for at least the first 50 hours on line; and
 - Successful completion of a full co-pilot flight evaluation flight for suitability as a line co-pilot after completion of the above.

Pilot relevant role experience

Aircraft Commander Experience Requirements:

Aeroplanes	Helicopters	
Where specialist activities are involved, such as airborne pollution control, top dressing, aeromagnetic surveys, then advice on specialist experience requirements should be sought from a qualified Aviation Adviser.	Land Seismic Operations	See OGP 351
	Winching	A formal and recorded training scheme must have been undertaken which must include 10 hours of dedicated winching operation sorties (50 hrs where an exclusive SAR Winch Ops contract is in place) and be qualified under offshore or land seismic operations as appropriate as above. Recurrent training requirements are 3 winch rescue ops every 90 days. See Appendix 9.
	Aeromagnetic and Geophysical Survey Operations	See IAGSA Recommended Practices, Appendix 15
	Offshore Spraying/Pollution Control	Prior offshore experience. Details in each case to be agreed with a qualified Aviation Adviser
	Recent Role Experience	For all the above role requirements recent experience is considered essential and pilots who have not operated under any of the relevant categories for periods in excess of a year will require refresher training [more frequent in the case of winching]. Advice should be sought from a qualified Aviation Adviser in all cases

Appendix 5B INITIO & low experience pilot training & progression for multi-crew offshore helicopter pilots^{1,4,5}

1 Detailed pilot aptitude testing is required prior to enrolment in the programme

This testing should include evaluation of language skills, cognitive abilities, hand-eye coordination, ability to apply theory and team coordination, etc.



2 CPL(H) training at an approved flight training school²

ATP theory required for operations on multi-pilot helicopters
Total experience 150 hours



3 IR(H) training at an approved flight training organisation

35 hours flight time
Total experience 185 hours



4 CPLH/IR(H)

Individual may pass the entry process for company Ab-Initio programme with CPL or can enter programme with CPL as result of structured recruitment process



5 Company approved training programme

- a) Multi Pilot Type Rating Course 10hrs FS+2hrs A/C
 - b) Multi Crew Co-operation Course 12hrs FS³
 - c) Type IR Course 5hrs FS+2hrs A/C
 - d) Operator Conversion Course (hrs included in (b) and (c) above)
- Total 27 hours (A/C and FS)
Total experience 212 hours

Flight tests by different TRE

- a) Combined VMC Licence Skill Test and OPC
 - b) Type IR Skill Test
- Total approx 3 hours



6 Non-revenue offshore deck landing training by day and night with TRE

- a) WDD & HUET Training
 - b) Minimum 5 day and 5 night deck landings
 - c) Competence check for release to Line Training
- Minimum 5 flight hours
Total experience 220 hours



7 Line Training Ground Course

GPS Training, Performance, Flight Planning
Dangerous Goods Training
Simulator Line Flight or Jump Seat Line Familiarization



8 Line Flying under supervision of a Line Training Captain (LTC)

- a) Minimum 10 offshore landings to normal and small decks by day and night
 - b) 50 flight hours minimum
 - c) Progress report required for all flights
- Total experience 270 hours



9 Line Check as co-pilot by different LTC

Approx 3 flight hours
Must include and offshore landing and take off
Total experience 273 hours



10 Released to line

- a) Ab-Initio pilots and CPL(H) holders with less than 1000hrs – with any commander who has no less than 500hrs PIC time including 100hrs on type
- b) Co-pilots are restricted to day operations unless fully night qualified



11 Progressive monitoring on line as FO

- a) 2 Qualifying Flight Reports per month with a Training Captain or LTC
- b) Recurrent Training and OPC/LPC checks
- c) 6 monthly progress reviews with training staff
- d) Written records of above elements
- e) After the co-pilot has 500hrs he can be released to any PIC



12 Promotion to SFO

Approx 2 year point - promotion board or management evaluation with CP, CTC SLTC
Monitoring continues as above
Total experience approx 1450hrs depending on operational rate of accumulation



13 Command Course (approx 4 year point)

- a) Minimum requirements – ATPLH, 2000hrs helicopter including 1000 as PICUS gained in accordance with the Operators procedures
- b) Technical exam
- c) RHS checks
- d) FS or FTD 3 Training and Assessment
- e) CRM assessment
- f) Command Line Training
- g) Command Line Check by different LTC
- h) A letter of recommendation should be forwarded to the OGP Member Company prior to assignment



14 Promotion to Command

Initially only qualified to fly in command with copilots who have 500 hours total experience including 100hrs on type until the new commander has accumulated 500hrs in command.

Notes

- 1) Operators may establish equivalent programs for onshore operations, including airplanes, subject to acceptance by OGP Member Companies.
- 2) The State approved flight training school(s) and curriculum are to be to JAA/FAA or equivalent standards and successfully reviewed by the OGP Member Company. Pilots may be approved to enter the program with an existing CPL if his training program meets the requirements of 4.3.2.
- 3) For details on the Multi crew Co-operation Courses refer to EASAs
- 4) The program must meet both FAA and JAA certificate standards.
- 5) Detailed training records are to be maintained for all phases of the training program.

These records will reflect the results of each training session to include the standards to which the pilot was able to complete the exercise or flight requirement.

Appendix 5C Pilot Aircraft Conversion Syllabus and Minimum Hours

Current OGP standards (Appendix 5A) require 100 hours on type for commanders and 50 hours on type for co-pilots, which remains a requirement. However, when introducing new types into service or when changing to alternate types, it may be more appropriate to have an integrated structured training programme; this should consist of a dedicated training package that through the benefits of the training would enable a reduction of the overall hours required.

Tables 1 and 2 below define the elements of the types of training to be completed in the introduction of the type into public transport service and the indicative hours required for each group of elements. An assumption made in building this training analysis is that as part of the initial training on the aircraft type to get it on the pilots licence, the pilot should accumulate a minimum of 15 hours on type. It is recognised that there will be variations to this number in that some pilots may require additional hours, but the total will count as stated towards the total.

The Training must include a minimum of 25% in the simulator and a minimal amount of time in the aircraft as agreed upon by the Member Company per Table 2, unless simulators not available and excluded by risk assessment.

The following guidance gives a breakdown of the training requirements for converting from one aircraft to another; the hours incurred during the initial conversion training will count towards the total defined for the class and type of conversions. The guidance herein defines the generalized model and does not consider every case with all possible variations, therefore, applications for specific variations by model/type should be submitted for consideration to the OGP Member Company Aviation Advisor for approval.

Table 1 Total conversion Hours

Pilot Conversion Experience with Example Models	TRE/TRI A	Captain & LTC B	Co-pilot C	Remarks
1 Non Series/derivative analogue type aircraft converting to glass cockpit, or glass cockpit to analogue (i.e. Bell 212 analogue cockpit to an EC225 with full glass cockpit)	80 hours (A1)	60 hours (B1)	40 hours (C1)	Includes the total hours accrued in achieving the type rating.
2 Series/derivative analogue type aircraft converting to glass cockpit, or glass cockpit to analogue (i.e. AS332L1 to an EC225, or SK 76A++ to an SK-76C++)	30 (A2)	20 (B2)	10 (C2)	Assuming greater than 150 on the original type. Co-pilot will fly with experienced line training captain with 500 hours on type or derivative type otherwise requires 15 hours.
3 Non-series/derivative type with glass cockpit converting to another glass cockpit (i.e. S76C+ to S92A)	70 (A3)	50 (B3)	35 (C3)	May include change in class of aircraft e.g. small to large. Variant glass cockpits within a series will require a differences/familiarisation training course.
4 Non series/derivative analogue type single engine aircraft converting to multi engine glass cockpit aircraft with MTOGW of less than 7000lbs, (ie Bell 206analogue cockpit to and EC135 glass cockpit) or to SIC in a multi engine glass cockpit aircraft (ie Captain in Bell 206 to SIC in SK-76C++ or AW 139)	80 (A4)	50 (B4)	40 (C4)	Assumes pilot has no previous multi-engine aircraft experience. Reductions in flight under supervision times may be made commensurate with previous multi engine aircraft time.

Table 2 Training Elements and Hours

All hours listed in Table 2 are indicative and relevant to a generic pilot, but the sum total of the whole should equal the required total conversion hours detailed in Table 1. Subject to a training program being submitted by the Training Captain and the listing below provides a guide to the exercises to be completed. Hours suggested herein are not intended to exactly total the requirement, but to leave an element of latitude for the training captain to allocate to actual needs of the individual. This Table is a sample that might be used for helicopters; it can be modified as needed for airplanes and varying models/types of aircraft and should be approved prior to implementation by the OGP Member Company Aviation advisor.

	Training Location	A1	A2	A3	A3	B1	B2	B3	B4	C1	C2	C3	C4	Comments
Section 1: Pre-flight preparation and checks														
Helicopter exterior visual inspection; location of each item and purpose of inspection	Aircraft	0	0	0	0	0	0	0	0	0	0	0	0	
Cockpit inspection	Aircraft													
Starting procedures, radio and navigation equipment, selection and setting of navigation and communication frequencies	Aircraft or Flight Simulator													
Section 2: Flight Manoeuvres and procedures														
Taxiing/air taxiing in compliance with air traffic control instructions or on instructions of an instructor.	Aircraft or Flight Simulator	#	#	#	#	#	#	#	#	#	#	#	#	
Ground handling- Incl rate of turn limitations	Aircraft													
Pre take-off procedures and checks	Aircraft or Flight Simulator													
Takeoffs various profiles	Aircraft & Flight Simulator													
Cross-wind take-off (if practical)	Aircraft or Flight Simulator													
Take-off at maximum take-off mass (actual or simulated maximum take-off mass)	Aircraft or Flight Simulator													
Take-offs with simulated engine failure														
– Shortly before reaching TDP or DPATO	Aircraft & Flight Simulator													
– Shortly after reaching TDP, or DPATO	Aircraft or Flight Simulator													
Turns	Aircraft & Flight Simulator													
Landings, various profiles	Aircraft & Flight Simulator													
Go around or landing following a simulated engine failure before LDP or DPBL	Aircraft & Flight Simulator													
Landing following simulated engine failure after LDP or DPBL	Aircraft & Flight Simulator													
Normal and abnormal operations of the following systems and procedures:														
Engine/FADEC	Aircraft & Flight Simulator													
Air conditioning (heating/ventilation)	Aircraft & Flight Simulator													
Pitot/static system	Aircraft & Flight Simulator													
Fuel system	Aircraft & Flight Simulator													
Electrical system	Aircraft & Flight Simulator													
Hydraulic system	Aircraft & Flight Simulator													
FMS	Aircraft & Flight Simulator													
Flight Control and Trim System	Aircraft													
Anti and de-icing system	Aircraft & Flight Simulator													

	Training Location	A1	A2	A3	A3	B1	B2	B3	B4	C1	C2	C3	C4	Comments
Autopilot/Flight Director	Aircraft													
Stability augmentation device	Aircraft													
Weather radar, radio altimeter and transponder	Aircraft & Flight Simulator													
Area navigation system	Aircraft													
Landing gear system	Aircraft & Flight Simulator													
APU (if applicable)	Aircraft or Flight Simulator													
Radio, navigation equipment, instrument flight management	Aircraft & Flight Simulator													
Turns with 30 degrees bank, 180 degrees to 360 degrees left and right by sole reference to instruments.	Aircraft													
Section 3: Instrument procedures (to be performed in IMC or simulated IMC)		#	#	#	#	#	#	#	#	#	#	#	#	As required for use of systems
Instrument take-off: transition to instrument flight is required as soon as possible after becoming airborne.	Aircraft & Flight Simulator													
Adherence to departure and arrival routes and ATC instructions	Aircraft & Flight Simulator													
Holding procedures	Aircraft & Flight Simulator													
ILS approach down to CAT 1 decision height	Aircraft or Flight Simulator													
– Manually without a flight director	Aircraft & Flight Simulator													
– Manually with flight director	Aircraft													
– With coupled autopilot	Aircraft													
– Manually with one engine simulated inoperative	Aircraft													
Non precision approach down to the minimum descent altitude MDA/H	Aircraft & Flight Simulator													
Missed approach procedures	Aircraft or Flight Simulator													
Go around with all engine operating on reaching decision height/MDA	Aircraft & Flight Simulator													
Go around with one engine simulated inoperative on reaching decision height/MDA	Aircraft													
Autopilot degraded modes and SAS ops	Flight Simulator													
Airborne Radar Approaches	Aircraft													
Screen Failure management	Aircraft & FS													
Use of Standby instruments	Aircraft													
IMC autorotation with power recovery	Aircraft & Flight Simulator													
Section 4: Additional General Handling		18	5	15	10	2	10	10		10	Opt	7		
Left and right seat handling	Aircraft & FS													
Offshore Deck landings	Aircraft													
Fully coupled approaches	Aircraft & FS													

	Training Location	A1	A2	A3	A3	B1	B2	B3	B4	C1	C2	C3	C4	Comments
Use of upper modes	Aircraft & FS													
– Speed/climb/descent/manoeuvres	Aircraft & FS													
– Glass cockpit screen management	Aircraft & FS													
– Degraded mode operations	Aircraft & FS													
Section 5: Night Flying		5	Opt	5		2	Opt	2		2	Opt	2		If applicable
Night Deck Landing	Aircraft													
Screens management	Aircraft and FS													
Rejected take-off	Aircraft													
Continued take-off	Aircraft and FS													
Night recency	Aircraft													
Night Competency assessment	Aircraft													
Section 6: LOFT and CRM		4	2	4		4	2	4		4	2	4		LOFT mandated requirement specified in hours and includes whole crew
Specified Loft Scenarios	Flight Simulator													One LOFT Exercise to include a Ditching
3rd seat CRM assessment flights	Aircraft													
Section 7: Navigation and Line flying exercises		4	Opt	4		4	Opt	4		2	Opt	2		
Navex to be conducted out of theatre	Aircraft													
Line flying experience conducted in theatre	Aircraft													
– to include cabin attendant integration where appropriate	Aircraft													
Section 8: Use of optional equipment		2	Opt	2		2	Opt	2		Opt	Opt	Opt		As required for equipment installed on the contracted helicopter
HUMS/HOMP	Aircraft													
EGPWS	Aircraft													
ACAS/ACAD	Aircraft													
Section 9: Systems Familiarity and knowledge		22	8	15		15	5	10		5	Opt	4		
Abnormal and emergency procedures	Aircraft & Flight Simulator													
Tail rotor control failure	Flight Simulator													
Tail rotor loss	Flight Simulator													
Fire drills	Aircraft & Flight Simulator													
Smoke control and removal	Flight Simulator													
Engine Failures, shut down and restart at safe height	Aircraft													
Fuel Dumping	Flight Simulator													

	Training Location	A1	A2	A3	A3	B1	B2	B3	B4	C1	C2	C3	C4	Comments
Autorotation descent	Aircraft & Flight Simulator													
Autorotative landing or power recovery	Aircraft & Flight Simulator													
Incapacitation of a crew member	Aircraft & Flight Simulator													
Other emergency procedures as outlined in the appropriate flight manual	Aircraft & Flight Simulator													
Section 10: Special Task Operations		Opt	Opt	Opt	Opt	Opt	Opt	Opt	Opt	Opt	Opt	Opt		
Public Transport HH0 (e.g. Marine Pilot transfer)	Aircraft													Only required where pilots under training will have requirement to carry out Special Task Operations, this can be part of the total training hours if the Training Captain agrees the student has reached the standard for additional development beyond the basic public transport operations but specifically may not use more than 10 % of the total training allocation required for the class of pilot in Table 1 above
Underslung Loads	Aircraft													
Fire Fighting	Aircraft													
Secondary SAR	Aircraft													
Homing	Aircraft													
Search patterns	Aircraft													
Use of Night Sun	Aircraft													
Section 11: Phase Checks														
Phase 1 – Test on Manoeuvres sections 1-12 (as applicable)	Aircraft or FS													
Phase 2 – Test on Manoeuvres Sections 1-12 (As applicable) plus LOFT scenario.	Aircraft													
Phase 3 – Final Route Check	Aircraft													
Section 15: Flight Under Supervision if for single pilot aircraft (Revenue Flights)														
Define requirements for flight under supervision, prior to solo revenue flights	Aircraft													
Total time to be considered qualified in type		80	30	70	80	60	20	50	50	40	10	35	40	
Ground Training														
Section 13: Ground Training Courses Etc.														
Initial Ground School	Classroom													
Self study	As Required													
Refresher Courses	Classroom													
Operational / Technical tests	As required													
Section 14: Computer Based Trainings														
– CBT	As available													
– FTDs	As available													

Appendix 5D Engineering, load master, helideck personnel, aerial observer and dispatcher qualifications & experience

Table 5D-1 General Experience Requirements

Supervisory Role	Aerial Observer	Chief Engineer Airplane ⁴	Chief Engineer Helicopter ⁴	Engineer Airplane ⁴	Engineer Helicopter ⁴	Load Master	Dispatcher	Helideck Personnel
Total Time on Airplanes or Helicopters		1 Year						
Total Time in Field Operations		5 Years		2 Years		1 Year ³		
Appropriate ratings (airframe, powerplant, instrument or avionics) issued by the local civil aviation authority		2 Years				1 Year		
Approved factory course or regulatory approved programme on aircraft type and engine for the aircraft being maintained			Yes					
Formal training and field experience in helicopter and/or airplane operations, aircraft dispatching, weather forecast interpretation and radio procedures. Full knowledge of local civil aviation requirements.			Yes ²					
Formal training and experience in radio procedures, observation techniques and duties, and obstacles/hazard identification	Minimum 1 Year Experience ¹						Minimum 1 Year Experience ¹	
Formal training and field experience in helicopter external lift, winch and cargo requirements (Or for Airplane operations loading systems and cargo requirements). Full knowledge of local civil aviation requirements						Minimum 1 Year Experience ¹		
Formal training in Helideck Attendant or Helicopter Landing Officer duties and responsibilities compliant with OPT10 or an equivalent standard								Minimum 1 Year Experience ¹
Refresher Training conducted, including a Human Factors component and testing on knowledge of applicable manuals								
							Maximum interval of 3 years	

Notes:

- 1 Or competence checked by Company personnel.
- 2 In some countries, the CJA does not approve such courses. Notwithstanding, the Operator will have a written training program for each aircraft/engine type.
- 3 Experience required in Airplanes or Helicopters as appropriate.
- 4 Engineering Qualifications/Experience: Subject to the air operator's training organization being approved under EASA Part 147, EASA Part 66 qualifications should be applied. Experience levels acquired whilst obtaining EASA Part 66 licence privileges are acceptable. Where EASA Part 66 licences have not been granted, local national equivalence is recommended.

Table 5D-2 below summarises prior experience requirements (in addition to basic formal training course requirements) for the award of an EASA Part 66 licence. Certifying staff (i.e. those authorised to sign Certificates of Release to Service (CRS)) must, where required, have local regulator license endorsements.

Table 5D-2 EASA Prior Engineer Experience Requirements

Licence Category Applicant	Required years practical maintenance experience on aircraft (depending upon prior relevant training as defined and assessed by competent authority)
Category A	1 to 3 years
Category B1 and B2	2 to 5 years
Category C	3 to 5 years

Where local national licensing requirements differ from those required by EASA Part 66 (i.e. the combination of EASA Part 66 training time and additional year(s) practical application under supervision in a Part 145 organization), it is recommended that fitters, mechanics and licensed aircraft engineers:

- Obtain the equivalent number of years experience under supervision prior to exercising full license privileges when maintaining aircraft on contract, and
- may be employed as unlicensed trainees until such time as they have acquired the required equivalent combination of EASA Part 66 training time and additional year(s) practical application under supervision in a Part 145 organization.

Unlicensed and trainee personnel (including licensed personnel, other than those qualified under EASA Part 66), may be employed in support of the maintenance of aircraft contracted to OGP members provided they are subject to 100% supervision at all times. The ratio of unlicensed/trainee to qualified personnel should be agreed with the OGP Member Company.

Table 5D-3 below illustrates EASA Part 66 licence holder and broadly equivalent acceptable qualification and experience levels for other licence holders, plus prior experience requirements for supervisory and management appointment holders.

Table 5 D-3 Engineer Qualifications EASA or Equivalent

EASA Part 66 Licence Category	Privileges	EASA Part 66 Requirements	Minimum Experience	Equivalent non-EASA Part 66 Qualification	Typical Role
Unlicensed Trainee	None	Subject to 100% supervision	Subject to air operator selection process	As per EASA Part 66	Trainee
A	CRS up to weekly inspections. Limited and simple failure rectification	800 hrs basic training in a Part 147 organization, plus 1 year practical in a Part 145 organization	Subject to air operator selection process	Unlicensed Mechanic – no CRS privileges	Fitter, Mechanic
B1	CRS line maintenance. Failure rectification including avionics systems (no avionics test equipment)	2400 hrs basic training in a Part 147 organization, plus 2 years practical in a Part 145 organization	Applicable Type endorsement(s)	A&P Technician, etc	Licensed Aircraft Engineer (LAE)
B2	CRS line maintenance of avionics systems (Note: may have restricted privileges). Failure rectification of avionics systems	2400 hrs basic training in a Part 147 organization, plus 2 years practical in a Part 145 organization	Applicable Type endorsement(s)	Avionics Technician, Radio etc	Licensed Aircraft Engineer (LAE)
C	CRS Base Maintenance	3 years as B1 or B2 technician or academic degree acceptable to competent authority		NA	Licensed Base Maintenance Engineer

Continued Validity

Continued Validity: all Part 66 licences	For as long as licence remains valid	Invalid after 5 years unless submitted to competent authority		
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Independent Inspections

Independent Inspections	B category licence subject to licence category privileges held.	In all cases, the first signatory must hold certification privileges (CRS) or equivalent for that aircraft type, as expressed in EASA Part M.	The second signatory must be able to demonstrate that they are competent and qualified to complete the independent inspection, by either: Holding CRS certification privileges for that aircraft type, OR Providing evidence of suitable training and relevant experience to certify that level of independent inspection		Independent Inspections shall be carried out on any flight safety sensitive maintenance task and those defined by the operator as critical tasks or vital points
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Supervisory and Management Appointment Experience Requirements

B1/B2/C	As above for licence category held, or CRS Base Maintenance	As above	5 years exercising Cat B privileges. Must have type endorsement in the contracted aircraft type	As above	Senior LAE, Shift Supervisor, Quality Supervisor
B1/B2/C	As above	As above	7 years exercising Cat B privileges. Must have type endorsement in the contracted aircraft type, except where multiple types are operated in which case appropriate group type endorsement required (i.e. large helicopters)	As above	Base Chief Engineer, Quality Manager
B1/B2/C	As above	As above	12 years exercising Cat B (Cat B/C for Part 145 Base Maintenance) privileges including Type endorsement in the appropriate group (i.e. large helicopters)	As above	Director Maintenance, Chief Engineer, or, Director, Manager Part 145 Base Maintenance

Appendix 6 Contents

A6	Aviation weather guidelines	135
A6.1	General.....	135
A6.2	Operating environment & weather	135
A6.2.1	Hostile vs. non-hostile environment.....	135
A6.2.2	Risk factors	135
A6.2.3	Hostile environments.....	135
A6.2.4	Non-hostile environments	135
A6.3	Flight rules & weather	135
A6.3.1	Instrument Flight Rules (IFR)	135
A6.3.2	Visual Flight Rules (VFR)	136
A6.3.3	VFR weather minimums.....	136
A6.3.4	Weather reports.....	136
A6.3.5	Adverse weather planning.....	136
A6.4	Offshore helicopter weather limits & reporting.....	138
A6.4.1	Limitations	138
A6.4.2	Floating helidecks - pitch, roll, heave & additional weather limitations/guidelines	138
A6.5	Offshore helicopter adverse weather operational limitations	139
A6.5.1	Purpose.....	139
A6.5.2	Factors to consider	139
A6.5.3	Precautionary weather conditions.....	139
A6.5.4	Emergency weather conditions	140
A6.5.5	Flow-charts for decision-making.....	140

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Appendix 6 Aviation weather guidelines

A6.1 General

This document is provided as a guide for planning and operational decisions in regard to weather, both adverse and routine, and the impacts of weather criteria on aircraft selection/operation. It is designed for use for all aircraft operations, both aeroplane and helicopter, and for onshore/offshore operations.

A6.2 Operating environment & weather

A6.2.1 Hostile vs. non-hostile environment

In determining the type of aircraft and the operational parameters to be specified for a specific project, the user should first determine the type of operating environment (hostile or non-hostile), including weather considerations, as noted in Chart 1 at the end of this appendix.

A6.2.2 Risk factors

Factors to be considered in determining the environment include: local topographical considerations; weather and temperature conditions; restrictions to visibility; day or night; flight-crew experience in the environment and operation; type of operation; availability of infrastructure such as airfields, helipads, refuelling, and navigational aids; communications; aircraft type; protection of occupants following an unscheduled landing; and search and rescue resources in the area of operation. See Chart 2 for a matrix of related weather factors and the Survival Equation Matrix at the end of this appendix.

A6.2.3 Hostile environment

Hostile environment definition

An environment in which a successful emergency landing cannot be assured, or the occupants of the helicopter cannot be adequately protected from the elements, or search and rescue response/capability cannot be provided consistent to the anticipated exposure.

Hostile environment aircraft requirements

A twin-engine aircraft able to sustain one engine inoperative (OEI) flight in cruise should be specified for operations in a hostile environment. See Chart 1.

A6.2.4 Non-hostile environment

Non-hostile environment definition

An environment can be considered non-hostile subject to the criteria shown in Chart 1 and satisfactory review and or mitigation of each of the following:

- a) an environment in which a successful emergency landing can be reasonably assured;
- b) the occupants can be protected from the elements; and
- c) Search & Rescue response/capability is provided consistent with anticipated exposure.

Non-hostile environment aircraft requirements

Single-engine aircraft that have been satisfactorily reviewed may be used in a non-hostile environment. See Chart 1.

A6.3 Flight rules & weather

A6.3.1 Instrument Flight Rules (IFR)

IFR operations should comply with local regulatory IFR weather minimums unless more stringent Company requirements are issued.

A6.3.2 Visual Flight Rules (VFR)

Weather minimums are contained in the table below.

Local regulatory minimums are to be followed when their guidance is more conservative than those contained in the table below or in mission-specific weather minimums presented in other sections of this guide.

A6.3.3 VFR weather minimums

Flight Regime	Minimum Operating Height (1)	Cloud Base (feet)	Visibility (SM) (4)	Requirements to fly given these VFR weather minimums (2)
Offshore - Day	500 Feet (3,4)	600 Feet	3 SM (3,4)	
	400 Feet	500 feet	1/2 SM	Offshore helicopter interfield use only if visual contact is maintained with other facilities.
Overland - Day	500 Feet (3)	600 Feet	3 SM (3)	
All Night Ops (3)	Night Flights will be flown using only IFR procedures and minimums where available, otherwise the VFR minimum shall be a cloud base of 1000 feet with 100 feet of vertical cloud clearance and 3 SM visibility.			Twin-engine IFR certified helicopter with dual IFR-night current crew. All night flights should utilise IFR cockpit procedures for takeoffs and landings.

A6.3.4 Weather Reports

Providing accurate aviation weather for both current and forecast conditions should be a priority for all flight operations.

Use of personnel trained and certified as aviation weather observers or an Automated Weather Observation System (AWOS) which also provides certified aviation weather are recommended for long-term projects, where appropriate.

When provided, weather reporting equipment should be capable of determining the following information: wind speed and direction, barometric pressure, temperature, visibility, and ceiling height. Sea state should also be provided for helideck operations and for floating facilities helideck pitch, roll and heave data.

A6.3.5 Adverse Weather Planning

Purpose

The purpose of Adverse Weather Guidelines are to provide open dialogue between the Aircraft Operator and the OGP Member's local aviation contact when weather conditions become marginal for normal aircraft operations. The dialogue may identify mitigating measures necessary to continue operations at an equivalent level of safety or result in the decision to suspend operations.

Notes:

- 1) The minimum operating height refers to the height Above Ground Level (AGL) for overland flights, and the height Above Mean Sea Level (AMSL) for offshore flights.
- 2) VFR Flights may not depart or continue if the weather conditions at departure, en-route or the destination are below the above stated minimum.
- 3) Minimum operating height for Day VFR less than a ceiling to 600 feet (inclusion of 100 feet of cloud clearance) and visibility to 2 SM may be allowed if the procedures are authorized by the appropriate authority.
- 4) When lower minimums are used, it is recommended that only those twin-engine IFR certified with a dual pilot IFR current crew be used.

Guidance

OGP Member Companies should, through a risk analysis, determine if a localized Adverse Weather Policy should be adopted. Some considerations for an Adverse Weather Policy for offshore helicopter operations can be found below.

All factors, including discussions with the operator, should be reviewed in establishing local adverse weather operational limits.

The OGP Member should always have the option to delay or cancel a flight, even when conditions are technically within limits, should it choose to do so.

The Aircraft Operator's Operations Manuals may have more restrictive guidelines than those listed in this document.

Factors to Consider

Factors that should be considered in determining if flights should be performed in adverse weather include:

- a) Aircraft Operator's compliance with regulatory, Company Operations Manual, and OGP Member's weather and operational limitations.
- b) Safe movement of passengers and operation of the aircraft at the landing/departure site.
- c) Rescue provisions, which will provide a reasonable expectation of rescue both en-route and at the landing site, in the event of a forced landing.
- d) Degree of urgency of proposed flights.

Precautionary Weather Condition Zone

When conditions have become marginal or reached any of the criteria listed below, the situation may be considered to have reached the 'adverse' level, where OGP Member review or intervention may be justified and where 'routine' flights may be curtailed.

- a) High wind speed or gust spread: aircraft Flight Manuals have operational limits for both speed and gust spread that should be considered, but in any case when wind speed reaches 53-59 knots, OGP Members should consider:
 - i) specialised passenger handling procedures; and
 - ii) advising inbound flights of the weather conditions.
- b) Weather less than 600-foot ceiling and 3 miles visibility (see above) require IFR capable multi-engine aircraft and crew.
- c) Severe loose dust or blowing snow or other conditions at the landing site that may inhibit visibility requires specialised pilot training and/or operational procedures.
- d) Severe cold conditions below -29° Celsius (-20°F) may require specialised passenger and aircraft handling procedures.
- e) Any other conditions established for this Zone by the OGP Member.
- f) At this stage, the aircraft crew or Aircraft Operator will be expected to indicate that Precautionary Limits have been reached, will advise the OGP Member's local aviation contact, and jointly they will reach agreement on whether flights should continue or be delayed.
- g) The OGP Member's supervisor responsible for operations should review all proposed aircraft operations, to determine whether such flights are essential to meet company objectives, or should be delayed. When delaying flights, the supervisor may consider prioritizing as noted below:
 - i) Flights for visits by non-operational staff or other non-essential flights.
 - ii) Flights for routine crew changes.
- h) Where a number of the criteria above exist simultaneously or if the flights will be at night, the supervisor should assume that the risk level will be higher.

Emergency Weather Condition Zone

Among the conditions to be considered when routine or precautionary level flights shall be considered for curtailment and only emergency operations should be considered are those listed below.

- a) Winds above 60 knots.
- b) Extreme cold below -40°C (-40°F).
- c) For all floatplanes, no water landings with sea state above one foot. For amphibious floatplanes, no landings below -1°C (+30°F).
- d) Any other conditions established for this Zone by the OGP Member Company.
- e) Flights in this Zone are normally performed only with multi-engine IFR equipped aircraft and dual IFR qualified pilots.
- f) At this stage, the flight crew, Aircraft Operator or OGP Member's local aviation contact will be expected to indicate that guideline limits have been reached, and all flights should be delayed, except for life-saving flights.
- g) Qualified medical advice should be sought before launching an emergency flight for medical reasons, in order to establish that the risk facing the patient exceeds the risk to the aircraft and crew.
- h) OGP Member's supervisors should consider the landing area unsafe for personnel for routine or precautionary operations.

A6.4 Offshore helicopter weather limits & reporting

A6.4.1 Limitations

Section A6.3.3 provides offshore weather limitations and procedures to be followed for adverse weather.

A6.4.2 Floating helidecks - pitch, roll, heave & additional weather limitations/ guidelines

Conditions	Limits for Landing - Day	Limits for Landing - Night	Limits for Planning - Day	Limits for Planning - Night
Pitch and Roll	+3°	+2°	+3°	+2°
Average Heave Rate	1.0 m/sec	0.5 m/sec	1.3 m/sec	0.5 m/sec

Measurement of Pitch, Roll & Heave (PRH)

A method of measuring PRH shall be available and a means provided to transmit that data to flight crews prior to landing. The accelerometers for such measurements should be located as close to helideck level and centerline as possible to provide accurate readings. The accelerometer readings may be processed by sophisticated software that can produce accurate helideck level measurements of PRH regardless of the accelerometer location. Provided the system is operational, and these calculations can provide accurate output of the helideck PRH movements, they may be used for pilot information.

If the PRH measurement system is capable of recording accurate helideck movements for at least ten minutes and can calculate the average heave rate, then less restrictive limits than those indicated in the chart above may be applied to specific floating facilities. Such variances must be allowed in the local operator's Operations Manual, and be documented in the local helideck operating procedures/ diagrams and facility helideck procedures. The OGP Member's Aviation Advisor should be consulted for relevant guidance before the variances are implemented.

When a vessel gives clearance for a helicopter to land on deck, the intention is for that vessel to maintain the existing heading while the helicopter remains on the deck. The monitoring station

providing deck motion limits and wind data must be manned during the entire time the helicopter is operating on the deck.

The helicopter crew is to be notified immediately by radio if any of the following occurs: the vessel goes off heading by 10 degrees or more, there is a vessel/installation or station keeping/handling problem, pitch/roll/heave exceeds the limits in Table 4.2 above, a significant change in the relative wind of 30 degrees or more, or there is any other abnormal event.

The operational limitations for helicopter operations to monohull vessels with helidecks greater than or equal to eighty (80) feet above sea level are more restrictive than the chart above, may vary by helicopter model, and prior to operation to such vessels, the OGP Member's Aviation Advisor should be contacted for relevant guidance.

Deck Limitations are not applicable for takeoff from the helideck.

A6.5 Offshore helicopter adverse weather operational limitations

A6.5.1 Purpose

See *Section A6.3.5* for general planning guidance for adverse weather.

A6.5.2 Factors to consider

Among factors that should be considered in determining if flights should be performed in adverse weather, in addition to those listed in *A6.3.5* are the following:

- a) Safe movement of passengers and operation of the helicopter on the helideck.
 - i) Assign helideck assistance as necessary.
 - ii) Consider changing passengers out 1-1, 2-2, *etc.*
 - iii) Consider use of helideck rope from stairwell to a point adjacent to helicopter (do NOT tie the rope to the helicopter).
 - iv) Brief passengers on special helideck procedures.

A6.5.3 Precautionary weather conditions

When conditions broadly reach any of the criteria listed below, and those shown in *Section A6.3.5* (Precautionary weather condition zone), the situation may be considered to have reached the 'adverse' level, where OGP Member Review/Intervention may be justified (see Chart 2).

- a) Wind speed 53-59 knots.
 - i) Suspend flights to unmanned structures.
 - ii) Implement special passenger handling procedures.
 - iii) Advise inbound flights of weather conditions.
 - iv) Implement Search & Rescue (SAR) procedures for adverse weather.
- b) Significant wave height above 5.5 meters, but less than 7.0 meters.
- c) Weather less than 600-foot ceiling and 3 miles visibility (see *Section A6.3.3*). IFR capable helicopter and crew required.
- d) Pitch, roll, and heave exceeding the guidelines in *Section A6.4.2* for floating offshore structures.
 - i) The helicopter Flight Manual and Aircraft Operator's Operations Manual should be reviewed to determine if landings are possible.
 - ii) If no criteria exist for the model being flown, then the criteria listed above apply.
- e) Flights in this zone are normally performed only with multi-engine helicopters.

- f) At this stage, the helicopter crew will be expected to indicate that Precautionary Limits have been reached, will advise the OGP Member's local aviation contact, and jointly they will reach agreement on whether flights should continue or be delayed.
- g) The OGP Member's supervisor responsible for operations should review all proposed helicopter operations to determine whether such flights are essential to meet Company objectives, or should be delayed. In addition to the items listed in *Section A6.5.3* (Precautionary weather condition zone), OGP Member's should also consider delaying flights to unmanned structures.
- h) Where a number of the criteria above exist simultaneously or if the flights will be at night, the supervisor should assume that the risk level will be higher.

A6.5.4 Emergency weather conditions:

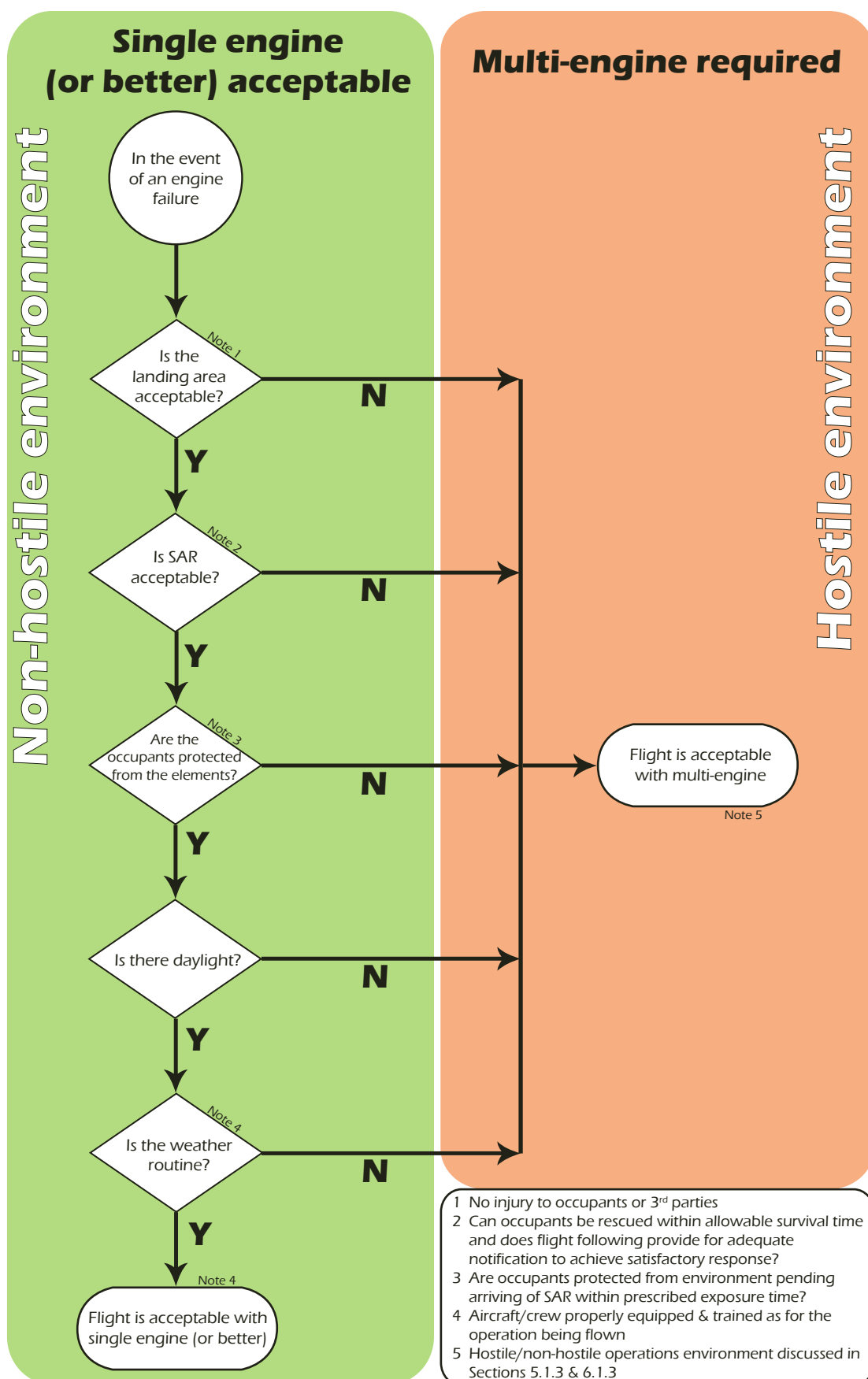
Only emergency operations should be attempted when conditions reach those shown in *Section A6.5.3* (Emergency weather condition zone) and those indicated below. See Chart 2.

- a) Snow or ice accumulation on the helideck.
- b) Sea-spray blowing across helideck.
- c) Significant Wave height above 7.0 meters.
- d) Pitch, roll, and heave on floating structures exceeding the limitations for helicopter operations as listed in Section A6.4.2.
- e) Flights in this zone are normally performed only with multi-engine IFR capable helicopters and dual IFR qualified pilots.
- f) At this stage, the helicopter flight crew will be expected to indicate that guideline limits have been reached, and all flights should be delayed, except for life-saving flights.
- g) Qualified medical advice should be sought before launching an emergency flight for medical reasons, in order to establish that the risk facing the patient exceeds the risk to the helicopter and crew.
- h) Platform supervisor considers helideck unsafe for personnel for routine operations.

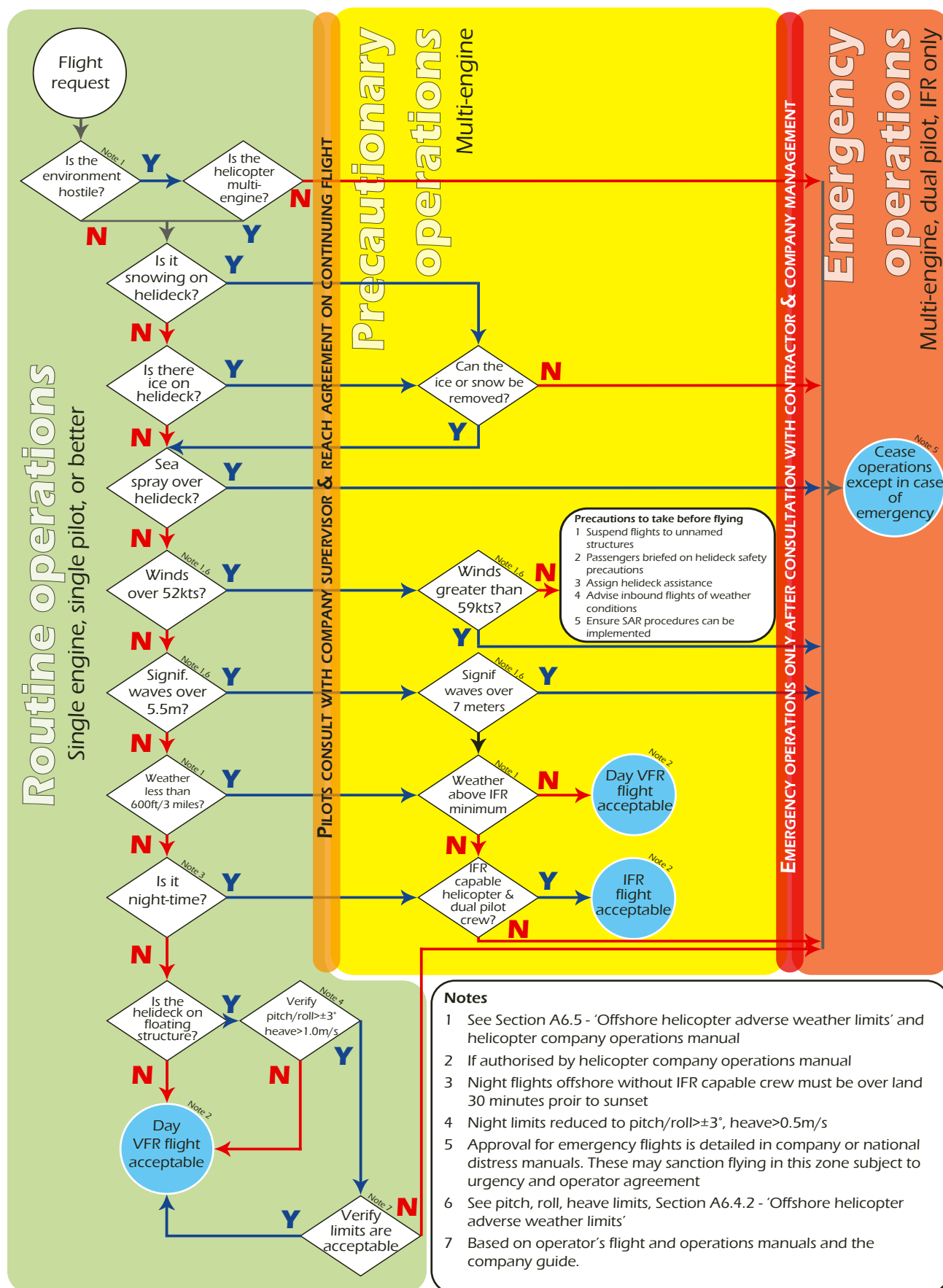
A6.5.5 Flow-charts for decision-making

Chart 1 is designed to assist in determining Hostile versus Non-hostile environments whilst Chart 2 to assist local aviation contacts and managers in decision-making during adverse weather. These charts are not intended to be used in isolation as comprehensive knowledge of local environments is also vital in making informed decisions.

Chart I – Hostile/Non-Hostile Environment Aircraft Considerations



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Appendix 7

Recommended aircraft equipment fit

Equipment requirements for aircraft are an important consideration and can have an impact on the aviation portion of a project's budgets. Consequently it cannot be overstated that the Aviation Advisor must be involved as early as possible, and have a clear understanding of the project and the associated constraints. Ultimately, the goal is to correctly equip the aircraft to match the task thereby enabling the crew to complete the job safely.

In determining appropriate aircraft and equipment several points need to be considered; project needs, the environment to be operated in, and the length of the contract.

Project needs should be clearly understood by the aviation advisor.

- 1) Is the aircraft to fly cargo and/or passengers?
- 2) Will the operation include offshore operations or other specialised operations?
- 3) Will the aircraft be used to provide medical evacuation support?
- 4) How critical is aviation support to the overall project?

The operating environment for the project refers to the distinction between Hostile vs Non-Hostile environment. Hostile is an environment where a successful emergency landing cannot be assured, the occupants of the aircraft cannot be adequately protected, or search and rescue response/capability cannot be provided consistent with the anticipated exposure.

Non-Hostile is an environment in which a successful emergency landing can be reasonably assured, the occupants can be protected from the elements, and search & rescue response capability is provided consistent with anticipated exposure.

The *Aircraft Management Guide* contains for a general discussion on aircraft and aircraft operator selection, which contains further discussion of operating environments. Essentially the Aviation Advisor should attempt to mitigate the risk of the operating environment with a properly equipped aircraft and appropriate search & rescue (SAR) capability. *Appendix 6* contains a guide for planning and operational decisions in regard to weather, both adverse and routine, and the impacts of weather criteria on aircraft selection/operation. It is designed for use for all aircraft operations, both aeroplane and helicopter, and for onshore/offshore operations. *Appendix 12* contains considerations for SAR and requirements for aircraft providing SAR as a secondary role.

The length of contract is often a constraint but should not stop getting the right equipment for a particular project. As a general statement a long-term contract is one that is at least one year. However, the real deciding factor on aircraft equipment and ultimately aircraft performance is the operating environment.

The following equipment lists are not inclusive for every environment, but will provide a reasonable start point for most operations.

Aeroplane recommended equipment

Equipment	Multi-Engine Turbine & Jet ≥ 5,700kg	Multi-Engine < 5,700kg	Single-Engine Aeroplanes	
Operated by two qualified crew (5)	M	M(5)	May be operated single pilot, VFR Day	
IFR Certified	M			
Autopilot	M	R		
1 DME (where available)				
1 ADF (2 required if ADF is sole source of navigation)	M		0	
2 VOR/ILS				
CVR/FDR, when required by local CAA/Company				
Radio altimeter with audio & visual alert with analogue display (7)	M	MLT/R		
Weather radar (colour screen preferred)				
Public Address (PA) system (6)	MLT	RLT		
Enhanced Ground Proximity Warning System (EGPWS or TAWS)	MLT/R	R		
2 VHF transceivers	M			
1 HF transceiver (if VHF coverage area not assured)				
GPS (IFR TSO preferred) (6)				
Mode C or S transponder (or equivalent)				
ELT with TSO 126 or equivalent preferred (4) (7)				
First-Aid kit				
Passenger briefing cards				
Fire extinguisher with pressure gauge preferred				
Collision Avoidance System - active interrogating only (where available) (6)	RLT			
Portable Emergency Radio Beacon (EPIRB)	0		MLT/R	
Engine Monitoring System (1)			RLT/O	
1 Raft with ability to attach to aircraft via lanyard	M extended overwater flights		M Float-Planes	
Sonar Transmitter (pinger), attach to CVR if equipped	0			
Survival equipment, appropriate for environment being flown (e.g. Arctic, jungle, desert, sea, etc.)	R		M	
Life-jackets with attached single devices, and water activated lights. Crotch strap design preferred.	M for Extended Overwater Flights or for floatplanes. M wear regardless of distance flown overwater			
Cabin heat	M for temperatures below 15°C			
Carbon monoxide detector in cockpit (electronic)	M with fuel/shroud heaters		M Piston	
De-icing equipment (3)	M for known, forecast or anticipated icing conditions			
Medical evacuation kit capability	0			
Large cargo door capability				

M = Minimum

R = Recommended

LT = Long-Term (1 year +) O = Optional

Notes: (For Aeroplane Recommended Equipment opposite)

- 1) When an approved modification exists for the aircraft type.*
- 2) All night flights SHOULD be flown with multi-engine turbine, equipped for IFR flight, using IFR flight procedures & dual pilot.*
- 3) Aeroplane de-icing equipment should be approved and functioning for the prevention or removal of ice accumulation, or be certified for a limited icing clearance approved.*
- 4) 406 MHz ELT preferred*
- 5) Geophysical and Pipeline Patrol operations may be flown single pilot.*
- 6) Required on Pipeline Patrol Aircraft.*
- 7) Recommended on Pipeline Patrol Aircraft.*

Helicopter recommended equipment

Equipment	Multi-Engine 10 or more passengers	Multi-Engine 9 or fewer passengers	Single-Engine Helicopters
Operated by two qualified crew	M	VFR Day may be single pilot (7)	VFR Day Opns only, may be single pilot
IFR Certified			
Autopilot or AFCS			
2 primary transceivers with 1 VHF minimum	M		
Mode C or S transponder			
ELT with TSO 126 preferred (5)			
Passenger briefing cards			
GPS/Loran (IFR TSO preferred, non-IFR TSO single-engine acceptable)			
1 HF transceiver	M, if VHF coverage is not assured for the entire area		
1 ADF, 2 required if ADF is only navigation source	N/R VFR (7)		0
2 VOR/ILS & 1 DME (where DME is available)			
Instantaneous Vertical Speed Indicator (IVSI)	M IFR and/or Offshore		M Offshore
Radio altimeter with audio/visual alert with analogue display (9)	M IFR and/or Offshore	MLT/R	M Offshore
Weather radar with colour screen (min. scale 2.5nm)		N/R VFR (7)	-
Public Address/intercom (PA) system	M		M (4)
Loud hailer with externally mounted speaker	RLT (8)	M single pilot/R	MLT
CVR and/or FDR - as mandated by CAA	RLT (required for HUMS and/or HOMP)		0
Enhanced Ground Proximity Warning System (EGPWS/TAWS) (2)	RLT		
Health Usage Monitoring System (HUMS), or (2,10) (2)			
Unit (Engine) Monitoring System (UMS), and with (2,10) (2)			
Airframe/Engine Vibration Monitoring System (2)			
Upper torso restraints, ALL seats (2)			
2 First-Aid kits	M		1 each M
2 fire extinguishers with pressure gauges preferred			
Raft(s), tethered to aircraft (6,8)	M Offshore 2 rafts w/50% overload		Minimum 1 raft
Altitude Voice Alert Device (AVAD) (2)	RLT		0
Emergency Exit Lighting System (2)	M Night Offshore/R RLT Offshore		
External mounted life-rafts (2)	M Offshore		
Aircraft flotation equipment			
Passenger life-vests, constant wear (1,6)			
Emergency pop-out window (2)			
Life-raft emergency radio/beacon/transponder (5,6)			
Sonar transmitter (pinger) (5,6)			
Pilot vest with voice capability emergency radio (1,5)	M Offshore & Remote areas		
Auto-inflation of fuselage floats (2)	RLT Offshore MLT Offshore/R		
Search & Rescue Transponder (SART) beacon			

Equipment	Multi-Engine 10 or more passengers	Multi-Engine 9 or fewer passengers	Single-Engine Helicopters
Approved immersion suits - crew/passengers	Offshore - M if required by CAA, R - if analysis justifies M for All appropriate for environment		
Survival equipment	M for All appropriate for environment		
Collision avoidance system - TCAS - active interrogating only (if certified)	RLT for All in High Density Area, with no radar		
High-visibility pulse lights			
Mirrors for external situation awareness	M (if available) to improve situational awareness outside aircraft		
Heating for cabin	MLT for temperatures below 15°C/R		
Litter kit, cargo hook, hoist, Aux. fuel	O (8)		

M = Minimum	LT = Long Term (1 year+)	R = Recommended	N/R = Not Required	O = Optional
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Notes:

- 1) Where TSO approved and available life-vests with crotch strap design preferred.
- 2) When an approved modification exists for the a/c type and it is recommended by Company Aviation Advisory personnel.
- 3) All night flights SHOULD be flown with multi-engine equipped for IFR flight, using IFR flight procedures & dual pilot.
- 4) Should have means of communication with passenger compartment, may be a phone type system.
- 5) Sonar pinger/ELT direction finding (homing) devices should be available in the country of operation, if not specify in contract specs. 406 MHz ELT/beacon/radios are preferred where registration is possible.
- 6) Life-rafts should be reversible or self-righting.
- 7) When flown IFR, these items are mandatory.
- 8) Optional items are added based on role specific mission requirements.
- 9) Dual display required for dual pilot or IFR operations long term and AVAD (Automatic Voice Alert Device)
- 10) HUMs reference is CAP 693 or equivalent, and UMS is contained in an appendix to JAR Ops 3.517(a) - para (b) (5) or equivalent.

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Appendix 8 Heliportable land seismic operations

Issued as OGP Report N° 420

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Appendix 9 Contents

A9	Winching (hoisting) operations	153
A9.1	Personnel transfer by winch	153
A9.2	Helicopter performance	153
A9.3	Operational procedures	153
A9.4	Personnel (pilots & winch operator) guidelines	154
A9.4.1	Training programmes	154
A9.4.2	Minimum crew	154
A9.4.3	Training & experience levels	154
A9.4.4	Passengers	154
A9.5	Required equipment standards	154
A9.5.1	Minimum equipment	154
A9.5.2	Maintenance	154

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Appendix 9

Winching (hoisting) operations

In offshore operations personnel transfers are often achieved by helicopter, as is the case for a limited number of onshore scenarios. Winching of personnel can result in additional risks and should only be made after analysis of the hazards. Transfers should be restricted to daylight hours, but this is not always practicable.

A9.1 Personnel transfer by winch

The transfer of personnel by winch can generally be divided into two categories:

1) **Crew change transfers**

Winching personnel to/from vessels by helicopter for crew changes or other associated routine vessel activities will be conducted in accordance with the International Chamber of Shipping (ICS) Guide to Helicopter/Ship.

Each Operator undertaking winching operations for an OGP Member shall ensure that vessel personnel involved in the operation are cognizant of the procedures contained in the ICS guide.

2) **Emergency winching**

Emergency winching of personnel via helicopters should be performed using the guidelines in the approved Operations Manual.

Night emergency winching should not be conducted unless the helicopter is properly equipped with items such as auto-hover and the crew (including hoist operator) is trained and current as outlined in their company Operations/Training Manual (see *Operational procedures* below).

A9.2 Helicopter performance

For all winching operations, the operator will use twin-engine helicopters capable of Hover Out of Ground Effect, One Engine Inoperative, (HOGE OEI) for the atmospheric conditions that exist at the time winching is conducted. Exceptions may be considered only in life threatening emergencies and training if:

- a) authorized by the local CAA;
- b) the operator has established alternative crew actions for an engine failure that minimizes the risk to occupants, personnel on the vessel, and on the winch line;
- c) each person onboard the aircraft is in agreement to conduct the operation; and
- d) the vessel or facility has been notified and agreed to the conditions.

In calculating performance limitations for HOGE OEI, no credit should be taken for forecast wind unless it exceeds 10 knots, in which case 50% of the forecast wind may be taken into account. Calculations must include the weight on the winch and the person being winched.

A9.3 Operational procedures

The helicopter should have an approved Flight Manual Supplement outlining the operation, limitations, and emergency procedures of the helicopter and hoist during hoisting operations.

The helicopter operator should have an approved Helicopter/Ship Operations Manual or Operations Manual Supplement outlining the following:

- a) responsibilities of crew members;
- b) equipment standards;
- c) pre-flight responsibilities;
- d) weather limitations;

- e) communications;
- f) procedures at winching area;
- g) approach and departure procedures; and
- h) emergency procedures.

A9.4 Personnel (pilots & winch operator) guidelines

A9.4.1 Training programmes

The operator will establish a written training programme and minimum qualification criteria for hoist or winching operations. The programme will cover items 'a' through 'h' in the preceding paragraph.

All personnel (pilots and hoist operator) should have an initial competence course and thereafter an annual refresher.

Training records should be maintained as outlined in the winch training programme.

Training programmes are also recommended for vessel/offshore structure crews who may be involved in winching operations.

A9.4.2 Minimum crew

Winching operations should be conducted with two pilots and one hoist operator.

A9.4.3 Training & experience levels

Requirements for pilots and winch operators/crewmen are detailed in *Section 8.1.10* and *Appendix 5*.

A9.4.4 Passengers

Passengers must receive a full emergency briefing, including the wearing of and use of survival equipment, prior to a flight. If the transfer involves winching then the briefing must also include practice with donning and using the lifting strop, as well as other winching procedures and crew signals. Practice can normally be carried out on the ground with the aircraft shut down.

A9.5 Required equipment standards

A9.5.1 Minimum equipment

The minimum equipment should consist of the following in addition to the items required for offshore flight:

- a) emergency cable-cutters (not bolt-cutters) to backup the electrically activated cutters;
- b) safety harness for winchman or other assistant;
- c) static discharge equipment (as necessary);
- d) lifting device or basket;
- e) leather gloves; and
- f) harness-cutting knife (protected edge).

A9.5.2 Maintenance

Hoists and all associated equipment should be maintained as prescribed in the operators approved maintenance programme. The following requirements should be complied with:

- a) technical logs should be maintained for all winches and lifting devices to record all hoist cycles and maintenance performed;

- b) time and/or cycle life limits should be established for the cable and cable-cutting squibs;
- c) all bulletins, notices, and directives or maintenance programmes published by the manufacturer of the airframe and the hoist should be on hand and incorporated into the overall maintenance programme as appropriate;
- d) all lifting devices (baskets, straps, personnel harnesses, personnel lifting devices, and any ancillary associated lifting equipment) that attach to the hoist cable should also be included in the maintenance programme.
- e) electrical hoist assemblies that do not have specified bonding tests and parameters should have the electrical bonding tested as follows:
 - i) test the electrical bonding between all adjacent component parts of the hoist assembly, including, but not limited to, control box, electric motor casing, hoist body, hoist arm and attachment bracket, and between the hoist assembly and the aircraft. The maximum permitted resistance is 0.010 OHM, using a bonding tester capable of resolving to 0.002 OHM;
 - ii) testing is to be completed every 24 months, or more frequently depending on frequency of installation and use; and
 - iii) results of testing should be recorded in the aircraft maintenance log.

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Appendix 10 Contents

A10	Airborne geophysical survey	159
A10.1	Risk analysis.....	159
A10.2	Aircraft equipment standards.....	159
A10.3	Personal equipment standards.....	159
A10.4	Minimum crew	159
A10.5	General pilot experience	160
A10.6	Pilot flight & duty times	160
A10.7	Minimum survey height	160
A10.8	Minimum survey speed.....	161
A10.9	SAR coverage.....	161
A10.10	Minimum fuel reserves	161
A10.11	Fuel quality & procedures	161
A10.12	Helicopter procedures	162

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Appendix 10 Airborne geophysical survey

OGP strongly encourages all operators engaged in geophysical flying operations to become members of the International Airborne Geophysics Safety Association (IAGSA). The charter of IAGSA includes the promotion of safer operating practices within the airborne geophysical industry and further provides an open forum for discussion within industry. Substantial compliance with IAGSA's standards and OGP recommended practices should be a requirement of any operator contracted for geophysical survey flying.

AI0.1 Risk analysis

A risk analysis is to be provided by the aircraft operator prior to the commencement of any geophysical survey for OGP member companies. The analysis is to demonstrate satisfactory performance margins related to the topographical area of operations, discuss minimum speeds and heights to be used and provide an insight to all perceived areas of risk. IAGSA provides a comprehensive risk assessment tool specifically for geophysical survey purposes; the satisfactory review of which would satisfy the OGP requirement in this respect.

AI0.2 Aircraft equipment standards

All non-standard modifications fitted to the aircraft are to be certified by the relevant aviation regulatory authority and be acceptable to the OGP Member's Aviation Advisors.

In addition to regulatory minimum instrument standards, the aircraft must possess the following serviceable equipment:

- Radar altimeter.
- Head up track and height guidance.
- TSO C126 ELT or equivalent.
- Shoulder harness for all occupants.
- Clear, unscratched and serviceable canopy.
- Appropriate securing mechanism for additional instrumentation (GPS/CDI).
- Survival pack suited to the operating environment.

AI0.3 Personal equipment standards

Personnel involved in geophysical flying operations must wear appropriate clothing. All occupants of an aircraft conducting geophysical flying must have as a minimum:

- Flying helmet meeting industry safety standards.
- Non-synthetic or fire blocked/retardant trousers and shirt.
- Cotton undergarments.
- Robust shoes.
- Life-jackets (and immersion suits depending on water temperatures) – if flight is outside safe auto-rotative/gliding distance from land.
- Personal emergency locator beacon.

AI0.4 Minimum crew

A pilot and geophysical operator is the minimum acceptable crew for airborne geophysical surveys. Single crew operations (i.e. the pilot as the sole occupant) are not permitted unless survey equipment can be operated automatically without significant inputs from the pilot during flight.

AI0.5 General pilot experience

The following experience requirements are generic to both fixed- and rotary-wing operations above and below 5,700 kg (12,500 lbs). Each requirement should be satisfied in addition to the specific pilot experience requirements detailed in *Section 4.3* of this guide and summarised in *Appendix 5*.

Captain

Successful completion of a geophysical training programme including, where applicable, a mountain flying course:

- 300 hours experience in airborne geophysical operations (including 100 hours in Command or In-Command-Under-Supervision);
- 50 hours Command (or ICUS) on geophysical survey in the contract aircraft type;
- 10 hours Command (or ICUS) in the contract aircraft type conducting geophysical operations within the preceding 90 days, or successful completion of a geophysical line check of at least two hours (excluding ferry time) within the preceding 90 days.

Co-Pilot (if carried)

Successful completion of geophysical training programme including, where applicable, a mountain flying course:

- 10 hours on low level survey operations;
- Manipulation of the flight controls at survey height by a co-pilot will be restricted to those flights where the aircraft captain is an approved check and training or supervisory captain.

AI0.6 Pilot flight & duty times

Due to the fatiguing nature of geophysical flying the following flight hour limitations are to be observed:

Single Pilot Operations

- 5 hours per day on actual survey (transit time excluded);
- 34 hours in any consecutive 7 days (inclusive of transit time);
- overall 28 day limits as specified in *Section 5.6* of this guide;
- a minimum of 24 consecutive hours free of duty during any seven consecutive days.

Two Pilot Operations

- 7 hours per day on actual survey (transit time excluded);
- 34 hours in any consecutive 7 days (inclusive of transit time);
- overall 28 day limits as specified in *Section 5.6* of this guide;
- in addition to the above limitations, aircraft crews operating internationally must comply with flight and duty limitations of the country in which they are operating if so required by that country's aviation regulatory authority.

AI0.7 Minimum survey height

The following IAGSA guidance is to be adhered to:

The maximum clearance height possible should be specified consistent with the objectives of the survey to be flown. If a survey is to be flown at less than 100m (328 ft) it should be flown after conducting a detailed risk analysis in accordance with an internationally recognised procedure such as the IAGSA risk analysis procedure referred to above, considering, but not limited to:

- terrain relief and vegetation;
- aircraft type;
- aircrew flight and duty times;

- prevailing weather conditions;
- anticipated density altitude;
- pilot experience and recency;
- planned flight speed.

AI0.8 Minimum Survey Speed

For each fixed-wing aircraft type, the minimum safe survey speed is calculated to be the greater of:

- 130% of clean stall speed (V_s);
- 110% of best single-engine rate of climb speed (V_{yse} , if applicable); and
- minimum safe single-engine speed (V_{sse} , if published).

This minimum survey speed is to be observed even after 'zoom' climbs and should be raised as necessary to account for local conditions such as turbulence and gusty winds.

AI0.9 SAR Coverage

All aircraft engaged in geophysical operations are to be in radio contact with an appropriate organisation holding Search & Rescue (SAR) responsibility. The utilisation of a satellite/VHF automatic flight-following system overcomes many of the difficulties and limitations associated with conventional radio communications. A SAR plan is to be established, and daily SAR briefings are to be given prior to any flying activity. The following is to be used as the framework for SAR planning:

Base-camp holding SAR for aircraft on survey

A comprehensive radio net is to be established between the base-camp and the aircraft on survey for the duration of the exercise. Where terrain or geophysical equipment prevent constant radio contact, provision is to be made for 'ops normal' calls every 30 minutes. In the event that flying a line is greater than 30 minutes in duration the call is to be made at the completion of each line.

Local flight service holding SAR for aircraft on survey

Liaison between the operator and flight service responsible for that area should outline the intended area of operations, SAR times, and methods by which position reports may be given. Details of the ground party supporting the operation, and methods by which they may be contacted, should be registered with flight service prior to the operation.

AI0.10 Minimum fuel reserves

A minimum fixed fuel reserve of 30 minutes flying time at cruise consumption rate is required for all survey operations. If, during deployment to and from the survey area a fixed-wing aircraft is flown under IFR conditions, a variable reserve of 10% is to be added to the fixed fuel reserve. Where the local regulatory authority requires higher reserves these amounts are to be used.

AI0.11 Fuel quality & procedures

Portable refuelling units used with bladder or drum stock are to be fitted with Go/No-Go filters. Water detector paste is to be used to test AVGAS from drum stock, and Shell Water Detector Capsules used for Jet A-1.

Storage control, purity control, grounding/earthing systems and security of fuel supply must be considered in fuel planning.

Rotors running refuelling for helicopters should comply with the requirements of *Section 5.8* of this guide.

AI0.12 Helicopter procedures

It should be noted that standards and procedures for helicopters involved in geophysical work follow those laid down for fixed-wing above.

Appendix 11 Contents

A11	Aerial pipeline inspection	165
A11.1	General.....	165
A11.2	General guidelines.....	165
A11.3	Single-engine aircraft.....	165
A11.4	Aircraft configuration	166
A11.5	Aircraft maintenance for long-term operations.....	166
A11.5.1	Maintenance of pipeline aircraft.....	166
A11.5.2	Responsibilities of the pilot/operator.....	167
A11.5.3	Maintenance schedules.....	167
A11.5.4	Aircraft special inspections.....	167
A11.5.5	Magnetic direction indicators.....	167
A11.5.6	Elementary work & servicing.....	167
A11.5.7	Airworthiness directives	167
A11.5.8	Deferred rectification of defects	168
A11.5.9	Aircraft weight & balance control.....	168
A11.5.10	Maintenance arrangements	168
A11.5.11	Aircraft defects	168
A11.5.12	Supplemental inspections.....	168
A11.6	General pilot and/or observer requirements.....	169
A11.7	Pipeline patrol specific pilot role experience.....	169
A11.8	Pilot flight & duty time.....	171
A11.9	Collision avoidance	171
A11.10	Passengers – crew members	171
A11.11	Exemptions/Low Altitude Waivers.....	172
A11.12	Inadvertent entry into Instrument Meteorological Conditions	172
A11.13	Flight following.....	172
A11.13.1	Responsibilities.....	173
A11.13.2	Recommended procedures for pilot/observer	173
A11.13.3	Recommended procedures for FFA	174
A11.13.4	Recommended flight following calls	175
A11.13.5	Exceptional reports.....	175
A11.14	Flights over urban areas.....	176
A11.15	Landings and low altitude inspections en-route (helicopters only)	176

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Appendix II Aerial pipeline inspection

All.1 General

In most countries periodic inspections of product pipelines are a requirement of national legislation, although the owner will usually wish to carry out inspections regardless of legislation. As well as checking for any signs of a leak from or damage to a pipeline, the inspection is to check that there is no danger to the integrity of the line from nearby construction or drainage work. The use of helicopters or fixed-wing aircraft is often the most effective way of achieving the task. Additional hazards are introduced by the need to operate at an altitude which is lower than optimum for normal operations. These hazards can be managed by complying with the following guidance.

All.2 General guidelines

- a) Weather.
 - i) All aerial survey/pipeline patrol operations should normally be conducted under Day Visual Flight Rules (VFR) conditions.
 - ii) Minimum weather for Day VFR of 1,000-foot ceilings and 3 miles visibility.
- b) Oil spill surveillance and other aerial surveillance operations using specialised IR/UV cameras may be conducted at night if all requirements for night flight (*Appendix 5*) are met.
- c) Operations should be conducted at no less than the minimum safe altitude stipulated by regulation or authorised by the local CAA.
- d) Helicopters, when used, should not be operated within the avoid area of the height/velocity curve, as published in the helicopter's approved flight manual, except during landing and takeoff.

All.3 Single-engine aircraft

The use of a single-engine aircraft may offer some advantages for manoeuvrability and visibility. There are conditions that should be considered when making the decision on whether a single-engine aircraft would offer an acceptable risk. Those conditions are generally: environment, terrain, availability of safe landing area along the route to be flown and ready access to professional search and rescue support (See *Appendix 6 – weather planning document*). When operating with a single-engine aircraft the following provisions must be in place and monitored for compliance:

- a) The terrain must be such that a safe forced landing may be achieved in the event of a power failure, which means that there should be a potential for limited damage to the aircraft and injury to occupants.
- b) Flights should be conducted at not less than 500 feet AGL cruising altitude and at a speed and height combination such that, in the event of a power failure, a safe forced landing can be made.

An altitude exception is madewhere an appropriate approved low level waiver is in place and the pilot has read and signed the waiver which is carried in the aircraft. See *Section 6.1.6* in the *Aircraft Management Guidelines (AMG)* for additional guidance.

All.4 Aircraft configuration

For long-term pipeline patrol operations, the aircraft should be at a minimum equipped as follows:

- a) Equipped for IFR flight.
- b) One VHF transceiver.
- c) GPS (IFR TSO preferred).
- d) Mode C or Mode S transponder (or equivalent).
- e) Crew headsets.
- f) ELT with TSO 126 or equivalent, 406mhz is preferred.
- g) Ground Proximity Warning System (GPWS, EGPWS, TAWS).
- h) Radar Altimeter (Radalt) with audio and visual alert or Automatic Voice Alerting Device (AVAD) where available for the aircraft model to ensure that the selected height AGL is maintained.
- i) Collision avoidance systems with active transponder interrogation, providing verbal and/or visual positional data on the target aircraft in high density areas or where other low level traffic may present a hazard.
- j) Automated engine monitoring systems for all single-engine aircraft (engine condition monitoring per FAA AC 20-105b is acceptable).
- k) Landing lights converted to pulse light configuration (for aeroplanes wing tip pulse lights) in high-density areas. High Intensity Strobe Lights (HISL)/pulse or forward recognition lights should be fitted to the aircraft.
- l) Climate controlled cabin for all operations in temperatures below 15°C and for long-term operations where temperatures are routinely above 32°C.
- m) For extended over-water flights, one life-raft with the ability to attach to the aircraft via a lanyard and life-jackets with attached signal devices and water activated lights.
- n) Survival kits should be appropriate for the environment being flown and should include a portable emergency beacon/radio.
- o) The aircraft should be painted in a high visibility paint scheme with appropriate markings and the operator should be encouraged to fit High Visibility Blades for helicopters if approved for the model.
- p) First Aid Kit and Fire Extinguisher (pressure gauge preferred)
- q) Upper Torso Restraint if an approved modification for the aircraft exists.
- r) Carbon Monoxide Detector in the cockpit (visual or electronic) on piston aircraft.
- s) Real Time satellite based Flight Following System.
- t) Wire Strike equipment for helicopters.
- u) Flight Data Monitor in accordance with *Section 10.2.9*.

All.5 Aircraft maintenance for long-term operations

All.5.1 Maintenance of pipeline aircraft

This section provides maintenance guidance for company owned or contracted aircraft. Its goal is to provide for the repair, maintenance, overhaul and modification of company owned or contracted aircraft and associated components in accordance with the objectives of maintaining safety; meeting airworthiness standards; and achieving maximum schedule reliability.

All.5.2 Responsibilities of the pilot/operator

The pilot/operator is responsible for the planning and control of all maintenance, liaison with the civil aviation authority on maintenance topics, and liaison with all persons or Approved Maintenance

Organizations (AMOs) performing maintenance on the operator's aircraft. They shall have access to all applicable technical and regulatory publications necessary to perform these duties, and shall ensure that those publications are kept up to date. The pilot/operator shall remove from service any aircraft that are unsafe, or that do not comply with the regulatory requirements of the local civil aviation authority or this manual.

All.5.3 Maintenance schedules

All aircraft shall be maintained in accordance with the manufacturer's approved maintenance schedule. Copies of the maintenance schedule are included in the Aircraft Maintenance Manual. This maintenance will include Annual, 100 Hour and CAP (Continued Airworthiness Programme) recommended inspections, where available. All mandatory and recommended Bulletins will be completed within the time limit stated in the bulletin. Optional bulletins are at the discretion of the company. The operator will adhere to manufacturer's TBO recommendations and transponder and altitude reporting checks will be performed every two years in accordance with local regulations. Engine oil changes will be completed in accordance with manufacturer's recommendations and the use of an oil analysis program is recommended.

All.5.4 Aircraft special inspections

During operations, an aircraft may be subject to speeds or other conditions that exceed normal operating limitations: severe turbulence, exceeding airspeed limitations, abnormal maneuvers, hard landing, over weight landing, or lightning strike. The engines may be subject to foreign object damage or over speed conditions. If any of these conditions occur, the aircraft will be restricted from normal flight until a special inspection, as recommended by the manufacturer, is carried out by a licensed engineer.

All.5.5 Magnetic direction indicators

The compensated installation may not have a deviation, in flight, greater than 10 degrees on any heading. A placard meeting the above requirements must be installed on or near the magnetic direction indicator. The placard must state whether calibration was made with the radio or air conditioner on or off. Each calibration reading must fall within 45-degree increments. Verification of the magnetic direction indicator is to take place every 24 calendar months or sooner if mandated by the appropriate regulatory authority.

All.5.6 Elementary work & servicing

No person shall perform any elementary work or servicing (oil changes, light bulb replacement, etc.) without first being trained and authorized by an appropriately rated engineer trained in the task to be accomplished. This training will be documented and included in the person's company training file. Elementary work and servicing shall be performed in accordance with the methods and procedures recommended by the aircraft or engine manufacturer.

All.5.7 Airworthiness directives

The person returning the aircraft to service after any scheduled inspection shall review all new and revised airworthiness directives upon receipt, to determine if they are applicable. They shall enter details of all applicable airworthiness directives, and details of all directives pertaining to the aircraft make and model, in the appropriate airframe, engine, or component technical record. The person returning the aircraft to service shall determine the date, air time or operating cycles, when the actions specified in the directive must be taken. If the required actions are due before the next scheduled maintenance activity they shall make the necessary entries in the log in accordance with the local regulations.

All.5.8 Deferred rectification of defects

All defects shall be cleared before further flight of the aircraft, except as provided in this section. Where permitted by regulatory provisions as applicable, aircraft having outstanding defects may be operated subject to the following procedures:

- a) Where a Minimum Equipment List (MEL) has been approved and the list includes limits on the amount of time equipment may be inoperative, those limits apply.
- b) Where the MEL does not specify time limits, the aircraft may be operated following discovery of a defect. This provision is conditional to the following procedure:
 - i) The pilot reports and coordinates the defect deferral with the Director of Maintenance or equivalent who will coordinate the authorization of the deferral;
 - ii) The defect shall be recorded in the aircraft discrepancy log;
 - iii) The discrepancy log entry shall specify the reason for the deferral and the latest date by which the defect must be corrected.
 - iv) The inoperative item is isolated and placarded "Inoperative" adjacent to the control.

All.5.9 Aircraft weight & balance control

Each aircraft shall have a current weight and balance report with an up-to-date equipment list. Using this information, the center of gravity location and operational empty weight (OEW) shall be calculated using actual occupant and cargo weights.

II.5.10 Maintenance arrangements

All aircraft maintenance shall be performed by the company's own authorized qualified maintenance technician, or an approved maintenance organization (AMO) holding proper license/ratings and training for the scope of the work to be undertaken.

All.5.11 Aircraft defects

The Certificate of Airworthiness of an aircraft is not in force if the aircraft has any malfunction or defect, unless the details of the malfunction or defect are recorded in the discrepancy log and unmistakable warning is given at the flight station by removing, placarding or tagging the affected item. In the case of deferred defects, the PIC shall assure him/her self that the affected equipment will still allow the flight to be conducted safely.

All.5.12 Supplemental inspections

All maintenance performed on flight controls, engine components, landing gear, any maintenance requiring specific rigging procedures or torque values and any maintenance activity which will be hidden from view upon completion shall be inspected during and/or following completion of the maintenance activity prior to returning the aircraft to service. Minor maintenance, which does not affect the airworthiness of the aircraft, routine servicing which does not require disassembly and visual inspections need not be included in this procedure. Any certificated engineers or persons familiar with the maintenance practices of the aircraft on which the maintenance is being performed may act as inspectors.

All.6 General pilot and/or observer requirements

The need for a qualified pilot and/or observer is extremely important and the following should be considered when selecting pilots and/or observers for a pipeline contract:

- a) The basic operation of pipeline patrol requires a division of attention between flying the aircraft, looking for traffic and observing the pipeline right of way.
- b) Patrol pilots may fly long hours often as a single pilot. The pilot should have a history of following all rules, and be self-motivated.

- c) Pilots must have a strong working knowledge of route terrain, have a good understanding of local weather conditions and potential migratory bird activity.
- d) Each Operator should establish the procedures to be used by the aircrew in the performance of their duties to include but not limited to cockpit procedures and crew responsibilities.
- e) Each Operator should establish a 'sterile cockpit' rule covering as a minimum: key altitudes/flight phases, restriction of unnecessary conversation and paperwork.
- f) Aircraft operators should ensure that PIC and observer candidates meet applicable certification, minimum experience levels and undergo initial and recurrent training.
- g) Annual ADM/CRM Training should be completed by ALL crewmembers.
- h) *Section 6.4.2* of the *AMG* should be considered for additional guidance regarding the use of a single pilot.

All.7 Pipeline patrol specific pilot role experience

In addition to experience requirements contained in *Appendix 5*, the following requirements are recommended for all aircrew:

- a) Successful completion of a pipeline route check for the route to be flown (unless for a newly established route).
- b) Basic instrument experience.
- c) 50 hours in command patrol survey time in the previous six months.
- d) 10 hours on the contract aircraft type conducting pipeline operations within the preceding 90 days, or successful completion of a pipeline line check within the preceding 90 days.
- e) DOT Operator Qualification Programme completed and current.
- f) Enrolled in an operator approved drug and alcohol programme if allowed by local regulations.
- g) For helicopter operations, see Helicopter recent Role Experience.

Requirements	PIC
Airman Certificates & Ratings	
Commercial Pilot Certificate	Minimum
Instrument Rating or an Airline Transport Pilot Certificate	
Appropriate Category Rating	
Appropriate Class Rating	
Valid Second Class Medical Certificate	
Flight Time ²	
1500 Hours Total Flight Time	Minimum
500 Hours Cross Country Flight Time	
25 Hours of Night Flight	
25 Hours in Make and Model	
50 Hours Aerial Patrol Experience	
Programmes	
DOT Operator Qualification Program Completed (If applicable)	Minimum
Enrolled in operator approved Drug & Alcohol Program	
Training	
Annual Recurrent Flight Training ¹	Minimum
Annual Recurrent Ground Training and Testing	
Annual ADM/CRM Training	
IIMC/Emergency Training	
Annual Maintenance Training	
Annual Flight/Line Check ¹	
Annual Simulator/IFR Training	Highly Recommended

1) Six months between Recurrent Flight Training and Flight / Line Check

2) Predicated on single engine airplane for Aerial Observation

Pipeline patrol specific observer role experience

In addition to experience requirements contained in this appendix, the following requirements are recommended for all aircrew:

- Successful completion of a pipeline observer training programme.
- DOT Operator Qualification Programme completed and current.
- Enrolled in an operator approved Drug & Alcohol programme.

All.8 Pilot flight & duty time

The pilot flight and duty time limitations described in *Section 5.6* of this guide should be applied.

All.9 Collision avoidance

There is an increased likelihood of traffic confliction with military low-level traffic; power line inspection flights; aerial work and private flying activity, often beneath ATC radio coverage. The following measures have been shown to alleviate the hazards:

- Collision avoidance equipment described in the 'aircraft configuration' section above.

- b) An optimum operating height should be maintained at 500 feet AGL or higher. An exception is granted when an appropriate low level waiver is in place and the pilot has read and signed the waiver which is carried in the aircraft.
- c) Every effort must be made to co-ordinate with other airspace users through a notification system.

SSR Transponders should always be turned on even if operating outside controlled airspace or in remote areas. Other aircraft which may be operating in the low level environment are typically equipped with collision avoidance equipment that relies on detecting transponder signals from potentially conflicting aircraft.

All.10 Passengers – crew members

Passengers should normally not be carried during aerial surveillance operations, unless they are performing work related to the flight. In such cases they should be considered 'crew members', if not in contravention to local regulations. In Addition to the normal passenger briefing described in *Section 9.5*, persons acting as crew members will be briefed on their responsibilities by the pilot to include:

- 1) Primary responsibility of the crewmember is to act as an observer.
- 2) Route of flight.
- 3) Map briefing pointing out all known hazards.
- 4) Weather en route and at destination.
- 5) Altitudes.
- 6) Emergency procedures.
- 7) Other duty assigned by the PIC.

The decision to operate using an observer in addition to a single pilot should be determined by the pipeline company based on a formal risk assessment. The aircraft operator should be consulted for input during the risk assessment process. Factors that need to be taken into account when performing a risk assessment include whether the operating area is considered hostile or non hostile, the availability of Search & Rescue, aircraft traffic, urban areas, and the availability of real time flight following. An observer should be used if there exists a significant risk to the operation based on the results of the risk assessment. These observers should receive appropriate initial and recurrent training following a written curriculum with appropriate testing. Recommended subjects include duties, responsibilities, observation techniques, and radio procedures.

All.11 Exemptions/low altitude waivers

In most countries pipeline inspections occur below normal minimum operating altitudes, especially in the case of helicopters, and it will be necessary for the operator to obtain an exemption from the regulatory authority to conduct low-level operations. If exemptions are not in place then the client and operator may be subject to liability in the event of an accident or complaint regarding aircraft noise.

All.12 Inadvertent entry into Instrument Meteorological Conditions

Pilots may have limited experience in flying under IFR. It is therefore recommended, where allowed by local authority, that procedures following inadvertent cloud entry should be included in the Operations Manual and practiced during pilots' base checks.

All.13 Flight following

It is likely that pipeline inspection aircraft will be below radio coverage for a significant proportion of the time. Special procedures should therefore be in place to ensure that position reporting is achieved. This may involve the use of HF to base, periodic climbs to a higher altitude to achieve VHF contact or the use of VHF FM or mobile phone to speak to pumping or service stations along the route or installation of automated satellite flight following systems. Emergency response procedures should be tested periodically to ensure that flight following arrangements are effective in the event of an overdue radio call or missing aircraft. The use of advanced satellite flight following technology that would allow the tracking of flights at a base station is highly recommended.

In addition to the above comments it must be clear that the contracting OGP Member Company is responsible for flight following, and must either have the capability to perform this or have it as a contract requirement.

This section provides a guideline for a manual flight following system to augment a real-time satellite tracking system or to provide sufficient flight following capability in the event an operator does not utilise satellite tracking.

The purpose of a flight following system is to keep the operator aware of the position and status of each aircraft and its crew as well as to provide an overdue aircraft alert and trigger the Emergency Response Plan should an aircraft become overdue. In addition, last known position, fuel status, persons on-board and projected flight path information can be provided to search and rescue authorities should their services be required.

It is preferred that each patrol operator employ a monitored real-time satellite tracking system on each aircraft deployed for aerial patrol, however there may be several reasons for utilising this manual system such as when the satellite system being inoperative or removed for service. Operators who are on short-term contracts (less than 12 months) should utilise a positive flight following system, which would include a manual system to provide operational capability and a positive flight following system should be included in each operator's operation manual. Each operator for each flight will determine the length of time between air-to-ground communications and the subsequent actions if an aircraft becomes overdue. It is recommended that this length of time be at a minimum of every 30 minutes for air to ground communication and if in contact with ATC, a positive position report is provided.

All.13.1 Responsibilities:

Operator

The Operator is responsible for maintaining an accurate and timely awareness of the location and status of each aircraft and crew. This status must be maintained by a person or facility not engaged in flight activities and will usually be a ground based dispatcher or flight following administrator (FFA). The status of each flight shall be maintained on a written or computerized Daily Flight Following Log which will be updated in real-time as new information is received.

Pilot

The pilot is responsible for reporting all required information to the operator/FFA in a timely manner. This will usually be accomplished by way of cell phone, two-way pagers etc. These reports will generally be made prior to each take-off, upon each landing or should an event necessitate a change to the flight path, destination, estimated time of arrival (ETA) or aircraft status.

All.13.2 Recommended procedures for pilot/observer

- 1) Contact the FFA with a request to utilise Automated Flight Following (AFF) via satellite or Positive/Manual Flight Following (preferably via phone or email prior to flight).
- 2) Provide the FFA with appropriate flight information. (See below)

Note: If AFF satellite availability is lost at the FFA office, or the signal is lost during the flight, flight following will revert to 30 minute radio check-in procedures.

Flight Following Administrator (FFA) - The FFA will log all calls from the pilots as they are received and maintain the log in a timely and accurate way such that the location and status of each flight is available to the operator. The FFA will also have a method of alerting the pilot if an ETA is exceeded or should they become distracted by other duties.

The FFA is also responsible for alerting the appropriate operator personnel when an aircraft exceeds its ETA and is considered “overdue.” The FFA may also initiate the “overdue aircraft” procedure from the Emergency Response Plan.

If the FFA must leave their duty station (end of shift/lunch) they are responsible to insure that their duties are transferred to another trained FFA and that there are no gaps in the flight following coverage.

All.13.3 Recommended procedures for FFA

- 1) When AFF is requested, ensure AFF program access is available and request standard flight information from the pilot/Chief of Party (COP). Document using existing FFA forms and logs.
- 2) Provide pilot/observer with appropriate frequencies to monitor during the Flight. (FFA frequency, national flight following, etc.) Ensure these frequencies are monitored during duration of flight.
- 3) Originating FFA center will communicate with destination FFA center as to whom will track on AFF.
- 4) If flight following will be handed off to another FFA office during the flight, brief this with the pilot/observer, providing the frequency change, call sign, and other appropriate information.
- 5) Brief with the pilot/observer on the radio calls that are expected and the expected responses.
- 6) Check the Automatic Flight Following system to ensure that the icon for the aircraft is shown.
- 7) Shortly after take off, the pilot/observer will call via radio stating ‘(Registration or Flight Number xxxx off (airport name) AFF’. Check the aircraft Icon color and verify the time and date. Respond to the radio call, stating ‘Registration or flight number xxxx, (FFA call sign) AFF’.
- 8) Keep the AFF system running and monitored on a computer during the entire flight.
- 9) Set a 30 minute timer, and check the flight progress as appropriate during the flight. Document the positions using existing forms and logs.
- 10) If the signal has been lost (for example - the aircraft icon turns RED). Immediately attempt contact with the aircraft via radio and follow normal lost communication, procedures as appropriate (to be defined).
- 11) If radio contact is made after a lost signal, flight may continue utilising 30 minute radio check-ins for flight following.
- 12) In the event that the FFA tracking an aircraft on AFF loses the internet connection (on the ground), immediately attempt contact with the aircraft via radio. If unable to rely on the 30 minute radio check-ins then flight following will fall back on FAA flight plan.
- 13) Flight following hand offs must be coordinated when using AFF and Manual/Positive Flight Following. Coordinate with the affected FFA staff and agree on who will be responsible for flight following, how it will be accomplished (AFF and/or radio check-ins), frequencies the aircraft should monitor, and if frequency changes are required, when and where they should be made.
- 14) Ensure that the pilots/observers are briefed on any hand offs anticipated (call signs, frequencies and when to switch) and if a combination of satellite AFF and radio check-ins will be required (when and where).

All.I3.4 Recommended Flight Following calls

Take-Off

At a minimum the FFA will have the following information prior to each take-off:

- 1) Aircraft Identification.
- 2) Point of Departure.
- 3) Departure Time.
- 4) Hours of Fuel on Board.
- 5) Route of Flight (Patrol Route).
- 6) Intended Destination.
- 7) Estimated Time of Arrival/Time in Route.
- 8) Name(s) and emergency contact information of any passengers (non-crew).

Landing

As soon as practical upon landing the pilot will report the following information to the FFA:

- 1) Point of Landing.

All.I3.5 Exceptional reports

In addition to the above routine reports, the pilot will report any of the following to the FFA in a timely manner:

- 1) Change in ETA by more than 30 minutes.
- 2) Change in Route of Flight.
- 3) Change in Aircraft Status.

Overdue aircraft

An aircraft will be considered overdue if the pilot has not reported landing within 30 minutes of the ETA. The steps below; 1 – 4 would be initiated at the ETA. If an aircraft is overdue the FFA will report this to the appropriate operator personnel and/or take the following actions, for example, but not limited to:

- 1) Call the crew mobile phones. Most overdue aircraft are the result of pilots failing to report immediately upon landing so a phone call will eliminate this possibility.
- 2) Call the ATC tower at the destination and alternate airports to see if they have had contact with the aircraft.
- 3) Call the FBO at the destination to see if they have refueled or had contact with the aircraft/crew.
- 4) Implement Emergency Response Plan.

Securing flight operations

An FFA must remain on duty until all flight crews have landed and reported that they are complete for the day.

All.I4 Flights over urban areas

Pipelines running through urban areas should wherever possible be inspected from the ground. Where aerial inspection is essential it should be conducted at a minimum altitude approved by local civil aviation authorities.

When operating single-engine aircraft, or multi-engine aircraft unable to sustain flight on one engine, pilots will select a flight path that provides a safe emergency landing area, avoids damage to third parties or facilities on the ground and that provides an opportunity for a safe emergency landing.

Operators will designate the preferred flight-path to be used if flights are conducted routinely over the same congested area.

All.15 Landings and low-altitude inspections en-route (helicopters only)

During the flight the observer will take a note of construction work, or any other activity near the pipeline which could affect its integrity and will report events to the pipeline owner to follow up on the ground. However, if the observer judges that urgent action is required (for example, a trench converging on the pipeline) the observer may request the pilot to land nearby so that he can talk to persons on-site.

The operator should therefore have a section in his Operations Manual for unplanned landings or low altitude inspections to include guidance on the justification for such a landing, landing site selection, informing base or ATC of the intention to land, and recording the event. Pilot training and line-checking should include unplanned landing procedures.

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Appendix 12 Contents

A12	Helicopters as a secondary Search & Rescue task	179
A12.1	Introduction	179
A12.2	Management	179
A12.3	Operating standards	179
A12.3.1	Operations manual	179
A12.3.2	Crew composition	180
A12.4	Aircraft & equipment fit	180
A12.5	SAR equipment	181
A12.6	Aircrew	181
A12.6.1	Experience & competence	181
A12.6.2	Recent operating experience	182
A12.6.3	Training & checking	182
A12.7	SAR crew	182
A12.7.1	Experience & competence	182
A12.7.2	Recent operating experience	182
A12.7.3	Training & checking	182

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Appendix 12 Helicopters as a secondary Search & Rescue task

AI2.1 Introduction

This guidance is intended to cover SAR as a secondary task to the offshore support contract and is appropriate to over water operations only. It is not intended to cover contracted public transport Helicopter Hoist Operations (HHO) e.g. marine pilot transfer, or to cover specialist primary SAR. The threshold between primary SAR and SAR as a secondary task is likely to occur when there is a requirement identified to conduct HHO from a life-raft at night, this normally being considered as a primary SAR task. Additionally, consideration should be given to specialist primary SAR when hoisting out of sight of land, in poor weather or in high sea states.

Additional information relating to Search & Rescue can be found in *Section 12 Emergency response planning* and *Appendix 9 Winching (hoisting) operations* of this guide.

AI2.2 Management

Comprehensive guidance on the planning and co-ordination of SAR services is available in the International Aeronautical and Maritime Search and Rescue (IAMSAR) Manual (IMO/ICAO Doc 9731-AN/958). Volume 2 (mission co-ordination) of this manual is focused on planning and co-ordination of SAR operations and exercises.

Where secondary SAR is tasked, the scope of the SAR cover should be clearly defined and include radius of action and time on task, whether daytime only or night and day, and minimum weather, including sea state and maximum wind. The oil company should include a comprehensive SAR plan within its emergency response plans. There should also be a clearly defined interface between the emergency response organization of the oil company and that of the helicopter operator. The oil company will need to define:

- an SAR authorization process, including authorities to request call out; and
- an 'authorization to launch' process.

SAR as a secondary task to the contract will normally have been generated following a structured risk assessment of passenger survivability within the context of national or regional SAR capabilities. While individual oil companies would normally provide their own guidance on risk assessment, background guidance on survivability can be found in the Transport Canada TP13822E – *Survival in Cold Waters* (website: <http://www.tc.gc.ca/marinesafety/TP/Tp13822/menu.htm>). The risk assessment should also include the survivor drop-off points (e.g. daytime use only or lit at nights) and the decision-making process for different types of injury.

Any helicopter operator contracted to provide secondary SAR will normally have experience in the provision of primary SAR services to national SAR agencies. Such operators would normally employ an SAR Standards Manager with past civil or military SAR experience.

AI2.3 Operating standards

AI2.3.1 Operations manual

Operators carrying out SAR as a secondary task should hold an approved Operations Manual which includes supplements containing material specific to helicopter hoist operations and SAR tasking. In particular the supplements should address:

- Details about the system to de-conflict airspace and communicate with other SAR assets.
- Crew qualifications (to include offshore experience and Instrument Rating).
- Crew training (to include proficiency and line-check requirements).
- Duties and responsibilities.

- Pre-flight preparation and briefing.
- Minimum HHO equipment.
- AEO and OEI performance criteria.
- If required, the conditions under which offshore HHO transfer may be conducted including the relevant limitations on vessel movement and wind speed.
- The criteria for determining the minimum size of the HHO site - appropriate to the task.
- Fuel planning.
- Search procedures.
- HHO transfers both onshore and offshore.
- Radio communications.
- Visual communications.
- Standard hoist procedures – to include minimizing height above solid surfaces in the event of hoist emergencies.
- Hoist emergency procedures, including intercom failure, hoist failure, hoist runaway and cable cutting.
- Hoist operators instructions.
- Winchman instructions.
- Air deployment of life-rafts, including HERDS.
- Call-out priority definitions.
- SAR response criteria.
- Weather minima, to include differences for non auto-hover capability.
- Conduct of SAR missions.
- Specialist equipment.
- The method by which crew members record hoist cycles.

When required, relevant extracts from the Operations Manual supplements should be made available to the organization for which the HHO is being provided.

A12.3.2 Crew composition

The minimum crew for HHO should be as stated in the Operations Manual supplement. It will depend on the type of helicopter, the weather conditions, the type of task and, in addition for offshore operations, the HHO site environment, the sea state and the movement of the vessel. In no case should the crew be less than two pilots, one HHO hoist operator and one winchman.

A12.4 Aircraft & equipment fit

Only twin-engine helicopters, with a single-engine HOGE capability during training to public transport standards should be used for the rescue element of SAR tasks. This HOGE training requirement is mandated by some regulatory authorities but does not preclude lesser OEI performance at higher weights during actual SAR. Aircraft should be equipped for standard offshore IFR operations. Additionally, aircraft equipment should include:

- Hoist and hoist fittings allowing hoist operation from a location at the cabin door.
- GPS.
- Radio altimeter.
- Marine Band Radio.
- Radar with search and beacon modes.
- DF homing capability.
- The following optional equipment:
 - approved stretcher fit;

- 4-axis autopilot;
- auto-hover capability;
- searchlight.

Maintenance instructions for HHO systems must be established by the operator in liaison with the manufacturer, and included in the operator's helicopter maintenance programme. The installation of all helicopter hoist equipment including any subsequent modifications and, where appropriate, its operation must have an airworthiness approval appropriate to the intended function. Ancillary equipment must be designed and tested to the appropriate standard and acceptable to the authority.

AI2.5 SAR equipment

Minimum equipment requirements should include the following:

- Sea tray fit (floor protection).
- Air transportable rescue equipment pack (generally held on a mobile trolley at base). This would normally include such items as:
 - hoist operator and winchman harnesses, including quick release belt;
 - lifting strops;
 - protective helmets;
 - winching gloves;
 - knee pads;
 - earthing wire;
 - hooks and grapples;
 - manual cable cutter;
 - immersion suits;
 - stretchers;
 - hi-lines (optional);
 - emergency hoists (Heave-Ho) (optional);
 - cable break plate (optional);
 - grabbit hook (optional).
- Air deployable life-raft (SAR raft or HERDS) (optional).

AI2.6 Aircrew

AI2.6.1 Experience & competence

The Operations Manual should contain criteria for the selection of flight crew members for the HHO task, taking previous experience into account. The minimum experience level for pilots conducting HHO flights shall not be less than the National regulatory requirement for public transport category hoist operations. Where such guidance is not available, the following is recommended for Pilots in Command:

- 1,000 hours pilot in-command of helicopters or 1000 hours as co-pilot in HHO operations of which 200 hours is as pilot-in-command under supervision.
- Successful completion of written and practical training in accordance with the procedures contained in the Operations Manual and relevant experience in the role and environment under which HHO are conducted.
- 50 hoist cycles conducted offshore.
- A valid HHO proficiency check.
- A valid HHO line check.

In addition, the following previous experience is desirable:

- Military or civil SAR.
- Mountain flying and external load operations.

A12.6.2 Recent operating experience

All pilots conducting HHO should have completed in the last 90 days a minimum of 3 hoist circuits, which should include a transition to and from the hover and 3 wet lifts within that 90-day period.

A12.6.3 Training & checking

The flight-crew member should be trained in the following subjects:

- Fitting and use of the hoist.
- Preparing the helicopter and hoist equipment for HHO.
- Normal and emergency hoist procedures.
- Crew co-ordination concept specific to HHO.
- Practice of HHO procedures.
- The dangers of static electricity discharge.

Proficiency checks should include procedures likely to be used at HHO sites with special emphasis on:

- Local area meteorology.
- HHO flight planning.
- HHO departures.
- A transition to and from the hover at the target location.
- Normal and simulated emergency HHO procedures.
- Crew co-ordination and, in particular, good communication (standard patter).

A12.7 SAR crew

A12.7.1 Experience & competence

Past operational SAR experience is highly desirable. As a minimum for competence, the following is recommended for SAR crew members (hoist operator and winchman):

- Successful completion of training in accordance with the procedures contained in the Operations Manual and relevant experience in the role and environment under which HHO are conducted.
- 50 hoist cycles conducted offshore.
- A valid HHO role check.
- A valid HHO line check.

A12.7.2 Recent operating experience

All HHO crew members, both Hoist Operator and Winchman, should have completed in the last 60 days a minimum of 6 simulated or actual hoist cycles and a minimum of 2 simulated hoist emergencies.

A12.7.3 Training & checking

The HHO crew member should be trained in accordance with the following:

- Duties in the HHO role.
- Fitting and use of the hoist, with support from qualified maintenance staff, as appropriate.
- Operation of hoist equipment.
- Preparing the helicopter and specialist equipment for HHO.
- Normal and emergency procedures.

- Crew co-ordination concepts specific to HHO.
- Operation of intercommunications and radio equipment.
- Knowledge of emergency hoist equipment.
- Techniques for handling HHO passengers.
- Effect of the movement of personnel on the centre of gravity and mass during HHO.
- Effect of the movement of personnel on performance during normal and emergency flight conditions.
- Techniques for guiding pilots over HHO sites.
- Awareness of specific dangers relating to the operating environment.
- The dangers of static electricity discharge.

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Appendix 13 Contents

A13	Cold weather aircraft operations	187
A13.1	Introduction	187
A13.1.1	Application	187
A13.1.2	Equipment & materials.....	187
A13.1.3	Personnel.....	188
A13.1.4	Environment	188
A13.1.5	Remote cold weather operations.....	188
A13.2	Aircraft certification standards & equipment fit.....	189
A13.2.1	General	189
A13.2.2	Aircraft equipment	189
A13.2.3	Additional maintenance related modifications.....	189
A13.3	Flight operations - general	190
A13.3.1	Aircrew experience & qualifications.....	190
A13.3.2	Weather	190
A13.3.2.1	Equipment & training.....	190
A13.3.2.2	Weather planning.....	190
A13.3.3	Flight following.....	191
A13.3.4	De-Ice/anti-ice	191
A13.3.5	Pre-heating.....	191
A13.3.6	Re-fuelling precautions.....	192
A13.3.6.1	Static electricity hazards.....	192
A13.3.6.2	Refuelling with passengers on board.....	192
A13.3.7	Parking aircraft in the open	192
A13.3.8	Emergency blind landing procedures	193
A13.3.9	Sea-ice operations.....	193
A13.4	Helicopter-specific operations	193
A13.4.1.1	Blowing snow & whiteouts	193
A13.4.1.2	External loads.....	193
A13.4.2	General procedures for aircrew pre-flight & in-flight ice encounter	194
A13.5	Airplane-specific operations.....	194
A13.5.1	Taxiing.....	194
A13.5.2	Float & amphibious airplanes	194
A13.5.3	Ski-equipped airplanes.....	195
A13.5.3.1	Pre-flight checks	195
A13.5.3.2	Take-offs – additional considerations.....	195
A13.5.3.3	Taxiing & parking.....	195
A13.5.4	Ice airstrip operations.....	195
A13.6	Maintenance procedures.....	195
A13.6.1	General	195
A13.6.2	Cold weather fuels & lubricants	196
A13.3.3	Ground handling	196
A13.7	De-ice/anti-ice	197
A13.7.1	General	197
A13.7.2	De-ice/anti-ice procedures.....	197
A13.8	Survival equipment	198
A13.8.1	General	198
A13.8.1.1	Risk assessment.....	198
A13.8.1.2	Calculating response times in cold weather	198
A13.8.2	Survival equipment lists	199
A13.9	Facilities.....	199
A13.9.1	General	199
A13.9.2	Design.....	199
A13.9.2.1	General.....	199
A13.9.2.2	Airbase design	199
A13.9.2.3	Additional airbase equipment & facility considerations.....	199
A13.9.2.4	Helidecks.....	200
A13.9.2.5	Heliports	200
A13.9.2.6	Navigation aids & instrument approaches	200
A13.9.2.7	Communications.....	200

A13.9.2.8 Fire-fighting.....	201
A13.10 Personnel.....	201
A13.10.1 General	201
A13.10.2 Training.....	201
A13.10.2.1 All personnel.....	201
A13.10.2.2 Aircrew.....	201
A13.10.2.3 Engineers, maintenance & ground staff.....	202
A13.11 References.....	203
A13.12 Annexes	203
A13.12 Annex A – Emergency blind landing procedure.....	203
A13.12 Annex B – Suggested survival equipment lists.....	204

Appendix 13

Cold weather aircraft operations

AI3.1 Introduction

AI3.1.1 Application

The guidelines of this appendix have been designed to apply to aviation operations conducted in cold climates globally and are not limited to Arctic regions. Additionally, consideration has been given to operations conducted where the classification of risk is considered as operating within a hostile environment based on the operating temperature and the associated hazards such as mountainous terrain, glaciated areas and broken sea-ice as well as time to rescue response. Reference and guidelines for determination of a hostile environment are contained in *Appendix 6 Operating environment and weather*.

Application of cold weather operating guidelines within this appendix is not based solely on a specific temperature, or geographical region. The Aviation Advisor, in consultation with the business unit, shall determine the requirements of the proposed mission and determine the applicability of the guidelines within this appendix. This appendix cannot cover every cold weather scenario and the Aviation Advisor must analyse all of the factors to complete a safe operation. The factors should include the environmental effects, geographical location, and the duration of the mission in the selection of, and type of, aircraft, support equipment and personnel.

Under all circumstances, the operator must have procedures within their operations manual that address cold weather operations which are approved by the National Civil Aviation Authority (NCAA). Additional authorizations may be present in the operator's operating specifications in support of cold weather operations. It is also expected that the hazards associated with cold weather operations will have been identified and analysed within the operator's hazard register and the appropriate controls documented and put in place.

This appendix provides supplementary guidance not contained in the *AMG* and is designed to be used in conjunction with the full contents of the *AMG*. Cross-references are included as necessary.

At the time of writing the principal OGP reference for working in cold climates is OGP Report N° 398, *Health aspects of work in extreme climates*. This document or its replacement can be accessed at: <http://www.ogp.org.uk/publications>.

Aviation operations in high latitudes and extremely low temperatures are significantly affected by a number of factors which are briefly discussed below.

AI3.1.2 Equipment & materials

Effects of cold on equipment and materials are numerous, some examples are:

- Metals become more brittle – leading to greater risk of cracking and fatigue damage.
- Shrinkage in metal components built to close tolerances, especially with dissimilar metals, could result in stiffness of controls, jamming of panel doors or other effects.
- Hydraulic oil seals may harden, resulting in leakage.
- Reduction gear oil seals could harden, causing the loss of oil and potential loss of pressure.
- Pneumatic lines may clog with frozen condensation, which could affect the operation of pneumatically operated systems.
- Fuel could start to congeal, ice crystals may form within the fuel system, and fuel filters may become blocked or by-passed with the use of some fuel additives. Special fuels may be required.
- Flight control take-off position indicator sensors may malfunction due to the effects of cold soak upon the components. There may also be effects on electrical trim motors resulting in slow trim rates or trim motor cut-out due to torque overload induced by stiffness of the controls.
- Lubricants may harden, resulting in stiff mechanical engine and flight controls.
- Battery performance is markedly reduced.

- LCD performance may be affected.
- Vertical suction gyro systems are very slow in erecting during low temperatures. (At -10°C , it takes 4 minutes, while at -40°C , it takes about 8 minutes.
- In high latitudes navigation and communication equipment are also likely to be affected in the following manner:
 - High magnetic variation – unreliability of gyro-magnetic compasses.
 - Poor coverage/footprint of some communication satellites.
 - Solar flare effects may affect some communications.

A13.1.3 Personnel

Personnel working in a cold weather environment may also be affected by a range of factors; the following should be taken into consideration:

- Projected survival times in Search & Rescue scenarios.
- The risks of hypothermia and frostbite.
- Over-dressing causing heat distress.
- Reduced dexterity, co-ordination and decision making ability.
- The potential for cold burns when handling metal or volatile fluids.
- Diet - the need to increase calorie intake, risk of dehydration, and avoidance of alcohol and caffeine.
- Time to carry out tasks when outside increased due to bulky clothing, possible difficulties moving equipment, need to take more breaks in order to stay warm, etc.
- Potential snow blindness and sunburn.
- Psychological effects of working in high latitudes (e.g. Seasonal Affective Disorder).
- Physiological effects of working at high altitudes.

A13.1.4 Environment

Cold weather may have a profound effect on the ability to conduct aviation operations, especially when rapid changes are likely to occur. Among the issues to consider are:

- Accumulations of snow and ice (wet snow, rain ice, clear icing, rime ice and hoar frost) on the airframe, including:
 - Degradation of the aerodynamic properties of wings, rotor blades and control surfaces.
 - Asymmetric weight distribution on helicopter rotor blades causing vibration.
 - Control restrictions.
 - Poor cockpit visibility.
 - Possible foreign object damage to engines.
- Falling and blowing snow affecting visibility.
- Snow clearance requirements on airfields and helipads/helidecks.
- Increased risk of Controlled Flight into Terrain due to whiteout or flat light conditions.
- Contaminated runways, helipads/helidecks.
- Sea-ice – pressure ridges, moving rubble ice affecting Search & Rescue.
- Ice fog, Arctic sea smoke.
- Static electricity discharges are routine and of increased intensity in dry conditions.
- Visual illusions caused by low sun, flat light etc.
- High winds.

A13.1.5 Remote cold weather operations

These operations may take place in remote areas; the distances travelled may be commensurately greater. The lack of facilities is also likely to be a problem in many areas. Consideration must be given to the availability of:

- Accurate and timely weather forecasts/observations.
- Alternates for IFR operations.
- Fuel and maintenance facilities.
- Hangars, particularly for long term operations.
- Search & Rescue assets and medical facilities.
- Navigational aids.
- Reliable communication systems.
- Wildlife or other obstructions on the landing area.
- Needs of the indigenous population, if applicable.
- Instrument approach systems including GPS and DGPS.

AI3.2 Aircraft certification standards & equipment fit

AI3.2.1 General

The OGP member's aviation departments should determine the appropriate aircraft to support the requested operation. The aircraft should be certified to operate in the anticipated temperatures. Aviation departments should work closely with the aircraft operator to assure the aircraft is fitted with appropriate and approved cold weather operating equipment, including de-icing, anti-icing and ice detection devices. As a recommendation, aircraft should be certified to at least -40°C . Modification kits are available for some aircraft models to improve cold weather limitations. Aviation Advisors should consult the manufacturer performance and certification data to assure the aircraft is properly equipped for the operating condition, and that cold weather modifications to the airframe or engine(s) are approved. Basic and supplemental cold weather information is typically available within aircraft flight manuals.

AI3.2.2 Aircraft equipment

Aircraft role and location-specific additional equipment considerations may include:

- Particle separators or intake screens may need removal or modification during cold weather operations.
- Engine and airframe anti-icing systems.
- Snow shoes/skis for landing gear. Specialised skis are available for use on small airplanes and most helicopters with skids or wheels. It may be appropriate to use these for landings in unimproved snow areas as well as in warmer months in soft tundra/muskeg.
- Low precession compasses with a 'direct gyro' mode for operations in high latitudes.
- GPS (This should be a duplex system if cleared for use as the primary navigation aid.) The use of differential GPS (DGPS) and/or Wide Area Augmentation System (WAAS) or equivalent systems should also be considered.
- Inertial navigation systems (INS).
- Satellite flight following systems.
- Enhanced night vision equipment, including night vision goggles (NVG), heads up displays (HUD), and enhanced vision systems (EVS).
- EGPWS to mitigate the CFIT hazards associated with white-out and flat light.

AI3.2.3 Additional maintenance-related modifications

Any manufacturer's cold-weather modifications should be considered and installed or made available as necessary. The following additional equipment should be considered for all aircraft:

- Screens/covers to protect cockpit windows.
- Baffles and intake covers.
- Pre-heating modifications for cabins, engines, electronic bays, transmissions, etc.

- Wing or rotor blade covers.
- Wing or rotor blade tie downs.

A13.3 Flight operations – general

A13.3.1 Aircrew experience and qualifications

All Pilots operating in cold weather environments shall be experienced and qualified for the environmental conditions anticipated and the nature of the operation and have at least a minimum of one year experience in arctic/cold weather environments as per *AMG Appendix 5*. Recommended minimum qualifications for arctic operations include IFR currency.

Additional training requirements are listed in *Section 10.2.2* of this appendix.

A13.3.2 Weather

When operating in cold climates and hostile environments the operator has accurate weather forecasting equipment as well as equipment at the operational base that monitors changes in barometric pressure. In most cases it is advisable to have a certified meteorologist on site.

A13.3.2.1 Equipment & training

Refer to the *AMG, Section 11.5* for information on recommended personnel training, equipment, observation requirements, and maintenance. Consideration should be given to providing the following meteorological equipment:

- References Thermometers that can record below -40°C.
- Barometric altimeters with adjustments for extremely low pressure.

A13.3.2.2 Weather planning

The following points should be considered when weather planning:

- References contained within the *AMG, Appendix 6* provide details on operational weather guidelines, adverse weather planning, etc.
- An accurate weather forecast will be a critically important requirement, especially in seasons and locations where the weather is known to change rapidly. Consideration should be given to provision of an in-house capability if no reliable service is available locally.
- Use weather reports and icing forecasts with caution. Area forecasts will probably not give sufficient detail when operating in remote locations. Furthermore, current icing definitions used to describe the icing environment (trace, light, moderate, and severe) do not differentiate with respect to different types of aircraft. Therefore, a problem with these definitions is that a particular liquid water content and drop size distribution may be light with respect to one aircraft and moderate to another.
- Cloud base and visibility minima for VFR flight, should take account of terrain and problems of depth perception associated with flat light, when necessary.

The published Adverse Weather Policy should include guidelines for the following in addition to those already provided in *Appendix 6*:

- Minimum operating temperatures for aircraft.
- Minimum operating temperatures for outside work of personnel without portable heating devices.
- Pre-heating temperatures.
- Cold weather flight control hydraulic warm up procedures.
- Compacted snow or ice operations.
- Temporary airbases and landing site safety.
- Inclusion of additional crew members, in particular maintenance staff.
- Landing zone condition (icy, deep snow, powder snow).

A13.3.3 Flight following

Due to the hostile nature of the environment and the subsequent difficulty in locating and recovering survivors from a downed aircraft, continuous flight following must be provided.

Preferred systems will vary according to location; in areas where full Air Traffic Control exists then aircraft are tracked as a matter of routine. In more remote areas consideration should be given to the use of automated satellite based systems which provide accurate, continuous position information, automatic alerting systems, and in many cases satellite phone capability.

Any flight following system should be permanently monitored when aircraft are airborne and recording equipment should be provided.

A13.3.4 De-ice/anti-ice

Pre-flight de-icing of aircraft and removal of snow is critical to operational safety. Aircraft unsheltered by hangars are subject to frost, snow, freezing drizzle, and freezing rain that can cause icing of control surfaces, rotor blades and fuselages, rendering them un-flyable until cleaned.

Operators should take particular care to ensure that aircraft are free from snow and ice during pre-flight inspections. Never assume that snow will blow off, there could be a layer of ice under it. Do not underestimate the effect of even a thin layer of ice on wing surfaces. Data from the available literature suggests that ice roughness as small as 0.010 - 0.015 inches (0.254 mm - 0.381 mm) may negate takeoff stall margins altogether on commuter type aircraft.

If any accumulation is present, the aircraft should be de-iced/anti-iced. Operator operations and training manuals should include aircrew actions to be followed for de-ice/anti-icing which include the following and must be type specific to the aircraft model being used:

- Pre-takeoff examination of the aircraft surfaces for contamination must be completed within 5 minutes prior to takeoff.
- Aircrew responsibilities for the clean aircraft rule including which surfaces must be checked.
- During blowing snow conditions, crew should inspect and clear any openings (engine or heater intakes, pitot static openings, wheel wells, fuel vents, elevator and rudder controls, control tubes, etc) for snow/ice obstruction that could affect normal operations.
- Recognition of surface contamination.
- Aircrew training on the de-/anti-icing procedures, holdover time tables (if operator has approval to use holdover times), and responsibilities.
- De-/anti-icing procedures, fluids, and methods authorized for use.
- Verification from the ground crew that the de-icing has been completed and of the holdover time start if the operator has an approved de-ice programme.
- Location specific procedures and equipment.
- Post de-icing/anti-icing checks.

See A13.7 below for details on de-ice/anti-ice procedures.

A13.3.5 Pre-heating

Pre-heating of the cockpit and cabin should be conducted under the guidelines of the aircraft, engine and avionics manufacturer's recommendations. The operator's maintenance and operations manuals should include details of the procedures, equipment and training to be used for pre-heating of aircraft. These should establish temperatures for cabin and engine heating requirements. The safest and most efficient means of pre-heating is to house the aircraft in a suitable, heated facility.

Pre-heating of the engines, transmissions, electronic bays, etc. should be conducted anytime the ambient temperatures are below the manufacturer's recommended operating temperatures. For quick response, or on call flight conditions, the aircraft and engine compartments should be pre-heated to a temperature within normal operating limitations.

Whenever possible, use a start cart to preserve aircraft batteries and prevent shock to avionics systems caused by transferring power from start to generator feeds. Other factors to consider:

- Sluggish motor and actuator movements.
- Sluggish antenna scan - radar.
- Wires become brittle in extreme cold and are easy to break.
- Possible lack of engine and/or trim and navigational indications until units have properly warmed.
- ON/OFF and volume controls hard to turn, or inoperative.
- Gyros may take longer to erect (horizontal and vertical).
- Cockpit indicator lights may be dim due to poor contacts.
- Indicator glasses may fog in units not hermetically sealed.
- Contraction of avionics mounting racks is possible, causing multiple or intermittent malfunctions in avionics/instrument systems.
- Cold engines require more starter torque and higher current drain.
- The avionics may require warm-up after cold soak. Over twenty minutes may be required at temperatures below -30°C. (Refer to manufacturer's operating limitations for individual equipment) The following indications may confirm proper warm-up:
 - Frequency/code displays illuminate normally with pilot control of brightness and frequency selection.
 - Audio reception is available on all applicable avionics. In the absence of a suitable station.

A13.3.6 Re-fuelling precautions

A13.3.6.1 Static electricity hazards

Extreme care should be exercised when re-fuelling aircraft which are parked on snow or ice as there is an increased risk of build-up of static electricity. In particular high static charges may build up during snow removal as snow is brushed off fuselages and wings. Ensure that the aircraft is grounded properly by connecting the cable first to ground and then to the aircraft.

A13.3.6.2 Re-fuelling with passengers on board

Refuelling with passengers on board an aircraft is potentially hazardous; however, at remote sites in cold weather it is likely to be safer to re-fuel with passengers on board if no warm accommodation exists. Procedures should be developed for this which include:

- A crew member present in the cabin at all times.
- The fuelling rig attended at all times.
- Door open at all times.
- Seat-belt signs off; passengers must not have seat-belts fastened during fuelling.
- If using an aircraft engine-powered pump all crew and passengers briefed on dangers of running propellers or rotors.

A13.3.7 Parking aircraft in the open

If a hangar is not available and aircraft are parked in the open:

- Meticulous attention should be given to ensuring that all covers are fitted to pitot tubes, static ports, ram air ducts, and engine intakes and that control locks are inserted.
- Aircraft should be tied down when required, using approved equipment and tie-down schemes. This should include securing propellers and rotor blades.
- Batteries, not fully charged, will lose a large percentage of their efficiency while in temperatures below -30°C. Batteries should be removed if the aircraft is to be parked for lengthy periods in these temperatures.

- Tyres on an aircraft parked in the open during cold weather develop flat spots where the tyres contact the ground. This 'set' in the tyres is temporary and disappears quickly when the aircraft is taxied.

A13.3.8 Emergency blind landing procedures

Some operators, including the British Antarctic Survey, have developed a blind landing procedure for use in emergencies. An example of this is at *Annex A*. It is stressed that this is for illustrative purposes only and any such procedure should be developed and authorised in accordance with local and national regulations.

A13.3.9 Sea-ice operations

Operations on or from sea-ice are particularly hazardous and require specialised experience and knowledge. Only operators with such experience and who are familiar in the region of interest should be employed in such work. When operating on sea-ice the following points should be noted:

- A very simple formula to estimate the minimum ice thickness required to support the weight of the aircraft as flown is $h = 4 \times \text{square root of } P$; where **h** is the ice thickness in inches and **P** is the load, or gross weight, in tons. It must be noted that this is an extremely basic calculation and should be taken as an absolute minimum thickness required.
- Freshwater and sea-ice have different physical properties. The former is stronger but more brittle and prone to sudden collapse. Sea-ice will bend and flex more.
- A crucial point, particularly when considering fixed-wing operations is the water depth. Moving over ice will create a shock wave beneath. As the depth shallows, this can cause an interference wave that builds up beneath the ice and crack what would otherwise be considered strong enough ice. This is relevant to river and lake landings, and sea-ice close to shore.
- Prior to any aircraft operations ice should be drilled to assess its thickness and the operation reviewed by Risk Analysis. This is clearly problematic if landing for the first time at an un-manned site. With helicopters it may be possible to drop a drill crew then hold off and land on satisfactory result. Alternatively it may be necessary to send a crew in via ground means or land at a nearby hard surface area.

A13.4 Helicopter-specific operations

A13.4.1.1 Blowing snow & whiteouts

Blowing snow and whiteouts can pose extreme hazards to helicopter operations due to loss of visual cueing and reference to the horizon and pilots should have training in actual conditions before performing these operations.

It is vital that landing areas be cleared of loose snow as far as possible.

The addition of landing cues that extend above the snow level outside the perimeter of the established landing area should be considered, as should the provision of a Portable VASI or PAPI.

A13.4.1.1.1 Remote landing areas

When operating in deep, dry snow conditions which may obscure the pilot's vision during the descent, pilots should be trained to recognize and avoid possible white out conditions. In all cases, the pilot should not descend in snow conditions which would obscure visual references.

A13.4.1.2 External loads

- Very long lines may be necessary to allow the helicopter to hover above the snow cloud developed from the rotor wash.
- Specialised training in actual conditions will be necessary.
- Ground crew will need additional protective clothing due to wind chill effects.

AI3.4.2 General procedures for aircrew pre-flight & in-flight ice encounter

Whenever there is potential for flight in icing conditions pilots should consider the following procedures:

- Avoid all icing conditions. When unexpected in-flight icing is encountered, do not hesitate to initiate any and all actions reasonably calculated to depart the icing environment expeditiously.
- Avoid abrupt or erratic cyclic and collective inputs when attempting to shed rotor blade ice accumulations, since such inputs may cause asymmetrical shedding and accompanying severe vibrations. Rapid variations in rotor RPM may be of some assistance in achieving symmetrical shedding.
- Recognize the extreme susceptibility of light helicopters to in-flight icing. The limited power available and faster rotor systems of light helicopters make these aircraft extremely sensitive to in-flight icing (severe vibrations, control difficulties and insufficient power reserves).
- Do not attempt to judge or estimate main rotor blade ice accumulations by observed build-ups on the windscreen or other areas of the aircraft. Since ice accumulates on the rotor blades at an accelerated rate a 5 to 10 per cent increase in power required to sustain normal flight or a decrease in airspeed of 10-30 kts for a given power setting is a more reliable method of determining in-flight icing.
- After flight in the icing environment, helicopters should be shut down to prevent shedding ice from main rotors and tail rotors from injuring personnel or damaging other aircraft or structures.
- If encountering unintentional entry into IFR conditions be aware that sustained flight in the upper half of cumulus and stratus clouds, where large water droplets and high liquid water content normally are found, may cause an extremely fast build-up of ice with resulting severe vibrations.
- When severe vibrations due to blade icing occurs, reduce airspeed from normal cruise to lessen rotor vibrations.

AI3.5 Airplane-specific operations

AI3.5.1 Taxiing

During taxiing the following points should be considered:

- Reduced visibility due to snow cloud caused by prop wash.
- In snow or slush conditions avoid taxiing at high speed or long distances as contamination may accumulate in the wheels, bay doors, brake housings, etc.
- After taxiing in slush, it is recommended that the landing gear is cycled several times shortly after takeoff to dislodge any debris before it freezes and affects the operation of doors and actuators.
- For fixed-wheel aircraft, it is recommended that wheel skirts be removed during winter operations.
- During taxiing use brakes to create friction heat.
- Taxi with slats/flaps retracted to avoid ice and/or slush build up on slats/flaps rails, tracks, and actuators.
- Follow manufacturer's recommendations for use of parking brake and control locks.

AI3.5.2 Float & amphibious airplanes

Airplanes with floats can have water rudders and landing gear freeze after departure from water in cold weather. Therefore, amphibious float planes should not conduct water landings when air temperatures are below 0°C.

A13.5.3 Ski-equipped airplanes

A13.5.3.1 Pre-flight checks

Due to lack of brakes, it is not normally possible to carry out propeller auto-feather and over-speed governor checks on snow surfaces, however, the opportunity to make these checks should be taken **when the skis are frozen in**. When carrying out these checks, it is most important that the area ahead of the aircraft is free of all obstructions in case the aircraft should move forward.

A13.5.3.2 Take-offs – additional considerations

When operating from snow covered surfaces, surface consistency can vary greatly between sites and over time. The snow may be hard, almost icy, to soft powder, to melting slush with the consistency of porridge. The softer conditions may reduce aircraft acceleration to the point where it is impossible to get airborne. To address this taxiing along the take-off run several times to compact the surface has been shown to be effective. Additionally when loading the aircraft, aim for as far aft a centre of gravity as possible, within manufacturers loading limits, this will aid the lifting of the nose ski, reduce drag and aid further acceleration.

Sastrugi¹ patterns may also influence take-off direction. Take-offs parallel to sastrugi will reduce shock loads through the nose gear, but all factors must be considered.

A13.5.3.3 Taxiing and parking

Prior to parking the aircraft for any length of time, it is useful to stop for a few seconds before pulling on to the parking area; this allows the skis to cool and helps prevent them subsequently freezing to the surface. The parking area must be approached with extreme caution, especially when there are obstructions close at hand. The lack of instantaneous braking, and the possibility of the aircraft sliding (even when the engines are stopped) must be borne in mind at all times by the crew and ground personnel. Ideally the aircraft should be parked into wind. If on a traverse slope, park across the slope, with the nose ski turned slightly up-slope. A fully loaded aircraft may not slide when stationary, but may do so as weight is removed.

On some surfaces and slopes, forward movement may occur even at idle power and with propellers feathered.

A13.5.4 Ice airstrip operations

Ice-strip construction and operations are specialised and professional advice should be sought if the mission requires such construction. The aircraft operator must have approval from their controlling NCAA to operate from such airstrips, and the aircraft must be equipped for gravel, or contaminated runway operations prior to use.

A13.6 Maintenance procedures

A13.6.1 General

The following points should be considered when developing maintenance procedures for cold weather operations:

- Aircraft must be maintained in accordance with any enhanced procedures recommended by the manufacturer for operations in cold climates.
- Pitot static systems may become blocked by ice, snow or de-ice fluids.
- To reduce condensation in fuel tank, when operationally possible for the next flight, it is recommended that fuel tanks be topped off/filled as much as practicable before placing in hangars or when parking warm aircraft in cold conditions.
- Fuel weights and volume may be significantly different due to type of fuel used and cold temperatures.

¹ Sastrugi are sharp irregular grooves or ridges formed on a snow surface by wind erosion and deposition. They differ from sand dunes in that the ridges are parallel to the prevailing winds.

- Research into the applicable maintenance publications such as the aircraft maintenance manuals and service bulletins for the airframe and engines, ancillary equipment, should be undertaken to determine any systems, or components that may require additional precautions during cold weather operations.
- The freezing point of liquids in galleys, toilets and potable water systems should be considered. If aircraft are going to cold soak below freezing temperatures, then such liquids should be drained down and the relevant systems disabled.
- Tires may appear to have low pressure in cold weather. The minimum required inflation must be maintained for the cooler climate and readjusted in the warmer climate.
- Landing-gear oleo struts should be serviced with nitrogen as per manufacturer recommendations to prevent the formation of ice crystals in the hydraulic fluid that could cut the seals.
- Engine fire protection canisters may appear below normal charge. The appropriate charge should be determined by the use of a calibration graph.
- Battery performance may be significantly degraded when cold soaked. Manufacturer's performance data should be consulted and, if necessary, batteries removed from the aircraft and stored in warm facilities.
- Post-flight, ensure that door, window, baggage and equipment bay seals are free from moisture – (if this is not done then frozen moisture could prevent doors etc being opened easily).

A13.6.2 Cold weather fuels & lubricants

At temperatures near or below -47°C (the freezing point of Jet A-1) consideration should be given to using Jet B or equivalent fuel if the aircraft is certified for its use. However, Jet B is a more volatile fuel and so a separate risk assessment should be undertaken and procedures put in place for the handling of Jet B.

The following should be considered:

- Fuel anti-icing additives and their effects on fuel filters and tank systems.
- As maintenance procedures, aircraft performance and fuel consumption figures may be affected, detailed advice should be sought from the aircraft manufacturer.
- Ground support equipment may also need additives in the fuel to prevent gelling.
- Cold weather increases the likelihood of the accumulation of static electricity when using pumping equipment and powerful static discharges present a risk of fire and serious injury to personnel. Bonding integrity should be regularly checked and procedures modified to minimise the danger.
- The presence of water in fuel can lead to the formation of ice crystals, which can block filters and cause damage to sophisticated aircraft fuel control systems. The use of fuel system icing inhibitors should be considered, even if the surface temperature is above freezing, as aircraft may be flying at altitudes where the temperature is considerably lower. Airframe manufacturers should be consulted for suitability of these fluids.

A13.6.3 Ground handling

- Towing vehicles with 4 wheel drive, or tire chains on the wheels may be necessary for aircraft movement.
- The operation of towing equipment becomes more hazardous during cold weather operations due to ice and snow on the towing surface. Stopping distance will be increased and caution should be used when towing on an incline due to poor traction.
- Specialised training and procedures may be needed for ground handling in cold weather operations.
- De-ice/anti-ice equipment should be available for any location where the aircraft may operate within the cold weather operation.
- Additional cold weather personnel protective equipment should be made available and used.

AI3.7 De-ice/anti-ice

AI3.7.1 General

Clean aerodynamic flight surfaces are critical to flight safety and aircraft performance. By regulation pilots may not take-off with an aircraft when frost, ice or snow is adhering to the surfaces.

De-icing may be accomplished by the following means:

- Application of heated water followed by undiluted glycol based fluids; or
- By applying a heated water/glycol solution; or
- By mechanically brushing off snow and ice prior to application of de-ice/anti-ice fluids; or
- By placing the aircraft in a heated hangar until the contaminant melts and the surfaces are tested dry.
- Consideration should be given to painting wings, rotor blades and control surfaces black to aid the melting of snow and ice when aircraft are parked in sunlight, if authorised by the aircraft manufacturer.

AI3.7.2 De-ice/anti-ice procedures

Written procedures should be provided by the aircraft operator in the form of a Ground Support De-ice/Anti-Ice Manual that includes the following:

- Detailed procedures to be used for de-ice/anti-ice in line with local Civil Aviation Authority, aircraft manufacturer, ICAO standards and Association of European Airlines as applicable, note this list is not exhaustive and there may be other publications available according to location.
- Procedures for ensuring the quality and suitability of fluids for the aircraft type.
- Procedures for annual pre-cold weather season verification that landing areas being used have proper ice and snow removal equipment for the operations area, that required de-ice/anti-ice fluids are adequate and shelf life has not expired.
- De-icing fluids can be damaging to aircraft components. Manufacturer recommendations and approvals for the use of fluids should be checked for currency and assurance they have not changed.
- Appropriate de-icing training for the aircraft type since composite components are susceptible to damage from de-icing operations. Physical impact, scraping, high temperatures and rapid thermal cycling may all cause damage and unseen de-lamination.
- Verification should be provided that the available Type I-IV de-ice/anti-ice fluids are approved for use by the airframe, landing gear and engine manufacturer.
- Training of personnel on the specific procedures and equipment to be used.
- Equipment required, with verification that necessary lift baskets are available for reaching aircraft surfaces at elevation.
- Procedures for tracking use of Type II-IV fluids and subsequent inspection for de-hydrated and removal of Type II-IV fluids, if used, from aerodynamic 'quiet' areas to avoid the risk of re-hydration and re-freezing.
- A means to capture fluids may be necessary to allay environmental concerns.
- Provision for the ground staff to inform aircrews that, prior to departure, the aircraft has been properly de-/anti-iced, the type fluid used, start/beginning of holdover time, and verification that the aircraft is free of contamination.
- The calculation of holdover times following the use of de-icing fluids. This time begins when the application of the fluid is complete and expires when the fluid loses its effectiveness according to the prescribed holdover time tables (SAE or ISO). Holdover times are based on temperatures of fluids, concentrations etc.
- Environmental protection considerations; glycol-based de-icing fluids used for commercial aircraft can be harmful to the environment.

Notes:

- *Automotive antifreeze is not an approved fluid for aircraft exterior surface use.*
- *Type I fluid is always applied heated. Types II, III and IV may be heated/unheated. Cold undiluted fluid provides longer protection.*

AI3.8 Survival equipment

AI3.8.1 General

Survival equipment requirements vary by region and time to rescue, land versus sea and the environmental conditions. The Aviation Advisor should check with the regional Civil Aviation Authority for guidance of any recommended or regulatory requirements.

Weight restrictions normally preclude the opportunity to carry all the desired survival equipment and rations recommended by various agencies. It is recommended that the Aviation Advisor include communication, locating devices and a reliable Search & Rescue service as the primary components of the survival plan.

The following points are for consideration and to prompt discussion according to the specific nature of the operating environment, including the estimated time for rescue. The Aviation Advisor working with the aircraft operator must determine the appropriate equipment and quantity to be carried. The following points should also be included in such planning:

- Aircrews operating helicopters in a cold-weather hostile environment should wear a survival vest which at a minimum contains a voice-capable GPS Emergency Position Indicating Radio Beacon (EPIRB).
- Consideration should be given regarding access to survival equipment in the event of a mishap. Survival equipment in a baggage bay may not be accessible depending on the final resting position of the aircraft.
- Passengers should be briefed to keep personal survival equipment and clothing readily accessible in the event of fire/ditching.
- Passengers should be trained in basic survival techniques for the region in which the aircraft operates.
- In cold weather operations where there is a risk of elevated time to rescue, passengers should be instructed to carry an extra supply of any personal medications to cover that extended period. A 48 hour period should be suggested.
- Consideration should be given to establishing caches of survival equipment at points along overland routes.

AI3.8.1.1 Risk assessment

Before deciding on which equipment will be required, a risk assessment should be conducted (see *AMG Appendix 1*) to include an evaluation of exposure time; e.g. whether the flight will be primarily conducted over water, broken ice or over land (including thick ice). The threat from animals such as bears should be assessed and an appropriate response developed. This may involve the carriage of firearms and the employment of bear ‘hazers’ (if so then this must be done in accordance with local regulatory authorities requirements).

AI3.8.1.2 Calculating response times in cold weather

It will be necessary to establish realistic estimates of survival and rescue times in the event of a ditching or forced landing in cold weather. Survival times will depend on a range of factors, including the nature of the operating environment (geography, seasons, water temperatures, etc.), the survival equipment provided, the response time, and training of personnel. Every effort should be made prior to project start to have the appropriate and trained assets in place for Search & Rescue services.

As a general rule, Survival Time $\geq 1.5 \times$ Rescue Time (RT).

Rescue times should be established from actual exercise data.

Rescue time calculations should include:

- Time to lift or hoist all aircraft occupants to the rescue vessel/helicopter.
- Time for the response asset to reach the survival scene.
- Time to shuttle personnel to a place of safety. A suitable response vessel is regarded as a 'place of safety', the rescue phase is considered to be complete once the survivors are sheltered and under medical care.
- Time to off-load, refuel, etc. at the place of safety for any required return trips. It is essential to use realistic timings, including return trips, in the case of more survivors than a single Search & Rescue asset can accommodate, or sequencing of pick-up, in the event of more than one Search & Rescue asset on scene at a time.

A13.8.2 Survival equipment lists

Suggested lists of survival equipment are at *Annex B*.

A13.9 Facilities

A13.9.1 General

When practicable, aircraft should be kept in a heated hangar between flights.

If the risk of wind chill is rated 'high' or 'very high', all work should be carried out inside if possible.

Operations from open air exposed locations should be avoided whenever possible, but it will be necessary to have planned appropriately to provide air-portable solutions for situations when this is unavoidable.

A heated refuge should be available for crew and technical staff in the vicinity of the aircraft operating area.

A13.9.2 Design

A13.9.2.1 General

Professional guidance should be sought when planning the construction of an airstrip/heliport/helideck.

A13.9.2.2 Airbase design

Recommendations are listed in *Section 11* of the *AMG*. Additionally:

- In cases where the aircraft manufacturer has not provided performance data for operation on contaminated or ice runways, the operator must show that an adequate margin of safety will be applied.
- Obstruction data and performance calculations should take account of the potential hazard of snow piled at the end of runways during ploughing.
- Balanced field lengths should be calculated using manufacturer approved data.

A13.9.2.3 Additional airbase equipment and facility considerations

- Snow and ice clearance capability.
- De-icing/anti-icing equipment.
- Forced air heaters, etc.
- Aircraft tie-down points and tie-down equipment appropriate to the aircraft in use.
- Additional/specialised runway marking.
- Hangars must be heated; portable sources may be acceptable for temporary facilities. Precautions against fire hazards should be taken when using portable equipment for heating.

- Portable heating solutions may include (certification/approval for use on aircraft should be confirmed):
 - The use of space heaters to heat cabins, cockpits and electronic bays, engines, gearboxes etc.
 - Electric heating pads to pre-heat gearboxes.
 - Electric heaters for engines.
 - The use of temporary shelters (including ‘tents’ to provide protection from the elements when working on particular parts of the aircraft) for necessarily prolonged operations.

A13.9.2.4 Helidecks

Consideration should be given to the following:

- Adequacy of non-slip surfaces on the helideck, access and emergency egress routes. In most cases in cold environments with snow and ice conditions rope or nylon weave nets will be necessary to provide the necessary friction. Although this makes snow and ice removal more difficult, for snow conditions, the nylon net has proven to be easier to work with than the rope nets.
- The effects of the environment on fire fighting and crash rescue response capability. It may be necessary to provide heated pipe work, or open and close valves during flight operations.
- Formulating procedures for the use of unmanned platforms. Their use may need to be restricted or banned if snow and ice are present on the helideck.
- Hangars will be necessary for any offshore helicopter basing. Consideration should be given to helicopters with folding blades which have a storage advantage due to smaller hangar requirements.
- Snow and ice clearance procedures must be in place to provide acceptable obstacle clearances.

A13.9.2.5 Heliports

- In extreme heavy snow areas, it may be necessary to raise lights above the normal height and displace further from the heliport edges.
- Use of visual markers is recommended in areas where snow may accumulate above standard light heights.
- Snow and ice clearance procedures must be in place to provide acceptable obstacle clearances.

A13.9.2.6 Navigation aids and instrument approaches

GPS will generally be the preferred solution for area navigation at high latitudes due to its availability and lack of requirement for ground based equipment. GPS, may however, be less effective at very high latitudes due to errors induced by atmospheric effects and sub-optimal satellite geometry (depending on the satellite constellation used).

It may be necessary to use differential GPS (DGPS) to achieve the necessary accuracy for terminal applications.

In some locations, where GPS is not approved for use, ILS or NDB may be used as an alternative.

A13.9.2.7 Communications

By the nature of the environment facilities may be limited, but reliable communications are vital to successful operations. The following factors should be considered:

- **HF Radio:** This has historically been the principal method for long range communications, but HF often suffers from poor transmission and reception due to diurnal changes in the ionosphere, solar flares etc.
- **Satellite Communications:** Modern systems are reliable and cost effective and have the bandwidth to deal with large quantities of data and digitised voice capability. Existing satellite footprints may be limited in high latitudes, depending on the satellite constellation used. Flight following may also be provided by satellite based systems.

- **VHF and VHF Repeater Stations:** VHF radio will remain the principal method of air/ground communication for civil aircraft for the foreseeable future, at least for relatively short ranges (>20nm). Repeater stations may be used to extend the effective range.

A13.9.2.8 Fire-fighting

- Note that fire-fighting media have temperature ratings for applicable use due to chemical composition.
- Traditional water and foam-based fire fighting systems may not be appropriate for use in extremely cold environments.
- Dry powder and compressed air foams may be used on fuel fires, and aqueous film forming foam (AFFF) may be successfully used in conjunction with these at temperatures as low as -40°C when an antifreeze agent and salt-based chemical are included in the water.

A13.10 Personnel

A13.10.1 General

Some of the potential effects on personnel are outlined in *Section 1.3* above. It is vital that working routines are properly structured to take account of the environment. Details of procedures should be laid down for both aircrew and maintenance staff to prevent physical injury and mitigate any reduction in efficiency. Even the simplest task may be very difficult to achieve, and appropriate levels of supervision (e.g. the use of a two-man rule) will be necessary.

A13.10.2 Training

A13.10.2.1 All personnel

It is recommended that all passengers and support personnel associated with operations in cold weather climates and hostile environments attend survival courses appropriate for the anticipated conditions.

A13.10.2.2 Aircrew

All crews shall complete an initial and annual recurrent arctic/cold weather operations training syllabus appropriate to the nature and location of their operations, including documented ground, flight and survival training. This is to include, but not be limited to, the aircraft to be operated. Suggested topics shall include:

- Clothing to be worn.
- Use of aircraft survival equipment.
- Animal hazards.
- Physiological effects of cold weather.
- Regional meteorology and specific weather hazards.
- Aircraft de-icing/anti-icing.
- Review of de-icing/anti-ice systems and de-icing equipment, including the use of hold-over time tables.
- Aircraft performance and flight planning.
- High latitude navigation (if applicable).
- Preparation for flight, including preheating.
- The effect of cold on dangerous goods.
- Fuelling procedures.
- Techniques for flight in snow including: flat light, whiteout, blowing snow.
- Landing on skis (if installed), ice and snow runways/helipads/heli-decks.
- The risks associated with contaminated runway performance.

- For helicopters - landing on unprepared snow and ice, especially in remote areas. Specialised training in high hover/landing techniques, rotor wash, snow cloud situations in actual conditions will be necessary. Similar training will be needed for external load operations.
- Cold weather areas are more likely to be remote, uncontrolled airspace so need to reinforce/enhance procedures for mid-air collision avoidance.
- Personal safety.

In addition to the ground school initial/recurrent/seasonal training described above, the aircrew shall complete a flight training proficiency check with a qualified instructor when suitable conditions exist, covering:

- Landing and departure from snow and/or ice airbases and with skis, if installed.
- For helicopters – take off and landing on unprepared snow and ice.
- Operating area familiarisation and procedures including fuelling, communications and flight tracking.
- Whiteout, blowing snow, and flat-light landing techniques.

Note: if conditions do not permit such training at the time the training is conducted, it shall be completed and documented at the first opportunity when conditions do exist.

- Simulator training will include elements relevant to cold weather operations and procedures for contaminated airbase landing surfaces. This should also include enhanced training for runway overruns – which are more likely to be encountered in ice/snow conditions.
- It is recommended that the free, on-line ground and in-flight icing courses offered by NASA at <http://aircrafticing.grc.nasa.gov> form part of any aircrew training programme for arctic/cold weather operations.

A13.10.2.3 Engineers, maintenance and ground staff

All engineers, maintenance and ground handling staff shall be given initial and annual recurrent training on specific cold weather operating hazards and procedures. These should include but are not limited to:

- Aircraft handling and movement, including towing on ice/snow.
- Use of ground equipment.
- Aircraft de-icing/anti-icing.
- Passenger and cargo handling.
- Re-fuelling.
- Fluid replenishment.
- Aircraft maintenance in cold weather.
- Effects of cold on a/c structure and systems.
- Personal safety.
- Duration of exposure.
- Tool handling.
- Physiological effects of cold weather.
- Protective clothing, use of goggles and gloves.
- Safety.

AI3.II References

- FAA Advisory Circular: 135-16 – *Ground de-icing training & checking.*

AI3.I2 Annexes

AI3.I2 Annex A Emergency blind landing procedure

Due to a lack of instrument and/or approach aids in remote areas it may be useful to document a procedure to enable the aircraft to be landed safely in whiteout conditions. The example given below is based on work carried out by the British Antarctic Survey for their ski-equipped Twin Otter aircraft. It must be stressed that this is an emergency procedure and should only be used after all other options have been exhausted. No flight should be continued into poor visibility where there is likelihood that a blind landing may become necessary.

Preparation

Blind landing sites should be identified in the area of operations. These areas should be inspected prior to commencement of operations to check that the surfaces are suitable and that there are no vertical obstructions. Prevailing wind direction should be established. Pilots should be aware that the condition of the surfaces at these sites may not always be suitable for blind landings.

In each case it is advisable for all pilots to become familiar with these areas and likely safe approach lines.

Procedure

Once committed to a blind landing, if possible, a briefing should be obtained from the forecaster for the area you are going to use with particular emphasis on the wind strength and direction. Onboard navigation equipment should be used to confirm the direction.

A straight-in approach to the area should be carried out if possible. As an aid to ensuring a safe approach route use a waypoint down wind and in a position to produce an approach that will keep the aircraft clear of any terrain for the approach. Note the height of the site. Plan the descent to the area so as to avoid approaching over high ground, and to be level at 500 feet agl at least 5nm before the landing site.

Before beginning the descent ensure that the GPSs agree (if more than one unit is carried) and that the radar picture is as expected. Test both Rad Alts and then set the bugs at 2000 feet; ensure that they begin to read when expected.

Once through 2000 feet set the bugs just below 500 feet, this will allow a level off at 500 feet and the bug will act as an instant warning that a correction is needed if the aircraft descends below 500 feet.

During the descent the Rad Alt bugs can be set at intermediate heights and must be set just below any intended intermediate level-off heights. The Rad Alt should be set such that any indication of the warning light requires an action. Pilots should not allow themselves to get into the habit of having the warning light illuminated and being ignored.

Once level at 500 feet, assess the wind direction by using the aircraft drift. Correct course as necessary and check that ground speed confirms that you are heading into wind.

5 nm before the landing site the aircraft should be level at 500 feet flap 10° and 80 kts and all pre-landing checks should be complete. Weather radar should be set to mapping mode and at a suitable range to help maintain situational awareness with regard to terrain.

Once established on the approach course with 5 nm to go, re-set the Rad Alt bug at 200 feet and adjust the power in order to set up a stabilised descent at 200 feet per minute maintaining 80 kts. Once stabilised in the descent and established on the desired track the Rad Alt bug should be re-set to 20 feet. At this point do not be too concerned about where the aircraft will land as long as any obstacles are cleared.

In the later stages the rate of descent may be allowed to decrease, in some cases this will naturally happen due to ground effect, the key is to maintain the attitude at this stage. If the aircraft starts to climb by any amount or descend beyond 300 feet per minute, go-around. The VSI does lag and any attempt to re gain 200 feet per minute descent rate after the aircraft shows a climb is liable to have the aircraft impacting the ground with a high rate of descent.

Do not be tempted to try and round-out; fly the aircraft on to the ground at 80 kts. If the aircraft is light the speed can be progressively reduced to 70 kts but again do not round-out. If a little fast a small skip may occur; if this happens just maintain the attitude and the aircraft will settle back down.

On positive contact with the ground apply full reverse and simultaneously, positively move the stick back bringing the aircraft to a halt as quickly as possible.

Do not taxi other than to turn the aircraft into wind. Call the flight follower with your position, details of the next sched and shut down. If possible put the blanks in along with the snow anchors and review the situation.

If a straight-in approach is not possible, fly overhead the site and carry out a teardrop procedure to be established at 5nm inbound to the landing site. It is advisable to be stabilised at 500 feet overhead the landing site in the approach configuration before going outbound.

The exact shape of the procedure can be up to the pilot, but it is recommended that a 20-30 offset is used out to 6 or 7 miles. If 30° is used this will allow a base leg to be flown at 90° to the inbound track, using range and bearing to establish the turn inbound. Using this method allows slightly more time to get established than trying to do a continuous turn on to finals. It also allows the pilot to lengthen the inbound leg if required by letting the aircraft drift down wind.

It cannot be stressed enough that maintaining the correct attitude by reference to the artificial horizon and not attempting to round-out is the key to ensuring a successful blind landing. This is further aided by setting the aircraft up in plenty of time and not having to rush into the procedure. Correct use of the Rad Alt and in particular the setting of the warning bug is important in ensuring the aircraft's safety during a blind landing.

Conclusion

As stressed earlier in this section blind landings are considered to be an emergency procedure. Good situational awareness when flying in our area of operation is essential. Always be prepared to cancel a flight or divert, turn back or if necessary land in good conditions at an intermediate point. Pressing on into poor conditions with no other option but a blind landing should be avoided at all costs.

Finally it is essential that pilots practice the procedures for blind landings regularly, in the hope that they never have to use them.

A13.12 Annex B Suggested survival equipment lists

Shelter & warmth

- Reflective 'aluminized' (Mylar coated) space blanket or survival blanket to retain body heat (and signal).
- Lightweight poncho for protection against wind and rain.
- 'Tube tent' or sleeping bag.
- Tarp with grommets or tie-tapes (best if nylon or polyester).
- Large plastic trash bag as poncho or expedient shelter roof.
- Knitted or fleece 'watch cap'.
- Ferro-cerium rod (AKA 'Metal match', 'Hot Spark', 'Firesteel', 'Magnesium bar') and fire striker for fire-starting.
- Waterproof matches, stored in waterproof container. (Butane lighters will not work below freezing)
- Hexamine fuel tablets (Esbit) or 'heat tablets' for fire-starting.

- Cotton balls or pads smeared with white petroleum for fire starting (can be carried in 35mm container or heat-sealed inside large diameter plastic straw).
- Dark-colored (black preferred) shoe polish for fire-starting.

Health and first aid

- First aid kit with bandages, sterile pads and gauze, first aid tape, tweezers, surgical razor, disinfectant pads, oxytetracycline tablets (for diarrhea or infection) and aspirin. Any material in the kit that may be damaged or rendered ineffective by water should be wrapped or sealed in plastic.
- Antibiotic cream (may also be used for fire-starting).
- Salt to maintain ability to perspire.
- Toilet paper (hygiene and fire starting).
- Lip balm.
- Sunscreen (30 SPF or more is recommended) for when clothing cover is not available.
- Polarized sunglasses (protects eyes from glare, especially at sea or in snowy environments).
- Suture kit.

Food and water

- At least three days' worth of water (1 US gallon (3.8l; 0.83 imp gal) - approximately 8 pounds (3.6kg) per person per day: two quarts for drinking, two quarts for food preparation/sanitation)). Commercially bottled water is the safest and most reliable emergency supply of water, kept bottled in its original container and unopened.
- Commercial water filter.
- Metal container to boil water.
- Mess tin to boil water and cook food in.
- Iodine or chlorine tablets for emergency water purification if boiling or filter not available.
- Collapsible (empty) water bags or containers.
- Canned food, ready-to-eat meals (MRE), or high-energy foods such as chocolate or emergency food bars. Hiking meals, such as dehydrated food, can also be used, but are not ready-to-eat – they require rehydration (water), but most are prepared in the bag rather than needing a cooking vessel. Canned foods heated in a closed can may explode.
- Tea, gum and hard candy (as a morale booster).
- Water purification tablets.

Signaling, navigation and reference

- Whistle.
- Signal mirror with instructions.
- Chemical light/glow stick – should come with a string. Tie it on and twirl the chemical light in a circle; this signal is highly recognizable to aircraft.
- Flare - three fires in a triangle is the international distress signal.
- Surveyor's tape - orange or chartreuse for marking location for rescuers.
- Pen/pencil and paper for leaving notes to rescuers about direction of travel.
- Compass and trail maps/charts (if location is known in advance).
- Survival manual for technique reference.
- Portable satellite phone.

Multi-purpose tools or materials

- Shovel.
- Aircraft tie-down kit.
- Fixed-blade knife - sturdy in safe sheath.
- Multi-tool knife such as Swiss Army knife or multi-tool.
- Sharpening stone or tool.

- Folding saw or cable saw.
- Heavy-duty needle and thread for repairing clothing and equipment.
- Plastic bag(s) or trash bags.
- Heavy-duty aluminum foil for frying food and signaling.
- Brightly-colored bandanna or scarf for filtering water, bandage, sun protection, and signaling.
- Sturdy cord or '550' parachute cord for setting up a tarpaulin.
- Firearms and ammunition if required by CAA regulations.
- Hatchet with sheath.
- Candles for warmth, light and signaling.
- Sealable plastic bags.

Life-raft survival kits

Life-raft survival kits are stowed in inflatable or rigid lifeboats or life-rafts; the contents of these kits are mandated by coast guard or maritime regulations. These kits provide basic survival tools and supplies to enable passengers to survive until they are rescued. Liferaft(s) with survival equipment should always be carried over open water or thin ice.

- First aid kit.
- Compass.
- Distress beacons, 406 Mhz (EPIRBs).
- Red flare, rocket parachute flare, and/or smoke signal flare.
- Radar reflector (to help rescuers locate the raft).
- Lantern and fuel and/or searchlight.
- Radio transceiver, standard VHF aircraft and/or marine.
- GPS.
- Food and water.
 - Emergency high-calorie rations.
 - Fishing kit.
 - Rainwater collection equipment.
 - Seawater desalination kit.
 - Water (typically 3 litres/person).
- Other tools and boating items.
 - Hatchet and knife.
 - Waterproof flashlight.
 - Heaving line.
 - Sea anchor (also called a 'sea drogue').
 - Bailer.
 - Bilge pump.
 - Bucket.
 - Patch kit.

Overwater exposure suits

If the exposure will be over open water, the immersion suit policy in the *AMG, Section 12.2* should be consulted.

A risk assessment should be conducted to establish whether immersion suits should be carried or worn.

Additional thermal insulation garments (TIGs) will be required in extreme cold water conditions and a layer policy (to include maintenance and daily checks of suits) should be developed and published.

Overland/thick ice survival equipment

For exposure over land or thick ice, appropriate clothing and equipment to permit survival in the event of a forced landing must be carried. This may include tents, thermal suits for each passenger/crew member, and sleeping bags.

Personal Locator Beacons (PLBs)

PLBs are mandatory for helicopter and single-engine airplane aircrew in cold weather operations, and should be considered for passengers in the same aircraft. PLBs should be attached to a vest provided to each passenger.

Spare batteries should be placed inside outerwear to extend useful battery life in cold temperatures.

Intentionally Blank

What is OGP?

The International Association of Oil & Gas Producers encompasses the world's leading private and state-owned oil & gas companies, their national and regional associations, and major upstream contractors and suppliers.

Vision

- To work on behalf of all the world's upstream companies to promote responsible and profitable operations.

Mission

- To represent the interests of the upstream industry to international regulatory and legislative bodies.
- To achieve continuous improvement in safety, health and environmental performance and in the engineering and operation of upstream ventures.
- To promote awareness of Corporate Social Responsibility issues within the industry and among stakeholders.

Objectives

- To improve understanding of the upstream oil and gas industry, its achievements and challenges and its views on pertinent issues.
- To encourage international regulators and other parties to take account of the industry's views in developing proposals that are effective and workable.
- To become a more visible, accessible and effective source of information about the global industry, both externally and within member organisations.
- To develop and disseminate best practices in safety, health and environmental performance and the engineering and operation of upstream ventures.
- To improve the collection, analysis and dissemination of safety, health and environmental performance data.
- To provide a forum for sharing experience and debating emerging issues.
- To enhance the industry's ability to influence by increasing the size and diversity of the membership.
- To liaise with other industry associations to ensure consistent and effective approaches to common issues.



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