International Civil Aviation Organization

Runway and Ground Safety Working Group

Fourth Meeting (RGS WG/4)
(Cairo, Egypt, 05-07 November 2017)

Agenda Item 4: Coordination between RASG-MID and MIDANPIRG in the area of Aerodromes

UAE OFFSHORE AERODROMES REGULATORY FRAMEWORK

(Presented by UAE)

SUMMARY

This paper provides content for the consideration of the RGS WG in relation to regulation and safety oversight of Helidecks.

Action by the meeting is at paragraph 3.

REFERENCES

- Annex 14 Volume II-4th Edition, July 2013
- Heliport Manual Doc 9261

1. INTRODUCTION

1.1 ICAO Annex 14, Volume II, Heliports includes Standards and Recommended Practices in relation to Helidecks.

1.2 The UAE's General Civil Aviation Authority (GCAA) has implemented a regulatory framework to support the safety oversight of helicopter landing areas on fixed or floating off-shore facilities used for mineral exploitation (for the exploration of oil and gas), research or construction, limited to the UAE and within UAE territorial waters.

1.3 The GCAA's regulatory oversight process for off-shore heliport (Helidecks) for the oil and gas industry is conducted through an auditable approach with focus on regulatory compliance and the effectiveness of the Safety Management System and Quality Assurance processes of GCAA approved Primary Accountable Organisations (PAOs).

2. DISCUSSION

2.1 In order to ensure Helidecks compliance in accordance with ICAO Annex 14, Volume II, Heliports, the UAE's GCAA has developed a framework for implementation and safety oversight though regulations and guidance publications.

2.2 In the UAE, Aerodrome Regulation is supported by General Regulation stating "An aircraft shall not land at, or take-off from, any place unless; the place is suitable for use as an aerodrome (helideck) for the purposes of the landing and taking-off of aircraft in safety, having regard to all circumstances, including the prevailing weather conditions".

2.3 The GCAA published Civil Aviation Advisory Publications (CAAP) 71, Helidecks: Off-Shore to provide the off-shore oil and gas industry with standards, guidance and information regarding Helidecks. This document is included as **Appendix A.**

2.4 The UAE Helideck regulations are applicable to PAOs who are accountable for the safety oversight of Helideck operating companies and to operators of Helidecks in the UAE.

2.4.1 Once the GCAA approves a PAO according to Regulation, the safety oversight for the maintenance and condition of the Helidecks as well as facilities and obstacle control, remains with the PAO.

2.4.2 The GCAA regulatory and safety oversight process focuses on the PAO, which holds full responsibility for helideck operating companies or specific helidecks operators. PAOs are required to have a safety management framework in place which enables an effective safety oversight of the helideck companies or helideck operators for which they are responsible. A presentation summarising the requirements for PAOs is included as **Appendix B**.

2.5 If warranted, the GCAA may elect to conduct onsite Helideck safety and compliance oversight inspections, undertaken by one or more of the following areas, Air Navigation, Aerodrome Operations, Flight Operations Department and/or Aviation Security.

2.6 The GCAA has adopted this approach in partnership with the aviation industry in the UAE. This approach has gained the support of stakeholders, which has been an essential element in the process, particularly in a region where aviation growth continues at a rapid rate. This approach illustrates commitment to the promotion of a safe aviation infrastructure and to the principles of the UAE's State Safety Programme.

2.7 With this approach and framework, the UAE encourages States and international organisations to review the actions listed above.

2.8 The meeting may recall that MIDANPIRG/16 agreed to the following Conclusion emanating from the MSG/5 meeting:

CONCLUSION 16/9: ESTABLISHMENT OF HELIPORTS DATABASE

That, States be urged to establish and maintain a database for Heliports with information about location and type of use, as a minimum

2.9 The meeting is invited to note that a Follow-up State Letter Ref.: AN 5/25 – 17/185 dated 29 June 2017 was sent to MID States to provide information on status of implementation of Conclusion 16/9. Only Three (3) States (Bahrain, Jordan and Oman) have responded. Jordan and Oman has no civil Heliports hence; requirement is not applicable to both of them. Bahrain has confirmed establishment of a Heliport Data Base as required.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

a) note the UAE's approach to regulation of Helidecks as included in **Appendix A** and Summary Requirements in **Appendix B**; and

b) encourage States to implement regulatory and safety oversight of Helidecks.

APPENDIX A

الهيئة العامة للطيران المدني
GENERAL CIVIL AVIATION AUTHORITY

United Arab Emirates

CIVIL AVIATION ADVISORY PUBLICATION

CAAP 71

HELIDECKS (OFF-SHORE)

STANDARDS, GUIDANCE AND INFORMATION REGARDING HELIDECKS

Table of Contents

CHAPTER 1 – INTRODUCTION

1 GENERAL

In this publication the term ‘helideck’ refers to all helicopter landing areas on fixed or floating off-shore facilities used for mineral exploitation (for the exploration of oil and gas), research or construction. For helicopter landing areas on vessels (private or commercial use), the term 'shipboard helideck' may be used in preference to ‘helideck’.

2 PURPOSE

2.1 The information within this publication will ensure compliance with the UAE Civil Aviation Law and Civil Aviation Regulations and conformance with the international standards of ICAO Annex 14, Volume II.

2.2 Civil Aviation Regulation, Part III (General Regulations), Chapter 5 states that “An aircraft shall not land at, or take-off from, any place unless; the place is suitable for use as an aerodrome (helideck) for the purposes of the landing and taking-off of aircraft in safety, having regard to all circumstances, including the prevailing weather conditions”.

2.3 The information set out in this CAAP indicates the minimum requirements to determine the suitability of a helideck and its continued use.

2.4 The purpose of this CAAP is to provide regulation, guidance material and information on UAE off-shore installations to Primary Accountable Organisations (accountable for the safety oversight of helideck operating companies), and to helideck operators.

2.5 For land-based helicopter landing areas, reference should be made to CAAP 70 Heliports: Air Service and Private Use (Not Air Service).

3 APPLICABILITY

3.1 These regulations are applicable to all Primary Accountable Organisations who are accountable for the safety oversight of helideck operating companies and to operators of helidecks in the UAE.

3.2 A Primary Accountable Organisation is required to hold an Approval from the GCAA with reference to this CAAP.

3.3 Helideck operators are required to demonstrate compliance for all installations with reference to this CAAP.

4 IMPLEMENTATION OF SAFETY OVERSIGHT

4.1 In accordance with the GCAA DG Directive 1-2015, from 1st January 2015 all new facilities are required to be compliant with this CAAP.

4.2 Prior to 1st January 2015, existing operational helidecks are required to be compliant with this CAAP by 1st January 2018.

5 STATUS OF THIS CAAP

5.1 This document will remain current unless withdrawn or superseded. It incorporates amendments and comments with reference to NPA 07-2016:

1. Additions to the CAAP 71 Compliance Checklist, to be more comprehensive and reflective of the content of this CAAP.

2. Addition to minimum Personal Protective Equipment (Chapter 16, GM to 4.1).
3. Addition of guidance material for helideck friction measurement techniques (Chapter 9, GM to 3.3).
4. Helideck Status Light System added to Chapter 13 paragraph 3 (Helideck Status Light System) to provide clarity without change to the intended objective.

5.2 This document also includes ICAO Amendment 7 to ICAO Annex 14 Volume II, which became effective on 11th July 2016 and applicable on 10th November 2016. The amendment addresses:

1. Object height in obstacle-free sector of helidecks and shipboard helidecks (Chapters 7 and 8).
2. Helideck identification marking (Chapter 12).
3. Helideck emergency planning.

Should Amendment 7 affect the compliance status of helidecks currently in use, then plans to rectify or implement should be included as part of the Primary Accountable Organisation's oversight process of helideck operators. ICAO Amendment 7 is identified in *italic type* within the relevant text.

6 REFERENCES

a) CAR Part IV: Operational Regulations OPS 3: Commercial & Private Air Transportation (Helicopter)
b) GCAA CAR Part VI: Aviation Safety Regulations, Chapter 2: Transport of Dangerous Goods by Air
c) CAR Part IX (Aerodromes)
d) CAR Part X (Safety Management Requirements)
e) CAR Part XI (Aerodrome Emergency Services, Facilities and Equipment)
f) ICAO Annex 14 Volume II (Aerodromes) – Heliports
g) ICAO Heliport Manual Doc 9261-AN/903
h) ICAO Doc 9137 Airport Service Manual Part 1 Rescue and Fire-Fighting
i) National Fire Protection Association (NFPA) 418 Standards for Heliports
j) CAAP 22 (Safety Incident Reporting)
k) CAAP 35 (Inspecting and Testing of Rescue and Fire-Fighting Equipment)
l) CAAP 36 (Runway and Movement Area Inspections)
m) CAAP 43 (Foreign Object Debris – FOD)
n) CAAP 57 (Voluntary Occurrence Reporting System)
o) CAAP 70 Heliports: Air Service and Private Use (Not Air Service)
p) ICAO Annex 15 (Aeronautical Information Services)

7 GUIDANCE

For guidance on points that are not covered within this publication, advice should be sought from the Aviation Safety Affairs Sector, GCAA; email: ana@gcaa.gov.ae.

8 POLICY

8.1 The GCAA shall approve the Primary Accountable Organisation, once the criteria have been met; the safety oversight for the maintenance and condition of the helideck, the facilities, and for obstacle control, remains with the approved Primary Accountable Organisation.

8.2 For information which relates to helideck data / aeronautical data quality requirements, SMS, and mandatory reporting (ROSI), then in addition, reference shall be made to **CAR Part IX and CAR X**. For information relating to on-shore facilities, then in addition, reference shall be made to CAAP 70.

8.3 CAR Part IV – OPS 3 (Operational Regulations: Helicopters) provides regulation specifically for helicopter operations. Helideck operators should make reference to this document as an appreciation of the helicopter operators' responsibilities as holder of an air operator certificate (AOC). Such helicopter operators shall ensure that all pilots are familiar with the regulations and procedures pertinent to the performance of their duties.

9 DEFINITIONS

Aerodrome	A defined area on land or water (including any buildings, installations, and equipment) intended to be used either wholly or in part for the arrival, departure and surface movement of aircraft.
Aircraft	Any machine that can derive support in the atmosphere from the reactions of the air other than the reactions of the air against the earth's surface.
Air Service	An air service operation open to the public and performed by an aircraft for the public transport of passengers, mail or cargo for remuneration or hire.
Authority	The General Civil Aviation Authority of the United Arab Emirates is the competent body responsible for the safety regulation of Civil Aviation.
Commercial Air Transport Operation	An aircraft operation involving the transport of passengers, cargo or mail for remuneration or hire.
Declared Distances	a) Take-off distance available (TODAH). The length of the FATO plus the length of helicopter clearway (if provided) declared available and suitable for helicopters to complete the take-off. b) Rejected take-off distance available (RTODAH). The length of the FATO declared available and suitable for helicopters operated in Performance Class 1 to complete a rejected take-off. c) Landing distance available (LDAH). The length of the FATO plus any additional area declared available and suitable for helicopters to complete the landing manoeuvre from a defined height.
D	The largest overall dimension of the helicopter when rotor(s) are turning measured from the most forward position of the main rotor tip path plane to the most rearward position of the tail rotor tip path plane or helicopter structure. Note — "D" is sometimes referred to in the text using the terminology "D-value".
Design Helicopter	The helicopter type having the largest overall length and greatest maximum certificated take-off mass for which a helideck or shipboard helideck has been designed. Both attributes may not reside in the same helicopter.
Dynamic load-bearing surface	A surface capable of supporting the loads generated by a helicopter conducting an emergency touchdown on it.
Elevated heliport	A heliport located on a raised structure on land.

Falling gradient	A surface extending downwards on a gradient of 5:1 measured from the edge of the safety netting (or shelving) located around the TLOF below the elevation of the helideck or shipboard helideck to water level for an arc of not less than 180 degree which passes through the centre of the TLOF and outwards to a distance that will allow for safe clearance of obstacles below the TLOF in the event of an engine failure for the type of helicopter the helideck or shipboard helideck is intended to serve. Where high-performing helicopters are exclusively used, consideration may be given to relaxing the falling gradient from a 5:1 to a 3:1 slope.
Final approach and take-off area (FATO)	A defined area over which the final phase of the approach manoeuvre to hover or landing is completed and from which the take-off manoeuvre is commenced. Where the FATO is to be used by helicopters operated in Performance Class 1, the defined area includes the rejected take-off area available.
Helideck	A heliport located on an off-shore structure such as an exploration or production platform used for the exploitation of oil or gas.
Helideck Facilities and Equipment	Facilities and equipment, inside or outside the boundaries of the helideck, that are constructed or installed, operated and maintained for the arrival, departure and surface movement of aircraft.
Helideck Operations Manual	The Manual that forms part of the application for Acceptance.
Heliport	An aerodrome or a defined area on a structure intended to be used wholly or in part for the arrival, departure or surface movement of helicopters.
Helideck Elevation	The highest point of the FATO.
Obstacle	All fixed (whether temporary or permanent) and mobile objects, or parts thereof, that: a) are located on an area intended for the surface movement of aircraft; or b) extend above a defined surface intended to protect aircraft in flight; or c) stand outside those defined surfaces and that have been assessed as being a hazard to air navigation.
Obstacle Free Sector	A sector, not less than 210 degrees, extending outwards to a distance that will allow for an unobstructed departure path appropriate to the helicopter the TLOF is intended to serve, within which no obstacles above the level of the TLOF are permitted. (For helicopters operated in PC1 or PC2 the horizontal extent of this distance will be compatible with the one-engine inoperative capability of the helicopter type to be used).
Operator (Flight Operator)	A person, organisation or enterprise engaged in or offering to engage in an aircraft operation.
Primary Accountable Organisation	The primary accountable organisation with accountability for the safety oversight of helideck operating companies or helidecks for which the organisation holds responsibility.
Rejected take-off area	A defined area on a heliport suitable for helicopters operating in Performance Class 1 to complete a rejected take-off.
Safety area	A defined area on a heliport surrounding the FATO which is free of obstacles, other than those required for air navigation purposes, and intended to reduce the risk of damage to helicopters accidentally diverging from the FATO.
Safety Management System (SMS)	A systematic approach to managing safety including the necessary organisational structure, accountabilities, policies and procedures
Shipboard helideck	A heliport located on a ship that may be purpose or non- purpose-built. A purpose-built shipboard helideck is one designed specifically for helicopter operations. A non-purpose-built shipboard helideck is one that utilizes an area of the ship that is capable of supporting a helicopter but not designed specifically for that task.
Static load-bearing surface	A surface capable of supporting the mass of a helicopter situated upon it.

Surface-level heliport	A heliport located on the ground or on the water.
Touchdown and lift-off area (TLOF)	An area on which a helicopter may touch down or lift off.
Touchdown / Positioning Marking Circle	The TD/PM circle is the reference marking for a normal touchdown so located that when the pilot's seat is over the marking, the whole of the undercarriage will be within the TLOF and all parts of the helicopter will be clear of any obstacles by a safe margin.
Winching area	An area provided for the transfer by helicopter of personnel or stores to or from a ship.

CHAPTER 2 – INTRODUCTION TO THE GCAA REGULATORY OVERSIGHT PROCESS

1 GENERAL

1.1 GCAA regulatory oversight is applicable for helicopter landing areas on fixed or floating off-shore facilities used for mineral exploitation (for the exploration of oil and gas), research or construction, limited to the UAE and within UAE territorial waters.

1.2 The GCAA regulatory oversight process of helidecks for the oil and gas industry is conducted through an auditable approach with focus on regulatory compliance and the effectiveness of the Safety Management System and Quality Assurance processes of the Primary Accountable Organisation.

1.3 From 1st January 2015 all new facilities are required to be compliant with GCAA regulations. Prior to that date, existing operational helidecks are required to be compliant by 1st January 2018.

1.4 In order to aid the prioritisation process for compliance with GCAA regulations, Primary Accountable Organisations, helideck operating companies and helideck operators shall undertake a safety assessment of the facilities for which they are responsible. The safety assessment and resulting Action Plan shall be made available to the GCAA on request.

AMC to 1.4

The safety assessment should be based on a safety risk management model, which should include hazard identification, safety risk assessment and mitigation processes. Appendix A (Designation of Helidecks: Class of Use), provides a classification of facilities, against which reference may be made.

(Additional reference, Appendix B: CAAP 71 - Helideck Compliance Checklist).

1.5 Primary Accountable Organisations

1.5.1 The GCAA regulatory oversight process will focus on the Primary Accountable Organisation. This is the primary accountable organisation holding full responsibility for helideck operating companies or specific helidecks operators. They are required to have a safety management framework in place which enables an effective safety oversight of the helideck companies or helideck operators for which they are responsible.

1.5.2 Primary Accountable Organisations will be subject to:

a) An initial GCAA Approval Assessment. *(Reference, Appendix C: CAAP 71: GCAA Approval Assessment Checklist).*

b) Following the issue of Approval, the GCAA regulatory oversight process will be conducted as part of the GCAA Periodic Audit Programme, *(refer to paragraph 5 – GCAA Continued Safety Oversight - Primary Accountable Organisation).*

1.6 Helideck Operating Companies / Helideck Operators

1.6.1 Helideck operating companies and helideck operators are required to have an effective aviation based safety management system (SMS) and to be able to demonstrate compliance with CAAP 71 and GCAA regulations. Primary Accountable Organisations are responsible for the safety oversight of helideck operating companies and helideck operators. As part of the GCAA audit process of the Primary Accountable Organisation, helideck operating companies and helideck operators may also be subject to audit and on-site inspections. *(Refer to Chapter 4).*

1.7 Helideck owners

1.7.1 Helideck owners are required to demonstrate compliance with CAAP 71 for the design criteria and infrastructure. Demonstration of compliance is required prior to operating or leasing the facility to the helideck operating company or Primary Accountable Organisation.

1.8 The GCAA may choose to follow a more detailed assessment, which may involve site inspections and this may be undertaken by the following departments:

a) **Air Navigation and Aerodrome Department:** will assess visual aids and the Helideck Operations Manual in relation to CAR Part IX, CAR Part X, CAR Part XI; CAAP 71 and any ANS such as CNS, MET, AIS, ATS in relation to CAR Part VIII.

b) **Flight Operations Department:** will assess the application of the operations for which the facility is designed, in relation to CAR Part IV – OPS 3. This will include the direction of flight; the assessment of the obstacle environment on the basis of the intended use of a FATO; the acceptance of the Declared Distances and obstacle limitation surfaces in relation to the most critical helicopter type for which the helideck is intended.

c) **Aviation Security Affairs Sector:** Aviation security is an integral part of aerodrome planning and operations. Contact should be made with GCAA Aviation Security Affairs Sector for details regarding security requirements[1] and authorisation of the carriage of dangerous goods, with reference to GCAA CAR Part VI, Chapter 2: Transport of Dangerous Goods by Air.

2 ANA E-SERVICE APPLICATION

2.1 Applicants must have secure access to the ANA e-Services, available on the GCAA website: www.gcaa.gov.ae.

2.2 Applicants who do not have access to the ANA e-Services must make a request to: **ana@gcaa.gov.ae** and provide the following details:

a) Organisation / Operator Name
b) PO Box
c) City
d) Emirate
e) Details for Courier delivery
f) Telephone number
g) Name, phone and email of point of contact

2.3 Organisation applicants must supply a copy of their Trade License or equivalent.

[1] GCAA CAR Part VII Aviation Security Regulations

3 GCAA APPROVAL APPLICATION PROCESS – PRIMARY ACCOUNTABLE ORGANISATION

3.1 The GCAA application process for the Primary Accountable Organisation Approval shall consist of the following actions:

3.1.1 The applicant shall initiate a meeting with the GCAA to discuss the GCAA regulatory requirements and oversight process required for GCAA approval. This meeting should be scheduled prior to the submission of the application and relevant documentation.

3.1.2 The applicant shall submit sufficient documentation to demonstrate compliance with GCAA requirements as referred to in Chapter 3.

3.1.3 Documents required are:

a)	Safety Management Structure
b)	Policy and Procedures for Safety Oversight of Helideck Operating Company or Helideck Operator

3.2 The GCAA will conducted an assessment of the requirements as detailed in Chapter 3.

3.3 The GCAA will produce an assessment report identifying any shortfalls in compliance with the application.

3.4 If shortfalls in compliance are identified during the assessment, the applicant will be required to provide an action plan with timescales in order to rectify the shortfalls.

3.5 The GCAA will only issue an Approval when completely satisfied that all regulatory elements have been adequately addressed. The Approval will only be applicable within the UAE and UAE territorial waters.

3.6 GCAA Approval signifies that the Primary Accountable Organisation has in place:

a) an acceptable safety management structure;

b) policies, procedures and objectives for the safety oversight of helideck operating companies and helideck operators for which it is responsible;

c) a trained and qualified audit team(s); and

d) systems for reporting and communication to the GCAA, in accordance with the requirements of this CAAP. *(Refer to Chapter 3).*

4 SERVICE FEES APPLICABLE TO THE PRIMARY ACCOUNTABLE ORGANISATION

4.1 Applicants undertake to pay GCAA Service Fees in respect of an initial Approval.

4.2 Payment of the GCAA Service Fee does not guarantee the grant or continuation of an approval.

5 GCAA CONTINUED SAFETY OVERSIGHT – PRIMARY ACCOUNTABLE ORGANSATION

5.1 Following the issue of an Approval, regulatory oversight will continue as part of the GCAA Periodic Audit Programme, the frequency of which shall be determined by the GCAA.

5.2 The aim of the GCAA audit is to verify continued compliance with Civil Aviation Law, Regulations and GCAA Publications. It also aims to ensure that the organisation's policies and procedures are appropriately documented and followed. This will be conducted through the examination of relevant documentation and documented evidence relating to the compliance of helideck operating companies and helideck operators, which may include on-site inspections.

CHAPTER 3 – REQUIREMENTS FOR A PRIMARY ACCOUNTABLE ORGANISATION

1 GENERAL

1.1 The Primary Accountable Organisation shall have an aviation focused safety management structure in place to enable an effective safety oversight of the helidecks for which the organisation is responsible.

GM to 1.1

The Primary Accountable Organisation is the primary accountable organisation for the safety oversight of several helideck operating companies, or an individual helideck operator. This will be dependent on the organisational structure.

1.2 The Primary Accountable Organisation may be required to provide access to the helideck for Authority's inspectors.

1.3 The Primary Accountable Organisation shall be required to provide access to all safety related documents for the purpose of regulatory oversight to the GCAA.

2 REQUIREMENTS FOR A SAFETY MANAGEMENT STRUCTURE

2.1 The safety management and quality assurance systems shall be documented and shall include the following:

a)	Clearly defined lines of responsibility and accountability throughout the organisation, including a direct accountability for safety on the part of senior management.
b)	A statement of accountabilities – with named responsible persons: Accountable Manager, and those responsible for Safety and Quality Assurance; Operations; Maintenance; Rescue and Fire-Fighting Service (RFFS).
c)	A safety assessment: The Primary Accountable Organisation shall develop, implement and maintain a process that ensures analysis, assessment, and acceptable control of the safety risks associated with identified hazards. *(Reference Chapter 2, 1.4 and AMC to 1.4)*
d)	A description of the overall philosophies and principles of the organisation with regard to aviation safety, referred to as the "Safety Policy", signed by the Accountable Manager; this shall include a clear statement about the provision of the necessary resources for the implementation of the safety policy and achievement of the safety objectives.
e)	A policy statement and documented agreement between the Primary Accountable Organisation and the named helideck operating companies for the system of safety oversight.
f)	A policy to ensure that the Primary Accountable Organisation's audit team are sufficiently trained and qualified for the planned tasks and activities to be performed.
g)	The means to verify the safety performance of the organisation in reference to the safety performance indicators and safety performance targets of the safety management system, and to validate the effectiveness of safety risk controls.
h)	A formal processes to review the safety management system, identify the causes of substandard performance of the management system, determine the implications of such substandard performance in operations, and eliminate or mitigate such causes.

2.2 Policy and procedures for the oversight of helidecks shall be documented and shall include the following:

a)	A current list of helideck operating companies and data for each fixed facility, detailing: location, "Class of Use" (refer to Appendix A), D-value and unique number.
b)	A policy and procedure for the audit process and content, (i.e. audit scope, audit periodicity; audit plan; audit programme; definition of findings).
c)	A policy and procedure for the follow-up process on audit findings, (i.e. actions to be taken for safety critical issues; identifying causal factors and corrective actions; agreement on action plans; agreement on timescales).
d)	A policy and procedure for notification of safety critical issues / findings to stakeholders and the GCAA.
e)	A policy and procedure for document control of audits, reports and records.
f)	A policy and procedure for investigations (safety incidents and accidents; ROSI[2]).
g)	A policy and procedure for communicating with the GCAA (refer to Section 3).
h)	An Audit Programme (periodicity).
i)	An Audit Plan (i.e. scope).
j)	CAAP 71 compliance for accepting helidecks into operation since 1st January 2015, including commissioning requirements.
k)	CAAP 71 compliance for helidecks which have been in operation prior to 1st January 2015, (required compliance by 1st January 2018).

2.3 The audit team or person shall include the following:

a)	Demonstration impartiality from helideck operators. This shall be achieved through separation, at functional level between the Primary Accountable Organisation and the helideck operators (persons not involved in the operation of the helidecks).
b)	To be of sufficient number of qualified personnel to perform their allocated tasks and have the necessary knowledge, experience, initial, on-the-job and recurrent training to ensure continuing competence.
c)	That the person responsible for the compliance monitoring and quality assurance may perform all audits and inspections himself/herself, or appoint one or more auditors by choosing personnel having the related competence.
	AMC to 2.2 c): The Primary Accountable Organisation should establish a training programme for its helideck inspectors, and a plan for its implementation. The training programme should include at least the following: i. aviation legislation, organisation, and structure; ii. the applicable requirements and procedures; iii. safety management systems, including safety assurance principles; iv. acceptability and auditing of safety managements systems; v. change management;

[2] GCAA CAAP 22: Safety Incident Reporting

	vi. aeronautical studies, safety assessments, and reporting techniques; vii. evaluation and review of helideck manuals; viii. human factors principles; ix. helideck design; x. helideck signs, markings and lighting; xi. helideck maintenance; xii. helideck operations, including: • obstacle assessment; • rescue and firefighting; • emergency planning; • adverse weather operations; • wildlife management; • helideck safety management; • handling of dangerous goods; and • fuel, facilities, storage and handling; and xiii. other suitable technical training appropriate to the role and tasks of the personnel.
d)	Ensure that training records for helideck inspectors are to be retained and available for the GCAA audit.

3 REQUIRED COMMUNICATION WITH THE GCAA

3.1 The Primary Accountable Organisation shall provide the GCAA with following, on request:

a)	A current list of helideck operators companies and data for each fixed facility.
b)	The Annual Audit Programme.
c)	Safety assessment of non-compliant CAAP 71 elements, including all safety critical issues with actions and mitigations.

Note: all information submitted to the GCAA will be held in confidence.

CHAPTER 4 – REQUIREMENTS FOR A HELIDECK OPERATOR

1 GENERAL

1.1 The helideck operator shall:

a) have an aviation focused safety management system in place to enable an effective safety oversight of helideck operations (as detailed in Section 2); and

b) demonstrate regulatory compliance for each helideck with reference to CAAP 71 (as detailed in Section 3); and

c) be required to provide access to all safety related documents for the purpose of safety oversight and provision of evidence of compliance to the Primary Accountable Organisation (and to the GCAA on request).

1.2 The helideck owner shall provide:

a) evidence of compliance with the design criteria and infrastructure; and

b) evidence of compliance prior to leasing the facility within the UAE; this shall include commissioning requirements of equipment (examples: fire-fighting systems, lighting systems).

1.3 Evidence required in paragraph 1.2 shall be made available to the helideck operator.

2 REQUIREMENTS FOR A SAFETY MANAGEMENT SYSTEM (SMS)

2.1 The helideck operator shall implement a safety management system, as referred to in GCAA CAR Part X: Safety Management Systems (SMS) and framework shown in Table 4-1.

Table 4-1 SMS Framework

COMPONENT	ELEMENT
1. SAFETY POLICY AND OBJECTIVE	a) Management commitment and responsibilities
	b) Safety accountabilities
	c) Appointment of key safety personnel
	d) Coordination of emergency response planning
	e) SMS documentation
2. SAFETY RISK MANAGEMENT	a) Hazard identification
	b) Safety risk assessment and mitigations
3. SAFETY ASSURANCE	a) Safety performance monitoring and measurement
	b) management of change
	c) Continuous Improvement of the SMS
4. SAFETY PROMOTION	a) Training and education
	b) Safety communication

2.2 The safety management system shall be documented and shall include the following:

a)	A description of the overall philosophies, objectives and principles of the operator with regard to aviation safety, referred to as the "Safety Policy", signed by the Accountable Manager.
b)	Clearly defined lines of responsibility and accountability throughout the helideck operating company, including a direct accountability for safety on the part of senior management.
c)	Statement of accountabilities – with named responsible persons, (Accountable Manager, Helideck Safety and Quality Assurance; Operations; Maintenance; Rescue and Fire-Fighting Service (RFFS).
d)	A policy and procedure for a systematic approach to hazard identification and risk management. (Develop, implement and maintain a process that ensures analysis, assessment, and acceptable control of the safety risks associated with identified hazards).
e)	A safety assessment: reference to 2.2 d) above. *(Reference Chapter 2, 1.4 and AMC to 1.4)*
f)	A policy and procedure for notification of safety critical issues / findings to stakeholders; Primary Accountable Organisation.
g)	A policy and procedure for ensuring that accidents, serious incidents, unlawful interferences as well as safety events identified as mandatorily reportable in CAR Part IX are reported to the GCAA through the Reporting of Safety Incidents[3] (ROSI).
h)	A policy and procedure to educate their personnel of how to report an actual or potential safety deficiency through the Voluntary Reporting[4] (VORSY) System.
i)	A policy and procedure for the acceptance and transfer of contracted vessels to assure compliance with GCAA regulations.
j)	A policy and procedure to ensure sub-contractor compliance with GCAA regulations.
k)	a policy and procedure for an internal safety oversight and auditing system
l)	The means to verify the safety performance of the organisation with reference to the safety performance indicators and safety performance targets of the safety management system, and to validate the effectiveness of safety risk controls.
m)	A process to review the safety management system, identify the causes of substandard performance of the safety management system, determine the implications of such substandard performance in operations, and eliminate or mitigate such causes.
n)	A safety training programme that ensures personnel involved in the operation,

[3] GCAA CAAP 22: Safety Incident Reporting
[4] CAAP 57: Voluntary Occurrence Reporting System

	rescue and fire-fighting, maintenance and management of the helideck are properly trained and have been certified as competent to perform their duties safely.
o)	A formal means for safety communication that ensures that personnel are fully aware of the safety management system, conveys safety critical information, and explains why particular safety actions are taken and why safety procedures are introduced or changed.
p)	A coordination of the safety management system with the helideck emergency response plan; and coordination of the helideck emergency response plan with the emergency response plans of those organisations it must interface with during the provision of helideck services.
q)	A policy and procedure for the maintenance of compliance against CAAP 71 for contracted helidecks.
r)	A policy and procedure for recording the number of helicopter movements.

3 REGULATORY COMPLIANCE WITH CAAP 71

3.1 Policy and procedures shall be documented and shall include the following:

a)	An up-to-date Helideck Operations Manual (including or referencing policies and procedures).
b)	A method to monitor compliance with relevant GCAA requirements.
c)	Evidence to support regulatory compliance with CAAP 71.
	AMC to 3.1(c) i. This should include a CAAP 71 compliance matrix of each facility, which should include details of: location; "Class of Use" (refer to Appendix A); D-value and unique number. ii. Completion of the GCAA CAAP 71 Helideck Checklist (refer to Appendix B). iii. Frequency of a CAAP 71 audit should be based on the outcome of the safety assessment referred to in Chapter 2, 1.4 and industry best-practice (two-yearly).

4 HELIDECK OPERATIONS MANUAL

4.1 The helideck operator shall have an up-to-date Helideck Operations Manual.

4.2 The Helideck Operations Manual is a fundamental requirement of the regulatory process. It shall contain all the pertinent information concerning helideck landing area, facilities, services, equipment, operating procedures, organisation, standards, conditions and the levels of services and management including Safety Management System. The information presented in the Helideck Operations Manual shall demonstrate that the helideck conforms to regulation and that there are no apparent shortcomings that would adversely affect the safety of aircraft operations.

4.3 Each off-shore helicopter landing area shall be assessed based on limitations, warnings, instructions and restrictions to determine its acceptability with respect to the following that, as a minimum, should cover the factors listed in paragraph 2.1.

AMC1 to 4 Helideck Operations Manual

The Helideck Operations Manual relating to the specific helidecks should contain both the listing of helideck limitations in a Helideck Limitations List (HLL) and a pictorial representation (template) of each helideck showing all necessary information of a permanent nature. The HLL shall show, and be amended as necessary to indicate, the most recent status of each helideck concerning non-compliance with this document, limitations, warnings, cautions or other comments of operational importance. An example of a typical template is shown in Table 4-1. All helideck limitations should be included in the HLL. Helidecks without limitations should also be listed. With complex installations and combinations of installations (e.g. co-locations), a separate listing in the HLL, accompanied by diagrams where necessary, may be required.

AMC2 to 4 Helideck Operations Manual (Content)

Content of the Helideck Operations Manual should include the following as a minimum:

1. Policy, Safety Management System (SMS) and procedures
2. Operational procedures
3. Listing of helideck limitations in a Helideck Limitations List (HLL) – and pictorial representation of the helideck showing all the necessary information of a permanent nature
4. List of warnings, cautions and comments
5. The physical characteristics of the helideck including:
    a) Measured dimension
    b) Declared D-Value
    c) Load bearing capability
6. Preservation of the obstacle protected surfaces:
    a) The minimum 210° Obstacle Free Sector (OFS) surface
    b) The 150° Limited Obstacle Sector (LOS) surface; and
    c) The minimum 180° falling 5:1 gradient surface with respect to significant obstacles.

    Note: If these sectors/surfaces are infringed, even on a temporary basis and/or if an adjacent installation or vessel infringes the obstacle protected surfaces related to the landing area, procedures should be in place to conduct an assessment to determine whether it is necessary to impose operating limitations and/or restrictions to mitigate any non-compliance with the criteria.
7. Marking and lighting – Assessments, procedures, inspection records relating to:
    a) Helideck perimeter lighting
    b) Helideck touchdown marking lighting (TD/PM Circle lighting) and/or floodlighting
    c) Status lights (for day and night operations) – if used
    d) Dominant obstacle paint schemes and lighting
    e) Helideck markings and
    f) General installation lighting levels

    Note: Where inadequate helideck lighting exists the Helideck Limitation List (HLL) should be annotated 'daylight only operations'.

8. Deck surface - Assessments, procedures, inspection records relating to:
    a) Surface friction
    b) Helideck net (as applicable)
    c) Drainage system
    d) Deck edge perimeter safety netting
    e) System of tie-down points adequate for the range of helicopters in use; and
    f) Cleaning of all contaminants
9. Environment – Assessments, procedures, inspection records relating to :
    a) Obstacle controls
    b) Foreign object debris / damage
    c) Physical turbulence generators
    d) Bird control measures
    e) Air quality degradation due to exhaust emissions, hot gas vents or cold gas vents
    f) Adjacent helidecks may need to be included need to be included in the air quality assessment, and
    g) Flares
10. Rescue and fire-fighting – Assessments, procedures, inspection records relating to:
    a) Primary and complementary media types, quantities, capacity and systems
    b) Personal protective equipment (PPE) and clothing
    c) Breathing apparatus, and
    d) Crash box
11. Communications and navigation - Assessments, procedures, inspection records relating to:
    a) Aeronautical radio(s)
    b) Radio/telephone (R/T) call sign to match helideck name and side identification which should be simple and unique
    c) Non-Directional Beacon (NDB) or equivalent (as appropriate); and
    d) Radio log
12. Fuel facilities – Assessments, procedures, inspection records
13. Additional operational and handling equipment – Assessments, procedures, inspection records relating to:
    a) Windsleeve
    b) Meteorological information
    c) Helideck motion system recording and reporting (where applicable)
    d) Passenger briefing system
    e) Chocks - compatible with helicopter undercarriage/wheel configurations
    f) Tie-downs and
    g) Weighing scales - calibrated, accurate scales for passenger baggage and freight weighing
14. Qualified Personnel – Assessments, procedures and records relating to:
    a) Training and maintenance of competency for helicopter landing area staff (e.g. helicopter landing officer/helicopter deck assistant and fire-fighters, etc.).
    b) Training of persons and maintenance of competency for those required to assess local weather conditions or communicate with the helicopter by radio telephony.

Table 4-1 Helicopter Landing Area Template

<table>
<tr><td colspan="4">Helicopter Landing Area Template
Doc Ref: xx/xx/xx
الهيئة العامة للطيران المدني
GENERAL CIVIL AVIATION AUTHORITY</td></tr>
<tr><td colspan="2">INSTALLATION / VESSEL NAME:</td><td>R/T CALL-SIGN:</td><td>HELIDECK ID:</td></tr>
<tr><td colspan="2">HELIDECK ELEVATION (feet AMSL):</td><td>MAX. HEIGHT (feet):</td><td>SIDE ID:</td></tr>
<tr><td colspan="3">TYPE OF INSTALLATION/VESSEL[1] (fixed / mobile; manned / unmanned):</td><td>D-VALUE (metres):</td></tr>
<tr><td colspan="3">POSITION (LAT. & LONG.) DEG / MIN & DECIMAL OF MINS:</td><td>NAME OF OPERATOR[2]:</td></tr>
<tr><td rowspan="5">COM:</td><td rowspan="5">VHF FREQ (AVN):</td><td rowspan="5">NAV:</td><td>ATIS:
VHF</td></tr>
<tr><td>NDB IDENT:</td></tr>
<tr><td>GNSS:</td></tr>
<tr><td>VOR/DME:</td></tr>
<tr><td>Not Applicable:</td></tr>
<tr><td colspan="4">HELIDECK DRAWINGS / PHOTOS:</td></tr>
<tr><td colspan="2">FUEL AVAILABLE[3]: Y/N/CAP/UNITS</td><td>GPU: Y/N/28v DC:</td><td>HELIDECK “H” HEADING:</td></tr>
<tr><td colspan="2">MTOM / DECK RATED FOR (METRIC TONS/ LBS):</td><td>STATUS LIGHTS[4] (if used):</td><td>FIRE-FIGHTING EQUIPMENT[5]:</td></tr>
<tr><td colspan="3">LIMITATIONS / WARNINGS / NOTES:</td><td>REVISION DATE:</td></tr>
</table>

1. Fixed permanently attended, fixed not permanently attended; vessel type (e.g. diving support vessel); MODU - semi-submersible MODU - jack-up; FPSO, tanker
2. Name of operator of the installation/vessel
3. Pressure/gravity; pressure; gravity; no
4. Yes; no (as required by applicable codes e.g. IMO MODU Code)
5. Type of foam (e.g. 3% aqueous film forming foams (3% AFFF)) and nature of primary media delivery (e.g. deck integrated fire-fighting system (DIFFS))

GM1 to Table 4-1: Helideck Elevation

For a fixed facility the helideck elevation is measured at the highest point of the FATO (or FATOs) and recorded on the Helicopter Landing Area Template. Helideck elevation (metres) is the height of the FATO (or FATOs) above mean sea level (AMSL).

For floating installations and vessels the helideck elevation is measured from the keel of the installation/vessel to the highest point of the FATO. The profile information is independent from the draft marking and the actual elevation above the water level. The installation/vessel crew has to calculate the current height above the water level by subtracting the current draft at the perpendicular closest to the helideck and providing this to the helicopter operator. (The helicopter operator should include the corrected elevation information supplied by the installation/vessel operator in the helideck template).

GM2 to Helideck Operations Manual and Table 4-1

A Helideck Limitations List entry (HLL) should promulgate additional information for the helicopter landing area including the D-value of the FATO, whether expressed in metres and the limit on the maximum allowable mass of the helicopter permitted to operate to the FATO, a marking expressed in metric tonnes (known as the t-value). The D-value, in metres, corresponds to the size (diameter) of the FATO (and where coincident, to the size (diameter) of the TLOF) while the maximum allowable mass is a t-value marking expressing metric tonnes, that equates to the load bearing strength of the TLOF.

CHAPTER 5 – GUIDANCE MATERIAL - HELIDECKS: TYPES OF FACILITIES

Note —The types of facilities illustrated in within this Chapter, and described throughout this document, are typically used in the process of mineral extraction; for the exploration and/or exploitation of oil and/or gas in the off-shore environment.

Off-shore landing facilities range in types from helidecks on fixed platforms, on mobile off-shore drilling units, on crane barges (not illustrated) and on Floating Production Storage And Off-loading (FPSO) units, through to purpose-built shipboard helidecks located on large tankers or on smaller vessels such diving support vessels, seismic survey vessels, ice-breakers and research vessels.

For vessels, in particular, helicopter landing areas may be purpose built above the bow or stern, purpose-built in an amidships location or purpose-built overhanging the ship's side.

This document also provides information for non-purpose built shipboard helidecks, whether located on the side of a ship (ship's side) or landing on other areas not specifically designed to receive helicopters; such as on hatch covers.

Finally the document addresses shipboard winching areas, where a Helicopter Hoist Operation (HHO) is completed in lieu of landing-on. The operation of non-purpose built shipboard helidecks and shipboard winching areas is described in detail in the International Chamber of Shipping (ICS) Helicopter/Ship Guide which is referenced in the glossary.

1. HELIDECKS - TYPES OF FACILITIES

1.1 Fixed Platforms: Permanently Attended (PAI)

1.1.1 Fixed platforms sit directly on the sea floor and are thus stable. They can be single units or can consist of two or more separate modules for production, processing and accommodation. Where there are separate modules these are generally linked by bridges and can be served by more than one helideck and are occupied for 365 days a year.

Figure 5-1 Fixed platforms with helidecks above accommodation

1.2 Fixed Platforms: Not Permanently Attended (NPAI)

1.2.1 Facilities that do not subscribe to a permanent attendance model are referred to as not permanently attended installations (NPAIs).

Figure 5-2 Not Permanently Attended (NPAI) helideck

1.3 Mobile Off-Shore Drilling Units: Semi-Submersible

1.3.1 Semi-submersible units have the hull design of a catamaran and are either towed or self-propelled. A semi-submersible has good stability and sea-keeping characteristics and can be positioned dynamically with thrusters or by the use of anchors. Semi-submersible units are heavy duty specialised rigs with their hull structure submerged at a deep draft (ballasted down fifty feet or so to give it stability) so that a semi-submersible, being less affected by wave loadings than a normal ship, is able to operate in adverse weather conditions . They are used in a number of specific off-shore roles such as off-shore drilling rigs and heavy lift cranes. In the latter case a semi-submersible is able to transform from a deep to a shallow draft rig by de-ballasting (removing ballast water from the hull), and thereby becoming a surface vessel. Semi-submersibles are classified as Mobile Off-shore Drilling Units (MODUs) with standards for helidecks addressed in the International Maritime Organisation (IMO) MODU Code.

Figure 5-3 Deep ballasted semi-submersible mobile off-shore drilling unit

1.4 Mobile Off-Shore Drilling Units: Self-Elevating Unit (Jack-Up)

1.4.1 A jack-up rig, or a self-elevating unit, is a type of mobile platform that consists of a buoyant hull fitted with a number of moveable legs (typically three or four). These rigs are

towed to and from locations or may be self-propelled. When on site the legs (which can be up to 450 feet or more) are 'jacked' down until they penetrate the seabed or sit on the sea floor with the main body of the rig about 50 feet above sea level. The height of the legs when on station is dependent upon the depth of the water. When on tow, the legs are jacked up (and specific limitations are applied for helicopter operations to moving decks. When in the jacked-down position helidecks are not subject to significant movement and so behave more like fixed platforms. Jack-up rigs are classified as Mobile Off-shore Drilling Units (MODUs) with standards for helidecks also addressed in the IMO MODU Code.

Figure 5-4 Jack-up mobile off-shore drilling unit

1.5 Floating Production Storage and Off-Loading (FPSO) and Tankers

1.5.1 An FPSO unit is a floating vessel used for the production and processing of hydrocarbons and for the storage of oil, until it can be off-loaded onto a tanker or, less frequently, transported through a pipeline. The FPSO extracts and stores the oil while the tanker hooks up to the FPSO before it shuttles the oil ashore. FPSOs are either purpose-built or can result from the conversion of an oil tanker. They are really effective when used in remote or deep-water locations, where seabed pipelines are not a commercially viable option. Variations on the FPSO concept may include a floating storage and off-loading unit (FSO) or a Liquefied Natural Gas (LNG) floating storage and re-gasification unit.

2. SHIPBOARD HELIDECKS - TYPES OF FACILITIES

2.1 Drill Ships

2.1.1 A drill ship is a merchant vessel designed for use in exploratory off-shore drilling for new oil and gas wells. They can be either purpose built or a converted older vessel and are kept on station by standard anchoring systems or by a dynamic positioning system (DPS). In recent years they have increasingly been used to drill in deep-water or in ultra-deep water and, in this operating environment, require the most advanced dynamic positioning systems.

Figure 5-5 High mounted bow helideck on a drill ship

2.2 Small Vessels

2.2.1 Support and survey vessels are amongst the most challenging ships to fly too, especially at night. Vessels can be quite small and the helideck can be high up above the bow, over the stern or even amidships.

2.3 Non-Purpose Built Landing Area on Ship's Side –Tanker Port and Starboard

2.3.1 Some helicopter landing areas, located on tankers, consist in a non-purpose built ships side arrangement usually on one or other side of the vessel. For non-purpose facilities the control of ground based, and usually immoveable, obstacles become an issue. In this case care needs to be taken to ensure that deck-mounted obstacles, which may form part of the vessel superstructure, do not impinge on the safety of helicopter operations.

Figure 5-6 High mounted stern helideck

CHAPTER 6 – HELIDECK: DESIGN FACTORS

1 STRUCTURAL DESIGN

1.1 The helicopter landing area and any parking area provided should be of sufficient size and strength and laid out so as to accommodate the heaviest and largest helicopter requiring to use the facility (referred to as the design helicopter). The structure should incorporate a load bearing area designed to resist dynamic loads without disproportionate consequences from the impact of an emergency landing anywhere within the area bounded by the TLOF perimeter markings. Consideration should be given to the possibility of accommodating an unserviceable helicopter in a parking area (where provided) adjacent to the helideck to allow a relief helicopter to land.

Note — If the contingency is designed into the construction and operating philosophy of the installation or vessel, the helicopter operator should be advised of any mass restrictions imposed on a relief helicopter due to the presence of an unserviceable helicopter; whether elsewhere on the landing area or removed to a parking area, where present.

1.2 The helicopter landing area and its supporting structure should be fabricated from steel, aluminium alloy or other suitable materials designed and fabricated to applicable standards. Where differing materials are to be used in near contact, the detailing of the connections should be such as to avoid the incidence of galvanic corrosion.

1.3 Both the ultimate limit states (ULS) and the serviceability limit states (SLS) should be assessed. The structure should be designed for the SLS and ULS conditions appropriate to the structural component being considered as follows:

a) for deck plate and stiffeners
    i. ULS under all conditions;
    ii. SLS for permanent deflection following an emergency landing
b) for helicopter landing area supporting structure
    i. ULS under all conditions;
    ii. SLS

1.4 The supporting structure, deck plates and stringers should be designed to resist the effects of local wheel or skid actions acting in combination with other permanent, variable and environmental actions. Helicopters should be assumed to be located within the TLOF perimeter markings in such positions that maximise the internal forces in the component being considered. Deck plates and stiffeners should be designed to limit the permanent deflection (deformation) under helicopter emergency landing actions to no more than 2.5% of the clear width of the plates between supports. Webs of stiffeners should be assessed locally under wheels or skids and at the supports, so as not to fail under landing gear actions due to emergency landings. Tubular structural components forming part of the supporting structure should be checked for vortex-induced vibrations due to wind.

Note — For the purposes of the following sections it may be assumed that single main rotor helicopters will land on the wheel or wheels of two landing gear or on both skids, where skid fitted helicopters are in use. The resulting loads should be distributed between two main undercarriages. Where advantageous a tyre contact area may be assumed within the manufacturer's specification.

1.5 Case A – Helicopter Landing Situation

A helideck or a purpose-built shipboard helideck should be designed to withstand all the forces likely to act when a helicopter lands. The load and load combinations to be considered should include:

a) Dynamic load due to impact landing

This should cover both a heavy landing and an emergency landing. For the former an impact load of 1.5 x MTOM of the design helicopter should be used while for an emergency landing an impact load of 2.5 x MTOM should be applied in any position on the landing area together with the combined effects of b) to g) inclusive. Normally the emergency landing case will govern the design of the structure.

b) Sympathetic response of the landing platform

After considering the design of the helideck structures supporting beams and columns and the characteristics of the design helicopter, the dynamic load (see a) above) should be increased by a suitable structural response factor (SRF) to take account of the sympathetic response of the helicopter landing area structure. The factor to be applied for the design of the helicopter landing area framing depends on the natural frequency of the deck structure.

Unless specific values are available based upon particular undercarriage behaviour and deck frequency, a minimum SRF of 1.3 should be assumed.

c) Overall superimposed load on the landing platform

To allow for any appendages that may be present on the deck surface, such as helideck nets or lighting, in addition to the wheel loads, an allowance of 0.5kN/m2 should be applied over the whole area of the helideck.

d) Lateral load on landing platform supports

The helicopter landing platform and its supports should be designed to resist concentrated horizontal imposed actions equivalent to 0.5 x maximum take-off mass (MTOM) of the design helicopter, distributed between the undercarriages in proportion to the applied vertical loading in the horizontal direction that will produce the most severe loading for the structural component being considered.

e) Dead load of structural members

This is the normal gravity load on the element being considered.

f) Environmental actions on the helideck

i. Wind actions on the helideck structure should be applied in the direction, which together with the horizontal impact actions, produce the most severe load case for the component considered. The wind speed to be considered should be that restricting normal (non-emergency) helicopter operations at the landing area. Any vertical up and down action on the helideck structure due to the passage of wind over and under the helideck should be considered.
ii. Inertial actions due to platform motions – the effect of accelerations and dynamic amplification arising from the predicted motions of the fixed or floating platform in a storm condition with a 10-year return period should be considered.

g) Punching Shear

Where helicopters with wheeled undercarriages are operated, a check should be made for the punching shear from a wheel of the landing gear with a contact area of 65 x 10^3 mm^2 acting in any probable location. Particular attention to detailing should be taken at the junction of the supports and the platform deck.

1.6 Case B – Helicopter At Rest Situation

In addition to Case A, a helideck or a purpose-built shipboard helideck should be designed to withstand all the applied forces that could result from a helicopter at rest; the following loads should be taken into account:

a) Imposed load from helicopter at rest

All parts of the helideck or shipboard helideck should be assumed to be accessible to helicopters, including any separate parking area (see Chapter 14) and should be designed to resist an imposed (static) load equal to the MTOM of the design helicopter. This load should be distributed between all the landing gear, and applied in any position so as to produce the most severe loading on each element considered.

b) Overall superimposed load

To allow for personnel, freight, refuelling equipment and other traffic, and rotor downwash effects etc., a general area imposed action of 2.0kN/m2 should be added to the whole area of the helideck or shipboard helideck.

c) Horizontal actions from a tied down helicopter including wind actions

Each tie-down should be designed to resist the calculated proportion of the total wind action on the design helicopter imposed by a storm wind with a minimum one-year return period.

d) Dead load

This is the normal gravity load on the element being considered and should be regarded to act simultaneously in combination with a) and b). Consideration should also be given to the additional wind loading from any parked or secured helicopter (see also e) (1) below).

e) Environmental actions

i. Wind loading

Wind loading should be allowed for in the design of the platform. The 100-year return period wind actions on the helicopter landing area structure should be applied in the direction which, together with the imposed lateral loading, produces the most severe load condition on each structural element being considered.

ii. Acceleration forces and other dynamic amplification forces

The effects of these forces arising from the predicted motions of mobile installations or vessels, the appropriate environmental conditions corresponding to a 10-year return period should be considered.

Note — Not all helicopter landing areas on ships consist of purpose-built structures and some helicopter landing areas may alternatively utilise areas of the ship's deck which were not

specifically designed for helicopter operations e.g. main decking on a ship's side, a large hatch cover, etc. In the case of a non-purpose built structure it should be established, before authorising a landing area, that the area selected can withstand the dynamic and static loads imposed for the types of helicopters for which it is intended.

2 DESIGN - ENVIRONMENTAL EFFECTS

Note — In the following sections the term "helideck" is used throughout to denote a heliport on a fixed or floating facility such as an exploration and/or production unit used for the exploitation of oil and gas. Where helidecks are located on ships it will be for the designer to assess whether each aspect of design is appropriate for the "shipboard helidecks" under consideration. A stand-alone section (paragraph 2.5) is provided to address special considerations for floating facilities and ships which have particular applicability to all shipboard helidecks as well as to helidecks located on floating off-shore facilities

2.1 General Design Considerations

2.1.1 The location of a helideck is often a compromise between the conflicting demands of the basic design requirements, the space limitations on often cramped topsides of off-shore facilities and the need for the facility to provide for a variety of functions. It is almost inevitable that helidecks installed on cramped topsides of off-shore structures will suffer to some degree from their proximity to tall and bulky structures, and to gas turbine exhausts or flares. The objective for designers becomes to create topside designs incorporating helidecks that are safe and 'friendly' to helicopter operations by minimising adverse environmental effects (mainly aerodynamic, thermal and wave motion) which can affect helicopter operability.

Note — Where statutory design parameters cannot be fully met it may be necessary for restrictions or limitations to be imposed upon helicopter operations which could, in severe cases, lead to a loss of payload when the wind is blowing through a turbulent sector.

2.1.2 Helidecks are basically flat plates and so are relatively streamlined structures. In isolation they would present little disturbance to the wind flow, and helicopters would be able to operate safely to them in a more or less undisturbed airflow environment. Difficulties may arise however, when the wind has to deviate around the bulk of the off-shore installation causing large areas of flow distortion and turbulent wakes and/or because the producing facility itself is a source of hot or cold gas emissions. The effects fall into three main categories:

i. The flow around the bulk of the off-shore facility. Platforms in particular are slab-sided, non-streamlined assemblies (bluff bodies) which create regions of highly distorted and disturbed airflow in the vicinity
ii. The flow around large items of superstructure such as cranes, drilling derricks and exhaust stacks, generates turbulence that can affect helicopter operations (paragraph 2.2). Like the platform itself, these are bluff bodies which encourage turbulent wake flows to form behind the bodies
iii. Hot gas flows emanating from exhaust outlets and flare systems (paragraph 2.3) and/or cold faring (paragraph 2.4)

2.1.3 For a helideck on a fixed or floating off-shore facility it should ideally be located at or above the highest point of the main structure. This will minimise the occurrence of turbulence downwind of adjacent structures. However, whilst this is a desirable feature it should be appreciated that in many parts of the world, for a helideck much in excess of 60m above sea level the regularity of helicopter operations may be impacted by low cloud base conditions. Conversely low elevation helidecks may also adversely affect helicopter operations where one-engine inoperative (dropdown) performance is an operational requirement for a State i.e. due to the insufficient drop-down between the landing

area and the sea surface. Consequently a trade-off may need to be struck between the height of the helideck above surrounding structures and its absolute height above mean sea level (AMSL).

2.1.4 A key driver for the location of the helideck is the need to provide a generous sector clear of physical obstructions for the approaching/departing helicopters and also sufficient vertical clearance for multi-engine helicopters to lose altitude after take-off in the event of an engine failure. This will entail a design incorporating a minimum 210 degree obstacle free sector with a falling gradient below the landing area over at least 180 degrees of this arc (refer to Chapter 9). From an aerodynamic point of view the helideck should be as far away as possible from the disturbed wind flow around the platform and in order to achieve this, in addition to providing the requisite obstruction free areas described above, it is recommended that the helideck be located on the corner of the facility with as large an overhang as possible.

2.1.5 In combination with locating the helideck at an appropriate elevation and, providing a vital air gap (see 2.1.8), the overhang will encourage the disturbed airflow to pass under the helideck leaving a relatively clean 'horizontal' airflow above the deck. It is recommended that the overhang should be such that the centre of the helideck is vertically above or outboard of the corner of the facility's superstructure.

2.1.6 When determining a preference for which corner of the facility the helideck should overhang, a number of considerations should be evaluated which are listed as follows:

i. The helideck location should facilitate a direct approach whenever possible;
ii. The helideck location should provide for a clear overshoot;
iii. The helideck location should minimise the need for sideways or backwards manoeuvring;
iv. The helideck location should minimise the environmental impact due to turbulence, thermal effects etc.;
v. The helideck location should allow, wherever possible, an approach to be conducted by the commander of the helicopter.

2.1.7 The relative weighting between these considerations will change depending on factors such as wind speed. However, generally the helideck should be located such that winds from prevailing directions carry turbulent wakes and exhaust plumes away from the helicopter approach path. To assess if this is likely to be the case, for fixed facilities, it will usually be necessary for designers to overlay the prevailing wind direction sectors over the centre of the helideck to establish prevailing wind directions and wind speed combinations and to assess the likely impact on helicopter operations for a helideck if sited at a particular location.

2.1.8 The height of the helideck above mean sea level (AMSL) and the presence of an air gap between the helicopter landing area and a supporting module are the most important factors in determining wind flow characteristics in the helideck environment. In combination with an appropriate overhang, an air gap separating the helideck from superstructure beneath it will promote beneficial wind flow over the landing area. If no air gap is provided then wind conditions immediately above the landing area are likely to be severe, particularly if mounted on top of a large multi-storey accommodation block — it is the distortion of the wind flow that is the cause. However, by building in an air gap, typically of between 3m and 6m, this has the effect of 'smoothing out' distortions in the airflow immediately above the helideck. Helidecks mounted on very tall accommodation blocks will require the largest clearance (typically 5-6m) while those on smaller blocks, and with a very large overhang, will tend to require smaller clearances (typically 3-4m). For shallow super-structures of three storeys or less, such as are often found on semi-submersible drilling facilities, a 1m air gap may be sufficient; but there is scope to increase the air gap as long as the size and presence of a more generous air gap does not have an adverse effect on the stability of a floating facility or the sea-keeping qualities of a ship.

Note — To avoid wave loading on the helideck, the air gap required by 2.1.8 is also provided to clear the maximum wave height that might be encountered during transportation and for operational conditions. For a shipboard helideck mounted on the deck of a floating vessel, the maximum vertical displacement due to vessel motion should also be taken into account.

2.1.9 It is important that the air gap is preserved throughout the operational life of the facility, and care is taken to ensure that the gap between the underside of the helideck structure and the super-structure beneath does not become a storage area for bulky items that might otherwise hinder the free-flow of air through the gap.

2.1.10Where it is likely that necessary limitations and/or restrictions would have a significant effect on helideck operability, being caused by issues that cannot easily be 'designed out', an option may exist for providing a second helideck which could be made available when the wind is blowing through the restricted sector for the primary helideck.

2.2 Effects of Structured-Induced Turbulence

2.2.1 It is almost inevitable that helidecks installed on cramped topsides of off-shore structures will suffer to some degree from their proximity to tall and bulky structures such as drilling derricks, flare towers, cranes or gas turbine exhausts stacks; it is often impractical to site the helideck above every tall structure. So any tall structure above and/or in the vicinity of the helideck may generate areas of turbulence or sheared flow downwind of the obstruction; and so potentially pose a hazard to the helicopter. The severity of the disturbance will be greater the bluffer the shape and the broader the obstruction to the flow. The effect reduces with increasing distance downwind from the source of turbulence.

2.2.2 An assessment of the optimum helideck position should also take into account the location and configuration of drilling derricks, which can vary in relative location during the field life. A fully clad derrick, being a tall and solid structure, may generate significant wake downwind of the obstacle. As the flow properties of the wake will be unstable, if the helideck is located downwind of a clad derrick it is likely to be subject to large and random variations in wind speed and direction. As a guide on wake decay from bluff bodies it should be assumed that the wake effects will not fully decay for a downwind distance of some 10-20 structure widths (for a 10m wide clad derrick this corresponds to a decay distance of between 100-200m). Consequently it is preferable that a helideck is not placed closer than 10 structure widths from a clad derrick.

2.2.3 However, few off-shore facilities will be large enough to facilitate such clearances in their design and any specification for a clad derrick has potential to result in operational limitations being applied when the derrick is upwind of the helideck. In contrast, unclad derricks are relatively porous and whilst a wake still exists, it will be of a much higher frequency and smaller scale due to the flow being broken up by the lattice element of the structure. Consequently a helideck can be safely located closer to an unclad derrick than to its clad equivalent. As a rule of thumb separations of at least 5 derrick widths at helideck height should be the design objective. Separations of significantly less than 5 structure widths, may lead to the imposition of operating restrictions in certain wind conditions.

2.2.4 Gas turbine and other exhausts, whether or not operating, may present a further source of structure-induced turbulence by forming a physical blockage to the air flow over the helideck and creating a turbulent wake (as well as presenting a potential hazard due to the hot exhaust). As a rule of thumb, to mitigate physical turbulence effects at the helideck, it is recommended that a minimum of 10 structure widths ideally be established between the obstruction and the helideck.

2.2.5 Other potential sources of turbulence may be present on off-shore facilities which could give rise to turbulence effects for example, large structures in close proximity to the helideck or a lay-down area in the vicinity of the helideck. In the latter case, bulky or tall items placed in lay-down areas close to the helideck could present a source of turbulence, and being only of a temporary

nature, their presence may increase the hazard, since pilots otherwise familiar with a particular facility would not be expecting turbulence if the source is a temporary obstruction. Ideally, a platform design should seek to ensure that any proposed lay-down areas are significantly below helideck level and/or are sufficiently remote from the helideck so as not to present a problem for helicopter operations.

2.3 Temperature Rise Due to Hot Exhausts

2.3.1 Increases in ambient temperature at the helideck are a potential hazard to helicopters as increased temperatures result in less rotor lift and less engine power margin. Rapid temperature changes are a significant hazard, as the rate of change of temperature in the plume has potential to cause engine compressor surge or stall (often associated with an audible 'pop'), which can result in loss of engine power, damage to engines and/or helicopter components and, ultimately, engine flame-out. It is therefore extremely important that helicopters avoid these conditions by ensuring occurrence of higher than ambient conditions is foreseen and mapped, and, where necessary, that steps are taken to reduce payload to maintain an appropriate performance margin.

2.3.2 Gas turbine power generation systems are often a significant source of hot exhaust gases on fixed off-shore facilities, while diesel propulsion or auxiliary power system exhausts occurring on some floating off-shore facilities may also need to be considered. For certain wind directions the hot gas plumes from the exhausts will be carried by the wind directly across the helideck. The hot gas plume then mixes with the ambient air to increase the size of the plume, at the same time reducing its temperature by dilution.

2.3.3 Appropriate modelling designed to evaluate likely temperature rise would indicate that for gas turbine exhausts, with not untypical release temperatures up to 500°C and flow rates of between 50-100kg/s, the minimum range at which the temperature rise in the plume drops to 2°C above ambient temperature would be in the range of 130-190m downwind of the source. Even where gas turbine generation systems incorporate waste heat recovery systems, resulting in lower gas temperatures of about 250°C, with the same flow rate assumptions the minimum distance before the temperature rise in the plume drops to 2°C above ambient is still in the range of 90-130m downwind of the source.

2.3.4 In consideration of 2.3.3, except for the very largest off-shore facilities, it implies regardless of design there will always be a wind condition where temperature rise above the helideck exceeds the 2°C threshold. Consequently it may be impossible to design a helideck that is compliant with these criteria for all conditions. The design aim then becomes one of minimising the occurrence of high temperatures over the helideck rather than necessarily eliminating them completely. This can be achieved by ensuring that the facility layout and alignment directions are such that these conditions are only experienced rarely.

2.3.5 If it is necessary to locate power generation modules and exhausts close to the helideck, then this can be an acceptable location provided that the stacks are high enough to direct the exhaust gas plume clear of arriving/departing helicopters. It is also important to ensure that the design of the stacks does not compromise helideck obstacle protection surfaces or are so wide as to present a source of structure-induced turbulence.

2.3.6 The helideck should be located so that winds from the prevailing wind direction(s) carry the plume away from the helicopter approach/departure paths. To minimise the effects for other wind directions, the exhausts should be sufficiently high to ensure that the plumes are above all the likely helicopter approach/departure paths. To achieve this it is recommended that exhaust outlets are no less than 20-30m above the helideck. The provision of downward-facing exhausts that initially direct hot exhaust gases towards the sea should be avoided as experience has shown that hot plumes can rise from the sea surface and disperse in an unpredictable way, particularly in light and variable wind conditions.

2.3.7 In situations where it is difficult or impractical to reduce the potential interaction between the helicopter and the turbine exhaust plume to a sufficiently low level, consideration should be given to installing a gas turbine exhaust plume visualisation system on facilities having a significant gas turbine exhaust plume problem, in order to highlight the hazard to pilots when operating by day, so minimising the potential effect of the plume by making it easier to see and avoid a plume encounter.

2.3.8 Helicopter performance may also be significantly impaired as a result of the combined radiated and convection heat effects from flare plumes under certain wind conditions. In moderate or strong winds the radiated heat from a lit flare is rapidly dissipated and usually presents little problem for the helicopter, provided flight through the flare plume is avoided. However, in calm or light wind conditions, potential changes in air temperature in the vicinity of the helideck could be much greater and so have a marked effect on the performance of the helicopter. Therefore designers should exercise great care in the location and elevation of flare towers in relation to helicopter operations.

2.4 Cold Flaring and Rapid Blow-Down Systems

2.4.1 Hydrocarbon gas can be released as a result of the production process on the installation or from drilling facilities at various times. It is important to ensure that a helicopter does not fly into a cloud of hydrocarbon gas because even relatively low levels of concentration (typically above 10% lower flammable limit [LFL]) can cause a helicopter engine to surge or flame-out with a consequent risk to the helicopter. Also, in these conditions, the helicopter poses a risk to the off-shore facility because it is a potential ignition source for any hydrocarbon gas that may be present in the atmosphere. Consideration therefore needs to be given to ensuring that gas release points are as remote as possible from the helideck and from the helicopter flight path and that, in the event of any unforeseen gas release occurring during helicopter operations, the pilot of a helicopter is given sufficient warning so that, if necessary, he can break off his approach to the helideck. Planned gas releases should only occur when helicopters are not in the area.

2.4.2 The blow-down system on a production facility depressurises the process system releasing hydrocarbon gas. It will normally be designed to reduce the pressure down to half its operating value in about 15 minutes. However, for a large facility this could feasibly require the release of 50 tonnes of gas, or more. Once down to the target pressure, in 15 minutes or less, the remainder of the gas will continue to be released from the system. A blow-down may be automatically triggered by the detection of a dangerous condition in the process or alternatively manually triggered.

2.4.3 The blow-down system should have venting points that are as remote as possible from the helideck, and for prevailing winds, are downwind of the helideck. It is not uncommon to have this vent on the flare boom, and this will normally be a good location. However, it should be borne in mind that dilution of the gas to acceptably low levels of concentration (to <10% LFL) may not occur until the plume is a considerable distance from the venting point. This distance may be anywhere between 200m and 500m depending on the size of the vent, the rate of venting and the prevailing wind speed.

2.4.4 Drilling facilities often have ‘poor-boy degassers’ which are used to release gas while circulating a well, but, except for a sudden major crisis such as a blow-out on a drilling facility, are unlikely to release significant quantities of gas without warning. As with production facilities, it is not likely to be possible to locate the helideck sufficiently distant from the potential source of gas to always guarantee low levels of concentration at the helideck or in the helicopter flight path, and so the drilling facility may need to curtail helicopter flights when well circulation activity is going on, or when problems are experienced down the well.

2.5 Special Conditions for Floating Facilities and Ships

2.5.1 As well as experiencing the aerodynamic effects and potential hazards highlighted within this Chapter, floating installations and ships experience dynamic motions due to ocean waves. These motions are a potential hazard to helicopter operations, and motion limits for executing a safe landing will need to be established in order to avoid unsafe conditions. The recording and reporting of deck motions for the safe landing of helicopters is discussed in more detail in Chapter 20.

2.5.2 The setting of helideck performance/motion limitations due to floating installation and ship dynamic motions is usually the responsibility of the helicopter operator and will be influenced by the type of facility or ship to which they are operating, the types of helicopters being operated, the operating conditions (e.g. whether day or night) and the location of the helideck (a helicopter operator may, for example, discuss landing limits with the Ship's Master). Limitations typically apply both to vertical linear motions in heave and to angular motions expressed as pitch and roll. Some operators may consider additional parameters such as helideck inclination.

2.5.3 The angle of pitch and roll is the same for all points on a facility or ship but the amount of heave, sway or surge motion experienced will vary considerably depending on the precise location of the helideck. The severity of helideck motions will depend on:

i. The wave environment
ii. The size of the floating facility or ship (a smaller facility/ship generally tends to exhibit larger and faster wave induced motions than a large facility/ship where the Response Amplitude Operator (RAO) is lower)
iii. The characteristics of the floating facility or ship (certain hull forms exhibit larger wave induced motions than others, or are sensitive to particular sea conditions)
iv. Whether the floating facility or ship is moored, underway or under tow
v. The location of the helideck on a ship (vertical motions tend to be greater at the bow or stern of a ship than at the amidships location, and sway motions due to roll tend to increase with helideck height)

2.5.4 Sea states are usually characterised in terms of a significant wave height, an associated wave period and a wave energy spectrum. The motions of a ship or floating facility generally become larger as the significant wave height and period increase, but can be especially severe at certain wave periods (e.g. at natural roll or pitch periods) and may be sensitive to the range in frequency content of the wave spectrum experienced. The motion characteristics of a floating facility or ship may be reliably predicted by recourse to well-established computer models or to physical model testing. Helideck downtime will occur whenever the motions of the floating facility or ship exceed the derived criteria.

2.5.5 The operability of a helicopter landing area depends on its location on a floating facility or ship, both longitudinally and transversely. For ships and ship-shaped floating facilities, such as FPSOs, the pitching motion is such that the vertical heave motion experienced at the helideck on the bow or stern will generally be much greater than if the helideck is located amidships. Bow mounted helidecks can be particularly vulnerable to damage from green seas spilling over the superstructure of the ship, unless mounted high above deck level. Helidecks located off the vessel centreline, and cantilevered over the side (which usually provides the benefit of an unobstructed falling gradient over at least 180 degrees) may experience downtime due to heave motions caused by roll; although generally downtime for a helideck located amidships will be less than for a helideck located at the bow or stern of a ship or ship-shaped facility.

Note 1 — The location of the helideck particularly on drilling facilities is generally determined by factors other than the need to minimise heave motions, and it maybe that the central area of an FPSO or drillship, for example, is otherwise occupied by processing or drilling equipment. A helideck located at the bow or stern may be more accessible to the temporary refuge and/or accommodation on

board the facility which is another factor to consider particularly where the helideck is designated to be a primary means of escape in the event of an incident occurring.

Note 2 — Some thrusters-assisted FPSOs and dynamically positioned facilities or ships have the ability to turn to a desired heading which can be used operationally to minimise helideck downtime due to wave motions and aerodynamic effects. Where dynamic positioning (DP) systems are used to maintain heading control, it is important to ensure that the heading control system has adequate integrity (operability and redundancy) to maintain heading control at all times during helicopter operations.

2.6 Environmental Criteria

2.6.1 The design criteria given in the following paragraphs represent the current best information available and may be applied to new fixed or floating facilities or ships, and to significant modifications to existing facilities or ships and/or where operational experience has highlighted potential issues. When considering the volume of airspace to which the following criteria apply, designers should consider the airspace up to a height above helideck level which takes into consideration the requirement to accommodate helicopter landing and take-off decision points (or Committal Point). This is considered to be a height above the helideck corresponding to 9.14m (30 feet) plus wheels-to-rotor height plus one rotor diameter. For the Sikorsky S92, for example, this equates to a column of air approximately 31m (or 102 feet) above helideck surface level. The formula is clearly type specific being predicated on two of the dimensional aspects of the design helicopter which are specific to type.

2.6.2 As a general rule, in respect to turbulence, a limit on the standard deviation of the vertical airflow velocity of 1.75m/s should not be exceeded. Where these criteria are significantly exceeded (i.e. where the limit exceeds 2.4m/s), there is the possibility that operational restrictions will be necessary. Fixed or floating facilities or ships where there is a likelihood of exceeding the criteria should be subjected to appropriate testing e.g. a scale model in a wind tunnel or by Computational Fluid Dynamics (CFD) analysis, to establish the wind environment in which helicopters will be expected to operate.

2.6.3 Unless there are no significant heat sources on the facility or ship, designers should commission a survey of ambient temperature rise based on a Gaussian Dispersion model and supported by wind tunnel testing or CFD analysis. Where the results of such modelling and/or testing indicate there may be a rise of air temperature of more than 2 degrees Celsius averaged over a 3-second time interval, there is the possibility that operational limitations and/or restrictions may need to be applied.

2.6.4 For permanent multiple platform configurations, normally consisting of two or more bridge-linked modules in close proximity to each other, the environmental effects of hazards emanating from all constituent modules should be considered on helideck operations. This is particularly appropriate for the case of hot or cold gas exhausts where there will always be a wind direction which carries any exhaust plumes from a bridge-linked module in the direction of the helideck.

2.6.5 For temporary combined operations where typically one or more mobile facilities and/or ships are operated in close proximity to another (usually fixed) facility, the environmental effects emanating from one facility or ship should be fully considered for all facilities located together in temporary combined operations.

3 DESIGN – HELIDECK ACCESS POINTS

3.1 General

3.1.1 Helideck access points shall be located at two or preferably three locations around the landing area to give passengers embarking or disembarking direct access to and from the helicopter without a need to pass around the tail rotor or under the main rotor of those helicopters with a low main rotor profile. The need to preserve, as far as possible, an unobstructed falling gradient over at least 180° should be carefully weighed against the size and design of the access platform in needing to accommodate vital helideck safety equipment (e.g. fire-fighting equipment) plus access stairs and signage so that any infringement to the falling gradient is the smallest possible, and preferably not at all.

AMC to 3.1

a) When deciding the normal access and emergency escape routes to and from the helideck, a safe and efficient route should be provided for passengers between the helideck and arrival / departure areas.

b) The helideck normal access and emergency escape routes design analysis should take into account the following:

i. Limiting the steepness of access-ways to assist safe personnel passage
ii. Providing the most direct route for the primary access from the helideck
iii. Being able to secure the helideck properly from unauthorised or inadvertent access during helideck operations, etc.
iv. Provision of efficient passenger controls
v. Sufficient space for, and ease of laying fire hoses
vi. Easy and unrestricted access to rescue equipment
vii. Easy stretcher access
viii. Easy access for freight handling
ix. Easy access for baggage handling
x. Separation of passenger movement from refuelling operations
xi. Provision of good clearances from helicopter tail rotor position for deck crew and passengers
xii. The need to accommodate aircraft positioning in various wind directions

3.2 Emergency Escape Routes

3.2.1 There shall be a minimum of two primary escape routes from the helideck, preferably three.

3.2.2 Escape routes shall be of a suitable size to enable quick and efficient movement of the maximum number of personnel who may require to use them, and to facilitate easy manoeuvring of fire-fighting equipment and use of stretchers.

AMC1 to 3.2.2

Typical dimensions for width of escape routes would be 1.2m for main escape routes and 0.7m for secondary escape routes, with consideration given to areas for manoeuvring a stretcher.

AMC2 to 3.2.2

One escape route can be a ladder system if a platform and stairs prove to be an unworkable option.

3.2.3 Escape routes should be at least 90-degrees to each other; they shall not be sited together. *Note - Preferred option is for routes to be positioned opposite each other.*

3.2.4 Escape routes shall take into account fire monitor positioning and the likely effect of water blast impeding passenger escape.

3.2.5 Escape routes shall be positioned so as not to impede rescue operations.

3.2.6 Fire-fighting equipment and rescue equipment should be positioned close to exits.

AMC to 3.2.6

Where foam monitors are selected for fire-fighting and collocated on an access platform, care should be taken to ensure that the presence of a monitor does not impede or cause injury to escaping personnel due to the operation of the monitor in an emergency situation.

3.2.7 Escape routes should be designed to direct passengers immediately away from the helicopter, in particular the tail rotor area.

3.2.8 Escape routes shall provide easy access and quick arrival at a place of safety below helideck level.

3.2.9 Fire-fighters and helideck crew escape from fixed monitor platforms should access to the fire-fighting pumping switch.

3.2.10Vessels with helidecks on the foredeck may be unable to provide a tertiary escape other than via a hatch system to below deck. The designer should provide alternative options for the tertiary escape route, should a stricken helicopter hinders the use of the hatchway.

AMC to 3.2.10

Vessels with foredeck helidecks will sometimes offer a very good escape route to protected areas behind the bridge. The designer should take advantage of this option.

3.3 Stairways

3.3.1 The primary helideck access stairways should be designed with extra width where possible.

3.3.2 Long, very steep stairways should be avoided. It is preferable to have intermediate landings.

3.3.3 Handrails associated with access platforms may need to be made collapsible, retractable or removable where the height constraints of permitted objects cannot be otherwise met and should be painted yellow / black for increased conspicuity.

3.3.4 Similar to walkways, where possible, stairways should have high-sided handrail systems particularly where the outboard helideck access routes are likely to be exposed to high winds and on vessels subject to wave motions.

3.3.5 Ladders for normal access are unacceptable.

3.3.6 If chains are to be used to restrict access to helideck stairways, then they shall be frangible (plastic).

CHAPTER 7 – PHYSICAL CHARACTERISTICS: HELIDECKS

Note 1 - In respect to D and D-value referenced in the following sections, it should be noted that this corresponds to the largest overall dimension of a single main rotor helicopter when rotors are turning, being measured, and expressed in metres, from the most forward position of the main rotor tip path plane to the most rearward position of the tail rotor tip path plane or the helicopter structure.

Note 2 - Were the criteria cannot be met in full for a particular type of helicopter, it may be necessary to promulgate operational restrictions in order to compensate for deviations from these criteria. Helicopter operators are to be notified of any restrictions through the Helideck Limitations List (HLL).

Note 3 - For helidecks that have a 1 D or larger FATO it is presumed that the FATO and the TLOF will always occupy the same space and have the same load bearing characteristics so as to be coincidental.

Note 4 - For helidecks that are less than 1 D, the reduction in size is only applied to the TLOF which is a load bearing area. In this case, the FATO remains at 1 D but the portion extending beyond the TLOF perimeter need not be load bearing for helicopters. The TLOF and the FATO may be assumed to be collocated but are not coincidental.

1 FINAL APPROACH AND TAKE-OFF AREAS (FATO) AND TOUCHDOWN AND LIFT-OFF AREAS (TLOF)

1.1 A helideck shall be provided with one FATO and one coincident or collocated TLOF.

1.2 A FATO may be any shape but shall be of sufficient size to contain an area within which can be accommodated a circle of diameter of not less than 1 D of the largest helicopter the helideck is intended to serve.

1.3 A TLOF may be any shape but shall be of sufficient size to contain:

a) for helicopters with an MTOM of more than 3,175 kg, an area within which can be accommodated a circle of diameter not less than 1 D of the largest helicopter the helideck is intended to serve; and

b) for helicopters with an MTOM of 3,175 kg or less, an area within which can be accommodated a circle of diameter not less than 0.83 D of the largest helicopter the helideck is intended to serve.

Note: For helicopters with a MTOM of 3,175 kg or less, the TLOF should be of sufficient size to contain an area within which can be accommodated a circle of diameter of not less than 1 D of the largest helicopter the helideck is intended to serve. (*Refer to GM1 (d)*)

1.4 A helideck shall be arranged to ensure that a sufficient and unobstructed air-gap is provided which encompasses the full dimensions of the FATO. *(Refer to Chapter 6)*.

1.5 The FATO should be located so as to avoid, as far as is practicable, the influence of environmental effects, including turbulence, over the FATO, which could have an adverse impact on helicopter operations. *(Refer to Chapter 6)*.

1.6 The TLOF shall be dynamic load-bearing.

1.7 The TLOF shall provide ground effect.

1.8 No fixed object shall be permitted around the edge of the TLOF except for frangible objects, which, because of their function, must be located thereon.

1.9 For any TLOF *1D or greater and any TLOF* designed for use by helicopters having a D-value of greater than 16.0 m, objects *installed* in the obstacle free sector whose function requires them to be located on the edge of the TLOF shall not exceed a height of 25 cm[5].

1.10 *For any TLOF 1D or greater and any TLOF designed for use by helicopters having a D-value of greater than 16.0 m, objects installed in the obstacle-free sector whose function requires them to be located on the edge of the TLOF should be as low as possible and in any case not exceed a height of 15 cm[6].*

1.11 For any TLOF designed for use by helicopters having a D-value of 16.0 m or less, *and any TLOF having dimensions of less than 1D,* objects *installed* in the obstacle-free sector whose function requires them to be located on the edge of the TLOF, shall not exceed a height of 5 cm[7].

Note — Lighting that is mounted at a height of less than 25 cm is typically assessed for adequacy of visual cues before and after installation.

1.12 Objects whose function requires them to be located within the TLOF (such as lighting or nets) shall not exceed a height of 2.5 cm. Such objects shall only be present if they do not represent a hazard to helicopters.

Note — Examples of potential hazards include nets or raised fittings on the deck that might induce dynamic rollover for helicopters equipped with skids.

1.13 Safety devices such as safety nets or safety shelves shall be located around the edge of a helideck but shall not exceed the height of the TLOF.

1.14 The surface of the TLOF shall be skid-resistant to both helicopters and persons and be sloped to prevent pooling of water. *(Refer to Chapter 9).*

GM1 to: Helideck FATO and TLOF

a) From a point on the periphery of the FATO 1D-circle, an obstacle free approach and take-off sector should be provided which extends over an angle of at least 210 degrees. Within this sector obstacle accountability should be considered out to a distance from the periphery of the FATO that will allow for an unobstructed departure path appropriate to the least well performing helicopter the FATO is intended to serve. The height limitation for obstacles in the obstacle free sector is 25 cm for a TLOF of greater than 16.0m and/or 1D or greater and 5 cm for a TLOF 16.0m or less and/or less than 1D. For helicopters that are operated in Performance Class 1 or 2, the horizontal extent of this distance from the edge of the FATO will be based on the one-engine-inoperative capability of the type to be used.

b) It is essential the TLOF provides sufficient space for the landing gear configuration and sufficient surface area to promote helpful “ground cushion” effect from rotor downwash. The area provided should also allow adequate room for passengers and crew to alight or embark the helicopter and to transit to and from the operating area safely. In addition space consideration needs to be given to allow essential on-deck operations, such as baggage handling, tying down the helicopter or helicopter refuelling, to occur safely and efficiently, and, in the event of an incident or accident occurring, for rescue and fire-fighting teams to always have good access to the landing area from an upwind location (see also Chapter 6).

c) The design should allow for sufficient clearance from the main rotor and tail rotor of the helicopter to essential objects permitted to be around the perimeter of the TLOF, including obstacles that may be present in the limited obstacle sector. It should be clearly understood that

[5] ICAO Amendment 7 to ICAO Annex 14 Volume II (Italic grey)
[6] ICAO Amendment 7 to ICAO Annex 14 Volume II (Italic grey)
[7] ICAO Amendment 7 to ICAO Annex 14 Volume II (Italic grey)

a FATO of 1D is the minimum dimension sufficient for containment of the helicopter; in this case, where a precise landing is completed, the main and tail rotors will a-but the edge of the 1D circle. For this reason it is important that the yellow touchdown/positioning marking circle is accurately and clearly marked and is used by aircrew every time for positioning the helicopter during the touchdown manoeuvre.

d) Sufficient margins to allow for touchdown/positioning inaccuracies as a result of normal variations or handling difficulties, for example due to challenging meteorological conditions, aerodynamic effects and/or dynamic motions due to ocean waves, should be allowed for in the design. The helideck and environs should provide adequate visual cues and references for aircrew to use throughout the approach to touchdown manoeuvre from initial helideck location and identification (acquisition) through final approach to hover and to landing. In addition adequate visual references should be available for the lift-off and hover into forward flight.

e) In consequence of the considerations stated in a), b) and c), except where an Aeronautical Study is able to demonstrate otherwise, the minimum size for the new-build design of a TLOF for single main rotor helicopters is deemed to be an area which can accommodate a circle whose dimension is no less than 1.0x the overall length including rotors of the largest helicopter that the helideck is intended to serve. For helicopters with a MTOM of 3175kg or less, it is permitted, on the basis of a risk assessment to shrink the overall size of the TLOF so that it is less than 1D, but is not less than 0.83D.

f) A FATO of 1D provides full containment of the helicopter where touchdown markings are used correctly and precisely. For a helideck that has a dynamic load bearing surface (TLOF) of less than 1D, elements of the helicopter will inevitably extend beyond the edge of the TLOF. For this reason the TLOF is surrounded by a circle with a diameter of 1D — which is obstacle free with the exception of the permitted obstacles. In essence this obstacle free area represents the standard 1D FATO from which the limited obstacle sector extends. To ensure obstacle clearance, it is important that the diameter of the touchdown/positioning marking circle is 0.5 of the notional FATO (not of the smaller landing surface (TLOF)) and is located at the centre of the FATO.

CHAPTER 8 – PHYSICAL CHARACTERISTICS: SHIPBOARD HELIDECK

Note 1 - When helicopter operating areas are provided in the bow or stern of a ship or are purpose-built above the ship's structure, they shall be regarded as purpose-built shipboard helidecks.

Note 2 - Except for the arrangement described in paragraph 1.6 b), for shipboard helidecks it is presumed that the FATO and the TLOF will be coincidental.

1 FINAL APPROACH AND TAKE-OFF AREAS (FATO) AND TOUCHDOWN AND LIFT-OFF AREAS (TLOF)

1.1 A shipboard helidecks shall be provided with one FATO and one coincidental or collocated TLOF.

1.2 A FATO may be any shape but shall be of sufficient size to contain an area within which can be accommodated a circle of diameter of not less than 1 D of the largest helicopter the helideck is intended to serve.

1.3 The TLOF of a shipboard helideck shall be dynamic load-bearing.

1.4 The TLOF of a shipboard helideck shall provide ground effect.

1.5 For purpose-built shipboard helidecks provided in a location other than the bow or stern, the TLOF shall be of sufficient size to contain a circle with a diameter not less than 1 D of the largest helicopter the helideck is intended to serve.

1.6 For purpose-built shipboard helidecks provided in the bow or stern of a ship, the TLOF shall be of sufficient size to:

a) contain a circle with a diameter not less than 1 D of the largest helicopter the helideck is intended to serve; or

b) for operations with limited touchdown directions, contain an area within which can be accommodated two opposing arcs of a circle with a diameter not less than 1 D in the helicopter's longitudinal direction. The minimum width of the helideck shall be not less than 0.83 D (see Figure 8-1).

Note 1 — The ship will need to be manoeuvred to ensure that the relative wind is appropriate to the direction of the helicopter touchdown heading.

Note 2 — The touchdown heading of the helicopter is limited to the angular distance subtended by the 1 D arc headings, minus the angular distance which corresponds to 15 degrees at each end of the arc.

1.7 For non-purpose-built shipboard helidecks, the TLOF shall be of sufficient size to contain a circle with a diameter not less than 1 D of the largest helicopter the helideck is intended to serve.

1.8 A shipboard helideck shall be arranged to ensure that a sufficient and unobstructed air-gap is provided which encompasses the full dimensions of the FATO. *(Refer to Chapter 6)*

1.9 The FATO shall be located so as to avoid, as far as is practicable, the influence of environmental effects, including turbulence, over the FATO, which could have an adverse impact on helicopter operations. *(Refer to Chapter 6).*

1.10 No fixed object shall be permitted around the edge of the TLOF, except for frangible objects, which, because of their function, must be located thereon.

1.11 For any TLOF *1D or greater and any TLOF* designed for use by helicopters having a D-value of greater than 16.0 m, objects *installed* in the obstacle free sector whose function requires them to be

located on the edge of the TLOF shall not exceed a height of 25 cm[8].

1.12 *For any TLOF 1D or greater and any TLOF designed for use by helicopters having a D-value of greater than 16.0 m, objects installed in the obstacle-free sector whose function requires them to be located on the edge of the TLOF should be as low as possible and in any case not exceed a height of 15 cm[9].*

1.13 For any TLOF designed for use by helicopters having a D-value of 16.0 m or less, *and any TLOF having dimensions of less than 1D*, objects in the obstacle-free sector, whose function requires them to be located on the edge of the TLOF, shall not exceed a height of 5 cm[10].

Note — Lighting that is mounted at a height of less than 25 cm is typically assessed for adequacy of visual cues before and after installation.

1.14 Objects whose function requires them to be located within the TLOF (such as lighting or nets) shall not exceed a height of 2.5 cm. Such objects shall only be present if they do not represent a hazard to helicopters.

1.15 Safety devices such as safety nets or safety shelves shall be located around the edge of a shipboard helideck, except where structural protection exists, but shall not exceed the height of the TLOF.

1.16 The surface of the TLOF shall be skid-resistant to both helicopters and persons.

GM1 to: Shipboard Helideck FATO and TLOF

a) A shipboard helideck may be purpose built or non-purpose built and be provided in the bow or stern of a ship, have an over-side location (usually cantilevered), be amidships on or close to the centre line of the ship, be located on the ships side or, subject to structural considerations, utilise other non-purpose built areas of the ship such as over a hatch cover *(Refer to Chapter 6)*.

b) For a shipboard helideck, regardless of whether it is purpose built or non-purpose built, where the diameter of the landing area is 1D or larger it is presumed that the FATO and TLOF will always be coincidental and therefore the TLOF is assumed to include the FATO when used throughout the requirements of CAAP 71. A shipboard helideck commonly incorporates one TLOF, notwithstanding that for a large ship, to improve operational flexibility, there may be opportunity to provide an additional landing area elsewhere on the facility.

c) For a purpose built shipboard helideck provided in the bow or stern of a ship, where operations are conducted within limited touchdown directions only (see Figure 8-1), consideration may be given to reduce the load bearing surface dimension athwart-ships; provided in the helicopter's longitudinal (landing) direction the TLOF dimension is at-least 1D, the width of the TLOF in the athwart-ships direction may be reduced to no less than 0.83D. Across both axes the minimum dimension of the FATO is 1D, so athwart-ships the FATO will typically overlap the perimeter netting (or safety shelving) on both the port and starboard sides. This portion of the FATO, which for a minimum size (0.83D TLOF), extends either side beyond the TLOF by 0.085D, is assumed to be non-load bearing for helicopters. Any reductions should be supported by an Aeronautical Study.

d) The basic size of the FATO and TLOF for a shipboard helideck is, of necessity, a compromise for off-shore operations where space is often limited. The landing and take-off (load bearing) area should provide sufficient space for the landing gear configuration and a sufficient surface area to promote helpful "ground cushion" effect from rotor downwash. The surface area should allow

[8] ICAO Amendment 7 to ICAO Annex 14 Volume II (Italic grey)
[9] ICAO Amendment 7 to ICAO Annex 14 Volume II (Italic grey)
[10] ICAO Amendment 7 to ICAO Annex 14 Volume II (Italic grey)

adequate room for passengers and crew to alight or embark the helicopter and to transit to and from the operating area safely. In addition space consideration needs to be given to allow essential on-deck operations, such as baggage handling, tying down the helicopter or helicopter refuelling, to occur safely and efficiently, and, in the event of an incident or accident occurring, for rescue and fire-fighting teams to have good access to the landing area, at all times from an upwind location.

e) The design should allow for sufficient clearance from the main rotor and tail rotor of the helicopter to objects permitted to be around the perimeter of the TLOF, including objects that may be present in the limited obstacle sector. It should be clearly understood that a FATO of 1D is sufficient only for containment of the helicopter; the main and tail rotors will always be at the edge of the 1D circle — even when the helicopter is perfectly positioned. For this reason it is important that the touchdown/positioning marking circle is accurately and clearly marked and is used by aircrew for positioning the helicopter during the touchdown manoeuvre.

f) Sufficient margins to allow for touchdown/positioning inaccuracies as a result of normal variations or handling difficulties, for example due to challenging meteorological conditions, aerodynamic effects and/or dynamic motions due to ocean waves, should be allowed for in the design. Finally, the helideck and the environs should provide adequate visual references for the aircrew throughout the approach to touchdown manoeuvre from initial helideck location and identification (acquisition) through final approach to hover and to landing. In addition adequate visual references should be available for lift-off and hover.

g) In consequence of the considerations stated in d), e) and f), the minimum size of the FATO and the TLOF for single main rotor helicopters is deemed to be an area which can accommodate a circle whose dimension is no less than 1.0x the overall length including rotors of the largest (design) helicopter that the shipboard helideck is intended to serve.

h) In the case of a purpose built shipboard helideck provided in the bow or stern of a narrow-beam ship, where operations are conducted with limited touchdown directions it is permissible to make a case for operations to shipboard helidecks that are less than 1D, but are no less than 0.83D in the athwart-ships direction. Any reductions should be supported by an Aeronautical Study.

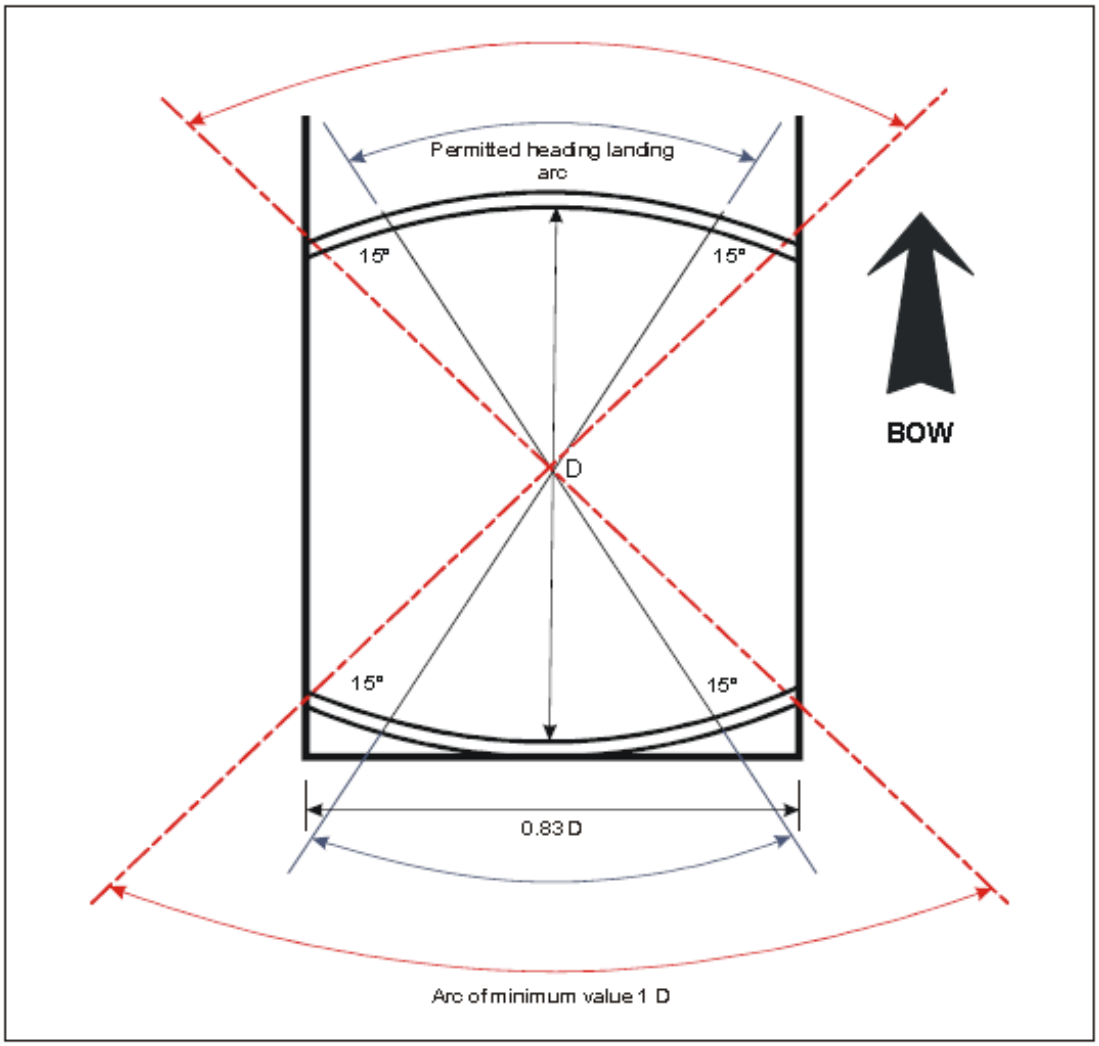
i) One of the important elements relating to the minimum size of the FATO and TLOF is the requirement for sufficient clearance to exist from the main or tail rotor of the helicopter to essential objects which may need to be present around a TLOF. For a shipboard helideck, which has an overall dimension less than 1.0D and/or has a D-value of 16.00m or less, the height of essential permitted objects around the TLOF perimeter should be no greater than 5cm above the level of the landing area, whilst for a shipboard helideck having an overall dimension of 1.0D or greater, assuming also a D-value greater than 16.00m, the height of essential permitted objects around the TLOF perimeter should be no greater than 25cm above the level of the landing area. Essential objects may include guttering with or without a raised kerb, where provided, perimeter lighting systems, including perimeter floodlighting and foam monitors where a Fixed Monitor System (FMS) is the primary means for fire-fighting and any handrails or signage associated with the shipboard helideck which may not be capable of complete retraction or removal during helicopter operations.

j) Essential objects, which because of their function are required to be located around the TLOF perimeter, should be of a suitable construction when assessed against the undercarriage design of helicopters operating to the shipboard helideck. For a purpose-built shipboard helideck having an overall dimension of 1D or larger, assuming also a D-value greater than 16.00m, where the construction of permitted objects around the TLOF could present a threat to the undercarriage and tail rotor systems of helicopters passing over the TLOF perimeter at low altitude and at low airspeed, more demanding obstacle height restriction for objects around the TLOF should be

considered; so that essential objects are restricted to a height no greater than 15cm above helideck level.

k) With the exception of the operation illustrated in Figure 8-1, a FATO and TLOF for a shipboard helideck may be any shape as long as it can contain a usually 'hypothetical' circle with the minimum prescribed dimensions of 1D. Although purpose built shipboard helidecks may be square, circular or rectangular — a common shape used for early designs — new build purpose built shipboard helidecks are more likely to be hexagonal or octagonal in shape. Consisting of a series of straight sides/edges, these arrangements provide some advantages over early design shapes. For example, multi-sided straight lines can provide better visual cues at night than either a circular or a square arrangement.

Figure 8-1 Shipboard permitted landing headings for limited heading operations



CHAPTER 9 – HELIDECK SURFACE ARRANGEMENTS: OBJECTS, SLOPES, FRICTION, TIE-DOWN POINTS, PERIMETER SAFETY NET

1. OBJECTS

1.1 Objects which due to their function are required to be located on the surface of the TLOF, such as helideck nets and helideck touchdown marking lighting systems, where provided, should not exceed a height above surface level prior to installation of more than 2.5cm and may only be present if they do not represent a hazard to helicopter operations. It should be appreciated that the presence of raised fittings on a helideck has potential to induce dynamic roll over for helicopters fitted with skids and extra care should be taken when incorporating deck-mounted fittings to helidecks intended for use by skid-fitted helicopters. As a consequence, because of the possible adverse effects of skid tips becoming enmeshed in helideck surface netting, it is recommended that skid fitted helicopters not operate to helidecks while a net is present. In addition because of the concerns of dynamic rollover, helicopters should only operate to helidecks fitted with deck mounted touchdown marking lighting systems where the system components are suitably finished, and the installed height of the system does not exceed 2.5cm. This would include proper arrangements for the chamfering of components (e.g. panels) and the maintenance of suitable friction surface finishes for each element of the system.

Note — For a non-purpose built shipboard helideck there may be circumstances where non-essential, and otherwise immoveable surface mounted obstructions are located within or immediately adjacent to the landing area which, with robust operational controls may be assessed not to present a hazard to the helicopter, but which may need to be highlighted to be readily visible from the air. There is a scheme for marking of obstacles described in Chapter 10 which also provides details of how to complete a helicopter landing area/operating area plan.

2. SLOPES

1.2 The surface of the landing area should be sloped to prevent the pooling of water. To this end the landing area should be provided with a suitable drainage system capable of directing rainwater, seawater, fire-fighting media and fuel spills away from the helideck to a safe place. To ensure adequate drainage of a helideck located on a fixed facility, the surface of the helideck should be laid to a fall or cambered to prevent any liquids accumulating on the landing area. Such falls or cambers should be approximately 1:100 and should be designed to drain liquids away from the main structure. A system of guttering, and/or slightly raised kerb, should be provided around the perimeter of the TLOF to prevent spilled fuel falling onto other parts of the facility whilst directing any spillages to a safe storage or disposal area, which may include the sea surface (where permitted). The capacity of the drainage system should be adequate to contain the maximum likely spillage of fuel on the helideck taking account the design helicopter and its fuel capacity, typical fuel loads and uplifts. The design of the drainage system should preclude blockage by debris. Any deflection of the helideck surface, in service, due to static loads imposed by the helicopter while stationary should not modify the surface to the extent that it encourages pooled liquids to remain on the helideck.

3. FRICTION

3.1 The surface of the landing area should be prepared so as to be skid-resistant to both helicopters and personnel using the TLOF. This entails that all essential markings on the surface should have a coating of non-slip material.

Note — It is recognised that some designs of aluminium helidecks have holes in the topside construction for the purpose of the rapid drainage of fluids including fuel spills which could occur, for example, if a helicopter's fuel system is ruptured by the impact of a crash. In these cases particular care should be taken to assess the qualities of skid-resistance prior to the helideck going into service. In addition it is also important to ensure that the pattern, and especially the size of any holes, does not have a detrimental effect on helicopter operations in-so-far as the surface arrangement should not promote the breakdown of a helpful ground cushion beneath the helicopter to reduce beneficial ground effect.

3.2 The helideck surface should be rendered so as to meet the minimum friction coefficient.

3.3 The minimum average surface friction value of 0.65 should be achieved across the area inside the TD/PM, outside the TD/PM and on the paint markings themselves.

Table 9-1 Friction requirements

Average surface friction value	Maximum period between tests
0.85 and above	36 months
0.7 to 0.84	12 months
0.65 to 0.69	6 months
Less than 0.651	Net to be retained

GM to 3.3: The test method should involve a friction measuring device that:

a) employs the braked wheel technique;
b) is able to control the wetness of the deck during testing;
c) includes electronic data collection, storage and processing; and
d) allows the whole of the deck surface to be covered to a resolution of not less than 1 m2.

The minimum average surface friction value of 0.65 should be achieved across the area inside the TD/PM, outside the TD/PM and on the paint markings themselves.

3.4 However, where an acceptable minimum friction coefficient cannot be achieved for operations with wheeled helicopters, there is an option to provide a surface mounted tautly stretched helideck landing net to encompass the touchdown/positioning marking circle and the helideck identification "H" marking, so that for a normal touchdown, the wheeled undercarriage of the helicopter, is contained within the perimeter of the net. The net should not be so large as to compromise the clear interpretation of other markings; for example the helideck-name marking or the maximum allowable mass marking — the helideck net may need to be modified to achieve this objective e.g. corners are cropped and removed.

3.5 It is preferable that the net be manufactured from material which is durable in consideration of the mass of the design helicopter and the forces acting on the net through the undercarriage. Materials selected should not be prone to wear and tear such as flaking

caused by prolonged exposure to adverse weather conditions. The rope should be secured at regular intervals and tensioned to a suitable level (typically 2225N). As a rule of thumb it should not be possible to raise any part of the net by more than 25cm above the helideck surface when applying a vigorous vertical pull by hand. The profile of the uninstalled net should ensure that it does not exceed the touchdown area height constraint requirements specified in paragraph 1.1. (It is not recommended that nets be provided for operations by skid-fitted helicopters as skids can easily become enmeshed in netting).

4. TIE-DOWN POINTS

4.1 Sufficient tie-down points, flush fitting to obviate damage to tyres or skids, should be provided for securing the design helicopter. Tie-downs should be located, and be of such construction, so as to secure the helicopter in severe weather conditions. Construction should take account of the inertial forces resulting from any movement of a floating facility. Tie down points should be compatible with the dimensions of tie down strop attachments.

5. PERIMETER SAFETY NETS (PERSONNEL PROTECTION)

5.1 Personnel protection safety devices such as perimeter safety nets or safety shelves should be installed around the edge of the helideck except where structural protection already exists. For helidecks completed on or after 1st January 2012, any safety device employed should not exceed the height of the outboard edge of the TLOF and so present a hazard to helicopter operations. The load bearing capability of the safety device should be assessed fit for purpose by reference to the shape and size of the workforce that it is intended to protect.

5.2 Where the safety device consists of perimeter netting, this should be of a flexible nature and be manufactured from a non-flammable material with the inboard edge fastened just below the edge of the helideck. The net itself should extend to a distance of at least 1.5m in the horizontal plane and be arranged with an upward slope of approximately 10°. The net should not act as a trampoline but should exhibit properties that provide a hammock effect to securely contain a person falling or rolling into it, without serious injury. When considering the securing of the net to the structure and the materials used, care should be taken to ensure each element will meet adequacy of purpose requirements, particularly that netting should not deteriorate over time due to prolonged exposure to the elements, including ultraviolet light. Perimeter nets may incorporate a hinge arrangement to facilitate the removal of sacrificial panels to allow for periodic testing.

5.3 Where the safety device consists of safety shelving rather than netting, it should be ensured that the construction and lay out of the shelving does not promote any adverse wind flow issues over the helideck (see Chapter 6), whilst providing equivalent personnel safety benefits to 5.2, and that it is installed to the same minimum dimensions as the netting system described above (at least 1.5m in the horizontal plane beyond the edge of the helideck. This solid shelving offers some advantage for promoting helpful ground cushion, especially for helidecks which are sub-1D. It may also be further covered with netting to improve “grab” capabilities.

CHAPTER 10 – OBSTACLE ENVIRONMENT

Note 1 - The objectives of the specifications in this chapter are to define the airspace around helidecks to be maintained free from obstacles so as to permit the intended helicopter operations at the helidecks to be conducted safely and to prevent the helidecks becoming unusable by the growth of obstacles around them. This is achieved by establishing a series of obstacle limitation surfaces that define the limits to which objects may project into the airspace.

1 OBSTACLE-FREE SECTOR (OFS) / SURFACE - HELIDECKS

Description

1.1 A complex surface originating at and extending from a reference point on the edge of the FATO of a helideck. In the case of a TLOF of less than 1 D, the reference point shall be located not less than 0.5 D from the centre of the TLOF.

Characteristics

1.2 An obstacle-free sector/surface shall subtend an arc of specified angle.

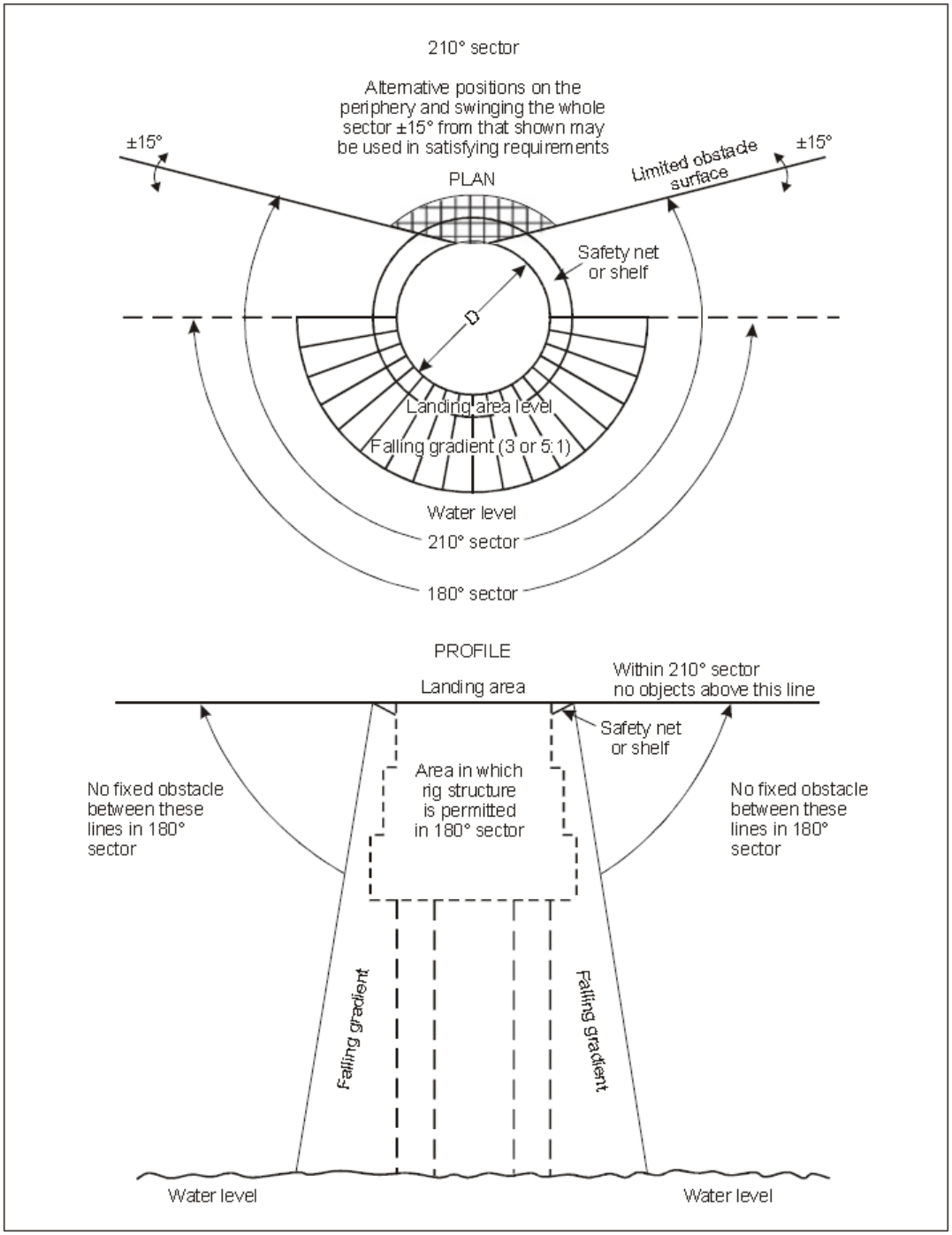
1.3 A helideck obstacle-free sector shall comprise two components, one above and one below helideck level (see Figure 10-1):

a) *Above helideck level*. The surface shall be a horizontal plane level with the elevation of the helideck surface that subtends an arc of at least 210 degrees with the apex located on the periphery of the D circle extending outwards to a distance that will allow for an unobstructed departure path appropriate to the helicopter the helideck is intended to serve.

b) *Below helideck level*. Within the (minimum) 210-degree arc, the surface shall additionally extend downward from the edge of the FATO below the elevation of the helideck to water level for an arc of not less than 180 degrees that passes through the centre of the FATO and outwards to a distance that will allow for safe clearance from the obstacles below the helideck in the event of an engine failure for the type of helicopter the helideck is intended to serve.

Note — For both the above obstacle-free sectors for helicopters operated in Performance Class 1 or 2, the horizontal extent of these distances from the helideck will be compatible with the one-engine-inoperative capability of the helicopter type to be used.

Figure 10-1 Helideck obstacle-free sector



2 LIMITED OBSTACLE SECTOR (LOS) / SURFACE - HELIDECKS

Note — Where obstacles are necessarily located on the structure, a helideck may have a limited obstacle sector (LOS).

Description

2.1 A complex surface originating at the reference point for the obstacle-free sector and extending over the arc not covered by the obstacle-free sector within which the height of obstacles above the level of the TLOF will be prescribed.

Characteristics

2.2 A limited obstacle sector shall not subtend an arc greater than 150 degrees. Its dimensions and location shall be as indicated in Figure 10-2 for a 1 D FATO with coincidental TLOF and Figure 10-3 for a 0.83 D TLOF.

Figure 10-2 Helideck obstacle limitation sectors and surfaces for a FATO and coincidental TLOF of 1 D and larger

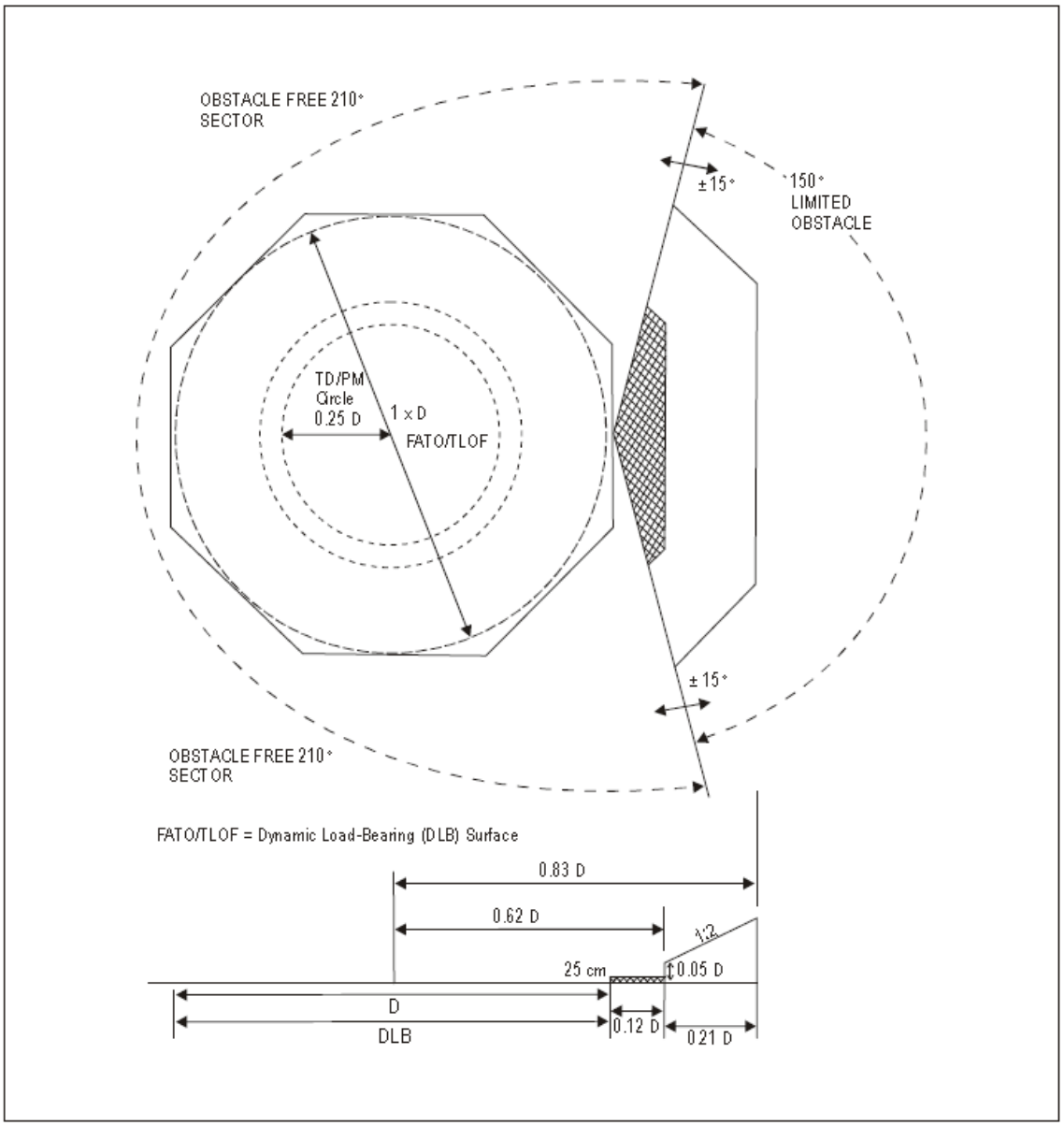
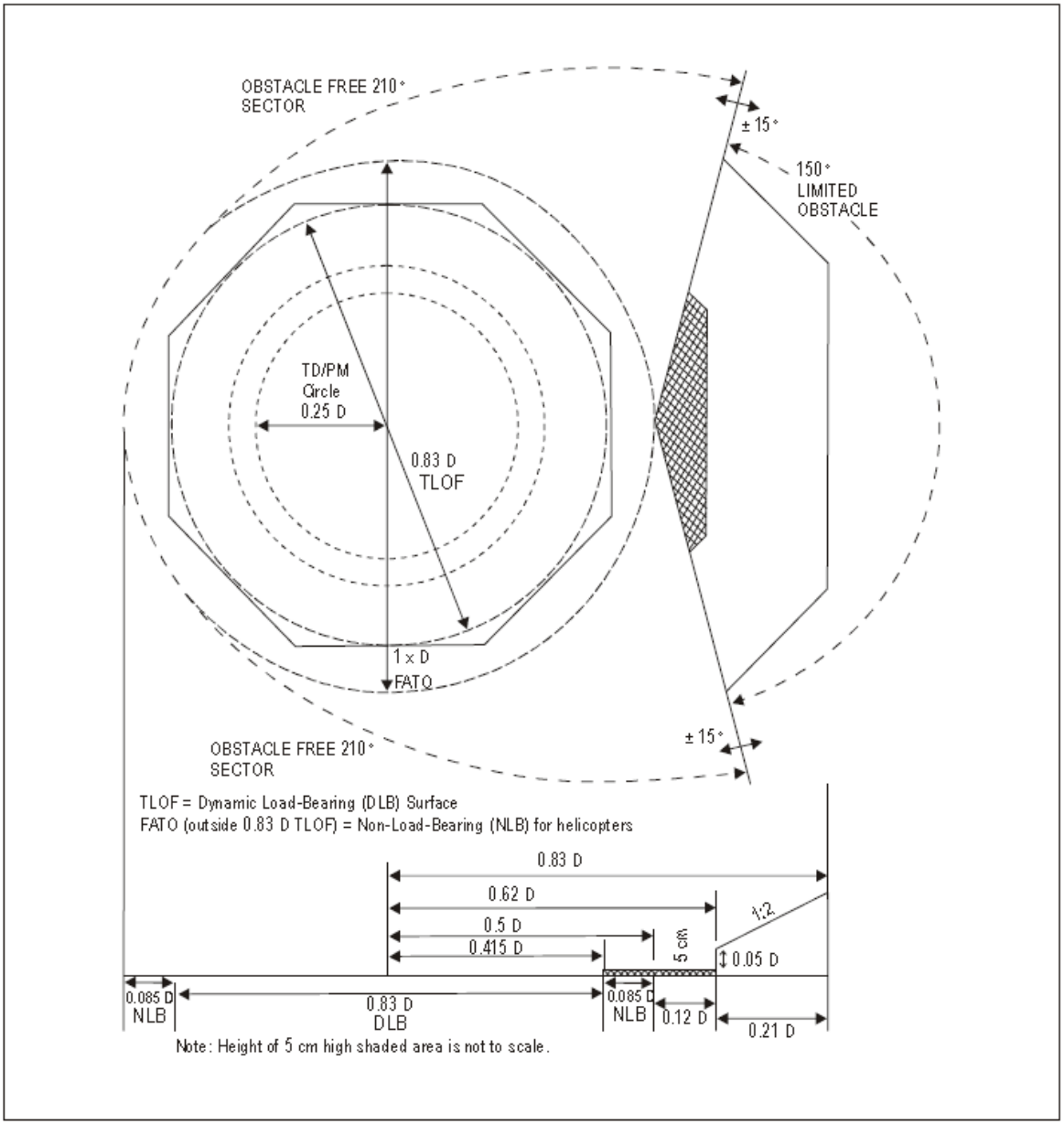


Figure 10-3 Helideck obstacle limitation sectors and surfaces for a TLOF of 0.83 D and larger



3 OBSTACLE LIMITATION REQUIREMENTS - HELIDECKS

3.1 A helideck shall have an obstacle-free sector.

Note — A helideck may have a limited obstacle sector (LOS).

3.2 There shall be no fixed obstacles within the obstacle-free sector above the obstacle-free surface.

3.3 In the immediate vicinity of the helideck, obstacle protection for helicopters shall be provided below the helideck level. This protection shall extend over an arc of at least 180 degrees with the origin at the centre of the FATO, with a descending gradient having a ratio of one unit horizontally to five units (5:1) vertically from the edges of the FATO within the 180-degree sector. This descending gradient may be reduced to a ratio of one unit

horizontally to three units (3:1) vertically within the 180-degree sector for multi-engine helicopters operated in Performance Class 1 or 2 (see Figure 10-1).

Note - Where there is a requirement to position, at sea surface level, off-shore support vessels (e.g. a Standby Vessel or tanker) essential to the operation of a fixed or floating off-shore facility, but located within the proximity of the fixed or floating off-shore facility's obstacle free sector (OFS), any off-shore support vessels would need to be positioned so as not to compromise the safety of helicopter operations during take-off, departure and approach to landing. (Refer to AMC1 to 7 Multiplatform Configurations / Locations of Standby Vessels).

GM1 to 3.3

To account for the loss in height of a helicopter following an engine failure occurring during the early stages of the take-off manoeuvre, it is required that a clear zone be provided below landing area level covering a sector of at least 180 degrees with its origin based at the centre of the D-circle. The falling gradient is measured downwards to the sea surface from the edge of the safety netting or safety shelving on a vertical gradient. The surface should extend outwards for a distance that will allow for safe clearance from obstacles below the landing area in the event of an engine failure based on the least well performing helicopter that is serviced by the FATO. For helicopters operated in Performance Class 1 or 2, the horizontal extent of this distance from the landing area will be based on the one-engine inoperative capability of the helicopter type in use. All objects that are underneath the final approach and take-off paths will need to be assessed.

3.4 For a TLOF of 1 D and larger, within the 150-degree limited obstacle surface/sector out to a distance of 0.12 D measured from the point of origin of the limited obstacle sector, objects shall not exceed a height of 25 cm above the TLOF. Beyond that arc, out to an overall distance of a further 0.21 D measured from the end of the first sector, the limited obstacle surface rises at a rate of one unit vertically for each two units horizontally originating at a height 0.05 D above the level of the TLOF. (See Figure 10-2).

3.5 For a TLOF less than 1 D within the 150-degree limited obstacle surface/sector out to a distance of 0.62 D and commencing from a distance 0.5 D, both measured from the centre of the TLOF, objects shall not exceed a height of 5 cm above the TLOF. Beyond that arc, out to an overall distance of 0.83 D from the centre of the TLOF, the limited obstacle surface rises at a rate of one unit vertically for each two units horizontally originating at a height 0.05 D above the level of the TLOF. (See Figure 10-3).

AMC1 to 3.4 and 3.5: Obstacle Protection Surfaces for Circular or Square Helidecks

a) Where the area enclosed by the TLOF perimeter marking is a shape other than circular, the extent of the LOS segments are represented as lines parallel to the perimeter of the TLOF rather than arcs. Figures 10-2 and 10-3 has been constructed on the assumption that an octagonal helideck arrangement is provided.

b) For circular helidecks or shipboard helidecks, the segments and sectors represented by straight lines are replaced using sectors shaped in an arc. Figures 10-4 to 10-7 provide examples.

Figure 10-4 Circular obstacle limitation sectors and surfaces for 1D FATO and coincidental TLOF

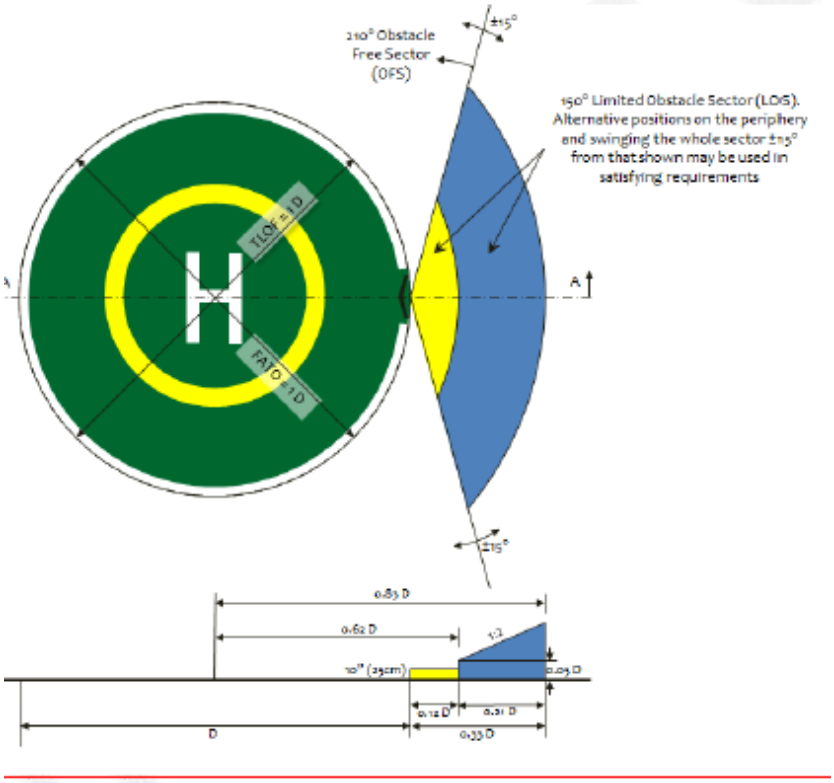


Figure 10-5 Circular obstacle limitation sectors and surfaces for 0.83D TLOF with collocated 1D TLOF

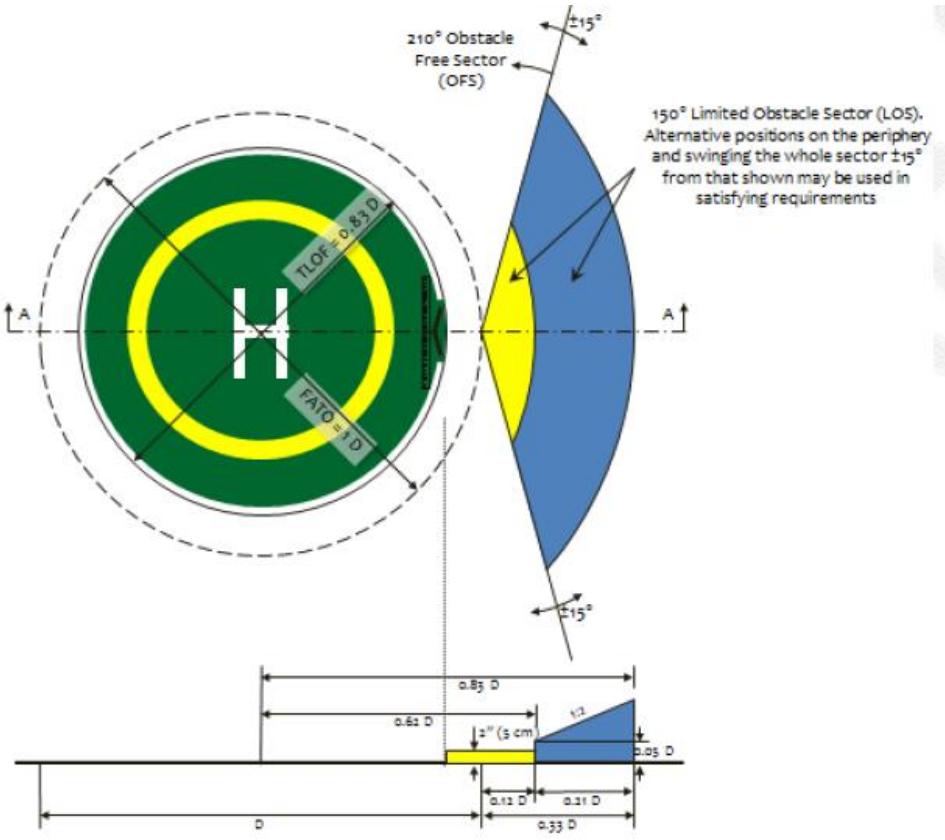


Figure 10-6 Square obstacle limitation sectors and surfaces for 1D FATO and coincidental TLOF

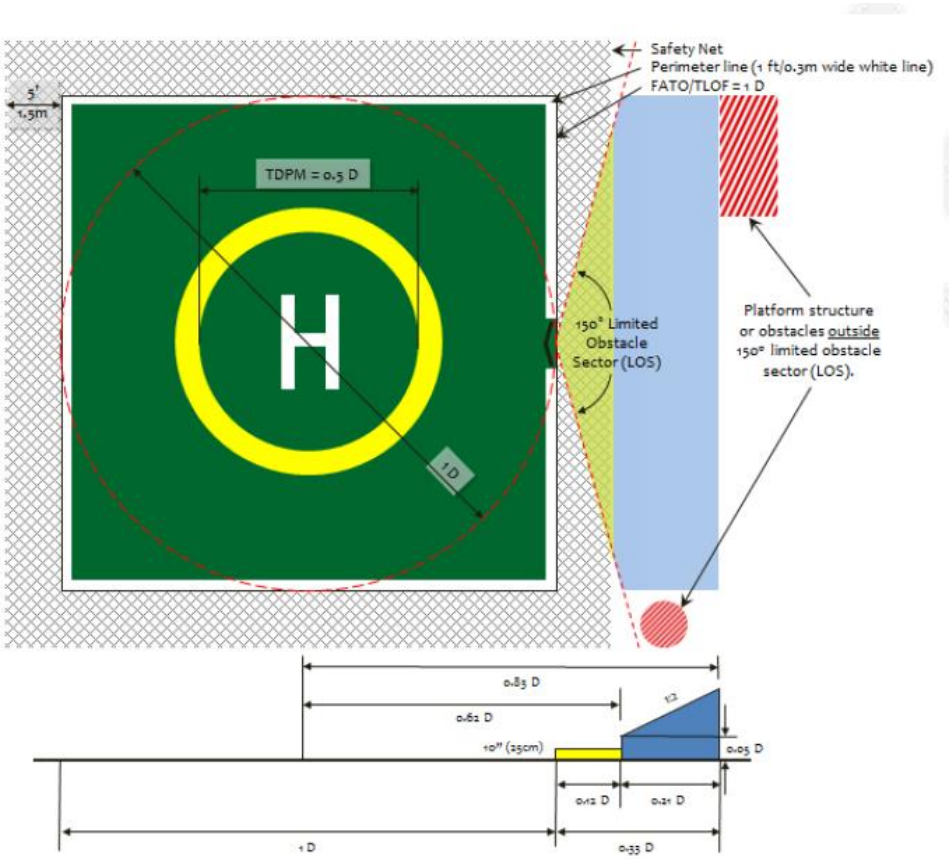
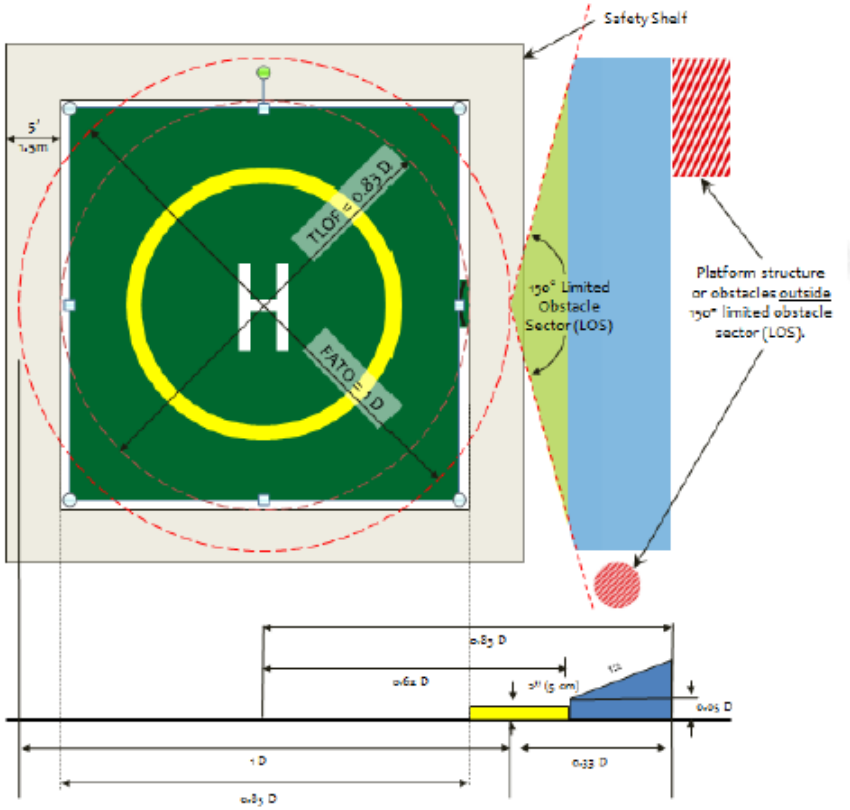


Figure 10-7 Square obstacle limitation sectors and surfaces for 0.83D TLOF with collocated 1D TLOF



4 OBSTACLE LIMITATION REQUIREMENTS - SHIPBOARD HELIDECKS

4.1 Shipboard helidecks - purpose-built helidecks located forward or aft

4.1.1 When helicopter operating areas are provided in the bow or stern of a ship, they shall apply the obstacle criteria for helidecks.

4.2 Amidships location - purpose-built and non-purpose-built

4.2.1 Forward and aft of a TLOF of 1 D and larger shall be two symmetrically located sectors, each covering an arc of 150 degrees, with their apexes on the periphery of the TLOF. Within the area enclosed by these two sectors, there shall be no objects rising above the level of the TLOF, except those aids essential for the safe operation of a helicopter and then only up to a maximum height of 25 cm.

4.2.2 Objects whose function requires them to be located within the TLOF (such as lighting or nets) shall not exceed a height of 2.5 cm. Such objects shall only be present if they do not represent a hazard to helicopters.

Note — Examples of potential hazards include nets or raised fittings on the deck that might induce dynamic rollover for helicopters equipped with skids.

4.2.3 To provide further protection from obstacles fore and aft of the TLOF, rising surfaces with gradients of one unit vertically to five units horizontally shall extend from the entire length of the edges of the two 150-degree sectors. These surfaces shall extend for a horizontal distance equal to at least 1 D of the largest helicopter the TLOF is intended to serve and shall not be penetrated by any obstacle. (See Figure 10-8).

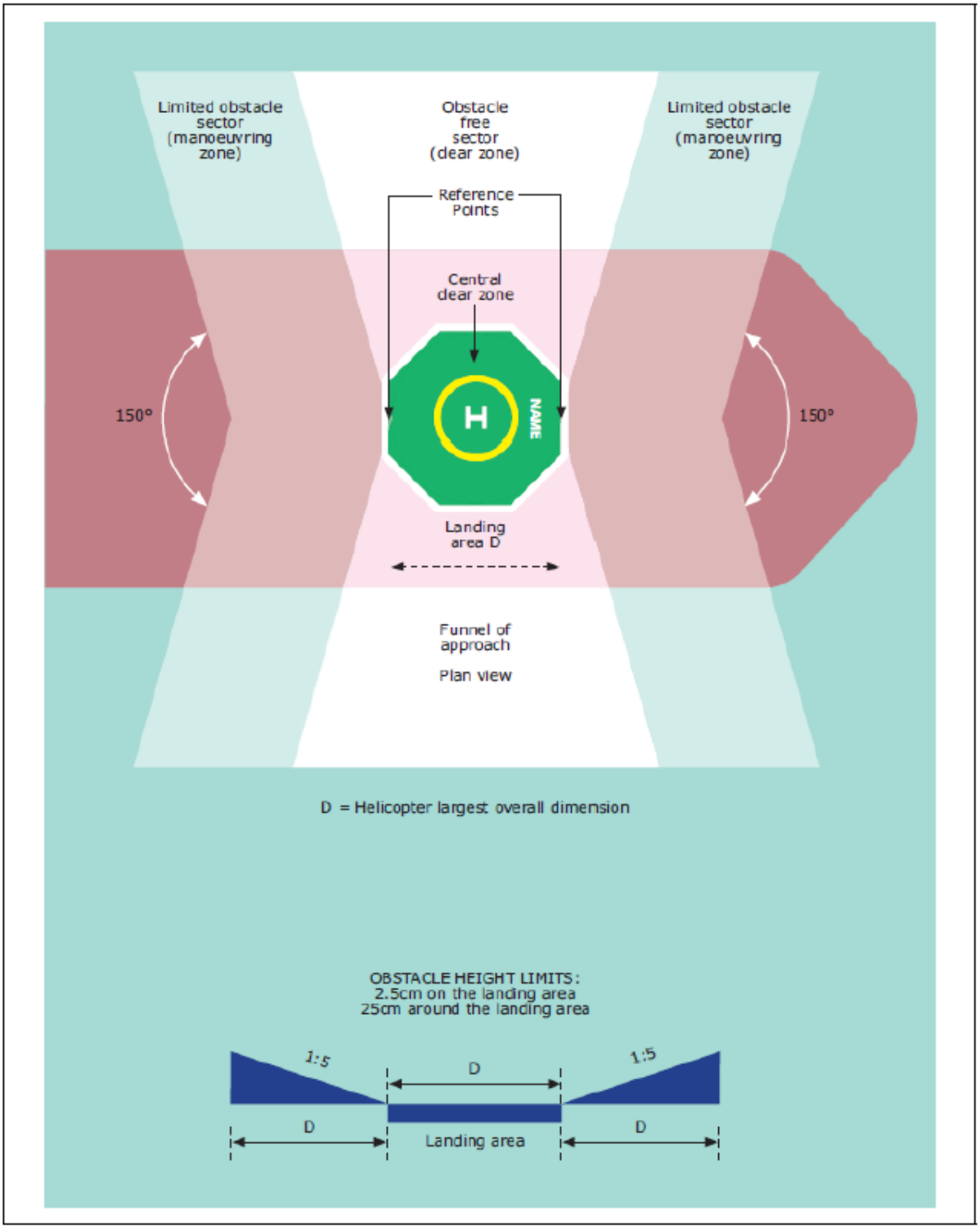
4.3 Non-purpose-built helidecks - Ship's side location

4.3.1 No objects shall be located within the TLOF except those aids essential for the safe operation of a helicopter (such as nets or lighting) and then only up to a maximum height of 2.5 cm. Such objects shall only be present if they do not represent a hazard to helicopters.

4.3.2 From the fore and aft mid-points of the D circle in two segments outside the circle, limited obstacle areas shall extend to the ship's rail to a fore and aft distance of 1.5 times the fore-to-aft-dimension of the TLOF, located symmetrically about the athwartships bisector of the D circle. Within these areas there shall be no objects rising above a maximum height of 25 cm above the level of the TLOF. (See Figure 9-9). Such objects shall only be present if they do not represent a hazard to helicopters.

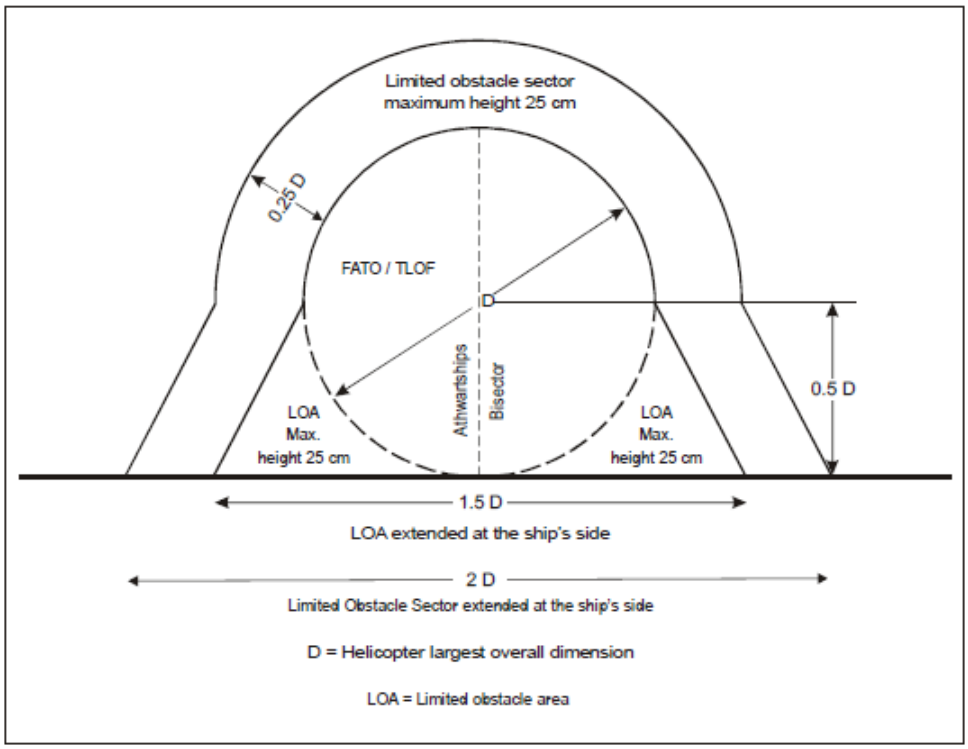
4.3.3 A limited obstacle sector horizontal surface shall be provided, at least 0.25 D beyond the diameter of the D circle, which shall surround the inboard sides of the TLOF to the fore and aft mid-points of the D circle The limited obstacle sector shall continue to the ship's rail to a fore and aft distance of 2.0 times the fore-to-aft dimension of the TLOF, located symmetrically about the athwartships bisector of the D circle. Within this sector there shall be no objects rising above a maximum height of 25 cm above the level of the TLOF.

Figure 10-8 Amid-ship location – Shipboard helideck obstacle limitation surfaces



Note — Where the D-value is 16.00m or less the obstacle height limitation around the landing area is restricted to 5cm.

Figure 10-9 Ships-side non-purpose-built helideck obstacle limitation sectors and surfaces



Note — Where the D-value is 16.00m or less the obstacle height limitation around the landing area is restricted to 5cm.

AMC1 to 4 Shipboard helidecks: Mapping of Obstacles on Non-Purpose Built Shipboard Helidecks

a) Any objects located within the areas described in 3.2.6 and 3.6.7 that exceed the height of the TLOF are notified to the helicopter operator using a ship's helicopter landing area plan. For notification purposes it may be necessary to consider immoveable objects beyond the limit of the surface prescribed in 3.2.7 particularly if objects are significantly higher than 25 cm and in close proximity to the boundary of the LOS.

b) For a non-purpose built landing area located on a ship's side, which by design utilises an area of the ship's decking, the tight control of obstacles on the ship's surface is not as straightforward as it would be for any purpose built helideck structure. In the circumstances it is necessary to develop a system for mapping of obstacles so the operator is aware of their location and any potential impact on helicopter operations.

c) The Helicopter Landing Area Plan provides additional information regarding the vessel's surface and the helicopter landing area. The Plan should be prepared in advance of any intended helicopter operations and should be stored on the vessel and lodged with the helicopter operator. Amendments to the Plan should be made when appropriate.

d) The system described assumes paper versions of a Helicopter Landing Area Plan will be made, but this procedure lends itself just as easily to an electronic form of dissemination. Whichever method is used to create and file the Helicopter Landing Area Plan it should include templates annotated with vessel specific data including any obstructions within the FATO/TLOF (a 1D circular clear zone) or within the manoeuvring zone or limited

obstacle area. Templates should be annotated with obstructions which exceed the height limits prescribed for the specific areas in Figure 10-9.

e) The template should ideally include a photograph showing the ship's helicopter operating area to provide a helicopter pilot with a quick reference guide to the ship, the helicopter operating area(s) and notable obstructions. Care in recording the nature and location of obstructions on the template is very important. Accurate measurement should be taken of the position and height of all significant obstructions relative to the helicopter touchdown markings.

f) Any identified obstacles should be colour coded on the template and painted on the physical surface of the vessel. Colour coding and painting will define the safety significance of an obstruction. For the purpose of standardisation, the following paint colour schemes are recommended:

   RED and WHITE painted stripes should be used for marking the position of notifiable objects within the manoeuvring zone, the clear zone or the limited obstacle area where they exceed the height limits for these zones, (refer to Figure 10-10):

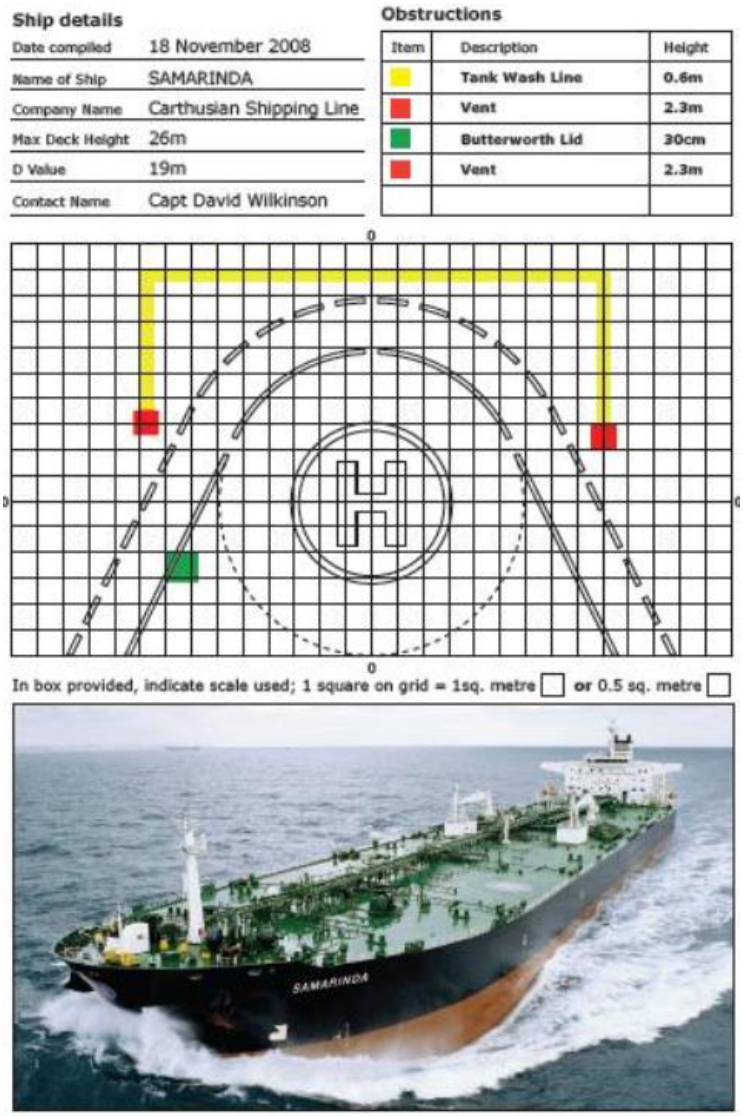
   i. Objects within the clear zone of a height exceeding 2.5cm
   ii. Objects outside the clear zone but within the manoeuvring zone or limited obstacle area which exceed a height of 25cm
   iii. Where the diameter of the clear zone is 16.00m or less limitation in the manoeuvring zone and LOA applies to objects which exceed a height of 5cm

   YELLOW and BLACK painted stripes should be applied for marking objects beyond the manoeuvring zone to which it is considered appropriate to draw the attention of the helicopter pilot. This may also be used to mark objects within the manoeuvring zone, the clear zone and the LOA which though below the height limits for these sectors, are still considered appropriate to draw to the attention of the helicopter pilot.

g) Vessel details should be included on the template and a photograph that shows the location of the helicopter landing area should be scanned and forwarded to the helicopter operator in a colour presentation. An indication of the scale used should also be provided.

h) Figure 9-8 shows an example of a Helicopter Landing Area Plan for a ship's side non-purpose built helideck on a tanker. The red/yellow/green colour coding presentation corresponds to the absolute height of the obstruction above deck level. The Butterworth Lid at 30cm is shown in green. The tank wash line at 60cm (0.6m) is shown in yellow and the dominant vents at 230cm (2.3m) are shown in red.

Figure 10-10: An example of a Helicopter Landing Area Plan for a ship's side non-purpose built helideck on a tanker



Ship details

Date compiled	18 November 2008
Name of Ship	SAMARINDA
Company Name	Carthusian Shipping Line
Max Deck Height	26m
D Value	19m
Contact Name	Capt David Wilkinson

Obstructions

Item	Description	Height
	Tank Wash Line	0.6m
	Vent	2.3m
	Butterworth Lid	30cm
	Vent	2.3m

5 OBSTACLE LIMITATION REQUIREMENTS - OBSTACLE CONTROLS

Obstacle Limitation Requirements (Helidecks and Shipboard Helidecks)

5.1 Obstacles that penetrate the LOS should be removed or so modified that they no longer constitute an infringement. Where an immoveable object penetrates the LOS, whether in the first and/or second segment (an example could be the leg of a self-elevating jack-up facility which is situated in the LOS and which cannot be moved or modified), it may be possible to mitigate the effects of the penetration by applying a Prohibitive Landing Sector (PLS) marking which ensures that a helicopter cannot land with the tail towards the obstacle, where the obstacle is not within the pilot's field of view. The benefit of a PLS marking may be maximised by applying it in conjunction with an offset touchdown/positioning marking. (The offset marking is discussed in further detail in Chapter 12, Section 2 and illustrated in Figure 12.6). The application of a PLS, with or without an offset TD/PM, should not be used as a 'quick fix' to justify the presence of unwanted

obstructions; it is always preferable, where practical, to remove, to relocate or to modify an obstacle which would otherwise penetrate through the surface of the LOS.

5.2 Experience suggests there can be a pressure to accommodate obstacles close to the extended boundary of the OFS, but outside the second segment on the limited obstacle side, where there are no specific obstacle restrictions/limitations. For the presence of a large solid object, whether a new permanent feature or a temporary one, this location so close to the helideck, has potential to promote turbulence over the helideck in some wind conditions and should be avoided. For the avoidance of doubt, any proposed siting near to the helideck should be subjected to appropriate modelling before it is introduced. Equally, locating a non-rigid (flexible) structure, such as a long whip aerial, in the area immediately adjacent to the helideck, can have an impact on the safety of helicopter operations if the whip aerial should bend into the OFS under the force of an approaching helicopter's rotor downwash. It is therefore recommended that flexible objects, such as whip aerials are not sited right at the edge of the OFS, where they could bend into the protected area.

6 OBSTACLE LIMITATION REQUIREMENTS - TEMPORARY COMBINED OPERATIONS

6.1 Temporary Combined Operations are essentially arrangements where two or more off-shore facilities, whether fixed or floating, are in close proximity 'alongside' or 'pulled away' from one another. They may be in place for a matter of hours, days or for up to several years. On occasions, combined operations may include vessels working alongside one or more fixed and/or mobile facilities. The close proximity of facilities and/or vessels to one another is likely to entail that one or more of the helidecks/shipboard helidecks is operationally restricted due to one or more of the obstacle protected surfaces being compromised and/or due to adverse environmental effects of one installation on the landing area of another (environmental effects are discussed in more detail in Chapter 6).

6.2 For example, the facility pictured in the centre of Figure 10-11 has obstacle protected sectors and surfaces (extended OFS as well as the falling gradient) that are severely compromised by the proximity of the other two facilities. In these circumstances a landing prohibited marker (a yellow cross on a red background) is in place on the drilling facility (centre) to prevent operations to the helideck.

6.3 Where temporary combined operations are planned, prior to helicopter operations an assessment should be completed to assess the physical, as well as the environmental, impact of the arrangements and to assess any flight restrictions or limitations, including prohibitions, which might need to be disseminated to air crew (usually a temporary instruction). Helidecks (or shipboard helidecks) which are determined to be unavailable should display the relevant landing prohibited marker by day while, at night, all aeronautical lights should be extinguished.

6.4 Often, combined operations will involve both facilities and/or vessels being in close proximity 'alongside' one another (Figure 10-11), where the effect of one facility on the helideck obstacle protected surfaces of another is immediately obvious. However, during the life of a combined arrangement there may also be periods when mobile facilities and/or vessels are 'pulled-away' to a stand-off position, which could be some distance apart. It will be necessary for operators to re-appraise the situation for a combined operation now in the 'stand-off' configuration. With one or more installations or vessels 'pulled-away' there may

be opportunity to relax or remove limitations imposed for the ‘alongside’ configuration. This is normally an assessment for the helicopter operator to make.

Figure 10-11 Temporary combined operation showing relative position of each helideck 210^{o} sector

7 OBSTACLE LIMITATION REQUIREMENTS - MULTIPLATFORM CONFIGURATIONS / LOCATION OF STANDBY VESSELS

7.1 Where two or more fixed structures are permanently bridge linked the overall design should ensure that the sectors and surfaces provided for the helideck are not compromised by other modules which may form part of a multiple platform configuration. It is also important to assess the environmental impact of all modules on the flying environment around the helideck. *(Refer to Chapter 6)*.

7.2 Where there is an intention to add new modules to an existing platform arrangement it is important to make an assessment on the potential impact that additional platforms might have on helideck operations. This will include an assessment of the sectors and surfaces for the helideck which should not be compromised due to the location of a new platform, or modification to an existing platform. This will include a detailed analysis of the environmental impact on the flying environment around the helideck which is addressed in further detail in *(Refer to Chapter 6)*.

7.3 The presence of a Standby Vessel in the vicinity of a 'live' helideck operation is a legal requirement in many off-shore sectors. The location of the Standby Vessel, and any other vessel present on the sea surface, should not compromise the safety of the helicopter operation.

8 CONTROL OF CRANE MOVEMENT IN THE VICINITY OF THE LANDING AREA

8.1 The 210^0 obstacle- free sector of the helideck shall not be infringed upon by any cranes or parts thereof during helicopter movements.

8.2 All cranes in the vicinity of the FATO which may, during their operation, encroach into the 210^0 sector or the 150^0 limited obstacle sector must cease movement during helicopter operations.

8.3 When helicopter movements take place (±5 minutes) crane work ceases and jibs, 'A' frames, etc. are positioned clear of the obstacle protected surfaces and flight paths.

CHAPTER 11 – WINCHING AREAS ON SHIPS

1 WINCHING AREAS

1.1 An area designated for winching on-board ships shall comprise a circular clear zone of diameter 5 m and extending from the perimeter of the clear zone, a concentric manoeuvring zone of diameter 2 D (see Figure 11-1).

1.2 The manoeuvring zone shall comprise of two areas:

a) the inner manoeuvring zone extending from the perimeter of the clear zone and of a circle of diameter not less than 1.5 D; and

b) the outer manoeuvring zone extending from the perimeter of the inner manoeuvring zone and of a circle of diameter not less than 2 D.

1.3 Within the clear zone of a designated winching area, no objects shall be located above the level of its surface.

1.4 Objects located within the inner manoeuvring zone of a designated winching area shall not exceed a height of 3 m.

1.5 Objects located within the outer manoeuvring zone of a designated winching area shall not exceed a height of 6 m.

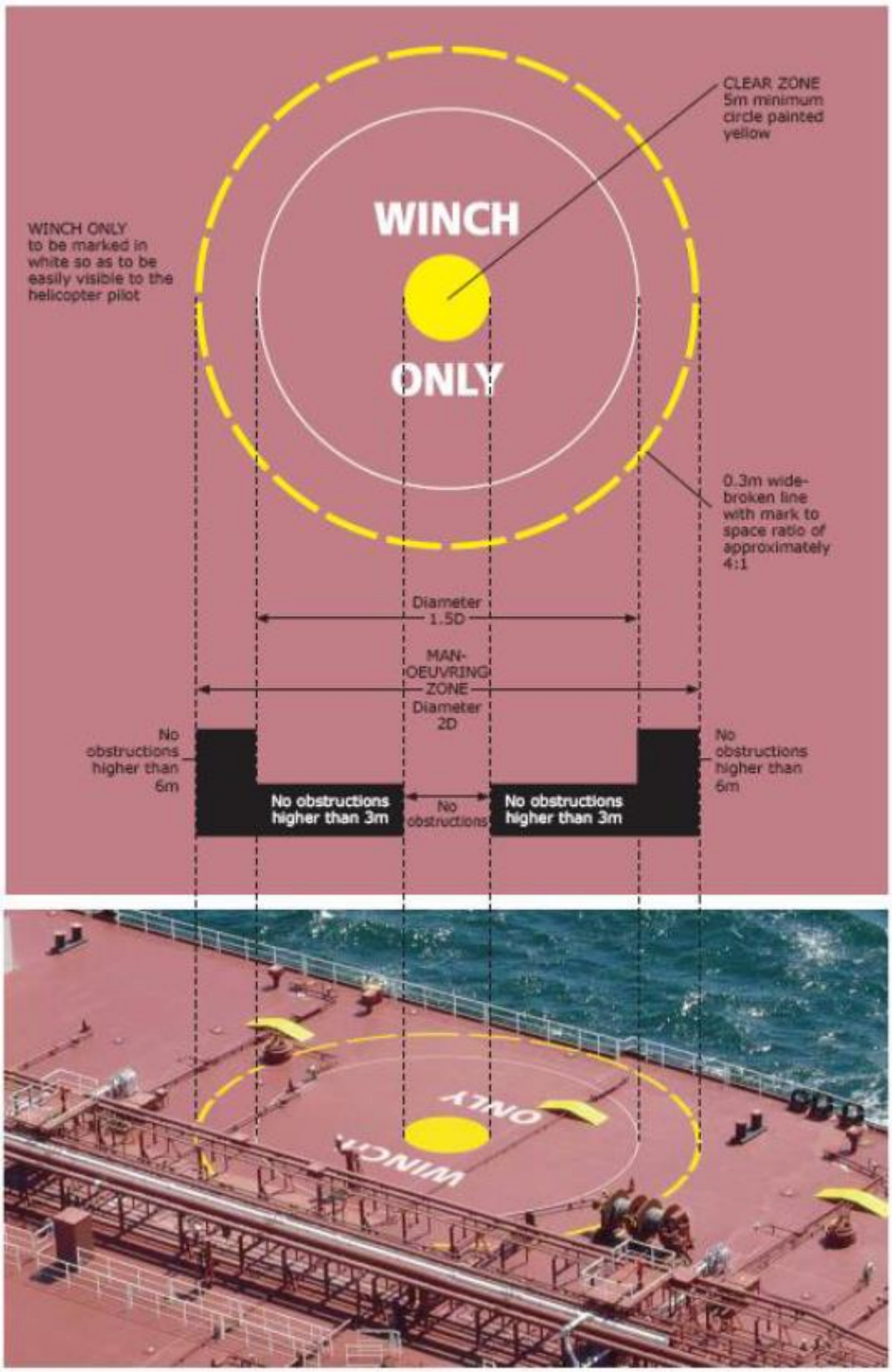
GM to 1 Winching Area

a) Where practicable, the helicopter should always land rather than winch (an operation commonly referred to as heli-hoist operation (HHO)) because safety is enhanced when the time spent hovering is reduced. However, certain types of ships which need to engage helicopter support but are unable to provide the space and/or obstacle limitation surfaces needed to meet the requirements for a shipboard helideck, may need to consider a shipboard winching area in lieu of a shipboard helideck landing area.

b) The optimum position for a winching area will be determined primarily by the availability of a suitable space on the ship. However, a winching operation should be located over an area to which the helicopter can safely hover whilst winching to or from the ship. Its location should allow the pilot an unimpeded view of the whole of the winching area clear zone and the ship's topside layout. Where more than one area capable of accommodating a winching area exists, preference should be given to the location that best minimizes aerodynamic and wave motion effects. In addition the winching area should preferably be clear of accommodation spaces and provide adequate deck areas adjacent to the manoeuvring zone to allow for safe access to the winching area from at least two different directions. In selecting a suitable winching area the desirability for keeping the winching (hoist) height to a minimum should also be borne in mind, such that the area chosen will allow a helicopter to hover at a safe height above the highest obstacle that may be present in the manoeuvring zone.

c) The clear zone should be a solid surface capable of accommodating personnel and/or stores for which the winching area is intended. It is not essential for the entire manoeuvring zone to be a solid surface, and a portion may be located beyond the ship's side over the water (the same obstacle height limitations would apply as for a solid surface).

Figure 11-1 Winching area of a ship



2 MARKING OF WINCHING AREAS

Application

2.1 Winching area markings shall be provided at a designated winching area (see Figure 11-1).

Location

2.2 Winching area markings shall be located so that their centre(s) coincides with the centre of the clear zone of the winching area.

Characteristics

2.3 Winching area markings shall comprise a winching area clear zone marking and a winching area manoeuvring zone marking.

2.4 A winching area clear zone marking shall consist of a solid circle of diameter not less than 5 m and of a conspicuous colour.

2.5 A winching area manoeuvring zone marking shall consist of a broken circle of line of 30 cm in width and of a diameter not less than 2 D and be marked in a conspicuous colour. Within it “WINCH ONLY” shall be marked to be easily visible to the pilot.

GM to 2 Marking of Winching Areas

a) It is usually necessary to apply a paint scheme that provides a high friction coating to prevent personnel from slipping in the clear zone and/or stores from sliding due to the motion of the ship. Ideally the clear zone should be painted yellow. It is usually necessary to apply a paint scheme that provides a high friction coating to prevent personnel from slipping in the clear zone and/or stores from sliding due to the motion of the ship.

b) Ideally the clear zone should be painted yellow. It is usually necessary to apply a paint scheme that provides a high friction coating to prevent personnel from slipping in the clear zone and/or stores from sliding due to the motion of the ship.

c) While it is not a specific requirement to mark the periphery of the inner manoeuvring zone (with a diameter not greater than 1.5D), it may be helpful, for the mapping of obstacles relative to the two obstruction segments in the manoeuvring zone, to do so. In this case it is recommended that a thin unbroken circle be painted around the periphery of the inner manoeuvring zone in a colour which contrasts with the adjacent ship’s deck, but which is different from the colour used to define the outer manoeuvring zone. For standardisation it is recommended wherever possible that the inner manoeuvring zone circle, where marked, is painted white, with a line width of approximately 10cm.

d) Obstructions within or immediately adjacent to, the manoeuvring zone which may present a hazard to the helicopter need to be readily visible from the air and should be conspicuously marked. The description for marking of obstacles is in CAR Part IX (Aerodromes), however, a protocol also exists

e) internationally which ship’s Masters may find helpful to adopt particularly as it harmonises with colour schemes being proposed for a ship’s helicopter landing area plan (see Chapter 10 for details of how to complete a helicopter landing area/operating area plan). For objects within the height constraints specified for the two segments of the manoeuvring zone, to which it is necessary to draw the attention of the helicopter pilot,

it is recommended that a yellow paint scheme be applied to highlight the position of these objects. Where, exceptionally, objects within the manoeuvring zone exceed the height constraints specified in 1.1.3, it is suggested that a paint scheme consisting of red and white stripes, in lieu of yellow, be applied to the object. In all cases it is necessary that the marking of objects contrasts effectively with the surface of the ship and therefore, some latitude may be required for precise colour schemes to be used. The suggestions given in this paragraph are intended to achieve standardisation of markings wherever possible.

3 LIGHTING OF A WINCHING AREA FOR NIGHT HELI-HOIST OPERATIONS

Application

3.1 Winching area floodlighting shall be provided at a winching area intended for use at night.

Location

3.2 Winching area floodlights shall be located so as to avoid glare to pilots in flight or to personnel working on the area. The arrangement and aiming of floodlights shall be such that shadows are kept to a minimum.

Characteristics

3.3 The spectral distribution of winching area floodlights shall be such that the surface and obstacle markings can be correctly identified.

Note: The average horizontal luminance should be at least 10 lux, measured on the surface of the winching area.

4 GUIDANCE MATERIAL: ADDITIONAL OPERATIONAL CONSIDERATIONS

4.1 To reduce the risk of a hoist hook or cable becoming fouled, all guard rails, awnings, stanchions, antennae and other obstructions within the vicinity of the manoeuvring zone should, as far as possible, be either removed, lowered or securely stowed. In addition personnel should be kept well clear of any space immediately beneath the operating area. All doors, portholes, skylights, hatch-covers etc. in the vicinity of the operating area should be closed. This may also apply to deck levels that are below the operating area.

4.2 Fire and rescue personnel should be deployed in a ready state, but sheltered from the helicopter operating area. Rescue and Fire-Fighting Service requirements for landing areas are addressed in Chapter 17.

CHAPTER 12 – VISUAL AIDS

Note — For a non-purpose-built helideck located on a ship's side the surface colour of the main deck can vary from ship to ship and therefore some discretion may need to be exercised in the colour selection of helideck paint schemes; the objective being to ensure that the markings are conspicuous against the surface of the ship and the operating background.

1 WIND DIRECTION INDICATORS

1.1 A helideck shall be equipped with at least one wind direction indicator and at least one additional spare wind direction indicator of the same specification.

Location

1.2 A wind direction indicator shall be located so as to indicate the wind conditions over the FATO and in such a way as to be free from the effects of airflow disturbances caused by nearby objects or rotor downwash. It shall be visible from a helicopter in flight, in a hover or on the movement area.

1.3 Where a TLOF may be subject to a disturbed airflow, then additional wind direction indicators located close to the area should be provided to indicate the surface wind on the area.

Characteristics

1.4 A wind direction indicator shall be constructed so that it gives a clear indication of the direction of the wind and a general indication of the wind speed.

1.5 An indicator should be a truncated cone made of lightweight fabric and should have the following minimum dimensions:

Length 1.2m; diameter (large end) 0.3m; diameter (small end) 0.15m

1.6 The colour of the wind direction indicator should be so selected as to make it clearly visible and understandable from a height of at least 200 m above the helideck, having regard to background. Where practicable, a single colour, preferably white or orange, should be used. Where a combination of two colours is required to give adequate conspicuity against changing backgrounds, they should preferably be orange and white, red and white, or black and white, and should be arranged in five alternate bands the first and last band being the darker colour.

1.7 A wind direction indicator at a helideck intended for use at night shall be illuminated.

AMC to 1.7

This can be achieved by internal illumination, by a floodlight pointing through the wind cone. Alternatively, the windsock can be externally highlighted using, for example, area floodlighting. Care should be taken to ensure that any system used to illuminate a wind direction indicator highlights the entire cone section while not presenting a source of glare to a pilot operating at night.

2 HELIDECK IDENTIFICATION MARKING ("H")

Application

2.1 Helideck identification markings shall be provided at a helideck.

Location

2.2 A helideck identification marking shall be located at or near the centre of the FATO.

AMC to 2.2

A helideck identification marking shall be located in the centre of the FATO except where the results of an aeronautical survey indicate that an offset marking may be beneficial to helicopter operations and still allow for the safe movement of personnel around the helicopter; in which case the centre of the "H" may be offset by up to 0.1D towards the outboard edge of the FATO.

GM to 2.2

An example of where this measure may be used could be for an over-sized helideck — one that exceeds the minimum 1D dimensional requirement — but that also has immoveable obstructions close to the inboard perimeter, in the LOS. In this case moving the touchdown marking location away from the centre of the FATO towards the outboard edge will improve clearances from dominant obstacles, while, in theory, still facilitating adequate on-deck clearance around the helicopter for the safe movement of passengers and for the efficiency of helideck operations, such as refuelling.

2.3 If the touchdown/positioning marking is offset on a helideck, the helideck identification marking is established in the centre of the touchdown/positioning marking.

Characteristics

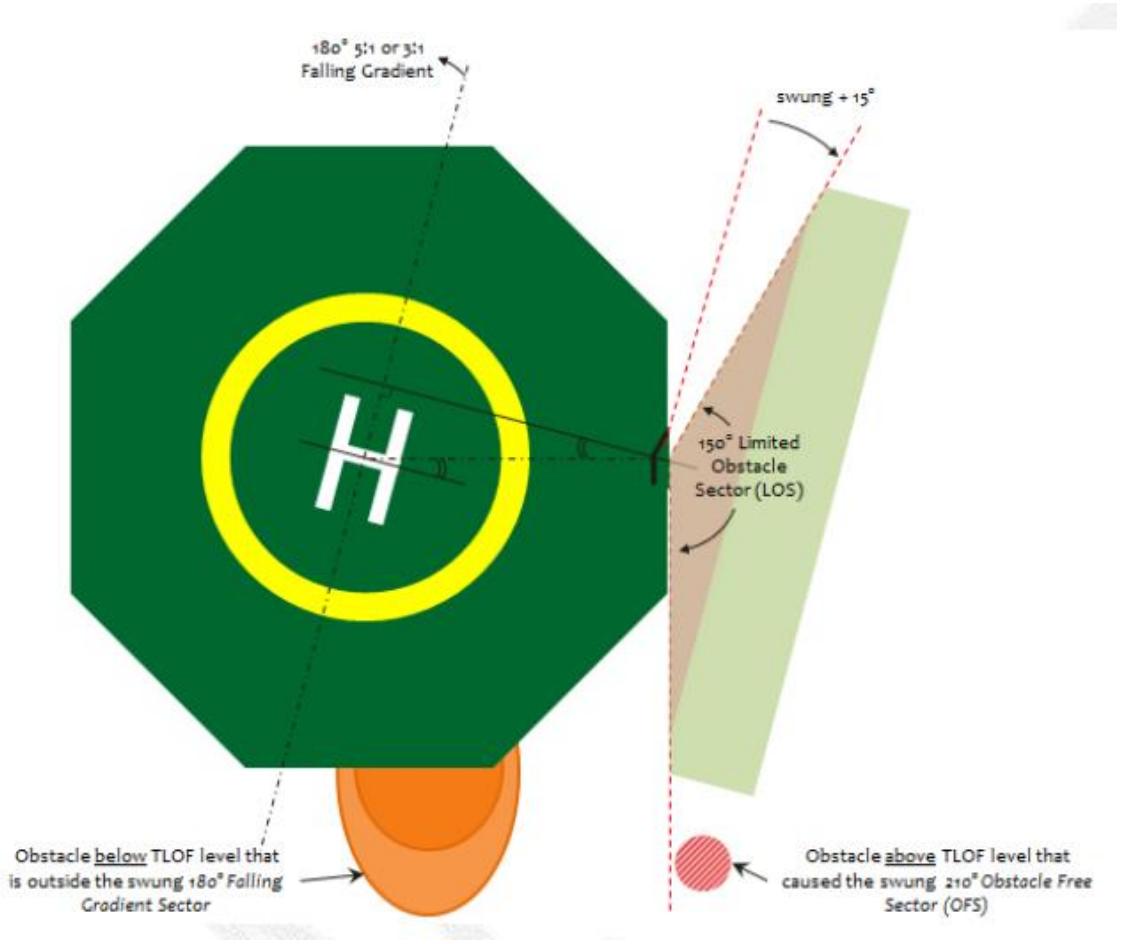
2.4 A helideck identification marking shall consist of a letter H, white in colour.

2.5 On a helideck the cross arm shall be on or parallel to the bisector of the obstacle-free sector. For a non-purpose-built shipboard helidecks located on a ship's side, the cross arm shall be parallel with the side of the ship, Figure 12-1.

AMC to 2.5

Where it is necessary for the obstacle-free sector (chevron) marking to be swung for a helideck (e.g. to clear an obstacle which might otherwise penetrate the 210-degree sector), it will be necessary to swing the "H" marking by the corresponding angle. The maximum swung sector should not exceed +/-15 degrees from the normal for the OFS. A 'swung' helideck identification "H" marking is illustrated in Figure 12-1.

Figure 12-1 Helideck identification marking reflecting a swung obstacle free sector (in this case the OFS is swung by 15 degrees in a clockwise direction to avoid an obstacle)

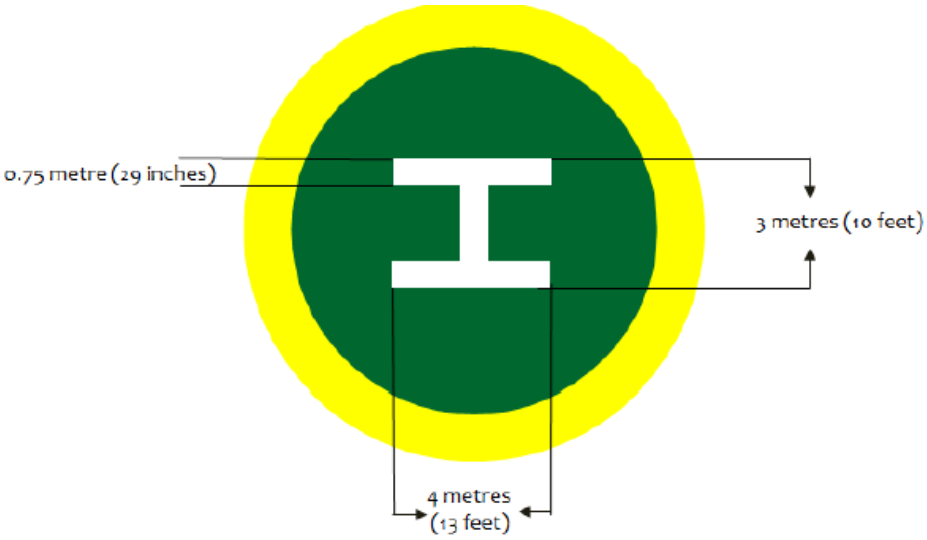


Note — The bisector of the 210° Obstacle Free Sector (OFS) should normally pass through the Centre of the D-circle. The sector may be 'swung' by up to 15° in either direction from the normal. (A 15° clockwise swing is illustrated). If the 210° OFS is swung, then it would be normal practice (but not mandatory) to swing the 180° falling 5:1 gradient by a corresponding amount to indicate, and align with, the swung OFS.

2.6 On a helideck and or a shipboard helideck *where the D value is 16.0 m or larger*, the size of the helideck identification H marking should have a height of 4 m with an overall width not exceeding 3 m and a stroke width not exceeding 0.75 m. *Where the D value is less than 16.0 m, the size of the helideck identification H marking should have a height of 3 m with an overall width not exceeding 2.25 m and a stroke width not exceeding 0.5 m*[11].

[11] ICAO Amendment 7 to ICAO Annex 14 Volume II (Italic grey)

Figure 12-2 Dimensions of the Helideck Identification Marking "H"



3 MAXIMUM ALLOWABLE MASS MARKING

Application

3.1 A maximum allowable mass marking shall be displayed at a helideck and a shipboard helideck.

Location

3.2 A maximum allowable mass marking should be located within the TLOF or FATO and so arranged as to be readable from the preferred final approach direction i.e. towards the OFS origin.

Characteristics

3.3 A maximum allowable mass marking shall consist of a one-, two- or three-digit number.

3.4 The marking shall be expressed in tonnes (1 000 kg) rounded to the nearest 1000 kg followed by a letter "t".

3.5 The maximum allowable mass marking should be expressed to the nearest 100 kg. The marking should be presented to one decimal place and rounded to the nearest 100 kg followed by the letter "t".

3.6 When the maximum allowable mass is expressed to 100 kg, the decimal place should be preceded with a decimal point marked with a 30 cm square.

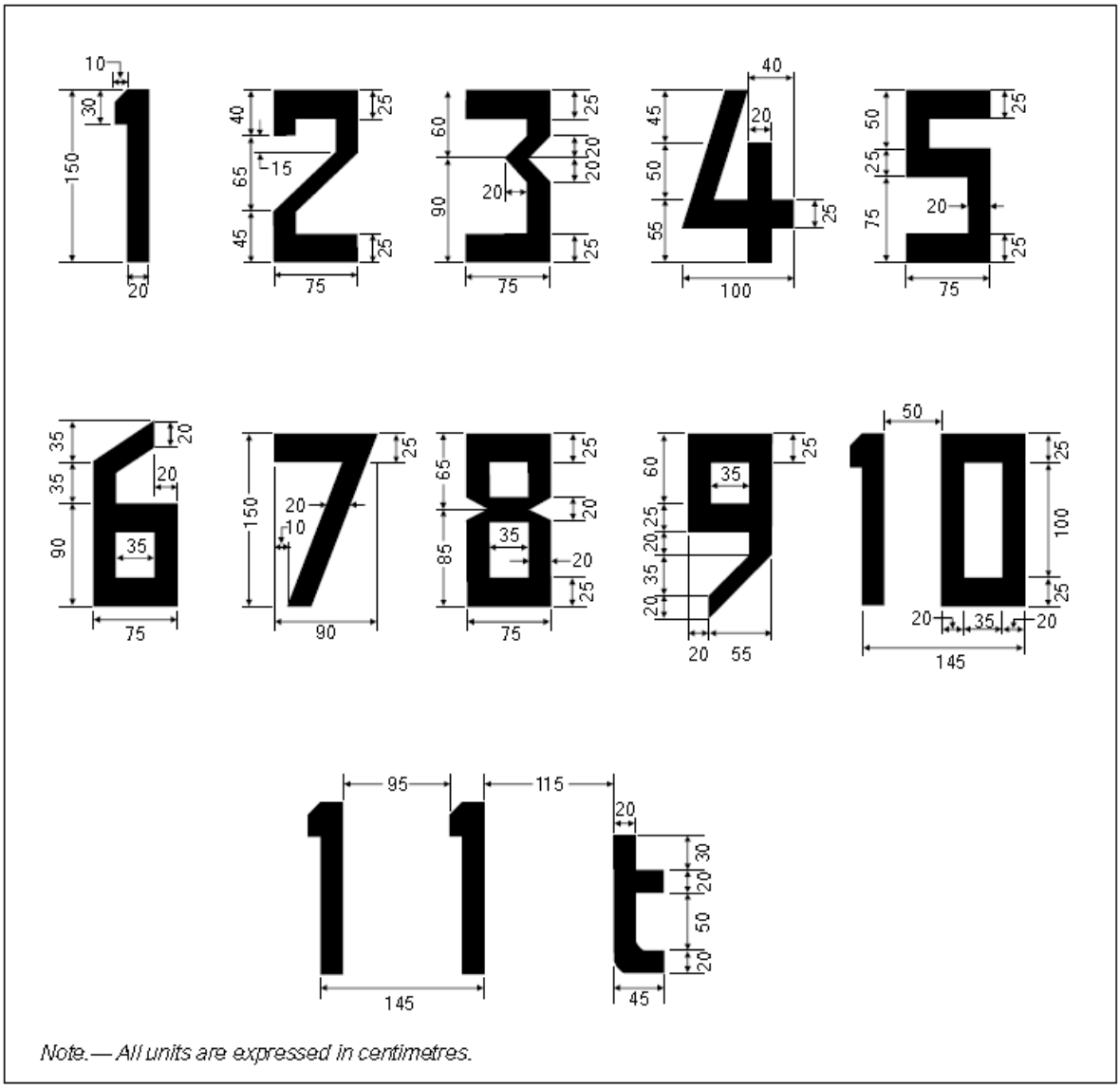
3.7 The numbers and the letter of the marking shall have a colour contrasting with the background and should be in the form and proportion shown in Figure 12-3, for a FATO with a dimension of more than 30 m (with decimal point of 30cm^2). For a FATO with a dimension of between 15 m to 30 m the height of the numbers and the letter of the marking should be a minimum of 90 cm (with decimal point of 18cm^2), and for a FATO with a dimension of less than 15 m the height of the numbers and the letter of the marking should be a minimum of

60 cm (with decimal point of 12cm^2), each with a proportional reduction in width and thickness.

GM1 to 3 Maximum allowable mass marking

The maximum allowable mass marking should correspond to the maximum allowable mass of the heaviest helicopter permitted to use the TLOF in accordance with the structural requirements detailed in Chapter 6. In most cases the maximum allowable mass marking will correspond to the MTOM for the design helicopter type, but this need not necessarily be the case if the structural calculations performed for the helideck or shipboard helideck confirm a structural limit that is different from (i.e. exceeding) the MTOM of the design helicopter.

Figure 12-3 Form and Proportions of Numbers and Letters



4 D-VALUE MARKING

Application

4.1 The D-value marking shall be displayed at a helideck and at a shipboard helideck.

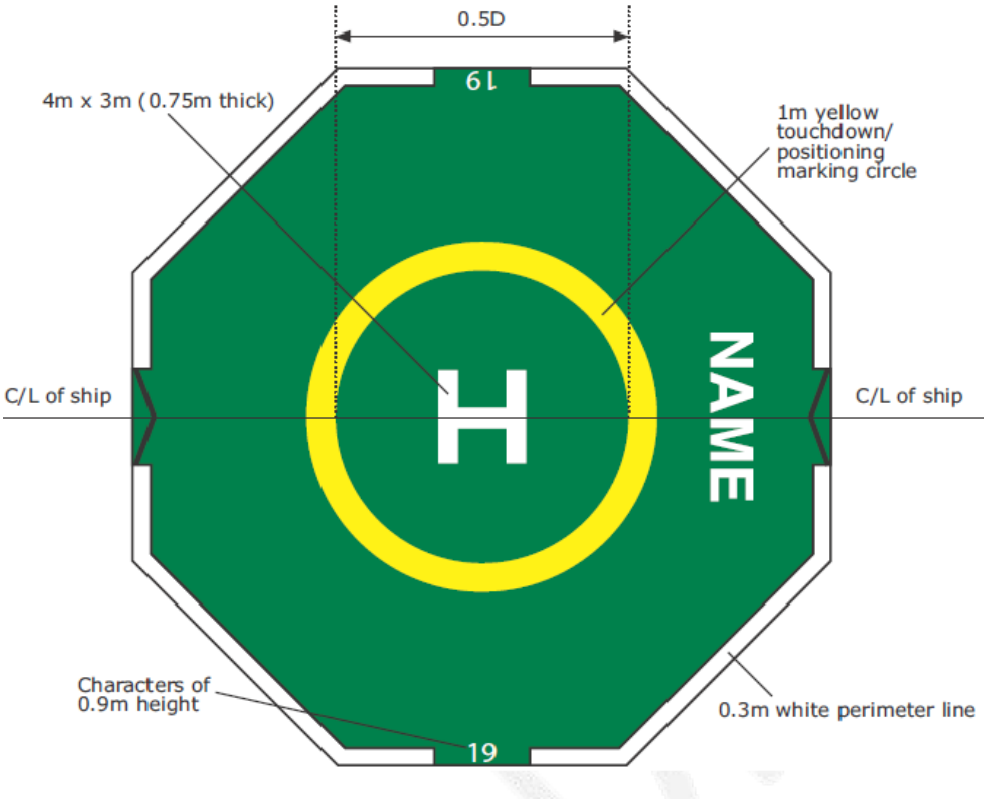
Location

4.2 Where there is more than one approach direction, additional D-value markings should be provided such that at least one D-value marking is readable from the final approach directions. For a non-purpose-built helideck located on a ship's side, D-value markings should be provided on the perimeter of the D circle at the 2 o'clock, 10 o'clock and 12 o'clock positions when viewed from the side of the ship facing towards the centre line.

AMC1 to 4.2

D-value markings should be displayed within the broken white TLOF perimeter line at three locations presented in Figure 12.8 or Figure 12.9 so that at least one marking is readable from the final approach direction. For a purpose built shipboard helideck in an amidships location, having a chevron at either end (see Figure 12-4), two D-value markings are required to be displayed — one on the portside of the helideck and the other starboard side.

Figure 12-4 D-value markings for a purpose built shipboard helideck in an amidships location



Characteristics

4.3 The D-value marking shall be white. The D-value marking shall be rounded to the nearest whole metre with 0.5 rounded down.

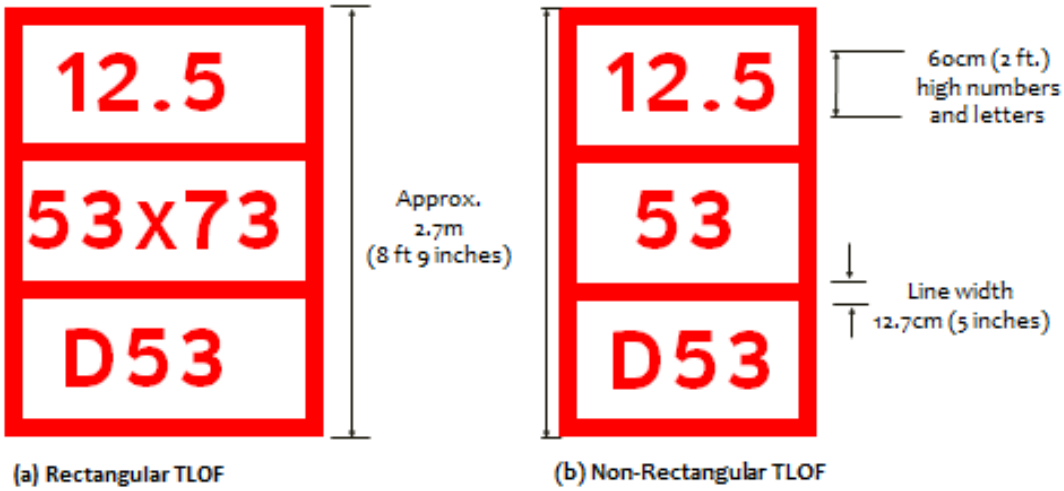
4.4 The numbers of the marking should have a colour contrasting with the background and should be in the form and proportion shown in Figure 12-3 for a FATO with a dimension of more than 30 m. For a FATO with a dimension of between 15 m to 30 m the height of the numbers of the marking should be a minimum of 90 cm, and for a FATO with a dimension of less than 15 m the height of the numbers of the marking should be a minimum of 60 cm, each with a proportional reduction in width and thickness.

AMC to 4.4

a) A method of designating the helideck limitations is to have the weight and D size marked in a 'box', outlined in red, in red numerals on a white background as shown below in Figure 12-5(a). The height of the figures should be 0.9 m with the line width of the 'box' approximately 12 cm. For smaller helidecks where space may be limited, provided the 'box and numerals' are discernible at a range which is compatible with a pilot's landing decision point (LDP), giving sufficient time to affect a go-around if necessary, the height of the figures may be reduced to no less than 45 cm.

b) The weight/size limitation 'box' marking should be visible from the preferred direction of approach. It is recommended that on square or rectangular helidecks the 'box' should be located relative to the preferred direction of approach (when facing the helideck). For circular, hexagonal and similar shapes the 'box' should be located on right-hand side of the TLOF and outside the TDPM circle, when viewed from the preferred direction of approach.

Figure 12-5 Helideck Limitation Markings



5 TOUCHDOWN AND LIFT-OFF AREA (TLOF) PERIMETER MARKING

Application

5.1 A TLOF perimeter marking shall be displayed on a helideck and a shipboard helideck.

Location

5.2 The TLOF perimeter marking shall be located along the edge of the TLOF.

Characteristics

5.3 A TLOF perimeter marking shall consist of a continuous white line with a width of at least 30 cm.

GM to 5 TLOF perimeter marking

The TLOF perimeter line should follow the physical shape of the helideck or shipboard helideck, such that where the deck shape is octagonal or hexagonal, the shape of the painted white TLOF marking will correspond to an octagon or hexagon. A TLOF marking should only be circular where the physical shape of the helideck or shipboard helideck is also circular.

6 TOUCHDOWN / POSITIONING (TD/PM) CIRCLE MARKING

Application

6.1 A touchdown/positioning marking shall be provided where it is necessary for a helicopter to touch down and/or be accurately positioned by the pilot.

Location

6.2 A touchdown/positioning marking shall be located so that when the pilot's seat is over the marking, the whole of the undercarriage will be within the TLOF and all parts of the helicopter will be clear of any obstacle by a safe margin.

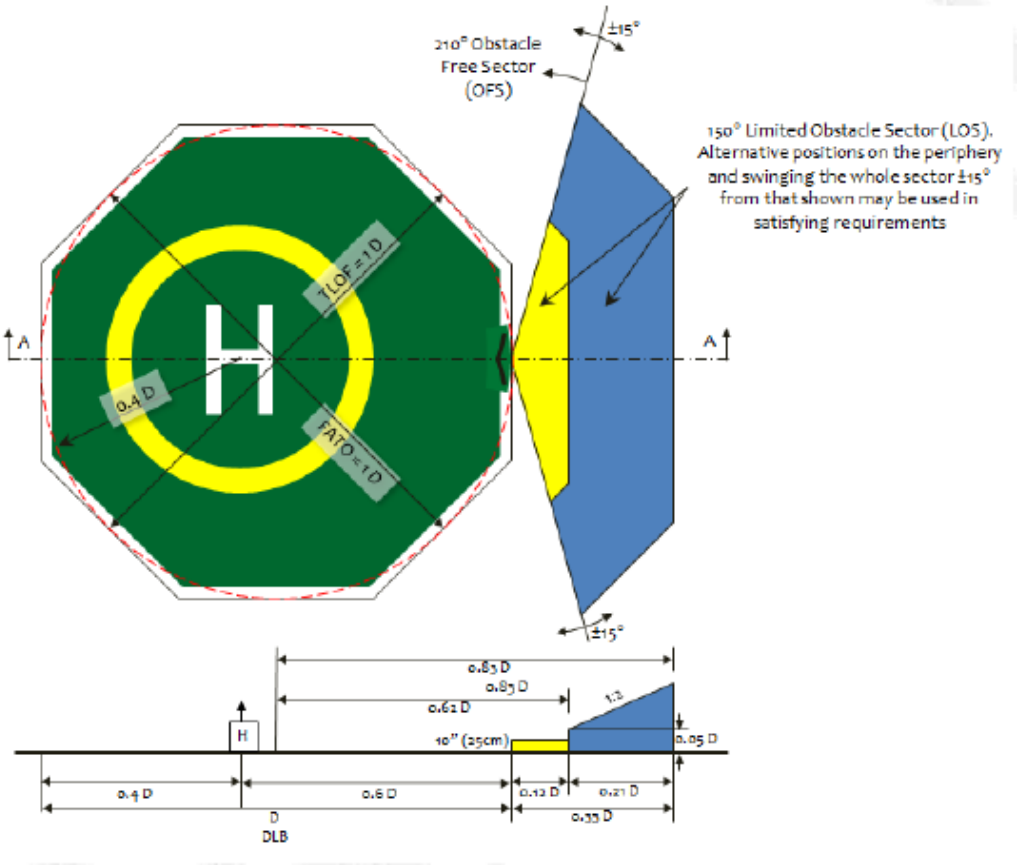
6.3 On a helideck the centre of the touchdown marking shall be located at the centre of the FATO, except that the marking may be offset away from the origin of the obstacle-free sector by no more than 0.1 D where an aeronautical study indicates such offsetting to be necessary and that a marking so offset would not adversely affect the safety. (Figure 12-6).

GM to 6.3

a) The touchdown/positioning marking is so located that when the pilot's seat is over the marking the whole of the undercarriage is comfortably within the TLOF and all parts of the helicopter are clear of any obstacles by a safe margin.

b) For helidecks which are less than 1D it is not recommended that an offset marking be utilised.

Figure 12-6 Location of offset touchdown marking

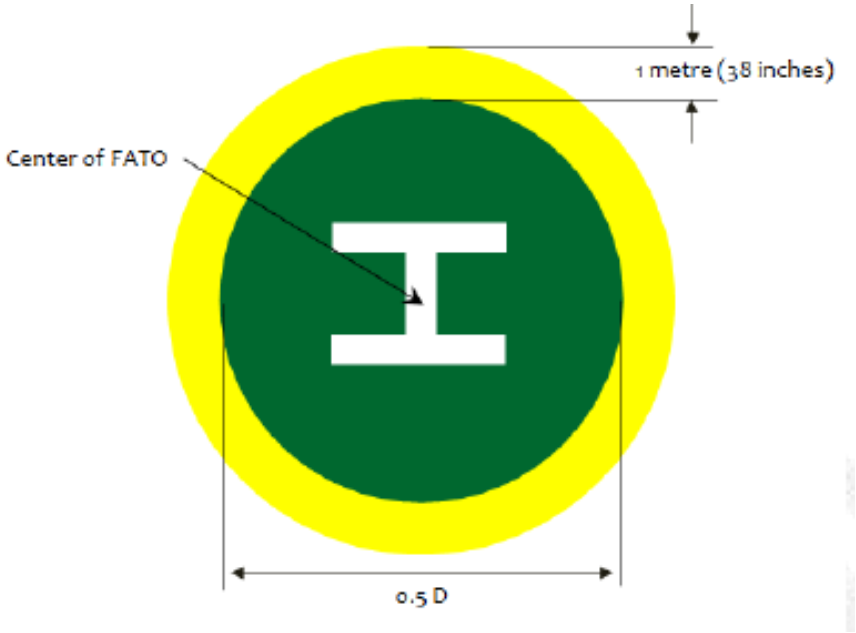


Characteristics

6.4 A touchdown/positioning marking shall be a yellow circle and have a line width of at least 0.5 m. For a helideck or a purpose-built shipboard helideck with a D value of 16.0 m or larger, the line width shall be at least 1 m.

6.5 The inner diameter of the circle shall be 0.5 D of the largest helicopter the TLOF is intended to serve.

Figure 12-7 touchdown/positioning marking



7 HELIDECK NAME MARKING

Application

7.1 A helideck name marking should be provided at a helideck where there is insufficient alternative means of visual identification.

Location

7.2 The helideck name marking should be displayed on the helideck so as to be visible, as far as practicable, at all angles above the horizontal. Where an obstacle sector exists on a helideck the marking should be located on the obstacle side of the helideck identification marking. For a non-purpose-built helidecks located on a ship's side the marking should be located on the inboard side of the helideck identification marking in the area between the TLOF perimeter marking and the boundary of the LOS.

Characteristics

7.3 A helideck name marking shall consist of the name or the alphanumeric designator of the helideck as used in the radio (R/T) communications.

7.4 The characters of the marking should be not less than 1.2 m on, helidecks and shipboard helidecks. The colour of the marking should contrast with the background and preferably be white.

GM to 7 Helideck name marking

a) To allow for recognition of the facility or vessel further up the approach manoeuvre, consideration should be given to increasing the character height of the helideck name marking from 1.2 m to 1.5 m. Where the character height is 1.5 m, the character widths and stroke widths should be in accordance with Figure 12-3. The character widths and stroke widths of nominal 1.2 m characters should be 80% of those prescribed by Figure

12-3. Where the helideck name marking consists of more than one word it is recommended that the space between words be approximately 50% of character height.

b) Some types of floating facilities and vessels may benefit from a second name marking diametrically opposite the first marking, with the characters facing the opposite direction (so that the feet of characters are located adjacent to the outboard edge of the touchdown/positioning marking circle. Having a name marking either end of the touchdown/positioning marking circle will ensure that one marking is always readable the right way up for aircrew on approach e.g. for a bow mounted helideck on a vessel that is steaming into wind, a second name marking oriented towards the main vessel structure (aft) and located between the outer edge of the circle and the outboard edge of the helideck, will be more easy to process for aircrew approaching into wind than will a helideck name marking located in the normal location. In this case aircrew would be required to process a marking which is upside down.

8 HELIDECK OBSTACLE-FREE SECTOR (CHEVRON) MARKING

Application

8.1 A helideck with adjacent obstacles that penetrate above the level of the helideck shall have an obstacle-free sector marking.

Location

8.2 A helideck obstacle-free sector marking shall be located, where practicable, at a distance from the centre of the TLOF equal to the radius of the largest circle that can be drawn in the TLOF or 0.5 D, whichever is greater.

Characteristics

8.3 The helideck obstacle-free sector marking shall indicate the location of the obstacle-free sector and the directions of the limits of the sector.

8.4 The height of the chevron shall not be less than 30 cm.

8.5 The chevron shall be marked in a conspicuous colour.

8.6 The colour of the chevron should be black.

GM to 8 Chevron marking

a) The origin of the obstacle-free sector should be marked on the helideck or shipboard helideck by a black chevron, each leg being 79 cm long and 10 cm wide forming the angle of the obstacle free sector in the manner shown in Figure 12-8. Where the OFS is swung (by up to +/-15 degrees) then the chevron is correspondingly swung. Where there is insufficient space to accommodate the chevron precisely, the chevron marking, but not the point of origin of the OFS, may be displaced by up to 30 cm towards the centre of the TLOF.

b) The purpose of the chevron is widely misunderstood to provide a form of visual indication to the aircrew that the obstacle free sector is clear of obstructions. However, the marking is too small for the purposes of aircrew and instead is intended as a visual ‘tool’ for a Helideck Landing Officer (an HLO who has charge of the helideck operation ‘on the ground’) so that he can ensure that the 210 degree OFS is clear of any

obstructions, fixed or mobile, before giving a helicopter clearance to land. The black chevron may be painted on top of the white TLOF perimeter line to achieve maximum clarity for helideck crew.

c) Adjacent to and where practical inboard of the chevron, the certified D-value of the helideck is painted in 10 cm alphanumeric characters. The D-value of the helideck should be expressed in metres to two decimal places (e.g. “D= 16.05 m”).

d) For a TLOF which is less than 1D, but not less than 0.83D, the chevron is positioned at 0.5D from the centre of the FATO which will take the point of origin outside the TLOF. If practical this is where the black chevron marking should be painted. If impractical to paint the chevron at this location, then the chevron should be relocated to the TLOF perimeter on the bisector of the OFS. In this case the distance and direction of displacement along with the words “WARNING DISPLACED CHEVRON” are marked in a box beneath the chevron in black characters not less than 10 cm high. An example of the arrangement for a sub-1D helideck is shown in Figure 12-9.

Figure 12-8 Chevron for a 1 D helideck and helideck D-value markings

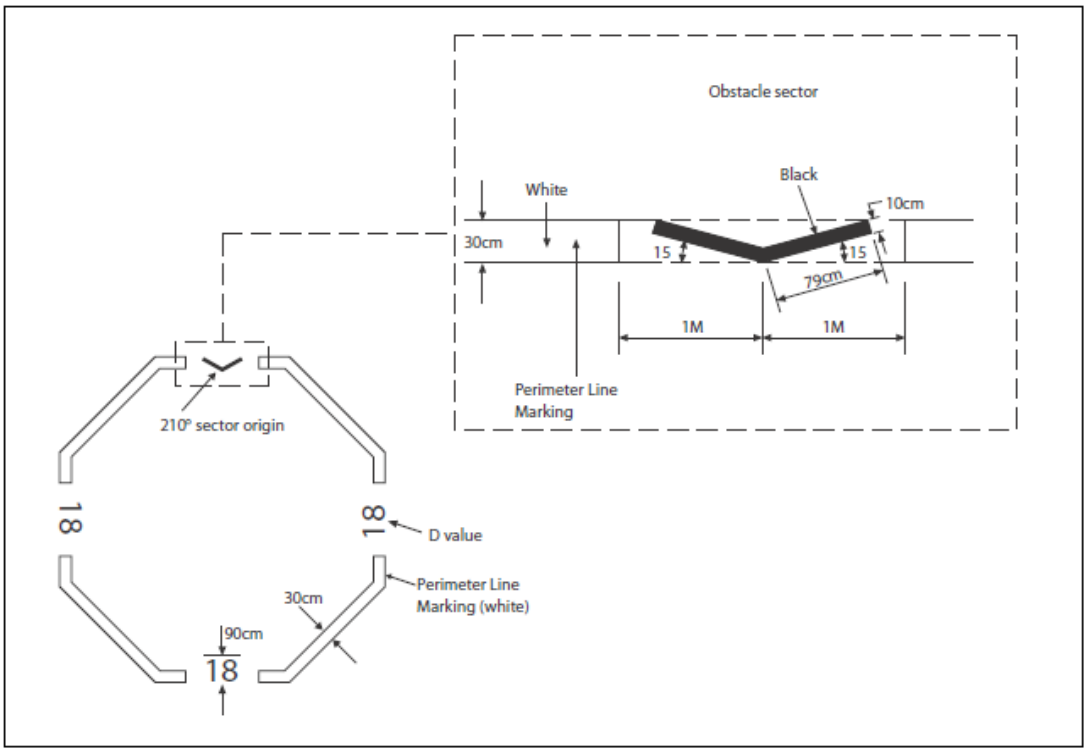
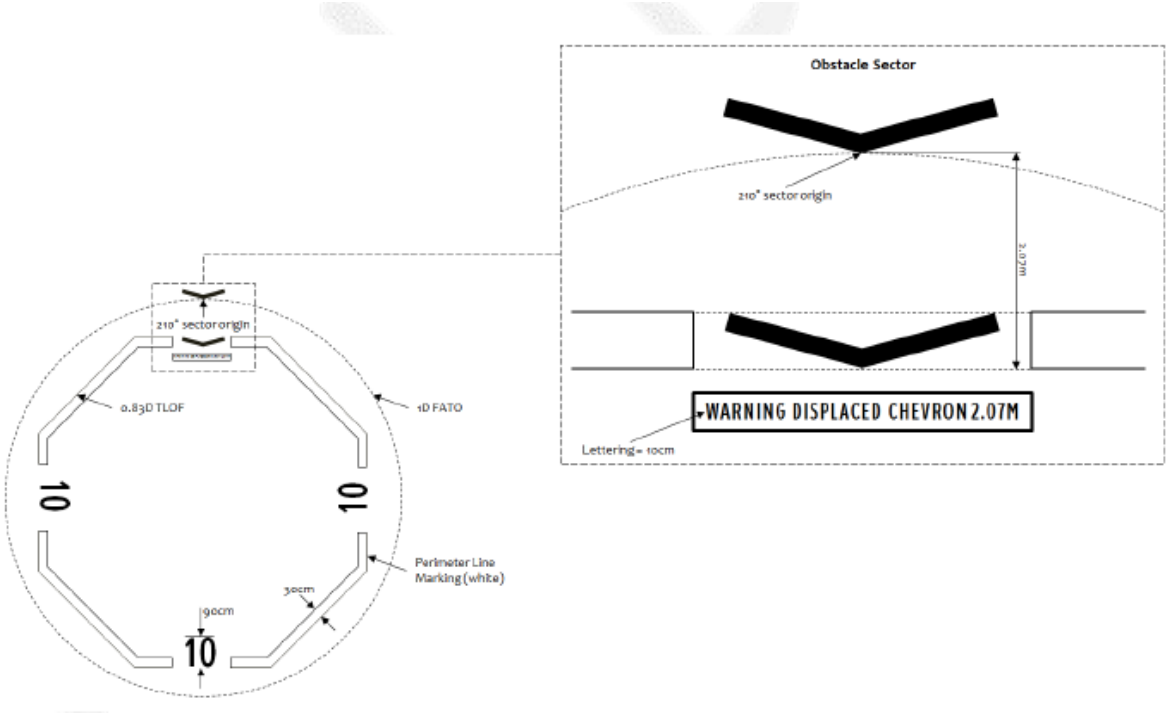


Figure 12-9 Chevron for a 0.83D helideck



9 HELIDECK AND SHIPBOARD HELIDECK SURFACE MARKING

Application

9.1 A surface marking should be provided to assist the pilot to identify the location of the helideck or shipboard helideck during an approach by day.

GM to 9.1

The purpose is to protect the helicopter from landing or manoeuvring in close proximity to limiting obstructions which, being of an immoveable nature, may compromise the sectors and surfaces established for the helideck (an example might be a jack-up leg penetrating the 150 degree limited obstacle sector or a crane on the edge of the LOS).

Location

9.2 A surface marking should be applied to the dynamic load bearing area bounded by the TLOF perimeter marking.

Characteristics

9.3 The helideck or shipboard helideck surface bounded by the TLOF perimeter marking should be of dark green using a high friction coating.

Note — Where the application of a surface coating may have a degrading effect on friction qualities the surface might not be painted. In such cases the best operating practice to enhance the conspicuity of markings is to outline deck markings with a contrasting colour.

10 HELIDECK PROHIBITED LANDING SECTOR MARKINGS

Application

10.1 Helideck prohibited landing sector markings should be provided where it is necessary to prevent the helicopter from landing within specified headings.

Location

10.2 The prohibited landing sector markings should be located on the touchdown/positioning marking to the edge of the TLOF, within the relevant headings.

Characteristics

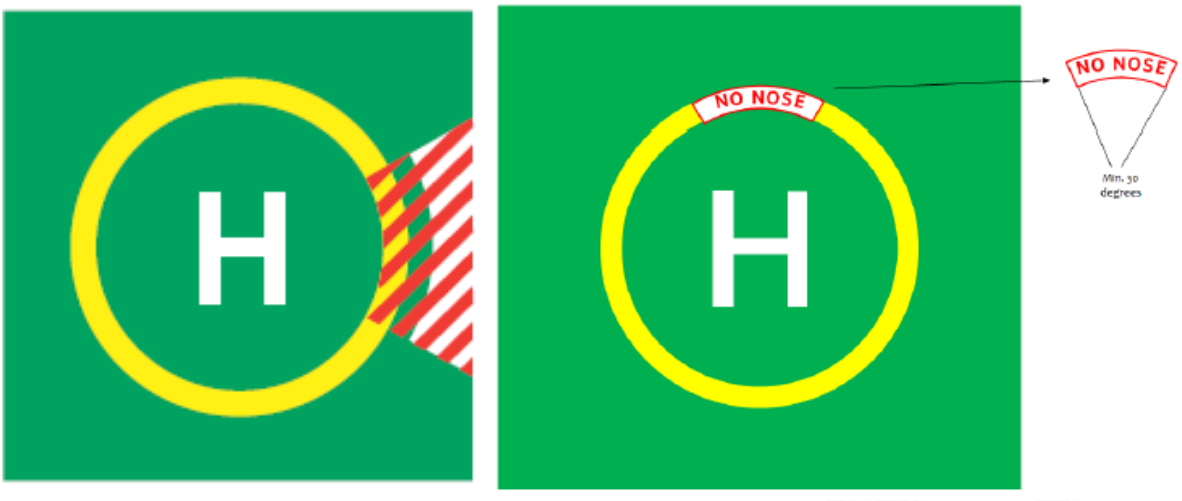
10.3 The prohibited landing sector markings shall be indicated by white and red hatched markings as shown in Figure 12-10.

Note — Prohibited landing sector markings, where deemed necessary, are applied to indicate a range of helicopter headings that are not to be used by a helicopter when landing. This is to ensure that the nose of the helicopter is kept clear of the hatched markings during the manoeuvre to land.

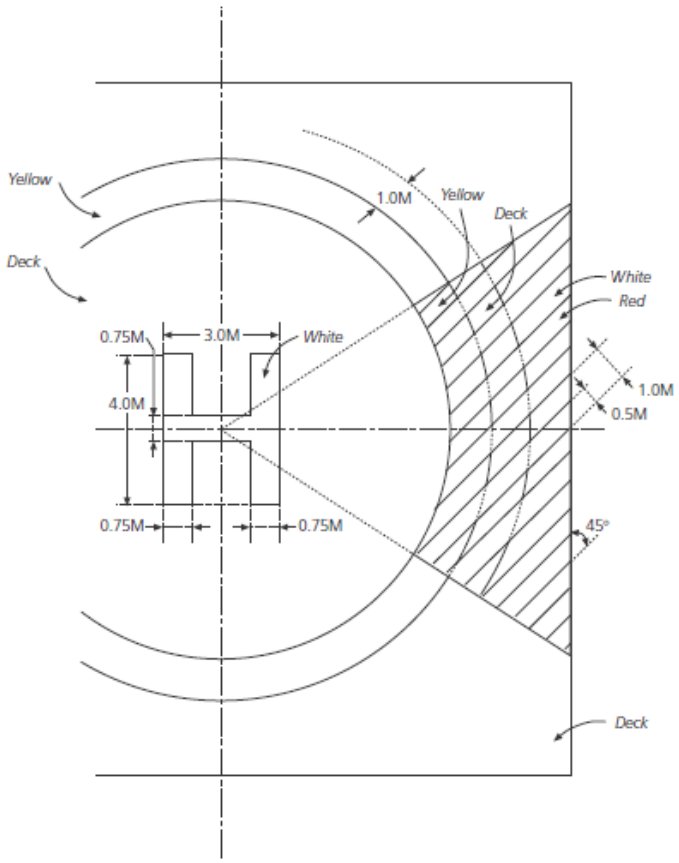
GM to 10.3

a) The arc of coverage should be sufficient to ensure that the tail rotor system will be positioned clear of the obstruction when hovering above, and touching down on, the yellow circle at any location beyond the prohibited landing sector marking. As a guide it is recommended that the prohibited landing sector marking extends by a minimum 10 to 15 degrees either side of the edge of the obstacle (this implies that even for a simple whip aerial infringement' the prohibited landing sector arc applied will be an arc no less than 20-30 degrees of coverage).

Figure 12-10 Examples of an alternative prohibited landing sector marking



b) The sector of the TD/PM circle, opposite from the personnel access point, should be bordered in red with the words "No Nose" clearly marked in red on a white background as shown in Figure 12-9. When positioning over the touchdown/positioning marking circle, helicopters should be manoeuvred so as to keep the aircraft nose clear of the "No Nose" marked sector of the TDPM circle at all times. The minimum prohibited "NO NOSE" marking should cover an arc of at least 30 degrees.



11 VISUAL AIDS FOR DENOTING OBSTACLES

Application, Location and **Characteristics**: refer to CAR Part IX (Aerodromes).

GM to 11 Visual aids for denoting obstacles

a) Fixed obstacles which present a hazard to helicopters should be readily visible from the air. If a paint scheme is necessary to enhance identification by day, alternate black and white, black and yellow, or red and white bands are recommended, not less than 0.5 metres, or more than six metres wide. The colour should be chosen to contrast with the background to the maximum extent.

b) Obstacles to be marked in these contrasting colours include any lattice tower structures and crane booms which are close to the helideck or to the LOS boundary. Similarly parts of the leg (or legs) of a self-elevating jack-up unit that are adjacent to the helideck and which extend, or can extend above it, should also be marked in the same manner.

12 INSTALLATION CLOSED MARKING

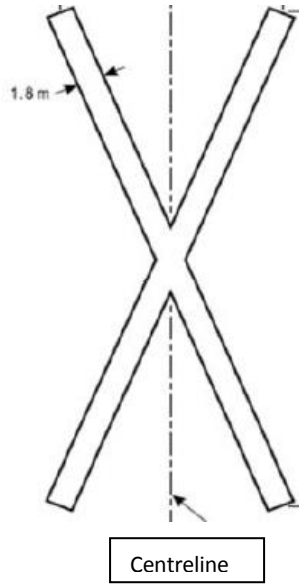
Application

12.1 A closed marking shall be displayed on an installation which is permanently closed to the use of all helicopters.

Characteristics

12.2 The white closed marking shall be of the form as detailed in Figure 12-11, the size of the marking should be adjusted to cover the letter 'H' inside the TD/PM.

Figure 12-11 Helideck closed



13 PROHIBITION OF LANDING

Application

13.1 A prohibition of landing marking shall be displayed when landings are prohibited and when the prohibition is likely to be prolonged.

Characteristics

13.2 The marking shall be of the form as detailed in Figure 12-12, the size of the marking should be adjusted to cover the letter 'H' inside the TD/PM.

Figure 12-12 Prohibition of landing

CHAPTER 13 – AERONAUTICAL LIGHTS

Note 1 - Helidecks located near navigable waters, consideration needs to be given to ensuring that aeronautical ground lights do not cause confusion to mariners.

Note 2 - The specification for the TLOF lighting system assumes that the performance of the lighting will not be diminished due to the relative intensity, configuration or colour of other lighting sources present on a fixed or floating facility or on a vessel. Where other non-aeronautical lighting has potential to cause confusion, or to diminish or prevent the clear interpretation of aeronautical ground lights, it will be necessary for the facility or vessel operator to extinguish, screen, or otherwise modify, non-aeronautical light sources to ensure the effectiveness of helideck or shipboard helideck lighting systems are not compromised. To achieve this, operators should give consideration to shielding any high intensity light sources from approaching helicopters by fitting screens or louvers.

1 HELIPORT BEACON

Application, Location and **Characteristics**: refer to CAAP 70.

2 TOUCHDOWN AND LIFT-OFF AREA (TLOF) LIGHTING SYSTEM

Application

2.1 A TLOF lighting system shall be provided at a helideck intended for use at night.

2.2 The TLOF lighting system for a helideck shall consist of:

a) perimeter lights; and

b) Arrays of Segmented Point Source Lighting (ASPSL) and/or Luminescent Panels (LP) to identify the touchdown marking where it is provided and/or floodlighting to illuminate the TLOF.

Note — At helidecks, surface texture cues within the TLOF are essential for helicopter positioning during the final approach and landing. Such cues can be provided using various forms of lighting (ASPSL, LP, floodlights or a combination of these lights, etc.) in addition to perimeter lights. Best results have been demonstrated by the combination of perimeter lights and ASPSL in the form of encapsulated strips of light emitting diodes (LEDs) to identify the touchdown and helideck identification markings.

2.3 The TLOF lighting system may consist of a lit helideck identification (“H”). If utilised, the helideck identification marking lighting shall be omnidirectional showing green.

Location

2.4 TLOF perimeter lights, around the edge of the area designated for use as the TLOF shall be uniformly spaced at intervals of not more than 3m and should follow the shape of the helideck or shipboard helideck (e.g. for an octagonal shaped helideck, the TLOF perimeter lights should be arranged to form an octagon).

AMC to 2.4

To avoid lights creating a trip hazard at points of access and egress it may be necessary to provide sources that are flush-mounted (i.e. recessed) into the surface. The pattern of lights should be formed using regular spacing. However, to avoid potential trip hazards, blocking

foam dispensing nozzles, etc., it may be desirable to move lights to one side. In this case TLOF perimeter lights may be relocated by up to +/- 0.5 m such that the maximum gap between two adjacent TLOF perimeter lights is no more than 3.5 m and the minimum no less than 2.5m.

2.5 The TLOF perimeter lights shall be installed at a fixed helideck such that the pattern cannot be seen by the pilot from below the elevation of the TLOF.

2.6 The TLOF perimeter lights shall be installed at a floating helideck, such that the pattern cannot be seen by the pilot from below the elevation of the TLOF when the helideck is level.

2.7 When Luminescent Panels are used on a helideck to enhance surface texture cues, the panels should not be placed adjacent to the perimeter lights. They should be placed around a touchdown marking where it is provided.

2.8 TLOF floodlights shall be located so as to avoid glare to pilots in flight or to personnel working on the area. The arrangement and aiming of floodlights shall be such that shadows are kept to a minimum.

GM to 2.8

Floodlighting can easily become misaligned and the Helicopter Landing Officer (HLO) should instigate daily checks to ensure that misaligned lights are corrected and so not creating a hazard to flight operations by providing a source of glare (the glare issue may be reduced by fitting appropriate hoods [louvers] onto deck-mounted floodlights). Notwithstanding lights should be realigned when, in the opinion of air crew, they are creating a glare hazard during flight operations.

Note — ASPSL and LPs used to designate the touchdown marking have been shown to provide enhanced surface texture cues when compared to low-level floodlights. Due to the risk of misalignment, where floodlights are used, there will be a need for them to be checked periodically to ensure they remain within the specifications.

Characteristics

2.9 The TLOF perimeter lights shall be fixed omnidirectional lights showing green.

2.10 The chromaticity and luminance of colours of LPs shall conform to CAR Part IX:

Table 13-1 Colours for aeronautical ground lighting: Chromaticities

Perimeter Lights GREEN		**Touchdown/Positioning Lights YELLOW**	
Yellow Boundary	x = 0.360 – 0.080y	Red Boundary	y = 0.382
White Boundary	x = 0.650y	White Boundary	y = 0.790 – 0.667x
Blue Boundary	y = 0.39 – 0.171x	Green Boundary	y = x – 0.120

2.11 An LP shall have a minimum width of 6 cm. The panel housing shall be the same colour as the marking it defines.

2.12 The perimeter lights should not exceed a height of 25 cm and should be inset when a light extending above the surface could endanger helicopter operations.

AMC to 2.12

The height of the installed TLOF perimeter lights and floodlights should not exceed 25cm above the level of the TLOF for helidecks which are 1D or greater and/or have a D-value greater than 16.00 m, and 5 cm for helidecks which are sub-1D, but not less than 0.83D, and/or have a D-value of 16.0 m or less.

2.13 The LPs shall not extend above the surface by more than 2.5 cm.

2.14 The light distribution of the perimeter lights should be as shown in Figure 13-3, Illustration 6.

2.15 The light distribution of the LPs should be as shown in Figure 13-3, Illustration 7.

2.16 The spectral distribution of TLOF area floodlights shall be such that the surface and obstacle marking can be correctly identified.

2.17 The average horizontal illuminance of the floodlighting should be at least 10 lux, with a uniformity ratio (average to minimum) of not more than 8:1 measured on the surface of the TLOF.

2.18 Lighting used to identify the touchdown marking should comprise a segmented circle of omnidirectional ASPSL strips showing yellow. The segments should consist of ASPSL strips, and the total length of the ASPSL strips should not be less than 50 per cent of the circumference of the circle.

2.19 The design of the perimeter lights should be such that the luminance of the perimeter lights is equal to or greater than that of the TD/PM Circle segments.

2.20 The perimeter lighting and touchdown/position marking lighting is considered serviceable provided that at least 90% of the lights are serviceable, and providing that any unserviceable lights are not adjacent to each other. A light shall be deemed to be unserviceable when the main beam average intensity is less than 50 per cent of the value specified in the appropriate illustration in Figure 13-3.

GM1 to 2.8 and 2.17 Deck-mounted floodlighting

a) Deck-mounted floodlighting, given their ‘shallow angle of attack’ and the potentially very large area needing to be illuminated, especially over the touchdown markings, is what is commonly known as the ‘black-hole effect’. In this case adequate illumination is dispensed in areas adjacent to the perimeter lights, but a ‘black-hole’ is left in the centre of the landing area where the ‘throw’ of the lights is inadequate to reach the central touchdown area markings. Designers should aim to create a lighting environment which achieves an average horizontal illuminance of the floodlighting which is at least 10 lux, with a uniformity ratio (average to minimum) of not more than 8:1, measured on the surface of the TLOF. Furthermore the spectral distribution of TLOF area floodlights should ensure adequate illumination of the surface markings (especially the touchdown/positioning marking circle) and obstacle markings (this may include a prohibited landing sector marking, where present).

b) Given the challenges of meeting 2.17, designers may be tempted to provide multiple floodlighting units, in seeking to achieve the recommendations for spectral distribution and average horizontal illuminance for floodlighting. However, being very much brighter than the TLOF perimeter lights, floodlighting has a tendency to ‘wash out’ the pattern of

the green perimeter lights, due to the number and intensity of much brighter floodlights. As the green pattern provided by the TLOF perimeter lights generates the initial source of helideck acquisition for aircrew, the desire to specify multiple sets of floodlights should be resisted. For all but the largest helidecks a compliment of between 4 and 6 floodlights should be sufficient (up to 8 for the largest helidecks). Providing technologies are selected which promote good sharp beam control, this should optimise their effectiveness and offer the best opportunity to effectively illuminate touchdown markings. To mitigate, as far as possible the glare issue, floodlights should be mounted so that the centreline of the floodlight beam is at an angle of 45 degrees to the reciprocal of the prevailing wind direction. This will minimise any glare or disruption to the pattern formed by the green perimeter lights for the majority of approaches. Figure 13-1 illustrates a typical floodlighting arrangement.

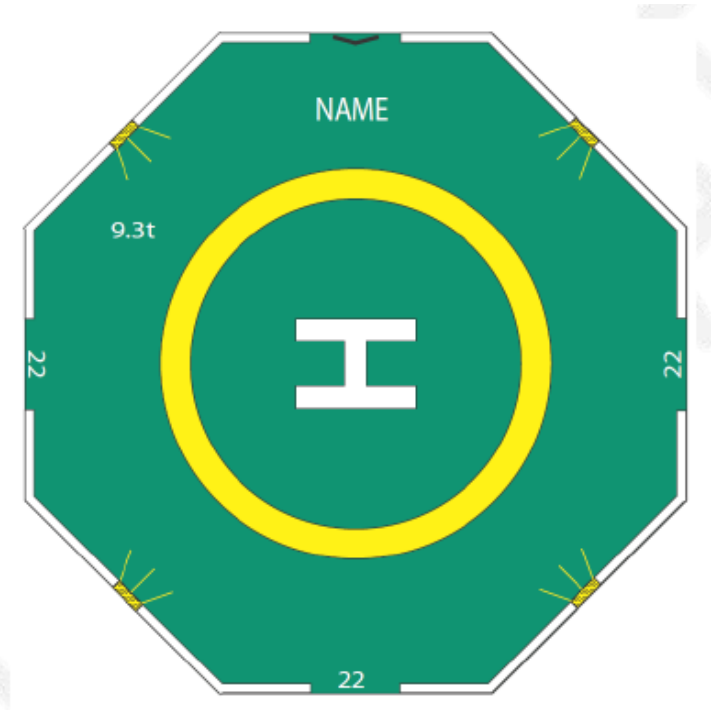
c) As well as providing the visual cues needed for helideck recognition for approach and landing, helideck floodlighting may be used at night to facilitate on-deck operations such as passenger movements, refueling operations, freight handling etc. Where there is potential for floodlights to dazzle a pilot during the approach to land or during take-off manoeuvres, they should be switched off for the duration of the approach and departure. Therefore all floodlights should be capable of being switched off at a pilot's request. All TLOF lighting should be fed from an uninterrupted power supply (UPS) system.

d) For some helidecks or shipboard helidecks it may be possible to site additional high-mounted floodlighting away from the TLOF perimeter, such as a ship's bridge or pointing down from a hangar. In this case, extra care should be taken to ensure additional sources do not cause a source of glare to a pilot, especially when lifting in the hover to transition into forward flight, and do not present a competing source to the green TLOF perimeter lights. Screens or louvers should be considered for any additional high-mounted sources.

GM2 to Chapter 13: Night viewing conditions

a) The helideck and shipboard helipdeck lighting systems are designed on the assumption that operations occur in typical night viewing conditions, with an assumed eye threshold illuminance of Et = 10-6.1. If there is an expectation for aeronautical lighting to be used in more demanding viewing conditions, such as at twilight or during typical day conditions, (where Et = 10-5.0 for twilight and Et = 10-4.0 for normal day), there needs to be recognition that the 'true night' viewing ranges achieved by the system design will decay considerably in more demanding viewing conditions (i.e. the range at which a particular visual aid becomes detectable and conspicuous at night will decrease if that same aid is used at twilight or by day; because the higher background brightness leads to decreasing probability of detection).

Figure 13-1 Typical floodlighting arrangement for an octagonal helideck



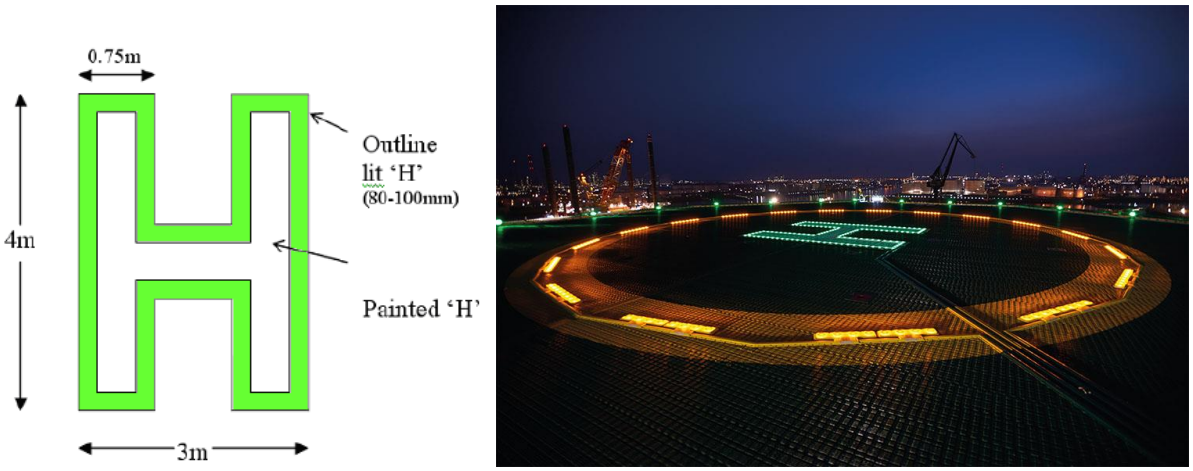
GM to 2.3 Lit helideck identification marking ("H")

a) As an effective alternative to providing illumination of the touchdown markings by the use of deck-mounted floodlighting, operators may wish to consider a scheme for a lit touchdown/ positioning marking and a lit helideck identification marking.

b) The lit touchdown/positioning marking and the lit helideck identification marking scheme has been developed by the UK CAA to be compatible with helicopters having wheeled undercarriages. Although the design specification ensures segments and sub-sections are compliant with the maximum height for obstacles on the TLOF surface (2.5 cm), and are likely to be able to withstand the point loading presented by typically lighter skidded helicopters, due to the potential for raised fittings to induce dynamic rollover, it is important to establish compatibility with skid-fitted helicopter operations before lighting is installed on helidecks and shipboard helidecks used by skid-fitted helicopters.

c) If used, the lit Helideck Identification Marking ('H') should be superimposed on the 4m x 3m white painted 'H' (limb width 0.75m). The lit 'H' should be 3.9 to 4.1m high, 2.9 to 3.1m wide and have a stroke width of 0.7 to 0.8m. The lit 'H' may be offset in any direction by up to 10cm in order to facilitate installation (e.g. avoid a weld line on the helideck surface). The limbs should be lit in outline form as shown in Figure 13-2. An outline lit 'H' should comprise sub-sections of between 80mm and 100mm wide around the outer edge of the painted 'H'. There are no restrictions on the length of the sub-sections, but the gaps between them should not be greater than 10cm. The mechanical housing should be coloured white.

Figure 13-2 Configuration and example of a normal dimension helideck identification marking "H"



3 HELIDECK STATUS LIGHT SYSTEM

Application

3.1 If it is deemed that a hazard or potential hazardous condition exists for the helicopter or its occupants, a visual warning system should be installed. The system (Status Lights) should be a flashing red light (or lights), visible to the pilot from any direction of approach and on any landing heading.

GM to 3.1: The aeronautical meaning of a flashing red light is either "do not land, aerodrome not available for landing" or "move clear of landing area". The necessity for the installation of a Status Light systems should be the results of a safety assessment, accepted by the accountable organisation.

3.2 The system should be automatically initiated at the appropriate hazard level (e.g. gas release) as well as being capable of manual activation by the HLO. It should be visible at a range in excess of the distance at which the helicopter may be endangered or may be commencing a visual approach.

3.3 The following specification should be applied:

a) Where required, the helideck status signalling system should be installed either on or adjacent to the helideck. Additional lights may be installed in other locations on the platform where this is necessary to meet the requirement that the signal be visible from all approach directions, i.e. 360^0 in azimuth.

b) The effective intensity should be a minimum of 700 cd between 2^0 and 10^0 above the horizontal and at least 176 cd at all other angles of elevation.

c) The system should be provided with a facility to enable the output of the lights (if and when activated) to be dimmed to an intensity not exceeding 60 cd while the helicopter is landed on the helideck.

d) The signal should be visible from all possible approach directions and while the helicopter is landed on the helideck, regardless of heading, with a vertical beam spread as shown in b) above.

e) The colour of the status light(s) should be red as defined in CAR Part IX (Aerodromes), colours for aeronautical ground lights.

f) The light system as seen by the pilot at any point during the approach should flash at a rate of 120 flashes per minute. Where two or more lights are needed to meet this requirement, they should be synchronised to ensure an equal time gap (to within 10%) between flashes. While landed on the helideck, a flash rate of 60 flashes per minute is acceptable. The maximum duty cycle should be no greater than 50%.

g) The light system should be integrated with platform safety systems such that it is activated automatically in the event of a process upset.

h) Facilities should be provided for the HLO to manually switch on the system and/or override automatic activation of the system.

i) The light system should have a response time to the full intensity specified not exceeding three seconds at all times.

j) Facilities should be provided for resetting the system which, in the case of NUIs, do not require a helicopter to land on the helideck.

k) The system should be designed so that no single failure will prevent the system operating effectively. In the event that more than one light unit is used to meet the flash rate requirement, a reduced flash frequency of at least 60 flashes per minute is considered acceptable in the failed condition for a limited period.

l) The system and its constituent components should comply with all regulations relevant to the installation.

m) Where the system and its constituent components are mounted in the 210^0 OFS or in the first segment of the LOS, the height of the installed system should not exceed 25 cm above deck level (or exceed 5 cm for any helideck where the D-value is 16.00 m or less).

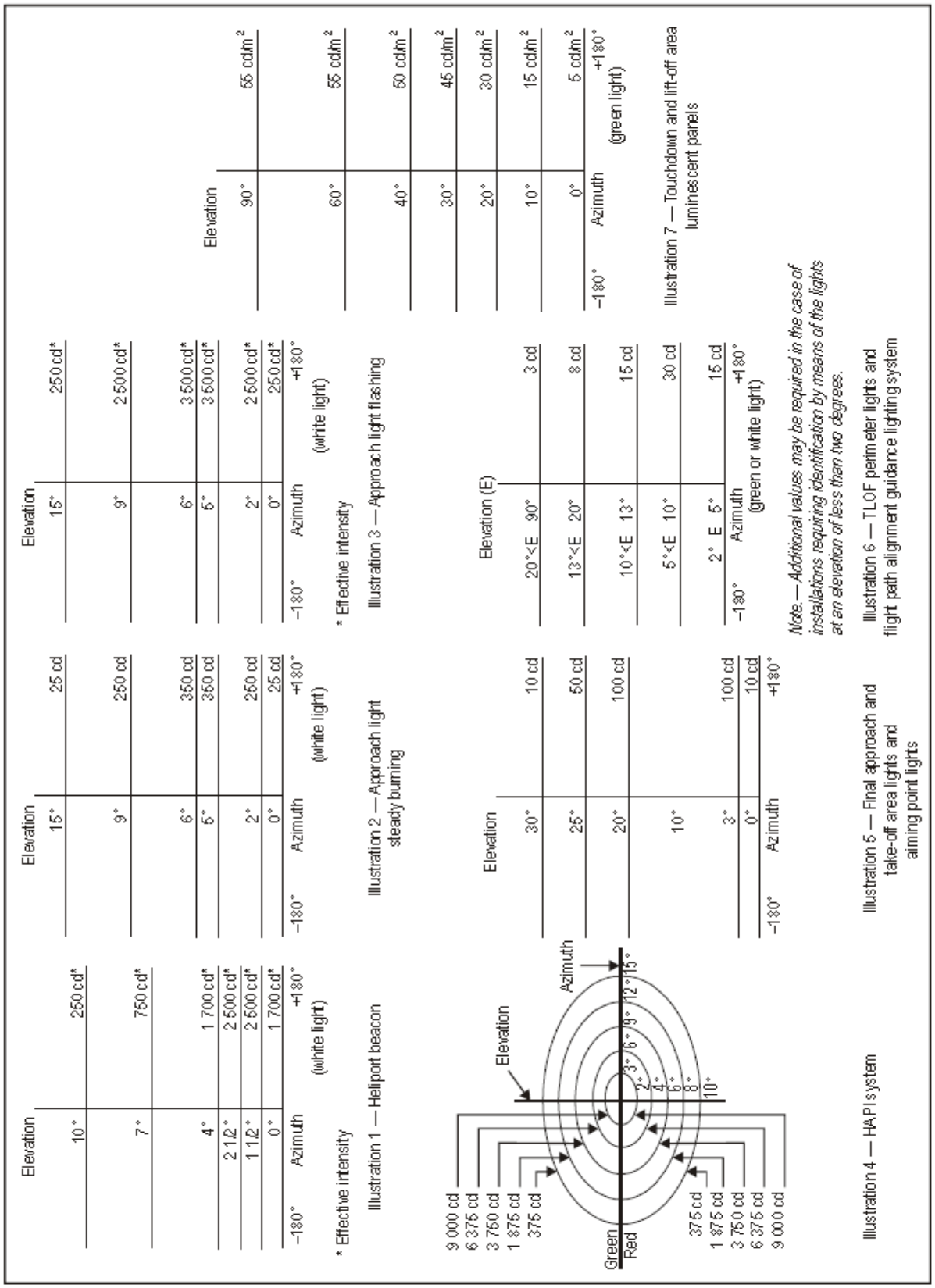
n) Where supplementary 'repeater' lights are employed for the purposes of achieving the 'on deck' 360^0 coverage in azimuth, these should have a minimum intensity of 16 cd and a maximum intensity of 60 cd for all angles of azimuth and elevation.

3.4 All components of the status light system should be tested by an independent test house to ensure verification with the specification. The photometrical and colour measurements performed in the optical department of the test house should be accredited.

GM to 3.4: Manufacturers are reminded that the minimum intensity specification stated above is considered acceptable to meet the current operational requirements, which specify a minimum meteorological visibility of 1400 m (0.75 NM). Development of offshore approach aids which permit lower minima (e.g. differential GPS) will require a higher intensity.

3.5 Where helideck status light systems installed on normally unattended installations (NUIs) malfunction, whether the outcome is light(s) permanently flashing or disabled/depowered, in these cases, in order to allow them to be manually reset at the platform, a duty-holder may present a case-specific risk assessment to the accountable organisation, who if satisfied with the risk assessment, may provide acceptance to permit flights against operating status lights or black platforms to occur.

Figure 13-3 Isocandela diagrams



4 FLOODLIGHTING OF OBSTACLES

Application

4.1 At a helideck intended for use at night, obstacles shall be floodlighted if it is not possible to display obstacle lights on them.

Location

4.2 Obstacle floodlights shall be arranged so as to illuminate the entire obstacle and as far as practicable in a manner so as not to dazzle the helicopter pilots.

Characteristics

4.3 Obstacle floodlighting should be such as to produce a luminance of at least 10cd/m2

GM to 3.3

a) Omni-directional low intensity steady red obstruction lights having a minimum intensity of 10 candelas for angles of elevation between 0 degrees and 30 degrees should be fitted at suitable locations to provide the helicopter pilot with visual information on the proximity and height of objects which are higher than the landing area and which are close to it, or to the LOS boundary. This should apply, in particular, to all crane booms on an off-shore facility or vessel. Objects which are more than 15 metres higher than the landing area should be fitted with intermediate low intensity steady red obstruction lights of the same intensity spaced at 10 metre intervals down to the level of the landing area (except where such lights would be obscured by other objects). It is often preferable for some structures such as flare booms and towers to be illuminated by floodlights as an alternative to fitting intermediate steady red lights, provided that the lights are arranged such that they will illuminate the whole of the structure and not dazzle a helicopter pilot. Facilities may, where appropriate, consider alternative equivalent technologies to highlight dominant obstacles in the vicinity of the helideck.

b) An omni-directional low intensity steady red obstruction light should be fitted to the highest point of the installation. The light should have a minimum intensity of 50 candelas for angles of elevation between 0 and 15 degrees, and a minimum intensity of 200 candelas between 5 and 8 degrees. Where it is not practicable to fit a light to the highest point of the installation (e.g. on top of flare towers) the light should be fitted as near to the extremity as possible.

c) In the particular case of jack-up units, it is recommended that when the tops of the legs are the highest points on the facility, they should be fitted with omni-directional low intensity steady red lights of the same intensity and characteristics as described in paragraph b). In addition the leg (or legs) adjacent to the helideck should be fitted with intermediate low intensity steady red lights of the same intensity and characteristics as described in paragraph a) at 10 metre intervals down to the level of the landing area. As an alternative the legs may be floodlit providing the helicopter pilot is not dazzled.

d) Any ancillary structure within one kilometre of the helideck, and which is significantly higher than it, should be similarly fitted with red lights.

e) Red lights should be arranged so that the locations of the objects which they delineate are visible from all directions of approach above the landing area.

f) Facility/vessel emergency power supply design should include all forms of obstruction lighting. Any failures or outages should be reported immediately to the helicopter operator. The lighting should be fed from a UPS system.

g) For some helidecks, especially those that are on not permanently attended installations (NPAI), it may be beneficial to improve depth perception by deploying floodlighting to illuminate the main

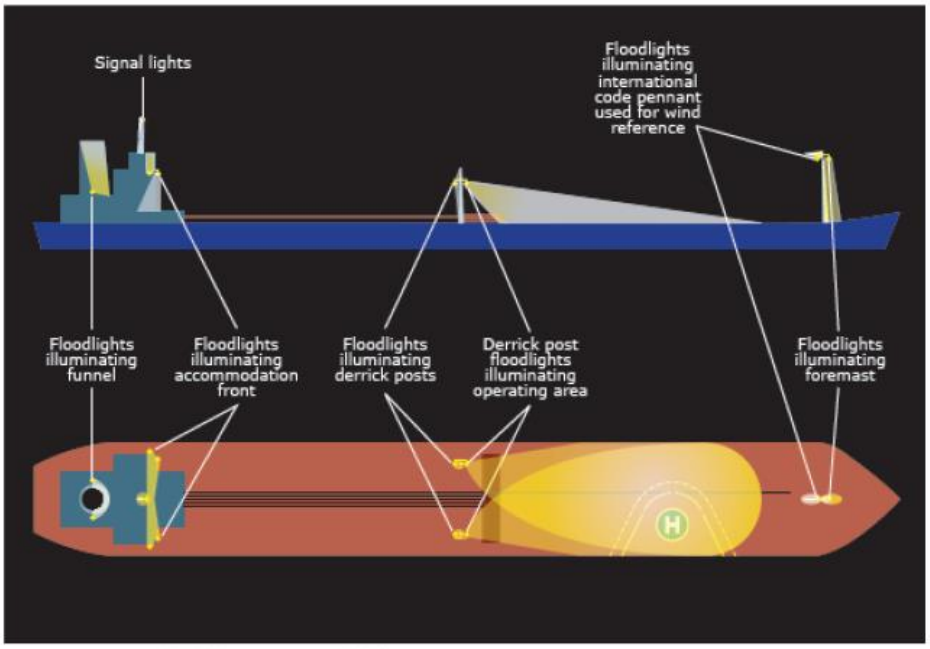
structure (or legs) of the platform. This can help to address the visual illusion that a helideck appears to be 'floating in space'.

5 GUIDANCE MATERIAL – SPECIAL CONSIDERATIONS FOR NON-PURPOSE BUILT SHIPBOARD HELIDECKS

5.1 At a helideck intended for use at night, obstacles shall be floodlighted if it is not possible to display obstacle lights on them.

5.2 Given the possible presence of obstructions within the landing area night operations should not take place unless a risk assessment has been undertaken to demonstrate it is safe to do so. Where night operations are conducted, specific lighting schemes for non-purpose built shipboard helidecks may utilise an area floodlighting solution to illuminate the TLOF and markings as illustrated in Figure 13-4 below.

Figure 13-4 Special considerations for lighting non-purpose built shipboard helidecks



CHAPTER 14 – PARKING AREAS AND PUSH-IN AREAS

1 PARKING AREA (PA)

1.1 Where provided, parking areas shall be located within the 150 degree limited obstacle sector (LOS) equipped with markings to provide effective visual cues for flight crews needing to use the parking area.

GM to 1.1

Markings should be incorporated on the parking area surface to provide visual cues to the flight crew to enhance safe operations.

It is necessary for a parking area to be clearly distinguishable from the landing area (the TLOF). By day this is achieved by ensuring a good contrast between the surface markings of the landing area and the surface markings of the parking area. For a standard dark green helideck, as described in Chapter 12, a parking area which is painted a light grey colour utilising a high friction coating, will provide suitable contrast (an aluminium surface may be left untreated). For an untreated aluminium landing area, it may be necessary to select a different colour finish for the parking area (preferably a darker colour than the landing area but avoiding dark green) to achieve a good contrast. (The Figures in this chapter assume that a dark green minimum 1D FATO is provided. When an untreated aluminium landing area is selected the underlying colour of the parking area will need to be varied to achieve good contrast).

1.2 The dimensions of the parking area shall be able to accommodate a circle with a minimum diameter of 1 x the D-value of the design helicopter.

AMC1 to 1.2

Where space (the physical surface) is limited for the parking area it is permissible to reduce the parking area 'footprint' to be no less than the rotor diameter (RD) of the design helicopter. In this case the touchdown/positioning marking (TD/PM) circle is offset away from the landing area to ensure a parked helicopter is a safe distance away from the landing area and is contained in the parking area within an imaginary circle of dimension D. With a reduction in the load bearing surface of the parking area from D to RD, it is accepted that parts of the helicopter e.g. the tail rotor or main rotor, may overhang the physical parking area (inboard). The general arrangement for a helideck parking area with offset TD/PM circle is shown at Figure 14-2.

AMC2 to 1.2

For some offshore facilities it may not be practical to accommodate a full helideck parking area adjacent to the landing area. In this case consideration may be given to providing an extension to the landing area, known as a limited parking area (LPA) or push-in area (PIA), separated from the landing area by a Parking Transition Area (PTA) (see 1.3) and designed to accommodate only a fully shutdown helicopter. In this case it is intended helicopters should be shut down on the landing area and ground handled to and from the LPA/ PIA. The arrangement for an LPA/PIA is shown at Figure 14-3. Similar to a parking area, the LPA/PIA is bounded by a solid white edge buffer line, and should be painted in a colour that contrasts effectively with the landing area (and the PTA).

Figure 14-1 1D FATO/TLOF with associated 1D parking area (separated by a parking transition area

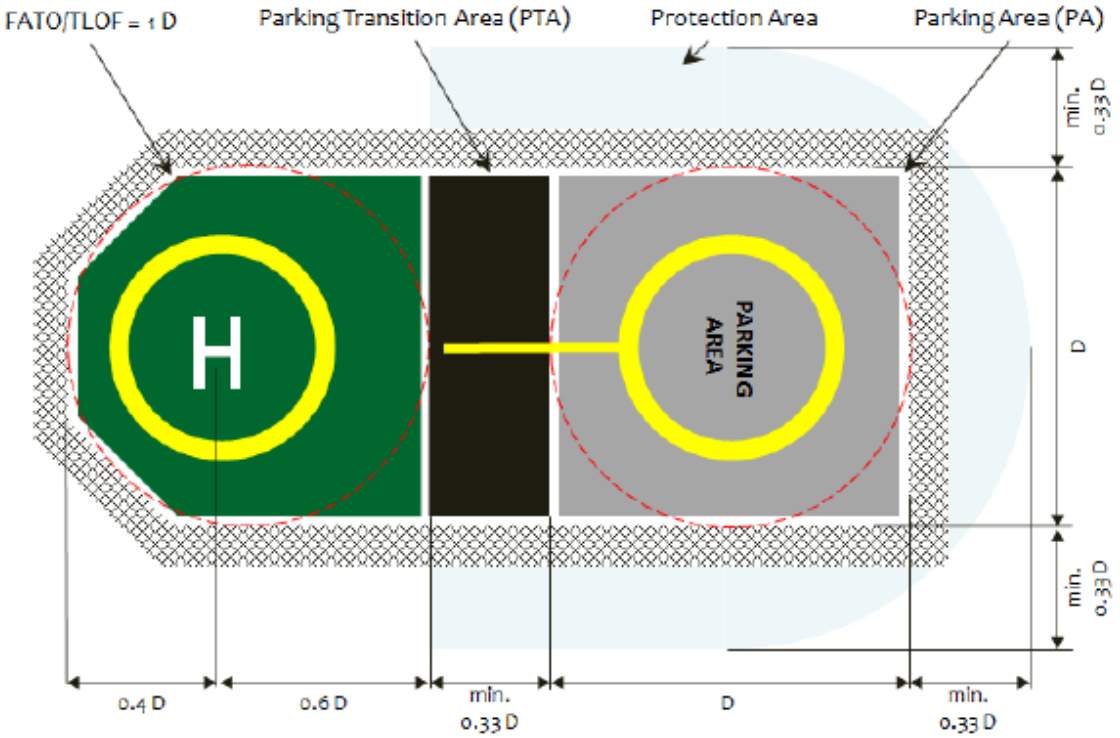


Figure 14-2 Helideck parking area with off-set TD/TM circle

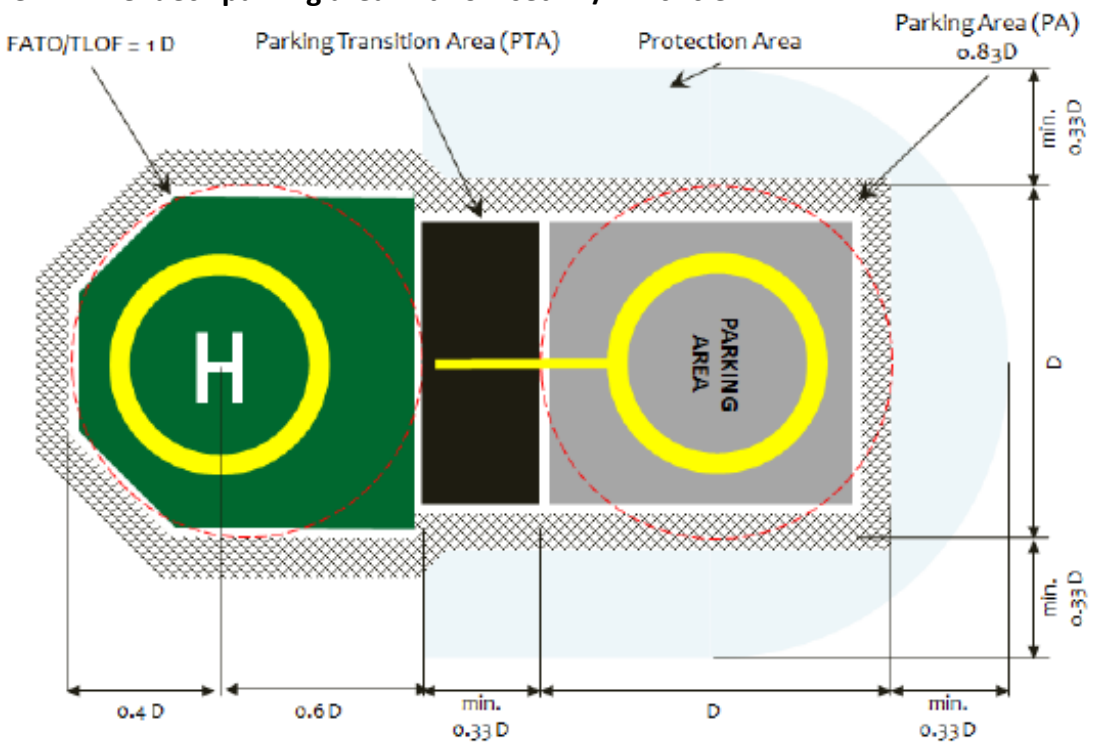
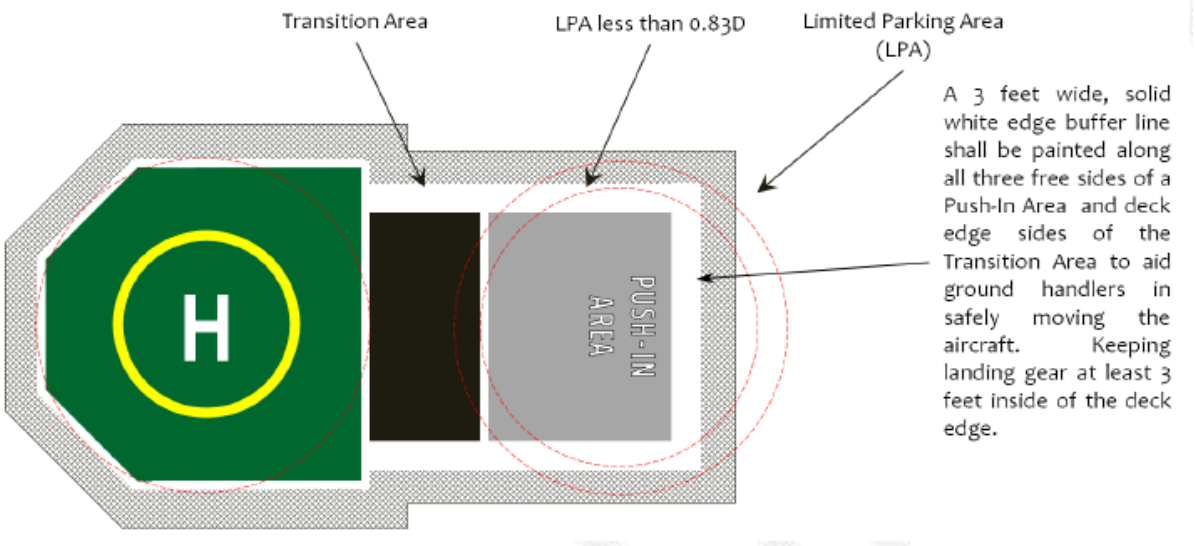


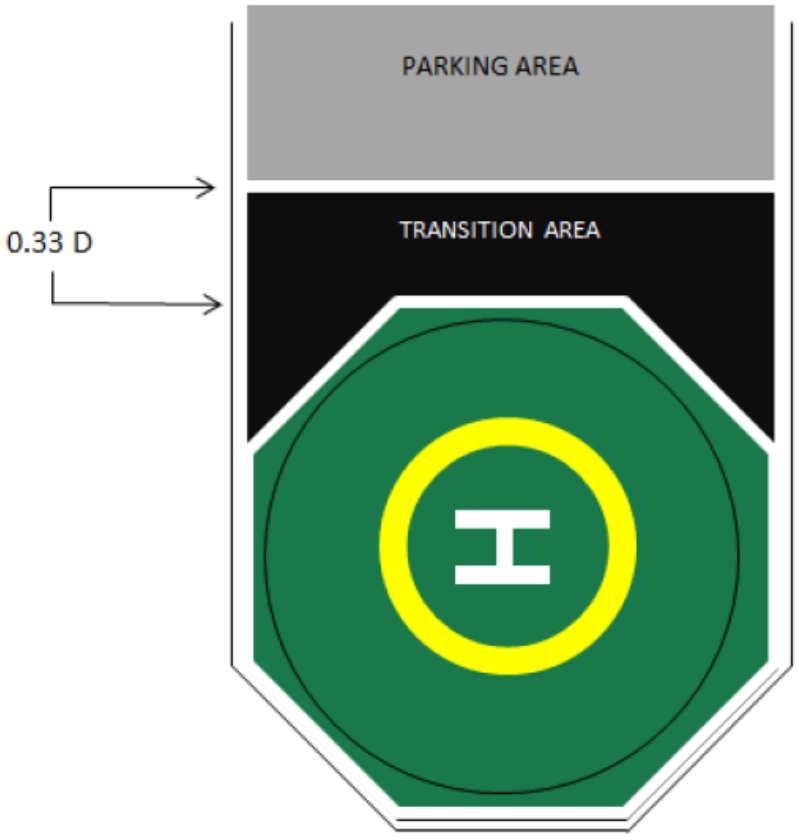
Figure 14-3 A helideck with limited parking area (LPA) / push-in area (PIA)



2 PARKING TRANSITION AREA (PTA)

2.1 A minimum clearance between the edge of the parking area and the edge of the landing area of 1/3 (0.33D) based on the design helicopter shall be provided and shall be kept free of obstacles when a helicopter is located in the parking area. (Refer to Figure 14-4)

Figure 14-4 Parking transition area (PTA)



GM1 to 2.1

In all cases the parking transition area (PTA) provides a sterile area between the edge of the landing area (the TLOF) and the edge of the parking area or LPA/PIA, and is used to transition the helicopter to and from the parking or LPA/push-in area, whether performing an air taxi-ing or ground taxi-ing manoeuvre to the parking or push-in area or, in the case of a disabled helicopter, towing or pushing the helicopter clear of the landing area (for an LPA/PIA the helicopter will always be pushed-in). No part of either helicopter, whether parked in the parking or LPA/push-in area, or operating into the landing area, should intrude into the PTA.

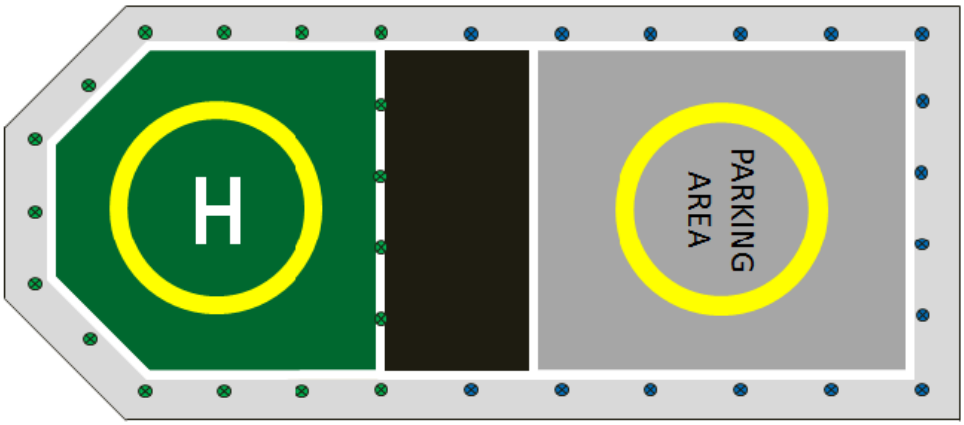
GM2 to 2.1

The PTA should be painted in black for the area between the TLOF perimeter marking and the inboard perimeter of the parking (or push-in) area (both defined with 30cm white lines).

Guidance Material to Chapter 14: Landing and parking area lighting scheme

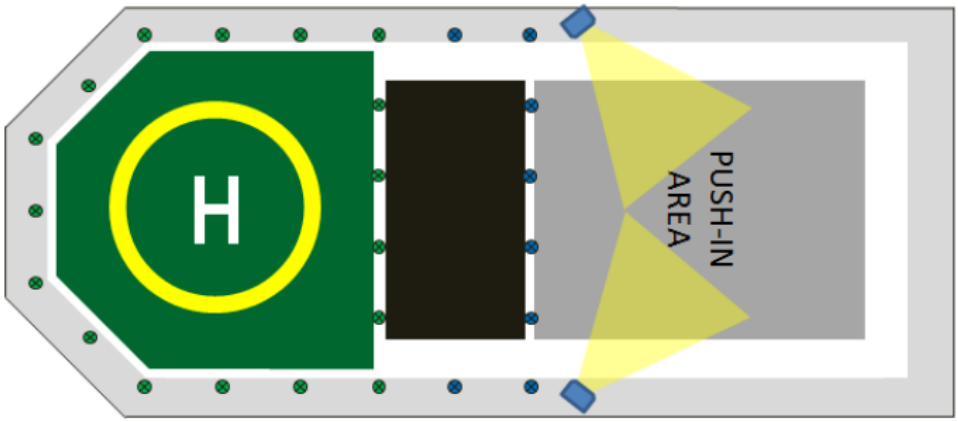
To provide illumination to a parking area at night, and to ensure a pilot is able to differentiate between the parking area and the landing area, it is recommended that deck-mounted floodlights, with louvres, be arranged along either side of the parking area (for guidance on the number and use of floodlighting see Chapter 13). Alternatively, where point source (coloured) lights are preferred, or are utilised in addition to floodlights, then the colour green should be avoided for the parking area and the associated PTA — instead blue lights are preferred. The perimeter lights on the parking area do not need to be viewed at range, as do the TLOF perimeter lights and therefore parking area perimeter lights should be a blue low intensity light — no greater than 5 candelas at any angle of elevation.

Figure 14-5 Landing and parking area lighting scheme



Note — For Parking Areas and Limited Parking Areas where Hover Taxi and/or Ground Taxi is authorized, blue lights shall extend along the Transition Area and the (L)PA.

Figure 14-6 Floodlighting scheme for a push-in area (PIA) connected via a PTA to a 0.83D TLOF

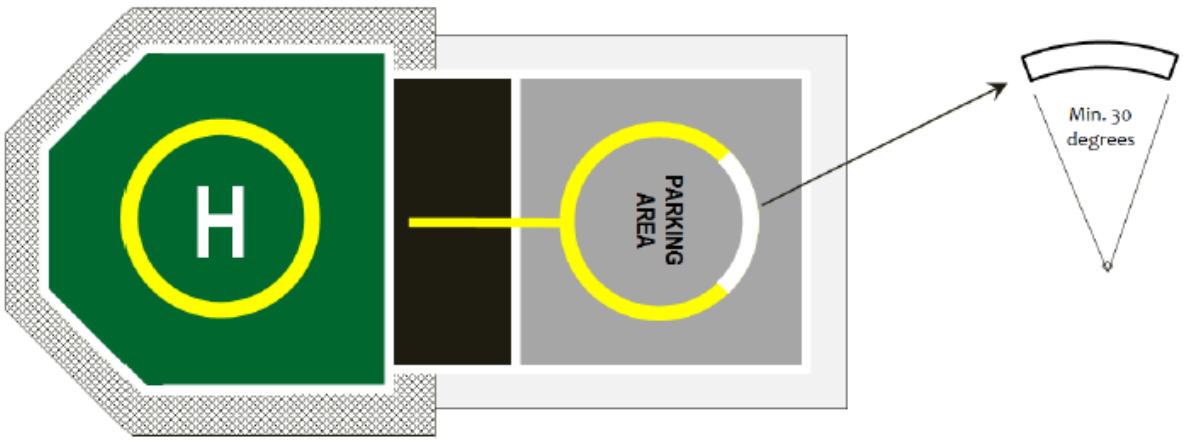


Note — The Push-in Area shall be provided with flood lighting. If hover taxi and/or ground taxi is still allowed in the Transition Area, the TA perimeter lights should be in a blue colour. If no taxi-ing is allowed in the TA, then flood lights would also be recommended

Guidance Material to Chapter 14: Taxi from the landing area to the parking area

A helicopter may be taxied from the landing area to the parking area, by reference to the 15cm yellow taxiway alignment line (see Figures 14-7 and 14-8) and then shut down on a heading which keeps the tail clear of any obstructions that may be present in the vicinity of the parking area. Where an obstacle is in close proximity to, or infringes the parking protection area, a no nose marking may be necessary to prevent the helicopter tail rotor from coming into line with an object as illustrated by Figure 14-8.

Figure 14-7 Touchdown Parking Circle and Parking Circle Orientation Marking (PCOM)

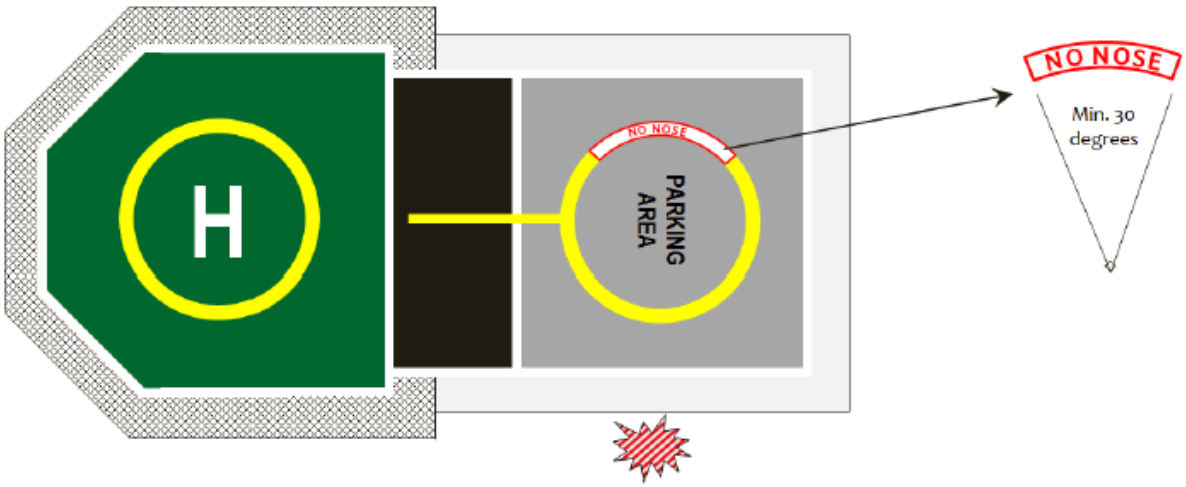


Manoeuvring (360 degrees) in the PA as a hover or ground taxi operation is acceptable. The nose of the helicopter should be located over the yellow portion of the parking circle orientation marking (PCOM) when shutdown i.e. the nose of the helicopter should not be located over the white portion of the PCOM circle during or while shutdown (refer to Figure 14-7.

A “PCOM” marking can be used to avoid the tail rotor being positioned in the vicinity of an exit or emergency exit. The coverage of the white portion of the PCOM will depend on the

size of the obstacle to be avoided but, when used, it is recommended the minimum (angular) size should be no less than 30 degrees (refer to Figure 14-8).

Figure 14-8 Illustration of a "No Nose" marking



A 'NO NOSE' marking should be used to avoid the tail rotor being positioned in the vicinity of an obstacle that is very near to, or infringes the 0.33 D parking protection area.

A 'NO NOSE' marking provides visual cues for aircrew indicating that the 'helicopters nose' should not be manoeuvred or parked in a particular direction. (Figure 14-8) shows a helicopter manoeuvring and parking orientation restriction, to avoid infringement of a tail rotor hazard.

A "No Nose Marking" should be on a white background with a red border and the words 'NO NOSE' located on the Touchdown Parking Circle (TDPC) as shown in (Figure 14-8). The "NO NOSE" marking size will depend on the size of the area or obstacle to be avoided by the tail rotor/tail boom. It is recommended the minimum (angular) size should be not less than 30 degrees. One or multiple obstacles may be covered by this sector.

Note — Consistent with the arrangements for the landing area provisions should be put in place for parking or limited parking/ push-in areas/parking transition areas to ensure adequate surface drainage arrangements and a skid-resistant surface for helicopters and persons operating on the parking or limited parking /push-in areas/parking transition areas. When tying down helicopters in the parking area it is prudent to ensure sufficient tie-down points are located about the touchdown/positioning marking circle. A method to secure a helicopter in the push-in area should also be considered. Where necessary a safety device, whether netting or shelving, should be located around the perimeter of the parking area or limited parking/push-in area (and the parking transition area). Parking areas may be provided with one or more access points to allow personnel to move to and from the parking area without having to pass through the PTA to the landing area.

CHAPTER 15 – NOT PERMANENTLY ATTENDED INSTALLATIONS (NPAI)

1. Bird control

1.1 Bird guano infestations may be routinely encountered, particularly at not permanently attended installations, and especially at certain times of the year for facilities located in proximity to bird migratory routes. The effects of bird guano infestation are many and include threats to safe flight operations (e.g. potential for a bird strike during an approach), the obliteration of essential markings (so making touchdown/positioning inaccuracies more likely), a reduction in the friction qualities of the surface (leading to a helicopter sliding over the deck surface) and effects on personnel health and safety due to the highly toxic and slippery-when-wet nature of guano (e.g. effect on the lungs due to inhalation of dried guano 'dust', slips and trips on wet-guano surfaces). Also to consider are the additional costs incurred through a requirement for more regular maintenance of static equipment on a facility, of damage caused to the interior of the helicopter (guano is trodden into floor surfaces) and the need to perform high-pressure cleaning on a regular basis to restore the integrity of markings, etc.

1.2 Problems caused by the presence of sea birds and guano infestation on or around the landing area should be noted and reported by flight crews. Significant surface contamination is likely to incur flight restrictions where, for example, the build-up of guano has a detrimental effect on the interpretation of surface markings and an inability to maintain an adequate friction surface. Routinely, for affected facilities, flight crew should be encouraged to complete and file helideck condition reports that indicate the current condition of the surface, of helideck lighting (including any outages) and of the wind direction indicator (including illumination).

1.3 Experience over time in various sectors would suggest that finding permanent solutions to the guano/bird problem can be challenging, such are the forces of nature. Consequently determining an optimum solution to the problem has proven elusive. In the past active measures taken to discourage sea birds from roosting on helidecks has included visual deterrents, different audio deterrents (e.g. distress calls) and even combined audio/visual deterrents that build-in random changes such as to the distress call. However, over a passage of time, birds have tended to habituate to any 'solutions' that involve audio and/or visual deterrents, even where these incorporate random changes.

1.4 One 'solution' that has been found to be more effective than most of the aforementioned is the application of pressurised water-spray systems, to which birds do not appear to readily habituate (pressurized water could be delivered from an automated fire-fighting deck integrated fire-fighting system (DIFFS) or a ringmain system (RMS) where bird activities are being monitored, at the beach or on a normally attended platform, via a remotely operated TV system (ROTS). When water combined with an effective bird scaring device is activated automatically as birds are detected around the landing area, these combinations have proven to be relatively effective in dispersing birds that may have encroached onto the helideck. However, in general, it is fair to conclude that current bird-exclusion methods have, at best, been only partially successful; so there would seem to be room for more innovative approaches to bird control measures at helidecks.

2. Rescue and Fire-Fighting Facilities

2.1 In the case of new–build NPAI's, serious consideration shall be given to the selection and provision of foam fire extinguishing systems integrated into helideck.

2.2 For installations which are at times unattended the effective delivery of foam to the whole of the landing area is probably best achieved by means of a DIFF System.

2.3 For NPAIs the GCAA may also consider other 'combination solutions' where these can be demonstrated to be effective in dealing with a running fuel fire. This may permit, for example, the selection of a seawater-only DIFFS used in tandem with a passive fire-retarding system demonstrated to be capable of removing significant quantities of unburned fuel from the surface of the helideck in the event of a fuel spill from a ruptured aircraft tank.

2.4 DIFFS on NPAI's shall be integrated with platform safety systems so that pop-up nozzles are activated automatically in the event of an impact of a helicopter on the helideck where a Post-Crash Fire is a probable outcome.

2.5 The overall design of a DIFFS shall incorporate a method of fire detection and be configured to avoid false activation/alarms. It should be capable of manual over-ride by the HLO and from the main installation or control room.

2.6 Similar to a DIFFS provided for a Permanently Attended Installation or vessel, a DIFFS provided on an NPAI needs to consider the eventuality that one or more nozzles may be rendered ineffective by, for example, a crash. The basic performance assumptions stated in the rule should also apply for a DIFFS located on a NPAI.

3. Rescue and Fire-Fighting Facilities (Without DIFFS)

3.1 Where no automatic fire detection/protection system is provided then the operator shall conduct a Risk Assessment and detail the equipment and method of fire-fighting for the arrival of the first helicopter and the departing of the last helicopter.

3.2 Where DIFFS are not part of the installation then the following equipment shall be supplied:

a) 90 kg of dry powder – is suitable extinguishers.
b) 36kg of CO2 with extendable applicator for high engine access
c) Rescue equipment (refer to Chapter 17 – section 6 table 17.1)
d) 2 x full sets of fire-fighting PPE (refer to Chapter 17 – section 7)
e) 2 breathing apparatus sets with spare cylinders

3.3 Helideck operators should consider the use of a cameras in order that an assessment of the conditions of the helideck can be monitored before a flight takes place.

3.4 A procedure should be implemented and consist of:

a) On board the first arriving helicopter is a Helicopter Landing Officer (HLO).
b) The HLO is to comprehensively brief his team before take-off of the actions required upon landing at the NPAI and of the emergency actions in the event of a helicopter crash/fire situation on landing.
c) The HLO is to analyse the weather, checked the state of the deck, and coordinate the deck arrival in terms of safety.
d) On landing the HLO is to secure the chocks, check the deck, call the on-shore base to confirm safe arrival if applicable and manage the disembarkation – fire-fighter first.
e) There should be at least one additional fully trained fire person on board.

f) On landing, the crew should undertake a visual inspection, test the safety equipment and check the deck surface for any obstructions and maintenance issues. These inspections and tests shall be recorded.

g) For embarkation the luggage/equipment; always goes on first. The HLO is to allow one passenger to board the helicopter at a time, holding back the next person in line.

h) Once the passenger is seated and strapped the passenger should provide the “thumbs-up” sign and the HLO then allows the next passenger to board.

i) Once all the passengers and luggage/equipment is on board the HLO should indicate to the pilot all is loaded and ready.

j) The HLO should conduct a final visual inspection of the flight direction and surrounding area give the “thumbs up” to the pilot and board the helicopter.

CHAPTER 16 – HELIDECKS AND VESSELS – PERSONNEL REQUIREMENTS

1 GENERAL

1.1 The organisation's Safety Management System (SMS) is one of the keys to assuring safe and efficient off-shore helideck operations. Supervision of helicopter operations should be fully integrated into the SMS.

1.2 The responsibilities and authority assigned to individuals for controlling all activities related to helideck operations (in all weather conditions) should be set down in a clearly defined structure and hierarchy. They should be widely promulgated, on-shore and off-shore, to ensure full and proper understanding by all. The interfaces with other disciplines and those activities that may impact safe and efficient helideck operations should be identified and built into operating procedures.

1.3 Irrespective of the volume of helicopter traffic, the level of preparedness and effectiveness of both personnel and equipment involved in helicopter operations requires to be of a single satisfactory standard.

1.4 On facilities with infrequent helicopter operations, this may involve a significant commitment to ensure there are enough adequately trained personnel available for helideck duties. Such operations will require routine monitoring and testing to ensure proper standards are maintained.

2 DANGEROUS GOODS

2.1 Personnel involved with dangerous goods shall hold a certificate of training, appropriate to the role and responsibility of the individual. This shall be provided from a GCAA approved training provider. Further information can be obtained from the GCAA, Aviation Security Affairs Sector for details regarding authorisation of the carriage of dangerous goods, with reference to GCAA CAR Part VI, Chapter 2: Transport of Dangerous Goods by Air.

3 HELIDECK PREPARATION

3.1 Prior to helicopter landings taking place on an installation or vessel, all support facilities shall be properly prepared for use. Preparation should be carried out in a systematic manner; following set procedures/checklists this is to ensure all equipment is serviceable, in the correct position and ready for immediate use. Completion of helideck and support equipment preparation should be formally documented by the Helicopter Landing Officer (HLO) and all records retained for auditing purposes.

4 INSTALLATION MANAGER / VESSEL MASTER

4.1 With respect to helicopter operations, the Installation Manager or Master of a vessel is responsible for:

i. appointing a competent person to be responsible for the control of helicopter operations in relation to the installations, to be known as the Helicopter Landing Officer (HLO)
ii. ensuring that all persons engaged on helicopter operations, or who are in or near any helicopter landing area, are under the immediate and effective control of the HLO
iii. ensuring that all helideck personnel are appropriately trained for normal and emergency helicopter operations
iv. ensuring that the helideck and associated operational and emergency equipment is provided and maintained in good working condition
v. ensuring that all helideck personnel are provided with appropriate personal protective equipment (PPE)

vi. ensuring that the appointed Helicopter Landing Officer carries out his duties as described by the Safety Management System.

GM to 4.1v: All personal including contractors should wear hi-visibility clothing, safety shoes, hearing protection muffs and eye protecting glasses.

5 HELIDECK PERSONNEL COMPOSITION

5.1 Helideck operators shall appoint a competent person to establish and effectively manage all aspects of fire-fighting and rescue, staffing, equipment and response.

5.2 Sufficient competent personnel shall be readily available to respond and operate the helideck equipment and emergency facilitates at maximum capacity. These personnel shall be deployed in a way that ensures that response objectives shall be achieved and that continuous agent application at the appropriate rate(s) shall be fully maintained.

5.3 An organisation shall appoint a trained and certified Helideck Landing Officer (HLO) and 'sufficient' emergency personnel when undertaking helicopter operations on an off-shore Installation or vessels.

GM to 5.3

The precise composition of helideck crews required for off-shore helideck operations is a matter for the installation/vessel owner/operator to decide. The primary objective is to ensure the safety of the helicopter passengers and crew.

5.4 To establish the optimum number of helideck personnel for a particular off-shore operation, the installation owner/operator should carry out a thorough assessment (Task and Resource Analysis).

5.5 When conducting this assessment the following should be taken into account:

vii. The types and size of helicopters using the helideck;
viii. Type, design, capacity and discharge rate of a fire-fighting equipment;
ix. Need for the rescue of helicopter occupants;
x. Need to operate ladders, breathing apparatus, fire extinguishers, hand-lines, and rescue equipment;
xi. Availability of additional emergency support personnel; and
i. Training and Competency levels of helideck personnel.

5.6 The helideck owner / operator shall formulate a selection and recruitment process that identifies the ideal candidate to undertaken such duties.

5.7 As a minimum the GCAA would expect a helideck team comprising of a HLO to supervise the helideck operations plus a minimum of three Helideck Assistances (HDA) (in effect a fire-fighting monitor/hand-line operator plus one person to affect any rescue/evacuation operation).

5.8 Members of the flight crew shall not be considered as part of the helideck crew.

5.9 In addition the helideck operator should conduct an assessment for the need of a Radio Operator, with an acceptable level of English to confirm the helideck is available and ready accept the helicopter and to monitor and respond to any emergency calls.

Table 16-1 Example of Minimum Staffing Levels

Role	Installation (complexes)	Rigs and Barges
HLO	1	1
HDA (Fire-fighting team)	3	3
Radio Operator (RO)	1	1
Refueller (if required)	1	1

5.10 If they are to effectively utilise the equipment provided, all personnel assigned to fire-fighting duties on the helideck shall be comprehensively trained to carry out their duties to ensure competence in role and task. The GCAA will only accept personnel who have attended a SLP accepted by the GCAA for helideck operations.

5.11 In addition, regular training in the use of all fire and support equipment, helicopter familiarisation and rescue tactics and techniques shall be carried out. All such training shall be formally recorded and retained for at least 5-years.

6 RESPONSIBILITIES OF THE HELICOPTER LANDING OFFICER (HLO)

6.1 The Helicopter Landing Officer (HLO) is responsible for the day-to-day management of the helideck, associated helideck operations and supervision of the Helideck Assistants and support staff.

6.2 The HLO shall exercise immediate and effective control of all persons who are engaged in helicopter operations, or who are on or near the helicopter landing area.

6.3 The HLO shall immediately report any form of deviation on the helicopter deck to his immediate superior/installation manager, so that the helicopter operator may be informed of the situation.

6.4 The HLO shall be positioned to be able to observe as best as possible, and closely monitor, landing and take-off. The HLO shall immediately inform the pilot via radio or visually if any abnormal situation occurs.

6.5 The HLO's responsibilities should include, but are not necessarily limited to:

i. Overall charge (e.g. supervision) of the helideck and helideck crew.

ii. Ensuring pre-operational and post-operational helideck checks are carried out.

iii. Ensuring that on receipt of radio information regarding helicopter arrivals, helideck facilities are ready to receive the aircraft.

iv. Ensuring the safe movement of passengers, baggage, freight and correct loading of the aircraft.

v. Ensuring correct manifest procedures are used.

vi. Initiating fire-fighting and rescue procedures on the helideck, and ensuring that members of the helideck crew carry out their duties as described in the SMS.

Note - The HLO may also be responsible for leading the initial response to a helicopter emergency on an off-shore fixed, mobile, floating installation or vessel and leading the HDA helideck emergency response team during any emergency.

vii. Liaison with the installation/vessel fire teams and ensuring that backup fire-fighting and rescue procedures are implemented to assist after the initial stage of an emergency.

viii. Briefing the helideck crew on helideck handling and other relevant tasks.

ix. Ensuring the installation/vessel management, are kept aware of aircraft movements and that cranes in particular have ceased movement whilst aircraft operations are in progress.

x. Ensuring that the 210^0 OFS is clear of obstructions before giving a helicopter clearance to land.

xi. Ensuring that the floodlighting controls (and Status Lights if installed) are accessible to and controlled by the HLO (or Radio Operator).

xii. Ensuring that the refueling procedures are implemented.

xiii. Carrying out on-the-job training for trainee Helideck Assistants in accordance with their SMS.

6.6 The HLO shall also ensure that:

i. Necessary steps are taken to deny unauthorised persons access to the helicopter deck prior to take-off and landing.

ii. The deck is cleared of loose objects, inflammable substances etc.

iii. Necessary personnel are present and at a state of readiness.

iv. All equipment and instruments are in place and in full working order.

v. Passengers are held in the safe zone during landing/take off and that they are given guidance during disembarkation and embarkation.

6.6.1 **HLO Identification on PPE Clothing**

6.6.1.1 The HLO should wear identification on his outer PPE clothing to clearly show he is the responsible person during helideck operations. Either purpose made reflective markings wearing of a tabard will achieve this.

6.6.1.2 The tabard should be marked on the front and back with the letters HLO in a reflective material, and should be clearly visible from a distance. Because of the potential for static electricity hazards during helideck operations, clothing made from nylon should not be worn by helideck crew members.

7 RESPONSIBILITIES OF THE HELIDECK ASSISTANT (HDA)

7.1 As the HLO is required to be present on the helideck during helicopter arrivals and departures, the helideck operator shall appoint a 'Helideck Assistant ' (HDA) to assist the HLO with administration of passengers and freight.

7.2 The responsibilities of the HDA should include but not be limited to:

i. Assisting the HLO in the operation of the helideck.

ii. Directing passengers to and from the aircraft.

iii. Loading and unloading freight and baggage from the aircraft.

iv. Operation of fire-fighting and rescue equipment under the direction of the HLO and assisting the HLO in checking fire-fighting and rescue equipment.

v. Undertaking other duties around the helideck area as required by the HLO.

vi. Passenger and freight control before departure and on arrival.

vii. Production of complete and accurate passenger and cargo manifests.

viii. Preparation of Dangerous Goods manifests.

ix. Liaison with the HLO, Radio Operator on helicopter movements and requirements.

8 RESPONSIBILITIES OF THE RADIO OPERATOR (RO)

8.1 Organisations providing a flight information/alerting service to pilots operating within oil field complexes shall obtain an Aerodrome Flight Information Service Certificate from the GCAA, as required in Civil Aviation regulations CAR Part VIII Subpart 9.

Note: Radio Operators on individual platforms, although organisations have a duty to ensure their training, experience and competence, are not subject to these regulations provided they supply advice to pilots concerning only the status of that platform.

8.2 Continuous two-way radio communications shall be available between the helicopter pilot and the helideck operator or an appropriate agent. While not always possible, it is highly desirable to have a three-way communications link between the helicopter pilot, the off-shore facility, and a land-based facility.

8.3 Radio Operators shall be aware of helicopter operations within the vicinity of the helideck and should be prepared to pass on relevant information to the pilots.

8.4 Although these will vary amongst operations, the following should be a guide to Radio Operator procedures:

i. The provision of information and advice for the purpose of assisting the safe and efficient operation of aircraft. This should include:
   a) information when available on other known traffic,
   b) weather information,
   c) information regarding radio and navigational aids,
   d) landing area conditions and associated facilities,
   e) alerting service, and
   f) any other information likely to affect safety.

ii. Coordination is required with other agencies as required, including:
   a) other ATS and AFIS units,
   b) meteorological services providers,
   c) operators of aircraft and landing platforms,
   d) rescue and fire-fighting emergency services,
   e) search and rescue authorities, and
   f) UAE armed forces.

iii. Local processes may include passing Weather Status Reports to the helicopter operator, estimated times of arrival, and revisions, to the HLO, confirmation that the deck is ready for arriving helicopters, sending arrival messages, and obtaining flight plan and load details, etcetera.

iv. All procedures require to be documented.

8.5 Each RO should have an Emergency Procedures Checklist which clearly displays Alerting Service actions involving overdue or missing aircraft.

GM to 8 Responsibilities of the Radio Operator

a) Further information regarding the regulations and certification for the provision of flight information services can be found in CAR Part VIII (Air Navigation Regulations), Subpart 9 (Aerodrome Flight Information Services).

b) On most facilities, fixed and floating, the radio operator (RO) is the initial and final point of contact between flight crew and the facility. However, as final approach to the landing area is established, personnel (e.g. HLOs and HDAs) with portable aeronautical headsets, may be

available for guidance to the pilot as to the status of the landing area. When such personnel are utilised, the use of this equipment requires that they should be suitably trained.

c) A major advantage of having a radio-equipped person on the helideck is that they can maintain visual as well as radio communication during the circuit, final approach and landing, so assisting the helicopter crew with further positive identification of the facility and thereby reducing the incidence for a landing on an incorrect deck. A radio-equipped person is also in a good position to warn of any developing issues while the helicopter is 'on deck'.

d) In order to avoid misunderstandings, hand-over and general R/T procedures employed should consist of standard R/T phrases and vocabulary only. Transmissions should be restricted to aviation-related matters only, and radio discipline strictly maintained. Communications should be kept brief, avoiding any unnecessary 'chatter' on the selected aeronautical frequency and should be confined to essential dialogue.

e) Off-shore fixed and floating facilities which have aeronautical radio equipment and/or aeronautical Non-Directional Beacons (NDBs) on them, should ensure the systems are maintained by competent people. All Aeronautical Frequencies employed shall be allocated and authorised by the Telecommunications Regulatory Authority.

CHAPTER 17 – RESCUE AND FIRE-FIGHTING FACILITIES

1 GENERAL

1.1 The principal objective of a rescue and fire-fighting response is to save lives. For this reason the provision of a means of dealing with a helicopter accident or incident occurring at or in the immediate vicinity of the landing area assumes primary importance because it is within this area that there are the greatest opportunities for saving lives. This should assume at all times the possibility of, and need for, bring under control and then extinguishing a fire which may occur either immediately following a helicopter accident or incident (e.g. crash and burn) or at any time during rescue operations.

1.2 The most important factors having a bearing on effective rescue in a survivable helicopter accident are the speed of initiating a response and the effectiveness of that response. Requirements to protect accommodation beneath or in the vicinity of the landing area, a fuel installation (where provided) or the support structure of the off-shore helidecks are not taken into account in this chapter, nor is any additional considerations that may arise from the presence of a second helicopter located in a parking area.

1.3 Due to the nature of off-shore operations, usually taking place over large areas of open sea, an assessment will need to be carried out to determine if specialist rescue services and fire-fighting equipment is needed to mitigate the additional risks and specific hazards of operating over open sea areas. These considerations will form a part of the helideck emergency plan.

1.4 The operational objective of fire-fighting team / crew shall be to achieve a response to any helicopter incident on the helideck within 1-minute.

AMC to 1.4 Personnel designated to respond to a helicopter incident on the helideck should be dressed in full fire-fighting PPE and be readily available to respond during the take-off and landing of the helicopter.

2 PRINCIPLE FIRE-FIGHTING AGENT (FOAM)

2.1 A key aspect in the successful design for providing an efficient, integrated helideck rescue and fire-fighting facility is a complete understanding of the circumstances in which it may be expected to operate. A helicopter accident, which results in a fuel spillage with wreckage and/or fire and smoke, has the capability to render some of the fixed fire-fighting equipment unusable or prevent the use of some passenger escape routes.

2.2 Delivery of fire-fighting media to the landing area at the appropriate application rate shall be achieved in the quickest possible time.

2.3 A delay of less than 15 seconds, measured from the time the system is activated to actual production at the required application rate, should be the objective. The operational objective shall ensure that the system is able to bring under control a helideck fire associated with a crashed helicopter within 30 seconds measured from the time the system is producing foam at the required application rate in all weather conditions.

Note: A fire is deemed to be 'under control' at the point when it becomes possible for the occupants of the helicopter to be effectively rescued by trained fire-fighters.

2.4 Foam-making equipment shall be of acceptable performance and be suitably located to ensure an effective application of foam to any part of the landing area irrespective of the wind strength/direction or accident location when all components of the system are operating in accordance with the manufacturer's technical specifications.

2.5 However, for a Fixed Monitor System (FMS), consideration should also be given to the loss of a downwind foam monitor either due to limiting weather conditions or a crash situation occurring. The design specification for an FMS shall ensure remaining monitors are capable of delivering finished foam to the landing area equal to or above the minimum application rate. For areas of the helideck which, for any reason, may be otherwise inaccessible to an FMS, it is necessary to provide additional hand-controlled foam lines and branches.

2.6 Consideration should be given to the effects of the weather on static equipment. All equipment forming part of the facility shall be designed to withstand protracted exposure from the weather conditions expected. Where protection is the chosen option, it should not prevent the equipment being brought into use quickly and effectively.

2.7 The minimum capacity of the foam production system will depend on the D-value of the helideck, the foam application rate, discharge rates of installed equipment and the expected duration of application. It is important to ensure that the capacity of the main helideck fire pump is sufficient to guarantee that finished foam can be applied at the appropriate induction ratio and application rate and for the minimum duration to the whole of the landing area when all helideck monitors are being discharged simultaneously.

2.8 The GCAA recommends that foam concentrates compatible with seawater and meeting at least performance level 'B' are used. Level B foams should be applied at a minimum application rate of 6.0 litres per square metre per minute. Certificate of conformity shall be provided for each batch of foam.

2.8.1 **Calculation of Application Rate:**

Example for a D-value 22.2 metre helideck.

Application rate = 6.0 x ∏r2

(6.0 x 3.142 x 11.1 x 11.1) = 2322 litres per minute.

2.9 Given the remote location of helidecks the overall capacity of the foam system shall exceed that necessary for initial extinction of any fire. A "five (5) minute" discharge capability is strongly advised.

2.9.1 **Calculation of Minimum Operational Stocks:**

Using the 22.2 metre example as shown:-

i. A 1% foam solution discharged over five minutes at the minimum application rate will require 2322 x 1% x 5 = 116 litres of foam concentrate.

ii. A 3% foam solution discharged over five minutes at the minimum application rate will require 2322 x 3% x 5 = 348 litres of foam concentrate.

iii. A 6% foam solution discharged over five minutes at the minimum application rate will require 2322 x 6% x 5 = 696 litres of foam concentrate.

2.9.2 200% reserve foam stocks to allow for replenishment as a result of operation of the system during an incident or following training or testing, shall be provided.

2.10 Wherever non-aspirated foam equipment is selected during design, additional equipment capable of producing aspirated foam for post-fire security/control shall be provided.

2.11 Not all fires are capable of being accessed by monitors and on some occasions the use of monitors may endanger passengers. Therefore, in addition to a fixed foam system monitor, there should be the ability to deploy at least two deliveries with hand-controlled foam branches for the application of aspirated foam at a minimum rate of 225-250 litres/min through each hose line.

2.12 A single hose line, capable of delivering aspirated foam at a minimum application rate of 225-250 litres/min, may be acceptable where it is demonstrated that the hose line is of sufficient length, and the hydrant system of sufficient operating pressure, to ensure the effective application of foam to any part of the landing area irrespective of wind strength or direction. The hose line(s) provided shall be capable of being fitted with a branch pipe capable of applying water in the form of a jet or spray pattern for cooling, or for specific fire-fighting tactics.

2.13 As an effective alternative to a Foam Monitor System (FMS), off-shore operators are strongly encouraged to consider the provision of a DIFFS. These systems typically consist of a series of 'pop-up' nozzles, with both a horizontal and vertical component, designed to provide an effective spray distribution of foam to the whole of the landing area and protection for the helicopter for the range of weather conditions. A DIFFS should be capable of supplying performance level B or level C foam solution to bring under control a fire associated with a crashed helicopter within the time stated above.

2.14 Achieving an average (theoretical) application rate over the entire landing area (based on the D-circle) of 6.0 litres per square metre per minute for level B foams or 3.75 litres per square metre per minute for level C foams, for a duration which at least meets the minimum requirements stated above.

2.15 The precise number and layout of pop-up nozzles will be dependent on the specific helideck design, particularly the dimensions of the critical area. However, nozzles should not be located adjacent to helideck egress points as this may hamper quick access to the helideck by trained rescue crews and/or impede occupants of the helicopter escaping to a safe place beyond the helideck.

2.16 Notwithstanding this, the number and layout of nozzles should be sufficient to provide an effective spray distribution of foam over the entire landing area with a suitable overlap of the horizontal element of the spray pattern from each nozzle assuming calm wind conditions. It is recognised in meeting the objective for the average (theoretical) application rate specified above for performance level B or C foams that there may be some areas of the helideck, particularly where the spray patterns of nozzles significantly overlap, where the average (theoretical) application rate is exceeded in practice.

2.17 Conversely for other areas of the helideck the application rate in practice may fall below the average (theoretical) application rate specified. This is acceptable provided that the actual application rate achieved for any portion of the landing area does not fall below two-thirds of the rates specified for the critical area calculation.

Note: Where a DIFFS is used in tandem with a passive fire-retarding system demonstrated to be capable of removing significant quantities of unburned fuel from the surface of the helideck in the event of a fuel spill from a ruptured aircraft tank, it is permitted to select a seawater-only DIFFS to deal with any residual fuel burn. A seawater-only DIFFS should meet

the same application rate and duration as specified for a performance level B foam DIFFS.

2.18 In a similar way to where a Foam Monitor System (FMS) is provided, the performance specification for a DIFFS needs to consider the likelihood that one or more of the pop-up nozzles may be rendered ineffective by the impact of a helicopter on the helideck. Any local damage to the helideck, nozzles and distribution system caused by a helicopter crash should not unduly hinder the system's ability to deal effectively with a fire situation. To this end a DIFFS supplier shall be able to verify that the system remains fit for purpose, in being able to bring a helideck fire associated with a crashed helicopter "under control" within 30 seconds measured from the time the system is producing foam at the required application rate for the range of weather conditions.

2.19 If life-saving opportunities are to be maximised it is essential that all equipment shall be ready for immediate use on, or in the immediate vicinity of, the helideck whenever helicopter operations are being conducted.

2.20 All equipment shall be located at points having immediate access to the landing area. The location of the storage facilities shall be clearly indicated.

2.21 Where a Deck Integrated Fire Fighting System (DIFFS) capable of delivering foam and/or seawater in a spray pattern to the whole of the landing area. The provision of additional hand-controlled foam branches may not be necessary to address any residual fire situation. Instead any residual fire may be tackled with the use of hand-held extinguishers.

2.22 At facilities where DIFFS are fitted, the provision of hand-held fire-fighting equipment shall be assessed for the rapid intervention for helicopter engine fires, rotor head fires and cabin fires.

3 USE AND MAINTENANCE OF FOAM EQUIPMENT

3.1 Mixing of different concentrates in the same tank, i.e. different either in make or strength, is unacceptable. Many different strengths of concentrate are available. Any decision regarding selection should take account of the design characteristics of the foam system. It is important to ensure that foam containers and tanks are correctly labelled.

3.2 Induction equipment ensures that water and foam concentrate are mixed in the correct proportions. Settings of adjustable inductors, if installed, should correspond with strength of concentrate in use.

3.3 All parts of the foam production system, including the finished foam, shall be tested by a competent person on commissioning and annually thereafter. The tests should assess the performance of the system against original design expectations while ensuring compliance with any relevant pollution regulations.

3.3.1 **Testing and Inspection**

Foam systems need to be tested in two ways, firstly by ensuring the system is in working order and secondly by analysing samples of foam concentrate and finished foam. The discharge of significant quantities of finished foam to the sea has potential to pollute the environment. Therefore, the methodology for testing foam and equipment performance should be carried out with a view to minimizing the potential for pollution.

3.3.2 **System Installation Testing**

Systems shall be tested and quality assured to ensure that foam (particularly if 1% foam is used) meets its performance parameters of the design. This would normally be done onshore, with the finished foam contained and suitably treated. A performance report should be received from the testing authority.

3.3.3 **Periodic Testing**

Routine periodic testing of performance in the off-shore environment shall be achieved by operating the equipment initially using water only and subsequently confirming by production of a limited amount of finished foam captured for testing. Testing of this finished foam and a sample of the foam concentrate should be conducted by a trained and competent person. Records of all testing and certificates of foam conformity shall be retained for all tests.

3.3.4 **Testing Procedures for Foam Systems**

There are two tests for the systems, a performance test when commissioned and an in-service (annual) test.

3.3.4.1 Foam Production Performance Test

In order to ensure that foam production is of an acceptable standard a Foam Equipment Performance Test shall be conducted to confirm the system meets or exceeds design (Acceptance Test"):

3.3.4.2 When the equipment is installed on a deck.

When significant maintenance, refurbishment or component replacement has been undertaken that could affect a change in the foam quality or production performance of the foam-making System. This includes a change of foam-making branches, nozzles or monitors. Only those parts of the system that could have been affected by the work undertaken or the component change need to be tested.

The Foam Equipment Performance Test shall confirm the following:

i. The induction percentage for all foam-making devices.
ii. The jet range of the monitor/s.
iii. The spray pattern of the main monitor/s.

3.3.5 **In-Service Test NFPA Foam Test Procedures**

3.3.5.1 In-Service (annual) test shall be conducted to ensure the quality of the foam concentrate and the performance of the equipment. Samples of foam concentrate should be representative of the parent stock. Foam drum should be rolled or agitated to produce a consistent mix before drawing a sample from the top of the drum.

3.3.5.2 For bulk foam storage tanks circulate the contents to produce a consistent mix before taking a sample. Alternatively draw samples from the top, middle and base. Use a hollow tube to take a sample from the middle. For the base sample use a side-exiting outlet pipe or alternatively run-off about 25 litres of foam first to remove any accumulated sediment. This run-off may be returned to the top of the tank. Several samples may be mixed equally to produce a single composite sample of 500ml.

3.3.5.3 A small amount of finished foam should also be collected by placing a sample collector in the discharge area. Sufficient finished foam should be collected to provide a 500ml sample of foam. This sample should be used to check the percentage concentration in the finished foam.

3.3.5.4 Samples should be clearly labelled as concentrate or finished foam, origin, foam type, and recommended induction rate.

3.3.5.5 The tests should confirm that the system produces foam, within permitted tolerances, to the original technical specifications.

3.3.5.6 The foam production equipment should be activated using water only to confirm the jet range and spray pattern of the system.

4 COMPLEMENTARY MEDIA

4.1 While foam is considered the principal fire-fighting agent for dealing with fires involving fuel spillages, the wide variety of fire incidents likely to be encountered during helicopter operations – e.g. engine, avionic bays, transmission areas, hydraulics – may require the provision of more than one type of complementary agent.

4.2 Dry powder and gaseous agents are generally considered acceptable for this task. Systems should be capable of delivering the agents through equipment which will ensure effective application.

4.3 The dry powder shall be provided as the primary complementary agent. The minimum total capacity should be 45 kg delivered from one or two extinguishers. The dry powder system should have the capacity to deliver the agent anywhere on the landing area and the discharge rate of the agent should be selected for optimum effectiveness of the agent. Containers of sufficient capacity to allow continuous and sufficient application of the agent should be provided.

4.4 The use of a gaseous agent, preferably carbon dioxide or equivalent in addition to the use of dry powder as the primary complementary agent, is recommended. Therefore, in addition to dry powder specified, there shall be a quantity of gaseous agent provided with a suitable applicator for use on engine fires. The appropriate minimum quantity delivered from one or two extinguishers is 36 kg. Due regard should be paid to the requirement to deliver gaseous agents to the seat of the fire at the recommended discharge rate.

4.5 All applicators are to be fitted with a mechanism which allows them to be hand controlled. Consideration needs to be given to the height of helicopter fire access panels and engine intakes when selecting fire-extinguisher applicators.

4.6 Dry chemical powder should be of the ‘foam compatible’ type.

4.7 The complementary agent extinguishers should be sited so that they are readily available at all times.

4.8 200% reserve stocks of complementary media to allow for replenishment as a result of activation of the system during an incident, or following training or testing, shall be held.

4.9 Complementary agents shall be subject to annual visual inspection by a competent person and pressure testing in accordance with manufacturers’ recommendations.

4.10 All fire extinguishers shall be tested and inspected in accordance with GCAA CAAP 35 Testing and Inspection of Fire Service Equipment.

5 THE MANAGEMENT OF EXTINGUISHING MEDIA STOCKS

5.1 Consignments of extinguishing media should be used in delivery order to prevent deterioration in quality by prolonged storage.

5.2 For delivery of foam or complementary media a certificate of conformity shall be provided and retained for auditing purposes.

5.3 The mixing of different types of foam concentrate may cause serious sludging and possible malfunctioning of foam production systems. Unless evidence to the contrary is available it should be assumed that different types are incompatible. In these circumstances it is essential that the tank(s), pipework and pump (if fitted) are thoroughly cleaned and flushed prior to the new concentrate being introduced.

5.4 Consideration should be given to the provision of reserve stocks for use in training, testing and recovery from emergency use.

6 RESCUE EQUIPMENT

6.1 In some circumstances, lives may be lost if simple ancillary rescue equipment is not readily available.

6.2 As a minimum, the provision of the equipment listed in Table 17-1 shall be provided at each facility.

6.3 Sizes of equipment are not detailed in the Table 17-1, but should be appropriate for the types of helicopter expected to use the facility.

6.4 Rescue equipment should be stored in clearly marked and secure watertight cabinets or chests. An inventory checklist of equipment shall be held inside each equipment cabinet/chest.

Table 17-1 Minimum List of Rescue Equipment

Equipment	Helideck
Adjustable wrench	1
Rescue axe, large (non-wedge or aircraft type)	1
Cutters, bolt	1
Crowbar, large	1
Hook, grab or salving	1
Hacksaw (heavy duty) and six spare blades	1
Blanket, fire resistant	1
Ladder (two-piece)*	1
Life line (5 cm circumference x 15 m in length) plus rescue	1
Pliers, side cutting (tin snips)	1
Set of assorted screwdrivers	1
Harness knife and sheath**	**
Gloves, fire resistant**	**
Power cutting tool	–

*For access to casualties in an aircraft on its side.

** This equipment is required for each helideck crew member.

6.5 A responsible person shall be appointed to ensure that the rescue equipment is checked and maintained regularly.

6.6 Rescue equipment shall be inspected and tested in accordance with GCAA requirements and records maintained throughout the life of the equipment.

6.7 Rescue personal shall be given every opportunity to familiarize/train themselves with this equipment. Records of this type of training shall be retained for each individual.

7 PERSONAL PROTECTIVE EQUIPMENT (PPE)

7.1 All responding rescue and fire-fighting personnel shall be provided with appropriate PPE to allow them to carry out their duties in an effective manner.

7.2 Sufficient personnel to operate the RFF equipment effectively should be dressed in protective clothing prior to helicopter movements taking place.

7.3 For the selection requires element of PPE to be suitable and safe for intended use, maintained in a safe condition and inspected to ensure it remains fit for purpose. In addition, equipment should only be used by personnel who have received adequate information, instruction and training. PPE should be accompanied by suitable safety measures (e.g. Protective devices, markings and warnings). Appropriate PPE shall be determined through a process of risk assessment.

7.4 Facilities should be provided for the cleaning, drying and storage of PPE when crews are off duty. These facilities should be well ventilated, and secure. The drying of PPE should not be by direct sunlight exposure.

7.5 A responsible person(s) shall be made accountable to ensure that all PPE is installed,

stored, used, checked and maintained in accordance with the manufacturer's instructions.

7.6 The specifications for PPE should meet one of the standards in Table 17-2:

Table 17-2 List of PPE Standards

	NFPA	EN	BS
Helmet with Visor	NFPA 1972	EN443	BS3864
Gloves	NFPA 1973	EN659	BS659
Boots (footwear)	NFPA 1974	EN345	BS1870
Tunic and Trousers	NFPA 1971	EN469	BS6249
Flash-Hood	NFPA 1971	EN13911	BS EN13911

8 RESPIRATORY PROTECTIVE EQUIPMENT BREATHING APPARATUS (BA)

8.1 Helideck Emergency Team members attending a helicopter crash/fire may require Respiratory Protective Equipment (RPE). Fire-fighters required to enter a smoke filled cabin shall be provided with RPE of an approved design for the anticipated hazardous environment. In selecting RPE careful consideration shall be given into the design, function, duration, servicing, and repairs and testing of the equipment.

8.2 Further consideration shall be given to the manufactures instructions for use and the need to achieve an adequate facemask seal. Those persons required to enter and work in a toxic atmosphere will need to have a facemask fit assessment carried out to ensure positive pressure within the facemask can be achieved.

8.3 A process of command and control of those persons nominated to wear breathing apparatus during training or operational incident shall be formulated and implemented on each occasion.

8.4 Fire-fighters required to wear BA must maintain the area of the seal free from hair (facial or head). Failure to do so will impair the efficiency of the seal and an avoidable safety hazard to the BA wearer.

8.5 It is essential that a high level of competency in the use of breathing apparatus equipment is achieved and maintained by those fire-fighters nominated to wear breathing apparatus.

Note: for additional guidance, refer to GCAA CAAP 45 Breathing Apparatus Operational Guidance.

CHAPTER 18 – HELIDECK EMERGENCY RESPONSE MANUAL (ERM)

1 GENERAL

Introductory Note — Helideck emergency planning is the process of preparing a helideck to cope with an emergency that takes place at the helideck or in its vicinity. Examples of emergencies include crashes on or off the helideck, medical emergencies, dangerous goods occurrences, fires and natural disasters.

The purpose of helideck emergency planning is to minimise the impact of an emergency by saving lives and maintaining helicopter operations.

The Helideck Emergency Response Manual (ERM) sets out the procedures for coordinating the response of helideck agencies or services (i.e. air traffic services unit, firefighting services, helideck administration, Helicopter Emergency Medical Services (HEMS), Search and Rescue (SAR), helicopter operators, security services and police), that could be of assistance in responding to the emergency.

1.1 The Helideck Emergency Response Manual for off-shore installations and vessels should set out the emergency duties and responses for the management of the HLO, helideck and fire-fighting teams, the requirements for emergency drills and exercises, and the training and assessment of personnel.

1.2 A Helideck Emergency Response Manual shall be established commensurate with the helicopter operations and other activities conducted at the helideck.

1.3 The ERM shall identify agencies which could be of assistance in responding to an emergency at the helideck or in its vicinity.

1.4 All agencies identified in the ERM should be consulted about their role for an emergency response.

1.5 The ERM should provide for the coordination of the actions to be taken in the event of an emergency occurring at a helideck or in its vicinity.

1.6 The ERM should include, as a minimum, the following information:

1.6.1 the types of emergencies planned for;

1.6.2 how to initiate the plan for each emergency specified;

1.6.3 the name of agencies on and off the helideck to contact for each type of emergency with telephone numbers or other contact information;

1.6.4 the role of each agency for each type of emergency;

1.6.5 a list of pertinent on-helideck services available with telephone numbers or other contact information;

1.6.6 copies of any written agreements with other agencies for mutual aid and the provision of emergency services; and

1.6.7 location and references to installation(s).

GM to 1.6.1: The ERM should contain procedures for all emergency scenarios where helicopters may be involved. Procedures can range from dealing with major accident events and precautionary situations that occur on the installation and vessel to providing helicopter support for emergencies arising elsewhere.

Scenarios to consider are:

a) The following events that may occur on the installation or vessel:
   i. Helicopter crash on the helideck (with or without fire and fuel spillage).
   ii. Engine fire on helicopter.
   iii. Fire in the helicopter cabin.
   iv. Off-shore Installation or vessel on fire.
   v. Fire during helicopter refuelling operations.
   vi. Aviation refuelling fire.
   vii. An emergency or precautionary landing.
   viii. An attempted wheels-up landing.
   ix. Evacuation and emergency movement (e.g. Medevac) by helicopters.
   x. Helicopter use for man over-board.

b) The following events that may occur near the installation or vessel:
   i. Helicopter ditching near to off-shore Installation or vessel.
   ii. Inter-installation/vessel emergency support.
   iii. Search and Rescue (SAR) duties and contingencies.

c) In addition, the following events should also be considered for inclusion in the ERM, in so far as they may severely impact flight safety or the use of helicopters in the event of an emergency response (e.g. an evacuation):
   i. Obstructed helideck.
   ii. Wrong deck landing.
   iii. Installation, MODU or vessel status changes with helicopter on deck.

1.7 Personnel assigned to off-shore helideck activities and the related emergency duties should receive appropriate training and their competence assessed with reference to Section 2.

1.8 The ERM should be reviewed and the information in it updated at least yearly or, if deemed necessary, after an actual emergency, so as to correct any deficiency found during actual emergency.

1.9 A test of the emergency plan should be carried out every two years, but not exceeding every three years.

2 HELIDECK AND VESSEL EMERGENCY PROCEDURE

2.1 Procedures shall be developed for a variety of helideck fire-fighting, evacuation and rescue scenarios, and shall be included in the ERM.

GM to 2.1: The procedures should be written to encourage the full use of available fire-fighting appliances, rescue equipment and resources to best advantage. The ERM should include all elements for both on and off-shore co-ordination and support.

2.1.1 **Crash on Helideck**

In the event a crash on the helideck, the HLO should:

i. Raise the alarm.

ii. Direct first response helideck fire-fighting and rescue activities. On some installations and vessels, the arrival on scene of an appointed emergency coordinator may signal handover of responsibilities after the initial response.

iii. Contact the installation/vessel operator at the earliest opportunity.

iv. Establish and maintain contact with the radio room, Central Control Room (CCR) or incident room throughout any subsequent fire-fighting and rescue operations.

v. Report incident to the GCAA.

2.1.2 **Crash on Helideck, Major Spillage with No Fire**

In the event of a crash on helideck with a major spillage but no fire, the HLO should:

i. Raise the alarm.

ii. Direct helideck Fire Team to lay a foam blanket around and under the aircraft.

iii. Direct/manage the evacuation of the helicopter.

iv. Establish and maintain contact with the radio room/CCR/incident room as required.

v. Contact the installation/vessel operator at the earliest opportunity.

vi. Ensure fire team safety and support is provided.

vii. Report incident to the GCAA.

2.1.3 **Significant Fuel Spillage, Rotors Turning (Hot Fueling)**

In the event of a significant fuel spillage with rotors turning, the HLO should:

i. Immediately ensure that no further fuel is delivered to the aircraft.

ii. Inform the pilot of the circumstances. The pilot will decide whether to shut down or take-off.

iii. Once the aircraft has taken off or shut down, direct the hosing down of the helideck with water to wash away the fuel prior to any further operations. Such actions the HLO shall consider the environmental impact. Conditions should be provided to contain all spilled fuel.

iv. If the aircraft remains on deck, care must be taken not to spray the aircraft with foam/salt water.

v. Report incident to the GCAA.

2.1.4 **Emergency Evacuation by Helicopter**

In the event of evacuation by helicopter, the HLO should:

i. Prepare the helideck to receive incoming aircraft.

ii. Establish pay-loads as each aircraft approaches and inform administration of

the number of passengers required on deck.

iii. As each aircraft departs, report to administration the number of evacuees lifted off.

iv. Report incident to the GCAA.

2.1.5 **Man Over-board**

In the event of a man overboard, the HLO should:

i. If there is a helicopter available on deck equipped for winching or required for search activities, be prepared for it to take off when requested.

ii. If the helideck is not in use, prepare the helideck for operations and stand by to receive an incoming SAR aircraft if it is diverted to the installation, MODU or vessel.

iii. Inform vessels standing by of anticipated helicopter movements.

iv. Maintain communication with the radio room/CCR/incident room.

2.1.6 **Emergency or Precautionary Landing**

In the event of an emergency or precautionary landing, the HLO should:

i. Contact the installation operator at the earliest opportunity

ii. Instruct any aircraft on deck to take off, and hold off any incoming aircraft.

iii. Instruct cranes to lay down loads, and move jibs to a safe position.

iv. Confirm that the approach and overshoot areas are clear and in the case of vessels, if possible, turn the vessel onto appropriate heading for an optimum approach by helicopter.

v. Ensure that rescue and fire-fighting (RFF) equipment is ready for instant use.

vi. Ensure fire-fighting and rescue teams are standing by and are correctly dressed for fire-fighting/rescue response actions.

vii. Ensure complementary fire-fighting media are also to hand.

viii. Inform the radio room that the deck is clear and ready to receive the aircraft, maintain contact with the radio room.

ix. Report incident to the GCAA.

2.1.7 **Helicopter Incident on Landing**

In the event of a helicopter incident on landing, the HLO should:

i. Hold the helicopter on deck and advise the pilot of his observations.

ii. Inform the helicopter operator of the nature of the incident.

iii. Contact and inform the installation/vessel operator at the earliest opportunity.

iv. The helicopter operator and pilot will decide if the flight is to proceed.

v. Report incident to the GCAA.

2.1.8 **Dangerous Goods Spill/Release**

In the event a Dangerous Goods Spill/Release the HLO should:

I. Raise the alarm.

II. Direct first response helideck emergency crews to contain the spillage if possible – wearing appropriate PPE.

III. Evacuate the helideck and surrounding area, taking into account wind direction and surface slope.

IV. Contact the installation/vessel operator at the earliest opportunity.

V. Establish and maintain contact with the radio room, CCR or incident room throughout.

VI. Seek further information on the hazardous substance.

VII. Ensure limited contamination.

VIII. Ensure area is fully cleaned once the spillage/release is contained.

IX. Ensure all affected personnel are not contaminated, decontamination may be required.

X. Ensure all affected equipment remains/is fit for purpose.

XI. Report the incident to the GCAA.

CHAPTER 19 – TRAINING AND DEVELOPMENT OF PERSONNEL

1 GENERAL

1.1 If they are to effectively utilise the equipment provided, all personnel assigned to operational duties on a helideck shall be trained to carry out their duties to ensure competence in role and task.

1.2 Personnel shall attended a Structured Learning Programme (SLP) as referred to in paragraph 2 for helicopter operations and fire-fighting.

1.3 In addition to paragraph 1.2, regular training in the use of all RFF equipment, helicopter familiarisation and rescue tactics and techniques shall be carried out.

1.4 All such training shall be formally recorded, with records available to the GCAA and Primary Accountable Organisations.

2 TRAINING STRUCTURE – STRUCTURED LEARNING PROGRAMME

2.1 The aim of Structured Learning Programme is to provide helideck personnel with the knowledge, skill and attitudes which will enable them to perform their tasks commensurate with their role within the organisation efficiently, safely and competently.

2.2 All helideck personnel shall commence the process of acquiring competence through a Structured Learning Programme (SLP), which shall meet the specification detailed in Tables 19-1, 19-2, 19-3.

2.3 SLPs will provide helideck personnel with the initial acquisition of knowledge and skills in a controlled training/development environment.

2.4 All helideck personnel should have a development plan to refresh, enhance or attain additional skills to enable them to be fully competent in their current role.

2.5 Organisations / training providers delivering the Structured Learning Programme will have to demonstrate clearly the criteria and structure of their individual courses and the mapping against the training requirements of these regulations.

2.6 The comprehensive list of helideck duties and the environment in which they are to be carried out by helideck personnel must be considered in detail. To be acceptable, helideck personnel selected for a given operation must be able to clearly demonstrate safety in all operations.

3 INITIAL TRAINING – PHYSICAL AND STRESSFUL DEMANDS

3.1 All personnel who participate in practical activities specified in these regulations must be physically and mentally capable of participating fully.

3.2 Organisations / training providers are therefore required, as a minimum, to ensure that prior to participating in practical exercises the candidate provides written confirmation that they deem themselves physically and mentally capable of undertaking all aspects of the training or assessment.

3.3 Organisations / training providers must make the candidate aware that are required to immediately inform the organisation if this capability changes – at any time prior to, or during

the programme.

3.4 Candidates must be advised that they are required to declare any current or pre-existing medical conditions which may be exacerbated by, or impair their ability to complete, the training/assessment programme. Should this be the case, the individual may be required to provide an authentic medical certificate issued since any identified medical condition was diagnosed.

3.5 The any organisation / training provider shall keep a record of the candidate's declaration of fitness in accordance with their document control policy(s) or procedures.

3.6 The responsibility for declaring any known current or pre-existing medical conditions that could have adverse effects to the individual's state of health while undertaking the training and/or assessment activities lies with the delegate/candidate and/or company sponsoring the candidate.

3.7 Where doubt exists regarding the fitness of any candidate, the organisation / training provider should direct the individual to consult a medical officer familiar with the nature and extent of the training.

3.8 Candidates required to wear breathing apparatus (BA) must maintain the area of the seal free from hair (facial or head). Failure to do so could impair the efficiency of the seal and avoidable safety hazard to the BA wearer.

4 STRUCTURED LEARNING PROGRAMME – CONTENT

Table 19-1 Table of key information

Elements	
SLP Practical Elements = PE	Practical Elements where the candidate participates in practical elements as an individual or team member.
SLP Technical Elements = TE	Technical Elements the main focus is for the candidate to understand the technical elements of the function.
Safety Critical Functions = SCF	Individual tasks that collectively or individually contribute to safe operations. These critical tasks need to be formally assessed.
Assessment	
Assessment Method = AM	Formal methods and process of making judgments about performance. The means by which evidence of performance is collected and compared with the required competency standard and a judgment about performance is made and also fully recorded.
Practical Assessment = P	Practical Demonstration of operational skills and use of equipment including PPE.
Technically Assessment = T	Technical Written Examination Paper to assess fully the knowledge and understanding of training objectives
Oral Assessment = O	Oral Technical Spoken Word Assessment to support the technical assessment in the knowledge and understanding of training objectives
Personnel	
HLO	Helideck Landing Officer
HDA(L)	Helideck Assistant Team (Leader) - Emergency Team Member
HDAL	Helideck Assistant Team - Emergency Team Member

Table 19-2 Table of Application

Introduction to Regulatory Requirements		SLP PE	SLP TE	SCF	HLO	HDA	HDAL
Role of GCAA	T/O		100%		√	√	√
GCAA Regulations	T/O		100%		√		
Off-shore Helideck Regulations	T/O		100%		√		
Management of Off-shore Helideck Operations	T/O						
ICAO/IATA dangerous goods regulations	T/O		100%		√	√	√
Off-shore emergency response requirements	T/O		100%		√	√	√
Safety Management System (SMS)	T/O		100%		√	√	√
Helicopter Hazards	AM	SLP PE	SLP TE	SCF	HLO	HDA	HDAL
Overview of Helicopter Design and Construction	T/O		100%		√	√	√
Overview of Helicopter Performance	T/O		100%		√	√	√
Overview Helicopter Fuels –Hydraulic Liquids and Additives	T/O		100%		√	√	√
Overview of Helicopter danger areas	T/O		100%	YES	√	√	√
Rotors running – personnel contact with main or tail-rotors	T/O		100%		√	√	√
Adverse weather effect on helicopter operations, to include: excessive wind turbulence	T/O		100%		√	√	√
Helicopter engine shut down procedures – battery isolation	T/O		100%	YES	√	√	√
Helicopter Emergency Actions	T/O		100%	YES	√	√	√
Helicopter Fire Situations	T/O		100%	YES	√	√	√
Helideck Hazards	AM	SLP PE	SLP TE	SCF	HLO	HDA	HDAL
Helideck physical characteristics, to include: 'D value'	T/O		100%	YES	√	√	√
Access and Escape routes	T/O		100%	YES	√	√	√
Helideck visual aids, marking and lights	T/O		100%	YES	√	√	√
Power supplies emergency power back-up systems	T/O		100%	YES	√	√	√
Obstacle-protected surfaces, to include	T/O		100%	YES	√	√	√
Helideck landing and perimeter safety nets	T/O		100%	YES	√	√	√
Landing areas and winching areas on vessels	T/O		100%	YES	√	√	√
Safety Working practices on Helidecks	T/O		100%	YES	√	√	√
Helideck Equipment and Systems	AM	SLP PE	SLP TE	SCF	HLO	HDA	HDAL
Plant and equipment for routine and non-emergency response operations	T/O	20%	80%	YES	√	√	√
Fire Fighting Equipment – guidance on when and where to use various media	T/O	20%	80%	YES	√	√	√
Primary Media requirements: foam type, delivery and testing	T/O	20%	80%	YES	√	√	√
Complimentary media requirements	T/O	20%	80%	YES	√	√	√
Deck Integrated Fire-Fighting System (DIFFS)	T/O	20%	80%	YES	√	√	√
Meteorological systems and minimum meteorological equipment requirement for region of operations.	T/P	20%	80%	YES	√	√	√
Testing and Inspecting helideck systems Daily – Monthly – Annual Checks	T/O	20%	80%	YES	√	√	√
Reporting helideck and systems defects	T/O	20%	80%	YES	√	√	√
Helideck Operational Hazards	AM	SLP PE	SLP TE	SCF	HLO	HDA	HDAL
Poor visibility effect on helideck operations	T/O		100%	YES	√	√	√
Rotors running – personnel contact with main or tail	T/O		100%	YES	√	√	√

rotors while on deck							
Excessive wind turbulence	T/O		100%	YES	√	√	√
Obstacles on deck	T/O		100%	YES	√	√	√
Noise hazard	T/O		100%	YES	√	√	√
Loose items (baggage, freight, netting etc.) being sucked air intake	T/O		100%	YES	√	√	√
Passenger Transfer	T/O		100%	YES	√	√	√
Dangerous Goods Transfer	T/O		100%	YES	√	√	√
Crane operations: crane work to cease during helicopter operations	T/O		100%	YES	√	√	√
Responsibilities During Helicopter Landing and Departure	AM	SLP PE	SLP TE	SCF	HLO	HDA	HDAL
The role of the Off-shore Helicopter Landing Officer	T/O		100%		√	√	√
The key responsibilities of the HLO	T/O		100%		√	√	√
How the HLO is identifiable to the helicopter crew	T/O		100%		√	√	√
Helideck Procedures Prior to Landing	AM	SLP PE	SLP TE	SCF	HLO	HDA	HDAL
Helicopter type identification	T/O		100%				
30 minutes before helicopter ETA	T/O		100%	YES	√	√	√
10 minutes before helicopter ETA	T/O		100%	YES	√	√	√
Immediately before landing	T/O		100%	YES	√	√	√
After landing - rotors running turnaround	T/O		100%	YES	√	√	√
After landing - engines shut down and rotors not running	T/O		100%	YES	√	√	√
Helicopter tie-down	T/O		100%	YES	√	√	√
Helicopter start-up	T/O		100%	YES	√	√	√
Communications with all relevant personnel: heli-admin. personnel, pilot, crane operator, standby vessel, fire crews, HAs, loaders and passengers (simulated)	T/O		100%		√	√	√
HLO and flight crew radio transmissions restricted to essential dialogue	T/O		100%		√	√	√
How to ensure that the correct and agreed protocol for “clear to lift” signal to the pilot is understood on the specific fixed or mobile installation the HLO is operating on	T/O		100%	YES	√	√	√
HLO-to-pilot coms protocols are conducted correctly, to include ‘deck available’ or ‘do not land’ call to pilot	T/O		100%	YES	√	√	√
Limitation of radio coms and correct use of hand signals	T/O		100%	YES	√	√	√
Monitoring of environmental conditions and change in conditions	T/O		100%	YES	√	√	√
Checking helideck equipment availability	P/O	80%	20%	YES	√	√	√
Checking and testing radio equipment	P/O	80%	20%	YES	√	√	√
HLO to ensure that the helideck surface is free from any contamination, debris or damage after take-off	P/O	80%	20%	YES	√	√	√
Supervisor HAs Ensuring HA duties and responsibilities are clearly understood during helicopter landing and departure	P/O	80%	20%	YES	√	√	√
Briefing the HAs prior to helideck operations, to include a ‘tool-box-talk’	P/O	80%	20%	YES	√	√	√
Ensuring HAs are in the correct location	P/O	80%	20%	YES	√	√	√
Ensuring the HAs are prepared for helicopter emergencies	P/O	80%	20%	YES	√	√	√
Ensuring HLO and HAs are equipped with appropriate PPE	P/O	80%	20%	YES	√	√	√
Helideck Protocols	AM	SLP	SLP	SCF	HLO	HDA	HDAL

		PE	TE				
Safe-to-approach, helicopter agreed with operating company	P/O	80%	20%	YES	√	√	√
Supervision of Passenger and Cargo Handling	P/O	80%	20%	YES	√	√	√
Helicopter freight loading limitations and requirements and how these will vary for different types of helicopters	P/O	80%	20%	YES	√	√	√
Under-slung loads: hazards and typical procedures	P/O	80%	20%	YES	√	√	√
Checking freight manifests (inbound and outbound)	P/O	80%	20%	YES	√	√	√
Preparing for, and supervising, correct loading and unloading of freight and baggage. (HLOs should not become involved in manual activity, such as carrying bags, at the expense of their supervisory role)	P/O	80%	20%	YES	√	√	√
Supervising passenger baggage reclamation	P/O	80%	20%	YES	√	√	√
Dangerous goods identification	P/O	80%	20%	YES	√	√	√
Dangerous goods management and handling	P/O	80%	20%	YES	√	√	√
Notification to Captain of Dangerous Goods	P/O	80%	20%	YES	√	√	√
Supervise passenger handling	P/O	80%	20%	YES	√	√	√
Checking and interpreting information on passenger manifest and routing plans	T/O		100%	YES	√	√	√
Receiving incoming manifest from pilot and handing over outgoing manifest to pilot	T/O		100%	YES	√	√	√
Supervising passenger safe access and egress on helideck	P/O	80%	20%	YES	√	√	√
Supervising passenger entry into helicopter	P/O	80%	20%	YES	√	√	√
Supervising passenger exit from helicopter	P/O	80%	20%	YES	√	√	√
Conducting passenger checks, to include: checking that passengers are wearing required PPE for region of operations, ear protection and seat belt harnesses are secure	P/O	80%	20%	YES	√	√	√
First Aid	AM	SLP PE	SLP TE	SCF	HLO	HDA	HDAL
Carryout primary and secondary surveys for life threatening injuries	P/O	80%	20%		√	√	√
Establish airway	P/O	80%	20%		√	√	√
Carry out cardiopulmonary resuscitation	P/O	80%	20%		√	√	√
Identify and treat internal/external bleeding	P/O	80%	20%		√	√	√
Identify and treat casualty suffering from shock	P/O	80%	20%		√	√	√
Identify injuries to skull, spine, chest and extremities	P/O	80%	20%		√	√	√
Identify internal injuries	P/O	80%	20%		√	√	√
Place casualties in recovery position	P/O	80%	20%		√	√	√
Move casualties	P/O	80%	20%		√	√	√
Treat burns	P/O	80%	20%		√	√	√
Fire-fighting Equipment and Fire-Fighting Actions	AM	SLP PE	SLP TE	SCF	HLO	HDA	HDAL
Fire Extinguisher Identification	P/O	80%	20%	YES	√	√	√
Fire Extinguisher Testing and Inspection	P/O	80%	20%		√	√	√
Fire Hose and Branches Identification	P/O	80%	20%	YES	√	√	√
Fire Hose Reels Identification	P/O	80%	20%	YES	√	√	√
Fire Monitors Identification	P/O	80%	20%	YES	√	√	√
Fire Blankets Identification	P/O	80%	20%	YES	√	√	√
Deck Integrated Fire Suppression Systems - Identification	P/O	20%	80%	YES	√	√	√
Fire – Emergency Call Points	P/O	80%	20%	YES	√	√	√
Rescue Equipment Requirements	P/O	80%	20%		√	√	√
Rescue Equipment Testing and Inspection	P/O	80%	20%	YES	√	√	√

Rescue Equipment use	P/O	80%	20%	YES	√	√	√
Water Fire Extinguisher	P/O	80%	20%	YES	√	√	√
Foam Fire Extinguisher	P/O	80%	20%	YES	√	√	√
Dry Powder Fire Extinguisher	P/O	80%	20%	YES	√	√	√
CO2 Fire Extinguisher	P/O	80%	20%	YES	√	√	√
Fire-Fighting Practical Exercise 1	P/O	100%		YES	√	√	√
Fire-Fighting Practical Exercise 2	P/O	100%		YES	√	√	√
Fire-Fighting Practical Exercise 2	P/O	100%		YES	√	√	√
Breathing Apparatus (BA)	AM	SLP PE	SLP TE	SCF	HLO	HDA	HDAL
The requirements for BA	T/O		100%	YES	√	√	√
BA set and its equipment	T/O	80%	20%	YES		√	√
General Check and records	P/T/O	80%	20%	YES		√	√
Donning, Start and doffing Procedures	P/T/O	80%	20%	YES		√	√
Wearing Procedures	P/T/O	80%	20%	YES		√	√
Search Procedures	P/T/O	80%	20%	YES		√	√
Entrapped Procedures	P/T/O	80%	20%	YES		√	√
BA Wearer responsibilities	P/T/O	80%	20%	YES		√	√
Smoke Wearing Procedures	P/T/O	80%	20%	YES		√	√
Confined Space Procedures	P/T/O	80%	20%	YES		√	√
Incident Procedures Dangerous Goods	P/T/O	80%	20%	YES		√	√
BA set Incident Servicing procedures	P/T/O	80%	20%	YES		√	√
BA Entry Control Procedures	P/T/O	80%	20%	YES		√	√
BA Incident Procedures.	P/O	80%	20%	YES		√	√
BA Practical Exercise 1	P/O	100%		YES	√	√	√
BA Practical Exercise 2	P/O	100%		YES	√	√	√
Emergency Response Manual (ERM)	AM	SLP PE	SLP TE	SCF	HLO	HDA	HDAL
What is an ERP	T/O		100%		√	√	√
Elements of an ERP	T/O		100%		√	√	√
ERP Roles and Responsibilities	T/O		100%		√	√	√
Types of Emergencies	T/O		100%		√	√	√
Emergency Orders/Instructions	T/O		100%		√	√	√
Emergency Exercise Day	P/O	100%			√	√	√
Emergency Exercise Night	P/O	100%			√	√	√

Table 19-3 Duration and Frequency of Training

Discipline	Initial Training	Refresher Training	Frequency
Helideck Landing Officer (HLO)	5 Days SLP	3 days SLP	2-years
	1 Day Company Induction		
	1 Day HSE Safety	1 day	Annual
	Company On-Job Training	Ongoing Competency Assessment	
	Work place Exercises and Drills	Ongoing records to be maintained	
	Competency Assessment (SCF)	Ongoing Competency Assessment (SCF)	
Helideck Assistant - Leader (HDAL) (Fire Crew)	5 Days	3 days SLP	2-years
	1 Day Company Induction		
	1 Day HSE Safety Training	1 day	Annual
	Company On-Job Training	Ongoing records to be maintained	
	Work place Exercises and Drills	Ongoing records to be maintained	
	Competency Assessment (SCF)	Ongoing Competency Assessment (SCF)	
Helideck Assistant (HDA) (Fire Crew)	4 Days	3 days SLP	2-years
	1 Day Company Induction		
	1 Day HSE Safety Training	1 day	Annual
	Company On-Job Training	Ongoing records to be maintained	
	Work place Exercises and Drills	Ongoing records to be maintained	
	Competency Assessment (SCF)	Ongoing Competency Assessment (SCF)	
Radio Operator	Flight Information Service course	As required	2-years
	Company Induction Training		
	1 Day HSE Safety Training	1 day	Annual
	Minimum 40 hours initial Company On-Job Training	Ongoing records to be maintained	
	Comms. Exercises and Drills	Ongoing records to be maintained	
	Competency Assessment (SCF)	Ongoing Competency Assessment (SCF)	
	Standard telephony, R/T phraseology	Ongoing Competency Assessment (SCF)	
	Proficiency in English language	Ongoing Competency Assessment (SCF)	
	Appropriate training in required knowledge, skills and experience	Ongoing Competency Assessment (SCF)	

Note 1 - When developing training programmes the above course duration is the minimum expected and has not taken into account Meals and Prayer breaks.

Note 2 - If any candidate fails complete any course (fully), they should be not be deemed competent in acquisition; they shall complete the course in full before a certificate can be issued. The GCAA may request to sample course attendance records as part of the SLP oversight process.

Note 3 - All courses may be of modular format, however, for a certificate of competency to be issued, the complete course content must be completed.

CHAPTER 20 – METEOROLOGICAL EQUIPMENT PROVISION

1. GENERAL

1.1 Accurate, timely and complete meteorological observations are necessary to support safe and efficient helicopter operations. It is recommended that manned fixed and floating facilities and vessels are provided with an automated means of ascertaining the following meteorological information at all times:

a) wind speed and direction (including variations in direction);

b) air temperature and dew point temperature;

c) atmospheric pressure (QNH and, where applicable, QFE);

d) cloud amount and height of cloud base (above mean sea level (AMSL));

e) visibility and;

f) present weather

1.2 Where a fixed manned facility is in close proximity to another fixed manned facility, 'close' as determined by the competent authority, it may not be deemed necessary for every facility to provide the above equipment, providing that those facilities which are so equipped make their information routinely available to the others. For these 'other' facilities, a manual means of verifying and updating the reported elements of an observation, i.e. cloud amount and height of base, visibility and present weather, may be used. For not permanently attended installations (NPAI) and for those fixed and floating facilities and vessels deemed to have a low movement rate, as determined by the competent authority, it may be acceptable just to provide the basic elements of wind, pressure, air temperature and dew point temperature information.

1.3 Contingency meteorological observing equipment providing manual measurements of air and dew point temperatures, wind speed direction and pressure is recommended to be provided in case of the failure or unavailability of the automated sensors. It is recommended that personnel who carry out meteorological observations undergo appropriate training for the role and complete periodic refresher training to maintain competency.

1.4 Where required, for example for those helicopters which have remained overnight, access to meteorological forecasts, special observations, weather warnings and SIGMETS should be available.

1.5 Equipment sensors used to provide the data listed in paragraph 1.1. a) to f) should be periodically inspected, tested and calibrated in accordance with manufacturers' recommendations in order to demonstrate continuing adequacy for purpose.

1.6 For additional information relating to the provision of meteorological information reference should be made to GCAA CAR Part VIII (Air Navigations Regulations), Subpart 7 (Meteorological Services).

CHAPTER 21 – DECK MOTION REPORTING AND RECORDING

1. GUIDANCE MATERIAL

1.1 Floating facilities and vessels experience dynamic motions due to wave action which represent a potential hazard to helicopter operations. Although the ability of a floating facility or vessel to sometimes manouevre may be helpful in providing an acceptable wind direction in relation to the helideck/shipboard helideck location, it is likely that floating facilities and vessels will still suffer downtime due to excessive deck motions. Downtime can be minimised by careful consideration of the location of the landing area at the design stage (refer to Chapter 6, section 2.5 Special Considerations for floating facilities and ships). However, to a greater or lesser degree floating facilities and vessels remain subject to movement at the helideck in pitch and roll, in deck inclination and in heave (usually measured as rate of heave).

1.2 It is necessary for these motions to be recorded by the use of an electronic Helideck Motion System (HMS) and reported as part of the overall off-shore weather report (refer to Chapter 20), prior to landing and during helicopter movements. An HMS should be equipped with a colour-coded display which allows a trained operative to easily determine whether the landing area is ‘in-limits’, or is ‘out of limits’; or is moving towards a condition where it may soon be ‘out-of-limits’. Motions at the helideck should be reported to the helicopter operator to an accuracy of one decimal place. The helicopter pilot, in order to make vital safety decisions, is concerned with the amount of ‘slope’ on and the rate of movement of the helideck surface. It is therefore important that reported values are only related to the true vertical and do not relate to any false datum created, for example, by a ‘list’ created by anchor patterns or displacement.

1.3 Ongoing research indicates that the likelihood of a helicopter tipping or sliding whilst touched down on a helideck or shipboard helideck (especially with rotors running ‘turning and burning’ on the landing area) is directly related to helideck accelerations and to the prevailing wind conditions. Ideally a Helideck Motion System should incorporate additional software which allows for ‘on-deck’ Motion Severity and Wind Severity Index limits to be recorded and communicated to aircrew; in a similar way that pre-landing limits are disseminated to a pilot.

1.4 To provide air crew with a visual indication of the current status of a helideck/shipboard helideck it may be helpful to employ a traffic light system consisting of three lights mounted at three to four locations around the edge of a helideck. These lights should avoid the use of the colour green (green is used for TLOF perimeter lights), but could consist of blue/amber and red — where blue is ‘safe within limits’, amber is ‘moving out of limits towards an unsafe condition’ and red is ‘out of limits — unsafe condition’.

CHAPTER 22 – HELICOPTER REFUELLING OPERATIONS

1 GENERAL

1.1 It is essential to ensure at all times that aviation fuel delivered to helicopters from off-shore facilities and vessels is of the highest quality. A major contributor towards ensuring that fuel quality is maintained, and contamination prevented, is to provide clear unambiguous product identification on all system components and pipelines denoting the fuel type (e.g. Jet A-1) following the standard aviation convention for markings and colour code. Markings should be applied initially during systems manufacture and routinely checked for clarity during subsequent maintenance inspections.

1.2 It should be noted that an off-shore fuelling system may vary according to the particular application for which it was designed. Nevertheless the elements of all off-shore fuelling systems are basically the same and will include:

a) storage tanks;

b) static storage facilities, and if installed, a sample reclaim tank;

c) a pumping system and;

d) a delivery system

1.3 When preparing a lay-out design for aviation fuelling systems on off-shore facilities and vessels it is important to make provisions for suitable segregation and bunding of the areas set aside for the tankage and delivery system. Facilities for containing possible fuel leakage and providing fire control should be given full and proper consideration, along with adequate protection from potential dropped objects. The design of the elements of an off-shore fuelling system is not addressed in detail in the Heliport Design and Services Manual.

1.4 For detailed guidance refer to the Air Transport Association Specification 103 (Standard for Jet Fuel Quality Control at Airports).

1.5 Fuel storage, handling and quality control are key elements for ensuring, at all times, the safety of aircraft in flight. For this reason personnel assigned refuelling responsibilities should be certified as properly trained and competent to undertake systems maintenance, inspection and fuelling of helicopters.

1.6 Throughout the critical processes of aviation fuel system maintenance and fuelling operations, routine fuel sampling is required to ensure delivered fuel is scrupulously clean and free from contamination that may otherwise enter helicopter fuel tanks and could ultimately result in engine malfunctions.

1.7 Fuel samples drawn from transit/static storage tanks and the fuel delivery system should be retained in appropriate containers for a specified period. The containers should be kept in a secure light-excluding store and kept away from sunlight until they are disposed of.

1.8 Guidance on the design of containers is provided by the International Air Transport Association (IATA). The IATA fuel guidelines provide an essential set of standards designed to ensure safe and efficient aircraft fuel handling and contribute to training of fuelling operatives for oil companies or into-plane service providers.

APPENDIX A – DESIGNATION OF HELIDECKS CLASS OF USE

1 COMPLIANCE WITH GCAA REGULATION

1.1 From 1st January 2015 all new facilities are required to be compliant with GCAA regulations. Prior to that date, existing operational helidecks are required to be compliant by 1st January 2018.

1.2 In order to aid the prioritisation process for compliance with GCAA regulations, Primary Accountable Organisations, helideck operating companies and helideck operators shall undertake a safety assessment of the facilities for which they are responsible for. An action plan aimed at achieving compliance should be produced relevant to the risks identified.

1.3 The safety assessment should be based on a safety risk management model, which should include hazard identification, safety risk assessment and mitigation processes. Table A-1 Helidecks: Class of Use), provides a classification of facilities, against which reference should be made.

Table A-1 Helidecks: Class of Use

Helideck Class	Day / Night / Closed	Manned / Unmanned	Fixed / Movable	Regulatory Focus	Applicability
F1	Day and night	manned	fixed	Full compliance – Including lighting	For designated CASEVAC helidecks on major accommodation installations
F2	Day only	manned	fixed	Full compliance – Lighting optional	For designated 'DAY ONLY' helidecks on major and minor platforms
F3	Day only	unmanned	fixed	Compliance – 1. Mandatory markings 2. Lighting not required 3. Limited fire-fighting / crash equipment	For designated 'DAY ONLY' helidecks on minor platforms
F4	Closed	-	fixed	Helideck markings removed.	Closed / not to be used
M5	Day and night	manned	movable	Full compliance – Including lighting	For movable helidecks to which CASEVAC flights off-shore may be required at night
M6	Day only	manned	movable	Full compliance – Lighting optional	For movable helidecks to which night CASEVAC flights are not required

APPENDIX B – CAAP 71: HELIDECK COMPLIANCE CHECKLIST

INSPECTOR:	**DATE:**	
NAME OF OPERATING COMPANY:	**AUDIT REFERENCE NUMBER:**	
NAME OF OPERATOR REPRESENTATIVE:	**HELIDECK ID:**	
INSTALLATION / VESSEL NAME:	**HELIDECK D-VALUE:**	**t –VALUE:**
POSITION (LAT & LONG) Deg/Min & Decimals of Mins:	**HELIDECK ELEVATION (feet AMSL):**	
DATE OF LAST INSPECTION:	**LAST INSPECTION REPORT:**	
HELICOPTER LANDING AREA TEMPLATE:	**HELIDECK OPERATIONS MANUAL:**	

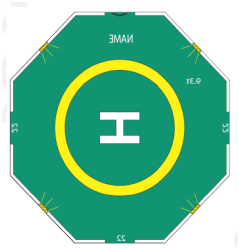
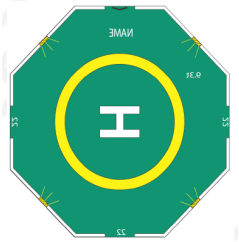
INSTALLATION TYPE:

LQ ☐	BARGE ☐	RIG ☐	VESSEL ☐	NPAI ☐	DPV/DSV ☐
Class F1 ☐	Class F1 ☐	Class F3 ☐	Class F4 ☐	Class M5 ☐	Class M6 ☐

OIM / BARGE MASTER:	NAME:	TEL:
INSTALLATION SAFETY OFFICER:	NAME:	TEL:
INSPECTION CARRIED OUT BY: (Internal)	NAME:	TEL:

TYPE	'D' VALUE	0.33 'D'	0.12 'D'	0.05 'D'	Minimum 't' value
AW 139	16.66 M	5.50	2.0	0.83	6,400 kg / 6,800 kg
BELL 412/212	17.10 M	5.64	2.05	0.86	5,400 kg

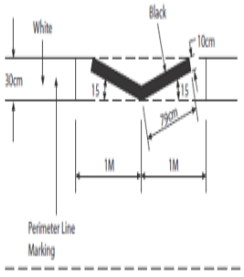
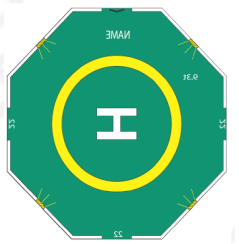
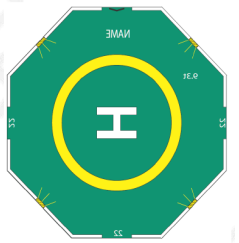
1	DOCUMENTS TO BE AVAILABLE	YES	NO	NOTES	CAAP 71
1	a) Helideck Operations Manual b) Helideck Landing Area Template c) Helideck Plans d) Foam test certificate e) Friction Test Report and certificate (if no net) f) Perimeter safety net testing records g) Landing safety net documentation (if applicable) h) Digital equipment calibration certificates (weather and HMS) i) Passenger scales calibration records j) Fire Monitor flow rates k) Training records and certificates l) RFFS certificates & tests records m) Emergency Response Manual (ERM) n) Fuel inspection records o) Dangerous goods certificates p) Previous Inspection reports q) Additional evidence of compliance as required below				Ch 4, 4 Ch 4,T4-1 Ch 19 Ch 17 Ch 18 Ch 22 Ch 16,2

2	HELIDECK DESIGN, ENVIRONMENTAL EFFECTS, PHYSICAL CHARATERISTICS	YES	NO	NOTES	CAAP 71
1	**Final Approach and Take-Off Area (FATO)** Measured FATO = _____m Is the FATO 1D? *Note: FATO: circle 1D TLOF: >3175kg = 1D; 3175kg or less = 0.83D*				Ch 7, 1
2	**Touchdown Lift and Off-Area (TLOF)** Measured TLOF = _____m Is the TLOF 1D? Is the TLOF dynamic load bearing? *Note: TLOF: >3175kg = 1D; 3175kg or less = 0.83D*				Ch 7, 1
3	What is the helideck constructed of? Steel:_____ Aluminium:_____ Other:_____				Ch 6, 1
4	Have the ultimate limit states (ULS) and the serviceability limit states (SLS) been assessed? *Note: For deck plate and stiffeners and for helicopter landing area supporting structure.*				Ch 6, 1
5	Is the helideck area free from flares & hot exhausts? Indicate on drawing all sources for: a) Hot and cold vented gas emissions b) Turbine or other exhaust emissions c) Raised platforms and vents for hydrocarbon release d) H2S environment/possible release e) Other emissions *Note the potential of turbulence on T/O or Landing; in addition for a rig on location, note exhaust flow changes with prevailing winds.*				Ch 6,2
6	**Access Points** How many access / egress points are there on the Helideck? Is there an Emergency Exit on the far side? Number:_____ (Include Emergency Exits) *Note: All frangible railings are to be hatch painted (Yellow & Black)* *(Hatch-painted red and white & Marked 'EMERGENCY EXIT')*			a = access point e = emergency exist 	Ch 6, 3
7	**Load Bearing Analysis** a) Maximum Weight: _____ b) Method of Determination: _____ Evidence Provided?				Ch 6, 1
8	**Air Gap** Is there an air-gap - encompassing full dimensions of FATO? Is the air gap between 3m-6m? Is the air gap kept free from objects? *(Note tall accommodation blocks require 5m-6m)*				Ch 6, 2
9	Do the helideck plans accurately show detail required? If not, state omissions:_____				Ch 4

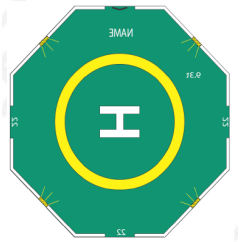
3	HELIDECK SURFACE ARRANGEMENTS	YES	NO	NOTES	CAAP 71
1a	**Objects** Is the helideck surface flush (level)? *(TLOF – not more than 2.5cm/if TLOF for use by helicopters less than 16m D value or TLOF having dimensions less than 1D – not more than 5 cm)*				Ch 9, 1
1b	What is the condition of the helideck surface? Acceptable:_____ Not acceptable:_____				Ch 9,1
1c	Is the Helideck covered with a helideck surface netting? *(If used by wheeled helicopters)* What type/material?				Ch 9, 1 Ch 9, 3
1d	Is the net (if fitted) in good condition and properly tensioned (2225N = Able to lift centre of net to approximately 25cm above deck level)?				Ch 9, 3
1e	Does the net cover the TDPM but not obscure name and t value?				Ch 9, 3
1f	Are the tie down points regularly spaced (recommended every 1.5m) and secure, with webbing strap ends properly secured/fastened?				Ch 9, 3
1g	Is the net when fitted less than 25mm above deck level?				Ch 9, 3
2a	**Slopes / Drainage** Is there a suitable drainage system and how many downpipes are used?				Ch 9,2
2b	Is fuel spillage kit available?				Ch 9, 2
2c	Has the helideck been provided with a slope / camber (1:100)? *(Designed to prevent liquid accumulating on landing area).*				Ch 9, 2
2d	Is there a full peripheral gutter or raised curb?				Ch 9, 2
2e	Is the deck sealed so that spillages drain only via the drainage system?				Ch 9, 2
2f	Does the design of the drainage system preclude blockage by use of debris filters or similar?				Ch 9, 2
3a	**Friction** Is the surface skid-resistant to both helicopters and personnel using the TLOF?				Ch 9, 3
3b	Are markings of a non-slip material?				Ch 9, 3
3c	Has a friction test been performed to confirm a minimum friction coefficient greater than 0.65mu?				Ch 9, 3
4a	**Tie-Down Points** Are the tie-down points suitable for helicopter type? *(Example: B412/212 & AW 139)*				Ch 9, 4
4b	Are the tie-down points flush fitting? If not, are they of a design (and height above deck level) to limit the likelihood of ground resonance?				Ch 9, 4
4c	Are the tie-down strop attachments/hooks compatible with the tie down points?				Ch 9, 4

5a	**Perimeter Safety Nets** Is a perimeter safety net installed? If no, state why:_____				Ch 9, 5
5b	Does it exceed the height of the outboard edge of the TLOF? (For helidecks completed on or after 01/01/2012 it must not exceed)				Ch 9, 5
5c	Has the load bearing capability been assessed and what measures/systems are in place to monitor deterioration?				Ch 9, 5
5d	Does it protect all drop down areas (e.g. at exit stairway decks etc.)?				Ch 9, 5
5e	Does it: Extend to a distance of 1.5m? Arranged with an upward slope of 10^0?				Ch 9, 5
5f	What is the condition / security of the perimeter safety net? Acceptable:_____ Not acceptable:_____				Ch 9, 5
4	**OBSTACLES ENVIRONMENT**	**YES**	**NO**	**NOTES**	**CAAP 71**
1	Is there an Obstacle-Free Sector (OFS) of 210^0? *(List all infringements: items, location, height - with drawing)*				Ch 10, 1
2	Is there a 180^0 sector with an obstacle free falling gradient 0f 5:1? *(List all infringements: items, location, height - with drawing)*				Ch 10, 1
3	Is the Limited Obstacle Sector (LOS) no greater than 150^0?				Ch 10, 2
4	Within the 150^0 Limited Obstacle Sector are there objects above allowed height?				Ch 10, 3
5	Control of cranes: Are controls and procedures in place to protect the OFS?				Ch 10, 8
6	Are cranes infringing the OFS even when stowed?				Ch 10, 8
5	**VISUAL AIDS**	**YES**	**NO**	**NOTES**	**CAAP 71**
1	Are the markings suitable for operations? Acceptable:_____ Not acceptable:_____				Ch 12
2a	**Wind Direction Indicator** Is there at least one wind direction indicator? Is there at least one spare wind direction indicator?				Ch 12, 1
2b	Is it located free from the effects of airflow disturbances?				Ch 12, 1
2c	Colour: is the wind direction indicator conspicuous?				Ch 12, 1
2d	Is it illuminated for night operations?				Ch 12, 1
2e	Are the dimensions a minimum of: Length 1.2m; diameter (large end) 0.3m; diameter (small end) 0.15m?				Ch 12, 1
3	Are the following markings correctly applied? (If not, state details)				Ch 12, 1

4a	**Helideck Identification Marking "H"** Is it in the centre of the FATO? State details if off-set:_____ *(Must be offset by no more than 0.1D)*				Ch 12, 2
4b	Is the cross-arm on or parallel to the bisector of the obstacle-free sector? *(Note for a non-purpose-built shipboard helidecks located on a ship's side, the cross arm shall be parallel with the side of the ship)*.				Ch 12, 2
4c	Is the H white; height 4m, width 3m, thickness 0.75m?				Ch 12, 2
5a	**Maximum Allowable Mass Marking** Is it located within the TLOF or FATO and arranged to be readable from the preferred final approach direction i.e. towards the OFS origin?				Ch 12, 3
5b	Does it agree with the heaviest helicopter and structural limitations?				Ch 12, 3
5c	Is the size compliant? *(90 cm (or 60cm if FATO < 15m) high, with proportional width).*				Ch 12, 3
5d	Is it a contrasting colour?				Ch 12, 3
6a	**D-Value Marking** Is the stated value correct?				Ch 12, 4
6b	Is there at least one D-value marking? *(Should have D-Value marking for each final approach direction)*				Ch 12, 4
6c	Is it readable from the final approach direction? (Note, for a non-purpose-built helideck located on a ship's side, D-value markings should be provided on the perimeter of the D circle at the 2 o'clock, 10 o'clock and 12 o'clock positions when viewed from the side of the ship facing towards the centre line).				Ch 12, 4
6d	Is the D-value white?				Ch 12, 4
6e	Is the size compliant? *(90 cm (or 60cm if FATO < 15m) high, with proportional width).*				Ch 12, 4
7a	**Touchdown and Lift-Off Perimeter (TLOF) Marking** Is the marking located on the edge of the TLOF?				Ch 12, 5
7b	Is the marking white, width 30cm?				Ch 12, 5
8a	**Touchdown / Positioning (TD/PM) Circle Marking** Is the marking at the centre of the FATO? State if off-set:_____ *(Must be offset by no more than 0.1D)*				Ch 12, 6
8b	Is the marking yellow; line width 1m?				Ch 12, 6
8c	Is the inner diameter0.5D of the largest helicopter?				Ch 12, 6
9a	**Helideck Name Marking** Is a marking provided? If not, then justify:_____				Ch 12, 7
9b	Does it consist of the name or the alphanumeric designator of the helideck as used in the radio (R/T) communications?				Ch 12, 7
9c	It is a contrasting colour?				Ch 12, 7

9d	Is the marking not less than 1.2m?				Ch 12, 7
10a	**Obstacle-Free Sector (Chevron) Marking** Is the marking correctly located with reference to the obstacle-free sector and the directions of the limits of the sector?				Ch 12, 8
10b	Is it located at a distance from the centre of the TLOF equal to the radius of the largest circle that can be drawn in the TLOF or 0.5 D, whichever is greater?				
11	**Helideck Surface Marking** Is the surface bounded by the TLOF perimeter marking dark green (high friction coating)? If not, state colour:_____				Ch 12, 9
12a	**Prohibited Landing Sector (or "no nose") Marking** Location: Is a marking within the relevant headings?				Ch 12, 10
12b	Colour and design in accordance with CAAP 71?				Ch 12, 10
13	**Obstacles** Are fixed obstacles marked and conspicuous?				Ch 12, 11
14	**Installation Closed Marking** When required, is a procedure available for temporary closures?				Ch 12, 12
6	**AERONAUTICAL LIGHTING**	**YES**	**NO**	**NOTES**	**CAAP 71**
1	Is Perimeter Lighting correctly installed around the helideck? *(Equally-spaced, not more than 3 m apart; height less than 25cm visible omni-directionally)* *Note: in order to avoid trip hazards, blocking foam dispensing nozzles etc. the TLOF perimeter lights may be relocated by up to +/- 0.5m – a maximum/minimum spacing of 3.5m/2.5m)*			Indicate: 	Ch 13, 2
2	What colour are the lights? (All Green lights of at least 25 candelas)				Ch 13, 2
3	Are the lights coincidental with the TLOF area as defined by the white perimeter line?				Ch 13, 2
4	Are they compliant with CAAP 71 chromaticity?				Ch 13 T13-1
5	Are the Floodlights correctly installed for the Helideck? *(At least four required adequate illumination; min 10 lux)*			Indicate: 	Ch 13, 2,3

6	Status Lights (if available)?				
7	Lit helideck marking (H) (if available)?				
8	Are they adjustable and can be operated by the Radio Operator or HLO?				
9	Is there a 28V DC Ground power supply to the helideck?				
10	Is the helideck lighting rigged to the UPS?				
11	Obstacle floodlighting: a) Obstacles higher than the Helideck – nearby or in 150^0 Sector b) Jack-up Legs c) Highest point of the Installation d) Obstacles higher than the Helideck out to 1000 metres				Ch 13, 3
12	Are daily checks conducted to correct misaligned lights? *(i.e. floodlighting)*				Ch 13, 2. 3
7	**PARKING AREAS AND PUSH-IN AREAS**	**YES**	**NO**	**NOTES**	**CAAP 71**
1	Are parking areas provided?				Ch 14, 1
2	Are the dimensions of the parking area able to accommodate a circle with a minimum diameter of 1 x the D-value of the design helicopter?				Ch 14, 1
3	Is a minimum clearance between the edge of the parking area and the edge of the landing area of 1/3 (0.33D) based on the design helicopter provided? (Parking transition area) Is it free of obstacles when a helicopter is located in the parking area?				Ch 14, 2
	Is the lighting scheme compliant?				Ch 14, 2
8	**NOT PERNAMENTLY ATTENDED INSTALLATIONS (NPAI)**	**YES**	**NO**	**NOTES**	**CAAP 71**
1	Are procedures in place to take action with regard to bird guano and bird activity?				Ch 15, 1
2	Are condition reports submitted to indicate the current condition of the surface, of helideck lighting (including any outages) and of the wind direction indicator (including illumination)?				Ch 15, 2
3a	**Rescue and Fire-Fighting Facilities** Has consideration been given on the selection and provision of foam as the principle agent?				Ch 15, 2
3b	Has a DIFF system been installed?				Ch 15, 2
3c	Has an assessment taken place for the provision of RFFS without DIFFS?				Ch 15, 2
9	**PERSONNEL REQUIREMENTS**	**YES**	**NO**	**NOTES**	**CAAP 71**
1	Dangerous goods: do personnel involved in dangerous good hold a certificate of training appropriate to the role and responsibility?				Ch 16, 2
2	Has an assessment (Task Analysis) be conducted to establish the number of personnel required? Date:_____				Ch 16, 5
	Has appropriate training been provided for each:				Ch 16, 5
3a	Helideck Landing Officer (HLO)				

3b	Helideck Assistances (HDA)				
3c	Radio Operator				
3d	Fire-fighter				
3e	Re-fueller				
4	Has the appropriate PPE been provided to each personnel?				Ch 16, 6
10	**RESCUE AND FIRE-FIGHTING FACILITIES**	**YES**	**NO**	**NOTES**	**CAAP 71**
1a	Has an assessment been undertaken and exercises conducted demonstrating a response time to any helicopter incident on the helideck within 1-minute?				Ch 17, 1 & 2
1b	Last Response Time test , date:_____ (15 secs, Completion < 30 secs)				Ch 17, 1 & 2
2	Is the objective, less than 15 seconds, measured from the time the system is activated to actual production at the required application rate achieved? (Exercise).				Ch 17, 1 & 2
3	Can the operational objective to ensure that the system is able to bring under control a helideck fire associated with a crashed helicopter within 30 seconds measured from the time the system is producing foam at the required application rate in all weather conditions be achieved?				Ch 17, 1 & 2
4	Where Fixed Monitor System is used, what are the angles between monitors? Angle(s):_____ Number of monitors:_____			Indicate positions & angles: 	Ch 17, 2
5a	**Principal Fire-Fighting Agent (Foam)** Is there a Certificate of conformity for each batch of foam? *(Available for audit)*				Ch 17, 2
5b	What is the foam application rate measured against the D-value: Rate:_____ litres per min (Example for a D-value 22.2 metre helideck). Application rate = 6.0 x ∏r2 (6.0 x 3.142 x 11.1 x 11.1) = 2322 litres per minute).				Ch 17, 2
5c	Can the Application rate be met? Can the "5-min" discharge capability be met?				Ch 17, 2
5d	Is there sufficient minimum operational stock				Ch 17, 2
5e	Is there 200% reserve foam stocks				Ch 17, 2
5f	Are hand-controlled foam branches available?				Ch 17, 2
5g	Type of Foam: _____% Discharge Rate: _____ Ltrs / min				Ch 17, 2
5h	Volume Available:_____ Ltrs				Ch 17, 2
5i	Are they remotely operable from the Helideck?				Ch 17, 2

5j	Are the Helideck crew familiar with the procedures?				Ch 17, 2
5k	Last Test Certificate, date:_____ Last Functional Check carried out, date:_____				Ch 17, 2
5l	Last Inspection Report, date:_____				Ch 17, 2
5m	Is a hand-held hose line reel monitor available? (At least 1 required) (Discharge rate 250Litres / min)				Ch 17, 2
5n	How many water hoses and hydrants? (At least 1 required)				Ch 17, 2
6a	**Complementary Media** Are Dry Chemical Powder units available? (Minimum 45 kgs) (Should be of "foam compatible" type) Number of Units : _____ Sizes :_____				Ch 17, 2
	Check Accessibility to Helideck Last Inspection Date :_____				Ch 17, 2
6b	Are Gaseous Agent (Carbon Dioxide: CO2 or equivalent) units available? (Minimum 22 kgs)				Ch 17, 2
	Check Accessibility to Helideck Number of Units :_____ Sizes :_____				Ch 17, 2
	Last Inspection Date :_____				Ch 17, 2
6c	Portable Foam Unit (NUI's Only)				Ch 17, 2
	Minimum requirement for MEDIUM H2 RFFS Standard Intensity NUI's Capacity:_____				Ch 17, 2
	Capacity: 1200lts Discharge Rate: 600lts Duration: 2 Minutes Last Inspection Date :_____				Ch 17, 2
	Is 200% reserve stocks of complementary media available?				Ch 17, 2
7	**Use and Maintenance of Foam Equipment** Have the following tests and inspection been conducted? Foam system installation test:_____ Date:_____				Ch 17, 2
	Periodic testing: :_____ Date:_____				Ch 17, 2
	Testing procedures for foam systems:_____ Date:_____				Ch 17, 2
	In-service test NFPA foam test procedures:_____ Date:_____				Ch 17, 2
8a	**Rescue equipment** Is a cabinet available and sited next to the Helideck? *(Should be easily accessible in event of Emergency)*				Ch 17, 6
8b	Is it secure and watertight?				Ch 17, 6
8c	Does it contain the following minimum required items? (Mark each item as appropriate)				Ch 17, 6
	a) Adjustable Wrench				Ch 17, 6
	b) Rescue axe, large (non-wedge or aircraft type)				
	c) Bolt Cutters				

	d) Crow Bar (Large)				
	e) Hook, grab or salving				
	f) Hacksaw (heavy duty) and six spare blades				
	g) Blanket, fire resistant				
	h) Ladder (two-piece) i) (For access to casualties in an aircraft on its side)				
	j) Life line (5 cm circumference x 15 m in length) plus rescue				
	k) Pliers, side cutting (tin snips)				
	l) Set of assorted screwdrivers				
	m) Harness knife and sheath n) (for each helideck crew member)				
	o) Gloves, fire resistant p) (for each helideck crew member)				
	q) Power cutting tool				
	r) Screw Drivers				
	s) Harness Knife x 2				
9	**Personal Protective Equipment (PPE)** Is the following provided for each fire-fighter?				Ch 17, 7
	a) Helmet with Visor				
	b) Gloves				
	c) Boots (footwear)				
	d) Tunic and Trousers				
	e) Flash-hoods				
	f) Ear protection				
10	**Respiratory Protective Equipment (RPE)** Are the following provided?				Ch 17, 8
	a) Positive Pressure SCBA. Sets x2				
	b) Full Back-up SCBA Cylinders x2				
	c) Ear protection for deck crew: all				
11	**HELIDECK EMERGENCY RESPONSE MANUAL (ERM)**	**YES**	**NO**	**NOTES**	**CAAP 71**
1	Does the ERM sets out the following procedures?				Ch 18, 1
	a) emergency duties and responses for the management				
	b) of the Helideck Landing Officer				
	c) helideck fire-fighting personnel				
	d) requirements for emergency drills and exercises				
	e) training and assessment of personnel				
2	Does it contain procedures for all emergency scenarios where helicopters may be involved ranging from dealing with major accident events and precautionary situations that occur on the installation and vessel to providing helicopter support for emergencies arising elsewhere?				Ch 18, 1
3	Does the ERM encourage full use of available fire-fighting appliances, rescue equipment and resources to best advantage including all elements for both on and off-shore co-ordination and				Ch 18, 1

	support?				
4	Are procedures in place for the following?				Ch 18, 1
	a) Crash on Helideck, Major Spillage with no fire				
	b) Significant fuel spillage, rotors turning (hot fuelling)				
	c) Emergency evacuation by Helicopter				
	d) Man over-board				
	e) Emergency or precautionary landing				
	f) Helicopter incident on landing				
	g) Dangerous goods spill/release				
12	**TRAINNG AND DEVELOPMENT**	**YES**	**NO**	**NOTES**	**CAAP 71**
1	Is a Structured Learning Programme (SLP) provided?				Ch 19, 2
2	Are training records available for all personnel? *(To be available for audit)*				Ch 19, 3
3	Has the duration and frequency of training been maintained? *(Provide details)*				Ch 19, 4
13	**METEOROLOGICAL EQUIPMENT PROVISION**	**YES**	**NO**	**NOTES**	**CAAP 71**
1	What MET Equipment is available? List: _____				Ch 20, 1
2	Fixed Anemometer KTS or MPH:_____ Calibration Dates:_____				Ch 20, 1
3	Hand Held Anemometer KTS or MPH:_____ Calibration Dates:_____				Ch 20, 1
4	Barometer Hpa or IN Hg:_____ Calibration Dates:_____				Ch 20, 1
14	**DECK MOTION REPORTING AND RECORDING**	**YES**	**NO**	**NOTES**	**CAAP 71**
1	Can helideck movement be measured? Pitch:_____ Roll:_____ Heave:_____				Ch 21, 1
2	Is an electronic Helideck Motion System (HMS) used?				Ch 21, 1
3	Is the HMS operator trained? *(Certificate to be available)*				Ch 21, 1
15	**REFUELLING OPERATIONS (IF PROVIDED)**	**YES**	**NO**	**NOTES**	**CAAP 71**
1	When was the System Inspected by an Authorised Fuel Inspector? *(Copy of last fuel Audit/Report required)* Name:_____ Company:_____ Date : _____				Ch 22, 1
2	When was the system last used? Date:_____ *(A System static for 3 months should be flushed & inspection)*				Ch 22, 1
3	What is the capacity and dispensing units of the Fuel System? LTR:_____ US GAL:_____ IMP GAL:_____ (Current Quantity)				Ch 22, 1

	(Circle unit of measurement)				
4	Is a Fuel Quality Check done prior to aircraft refuelling?				Ch 22, 1
5	Are current (in-date) Water Detector Kits available?				Ch 22, 1
6	Was a Company QA Inspection carried out, if not due when will it be required?				Ch 22, 1
7	Are all required records maintained as per Refuelling Manual?				Ch 22, 1
8	Are fuel sample retained in appropriate containers?				Ch 22, 1
9	Are the procedures aligned to the IATA fuel guidelines?				Ch 22, 1
16	**OPERATIONS INSPECTION (ON-SITE)**	**YES**	**NO**	**NOTES**	**CAAP 71**
1	Are the Deck Crew familiar with the required aircraft types? Date of last type-specific training: _____ Orientation Required:_____				Ch 19
2	Briefing Room – complete with TV and Video?				
3	Can you see the Helideck from the Radio Room?				
4	Is there a fixed multi-channel aeronautical VHF Radio installed? Allocated Frequency:_____				
5	HLO Radios & Headsets *(Minimum 2)*				
6	What other Communications Equipment is available? VHF FM: _____ Telefax:_____ Sat Phone:_____ Email:_____				
7	Is an operating NDB Installed? Freq and Ident:_____				
8	Is there a heavy duty Weighing Scale on board? Calibration Date : _____ Capacity : _____ (*Domestic scale not acceptable. Minimum capacity 300 kg)*				
9	Passenger Control: Have appropriate Passenger Safety Boards been provided?				
10	Does the Radio Operator maintain a Flight Log?				
11	Does the Radio Operator have an R/T Certificate and is he fluent in English?				
12	Did Radio Operator receive Helicopter Operator Briefing Pack? *(Briefing Video, Manifest, etc.) FAS/ADA/AGS/*_____				
13	Are wheel chocks available? *(3 sets)* Type: _____ Quantity: : _____				
14	A/C Tie Down Strops (3000kg Rated) X 4				
15	Condition of Baggage Trolley Acceptable:_____ Unacceptable:_____				
16	Record of the number of helicopter movements Last month: _____ Last year: _____				

17	HELIDECK OPERATOR – REGULATORY COMPLIANCE WITH SMS	YES	No	NOTES	CAAP 71
1	Is there a CAAP 71 compliance matrix? *(Documented evidence of compliance with CAAP 71)*				Ch 4, 1
2	Is there an established SMS (CAAP 71)?				Ch 4, 2
3	Does the Helideck Operations Manual meet the requirements of CAAP 71? *(Sample of operational procedures)*				Ch 4, 3
4	Are the helideck operating procedures comprehensively documented?				Ch 4, 2
5	Does the SMS include: a) a description of the overall philosophies, objectives and principles (Safety policy), signed by the Accountable Manager; b) clearly defined lines of responsibility & accountability; c) statement of accountabilities with named responsible persons, (Accountable Manager, Helideck Safety and Quality Assurance; Operations; Maintenance; Rescue and Fire-Fighting Service (RFFS); d) a policy and procedure for a systematic approach to hazard identification and risk management; e) a safety assessment: reference to Chapter 4, 2.2 d) and Chapter 2, 1.4 and AMC to 1.4); f) a policy and procedure for notification of safety critical issues / findings to stakeholders; Primary Accountable Organisation; g) a policy and procedure for ensuring that accidents, serious incidents, unlawful interferences as well as safety events identified as mandatorily reportable in CAR Part IX are reported to the GCAA through the Reporting of Safety Incidents (ROSI); h) a policy and procedure to educate their personnel of how to report an actual or potential safety deficiency through the Voluntary Reporting (VORSY) System; i) a policy and procedure for the acceptance and transfer of contracted vessels to assure compliance with GCAA regulations; j) a policy and procedure to ensure sub-contractor compliance with GCAA regulations; k) a policy and procedure for an internal safety oversight and auditing system; l) the means to verify the safety performance of the organisation with reference to the safety performance indicators and safety performance targets of the safety management system, and to validate the effectiveness of safety risk controls; m) a process to review the safety management system, identify the causes of substandard performance of the safety management system, determine the implications of such substandard performance in operations, and eliminate or mitigate such causes; n) a safety training programme that ensures personnel involved in the operation, rescue and fire-fighting, maintenance and management of the helideck are trained and competent to				Ch 4, 2

	perform their duties safely; o) a formal means for safety communication that ensures that personnel are fully aware of the safety management system, conveys safety critical information, and explains why particular safety actions are taken and why safety procedures are introduced or changed; p) a coordination of the safety management system with the helideck emergency response plan; and coordination of the helideck emergency response plan with the emergency response plans of those organisations it must interface with during the provision of helideck services; q) a policy and procedure for the maintenance of compliance against CAAP 71 for contracted helidecks; and r) a policy and procedure for recording the number of helicopter movements.				
6	Does the helideck operator engage, employ or contract sufficient and qualified personnel for the planned tasks and activities to be performed related to the operation, maintenance and management of the helideck in accordance with CAAP 71 (Training and Development of Personnel)?				Ch 19
7	Does the helideck operator ensure that personnel have demonstrated their capabilities in the performance of their assigned duties through proficiency check at adequate intervals to ensure continued competence?				Ch 19
8	Does the helideck operator ensure that unescorted persons operating on the helideck are adequately trained?				Ch 4
ADDITIONAL OBSERVATIONS, COMMENTS, DIAGRAMS					

APPENDIX C – CAAP 71: GCAA APPROVAL ASSESSMENT CHECKLIST - PRIMARY ACCOUNTABLE ORGANISATION

GCAA Approval Assessment Checklist – Primary Accountable Organisation

Aim: To confirm that the Primary Accountable Organisation meets the requirement to have a safety management structure in place, enabling effective safety oversight of helideck operating companies or specific helideck operators for which the Organisation is responsible for.

Present:

a) GCAA Team: Inspector(s)

b) Organisation: Accountable Manager

c) Organisation: Responsible persons for Safety and Quality Assurance; Operations; Maintenance; Rescue and Fire-Fighting Service (RFFS).

Documents / evidence required to be available to the GCAA at the commencement of the GCAA Approval Assessment:

A	Safety Management Structure - Documentary Evidence		Yes	No
a)	Organisational structure	Line of responsibility and accountability.		
b)		Statement of accountabilities – with named responsible persons: i. Accountable Manager ii. Safety and Quality Assurance iii. Operations iv. Maintenance v. Rescue and Fire-Fighting Service (RFFS)		
c)	Safety Assessment	A safety assessment. *Reference: Chapter 2: Safety risk management model (AMC to 1.4).*		
d)	Policies	Safety Policy signed by the Accountable Manager.		
e)		Statement and agreement between the Primary Accountable Organisation and named helideck operating companies or specific helideck operators for the system of safety oversight.		
f)		A policy stating the audit team are sufficiently trained and qualified for the planned tasks and activities to be performed.		
g)	Performance processes	The means to verify the safety performance of the organisation in reference to the safety performance indicators and safety performance targets of the safety management system, and to validate the effectiveness of safety risk controls.		
h)		A process to review the management system, identify the causes of substandard performance of the management system, determine the implications of such substandard performance in operations, and eliminate or mitigate such causes.		

B	Safety Oversight of Helidecks - Documentary Evidence		Yes	No
a)	List of facilities	List of helideck operating companies.		
		Data for each facility: i. Location ii. Owner (helideck operator or subsidiary company) iii. D-value iv. Unique identification name/number v. Class of Use		
b)	Policies and procedures	A policy and procedure for the audit process and content. (i.e. audit scope, audit periodicity; audit plan; audit programme; definition of findings).		
c)		A policy and procedure for the follow-up process on audit findings. (i.e. actions to be taken for safety critical issues; identifying causal factors and corrective actions; agreement on action plans; agreement on timescales).		
d)		A policy and procedure for notification of safety critical issues / findings to stakeholders and the GCAA.		
e)		A policy and procedure for document control of audits, reports and records.		
f)		A policy and procedure for investigations (safety incidents and accidents; ROSI).		
g)		A policy and procedure for communicating with the GCAA.		
h)	Audit documents	The Audit Programme (periodicity).		
i)		The Audit Plan (i.e. scope).		
j)	Audit reports	Reports since 1 January 2015 – compliance required for new facilities. *(Reference DG Directive: 01/2015)* Reports sampled (list): _____		
k)		Reports before 1 January 2015 Reports sampled (list): _____		
l)		i. Actions / closed actions / findings ii. Mitigations / controls for actions / findings still open Reports sampled (list): _____findings from reports		
m)		Reporting safety critical findings Findings sampled (list): _____		
n)	Audit team	Auditor / audit team: i. Training records ii. Training programme		

C	Example of a GCAA Approval Assessment Plan	
Day 1	In-brief: Opening meeting by GCAA	Present: 1. GCAA team 2. Primary Accountable Organisation (Accountable Manager, responsible persons as required by Chapter 3)
	Briefing by Primary Accountable Organisation	Overview of: 1. Organisation 2. Operation
	Requirement for a safety management structure	1. Organisational structure (i.e. accountabilities, responsibilities, agreements) 2. Safety assessment *Reference: Chapter 2: Safety risk management model (AMC to 1.4).* 3. Policies (i.e. safety policy, agreements; audit team) 4. Performance processes (i.e. SPI, SPT, review processes)
	Requirement for safety oversight of helidecks	1. List of each facility 2. Policy and procedure for audit process (i.e. audit scope, periodicity, plan, programme, definition of finding) 3. Policy and procedure for audit findings (i.e. action plans, actions for safety critical issues) 4. Policy and procedure for notification of safety critical issues / findings 5. Policy and procedure document control 6. Policy and procedure for investigations (i.e. safety incidents and accidents, ROSI,) 7. Policy and procedure for communicating with GCAA 8. Audit Programme 9. Audit Plan 10. Audit reports 11. Audit team training records
Day 2	Requirement for safety oversight of helidecks	Continuation
	Out-brief: Closing meeting by GCAA	Present: 1. GCAA team 2. Primary Accountable Organisation (Accountable Manager, responsible persons as required by Chapter 3)

United Arab Emirates

الهيئة العامة للطيران المدني
GENERAL CIVIL AVIATION AUTHORITY

CAAP 71: Helidecks (Off-Shore)

Primary Accountable Organisation: Requirements

Mohammed Yousif Mohamed, GCAA Aerodrome Operations Senior Inspector

Helidecks: Off-Shore

Introduction - GCAA Federal Regulations

GCAA Regulatory Oversight Model

Requirements of the Primary Accountable Organisation

Introduction
UAE Oil & Gas – Helidecks – 2012 GCAA Project

GCAA:

Federal authority for civil aviation (est. 1996 under Federal Law No. 4)
Member State to the International Civil Aviation Organisation
Promulgates policy for civil aviation and regulations (CARs & CAAPs)

Research:

- Investigations
- Consultation
- Training providers
- Industry best practice

Review:

- ICAO Annex 14 Volume II
- ICAO Heliport Manual
- UK CAP 437

GCAA Regulatory Model – GCAA State Safety Programme

The GCAA is responsible for:

- Safety Affairs
- Security Affairs
- Air Navigation Service Providers
- Strategy and International Affairs

The Safety Affairs sector manages the entire aviation safety affairs sector which consists of the following: Air Navigation and Aerodrome (ANA), Airworthiness (AW), Flight Operation (FOP), Licensing (LIC) and Policy, Regulation and Planning (PRP).

The Aviation Safety Sector was created to cluster all aviation safety related activities into one function. It is responsible for the regulation and oversight of the safety of the aviation industry in the United Arab Emirates.

Auditable by the ICAO

GCAA Regulatory Model – DG Directive 01-2015 (issued 8th January 2015)

IMPLEMENTATION OF HELIDECK REGULATIONS AND GUIDANCE MATERIAL

- CAAP 70 Heliports: Air Service and Private Use
- CAAP 71 Helidecks (Off-Shore)
- CAAP 72 Aircraft Landing Areas: Private Use (Not Air Service)

CAAP 71 is not new regulation – the latest editions includes detail on regulatory oversight, competencies and guidance material

From 1st January 2015 all new facilities are required to be compliant with GCAA regulations. Prior to that date, existing operational helidecks are required to be compliant by 1st January 2018.

GCAA Regulatory Model – CAAP 71: Helidecks (Off-Shore)

NPA CAAP 71: gcaa.gov.ae (e-publications)

Status of a “GCAA CAAP”:

- *Civil Aviation Advisory Publications (CAAP) are published by the GCAA under the authority and delegation of the Director General and in accordance with the provisions of GCAA Authority Law Article 7. The intent of these publications is to provide information and guidance material, as well as **GCAA requirements**, to operators of UAE registered aircraft and interested organizations and individuals.*

- *Although the CAAP itself is not a legal instrument, it may have legal effect in that failure to comply with specific requirements may lead to non-compliance with Civil Aviation Regulations. The use of the word “shall” in the CAAP should be seen as a **mandatory** requirement.*

GCAA Regulatory Model – CAAP 71: Helidecks (Off-Shore)

Primary Accountable Organisations

Helideck Operating Companies

Helideck Operators

SAFETY ASSESSMENTS

In order to aid the prioritisation process for compliance with GCAA regulations, Primary Accountable Organisations, helideck operating companies and helideck operators shall undertake a safety assessment of the facilities for which they are responsible for. The safety assessment shall be made available to the GCAA on request.

The safety assessment should be based on a safety risk management model, which should include hazard identification, safety risk assessment and mitigation processes.

Action Plan – with timeframe

GCAA Regulatory Model – CAAP 71: Helidecks (Off-Shore)

NPA CAAP 71: gcaa.gov.ae (e-publications)

Content - Summary

- GCAA Regulatory oversight Process
- **Requirements for a Primary Accountable Organisation**
- Requirements for a Helideck Operator
- Helideck Design Factors (including structural, access points, environment)
- Physical Characteristics
- Helideck Surface (including objects slopes, friction, perimeter net)
- Obstacle Environment (FLOPS assessments: Obs, direction of flight – based on design helicopter)
- Control of Cranes
- Visual Aids
- Aeronautical lights
- Parking Areas and Push-in Areas
- Not Permanently Attended Installations
- Personnel Requirements (including Dangerous Goods, responsibility of the HLO and Radio Operator)
- RFFS
- Training and Development of Personnel
- Meteorological Equipment Provision
- Deck Motion Reporting and Recording
- Compliance Checklists

GCAA Regulatory Model – CAAP 71: Helidecks (Off-Shore)

GCAA OVERSIGHT – PRIMARY ACCOUNTABLE ORGANISATIONS

What is a Primary Accountable Organisation?

The organisation or establishment with primary accountability for the safety oversight of helideck operating companies or helidecks for which it is responsible for.

GCAA regulatory oversight process is through an auditable approach of the with focus on regulatory compliance and the effectiveness of the Safety Management System and Quality Assurance processes, directed at the **Primary Accountable Organisation**.

GCAA Regulatory Model – The Primary Accountable Organisation

Requirements of the Primary Accountable Organisation

Subject to:

- *An initial GCAA Approval Assessment.*

  (Following the assessment process an Approval will be issued)

(CAAP 71: GCAA Approval Assessment Checklist).

- *Following the issue of Approval, the GCAA regulatory oversight process will be conducted as part of the GCAA Periodic Audit Programme.*

  (Not exceeding18 months)

(Audit of the policies, procedures and compliance statements, which may in the future involve site inspections of a helideck operating company or helideck operators).

GCAA Regulatory Model – Primary Accountable Organisation

The Primary Accountable Organisation: CAAP 71 Approval

Documents required, prior to assessment:

- Safety Management Structure
- Policy and Procedures for Safety Oversight of Helideck Operating Company or Helideck Operator

GCAA Regulatory Model – Primary Accountable Organisation

The Primary Accountable Organisation: CAAP 71 Approval Assessment

A	Safety Management Structure - Documentary Evidence		Yes	No
1a	Organisational structure	Line of responsibility and accountability		
1b		Named responsible persons: a) Accountable Manager b) Safety and Quality Assurance c) Operations d) Maintenance e) Rescue and Fire-Fighting Service (RFFS)		
2	Safety Assessment	a) Chapter 2: Safety risk management model (AMC to 1.4) b) Chapter 3: safety risk assessment process		
3	Risk Profile	Chapter 3: Risk profile		
4a	Policies	Safety Policy signed by the Accountable Manager.		
4b		Statement and agreement between the Primary Accountable Organisation and named helideck operating companies or specific helideck operators for the system of safety oversight.		
4c		Statement that audit team are sufficiently trained and qualified for the planned tasks and activities to be performed. Sample of: a) Training records: SMS b) Training records: technical		
4a	Performance processes	The means to verify the safety performance of the organisation in reference to the safety performance indicators and safety performance targets of the safety management system, and to validate the effectiveness of safety risk controls.		
4b		A process to review the management system, identify the causes of substandard performance of the management system, determine the implications of such substandard performance in operations, and eliminate or mitigate such causes.		

GCAA Regulatory Model – Primary Accountable Organisation

The Primary Accountable Organisation: CAAP 71 Approval Assessment

B	Safety Oversight of Helidecks		Yes	No
1a	List of facilities	List of helideck operating companies.		
1b		Data for each facility: a) Location b) Owner (helideck operator or subsidiary company) c) D-value d) Unique identification name/number e) Class of Use		
2	Safety Assessment	Chapter 2: Safety risk management model (AMC to 1.4)		
3a	Policy and procedure	A policy and procedure for the audit process and content. (i.e. audit scope (including requirements in CAAP 71, Chapter 4), audit periodicity; audit plan; audit programme; definition of findings; standardised audit checklists).		
3b		A policy and procedure for the follow-up process on audit findings. (i.e. actions to be taken for safety critical issues; identifying causal factors and corrective actions; agreement on action plans; agreement on timescales)		
3c		A policy and procedure for document control of audits, reports and records.		
3d		A policy and procedure for investigations (safety incidents & accidents; ROSI).		
3e		A policy and procedure for reporting to the GCAA.		
4a	Audit documents	The Audit Programme (periodicity).		
4b		The Audit Plan (i.e. scope).		
5a	Audit reports	Reports since 1 January 2015 – compliance required for new facilities (DG Directive: 01/2015) Reports sampled (list): _____		
5b		Reports before 1 January 2015 Reports sampled (list): _____		
5c		a) Actions / findings from reports b) Closed actions / findings c) Mitigations / controls for actions / findings still open Reports sampled (list): _____		
5d		Reporting safety critical findings Findings sampled (list): _____		

GCAA Regulatory Model – Primary Accountable Organisation

The Primary Accountable Organisation: Approval Assessment Plan

Day 1	**Requirement for a safety management structure**	**1. Organisational structure** **(i.e. accountabilities, responsibilities, agreements)** **1. Chapter 2: Safety risk management model (AMC to 1.4)** **2. Chapter 3: safety risk assessment process** **3. Risk profile** **4. Policies and procedures** **(i.e. safety policy, audit team: training records)** **1. Performance processes** **(i.e. SPI, SPT, review processes)**
	Requirement for oversight of helideck operating company	1. List of each facility 2. Policies and procedures (i.e. audit scope, periodicity, plan, programme, definition of finding, standard checklists) 1. Policy and procedure for audit findings (i.e. action plans, actions for safety critical issues) 1. Audit document control 2. Policy and procedure for investigations (i.e. safety incidents and accidents, ROSI,) 1. Policy and procedure for reporting to GCAA 2. Audit reports, Audit Plan and Audit Programme
Day 2	Requirement for oversight of helideck operating company	Continued

GCAA Regulatory Model – Primary Accountable Organisation

The Primary Accountable Organisation: Approval Issued

GCAA approval signifies that the Primary Accountable Organisation has in place:

- an acceptable safety management and quality assurance structure
- policies and procedures for the safety oversight of helideck operating companies and helideck operators
- a trained, qualified and an impartial audit team(s)
- a system for reporting to the GCAA: a list of helideck operators and data, annual audit programme and audit findings

Once issued, GCAA regulatory oversight process will commence - as part of the GCAA Periodic Audit Programme.

GCAA Requirements for a Helideck Operator

The Helideck Operator is required to:

- Have a safety management system in place to enable an effective safety oversight of helideck operations
- Demonstrate regulatory compliance for each helideck with reference to CAAP 71 to the Primary Accountable Organisation
- Provide access to all safety related documents for the purpose of safety oversight and provision of evidence of compliance to the Primary Accountable Organisation (and the GCAA on request)

Policy and procedures documented and include:

- Policy and procedure to maintain a current Helideck Operations Manual
- Policy and procedure to monitor compliance with relevant GCAA requirements
- Evidence to support regulatory compliance with CAAP 71

(CAAP 71: Content of a Helideck Manual; Compliance Checklist)

GCAA Regulatory Model: Helideck Owner

GCAA Regulatory – Evidence of Compliance

- Evidence of compliance with the design criteria and infrastructure; and
- Evidence of compliance prior to leasing the facility within the UAE; including commissioning requirements of equipment (examples: fire-fighting systems, lighting systems)

Comments and Questions