GACAR PART 138 – CERTIFICATION, AUTHORIZATION AND OPERATION OF HELIPORTS

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SUBPART A – CERTIFICATION AND AUTHORIZATION

§138.101 General

(a) This part is promulgated in accordance with the Article 33 of the Civil Aviation Law of the Kingdom of Saudi Arabia, which states that no civil aerodromes or airfields may be constructed, used, or invested in, in the Kingdom of Saudi Arabia without approval of the President. Heliports means aerodromes which include helideck and shipboard heliports in this part.

(b) The heliport design specifications, operation and management requirements for certification or authorization of civil heliports, helidecks and shipboard heliports are prescribed in this part.

§138.103 Applicability

(a) This part is applicable to all civil heliport operators including, those operators operating heliports inside an aerodrome under the provisions of GACAR Part 139.

(b) The requirements of this part are applicable to each person employed or used by a heliport operator certificated or authorized under this part.

(c) Each heliport operator seeking certification or authorisation must comply with the requirements of this part.

(d) All existing certificated or registered heliport operators including those operators operating inside the aerodromes must comply with the requirements of this part before January 1, 2023.

(e) Heliports located inside certificated aerodromes continue to be certificated as a part of aerodromes complying with the provisions of this part.

§ 138.105 Heliports Classification and Certification/Authorization Requirements

(a) For the purpose this part, heliports are classified as follows:

(1) **Civil/Public Heliports:** A heliport which is open to the public and serves helicopter operations offering scheduled or non-scheduled commercial air services. All civil/public heliports in KSA must be certificated under the provisions of this part.

(2) **General Aviation Heliports:** A General Aviation heliport must be authorized under provisions of this part, is any heliport used to serve helicopter operations for any purpose other than those listed in § 138.105 (a) (1). General Aviation heliports include but not limited to the following:

(i) Private Heliport. A heliport used for operation of helicopters for use by the owner or operator and not open to the public.

(ii) Hospital Heliport**.** A heliport used for helicopter operations associated with hospital emergency medical services.

(iii) Flight Training Heliport**.** A heliport used by flight training schools for providing pilot training and used by the flight instructors, pilots, flight crews and trainees only.

(iv) General Purpose Heliport. A heliport used for recreation, aerial work, or airshows, or to conduct the specified business of an organization other than the classified heliports mention in § 138.105 (a) (1).

(3) **Shipboard Heliports:** A heliport located on a ship that is registered in Saudi Arabia or a ship registered in any other country and its heliport is intended for use within the national waters of Saudi Arabia. All such heliports other than those classified shipboard heliports mention in § 138.105 (a) (1) must be authorized under the provisions of this part

(4) **Helidecks:** A helideck located in an off-shore installation for use of noncommercial air operation. All such helideck must be authorized under the provisions of this part.

(5) **Temporary Heliports:** For the purpose of this part, a temporary heliport is any of the following:

(i) A heliport intended for one time use only; or

(ii) A heliport intended for time limited single-event use.

(b) Each heliport operator must establish necessary facilities and install necessary equipment, appoint personnel for managerial and operational functions and develop documented procedures and manuals as per the requirements given in this part.

(c) Public heliport operators applying for certification must nominate a suitable person to act as the Heliport Accountable Executive in accordance with GACAR Part-5 (§ 5.25 (a) and (b)) in addition to nominating suitable personnel, who must be accepted by the President for the following functional positions:

(1) Persons reporting directly to the Heliport Accountable Executive:

i. Person In-Charge of the Heliport

ii. Person In-Charge of Safety in accordance with GACAR Part 5 (§ 5.25 (c))

(2) Persons reporting directly to Person In-Charge of the Heliport:

i. Person In-Charge of Operations

ii. Person In-Charge of Maintenance

iii. Person In-Charge of Rescue and Firefighting Services (RFFS)

(d) The heliport operators requiring certification must submit customized documents and procedures manuals relevant to the operation. The operators applying for certification are required to submit at least the following documents and procedures manuals:

(1) Heliport Operation Manual (HOM)

(2) Safety Management System Manual (SMSM)

(3) Security Manual (SPM); and

(4) Heliport Emergency Manual (HEM)

(e) The heliport operators applying for authorization under § 138 Subpart C are required to nominate a suitable person to function as the Person In-charge of the Heliport.

(f) The applicant seeking authorization under § 138 Sub Part C may submit separate procedures or a customized procedures manual for Heliport Operation Procedures, Emergency Procedures, Safety Management, and Security Procedures.

(g) The number of managerial positions mentioned in § 138.105 (c) and (e) to be nominated must depend upon the size, nature and complexity of the operations of heliport as acceptable to the President.

§ 138.107 Person in Charge of the Heliport

(a) The Person in Charge of the Heliport assumes the responsibility for the overall compliance of the certificated heliport with regulatory requirements of this part, assumes the direct supervision of the Person In-charge of Operations, Person In-charge of Maintenance, and Person In-Charge of Rescue and Firefighting Services (RFFS) in the certificated heliport, and reports to the Heliport Accountable Executive.

(b) Depending on the size and complexity of the heliport and the suitability of the nominated person, the President may accept the Heliport Accountable Executive to hold the position of the Person in-charge of the Heliport.

(c) Depending on the size and complexity of the heliport and the suitability of the nominated person, the President may accept one person to hold the position of the Person in Charge of the Heliport while holding any of the other positions in § 138.105.

§ 138.109 Heliport Management Personnel

(a) Each heliport certificate or authorization holder must nominate adequately qualified management person or group of persons as specified in § 138.105 (c) and (e), whose responsibilities are to ensure that the organization complies with the requirements of the heliport operation, maintenance, and safety functions.

(b) The certificate or authorization holder must appoint at least the minimum number of management personnel as specified in § 138.105 (c) and (e).

(c) The person in-charge of heliport operations is responsible for ensuring that the heliport operations are performed in accordance with the accepted manuals and procedures and are in compliance with the requirements of this part.

(d) The person in-charge of heliport maintenance is responsible for ensuring that the heliport's maintenance program is carried out in compliance with this part.

(e) The Person in-charge of the heliport safety must satisfy the requirements of GACAR Part-5 (§ 5.25(c)) and reports to the Heliport Accountable Executive.

(f) The person in-charge of heliport rescue and firefighting services is responsible to establish and effectively manage all activities related to the rescue and firefighting services.

(g) Except for the Heliport Accountable Executive and the Person In-charge of Safety, who must be appointed in accordance with GACAR Part-5, the management personnel specified in § 138.105 (c) and (e) must be appropriately qualified, experienced, and trained as acceptable to the President and all such details are to be described in the heliport manual.

(h) The heliport management personnel must have relevant knowledge and skill to perform the duties and responsibilities, including adequate knowledge in the following subjects:

(1) Civil aviation Law and relevant GACARs;

(2) Customized Heliport Operation Manual and Operation Procedures; and

(3) Theory and practical related to their functions and responsibilities.

(i) The President may authorize any management person in the organization, including the Accountable Executive to oversee additional management functions, depending upon the size and complexity of operations and suitability of the person.

(j) The names and titles of the management personnel including additional responsibilities with organizational chart must be listed in heliport operation manual.

(k) The heliport operator must identify an alternate person to each position to deputize that the management functions are smoothly continued during a long leave or absence of a management personnel. The names of deputizing personnel in each function are to be listed in the heliport operation manual.

(l) The heliport operator must inform the President in writing that if any management personnel is on leave or absent for a period of exceeding 30 days, and an alternate person is assigned to ensure continued operation of the heliport.

(m) All heliport operators, must have minimum number of personal required for operation, safety, maintenance, and rescue and firefighting which must be determined based on a task resource analysis.

§ 138.111 Prohibition of the Problematic use of Psychoactive Substances

(a) The requirements prescribed in GACAR Part 7 are applicable to all heliport operators certified or authorized under this part.

(b) No person on the maneuvering area, movement area, or stands/apron of a heliport will be under the influence of any psychoactive substance, by reason of which human performance is impaired.

(c) No heliport operator allows a person who appears to be or conducts by manner or physical indications that the individual is under the influence of psychoactive substances (except patients under medical care) on the maneuvering area, movement area or apron stands of the heliport.

(d) Whenever the President has a reasonable basis to believe that a person is under the influence of psychoactive substances, the President may seek the person to undergo necessary examination or tests at the authorized medical center or lab to confirm whether the person is under the influence of any psychoactive substances.

§ 138.113 Specific Procedures for Heliport Operations

(a) The certificated and authorized heliports must allow operations of helicopters for which the design of physical and operational characteristics of heliport is suitable.

(b) When operational parameters of a helicopter exceed the authorized or certified physical and operational characteristics of the heliport, the heliport operator must carry out a compatibility study and take suitable actions to confirm the acceptable level of safety in operation, prior to permitting such operations.

(c) Information concerning change of operational procedures and operating restrictions implemented at a heliport and granted regulatory exemptions to heliport operations must be published in the KSA AIP.

§ 138.115 Maintenance Service Provider Acceptance.

(a) No heliport certificate holder may outsource heliport maintenance services unless otherwise accepted by the President.

(b) For acceptance of maintenance Services, the heliport operator must apply in a form and manner acceptable to the president.

§ 138.117 Heliport Consultant Entity.

(a) Heliport consultant is a legal entity that has the expertise in discharging the functions of designing, constructing and/or carrying out the supervisory functions.

(b) The Heliport Certificate holder / operator is fully responsible to choose the appropriate consultant based on its ability to demonstrate proven related experience, adequacy of competent personnel, an effective quality management system, and any other requirements related to the consultant's areas of involvement.

§ 138.119 Inspection Authority

(a) President or an authorized representative has the authority to conduct planned inspections, unannounced spot inspection, audits and onsite verification of facility, documents, and records to determine the compliance with the regulatory requirements.

(b) The heliport operator must allow the President or his/her representative to have unrestricted access to all the areas of the heliport.

(c) Legal enforcement action may be taken as per the provisions of GACAR Part 13, where the President determines that a violation has occurred. The president may decide the circumstances or

conditions under which the heliport certification or authorisation holder deal with violation found during the internal process of audits and inspections.

§ 138.121 Exemptions

(a) In case of any deviation from any heliport specification that is permitted under the regulations in this part, an applicant must conduct an aeronautical study as acceptable to the President and provide mitigation measures for safe operation.

(b) Exemptions from the regulatory requirements or standards of this part must be processed as per the regulations stipulated in GACAR Part 11 in addition to requiring the applicant to prepare an aeronautical study to provide an equivalent level of safety to the regulation from which to be exempted.

(c) A list of all granted deviations and regulatory exemptions must be included in the aerodrome operations manual as stipulated in Appendix A-1 to this part.

Note- Aeronautical studies are covered in Appendix D-2 to this part.

§ 138.123 Classification of Findings

(a) A level 1 finding is any significant non-compliance with the GACAR Part 138 requirements which lowers the safety standard and hazards seriously the flight safety.

(b) A level 2 finding is any non-compliance with the GACAR Part 138 requirements which could lower the safety standard and possibly hazard the flight safety.

(c) Level 3 finding is an observation or recommendation to improve safety standards and/or achieve a better practice by addressing deficiencies that may lead to potential findings of Level 2 if not corrected.

(d) On receipt of notification of findings, heliport certificate holder must develop a corrective action plan and demonstrate corrective action to the satisfaction of the President within a period agreed.

SUBPART B – CERTIFICATION OF HELIPORTS

§ 138.125 Heliport Certification requirement

(a) The issuance of heliport certificate is applicable to the heliports open to the public and to serve helicopter operations offering commercial air operations.

(b) No heliport operators are permited to operate public heliport unless certified as per the provisions of this part.

§ 138.127 Application for Certification

(a) The application for certification of heliport must be submitted in a form and manner acceptable to the President.

(b) The applicant must ensure that the heliport physical characteristics, facilities, services, and equipment installed and meet the requirements of this part.

(c) The application for the heliport certification must be submitted in a prescribed form along with the following documents, manuals, approvals, agreements, and reports:

(1) Statement of regulations compliance in prescribed form with completed compliance checklist;

(2) List of Management Personnel along with curriculum vitae and relevant testimonials;

(3) Heliport Operation Manual (HOM);

(4) Safety Management System Manual (SMSM);

(5) Heliport Emergency Manual (HEM);

(6) Heliport Obstacle Survey Reports;

(7) Aeronautical Study Reports, if applicable;

(8) Approvals for operation of heliport from Principality;

(9) Agreement for Providing Air Navigation Services for heliport.

(10) Heliport Land Ownership proof or Lease Agreement; and

(11) Any other relevant documents as required by the President.

§ 138.129 Issuance of Heliport Certificate

An applicant may be issued with a Heliport Certificate upon confirming that the applicant meets the provisions of this part and no findings or deviations are reported or once the corrective action plans are accepted and mitigation measures are agreed upon.

§ 138.131 Validity of the Certificate

(a) The Heliport certificate is issued and renewed for a maximum period of three years. It remains valid subject to the condition that:

(1) The organization is remaining in compliance with requirements this part;

(2) The certificate is not being surrendered or revoked; and

(3) The President suspends or cancels the certificate.

(b) Upon surrender or revocation, the certificate must be returned to the GACA.

§ 138.133 Renewal and Amendment to the Certificate

(a) The heliport certificate holder must apply to the President for renewal or reissuance of the certificate at least three months in advance to the expiry of validity of the certificate or commencement of operation. The application must be submitted along with the updated documents and duly completed checklists as per requirements given in §138.127.

(b) The certificate holder must have procedures in heliport operation manual to notify the President of any changes in the organization's activities or approvals or locations or personnel.

(c) No heliport certificate holder implements any major changes as mentioned in § 138.133 (b) without prior acceptance of the President. Major changes are those that have direct or indirect influence in the safety of the operation including:

(1) The physical characteristics of the heliport;

(2) The location of the principal base of operations of the certificate holder;

(3) Change of management personnel; or

(4) The heliport operation manual, operating procedures, facilities, systems, any work that may affect the safety of the heliport operations.

(d) The certificate holder must apply in a form and manner acceptable to the president for acceptance of any major changes that affect the scope of certification and require revisions to the heliport operation manual.

§ 138.135 Cerificate Holder Responsibilities

(a) The heliport Certificate holder is responsible:

(1) To maintain the heliport in accordance with requirements specified in the accepted heliport operation manual and requirement of this part;

(2) To update and distribute the heliport operation manual among all stakeholders;

(3) To appoint suitably qualified, trained, and experienced management personnel as required in §138.107 and §138.109 of this part;

(4) To prepare, implement and monitor the service level agreements, in case any of the heliport services are outsourced;

(5) To inform the President whenever services or facilities fall below the requirements prescribed in the Heliport Operation Manual;

(6) To be responsible for the heliport infrastructure development, change management and tasks carried out at the recommendation of the design consultants and/or by the supervisory consultants as per the set standards;

(7) To take the overall responsibility of heliport maintenance that are to be performed as per the approved standards;

(8) To report safety occurrences including any incidents, serious incidents, and accidents to the President in accordance with the requirements stipulated in GACAR Part 4; and

(9) To implement SMS in accordance with the requirement of GACAR Part 5.

(b) Any other responsibility assigned by the President.

§ 138.137 Heliport Operation Manual

(a) Heliport operators, intend to apply for certification, must develop and submit the Heliport Operation Manual (HOM) for acceptance by the President.

(b) Each heliport certificate holder must develop the Heliport Operation Manual as per contents prescribed in Appendix A-1 of this part.

(c) A signed copy of Heliport Operation Manual must be submitted to the GACA in a print form.

(d) Granted regulatory exemptions must be published in the AIP.

(e) Maintain at least one copy of updated Heliport Operation Manual at the Heliport and one copy at the operator's principal place of business, if other than the heliport.

(f) Ensure that the appropriate portions of the Heliport Operation Manual are readily accessible to heliport operating personnel for reference on day-to-day activities.

(g) Any proposed amendment to the Heliport Operation Manual must be submitted to the President at least 30 working days before the proposed effective date unless a shorter filing period is accepted by the president. The relevant portion only of the amendments, to be made in the Heliport Operation Manual, needs to be submitted

(h) The revised pages must be appended with the Heliport Operation Manual once the amendments are accepted by the President.

§ 138.139 Safety Management Systems

(a) The certificate holder must develop and implement Safety Management System as per the provisions of GACAR Part 5.

(b) The Safety Management System Manual (SMSM), for the purpose of implementing the heliport SMS requirements as mentioned in § 138.135- (a)-9, must be developed in accordance with contents stipulated in the GACAR Part 5 and submitted to the President for acceptance.

§ 138.141 Competence of Personnel

(a) The heliport operator must describe the following competency requirements in the heliport operation manual and ensure that the persons possess competency with regard to:

(1) Relevant knowledge, skills and experience in the respective field of heliport operation, maintenance, safety, rescue and firefighting;

(2) Appropriate attitude towards safety and observance of procedures; and

(3) Knowledge of the associated procedures of the certificate holders.

(b) In accordance with the job function, adequate initial and recurrent training must be provided to persons to ensure that continued competence is maintained throughout the duration of employment or contract.

(c) The training program must be developed so as to ensure that each employee assigned to perform the functions including operation, safety, rescue and firefighting, and maintenance function is capable to perform the assigned task.

(d) The certificate holder must maintain the training records of all the personnel who have been imparted the training.

(e) Each person in the organization must be assessed in accordance with the procedure as established by the aerodrome operator to ensure that personnel competency is satisfactory for functions to be performed.

(f) Each technical person such as operation, firefighting and rescue, maintenance and safety must undergo refresher training at least once in two years.

(g) Training program must be developed taking into account of requirements of relevant GACARs.

SUBPART C – AUTHORIZATION OF HELIPORTS

§138.145 Authorization of Heliports

(a) The issuance of heliport authorization is applicable to heliports as per the classification of heliports stipulated in §138.105.

(b) No heliport operator is permitted to operate heliport or provide services without obtaining prior authorization from the President for the type of operations.

§138.147 Application for Heliport Authorization

(a) The application for authorization of heliport must be submitted in a form and manner acceptable to the President.

(b) The applicant must ensure that the heliport physical characteristics, facilities, heliport support services and equipment installed meet the requirements of this part.

(c) The application for the heliport authorization must be submitted in a prescribed form along with the following documents, approvals, agreements, and reports:

(1) Statement of regulatory compliance along with completed compliance checklist;

(2) List of Management Personnel and their biodata with relevant testimonials;

(3) Heliport Operation Procedures (HOP);

(4) Safety Management System (SMS);

(5) Heliport Emergency Procedures (HEP);

(6) Heliport Obstacle Survey Reports;

(7) Aeronautical Study Report, if applicable;

(8) Approvals for operations of heliport from Principality;

(9) No objection certificate for operations of heliport from Saudi Air Navigation Services (SANS);

(10) Heliport Land Ownership proof or Lease Agreement; and

(11) Any other relevant documents as required by the President.

(d) The applicant or operator for heliport authorization may decide to have a separate document for 138.147 (c) - (3), (4) and (5) or a combined customized manual for operation procedures, safety management system and emergency procedures incorporating all in the Heliport Operation

Procedures Manual (HOPM) depending on the size and complexity of the heliport requirements and operations.

§138.149 Issuance of Authorization

An applicant may be issued a heliport authorization upon confirming that the applicant meets the requirements of this part and no findings or deviations are reported or once the corrective action plans are accepted and mitigation measures are agreed upon.

§138.151 Continued Validity of the Authorization

(a) The Heliport authorization issued will remain valid, subject to:

(1) The organization is remaining in compliance with this part;

(2) Provide access of heliport to GACA officers to determine continued compliance with the requirements;

(3) The authorization is not being surrendered or revoked; and

(4) The President suspends or cancels the authorization.

(b) Upon surrender or revocation, the authorization must be returned to the President.

§ 138.153 Amendment to the Authorization

(a) The authorization holder must describe provisions for an amendment in heliport operation procedures manual as how to notify the President of any changes in the organization's activities or approvals or locations or personnel.

(b) No heliport authorization holder implements any major changes as mentioned in § 138.153 (a) without obtaining prior approval from the President. Major changes are those changes in the organization that affects the standards stipulated in this part or have direct or indirect influence on the safety of the operation including:

(1) The physical characteristics of the heliport;

(2) The location of the principal base of operations of the authorization holder;

(3) Change of management personnel; or

(4) The heliport operation manual, operating procedures, facilities, systems, any work that may affect the safety of the heliport operations.

§ 138.155 Responsibilities of the Authorization Holder

An authorization holder of a heliport must:

(a) Have a single point of responsibility for the authorized heliport for its management of safe operation, maintenance, and security as per the provisions of this part.

(b) Conduct heliport operations which meet the safety management system requirements in accordance with GACAR Part 5 as appropriate to the size and complexity of the operation.

(c) Report safety occurrences to the President in accordance with requirements stipulated in GACAR Part 4.

(d) Provide initial training to all technical personnel prior to assign them tasks independently, and conduct refresher training at least once in two years to ensure that continued competence is maintained throughout the duration of their employment or contract.

§138.157 Permission of Temporary Heliports

a) No person may use a temporary heliport unless otherwise permitted by the President.

b) An applicant of a temporary heliport must apply to GACA prior to the use of the temporary heliport in a form and manner acceptable to the President.

c) For the use of temporary heliports, the heliport operator and the helicopter operator must ensure that the heliport is suitable and safe in terms of physical and operational characteristics for the intended type of helicopter operations.

SUBPART D – HELIPORT DESIGN AND ESTABLISHMENT

§138.161 Heliports Design and Location

(a) The heliport operator must give due consideration for design of heliports taking into account the land-use and environmental impact control measures.

(b) Heliport design and location must be selected such that the downwind operations are avoided and cross wind operations are kept to a minimum.

(c) The heliport usability factor and the orientation for approach and take-off direction must be considered during the project feasibility and design stage that heliport is available for maximum time for operations. The usability factor must be at least 95 percent for public heliport for their intended operations.

§138.163 Permission for Design and Establishment of Heliports.

(a) Any person or organization intending to establish a heliport, must apply in a form and manner acceptable to the president for prior permission.

(b) The applicant must be the legal owner of the land or hold valid lease agreement or legal rights to use the land for the purpose of establishment of the heliport.

(c) In case of engaging a specialized consultant in design or supervisory function, the applicant must obtain prior permission from the President by submitting the details of the consultant in prescribed form.

(d) Notwithstanding the permission granted to establish heliports or engaging heliport design consultants, the heliport operator must obtain certification or authorization prior to commence operations.

§138.165 Application for Establishing a New Heliport

(a) The applicant must submit the following documents for the grant of permission:

(1) Application for establishment of heliport in the prescribed form;

(2) Statement of Regulations Compliance in the prescribed form;

(3) Proof of Ownership or Lease Rights of the land;

(4) Environment Impact Assessment Report;

(5) Heliport Feasibility Study Report (including site selection, weather data, tabulated wind data, wind rose analysis, approach and take-off climb surfaces, transitional surfaces, orientation, obstacle limitation surfaces survey, topographical area map, critical helicopter details, heliport design and master plan with dimensions, visual aids – markings, lightings, wind direction indicators and markers.);

(6) Aeronautical Study Report, if applicable;

(7) Approvals for establishment of heliport from Principality;

(8) No objection certificate for establishment of heliport from Saudi Air Navigation Services;

(9) Details of Consultant Entity, if appointed.

(b) Any other relevant document(s) required by the President.

§138.167 Grant of Permission

(a) An applicant may be granted permission to establish a new heliport, if the President considers that the applicant meets the requirements of this part;

(b) The President may stipulate additional requirements or conditions that are necessary to be included to ensure aviation safety; and

(c) President may suspend or cancel the establishment permission, if convinced that applicant has violated the provisions of the permission or the GACARs that affect the safety of operation.

§138.169 Construction of Heliport

(a) The applicant, once granted the establishment permission, must construct the heliport as per provisions of the permission and requirements of the relevant authorities for construction and safety regulations.

(b) The applicant must allow the GACA to inspect the heliport to ensure that the heliport has been constructed as per provisions of the establishment permission and meets the requirements of this part.

§138.171 Establishment of Temporary Heliports

(a) For the establishment of temporary heliports, the operator must ensure that the heliport is suitable in terms of physical and operational characteristics for the intended type of helicopter operations.

(b) Applicant must apply to GACA prior to the establishment of the temporary heliport in a form and manner acceptable to the President.

(c) The temporary heliport must satisfy all the conditions stipulated in the President's permission.

SUBPART E – HELIPORT DATA

§ 138.201 Common reference systems

(a) The following common reference systems must be used for heliports for establishing horizontal, vertical and temporal references.

(i) Horizontal Reference System - World Geodetic System — 1984 (WGS-84) must be used as the horizontal (geodetic) reference system. Reported aeronautical geographical coordinates (indicating latitude and longitude) must be expressed in terms of the WGS-84 geodetic reference datum.

(ii) Vertical Reference System-Mean Sea level (MSL) datum, which gives the relationship of gravity-related height (elevation) to a surface known as the geoid, must be used as the vertical reference system.

(iii) Temporal Reference System - The Gregorian calendar and Coordinated Universal Time (UTC) must be used as the temporal reference system.

§ 138.203 Aeronautical data

(a) Determination and reporting of heliport-related aeronautical data must be in accordance with the accuracy and integrity classification required to meet the needs of the end-user of aeronautical data.

(b) Digital data error detection techniques must be used during the transmission and/or storage of aeronautical data and digital data sets.

§ 138.205 Heliport reference point

(a) A heliport reference point must be established for a heliport not collocated with an aerodrome.

(b) The heliport reference point must be located near the initial or planned geometric center of the heliport and must normally remain where first established.

(c) The position of the heliport reference point must be measured and reported to the President in degrees, minutes and seconds.

(Note – When the heliport is collocated with an aerodrome, the established aerodrome reference point serves both aerodrome and heliport.)

§ 138.207 Heliport elevations

(a) The heliport elevation and geoid undulation at the heliport elevation position must be measured and reported to the aeronautical information services authority to the accuracy of one-half center or foot.

(b) The elevation of the TLOF and/or the elevation and geoid undulation of each threshold of the FATO (where appropriate) must be measured and reported to the President to the accuracy of one-half meter or foot.

§ 138.209 Heliport dimensions and related information

(a) The following data must be measured or described, as appropriate, for each facility provided on a heliport:

(1) heliport type — surface-level, elevated, shipboard or helideck;

(2) TLOF — dimensions to the nearest meter or foot, slope, surface type, bearing strength in tonnes (1000kg);

(3) FATO — type of FATO, true bearing to one-hundredth of a degree, designation number (where appropriate), length and width to the nearest meter or foot, slope, surface type;

(4) safety area — length, width and surface type;

(5) helicopter taxiway and helicopter taxi route – designation, width, surface type;

(6) apron — surface type, helicopter stands;

(7) clearway — length, ground profile; and

(8) Visual aids for approach procedures, marking and lighting of FATO, TLOF, helicopter ground taxiways, helicopter air taxiways and helicopter stands.

(b) The geographical coordinates of the geometric center of the TLOF and/or of each threshold of the FATO (where appropriate) must be measured and reported to the President in degrees, minutes, seconds and hundredths of seconds.

(c) The geographical coordinates of appropriate center line points of helicopter taxiways and helicopter taxi route must be measured and reported to the President in degrees, minutes, seconds and hundredths of seconds.

(d) The geographical coordinates of each helicopter stand must be measured and reported to the President in degrees, minutes, seconds and hundredths of seconds.

(e) The geographical coordinates of obstacles in Area 2 (the part within the heliport boundary) and in Area 3 must be measured and reported to the President in degrees, minutes, seconds and tenths of seconds. In addition, the top elevation, type, marking and lighting (if any) of obstacles must be reported to the President.

§ 138.211 Declared distances

(a) The following distances to the nearest meter or foot must be declared, where relevant, for a heliport:

(1) Take-off distance available;

(2) Rejected take-off distance available; and

(3) Landing distance available.

§ 138.213 Coordination between aeronautical information services and heliport authorities

(a) To ensure that aeronautical information services units obtain information to enable them to provide up-to-date pre-flight information and to meet the need for in-flight information, arrangements must be made between aeronautical information services and the GACA responsible for heliport services to report to the responsible aeronautical information services unit, with a minimum of delay:

(1) Information on heliport conditions;

(2) The operational status of associated facilities, services and navigation aids within their area of responsibility;

(3) Any other information considered to be of operational significance.

(b) Before introducing changes to the air navigation system, due account must be taken by the services responsible for such changes of the time needed by the aeronautical information service for the preparation, production and issue of relevant material for promulgation. To ensure timely provision of the information to the aeronautical information service, close coordination between those services concerned is therefore required.

(c) Of a particular importance are changes to aeronautical information that affect charts and/or computer-based navigation systems which qualify to be notified by the aeronautical information regulation and control (AIRAC) system. The predetermined, internationally agreed AIRAC effective dates in addition to 14 days' postage time must be observed by the responsible heliport services when submitting the raw information/data to aeronautical information services.

(d) The heliport services responsible for the provision of raw aeronautical information/data to the aeronautical information services must do that while taking into account accuracy and integrity requirements for aeronautical data.

(Note — The AIRAC information is distributed by the AIS at least 42 days in advance of the AIRAC effective dates with the objective of reaching recipients at least 28 days in advance of the effective date).

§ 138.215 Rescue and Firefighting

(a) Information concerning the level of protection provided at a heliport for helicopter rescue and firefighting purposes must be made available in heliport operation manual and the AIP.

(b) The level of protection normally available at a heliport must be expressed in terms of the category of the rescue and firefighting service as described in Subpart-I of this part and in accordance with the types and amounts of extinguishing agents normally available at the heliport.

(c) Changes in the level of protection normally available at a heliport for rescue and firefighting must be notified to the appropriate aeronautical information services units and, where applicable, air traffic units to enable them to provide the necessary information to arriving and departing helicopters. When such a change has been corrected, the above units must be advised accordingly.

(d) A change must be expressed in terms of the new category of the rescue and firefighting service available at the heliport.

(*Note. — Changes in the level of protection from that normally available at the heliport could result from, but may not be limited to, a change in the availability of extinguishing agent or equipment used to deliver agents, or of personnel used to operate the equipment.)*

SUBPART F – PHYSICAL CHARACTERISTICS

§ 138.301 Onshore heliports

(Note 1. — The provisions given in this section are based on the design assumption that no more than one helicopter will be in the FATO at the same time.

Note 2. — The design provisions given in this section assume when conducting operations to a FATO in proximity to another FATO, these operations will not be simultaneous. If simultaneous helicopter operations are required, appropriate separation distances between FATOs need to be determined, giving due regard to such issues as rotor downwash and airspace, and ensuring the flight paths for each FATO do not overlap.

Note 3. — The provisions given in this section are common for surface-level heliports and elevated heliports unless otherwise specified.)

I. Final approach and take-off areas (FATO)

(a) A FATO must:

(1) Provide:

(i) An area free of obstacles, except for essential objects which because of their function are located on it, and of sufficient size and shape to ensure containment of every part of the design helicopter in the final phase of approach and commencement of take-off in accordance with the intended procedures;

(ii) When solid, a surface which is resistant to the effects of rotor downwash; and

(A) When collocated with a TLOF, is contiguous and flush with the TLOF; has bearing strength capable of withstanding the intended loads; and ensures effective drainage; or

(B) When not collocated with a TLOF, is free of hazards should a forced landing be required; and

(2) Be associated with a safety area.

(b) A heliport must be provided with at least one FATO, which need not be solid.

(c) The minimum dimensions of a FATO must be:

(1) Where intended to be used by helicopters operated in performance class 1:

(i) The length of the Rejected Take-Off Distance (RTOD) for the required Take-Off procedure prescribed in the helicopter flight manual (HFM) of the helicopters for which the FATO is intended, or 1.5 Design D, whichever is greater; and

(ii) The width for the required procedure prescribed in the HFM of the helicopters for which the FATO is intended, or 1.5 Design D, whichever is greater.

(2) Where intended to be used by helicopters operated in performance classes 2 or 3, the lesser of:

(i) An area within which can be drawn a circle of diameter of 1.5 Design D; or

(ii) When there is a limitation on the direction of approach and touchdown, an area of sufficient width to meet the requirement of (a) (1) but not less than 1.5 times the overall width of the design helicopter.

(d) Essential objects located in a FATO must not penetrate a horizontal plane at the FATO elevation by more than 5 cm.

(e) When the FATO is solid the slope must not:

(1) Except as provided in (2) or (3) below; exceed 2 per cent in any direction;

(2) When the FATO is elongated and intended to be used by helicopters operated in performance class 1, exceed 3 per cent overall, or have a local slope exceeding 5 per cent; and

(3) When the FATO is elongated and intended to be used solely by helicopters operated in performance class 2 or 3, exceed 3 per cent overall, or have a local slope exceeding 7 per cent.

(f) The FATO must be located so as to minimize the influence of the surrounding environment, including turbulence, which could have an adverse impact on helicopter operations.

(g) A FATO must be surrounded by a safety area which need not be solid.

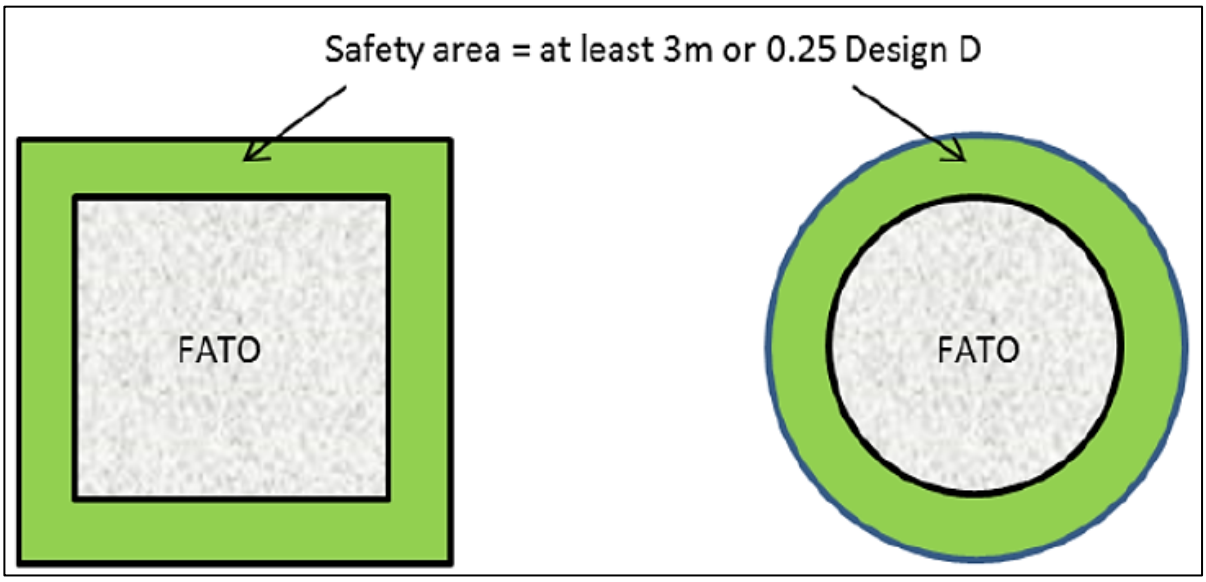


Figure F-1. FATO and associated safety area

II. Safety Areas

(h) A safety area must provide:

(1) An area free of obstacles, except for essential objects which because of their function are located on it, to compensate for maneuvering errors; and

(2) When solid, a surface which: is contiguous and flush with the FATO; is resistant to the effects of rotor downwash; and ensures effective drainage.

(i) The safety area surrounding a FATO must extend outwards from the periphery of the FATO for a distance of at least 3 m or 0.25 Design D, whichever is greater. (See Fig F-1).

(j) No mobile object must be permitted in a safety area during helicopter operations.

(k) Essential objects located in the safety area must not penetrate a surface originating at the edge of the FATO at a height of 25 cm above the plane of the FATO sloping upwards and outwards at a gradient of 5 per cent.

(l) When solid, the slope of the safety area must not exceed an upward slope of 4 per cent outwards from the edge of the FATO.

III. Protected side slope

(m) A heliport must be provided with at least one protected side slope, rising at 45 degrees outward from the edge of the safety area and extending to a distance of 10 m (See Figure F-2).

(n) A heliport should be provided with at least two protected side slopes, rising at 45 degrees outward from the edge of the safety area and extending to a distance of 10 m.

(o) The surface of a protected side slope must not be penetrated by obstacles.

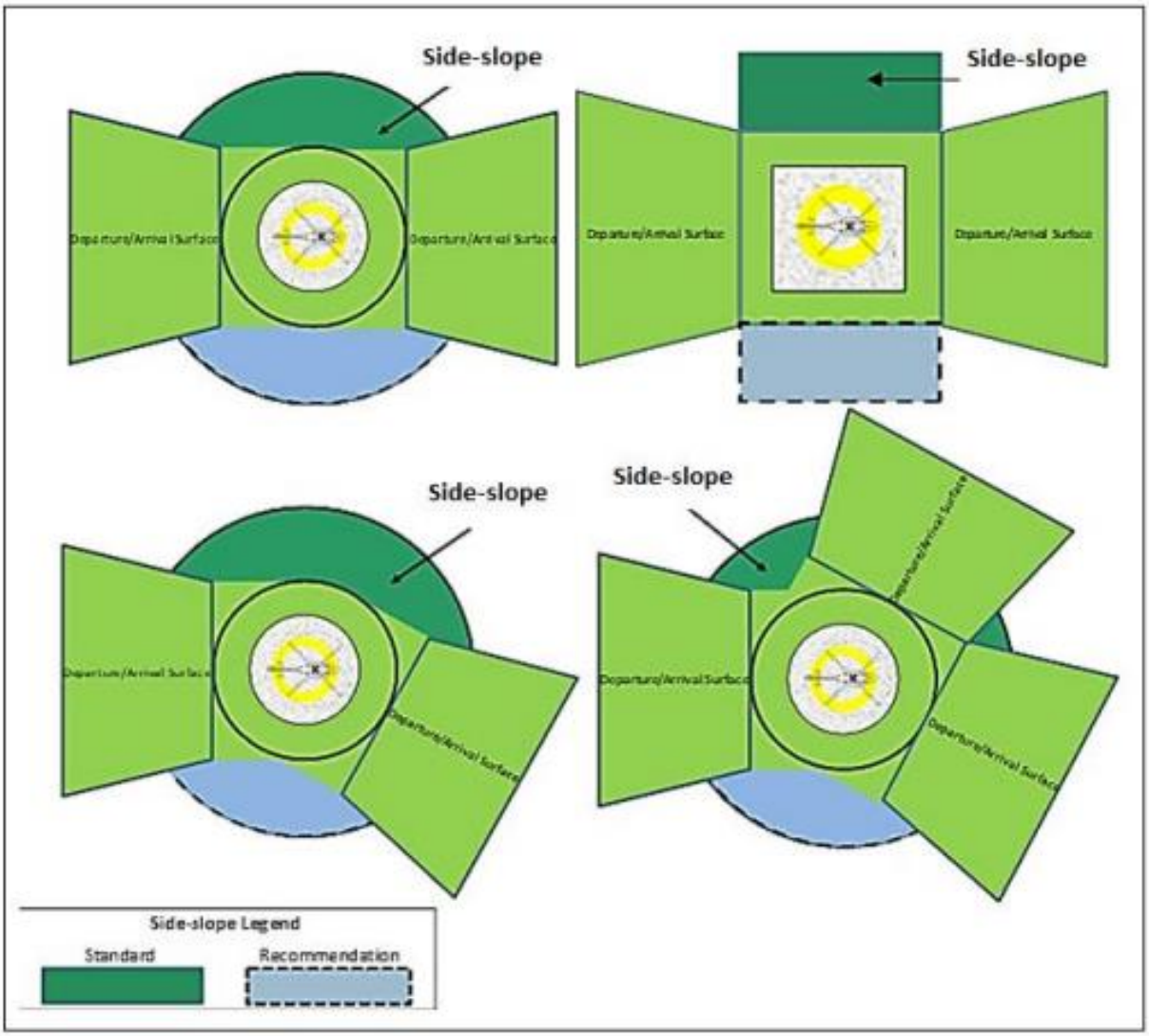


Figure F-2. FATO simple/complex safety area and side slope protection

(Note. — The diagrams in Figure F-6 show a number of configurations of FATO/Safety Areas/Side slopes. For a more complex arrival/departure arrangement which consists of: two surfaces that are not diametrically opposed; more than two surfaces; or an extensive obstacle free sector (OFS) which abuts directly to the FATO, it can be seen that appropriate provisions are necessary to ensure that there are no obstacles between the FATO and/or safety area and the arrival/departure surfaces.)

IV. Helicopter clearways

(Note. — The inclusion of detailed specifications for helicopter clearways in this section is not intended to imply that a clearway has to be provided.)

(p) A helicopter clearway must provide:

(1) An area free of obstacles, except for essential objects which because of their function are located on it, and of sufficient size and shape to ensure containment of the design helicopter when it is accelerating in level flight, and close to the surface, to achieve its safe climbing speed; and

(2) When solid, a surface which: is contiguous and flush with the FATO; is resistant to the effects of rotor downwash; and is free of hazards if a forced landing is required.

(q) When a helicopter clearway is provided, it must be located beyond the end of the FATO.

(r) The width of a helicopter clearway must not be less than the width of the FATO and associated safety area. (See Figure F-1.)

(s) When solid, the ground in a helicopter clearway must not project above a surface having an overall upward slope of 3per cent or having a local upward slope exceeding 5 percent, the lower limit of this surface being a horizontal line which is located on the periphery of the FATO.

(t) An object situated in a helicopter clearway, which may endanger helicopters in the air, must be regarded as an obstacle and must be removed.

V. Touchdown and lift-off areas (TLOF)

(u) A TLOF must:

(1) Provide:

(i) An area free of obstacles and of sufficient size and shape to ensure containment of the undercarriage of the most demanding helicopter the TLOF is intended to serve in accordance with the intended orientation;

(ii) A surface which:

(A) has sufficient bearing strength to accommodate the dynamic loads associated with the anticipated type of arrival of the helicopter at the designated TLOF;

(B) is free of irregularities that would adversely affect the touchdown or lift-off of helicopters;

(C) has sufficient friction to avoid skidding of helicopters or slipping of persons;

(D) is resistant to the effects of rotor downwash; and

(E) ensures effective drainage while having no adverse effect on the control or stability of a helicopter during touchdown and lift-off, or when stationary; and

(2) Be associated with a FATO or a stand.

(v) A heliport must be provided with at least one TLOF.

(w) A TLOF must be provided whenever it is intended that the undercarriage of the helicopter will touch down within a FATO or stand, or lift off from a FATO or stand.

(x) The minimum dimensions of a TLOF must be:

(1) When in a FATO intended to be used by helicopters operated in performance class 1, the dimensions for the required procedure prescribed in the helicopter flight manuals (HFMs) of the helicopters for which the TLOF is intended; and

(2) When in a FATO intended to be used by helicopters operated in performance classes 2 or 3, or in a stand:

(i) When there is no limitation on the direction of touchdown, of sufficient size to contain a circle of diameter of at least 0.83 D of:

(A) in a FATO, the design helicopter; or

(B) in a stand, the largest helicopter the stand is intended to serve;

(ii) When there is a limitation on the direction of touchdown, of sufficient width to meet the requirement of (u) (1) (i) above but not less than twice the undercarriage width (UCW) of:

(A) in a FATO, the design helicopter; or

(B) in a stand, the most demanding helicopter the stand is intended to serve.

(y) For an elevated heliport, the minimum dimensions of a TLOF, when in a FATO, must be of sufficient size to contain a circle of diameter of at least 1 Design-D.

(z) Slopes on a TLOF must not:

(1) Except as provided in (2) or (3) below; exceed 2 percent in any direction;

(2) When the TLOF is elongated and intended to be used by helicopters operated in performance class 1; exceed 3 per cent overall, or have a local slope exceeding 5 per cent; and

(3) When the TLOF is elongated and intended to be used solely by helicopters operated in performance class 2 or 3, exceed 3 per cent overall, or have a local slope exceeding 7 per cent.

(aa) When a TLOF is within a FATO it must be:

(1) Centered on the FATO; or

(2) For an elongated FATO, centered on the longitudinal axis of the FATO.

(bb) When a TLOF is within a helicopter stand, it must be centered on the stand.

(cc) A TLOF must be provided with markings which clearly indicate the touchdown position and, by their form, any limitations on maneuvering.

(dd) Where an elongated Performance Class 1 FATO/TLOF contains more than one TDPM, measures should be in place to ensure that only one can be used at a time.

(ee) Where alternative TDPMs are provided they should be placed to ensure containment of the undercarriage within the TLOF and the helicopter within the FATO.

(ff) Safety devices such as safety nets or safety shelves must be located around the edge of an elevated heliport but must not exceed the height of the TLOF.

VI. Helicopter taxiways and taxi-routes

(Note 1. — The specifications for ground taxi-routes and air taxi-routes are intended for the safety of simultaneous operations during the maneuvering of helicopters. The effect of wind velocity/turbulence induced by the rotor downwash would need to be considered.

Note 2. — The defined areas addressed in this section are taxiways and ground/air taxi-routes: (a) Taxiways associated with air taxi-routes may be used by both wheeled and skidded helicopters for either ground or air taxiing. (b) Ground taxi-routes are meant for use by wheeled helicopters, for ground taxiing only. (c) Air taxi-routes are meant for use by air taxiing only.

Note 3. — When a taxiway is intended for use by aeroplanes and helicopters, the provisions for aeroplane taxiways; taxiway strips; helicopter taxiways; and taxi-routes will be taken into consideration and the more stringent requirements will be applied.)

VII. Helicopter taxiways

(gg) A helicopter taxiway must:

(1) Provide:

(i) An area free of obstacles and of sufficient width to ensure containment of the undercarriage of the most demanding wheeled helicopter the taxiway is intended to serve;

(ii) A surface which:

(A) has bearing strength to accommodate the taxiing loads of the helicopters the taxiway is intended to serve;

(B) is free of irregularities that would adversely affect the ground taxiing of helicopters;

(C) is resistant to the effects of rotor downwash; and

(D) ensures effective drainage while having no adverse effect on the control or stability of a wheeled helicopter when being maneuvered under its own power, or when stationary; and

(2) Be associated with a taxi-route.

(hh) The minimum width of a helicopter taxiway must be the lesser of:

(1) Two times the undercarriage width (UCW) of the most demanding helicopter the taxiway is intended to serve; or

(2) A width meeting the requirements of (gg)(1)(i).

(ii) The transverse slope of a taxiway must not exceed 2 per cent and the longitudinal slope must not exceed 3 per cent.

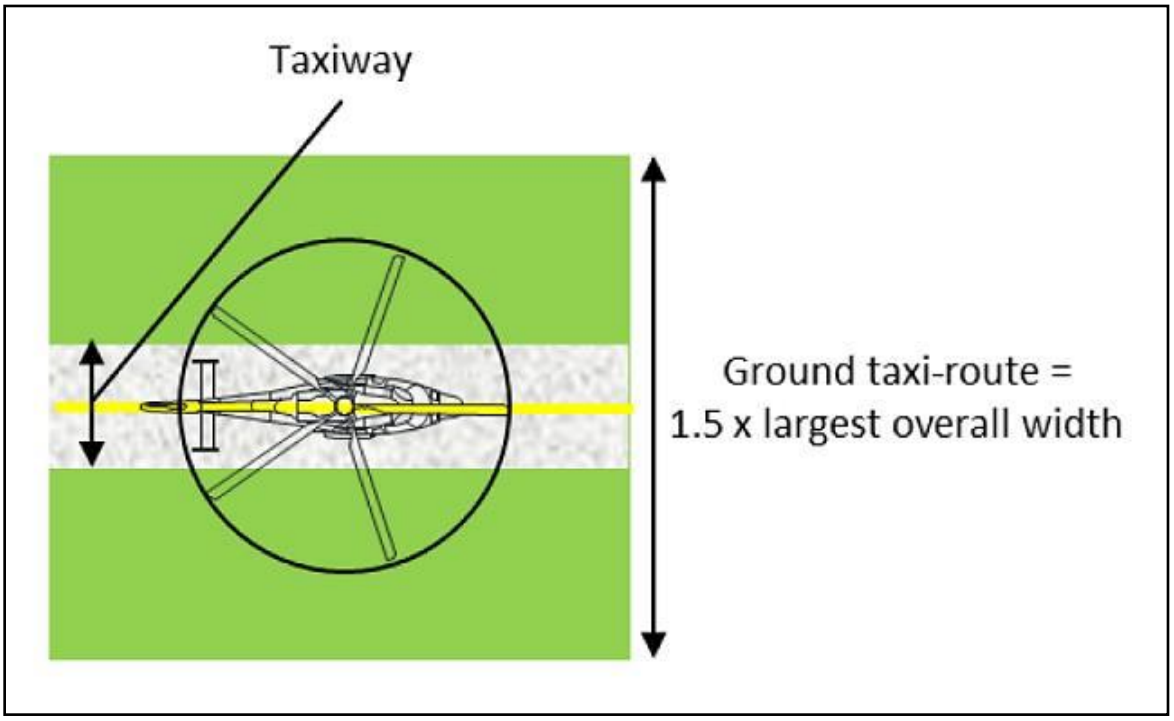


Figure F-3. Helicopter taxiway/ground taxi route

VIII. Helicopter taxi-routes

(jj) A helicopter taxi-route must provide:

(1) An area free of obstacles, except for essential objects which because of their function are located on it, established for the movement of helicopters; with sufficient width to ensure containment of the largest helicopter the taxi-route is intended to serve; and

(2) When solid, a surface which is resistant to the effects of rotor downwash; and

(i) When collocated with a taxiway:

(A) Is contiguous and flush with the taxiway;

(B) Does not present a hazard to operations; and

(C) Ensures effective drainage; and

(ii) When not collocated with a taxiway:

(A) Is free of hazards if a forced landing is required.

(kk) No mobile object must be permitted on a taxi-route during helicopter operations.

(ll) When solid and collocated with a taxiway, the taxi-route must not exceed an upward transverse slope of 4 per cent outwards from the edge of the taxiway.

IX. Helicopter ground taxi-routes

(mm) A helicopter ground taxi-route must have a minimum width of 1.5 times the overall width of the largest helicopter it is intended to serve, and be centered on a taxiway (See Figure F-3).

(nn) Essential objects located in a helicopter ground taxi-route must not:

(1) Be located at a distance of less than 50 cm outwards from the edge of the helicopter ground taxiway; and

(2) Penetrate a surface originating 50 cm outwards of the edge of the helicopter taxiway and a height of 25 cm above the surface of the taxiway and sloping upwards and outwards at a gradient of 5 per cent.

X. Helicopter air taxi-routes

(oo) A helicopter air taxi-route must have a minimum width of twice the overall width of the largest helicopter it is intended to serve.

(pp) If collocated with a taxiway for the purpose of permitting both ground and air taxi operations (see Figure F-4):

(1) the helicopter air taxi-route must be centered on the taxiway; and

(2) essential objects located in the helicopter air taxi-route must not:

(i) Be located at a distance of less than 50 cm outwards from the edge of the helicopter taxiway; and

(ii) Penetrate a surface originating 50 cm outwards of the edge of the helicopter taxiway and a height of 25 cm above the surface of the taxiway and sloping upwards and outwards at a gradient of 5 per cent.

(qq) When not collocated with a taxiway, the slopes of the surface of an air taxi-route must not exceed the slope landing limitations of the helicopters the taxi-route is intended to serve. In any event, the transverse slope must not exceed 10 per cent and the longitudinal slope must not exceed 7 per cent.

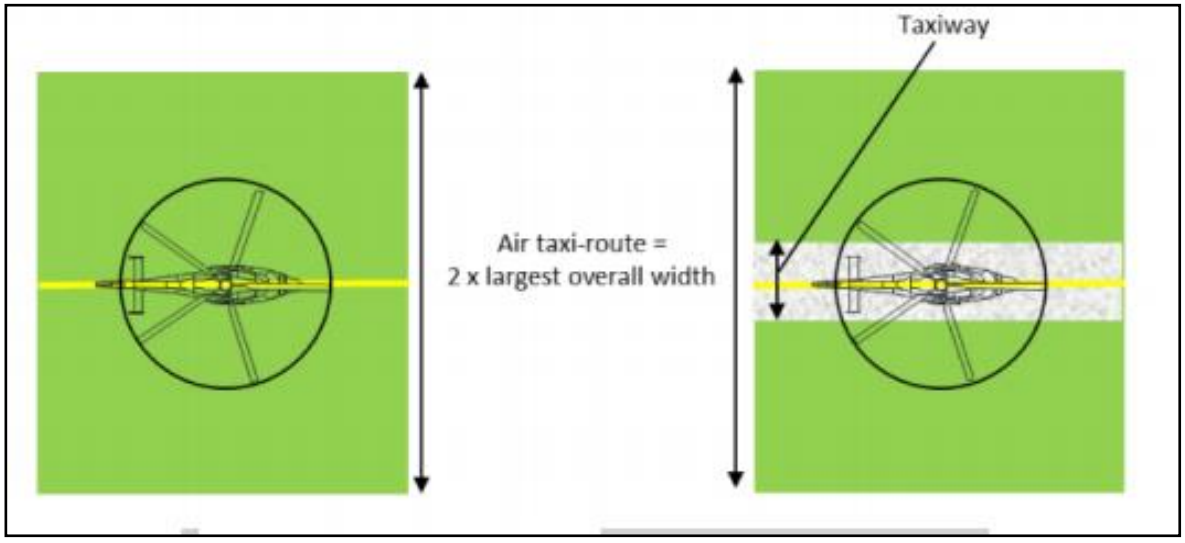


Figure F-4. Helicopter air taxi-route and combined air taxi-route/taxiway

XI. Helicopter stands

(rr) A helicopter stand must:

(1) Provide:

(i) An area free of obstacles and of sufficient size and shape to ensure containment of every part of the largest helicopter the stand is intended to serve when it is being positioned within the stand;

(ii) A surface which:

(A) is resistant to the effects of rotor downwash;

(B) is free of irregularities that would adversely affect the manoeuvring of helicopters;

(C) has bearing strength capable of withstanding the intended loads;

(D) has sufficient friction to avoid skidding of helicopters or slipping of persons; and

(E) ensures effective drainage while having no adverse effect on the control or stability of a wheeled helicopter when being manoeuvred under its own power, or when stationary; and

(2) Be associated with a protection area.

(ss) The minimum dimensions of a helicopter stand must be:

(1) A circle of diameter of 1.2 D of the largest helicopter the stand is intended to serve; or

(2) When there is a limitation on manoeuvring and positioning, of sufficient width to meet the requirement of (rr) (1) (i) above but not less 1.2 times overall width of largest helicopter the stand is intended to serve.

(Note 1.- *For a helicopter stand intended to be used for taxi-through only, a width less than 1.2D but which provides containment and still permits all required functions of a stand to be performed, might be used.*

Note 2. - *For a helicopter stand intended to be used for turning on the ground, the minimum dimensions may be influenced by the turning circle data provided by the manufacturer and may exceed 1.2 D.)*

(tt) The mean slope of a helicopter stand in any direction must not exceed 2 per cent.

(uu) Each helicopter stand must be provided with positioning markings to clearly indicate where the helicopter is to be positioned and, by their form, any limitations on maneuvering.

(vv) A stand must be surrounded by a protection area which need not be solid.

XII. Protection areas

(ww) A protection area must provide:

(1) An area free of obstacles, except for essential objects which because of their function are located on it; and

(2) When solid, a surface which is contiguous and flush with the stand; is resistant to the effects of rotor downwash; and ensures effective drainage.

(xx) When associated with a stand designed for turning, the protection area must extend outwards from the periphery of the stand for a distance of 0.4D. (See Figure F-5).

(yy) When associated with a stand designed for taxi-through, the minimum width of the stand and protection area must not be less than the width of the associated taxi-route (see Figures F-6 and F-7).

(zz) When associated with a stand designed for non-simultaneous use (see Figures F-8 and F-9):

(1) The protection area of adjacent stands may overlap but must not be less than the required protection area for the larger of the adjacent stands; and

(2) The adjacent non-active stand may contain a static object but it must be wholly within the boundary of the stand.

(Note. — To ensure that only one of the adjacent stands is active at a time, instruction to pilots in the AIP make clear that a limitation on the use of the stands is in force.)

(aaa) No mobile object must be permitted in a protection area during helicopter operations.

(bbb) Essential objects located in the protection area must not:

(1) If located at a distance of less than 0.75 D from the centre of the helicopter stand, penetrate a surface at a height of 5 cm above the surface of the central zone; and

(2) If located at a distance of 0.75 D or more from the centre of the helicopter stand, penetrate a surface at a height of 25 cm above the plane of the central zone and sloping upwards and outwards at a gradient of 5 per cent.

(ccc) When solid, the slope of a protection area must not exceed an upward slope of 4 per cent outwards from the edge of the stand.

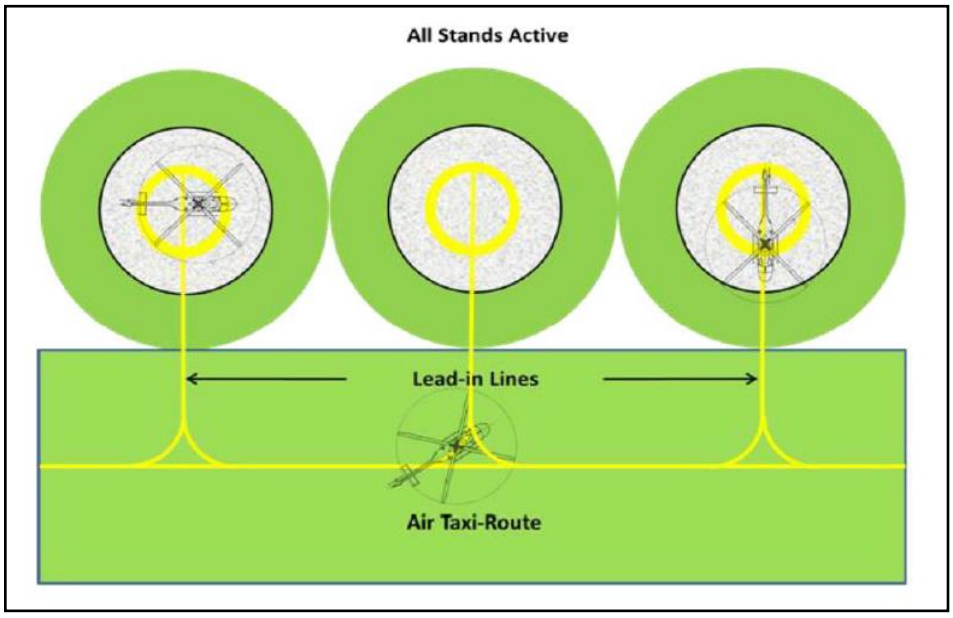


Figure F-5. Turning stands (with air taxi-routes) — simultaneous use

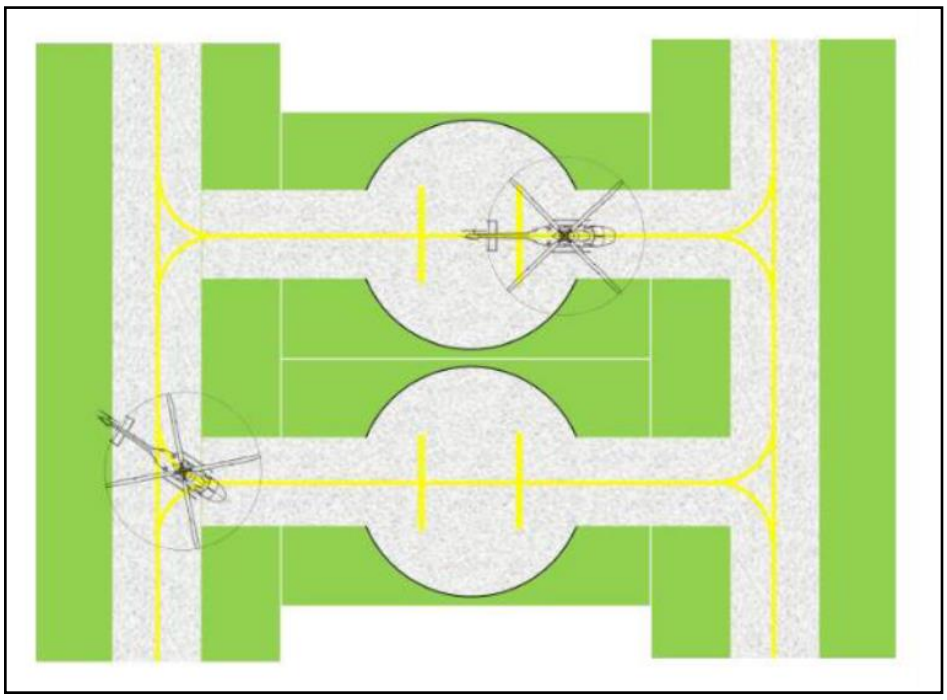


Figure F-6. Ground taxi-through stands (with taxiway/ground taxi-route) simultaneous use

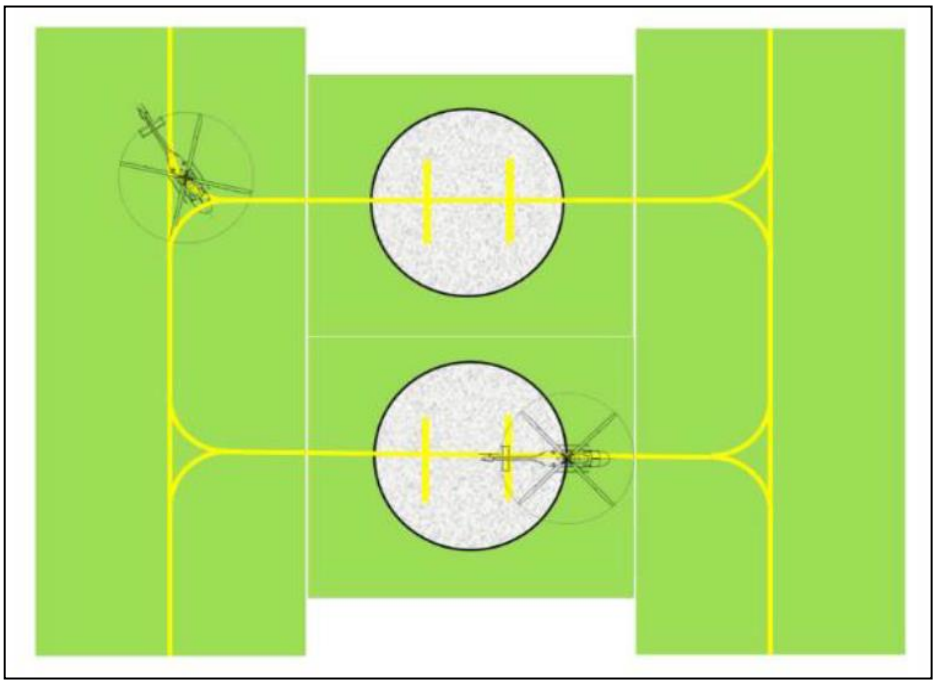


Figure F-7. Air taxi-through stands (with air taxi-route) simultaneous use

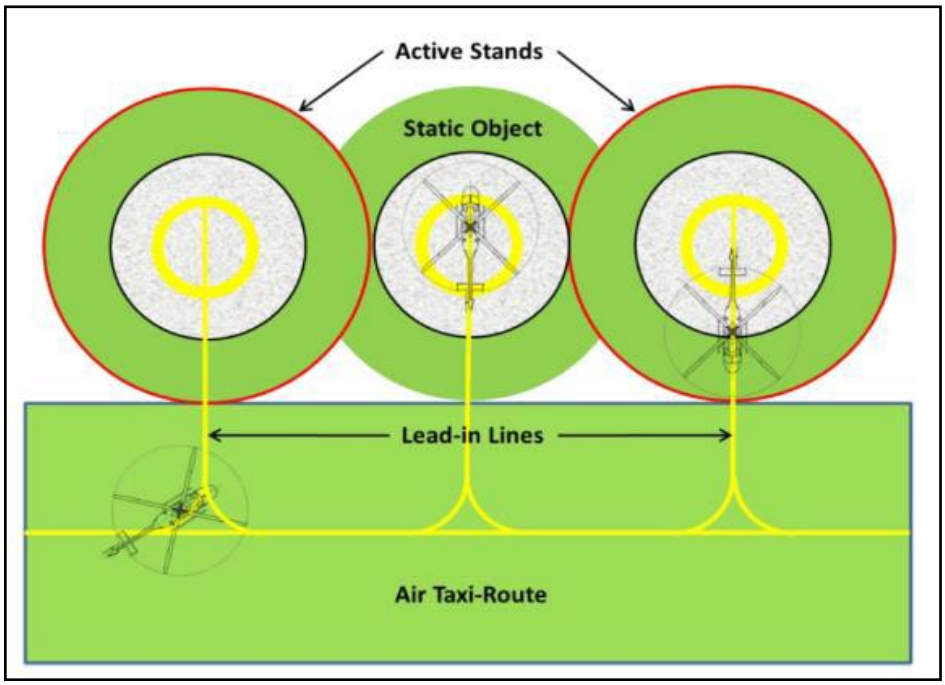


Figure F-8. Turning stands (with air taxi-routes)—non-simultaneous use–outer stands active

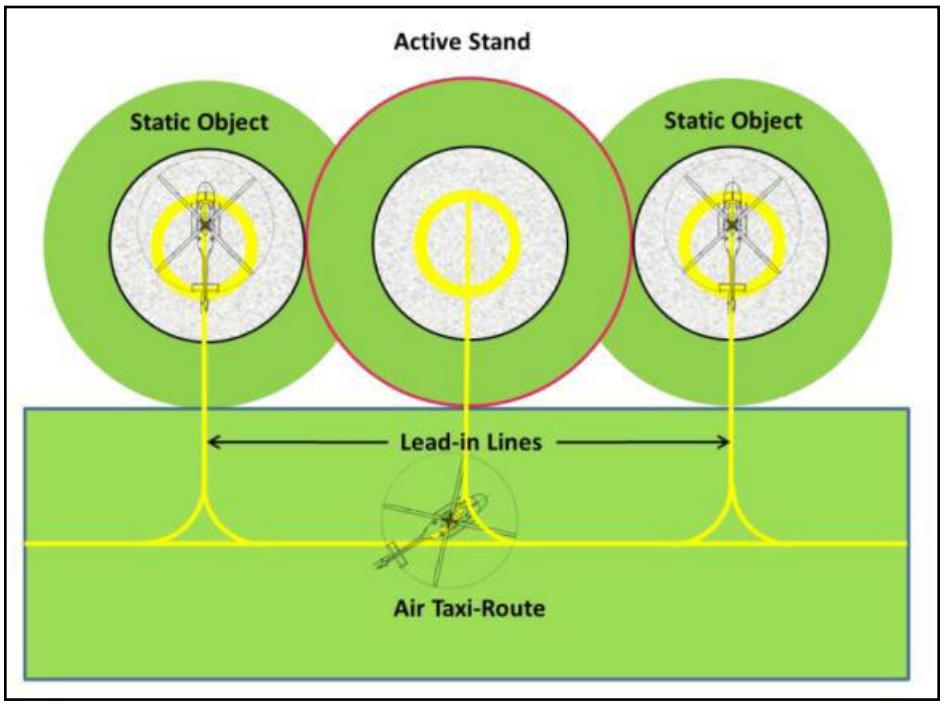


Figure F-9. Turning stands (with air taxi-route) non-simultaneous use – inner stand active

XIII. Location of a final approach and take-off area in relation to a runway or taxiway

(ddd) Where a FATO is located near a runway or taxiway, and where simultaneous operations are planned, the separation distance between the edges of a runway or taxiway and the edge of a FATO must not be less than the appropriate dimension in Table F-1.

(eee) A FATO must not be located:

(1) Near taxiway intersections or holding points where jet engine efflux is likely to cause high turbulence; or

(2) Near areas where aeroplane vortex wakes generation is likely to exist.

If aeroplane mass and/or helicopter mass are	Distance between FATO edge and runway edge or taxiway edge
up to but not including 3 175 kg	60 m
3 175 kg up to but not including 5 760 kg	120 m
5 760 kg up to but not including 100 000 kg	180 m
100 000 kg and over	250 m

Table F-1. FATO minimum separation distance for simultaneous operations

§ 138.303 Helidecks

I. Final approach and take-off areas and touchdown and lift-off areas (FATOs and TLOFs)

(Note 1. — 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. 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.)

(a) The specification in paragraphs 3.3.14 and 3.3.15 must be applicable for helidecks.

(b) A helideck must be provided with one FATO and one coincident or collocated TLOF.

(c) A FATO may be any shape but must 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.

(d) A TLOF may be any shape but must be of sufficient size to contain:

(1) For helicopters with an MTOM of more than 3175 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

(2) For helicopters with an MTOM of 3175 kg or less, the TLOF must be of sufficient size to contain 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.

(e) 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.

(f) A helideck must be arranged to ensure that a sufficient and unobstructed air-gap is provided which encompasses the full dimensions of the FATO.

(g) The FATO must 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.

(h) The TLOF must be dynamic load-bearing.

(i) The TLOF must provide ground effect.

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

(k) For any TLOF 1 D 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 must not exceed a height of 25 cm.

(l) For any TLOF 1 D 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.

(m) 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 1 D, objects installed in the obstacle-free sector whose function requires them to be located on the edge of the TLOF, must not exceed a height of 5 cm

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

(o) Safety devices such as safety nets or safety shelves must be located around the edge of a helideck but must not exceed the height of the TLOF.

(p) The surface of the TLOF must be skid-resistant to both helicopters and persons and be sloped to prevent pooling of water.

§ 138.305 Shipboard Heliport

(a) When helicopter operating areas are provided in the bow or stern of a ship or are purpose-built above the ship's structure, they must be regarded as purpose-built shipboard heliports.

(b) Except for the arrangement described in h (2) for shipboard heliports it is presumed that FATO and the TLOF will be coincidental.

I. Final approach and take-off areas and touchdown and lift-off areas

(c) A shipboard heliport must be provided with one FATO and one coincidental or collocated TLOF.

(d) A FATO may be any shape but must 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 heliport is intended to serve.

(e) The TLOF of a shipboard heliport must be dynamic load-bearing.

(f) The TLOF of a shipboard heliport must provide ground effect.

(g) For purpose-built shipboard heliports provided in a location other than the bow or stern, the TLOF must be of sufficient size to contain a circle with a diameter not less than 1 D of the largest helicopter the heliport is intended to serve.

(h) For purpose-built shipboard heliports provided in the bow or stern of a ship, the TLOF must be of sufficient size to:

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

(2) For operations with limited touchdown directions, contain an area within which can be accommodated two opposing arcs of a circle with a diameter of not less than 1 D in the helicopter's longitudinal direction. The minimum width of the heliport must be not less than 0.83D. (See Figure F-10.)

(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.)

(i) For non-purpose-built shipboard heliports, the TLOF must be of sufficient size to contain a circle with a diameter not less than 1 D of the largest helicopter the heliport is intended to serve.

(j) A shipboard heliport must be arranged to ensure that a sufficient and unobstructed air-gap is provided which encompasses the full dimensions of the FATO.

(k) The FATO must 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.

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

(m) 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 must not exceed a height of 25 cm.

(n) For any TLOF 1 D 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.

(o) 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 1 D, objects in the obstacle-free sector, whose function requires them to be located on the edge of the TLOF, must not exceed a height of 5 cm.

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

(q) Safety devices such as safety nets or safety shelves must be located around the edge of a shipboard heliport, except where structural protection exists, but must not exceed the height of the TLOF.

(r) The surface of the TLOF must be skid-resistant to both helicopters and persons and be sloped to prevent water accumulation.

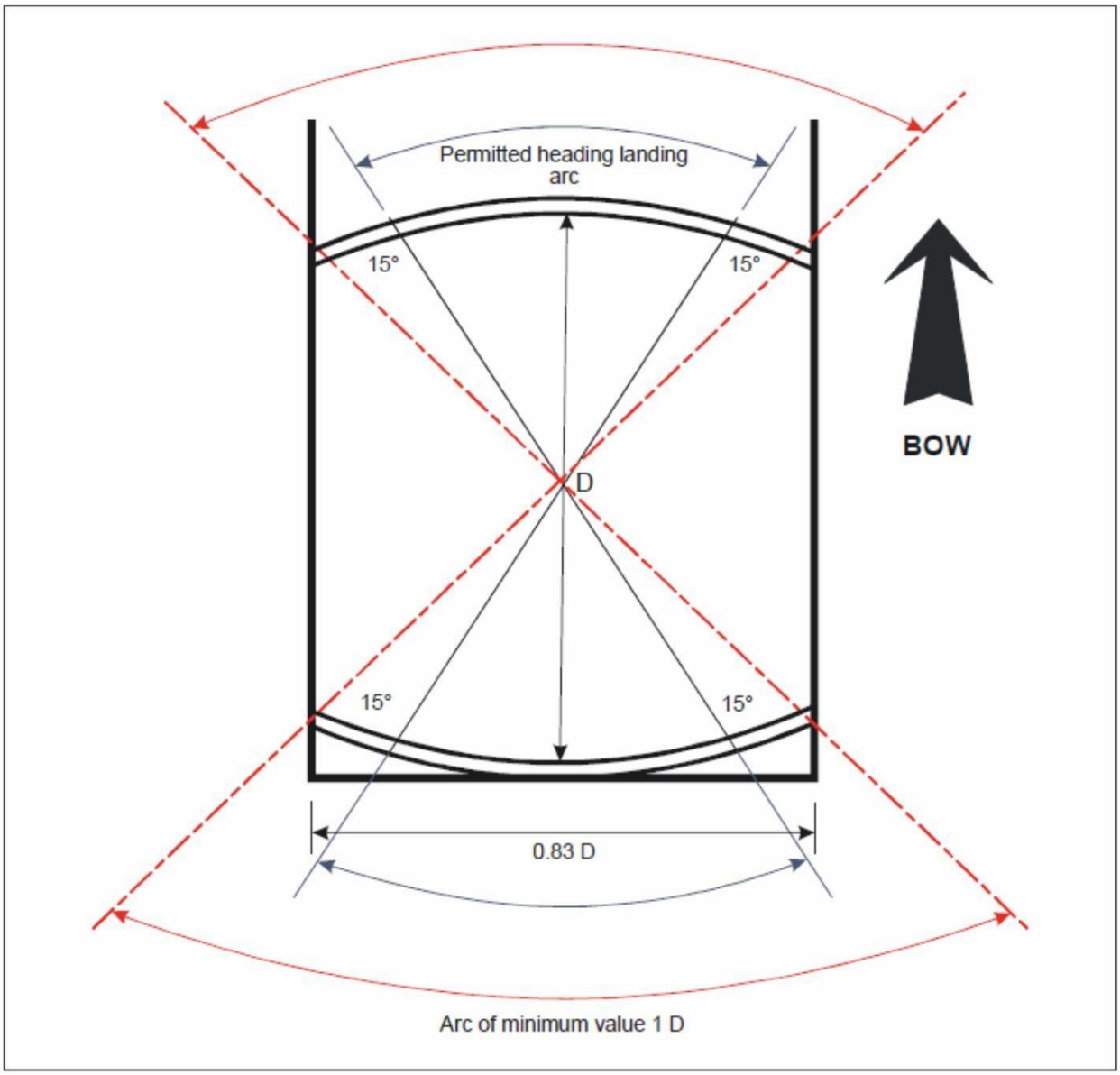


Figure F-10. Shipboard permitted landing headings for limited heading operations

SUBPART G – OBSTACLE ENVIRONMENT

Note. — The objectives of the specifications in this subpart are to describe the airspace around heliports so as to permit intended helicopter operations to be conducted safely and to prevent, where appropriate State controls exist, heliports from 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.

§ 138.401 Obstacle limitation Surfaces and Sectors

I. Approach surface

(a) Description–An inclined plane or a combination of planes or, when a turn is involved, a complex surface sloping upwards from the end of the safety area and centered on a line passing through the center of the FATO. (For depiction of surfaces see figures G-1, G-2, G-3 and G-4; for dimensions and slopes of surfaces see Table G-1).

(b) Characteristics- The limits of an approach surface must comprise:

(1) An inner edge horizontal and equal in length to the minimum specified width/diameter of the FATO plus the safety area, perpendicular to the centerline of the approach surface and located at the outer edge of the safety area;

(2) Two side edges originating at the ends of the inner edge diverging uniformly at a specified rate from the vertical plane containing the center line of the FATO; and

(3) An outer edge horizontal and perpendicular to the center line of the approach surface and at a specified height of 152 m (500 ft.) above the elevation of the FATO.

(c) The elevation of the inner edge must be the elevation of the FATO at the point on the inner edge that is intersected by the center line of the approach surface. For heliports intended to be used by helicopters operated in performance class 1 and when approved by the President, the origin of the inclined plane may be raised directly above the FATO.

(d) The slope(s) of the approach surface must be measured in the vertical plane containing the center line of the surface.

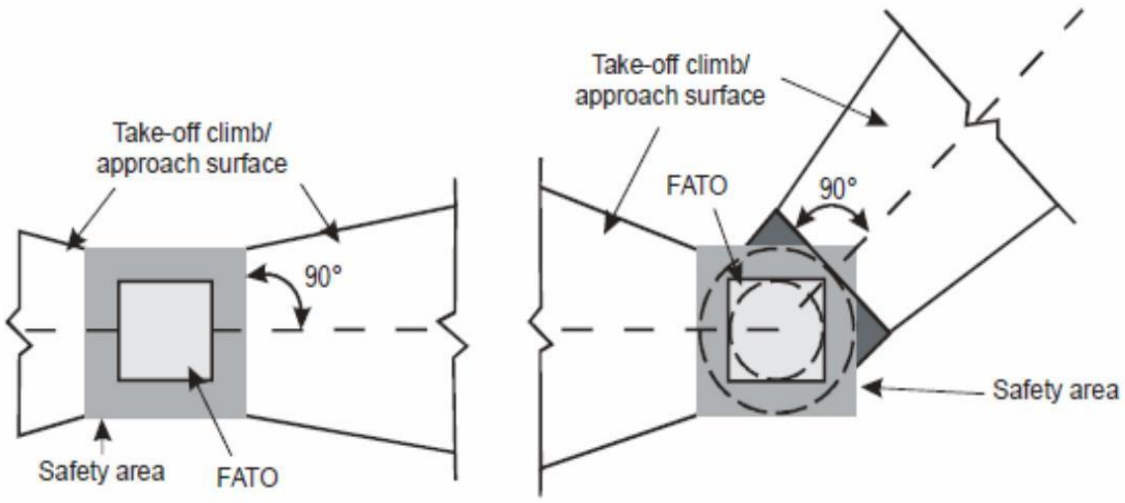
(e) In the case of an approach surface involving a turn, the surface must be a complex surface containing the horizontal normal to its center line and the slope of the center line must be the same as that for a straight approach surface. (See Figure G-5).

(f) In the case of an approach surface involving a turn, the surface must not contain more than one curved portion.

(g) Where a curved portion of an approach surface is provided, the sum of the radius of arc defining the center line of the approach surface and the length of the straight portion originating at the inner edge must not be less than 575 m.

(h) Any variation in the direction of the center line of an approach surface must be designed so as not to necessitate a turn radius less than 270 m.

(Note. — For heliports intended to be used by helicopters operated in performance class 2 and 3, it is good practice for the approach paths to be selected so as to permit safe forced landing or one-engine-inoperative landings such that, as a minimum requirement, injury to persons on the ground or water or damage to property are minimized. The most critical helicopter type for which the heliport is intended and the ambient conditions may be factors in determining the suitability of such areas.)



Note 1. Dark grey shaded area requires the same characteristics as the safety area.
Note 2. Angle between take-off climb/approaches surface from centerline to centerline depicted for illustration purpose only.
Note 3. Offset take-off climb/approach surface rotated around center point of FATO.

Figure G-1. Obstacle limitation surfaces – take-off climb/approach surface

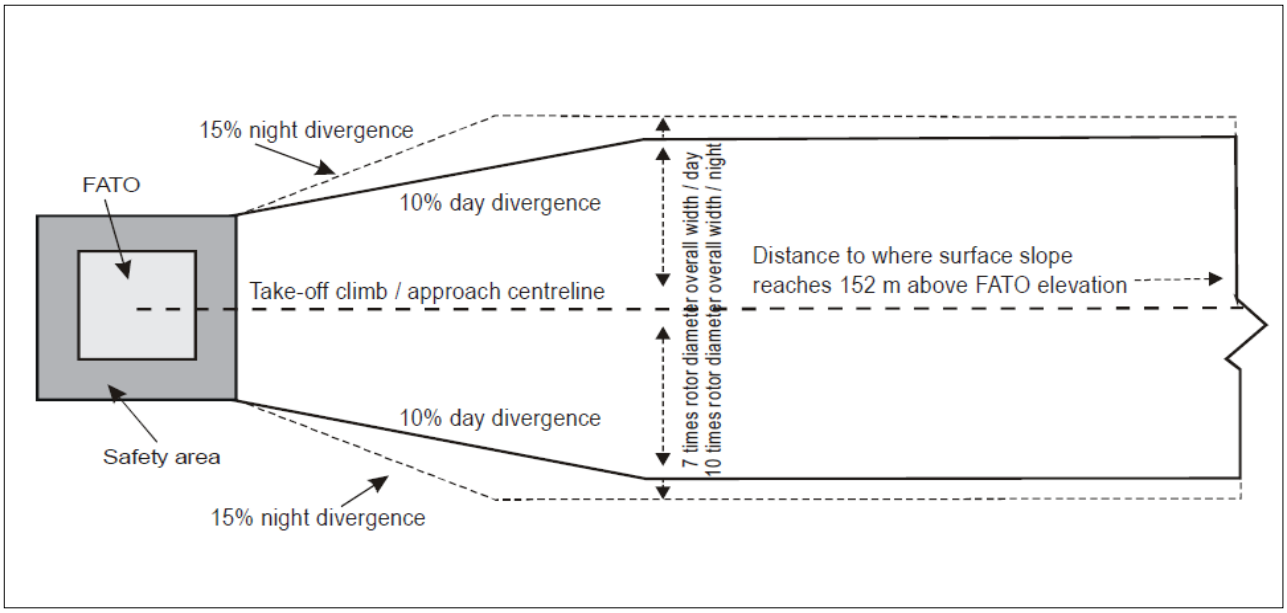
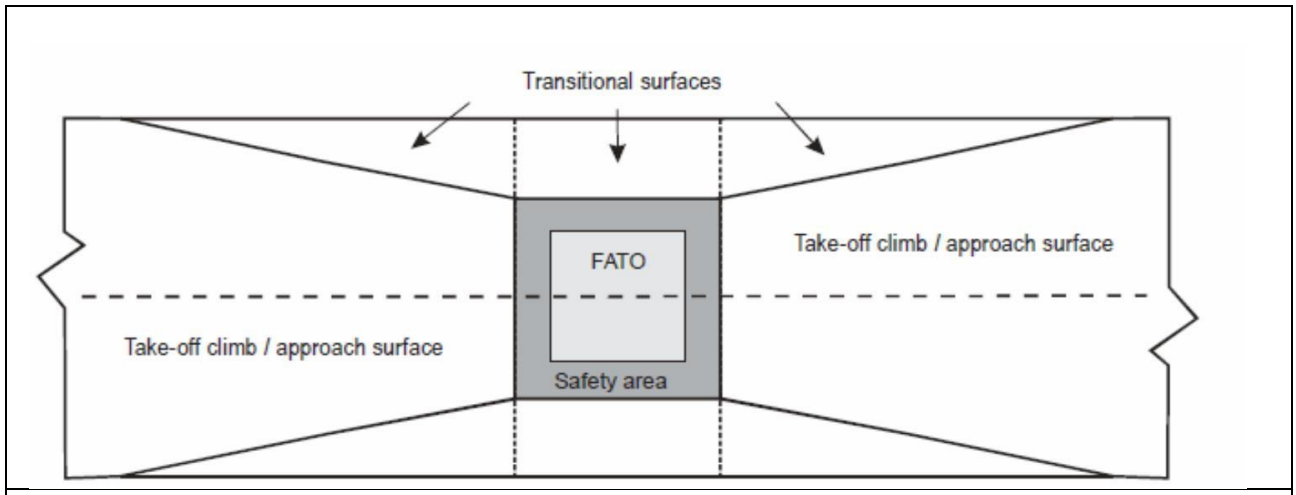
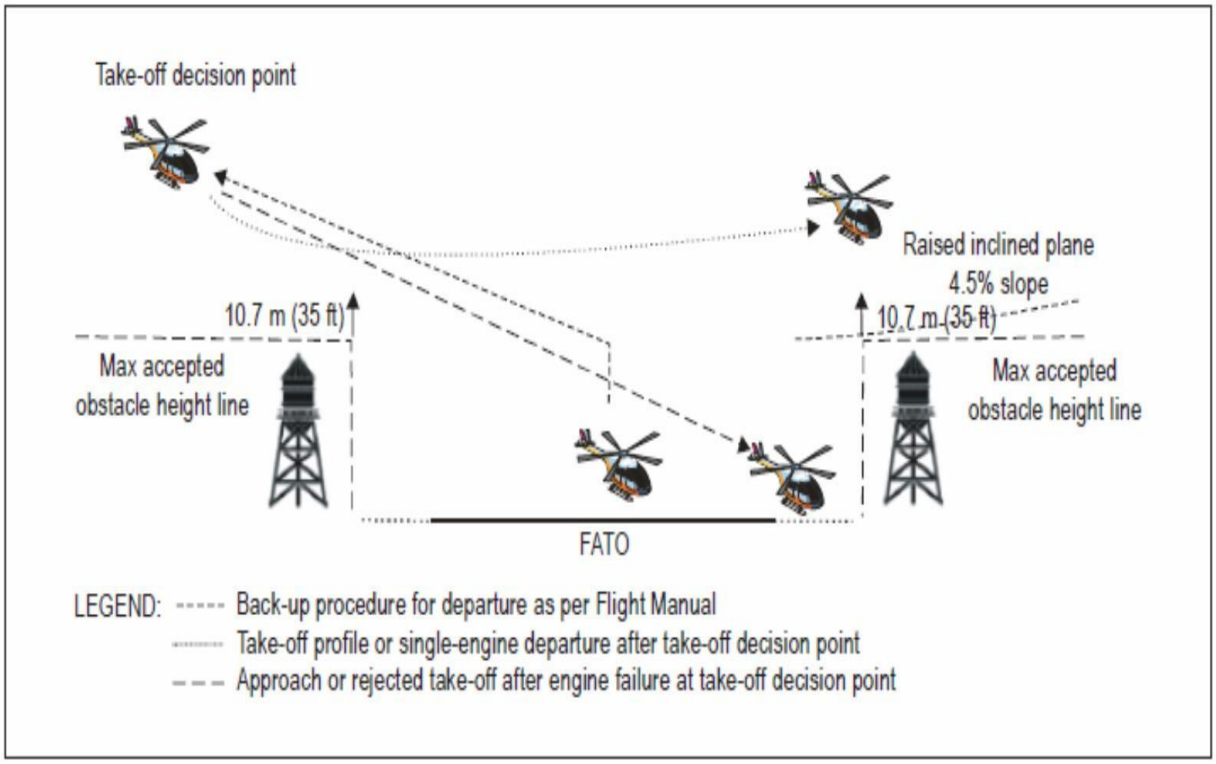


Figure G-2. Take-off climb/approach surface width



Note 1. For single take-off climb/approach surface. Transitional surface extends to perpendicular to far side of safety area.
Note 2. This figure shows a square FATO for illustrate purposes only. For circular FATO the transitional surface lower and upper edges would also be circular.

Figure G-3. Transitional surface for a FATO with a PinS approach procedure with a VSS



Note 1. — This example diagram does not represent any specific profile, technique or helicopter type and is intended to show a generic example. An approach profile and a back-up procedure for departure profile are depicted. Specific manufacturers operations in performance class 1 may be represented differently in the specific Helicopter Flight Manual.

Note 2. — The approach/landing profile may not be the reverse of the take-off profile.

Note 3. — Additional obstacle assessment might be required in the area that a back-up procedure is intended. Helicopter performance and the Helicopter Flight Manual limitations will determine the extent of the assessment required.

Figure G-4. Example of raised inclined plane during operations in Performance class 1

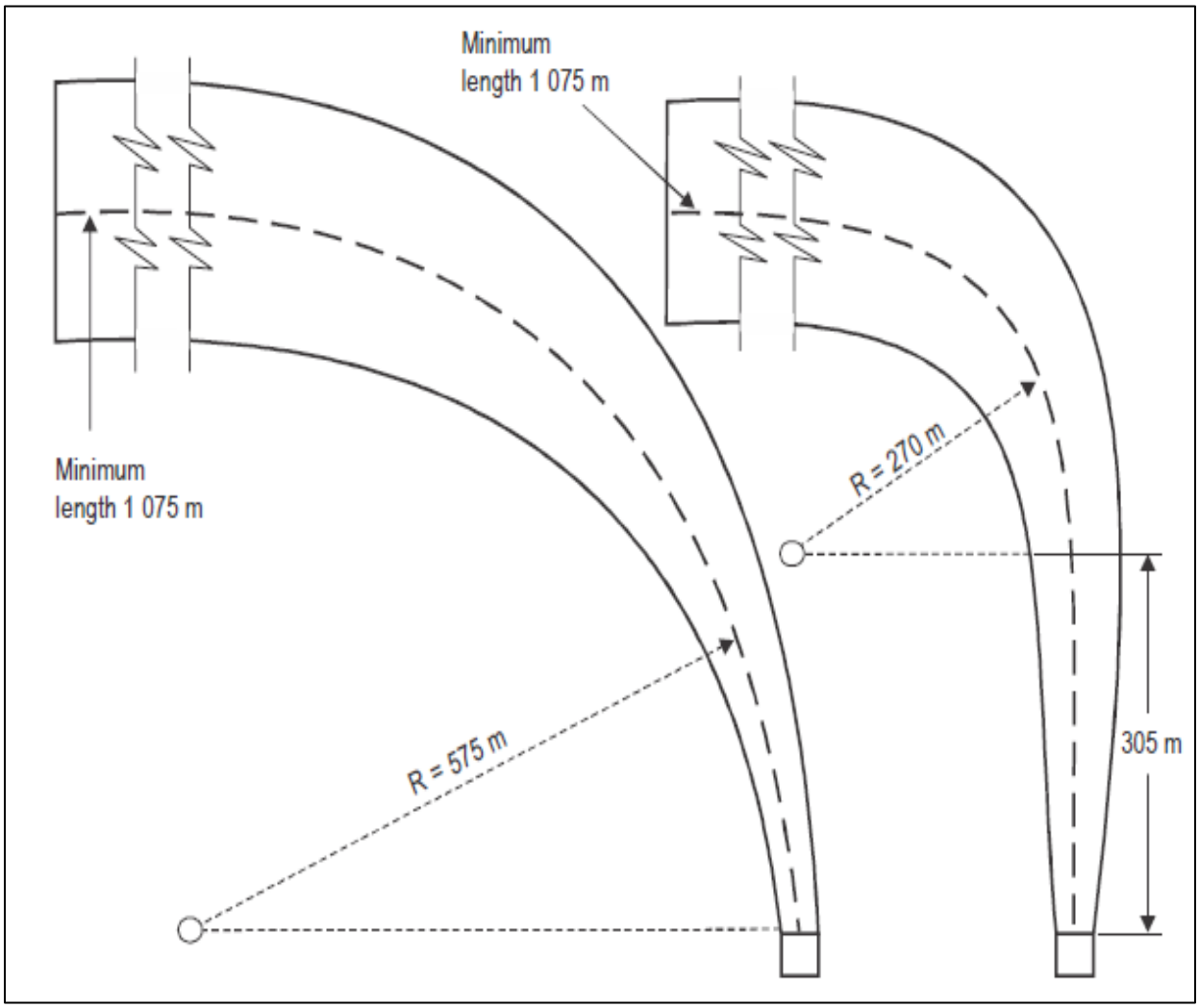


Figure G-5. Curved approach and take-off climb surface for all FATOs

Note 1. — Any combination of curve and straight portion may be established using the following formula:
S+R $\geq$ 575 m and R $\geq$ 270 m where S = 305 m, where S is the length of the straight portion and R is the radius of tum. Note any combination $\geq$ 575 m will work.

Note 2. — The minimum length of the center line of the curve and straight portion is 1075 m but may be longer depending upon the slope used. See Table G-1 for longer lengths.

Note 3. — Helicopter take-off performance is reduced in a curve and as such a straight portion along the take-off climb surface prior to the start of the curve should be considered to allow for acceleration.

Surface and dimensions	*Slope design categories*		
	A	*B*	*C*
Approach and take-off climb surface:			
Length of inner edge	Width of safety area	Width of safety area	Width of safety area
Location of inner edge	Safety area boundary (Clearway boundary if provided)	Safety area boundary	Safety area boundary
Divergence: (1st and 2nd section)			
Day use only	10%	10%	10%
Night use	15%	15%	15%
First section:			
Length	3 386 m	245 m	1 220 m
Slope	4.5% (1:22.2)	8% (1:12.5)	12.5% (1:8)
Outer width	(b)	N/A	(b)
Second section:			
Length	N/A	830 m	N/A
Slope	N/A	16% (1:6.25)	N/A
Outer width	N/A	(b)	N/A
Total length from inner edge (a)	3 386 m	1 075 m	1 220 m
Transitional surface: (FATOs with a PinS approach procedure with a VSS)			
Slope	50% (1:2)	50% (1:2)	50% (1:2)
Height	45 m	45 m	45 m

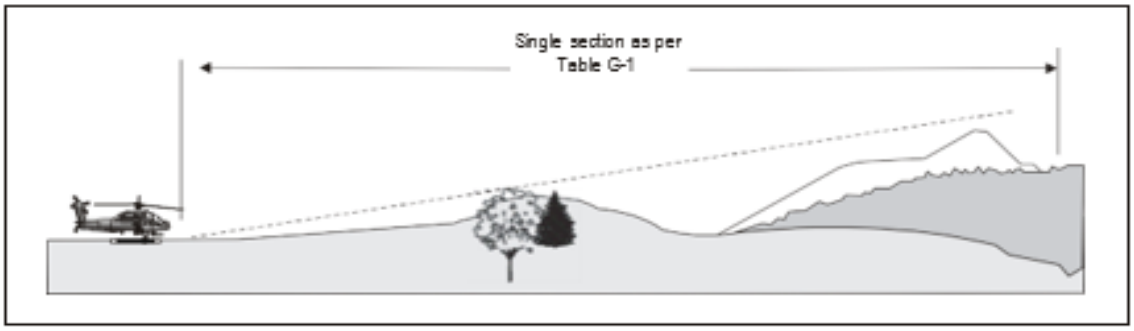
a. *The approach and take-off climb surface lengths of 3 386 m, 1 075 m and 1 220 m associated with the respective slopes brings the helicopter to 152 m (500 ft) above FATO elevation.*

b. *Seven rotor diameters overall width for day operations or 10 rotor diameters overall width for night operations.*

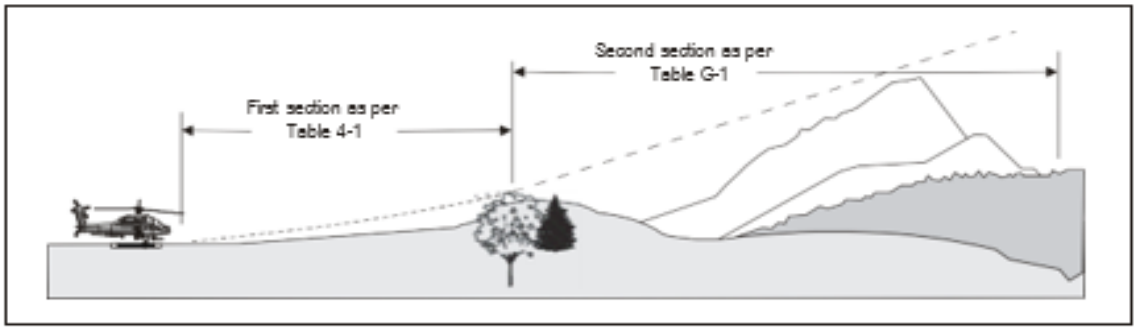
Table G 1. Dimensions and slopes of obstacles limitation surfaces for all visual FATOs

Note. — The slope design categories in Table G-1 may not be restricted to a specific performance class of operation and
may be applicable to more than one performance class of operation. The slope design categories depicted in Table G-1
represent minimum design slope angles and not operational slopes. Slope category "A" generally corresponds with helicopters operated in performance class 1; slope category "B" generally

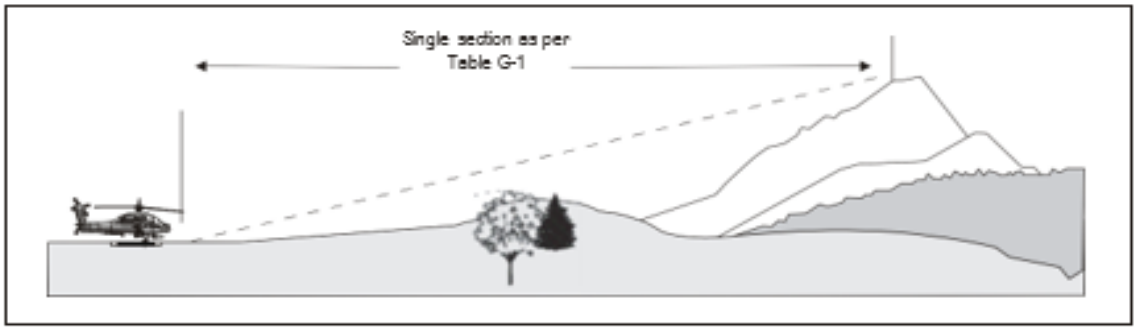
corresponds with helicopters operated in performance class 3; and slope category "C" generally corresponds with helicopters operated in performance class 2.
Consultation with helicopter operators will help to determine the appropriate slope category to apply according to the
heliport environment and the most critical helicopter type for which the heliport is intended.



a) Approach and take-off climb surfaces - "A" slope profile - 4.5% design



b) Approach and take-off climb surfaces - "B" slope profile - 8% and 16% design



c) Approach and take-off climb surfaces - "C" slope profile - 12.5% design

Figure G-6. Approach and take-off climb surfaces with different slope design characteristics

II. Transitional surface

(i) Description - A complex surface along the side of the safety area and part of the side of the approach/take-off climb surface, that slopes upwards and outwards to a predetermined height of 45 m (150ft). (See Figure G-3. See Table G -1 for dimensions and slopes of surfaces).

(j) Characteristics - The limits of a transitional surface must comprise:

(1) A lower edge beginning at a point on the side of the approach/take-off climb surface at a specified height above the lower edge extending down the side of the approach/take-off climb surface to the inner edge of the approach/takeoff climb surface and from there along the length of the side of the safety area parallel to the center line of the FATO; and

(2) An upper edge located at a specified height above the lower edge as set out in Table G-1.

(k) The elevation of a point on the lower edge must be:

(1) Along the side of the approach/take-off climb surface — equal to the elevation of the approach/take-off climb surface at that point; and

(2) Along the safety area — equal to the elevation of the inner edge of the approach/take-off climb surface.

(l) The slope of the transitional surface must be measured in a vertical plane at right angles to the center line of the FATO.

Note 1. — If the origin of the inclined plane of the approach/take-off climb surface is raised as approved by the President, the elevation of the origin of the transitional surface will be raised accordingly.

Note 2. — As a result of k (2) the transitional surface along the safety area will be curved if the profile of the FATO is curved, or a plane if the profile is a straight line.

III. Take-off climb surface

(m) Description - An inclined plane, a combination of planes or, when a turn is involved, a complex surface sloping upwards from the end of the safety area and centered on a line passing through the center of the FATO. (See Figures G-1, G-2, G-3 and G-4 for depiction of surfaces. See Table G -1 for dimensions and slopes of surfaces).

(n) Characteristics - The limits of a take-off climb surface must comprise:

(1) An inner edge horizontal and equal in length to the minimum specified width/diameter of the FATO plus the safety area, perpendicular to the centerline of the take-off climb surface and located at the outer edge of the safety area;

(2) Two side edges originating at the ends of the inner edge and diverging uniformly at a specified rate from the vertical plane containing the center line of the FATO; and

(3) An outer edge horizontal and perpendicular to the center line of the take-off climb surface and at a specified height of 152 m (500 ft.) above the elevation of the FATO.

(o) The elevation of the inner edge must be the elevation of the FATO at the point on the inner edge that is intersected by the centerline of the take-off climb surface. For heliports intended to be used by helicopters operated in performance class 1 and when approved by the President, the origin of the inclined plane may be raised directly above the FATO.

(p) Where a clearway is provided the elevation of the inner edge of the take-off climb surface must be located at the outer edge of the clearway at the highest point on the ground based on the centerline of the clearway.

(q) In the case of a straight take-off climb surface, the slope must be measured in the vertical plane containing the center line of the surface.

(r) In the case of a take-off climb surface involving a turn, the surface must be a complex surface containing the horizontal normal to its centerline and the slope of the centerline must be the same as that for a straight take-off climb surface. (See Figure G-5).

(s) In the case of a take-off climb surface involving a turn, the surface must not contain more than one curved portion.

(t) Where a curved portion of a take-off climb surface is provided the sum of the radius of arc defining the center line of the take-off climb surface and the length of the straight portion originating at the inner edge must not be less than 575 m.

(u) Any variation in the direction of the center line of a take-off climb surface must be designed so as not to necessitate a turn of radius less than 270 m.

IV. Obstacle-free sector/surface — helidecks

(v) Description – 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 than1D, the reference point must be located not less than 0.5 D from the center of the TLOF.

(w) Characteristics - An obstacle-free sector/surface must subtend an arc of specified angle.

(x) A helideck obstacle-free sector must comprise of two components, one above and one below helideck level. (See Figure G-7):

(1) Above helideck level - The surface must 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.

(2) Below helideck level – Within the (minimum) 210-degree arc, the surface must additionally extend down ward 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 center 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.

V. Limited obstacle sector/surface — helidecks

(y) Description. 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 must be prescribed.

(z) Characteristics. A limited obstacle sector must not subtend an arc greater than 150 degrees. Its dimensions and location must be as indicated in Figure G-8 for a 1D FATO with coincidental TLOF and Figure G-9 for a 0.83D TLOF.

§ 138.403 Obstacle Limitation Requirements

(Note 1. — The requirements for obstacle limitation surfaces are specified on the basis of the intended use of a FATO, i.e. approach manoeuvre to hover or landing, or take-off manoeuvre and type of approach, and are intended to be applied when such use is made of the FATO. In cases where operations are conducted to or from both directions of a FATO, then the function of certain surfaces may be nullified because of more stringent requirements of another lower surface.)

Surface-level heliports

(a) The following obstacle limitation surfaces must be established for a FATO at heliports with a PinS approach procedure utilizing a visual segment surface: (See Figure G-3).

(1) Take-off climb surface;
(2) Approach surface; and

(3) Transitional surfaces.

(b) The following obstacle limitation surfaces must be established for a FATO at heliports, other than specified in 138.403(a), including heliports with a PinS approach procedure where a visual segment surface is not provided:

(1) Take-off climb surface; and

(2) Approach surface.

(c) The slopes of the obstacle limitation surfaces must not be greater than, and their other dimensions not less than, those specified in Table G-1 and must be located as shown in Figures G-1, G-2 and G-6.

(d) For heliports that have an approach/take-off climb surface with a 4.5 per cent slope design, objects must be permitted to penetrate the obstacle limitation surface, if the results of an aeronautical study approved by the President have reviewed the associated risks and mitigation measures.

(e) New objects or extensions of existing objects must not be permitted above any of the surfaces in 138.403-(a) and 138.403-(b) except when shielded by an existing immovable object or after an aeronautical study approved by the President determines that the object will not adversely affect the safety or significantly affect the regularity of operations of helicopters.

(f) Existing objects above any of the surfaces in 138.403-(a) and 138.403-(b) must, as far as practicable, be removed except when the object is shielded by an existing immovable object or after an aeronautical study approved by the President determines that the object will not adversely affect the safety or significantly affect the regularity of operations of helicopters.

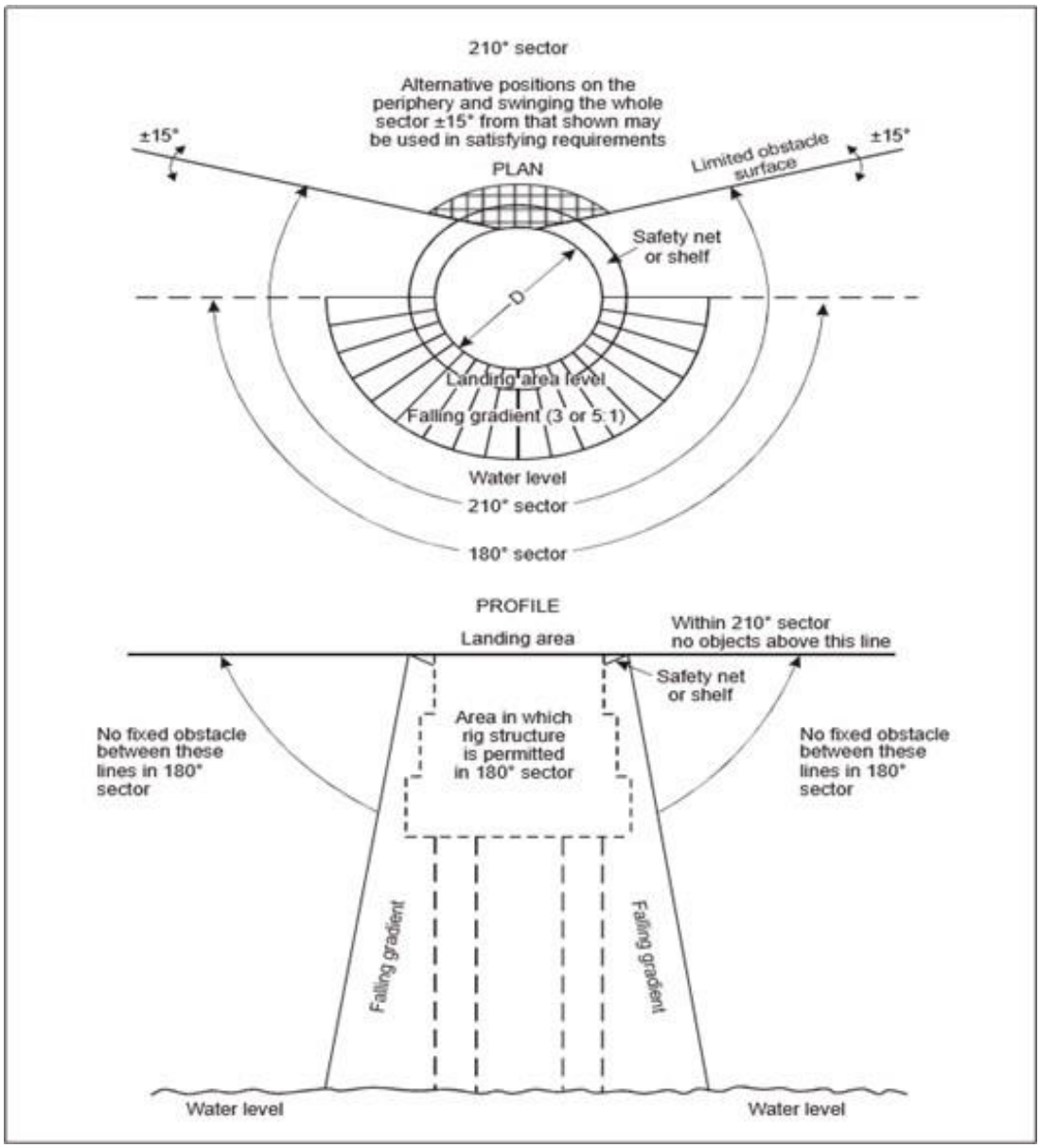
(g) A surface-level heliport must have at least one approach and take-off climb surface. An aeronautical study must be undertaken by the heliport operator when only a single approach and take-off climb surface is provided considering as a minimum, the following factors:

(1) The area/terrain over which the flight is being conducted;

(2) The obstacle environment surrounding the heliport and the availability of at least one protected side slope;

(3) The performance and operating limitations of helicopters intending to use the heliport; and

(4) The local meteorological conditions including the prevailing winds.



(h) A surface-level heliport must have at least two approach and take-off climb surfaces to avoid downwind conditions, minimize crosswind conditions and permit for a balked landing.

Figure G-7. Helideck Obstacle-free sector

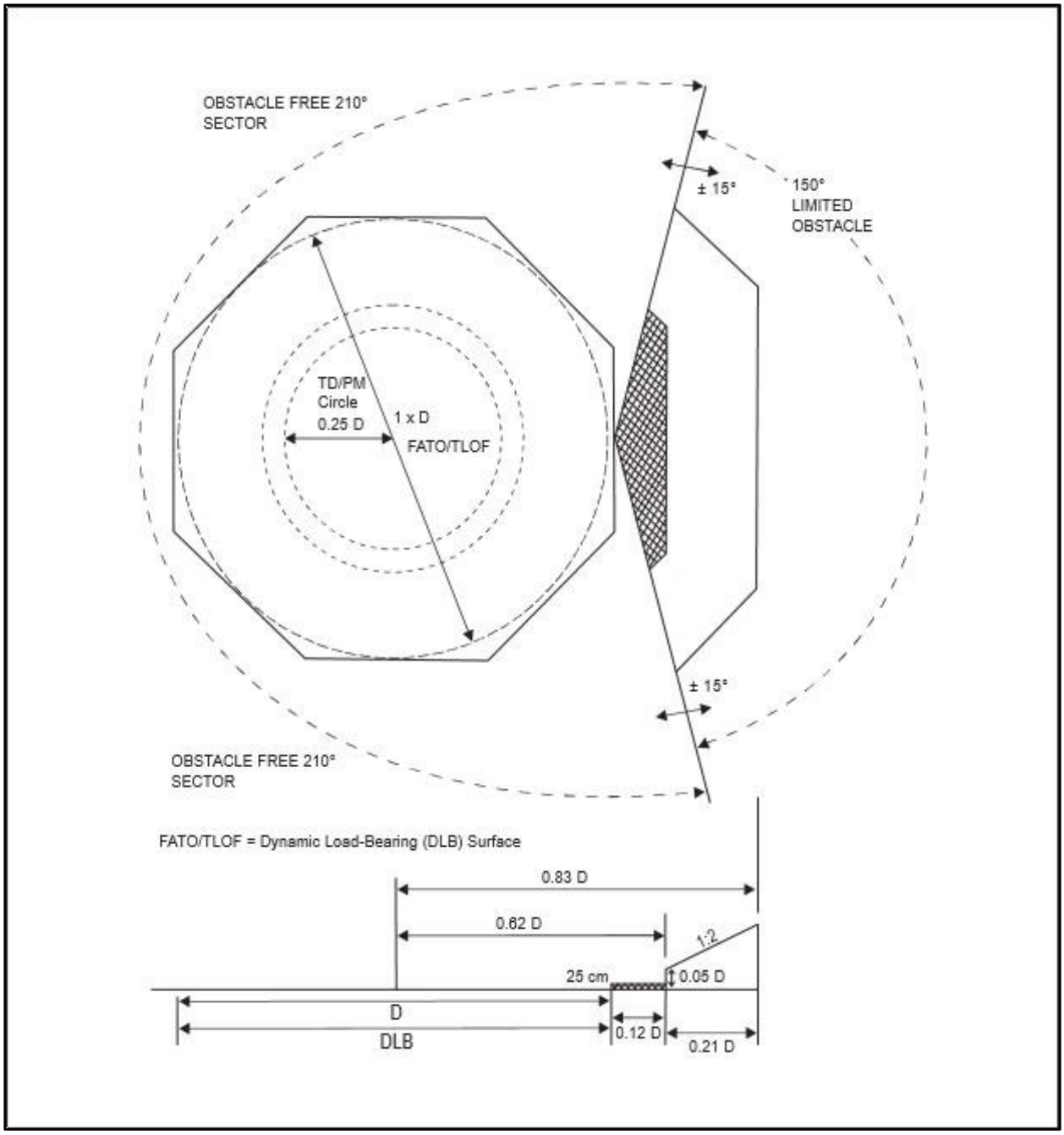


Figure G-8. Helideck Obstacle limitation sectors and surfaces for a FATO and coincidental TLOF of 1 D and larger

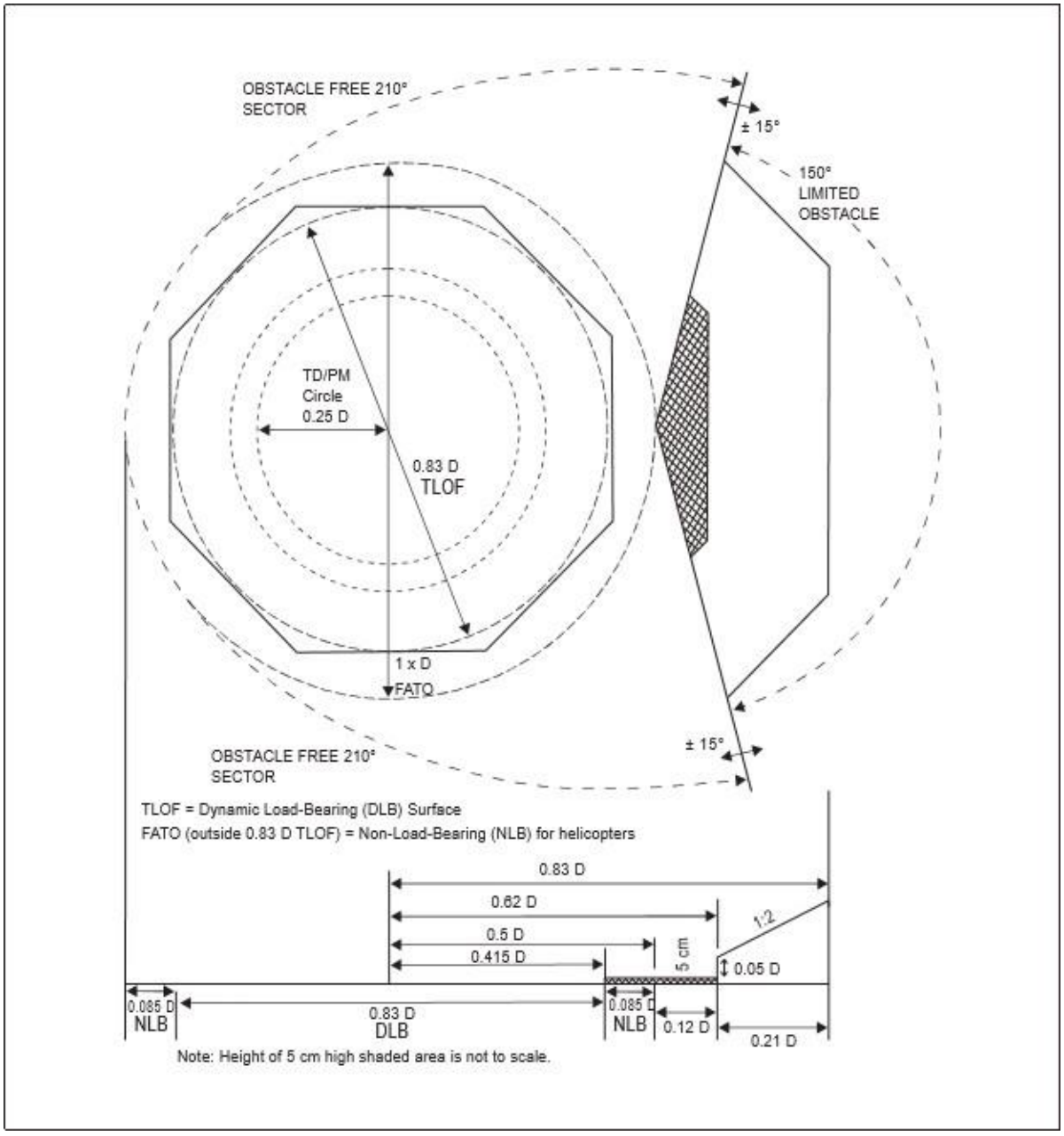


Figure G-9. Helideck Obstacle limitation sectors and surfaces for a TLOF of 0.83 D and larger

I. Elevated heliports

(i) The obstacle limitation surfaces for elevated heliports must conform to the requirements for surface- level heliports specified in 138.403-(a) and 138.403-(f)

(j) An elevated heliport must have at least one approach and take-off climb surface. An aeronautical study must be under taken by the heliport operator when only a single approach and take-off climb surface is provided considering as a minimum, the following factors:

(1) The area/terrain over which the flight is being conducted;

(2) The obstacle environment surrounding the heliport and the availability of at least one protected side slope;

(3) The performance and operating limitations of helicopters intending to use the heliport; and

(4) The local meteorological conditions including the prevailing winds.

(k) An elevated heliport must have at least two approach and take-off climb surfaces to avoid downwind conditions, minimize crosswind conditions and permit for a balked landing.

II. Helidecks

(l) A helideck must have an obstacle-free sector.

(m) There must be no fixed obstacles within the obstacle-free sector above the obstacle-free surface.

(n) In the immediate vicinity of the helideck, obstacle protection for helicopters must be provided below the helideck level. This protection must extend over an arc of at least 180 degrees with the origin at the center of the FATO, with a descending gradient having a ratio of one unit horizontally to five units vertically from the edges of the FATO within the 180-degree sector. This descending gradient maybe reduced to a ratio of one unit horizontally to three units vertically within the 180-degree sector for multi-engine helicopters operated in performance class 1 or 2. (See Figure G-7.)

(o) 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 must 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 0.05D above the level of the TLOF. (See Figure G-8.)

(p) For a TLOF less than 1D within the 150-degree limited obstacle surface/sector out to a distance of 0.62D and commencing from a distance 0.5D, both measured from the center of the TLOF, objects must not exceed a height of 5 cm above the TLOF. Beyond that arc, out to an overall distance of 0.83D from the center of the TLOF, the limited obstacle surface rises at a rate of one unit vertically for each two units horizontally originating at a height 0.05D above the level of the TLOF. (See Figure G-9.)

(Note. — Where the area enclosed by the TLOF perimeter marking is a shape other than circular, the extent of the LOS segments is represented as lines parallel to the perimeter of the TLOF rather than arcs. Figure G-8 and G-9 has been constructed on the assumption that an octagonal helideck arrangement is provided).

III. Shipboard heliports

(q) The specifications in (t) and (v) must be applicable for shipboard heliports.

IV. Purpose-built heliports located forward or aft

(r) When helicopter operating areas are provided in the bow or stern of a ship they must apply the obstacle criteria for helidecks.

V. Amidships location — purpose-built and non-purpose-built

(s) Forward and aft of a TLOF of 1 D and larger must 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 must 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.

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

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

VI. Non-purpose-built heliports

VI.1 Ship's side location

(v) No objects must 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 must only be present if they do not represent a hazard to helicopters.

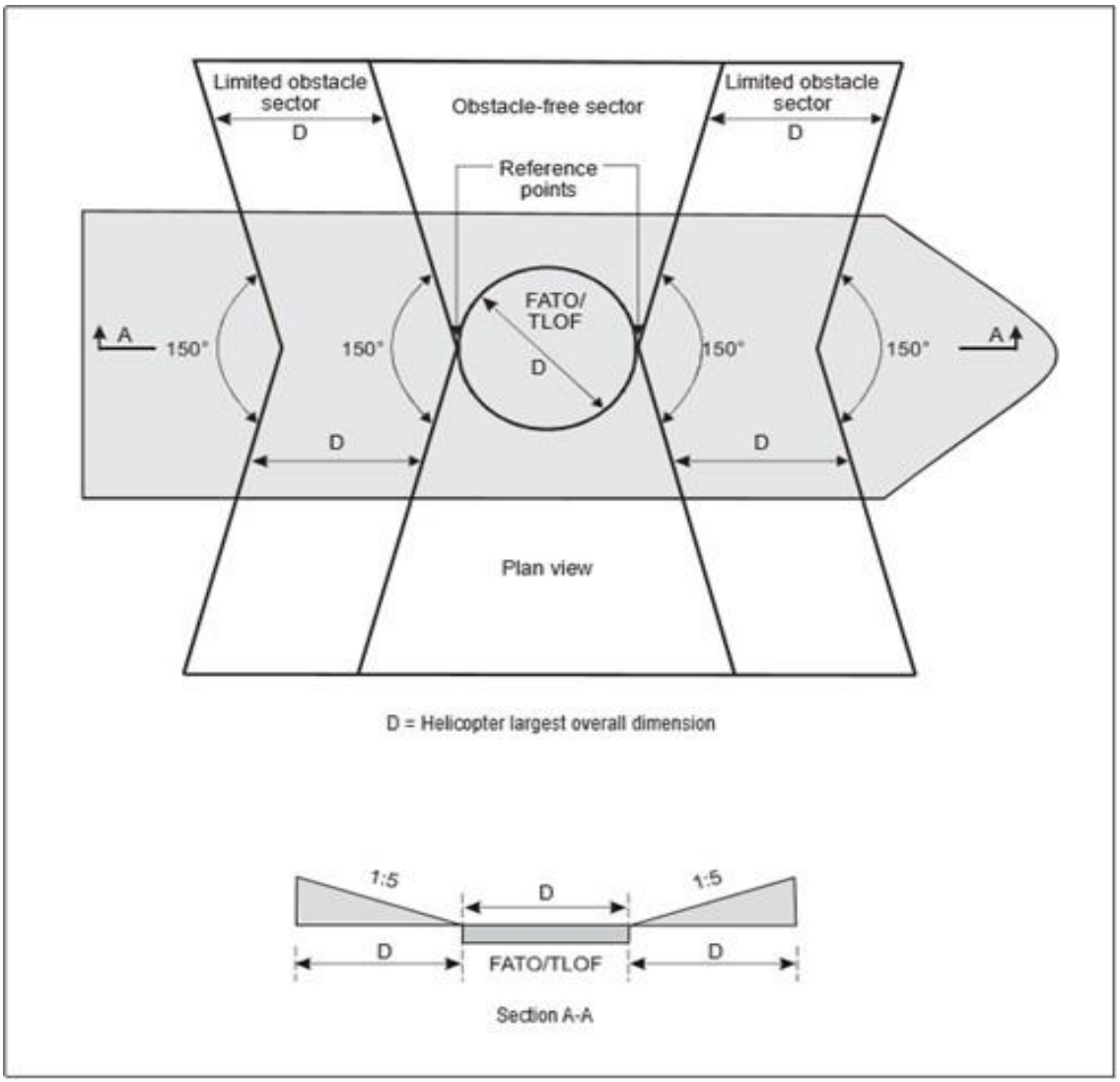


Figure G-10. Amid ship's location – Shipboard heliport obstacle limitation surfaces

(w) From the fore and aft mid-points of the D circle in two segments outside the circle, limited obstacle areas must 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 athwart ships bisector of the D circle. Within these areas there must be no objects rising above a maximum height of 25cm above the level of the TLOF. (See Figure G-11.) Such objects must only be present if they do not represent a hazard to helicopters.

(x) A limited obstacle sector horizontal surface must be provided, at least 0.25 D beyond the diameter of the D circle, which must surround the inboard sides of the TLOF to the fore and aft mid-points of the D circle. The limited obstacle sector must 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 athwart ships bisector of the D circle. Within this sector there must be no objects rising above a maximum height of 25 cm above the level of the TLOF.

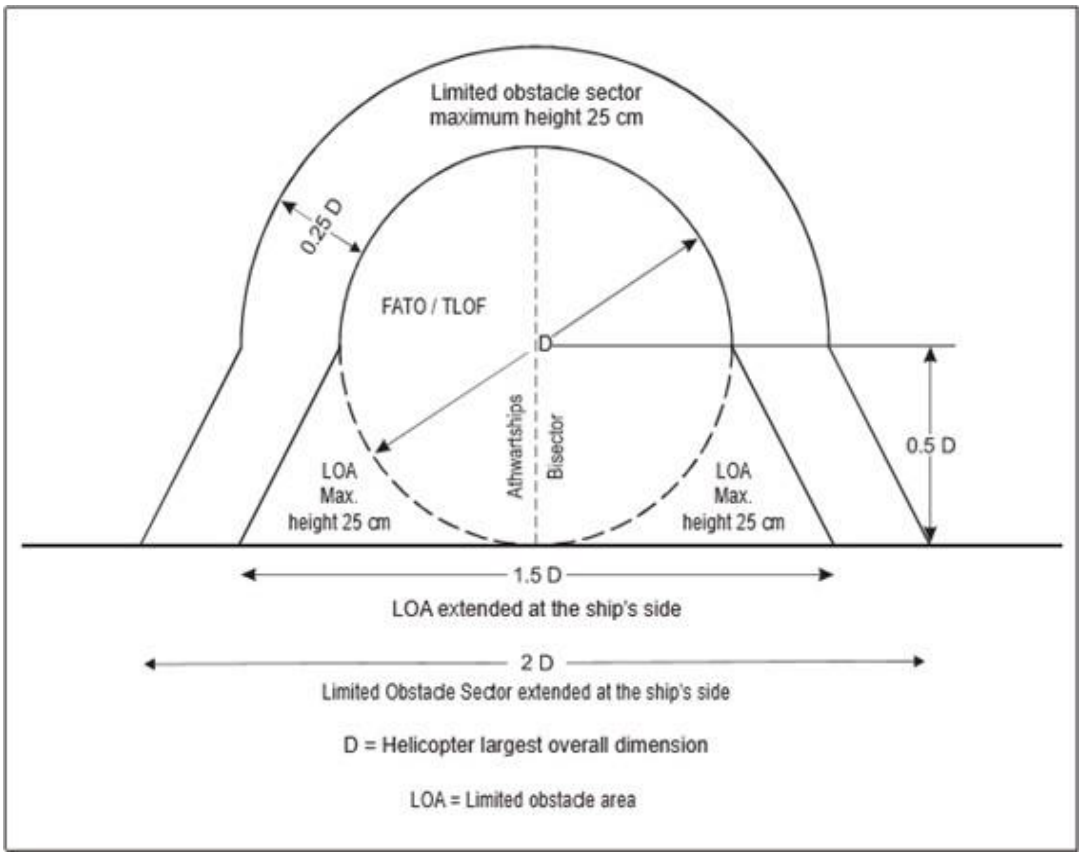


Figure G-11. Ships-side non-purpose-built heliport obstacle limitation sectors and surfaces

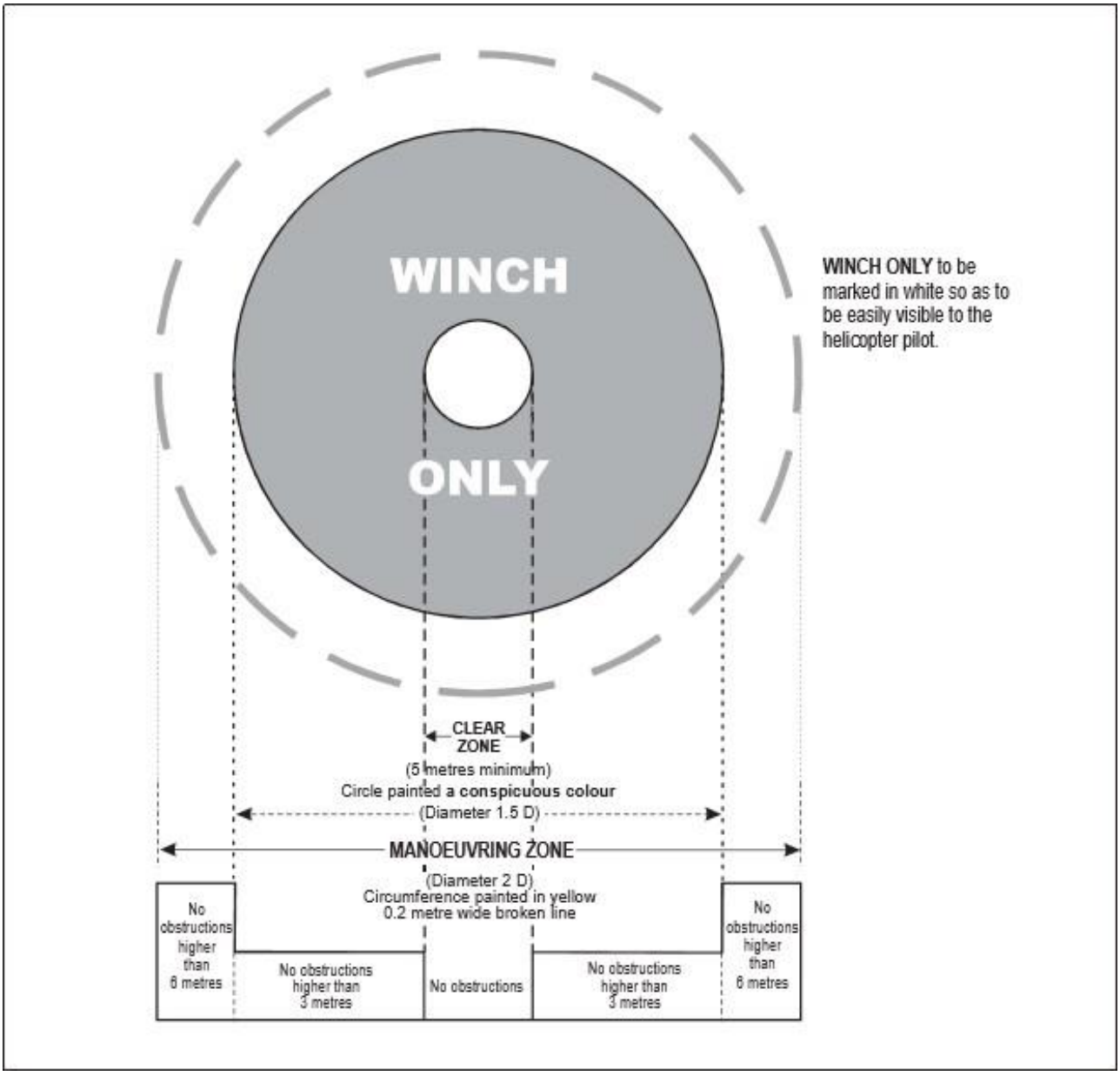


Figure G-12. Winching area of a ship

VI.2 Winching areas

(y) An area designated for winching on-board ships must be comprised of a circular clear zone of diameter 5 m and extending from the perimeter of the clear zone, a concentric maneuvering zone of diameter 2 D. (See Figure G-12.)

(z) The maneuvering zone must be comprised of two areas:

(1) The inner maneuvering zone extending from the perimeter of the clear zone and of a circle of diameter not less than 1.5 D; and

(2) The outer maneuvering zone extending from the perimeter of the inner maneuvering zone and of a circle of diameter not less than 2D.

(aa) Within the clear zone of a designated winching area, no objects must be located above the level of its surface.

(bb) Objects located within the inner maneuvering zone of a designated winching area must not exceed a height of 3 m.

(cc) Objects located within the outer maneuvering zone of a designated winching area must not exceed a height of 6m.

SUBPART H – VISUAL AIDS

(Note 1. — The procedures used by some helicopters require that they utilize a FATO having characteristics similar in shape to a runway for fixed wing aircraft. For the purpose of this chapter a FATO having characteristics similar in shape to a runway is considered as satisfying the concept for a "runway-type FATO". For such arrangements it is sometimes necessary to provide specific markings to enable a pilot to distinguish a runway-type FATO during an approach. Appropriate markings are contained within sub-sections entitled "Runway-type FATOs". The requirements applicable to all other types of FATOs are given within sub-sections entitled "All FATOs except runway-type FATOs".

Note 2. — It has been found that, on surfaces of light colour, the conspicuity of white and yellow markings can be improved by outlining them in black.)

§ 138.501 Indicators

(a) Wind direction indicators

1. Application

(i) A heliport must be equipped with at least one wind direction indicator.

2. Location

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

(iii) Where a TLOF and/or FATO may be subject to a disturbed airflow, then additional wind direction indicators located close to the area must be provided to indicate the surface wind on the area.

3. Characteristics

(iv) A wind direction indicator must be constructed so that it gives a clear indication of the direction of the wind and a general indication of the wind speed.

(v) An indicator must be a truncated cone made of lightweight fabric and must have the following minimum dimensions:

	Surface Level Heliports	Elevated Heliports and Helidecks
Length	2.4 m	1.2 m
Diameter (Large End)	0.6 m	0.3 m
Diameter (Smaller End)	0.3 m	0.15 m

(vi) The color of the wind direction indicator must be so selected as to make it clearly visible and understandable from a height of at least 200 m (650 ft.) above the heliport, having regard to background. Where practicable, a single color, preferably white or orange, must be used. Where a combination of two colors is required to give adequate conspicuity against changing backgrounds, they must be orange and white, red and white, or black and white, and must be arranged in five alternate bands the first and last band being the darker color.

(vii) A wind direction indicator at a heliport intended for use at night must be illuminated.

§ 138.503 Markings and Markers

(a) Winching area marking

(Note. — The objective of the winching area markings is to provide visual cues which assist a helicopter to be positioned over, and retained within, an area from which a passenger or equipment can be lowered or raised.)

1. Application

(i) Winching area markings must be provided at a designated winching area. (See Figure G-12.)

2. Location

(ii) Winching area markings must be located so that their center(s) coincides with the center of the clear zone of the winching area. (See Figure G-12.)

3. Characteristics

(iii) Winching area markings must comprise a winching area clear zone marking and a winching area maneuvering zone marking.

(iv) A winching area clear zone marking must consist of a solid circle of diameter not less than 5 m and of a conspicuous color.

(v) A winching area maneuvering zone marking must consist of a broken circle line of 30 cm in width and of a diameter not less than 2 D and be marked in a conspicuous color. Within it "WINCH ONLY" must be marked to be easily visible to the pilot.

(b) Heliport identification marking

(Note 1. — The objective of a heliport identification marking is to provide to the pilot an indication of the presence of a heliport and, by its form, likely usage; the preferred direction(s) of approach; or the FATO orientation within the helideck obstacle environment.
Note 2. — For other than helidecks, the preferred direction(s) of approach corresponds to the median of the departure/arrival surface(s).
Note 3. — For helidecks, the bar of the "H" points to the centre of the Limited Obstacle Sector.
Note 4. — If the touchdown/positioning marking is offset, the heliport identification marking is established in the centre of the touchdown/positioning marking.
Note 5. — On a FATO, which does not contain a TLOF and which is marked with an aiming point marking (see (h)), the heliport identification marking is established in the center of the aiming point marking as shown in Figures H -1 and H -1A)

1. Application

(i) A heliport identification marking must be provided at a heliport.

2. Location — All FATOs except runway-type FATOs

(ii) A heliport identification marking must be located at or near the center of the FATO.

(iii) On a FATO which contains a TLOF, a heliport identification marking must be located in the FATO so the position of it coincides with the center of the TLOF.

3. Location — Runway-type FATOs

(iv) A heliport identification marking must be located in the FATO and when used in conjunction with FATO designation markings, must be displayed at each end of the FATO as shown in Figure H-2.

4. Characteristics

(v) A heliport identification marking, except for a heliport at a hospital, must consist of a letter H, white in color. The dimensions of the H marking must be no less than those

shown in Figure H-3 and where the marking is used for a runway-type FATO, its dimensions must be increased by a factor of 3 as shown in Figure H-2.

(vi) A heliport identification marking for a heliport at a hospital must consist of a letter H, WHITE in color, on a RED CRESCENT made of semi-circle adjacent to each of the sides of a triangle in broken line with white color containing the H as shown in Figure H-3. The H, Red Crescent and triangle may be edged with 10 mm black border to improve contrast.

(vii) A heliport identification marking must be oriented with the cross arm of the H at right angles to the preferred final approach direction. For a helideck the cross arm must be on or parallel to the bisector of the obstacle-free sector. For a non-purpose-built shipboard heliport located on a ship's side, the cross arm must be parallel with the side of the ship.

(viii) On a helideck or a shipboard heliport where the D-value is 16.0 m or larger, the size of the heliport identification H marking must 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 heliport identification H marking must have a height of 3 m with an overall width not exceeding 2.25 m and a stroke width not exceeding 0.5m.

(c) Maximum allowable mass marking

(Note 1. — The objective of the maximum allowable mass marking is to provide the mass limitation of the heliport such that it is visible to the pilot from the preferred final approach direction.)

1. Application

(i) A maximum allowable mass marking must be displayed at an elevated heliport, a helideck and a ship board heliport.

(ii) A maximum allowable mass marking must be displayed at a surface-level heliport.

2. Location

(iii) A maximum allowable mass marking must be located within the TLOF or FATO and so arranged as to be readable from the preferred final approach direction.

3. Characteristics

(iv) A maximum allowable mass marking must consist of a one-, two- or three-digit number.

(v) The maximum allowable mass must be expressed in tones (1 000 kg) rounded down to the nearest 1 000 kg followed by a letter “t”.

(vi) The maximum allowable mass must be expressed to the nearest 100 kg. The marking must be presented to one decimal place and rounded to the nearest 100 kg followed by letter “t”.

(vii) When the maximum allowable mass is expressed to 100 kg, the decimal place must be preceded with a decimal point marked with a 30 cm square.

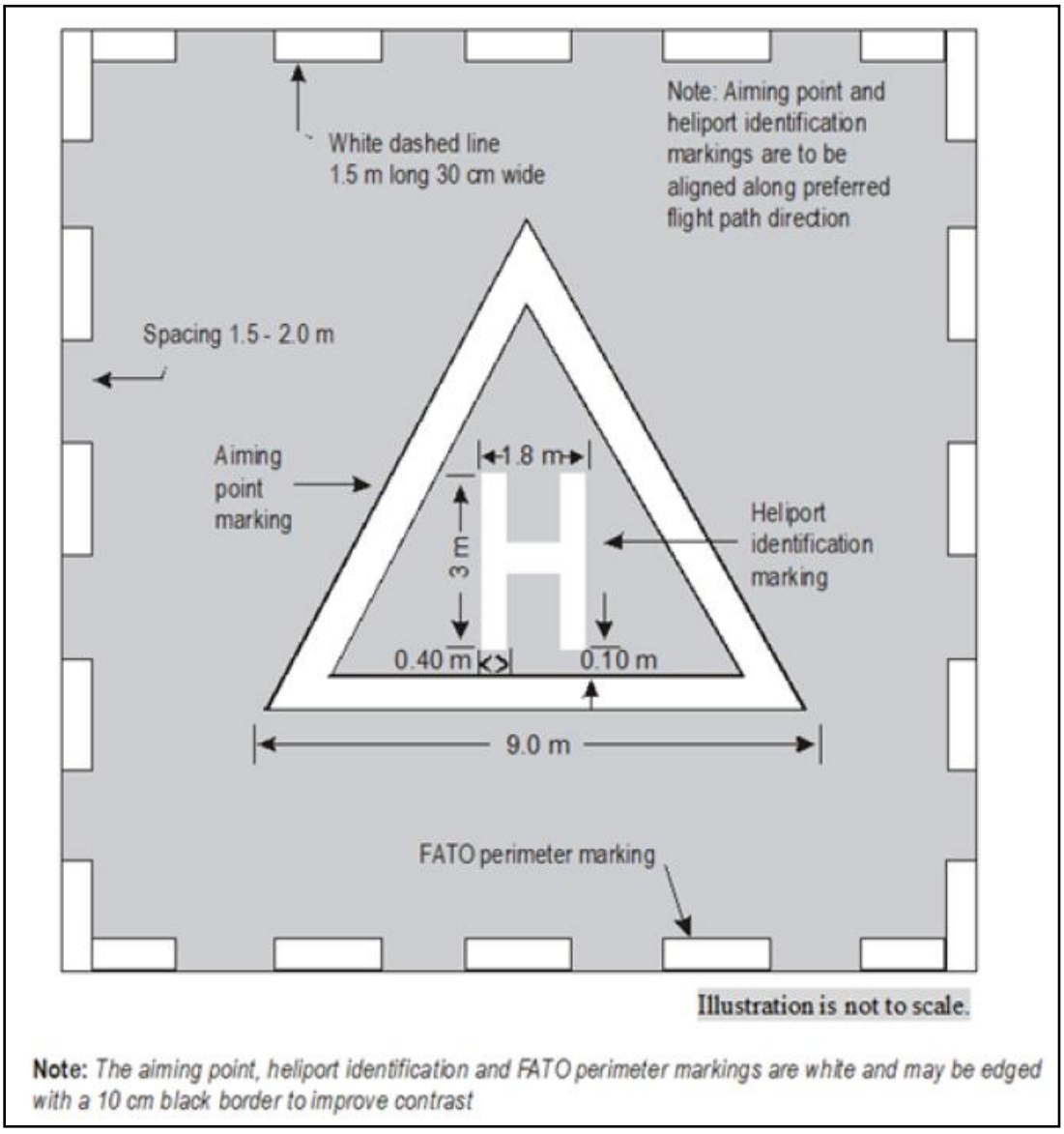


Figure H-1. Combined heliport identification, aiming point and FATO perimeter marking

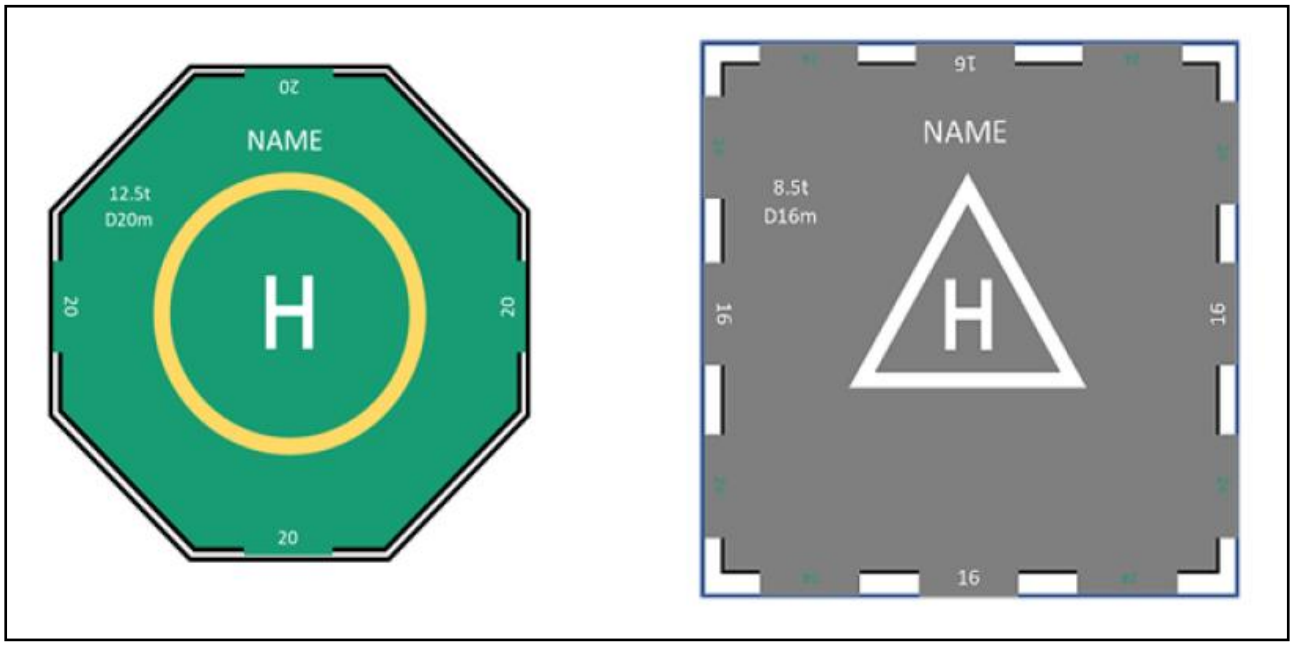
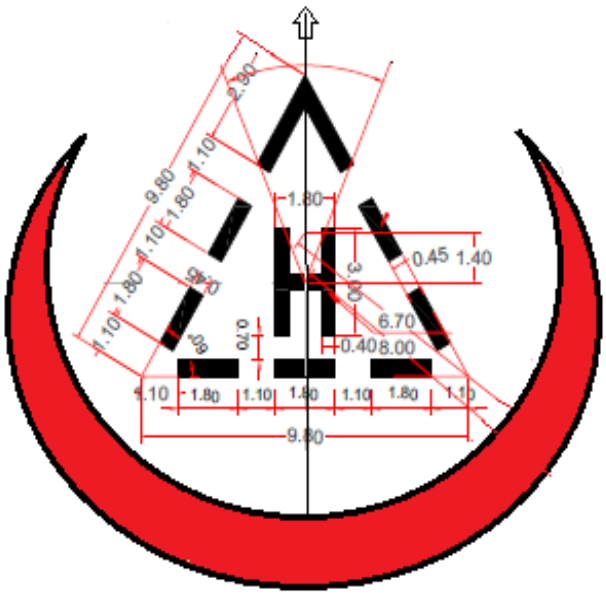
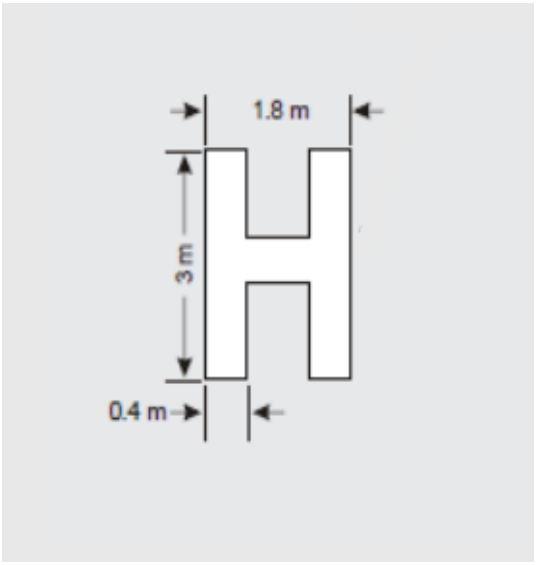


Figure H-1A. Heliport identification markings with TLOF and aiming markings for Heliport

Figure H-2. FATO designation marking and heliport identification marking for a runway-type FATO





(Note: Color of the markings must be as given in 138.503 (b)(5) and (6)

Figure H-3. Hospital Heliport identification and heliport identification marking

I. All FATOs except runway-type FATOs

(viii) The numbers and the letter of the marking must have a color contrasting with the background and must be in the form and proportion shown in Figure H-4 for a D-Value of more than 30 m. For a D-Value between 15 m to 30 m the height of the numbers and the letter of the marking must be a minimum of 90 cm, and for a D-Value of less than15 m the height of the numbers and the letter of the marking must be a minimum of 60 cm, each with a proportional reduction in width and thickness.

II. Runway-type FATOs

(ix)The numbers and the letter of the marking must have a color contrasting with the back ground and must be in the form and proportion shown in Figure H-4.

(d) D-value marking

(Note. — The objective of the D-value marking is to provide to the pilot the "D" of the largest helicopter that can be accommodated on the heliport.)

1. Application

I. All FATOs except runway-type FATOs

(i) The D-value marking must be displayed at a helideck and at a shipboard heliport.

II. Runway-type FATOs

(ii) The D-value marking must be displayed at surface-level and elevated heliports.

2. Location

(iii) A D-value marking must be located within the TLOF or FATO and so arranged as to be readable from the preferred final approach direction.

(iv) Where there is more than one approach direction, additional D-value markings must be provided such that at least one D-value marking is readable from the final approach directions. For a non-purpose-built heliport located on a ship's side, D-value markings must 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 centerline.

3. Characteristics

(v) The D-value marking must be white. The D-value marking must be rounded to the nearest whole center or foot with 0.5 rounded down.

(vi) The numbers of the marking must have a color contrasting with the background and must be in the form and proportion shown in Figure H-4 for a D-value of more than 30m. For a D-value with a dimension of between 15 m to 30 m the height of the numbers of the marking must be a minimum of 90 cm, and for a D-value of less than 15 m the height of the numbers of the marking must be a minimum of 60 cm, each with a proportional reduction in width and thickness.

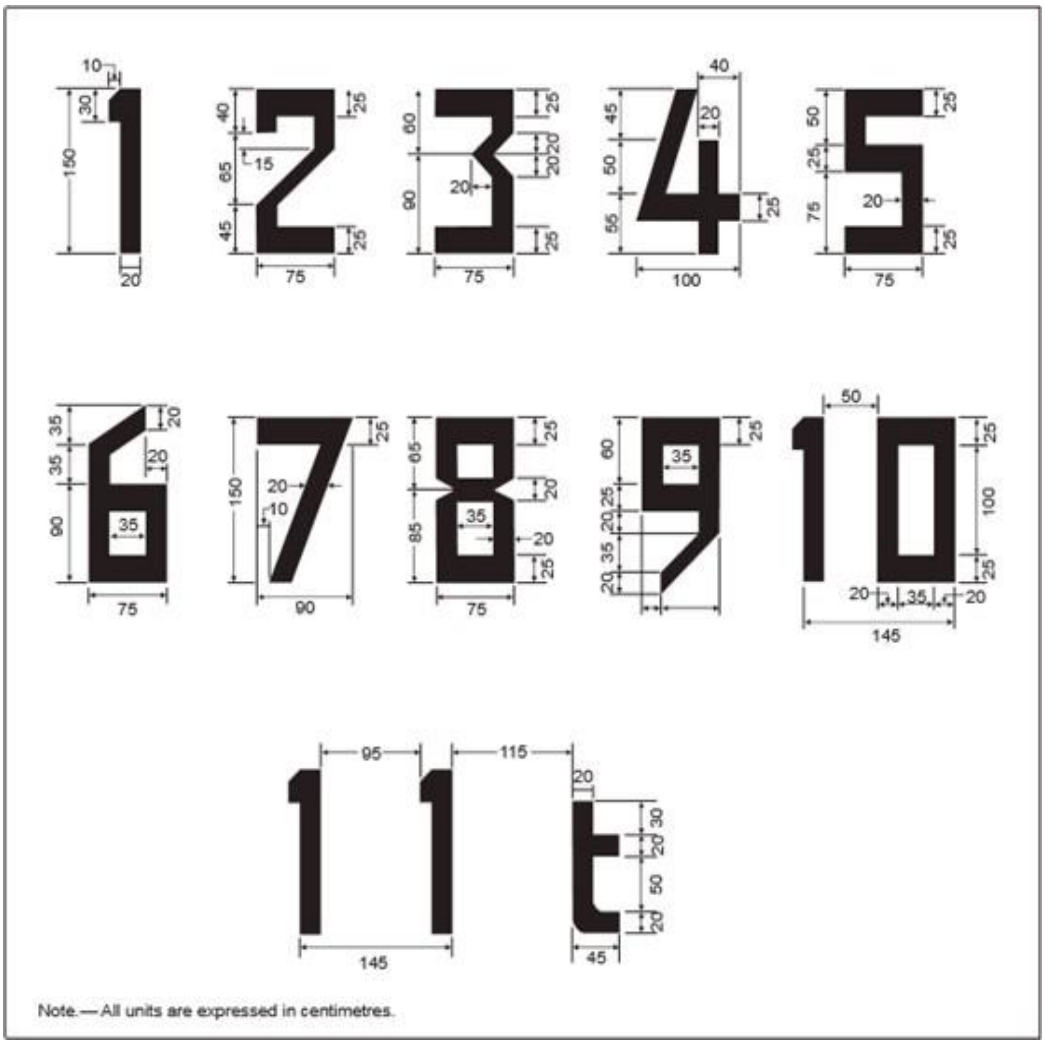


Figure H-4. Form and proportions of numbers and letters

(e) Final approach and take-off area perimeter marking or markers for surface-level heliports

(Note. — The objective of final approach and take-off area perimeter marking, or markers, is to provide to the pilot, where the perimeter of the FATO is not self-evident, an indication of the area that is free of obstacles and in which intended procedures, or permitted maneuvering, may take place.)

1. Application

(i) FATO perimeter marking or markers must be provided at a surface-level heliport where the extent of a FATO with a solid surface is not self-evident.

2. Location

(ii) The FATO perimeter marking or markers must be located on the edge of the FATO.

3. Characteristics — Runway-type FATOs

(iii) The perimeter of the FATO must be defined with markings or markers spaced at equal intervals of not more than 50 m with at least three markings or markers on each side including a marking or marker at each corner.

(iv) A FATO perimeter marking must be a rectangular stripe with a length of 9 m or one-fifth of the side of the FATO which it defines and a width of 1m.

(v) FATO perimeter markings must be white.

(vi) FATO perimeter marker must have dimensional characteristics as shown in Figure F-39.

(vii) FATO perimeter markers must be of color(s) that contrast effectively against the operating background.

(viii) FATO perimeter markers must be a single color, orange or red, or two contrasting colors, orange and white or, alternatively, red and white must be used except where such colors would merge with the background.

4. Characteristics — All FATOs except runway-type FATOs

(ix) For an unpaved FATO the perimeter must be defined with flush in-ground markers. The FATO perimeter markers must be 30 cm in width, 1.5 m in length,

and with end-to-end spacing of not less than 1.5 m and not more than 2 m. The corners of a square or rectangular FATO must be defined.

(x) For a paved FATO the perimeter must be defined with a dashed line. The FATO perimeter marking segments must be 30 cm in width, 1.5 m in length, and with end-to-end spacing of not less than 1.5 m and not more than 2 m. The corners of the square or rectangular FATO must be defined.

(xi) FATO perimeter markings and flush in-ground markers must be white.

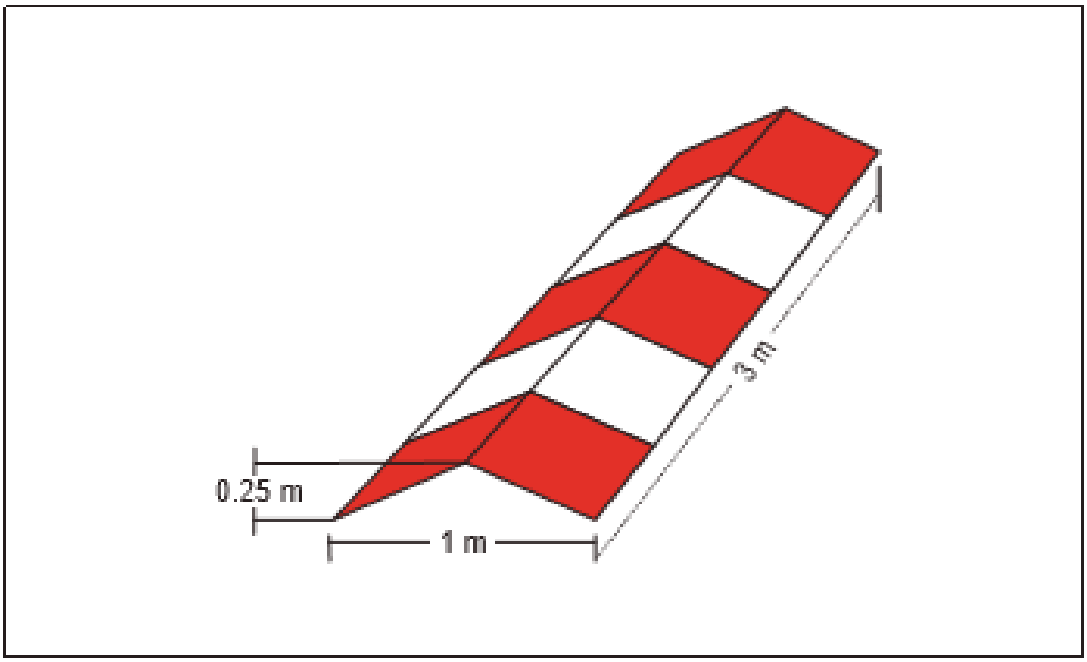


Figure H-5. Runway-type FATO edge marker

(f) Final approach and take-off area designation markings for runway-type FATOs

Note. — The objective of final approach and take-off area designation markings for runway-type FATOs is to provide to the pilot an indication of the magnetic heading of the runway.)

1. Application

(i) A FATO designation marking must be provided at a heliport where it is necessary to designate the FATO to the pilot.

2. Location

(ii) A FATO designation marking must be located at the beginning of the FATO as shown in Figure H-2.

3. Characteristics

(iii) A FATO designation marking must consist of a two-digit number. The two-digit number must be the whole number nearest the one-tenth of the magnetic North when viewed from the direction of approach. When the above rule would give a single digit number, it must be preceded by a zero. The marking as shown in Figure H-2 must be supplemented by the heliport identification marking.

(g) Aiming point marking

Note. — The objective of the aiming point marking is to provide a visual cue indicating to the pilot the preferred approach/departure direction; the point to which the helicopter approaches to the hover before positioning to a stand where a touchdown can be made; and that the surface of the FATO is not intended for touchdown.)

1. Application

(i) An aiming point marking must be provided at a heliport where it is necessary for a pilot to make an approach to a particular point above a FATO before proceeding to a TLOF.

2. Location — Runway-type FATOs

(ii) The aiming point marking must be located within the FATO.

3. Location — All FATOs except runway-type FATOs

(iii) The aiming point marking must be located at center of the FATO as shown in Figure H-1.

4. Characteristics

(iv) The aiming point marking must be an equilateral triangle with the bisector of one of the angles aligned with the preferred approach direction. The marking must consist of continuous lines, providing a contrast with the back ground color, and the dimensions of the marking must conform to those shown in Figure H-6.

(h) Touchdown and lift-off area perimeter marking

(Note. — The objective of the touchdown and lift-off area perimeter marking is to provide to the pilot an indication of an area that is free of obstacles; has dynamic load bearing; and in which, when positioned in accordance with the TDPM, undercarriage containment is assured.)

1. Application

(i) A TLOF perimeter marking must be displayed on a TLOF located in a FATO at a surface-level heliport if the perimeter of the TLOF is not self-evident.

(ii) A TLOF perimeter marking must be displayed on an elevated heliport, a helideck and a shipboard heliport.

2. Location

(iii) The TLOF perimeter marking must be located along the edge of the TLOF.

3. Characteristics

(iv) A TLOF perimeter marking must be consist of a continuous white line with a width of at least 30 cm.

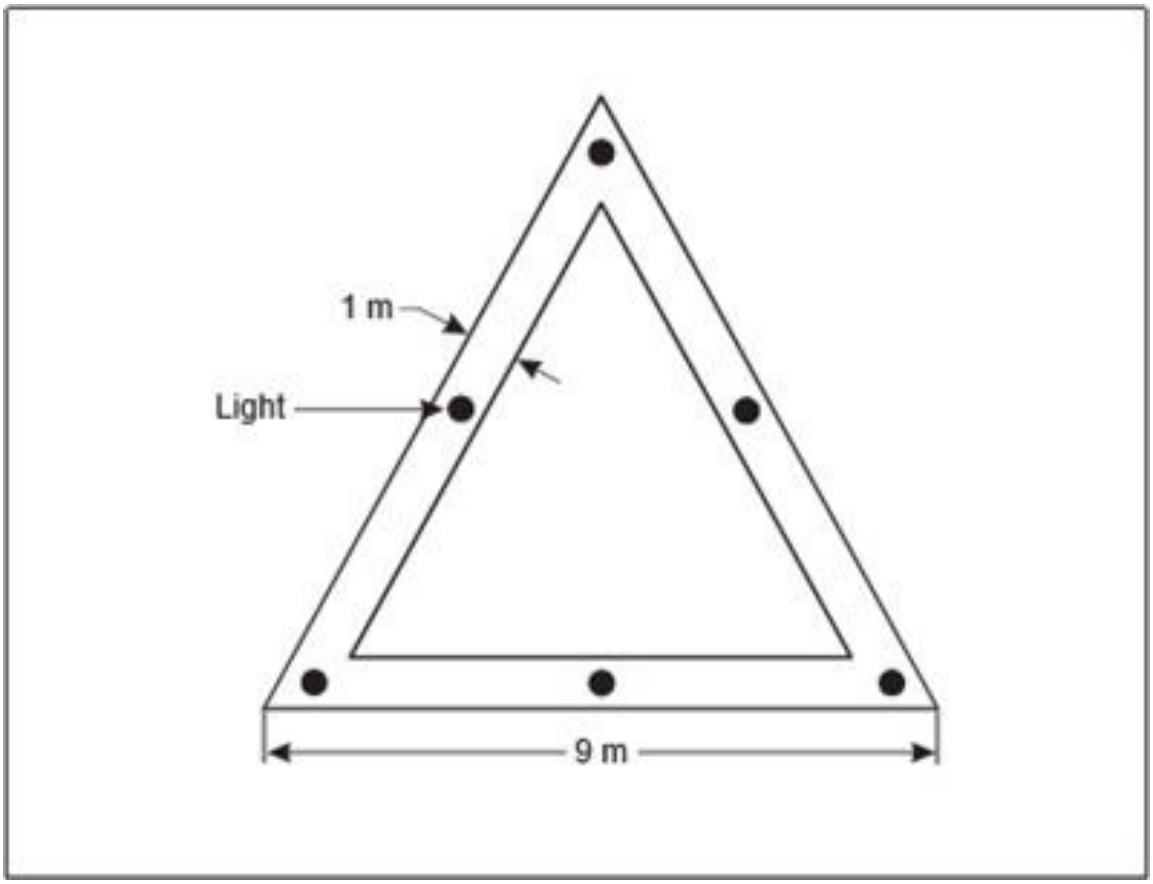


Figure H-6. Aiming point marking

(i) Touchdown/positioning marking

Note. — The objective of a touchdown/positioning marking (TDPM) is to provide visual cues which permit a helicopter to be placed in a specific position such that, when the pilot's seat is above the marking, the undercarriage is within the load-bearing area and all parts of the helicopter will be clear of any obstacles by a safe margin.

1. Application

(i) A touchdown/positioning marking must be provided for a helicopter to touch down or be accurately placed in a specific position.

(ii) The touchdown/positioning marking must be:

I. When there is no limitation on the direction of touchdown/positioning, a touchdown/ positioning circle (TDPC) marking; and

II. When there is a limitation on the direction of touchdown/positioning:

(A) For unidirectional applications, a shoulder line with an associated centreline; or

(B) For multidirectional applications, a TDPC marking with prohibited landing sector(s) marked.

2. Location

(iii) The inner edge/inner circumference of the touchdown/positioning marking must be at a distance of 0.25 D from the centre of the area in which the helicopter is to be positioned.

(iv) On a helideck, the centre of the TDPC marking must 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 is necessary and would not impair safety.

(v) Prohibited landing sector markings, when provided, must be located on the touchdown/positioning marking, within the relevant headings, and extend to the inner edge of the TLOF perimeter marking**.**

3. Characteristics

(vi) The inner diameter of the TDPC must be 0.5 D of the largest helicopter the area is intended to serve.

(vii) A touchdown/positioning marking must have a line width of at least 0.5 m. For a helideck and a purpose-built shipboard heliport, the line width must be at least 1 m.

(viii) The length of a shoulder line must be 0.5D of the largest helicopter the area is intended to serve.

(ix) The prohibited landing sector markings, when provided, must be indicated by white and red hatched markings as shown in Figure H-7

(x) The TDPM must take precedent when used in conjunction with other markings on the TLOF except for the prohibited landing sector marking.

(Note. — The prohibited landing sector (PLS) marking, when provided, is not intended to move the helicopter away from President may issue the heliport certificate valid up to a period of 3 years. *objects around the FATO, but to ensure that the tail is not placed*

in an orientation that might constitute a hazard. This is achieved by having the helicopter nose clear of the hatched markings during the touchdown.)

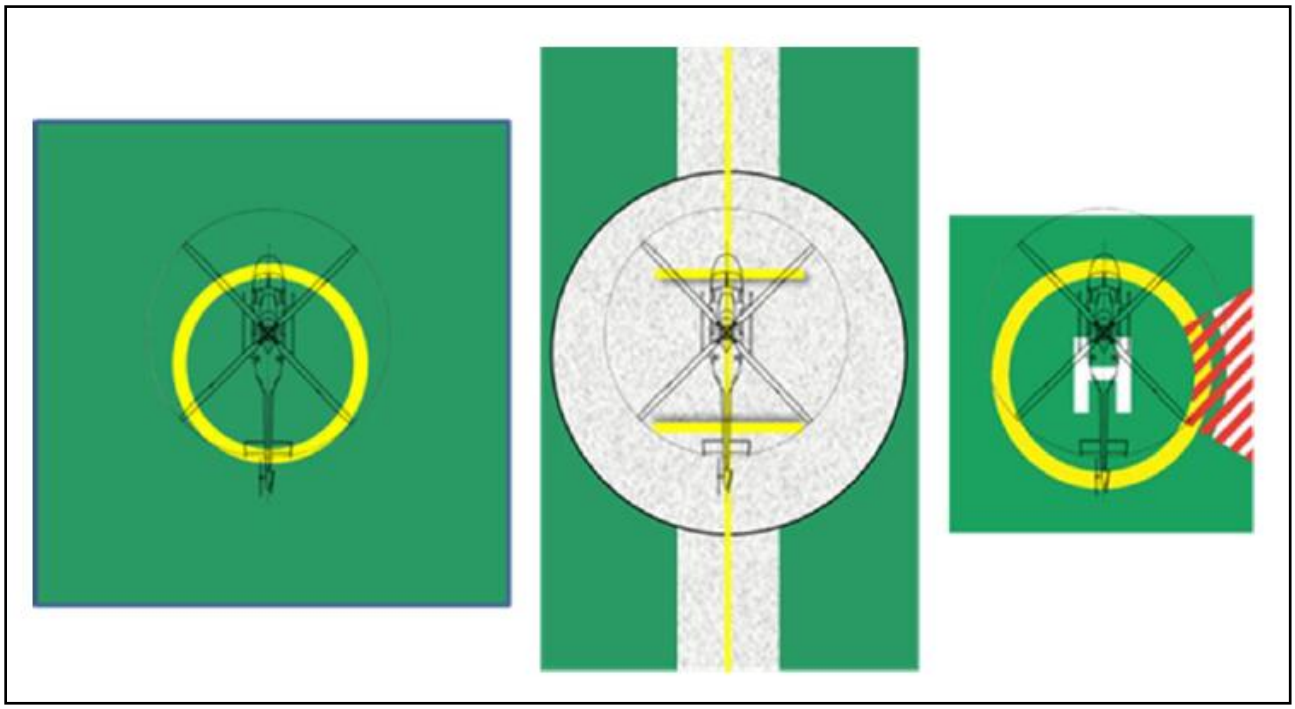


Figure H-7. (Left) Multidirectional TDPC with no limitations (Centre) Unidirectional marking shoulder line with associated center line (Right) Multidirectional TDPC with prohibited landing sector marking

(j) Heliport name marking

(Note. — The objective of a heliport name marking is to provide to the pilot a means of identifying a heliport which can be seen, and read, from all directions of approach.)

1. Application

   (i) A heliport name marking must be provided at a heliport and helideck where there is insufficient alternative means of visual identification.

2. Location

(ii) Where a limited obstacle sector (LOS) exists on a helideck the marking must be located that side of the "heliport identification marking". For a non-purpose-built heliport located on a ship's side the marking must be located on the inboard side of the heliport identification marking in the area between the TLOF perimeter marking and the boundary of the LOS.

3. Characteristics

(iii) A heliport name marking must consist of the name or the alphanumeric designator of the heliport as used in the radio (R/T) communications.

(iv) A heliport name marking intended for use at night or during conditions of poor visibility must be illuminated, either internally or externally.

II. Runway-type FATOs

(v) The characters of the marking must be not less than 3 m in height.

III. All FATOs except runway-type FATOs

(vi) The characters of the marking must be not less than 1.5 m in height at surface-level heliports and not less than 1.2 m on elevated heliports, helidecks and shipboard heliports. The color of the marking must contrast with the background and preferably be white.

(k) Helideck obstacle-free sector (chevron)marking

(Note. — The objective of the helideck obstacle-free sector (chevron) marking is to indicate the direction and limits of a sector that is free of obstacles above the level of the helideck for the preferred approach and departure directions.)

1. Application

(i) A helideck with adjacent obstacles that penetrate above the level of the helideck must have an obstacle-free sector marking.

2. Location

(ii) A helideck obstacle-free sector marking must be located, where practicable, at a distance from the center 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.

3. Characteristics

(iii) The helideck obstacle-free sector marking must indicate the location of the obstacle-free sector and the directions of the limits of the sector.

(iv) The height of the chevron must not be less than 30cm.

(v) The chevron must be marked in a conspicuous color.

(vi) The color of the chevron must be black.

(l) Helideck and shipboard heliport surface marking

(Note. -The objective of helideck and shipboard heliport surface marking is to provide to the pilot, by color and conspicuity, the location of the TLOF on a helideck or shipboard heliport.)

1. Application

(i) A surface marking must be provided to assist the pilot to identify the location of the helideck or shipboard heliport during an approach by day.

2. Location

(ii) A surface marking must be applied to the dynamic load bearing area bounded by the TLOF perimeter marking.

3. Characteristics

(iii) The helideck or shipboard heliport surface bounded by the TLOF perimeter marking must be of dark green using a high friction coating.

(m) Helicopter taxiway markings and markers

(Note 1. — The objective of helicopter taxiway markings and markers is, without being a hazard to the helicopter, to provide to the pilot by day and, if necessary, by night, visual cues to guide movement along the taxiway.
Note 2. — Ground taxi-routes and air taxi-routes over a taxiway are not required to be marked.
Note 3. — Unless otherwise indicated it may be assumed that a helicopter taxiway is suitable for both ground taxiing and air taxiing of helicopters.
Note 4. — Signage may be required on a heliport where it is necessary to indicate that a helicopter taxiway is suitable only for the use of helicopters).

1. Application

(i) The center line of a helicopter taxiway must be identified with a marking.

(ii) The edges of a helicopter taxiway, if not self-evident, must be identified with markers or markings.

2. Location

(iii) Helicopter taxiway markings must be along the center line and, if required, along the edges of a helicopter taxiway.

(iv) Helicopter taxiway edge markers must be located at a distance of 1 m to 3 m beyond the edge of the helicopter taxiway.

(v) Helicopter taxiway edge markers must be spaced at intervals of not more than 15 m on each side of straight sections and 7.5 m on each side of curved sections with a minimum of four equally spaced markers per section.

3. Characteristics

(vi) On a paved taxiway, a helicopter taxiway center line marking must be a continuous yellow line 15 cm in width.

(vii) On an unpaved taxiway that will not accommodate painted markings, a helicopter taxiway center line must be marked with flush in-ground 15 cm wide and approximately 1.5 m in length yellow markers, spaced at intervals of not more than 30 m on straight sections and not more than 15 m on curves, with a minimum of four equally spaced markers per section.

(viii) Helicopter taxiway edge markings must be a continuous double yellow line, each 15 cm in width, and spaced 15 cm apart (nearest edge to nearest edge).

(ix) A helicopter taxiway edge marker must be frangible to the wheeled undercarriage of a helicopter.

(x) A helicopter taxiway edge marker must not exceed a plane originating at a height of 25 cm above the plane of the helicopter taxiway at a distance of 0.5 m from the edge of the helicopter taxiway and sloping upwards and outwards at a gradient of 5 per cent to a distance of 3 m beyond the edge of the helicopter taxiway.

(xi) A helicopter taxiway edge marker must be blue.

(xii) If the helicopter taxiway is to be used at night, the edge markers must be internally illuminated or retro-reflective.

(xiii)

(n) Helicopter air taxi-route markings and markers

(Note. — The objective of helicopter air taxi-route markings and markers is to provide to the pilot by day and, if necessary, by night, visual cues to guide movement along the air taxi-route.)

1. Application

(i) The center line of a helicopter air taxi-route must be identified with markers or markings.

2. Location

(ii) A helicopter air taxi-route center line marking or flush in-ground center line marker must be located along the center line of the helicopter air taxiway.

3. Characteristics

(iii) A helicopter air taxi-route center line, when on a paved surface, must be marked with a continuous yellow line 15 cm in width.

(iv) A helicopter air taxi-route center line, when on an unpaved surface that will not accommodate painted markings, must be marked with flush in-ground 15 cm wide and approximately 1.5 m in length yellow markers, spaced at intervals of not more than 30 m on straight sections and not more than 15 m on curves, with a minimum of four equally spaced markers per section.

(v) If the helicopter air taxi-route is to be used at night, markers must be either internally illuminated or retro-reflective.

(o) Helicopter stand markings

(Note. — The objective of the helicopter stand markings is to provide to the pilot a visual indication of an area that is free of obstacles and in which permitted maneuvering, and all necessary ground functions, may take place; identification, mass and D-value limitations,

when required; and, guidance for maneuvering and positioning of the helicopter within the stand.)

1. Application

(i) A helicopter stand perimeter marking must be provided.

(ii) A helicopter stand must be provided with the appropriate TDPM. (See Figure H-7)

(iii) Alignment lines and lead-in/lead-out lines must be provided on a helicopter stand. (See Figure F-5 to F-9)

2. Location

(iv) The TDPM, alignment lines and lead-in/lead-out lines must be located such that every part of the helicopter can be contained within the helicopter stand during positioning and permitted maneuvering.

(v) Alignment lines and lead-in/lead-out lines must be located as shown in Figure H-8.

3. Characteristics

(vi) A helicopter stand perimeter marking must consist of a continuous yellow line and have a line width of 15 cm.

(vii) The TDPM must have the characteristics described in § 138.503 (i) above.

(viii) Alignment lines and lead-in/lead-out lines must be continuous yellow lines and have a width of 15 cm.

(ix) Curved portions of alignment lines and lead-in/lead-out lines must have radii appropriate to the most demanding helicopter type the helicopter stand is intended to serve.

(x) Stand identification markings must be marked in a contrasting colour so as to be easily readable.

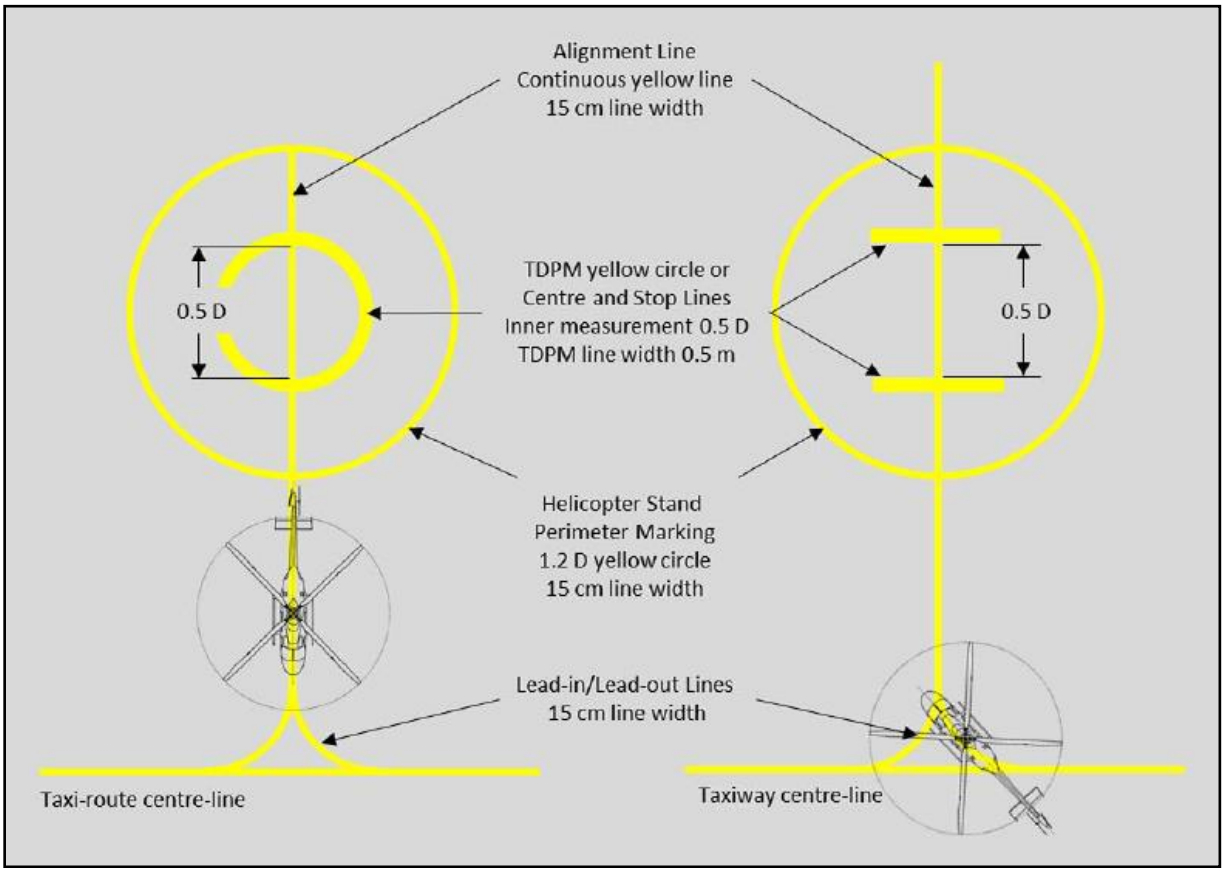


Figure H-8. Helicopter stand markings

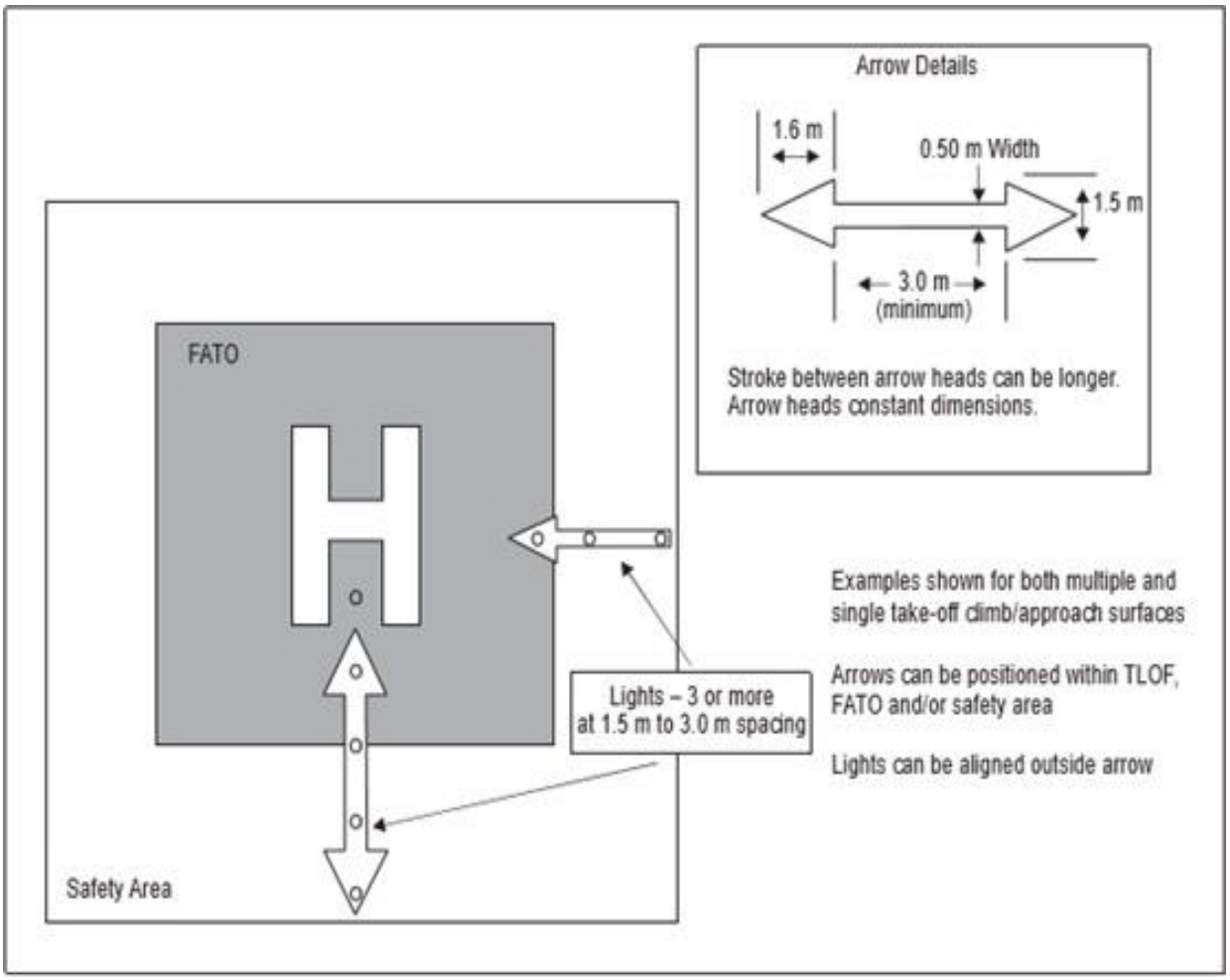


Figure H-9. Flight path alignment guidance markings and lights

(p) Flight path alignment guidance marking

(Note. — The objective of a flight path alignment guidance marking is to provide the pilot with a visual indication of the available approach and/or departure path direction(s).)

1. Application

(i) Flight path alignment guidance marking(s) must be provided at a heliport where it is desirable and practicable to indicate available approach and/or departure path direction(s).

(Note. — The flight path alignment guidance marking can be combined with a flight path alignment guidance lighting system described in § 138.505(d) and shown in Figure H-9).

2. Location

(ii) The flight path alignment guidance marking must be located in a straight line along the direction of approach and/or departure path on one or more of the TLOF, FATO, safety area or any suitable surface in the immediate vicinity of the FATO or safety area.

3. Characteristics

(iii) A flight path alignment guidance marking must consist of one or more arrows marked on the TLOF, FATO and/or safety area surface as shown in Figure H-9. The stroke of the arrow(s) must be 50 cm in width and at least 3 m in length. When combined with flight path alignment guidance lighting system it must take the form shown in Figure H-9 which includes the scheme for marking "heads of the arrows" which are constant regardless of stroke length.

(iv) The markings must be in a color which provides good contrast against the background color of the surface on which they are marked, preferably white.

§ 138.505 Lights

(a) General

(Note 1. — The Design, Characteristics and chromaticity of elevated and inset lights available in GACAR Part 139 are equally applicable to heliports.
Note 2. — The specifications for marking and lighting of obstacles available in GACAR Part 139, are equally applicable to heliports and winching areas.
Note 3. — In the case of helidecks and heliports located near navigable waters, consideration needs to be given to ensuring that aeronautical ground lights do not cause confusion to mariners.
Note 4. — In cases where operations into a heliport are to be conducted at night with Night Vision Imaging Systems (NVIS), it is important to establish the compatibility of the NVIS system with all heliport lighting through an assessment by the helicopter operator prior to use.)

(b) Heliport beacon

1. Application

(i) A heliport beacon must be provided at a heliport where:

I. Long-range visual guidance is considered necessary and is not provided by other visual means; or

II. Identification of the heliport is difficult due to surrounding lights.

2. Location

(ii) The heliport beacon must be located on or adjacent to the heliport preferably at an elevated position and so that it does not dazzle a pilot at short range.

3. Characteristics

(iii) The heliport beacon must emit repeated series of equispaced short duration white flashes in the format in Figure H-10.

(iv) The light from the beacon must show at all angles of azimuth.

(v) The effective light intensity distribution of each flash must be as shown in Figure H-11, Illustration 1.

(Note. - Where brilliancy control is desired, settings of 10 per cent and 3 per cent have been found to be satisfactory. In addition, shielding may be necessary to ensure that pilots are not dazzled during the final stages of the approach and landing.)

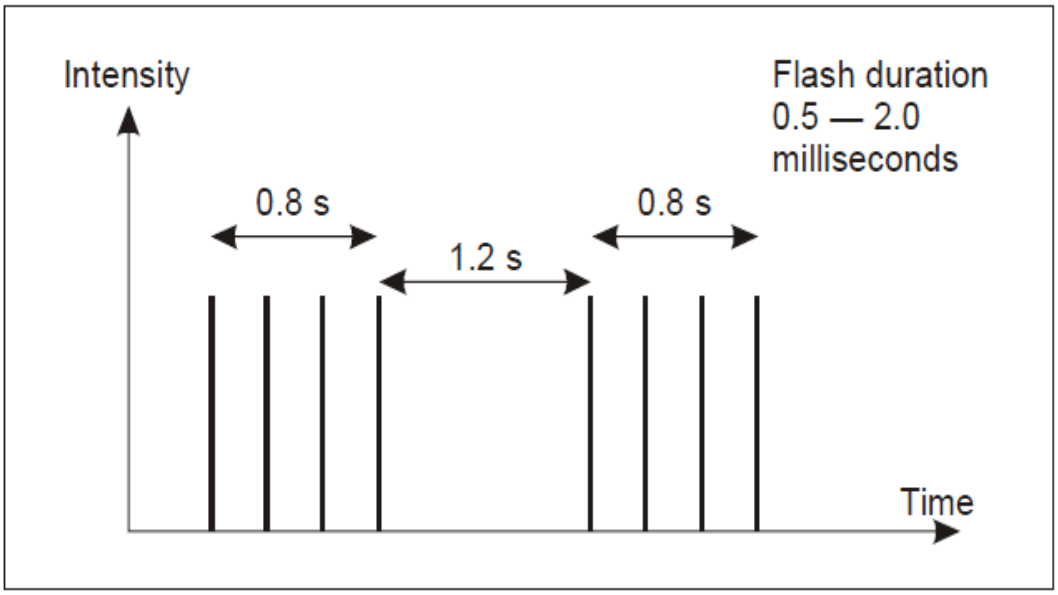


Figure H-10. Heliport beacon flash characteristics

(c) Approach lighting system

1. Application

(i) An approach lighting system must be provided at a heliport where it is desirable and practicable to indicate a preferred approach direction.

2. Location

(ii) The approach lighting system must be located in a straight line along the preferred direction of approach.

3. Characteristics

(iii) An approach lighting system must consist of a row of three lights spaced uniformly at 30 m intervals and of a crossbar 18 m in length at a distance of 90 m from the perimeter of the FATO as shown in Figure H-12. The lights forming the crossbar must be as nearly as practicable in a horizontal straight line at right angles to, and bisected by, the line of the center line lights and spaced at 4.5 m intervals. Where there is the need to make the final approach course more conspicuous, additional lights spaced uniformly at 30 m intervals must be added beyond the crossbar. The lights beyond the crossbar may be steady or sequenced flashing, depending upon the environment.

(iv) The steady lights must be omnidirectional white lights.

(v) Sequenced flashing lights must be omnidirectional white lights.

(vi) The flashing lights must have a flash frequency of one per second and their light distribution must be as shown in Figure H-11, Illustration 3. The flash sequence must commence from the outer lightest and progress towards the crossbar.

(vii) A suitable brilliancy control must be incorporated to allow for adjustment of light intensity to meet the prevailing conditions.

Note. - The following intensity settings have been found suitable:

I. Steady lights — 100 per cent, 30 per cent and 10 per cent; and

II. Flashing lights — 100 per cent, 10 per cent and 3 per cent.

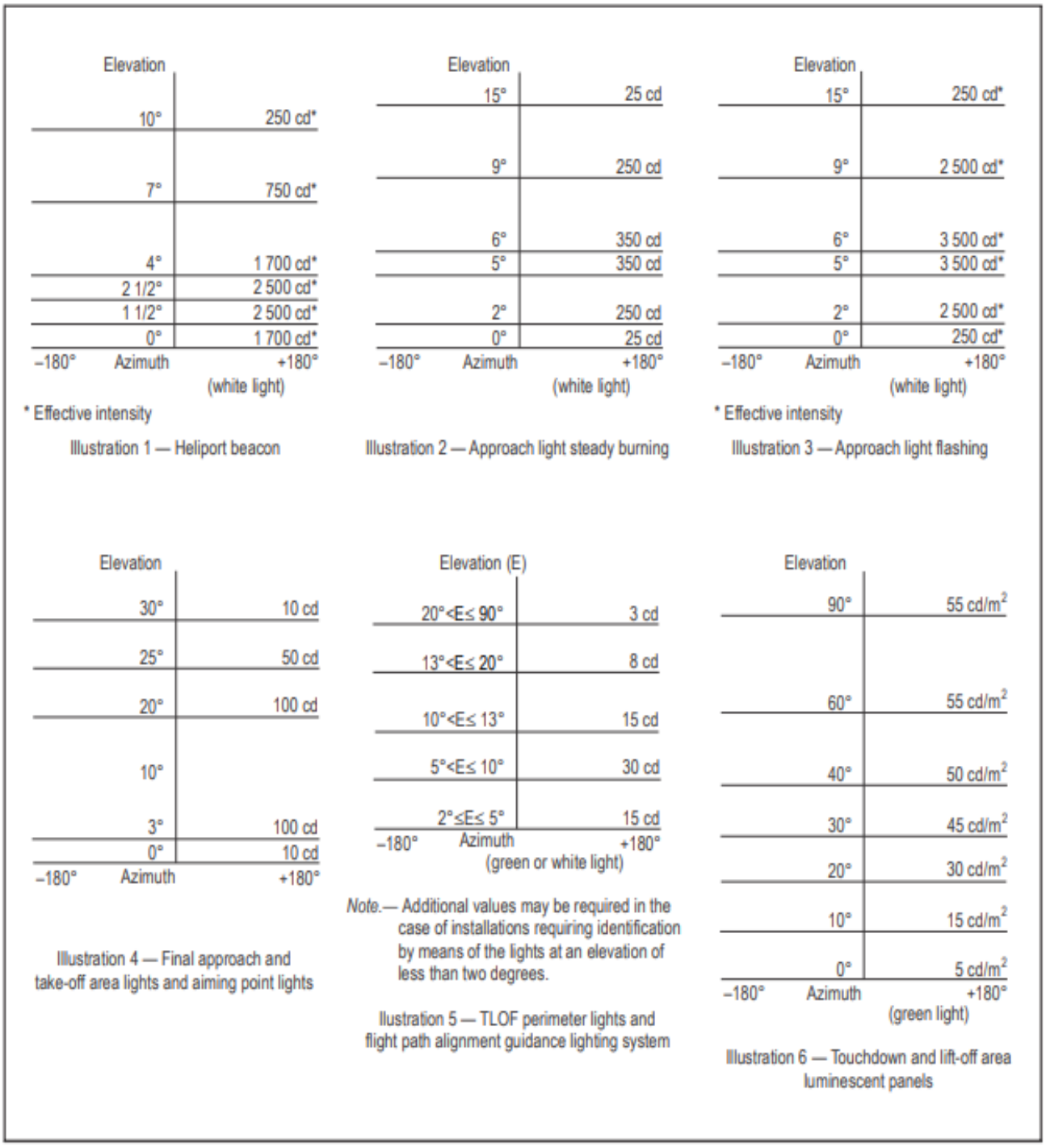


Figure H-11. Isocandela diagrams

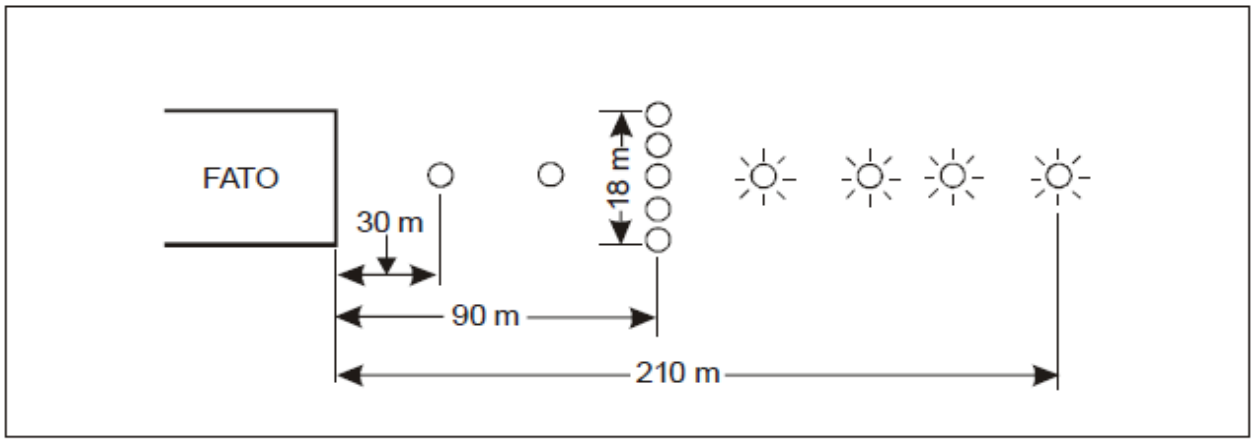


Figure H-12. Approach lighting system

(d) Flight path alignment guidance lighting system

1. Application

(i) Flight path alignment guidance lighting system(s) must be provided at a heliport where it is desirable and practicable to indicate available approach and/or departure path direction(s).

2. Location

(ii) The flight path alignment guidance lighting system must be in a straight line along the direction(s) of approach and/or departure path on one/or more of the TLOF, FATO, safety area or any suitable surface in the immediate vicinity of the FATO, TLOF or safety area.

(iii) If combined with a flight path alignment guidance marking, as far as is practicable the lights must be located inside the “arrow” markings.

3. Characteristics

(iv) A flight path alignment guidance lighting system must consist of a row of three or more lights spaced uniformly a total minimum distance of 6 m. Intervals between lights must not be less than 1.5 m and must not exceed 3 m. Where space permits there must be 5 lights. (See Figure H-9).

(v) The lights must be steady omnidirectional inset white lights.

(vi) The distribution of the lights must be as indicated in Figure H-11, Illustration 6.

(vii) A suitable control must be incorporated to allow for adjustment of light intensity to meet the prevailing conditions and to balance the flight path alignment guidance lighting system with other heliport lights and general lighting that may be present around the heliport.

(e) Visual alignment guidance system

(Note. — The objective of a visual alignment guidance system is to provide conspicuous and discrete cues to assist the pilot to attain and maintain a specified approach track to a heliport.)

1. Application

(i) A visual alignment guidance system must be provided to serve the approach to a heliport where one or more of the following conditions exist especially at night:

I. Obstacle clearance, noise abatement or traffic control procedures require a particular direction to be flown;

II. The environment of the heliport provides few visual surface cues; and

III. It is physically impracticable to install an approach lighting system.

(f) Visual approach slope indicator

(Note. — The objective of a visual approach slope indicator is to provide conspicuous and discrete color cues within a specified elevation and azimuth, to assist the pilot to attain and maintain the approach slope to a desired position within a FATO.)

1. Application

(i) A visual approach slope indicator must be provided to serve the approach to a heliport, whether or not the heliport is served by other visual approach aids or by non-visual aids, where one or more of the following conditions exist especially at night:

I. Obstacle clearance, noise abatement or traffic control procedures require a particular slope to be flown;

II. The environment of the heliport provides few visual surface cues; and

III. The characteristics of the helicopter require a stabilized approach.

(g) Final approach and take-off area lighting systems for onshore surface-level heliports

(Note. — The objective of a final approach and take-off area lighting system for onshore surface-level heliports is to provide to the pilot operating at night an indication of the shape, location and extent of the FATO.)

1. Application

(i) Where a FATO with a solid surface is established at a surface-level heliport intended for use at night, FATO lights must be provided except that they may be omitted where the FATO and the TLOF are nearly coincidental or the extent of the FATO is self-evident.

2. Location

(ii) FATO lights must be placed along the edges of the FATO. The lights must be uniformly spaced as follows:

I. For an area in the form of a square or rectangle, at intervals of not more than 50 m with a minimum of four lights on each side including a light at each corner; and

II. For any other shaped area, including a circular area, at intervals of not more than 5 m with a minimum of ten lights.

3. Characteristics

(iii) FATO lights must be fixed omnidirectional lights showing white. Where the intensity of the lights is to be varied the lights must show variable white.

(iv) The light distribution of FATO lights must be as shown in Figure H-11, Illustration 5.

(v) The lights must not exceed a height of 25 cm and must be inset when a light extending above the surface would endanger helicopter operations. Where a FATO is not meant for lift-off or touchdown, the lights must not exceed a height of 25 cm above ground or snow level.

(h) Aiming point lights

(Note. — The objective of aiming point lights is to provide a visual cue indicating to the pilot by night the preferred approach/departure direction; the point to which the helicopter

approaches to a hover before positioning to a TLOF, where a touchdown can be made; and that the surface of the FATO is not intended for touchdown.)

1. Application

(i) Where an aiming point marking is provided at a heliport intended for use at night, aiming point lights must be provided.

2. Location

(ii) Aiming point lights must be collocated with the aiming point marking.

3. Characteristics

(iii) Aiming point lights must form a pattern of at least six omnidirectional white lights as shown in Figure H-6. The lights must be inset when a light extending above the surface could endanger helicopter operations.

(iv) The light distribution of aiming point lights must be as shown in Figure H-11, Illustration 5.

(i) Touchdown and lift-off area lighting system

(Note. — The objective of a touchdown and lift-off area lighting system is to provide illumination of the TLOF and required elements within. For a TLOF located in a FATO, the objective is to provide discernibility, to the pilot on a final approach, of the TLOF and required elements within; while for a TLOF located on an elevated heliport, shipboard heliport or helideck, the objective is visual acquisition from a defined range and to provide sufficient shape cues to permit an appropriate approach angle to be established.)

1. Application

(i) A TLOF lighting system must be provided at a heliport intended for use at night.

(ii) For a surface-level heliport, lighting for the TLOF in a FATO must consist of one or more of the following:

I. Perimeter lights; or

II. Floodlighting; or

III. Arrays of segmented point source lighting (ASPSL) or luminescent panel (LP) lighting to identify the TLOF when (i) and (ii) are not practicable and FATO lights are available.

(iii) For an elevated heliport, shipboard heliport or helideck, lighting of the TLOF in a FATO must consist of:

I. Perimeter lights; and

II. ASPSL and/or LPs to identify the TDPM and/or flood lighting to illuminate the TLOF.

(iv) TLOF ASPSL and/or LPs to identify the TDPM and/ or floodlighting must be provided at a surface-level heliport intended for use at night when enhanced surface texture cues are required.

2. Location

(v) TLOF perimeter lights must be placed along the edge of the area designated for use as the TLOF or within a distance of 1.5 m from the edge. Where the TLOF is a circle the lights must be:

I. Located on straight lines in a pattern which will provide information to pilots on drift displacement; and

II. Where (i) is not practicable, evenly spaced around the perimeter of the TLOF at the appropriate interval, except that over a sector of 45 degrees the lights must be spaced at half spacing.

(vi) TLOF perimeter lights must be uniformly spaced at intervals of not more than 3 m for elevated heliports and helidecks and not more than 5 m for surface-level heliports. There must be a minimum number of four lights on each side including a light at each corner. For a circular TLOF, where lights are installed in accordance with §138.505-(h) -(5-ii) there must be a minimum of fourteen lights.

(vii) The TLOF perimeter lights must be installed at an elevated heliport or fixed helideck such that the pattern cannot be seen by the pilot from below the elevation of the TLOF.

(viii) The TLOF perimeter lights must be installed on a moving helideck, or shipboard, such that the pattern cannot be seen by the pilot from below the elevation of the TLOF when the helideck or shipboard is level.

(ix) On surface-level heliports, ASPSL or LPs, if provided to identify the TLOF must be placed along the marking designating the edge of the TLOF. Where the TLOF is a circle, they must be located on straight lines circumscribing the area.

(x) On surface-level heliports the minimum number of LPs on a TLOF must be nine. The total length of LPs in a pattern must not be less than 50 per cent of the length of the pattern. There must be an odd number with a minimum number of three panels on each side of the TLOF including a panel at each corner. LPs must be uniformly spaced with a distance between adjacent panel ends of not more than 5 m on each side of the TLOF.

(xi) When LPs are used on an elevated heliport or helideck to enhance surface texture cues, the panels must not be placed adjacent to the perimeter lights. They must be placed around a touchdown marking or coincident with heliport identification marking.

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

3. Characteristics

(xiii) The TLOF perimeter lights must be fixed omnidirectional lights showing green.

(xiv) At a surface-level heliport, ASPSL or LPs must emit green light when used to define the perimeter of the TLOF.

(xv) The chromaticity and luminance of colors of LPs must be as given in GACAR Part 139 (Appendix E).

(xvi) An LP must have a minimum width of 6 cm. The panel housing must be the same color as the marking it defines.

(xvii) For a surface level or elevated heliport, the TLOF perimeter lights located in a FATO must not exceed a height of 5 cm and must be inset when a light extending above the surface could endanger helicopter operations.

(xviii) For a helideck or shipboard heliport, the TLOF perimeter lights must not exceed a height of 5 cm, or for a FATO/TLOF, 15 cm.

(xix) When located within the safety area of a surface level or elevated heliport, the TLOF floodlights must not exceed a height of 25cm.

(xx) For a helideck or shipboard heliport, the TLOF floodlights must not exceed a height of 5 cm, or for a FATO/TLOF, 15 cm.

(xxi) The LPs must not extend above the surface by more than 2.5 cm.

(xxii) The light distribution of perimeter lights must be as shown in Figure H-11, Illustration 6.

(xxiii) The light distribution of the LPs must be as shown in Figure H-11, Illustration 7.

(xxiv) The spectral distribution of TLOF area floodlights must be such that the surface and obstacle marking can be correctly identified.

(xxv) The average horizontal illuminance of the floodlighting must 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.

(xxvi) Lighting used to identify the TDPC must comprise a segmented circle of omnidirectional ASPSL strips showing yellow. The segments must consist of ASPSL strips, and the total length of the ASPSL strips must not be less than 50 per cent of the circumference of the circle.

(xxvii) If utilized, the heliport identification marking lighting must be omnidirectional showing green.

(j) Helicopter stand floodlighting

(Note. — The objective of helicopter stand floodlighting is to provide illumination of the stand surface and associated markings to assist the maneuvering and positioning of a helicopter and facilitation of essential operations around the helicopter. Guidance on stand floodlighting is given in the apron floodlighting section in the Aerodrome Design Manual (Doc 9157), Part 4.)

1. Application

(i) Helicopter stand floodlighting must be provided on a helicopter stand intended to be used at night.

2. Location

(ii) Helicopter stand floodlights must be located so as to provide adequate illumination, with a minimum of glare to the pilot of a helicopter in flight and on the ground, and to personnel on the stand. The arrangement and aiming of floodlights must be such that a helicopter stand receives light from two or more directions to minimize shadows.

3. Characteristics

(iii) The spectral distribution of stand floodlights must be such that the colours used for surface and obstacle marking can be correctly identified.

(iv) Horizontal and vertical illuminance must be sufficient to ensure that visual cues are discernible for required maneuvering and positioning, and essential operations around the helicopter can be performed expeditiously without endangering personnel or equipment.

(k) Winching area floodlighting

(Note. — The objective of winching area floodlighting is to provide illumination of the surface, obstacles and visual cues to assist a helicopter to be positioned over, and retained within, an area from which a passenger or equipment can be lowered or raised.)

1. Application

(i) Winching area floodlighting must be provided at a winching area intended for use at night.

2. Location

(ii) Winching area flood lights must be located so as to avoid glare to pilots in flight or to personnel working on the area. The arrangement and aiming of floodlights must be such that shadows are kept to a minimum.

3. Characteristics

(iii) The spectral distribution of winching area floodlights must be such that the surface and obstacle markings can be correctly identified.

(iv) The average horizontal illuminance must be at least 10 lux measured on the surface of the winching area.

(l) Taxiway lights

The characteristics and specifications for taxiway center lights and taxiway edge lights given in GACAR§ 139.505 are equally applicable to taxiways intended for ground taxing of helicopters.

(m)Visual aids for denoting obstacles outside and below the obstacle limitation surfaces

(Note. - Arrangements for an aeronautical study of objects outside the obstacle limitation surface (OLS) and for other objects are addressed in GACAR§ 139 Sub Part F.)

(i) Where an aeronautical study indicates that obstacles in areas outside and below the boundaries of the OLS, established for a heliport, constitute a hazard to helicopters, they must be marked and lit, except that the marking may be omitted when the obstacle is lighted with high-intensity obstacle lights by day.

(ii) Where an aeronautical study indicates that overhead wires or cables crossing a river, waterway, valley or highway constitute a hazard to helicopters, they must be marked, and their supporting towers marked and lit.

(n) Floodlighting of obstacles

1. Application

(i) At a heliport intended for use at night, obstacles must be floodlighted if it is not possible to display obstacle lights on them.

2. Location

(ii) Obstacle floodlights must 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.

3. Characteristics

(iii) Obstacle floodlighting must be such as to produce a luminance of at least 10 cd/m2.

SUBPART I – HELIPORT EMERGENCY RESPONSE

§ 138.601 Heliport emergency planning

(Note. - Heliport emergency planning is the process of preparing a heliport to cope with an emergency that takes place at the heliport or in its vicinity. Examples of emergencies include crashes on or off the heliport, medical emergencies, dangerous goods occurrences, fires and natural disasters. The purpose of heliport emergency planning is to minimize the impact of an emergency by saving lives and maintaining helicopter operations.

The heliport emergency plan sets out the procedures for coordinating the response of heliport agencies or services (air traffic services unit, firefighting services, heliport administration, medical and ambulance services, aircraft operators, security services and police) and the response of agencies in the surrounding community (fire departments, police, medical and ambulance services, hospitals, military, and harbour patrol or coast guard) that could be of assistance in responding to the emergency.)

The heliport emergency plan must consider the following:

(a) A heliport emergency plan must be established commensurate with the helicopter operations and other activities conducted at the heliport.

(b) The operator of a certified heliport must establish a heliport emergency planning committee (HEPC). All assigned members from both internal and external (off heliport) agencies will be participants in the development, review and exercising of the heliport emergency plan.

(c) The plan must identify agencies which could be of assistance in responding to an emergency at the heliport or in its vicinity.

(d) The heliport emergency plan must provide for the coordination of the actions to be taken in the event of an emergency occurring at a heliport or in its vicinity.

(e) Where an approach/departure path at a heliport is located over water, the plan must identify which agency is responsible for coordinating rescue in the event of a helicopter ditching and indicate how to contact that agency.

(f) The plan must include, as a minimum, the following information:

(1) The types of emergencies planned for;

(2) How to initiate the plan for each emergency specified;

(3) The name of agencies on and off the heliport to contact for each type of emergency with telephone numbers or other contact information;

(4) The role of each agency for each type of emergency;

(5) A list of pertinent on-heliport services available with telephone numbers or other contact information;

(6) Copies of any written agreements with other agencies for mutual aid and the provision of emergency services; and

(7) A grid map of the heliport and its immediate vicinity.

(g) All agencies identified in the plan must be consulted about their role in the plan.

(h) The heliport emergency plan must include procedures for Emergency operations centre and command post.

(i) Sufficient medical services and supplies must be available at the heliport facility to deal with routine medical emergencies (which normally occur at the heliport such as on-the-job injuries, heart attacks etc.) and for medical emergencies of helicopter accidents.

(j) The plan must 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 an actual emergency.

(k) The heliport emergency plan must contain procedures for periodic testing of the adequacy of the plan and for reviewing the results in order to improve its effectiveness and:

(1) The plan must be tested by conducting a full-scale heliport emergency exercise at intervals not exceeding three years and partial emergency exercises in the intervening year to ensure that any deficiencies found during the full-scale heliport emergency exercise have been corrected;

(2) The heliport certificate holder must hold a meeting of all members of emergency planning committee at least 120 days prior to the scheduled full-scale emergency exercise. At this time, the aims of the exercise must be outlined, a scenario formulated, work tasks assigned and duties of all agencies and personnel defined. The heliport certificate holder must notify GACA concern department in formats and manner accepted to the President: and

(3) The heliport certificate holder must review the plan, thereafter, or after an actual emergency, so as to correct any deficiency found during such exercises or actual emergency.

§ 138.603 Rescue and Fire fighting

(Note. - Provisions described in this subpart are intended to address incidents or accidents within the heliport response area only. No dedicated firefighting provisions are included for helicopter accidents or incidents that may occur outside the response area, such as on an adjacent roof near an elevated heliport or outside the boundary of surface heliport.

Complementary agents are ideally dispensed from one or two extinguishers (although more extinguishers may be permitted where high volumes of an agent are specified, e.g. H3 operations). The discharge rate of complementary agents needs to be selected for optimum effectiveness of the agent used. When selecting dry chemical powders for use with foam, care needs to be exercised to ensure compatibility.

Where a fixed monitor system (FMS) is installed, trained monitor operators, where provided, be positioned on at least the upwind location to ensure primary media is directed to the seat of the fire. For a ring-main system (RMS) practical testing has indicated that these solutions are only guaranteed to be fully effective for TLOFs up to 20 m diameter. If the TLOF is greater than 20 m RMS should not be considered unless supplemented by other means to distribute primary media (e.g. additional pop-up nozzles are installed in the centre of the TLOF). This subpart does not include RFF arrangements for purpose-built or non-purpose-built shipboard heliports or for winching areas. This Sub Part does not include RFF arrangements for purpose-built or non-purpose-built shipboard heliports or for winching areas.)

(a) Applicability

(1) The following specifications must apply to new built or replacement of existing systems or part thereof from 1 January 2023: § 138.603 (b) (1), (c) (3), (c) (4), (c) (5), (c) (7), (c) (9), (c) (10), (c) (12), (c) (13) and (d) (2).

(2) Rescue and firefighting equipment and services must be provided at surface level heliports, helidecks and at elevated heliports located above occupied structures.

(3) A safety risk assessment must be performed to determine the need for rescue and firefighting equipment and services at surface level heliports and elevated heliports located above unoccupied structures.

(b) Level of protection provided

(1) For the application of primary media, the discharge rate (in liters/minute) applied over the assumed practical critical area (in m2) must be predicated on a requirement to bring any fire which may occur on the heliport under control within one minute, measured from activation of the system at the appropriate discharge rate.

Practical critical area calculation where primary media is applied as a solid stream

(Note - This section is not applicable to helidecks regardless of how primary media is being delivered.)

(2) The practical critical area must be calculated by multiplying the helicopter fuselage length (m) by the helicopter fuselage width (m) plus an additional width factor (W1) of 4 m. Categorization from H0 to H3 should be determined on the basis of the fuselage dimensions in Table I-1.

Category (1)	Maximum fuselage length (2)	Maximum fuselage width (3)
H 0	up to but not including 8 m	1.5 M
H 1	up to but not including 15 m	2 M
H 2	from 15 m up to but not including 24 m	2.5 M
H 3	from 24 m up to but not including 35 m	3 M

Table I-1. Heliport firefighting category

(3) For helicopters which exceed one or both of the dimensions for a category H3 heliport, it will be necessary to recalculate the level of protection using practical critical area assumptions based on the actual fuselage length and the actual fuselage width of the helicopter plus an additional width factor (W1) of 6 m. The practical critical area must be considered on a helicopter type-specific basis by using the formula in (b)(2).

Practical critical area calculation where primary media is applied in a dispersed pattern

(4) For heliports, except helidecks, the practical critical area must be based on an area contained within the heliport perimeter, which always includes the TLOF, and to the extent that it is load-bearing, the FATO.

(5) For helidecks, the practical critical area must be based on the largest circle capable of being accommodated within the TLOF perimeter.

(c) Extinguishing agents

Throughout (c), the discharge rate of a performance level B foam is assumed to be based on an application rate of 5.5 L/min/m2, and for a performance level C foam and for water, is assumed to be based on an application rate of 3.75 L/min/m2.

Surface level heliports with primary media applied as a solid stream using a portable foam application system (PFAS).

(1) Except for a limited-sized surface level heliport, the assumption is made that foam dispensing equipment will be transported to the incident or accident location on an appropriate vehicle (a PFAS).

(2) Where an RFFS is provided at a surface level heliport, the amount of primary media and complementary agents must be in accordance with Table I-2.

	Foam meeting performance level B		*Foam meeting performance level C*		*Complementary agents*	
Category (1)	*Water (L) (2)*	*Discharge rate foam solution/minute (L) (3)*	*Water (L) (4)*	*Discharge rate foam solution/minute (L) (5)*	*Dry chemical powder (kg) (6)*	*Gaseous media (kg) (7)*
H0	500	250	330	165	23	9
H1	800	400	540	270	23	9
H2	1 200	600	800	400	45	18
H3	1 600	800	1 100	550	90	36

Table I-2 Minimum usable amounts of extinguishing agents for surface-level heliports

(Note. — The minimum discharge duration in Table I-2 is assumed to be two minutes. However, if the availability of back-up specialist fire services is remote from the heliport, consideration may need to be given to increasing the discharge duration from two minutes to three minutes.)

Elevated heliports with primary media applied as a solid stream using a fixed foam application system (FFAS).

(3) The assumption is made that primary media (foam) will be delivered through a fixed foam application system such as a fixed monitor system (FMS).

(4) Where an RFFS is provided at an elevated heliport, the amount of foam media and complementary agents must be in accordance with Table I-3.

	Foam meeting performance level B		*Foam meeting performance level C*		*Complementary agents*	
Category (1)	*Water (L) (2)*	*Discharge rate foam solution/minute (L) (3)*	*Water (L) (4)*	*Discharge rate foam solution/minute (L) (5)*	*Dry chemical powder (kg) (6)*	*Gaseous media (kg) (7)*
H0	1 250	250	825	165	23	9
H1	2 000	400	1 350	270	23	9
H2	3 000	600	2 000	400	45	18
H3	4 000	800	2 750	550	90	36

Table I-3 Minimum usable amounts of extinguishing agents for elevated heliports

(Note 1.— The minimum discharge duration in Table I-3 is assumed to be five minutes.)

Elevated heliports/ limited-sized surface level heliports with primary media applied in a dispersed pattern through a fixed foam application system (FFAS) – a solid-plate heliport

(5) The amount of water required for foam production must be predicated on the practical critical area (m2) multiplied by the appropriate application rate (L/min/m2), giving a discharge rate for foam solution (in L/min). The discharge rate must be multiplied by the discharge duration to calculate the amount of water needed for foam production.

(6) The discharge duration must be at least three minutes.

(7) Complementary media must be in accordance with Table I-3, for H2 operations.

(8) For helicopters with a fuselage length greater than 16 m and/or a fuselage width greater than 2.5 m, complementary media in Table I-3 for H3 operations may be considered.

Purpose-built elevated heliports/limited-sized surface level heliport with primary media applied in a dispersed pattern through a fixed application system (FAS) – a passive fire retarding surface with water-only deck integrated firefighting system (DIFFS).

(9) The amount of water required must be predicated on the practical critical area (m2) multiplied by the appropriate application rate (3.75 L/min/m2) giving a discharge rate for water (in L/min). The discharge rate must be multiplied by the discharge duration to determine the total amount of water needed.

(10) The discharge duration must be at least two minutes.

(11) Complementary media must be in accordance with Table I-3, for H 2 operations.

(12) For helicopters with a fuselage length greater than 16 m and/or a fuselage width greater than 2.5 m, complementary media for H3 operations may be considered.

Purpose-built helidecks with primary media applied in a solid stream or a dispersed pattern through a fixed foam application system (FFAS) – a solid-plate heliport.

(13) The amount of water required for foam media production should be predicated on the practical critical area (m2) multiplied by the application rate (L/min/m2) giving a discharge rate for foam solution (in L/min). The discharge rate should be multiplied by the discharge duration to calculate the amount of water needed for foam production.

(14) The discharge duration should be at least five minutes.

(15) Complementary media should be in accordance with Table I-3, H0 levels for helidecks up to and including 16.0 m and to H1/H2 levels for helidecks greater than 16.0 m. Helidecks greater than 24 m should adopt H3 levels.

Purpose-built helidecks with primary media applied in a dispersed pattern through a fixed application system (FAS) – a passive fire-retarding surface with water-only DIFFS.

(16) The amount of water required must be predicated on the practical critical area (m2) multiplied by the application rate (3.75 L/min/m2) giving a discharge rate for water (in L/min). The discharge rate must be multiplied by the discharge duration to calculate the amount of water needed. (Note. — Sea-water may be used.).

(17) The discharge duration must be at least three minutes.

(18) Complementary media must be in accordance with Table I-3, to H0 levels for helidecks up to and including 16.0 m and to H1/H2 levels for helidecks greater than 16.0 m. Helidecks greater than 24 m should adopt H3 levels.

(d) Response time

(Note. - Response time is considered to be the time between the initial call to the rescue and firefighting service and the time when the first responding vehicle(s) (the service) is (are) in position to apply foam at a rate of at least 50 per cent of the discharge rate specified in Table I-2).

(1) At surface level heliports, the operational objective of the rescue and firefighting response must be to achieve response times not exceeding two minutes in optimum conditions of visibility and surface conditions.

(2) At elevated heliports, limited-sized surface level heliports and helidecks, the response time for the discharge of primary media at the required application rate must be 15 seconds measured from system activation. If rescue and firefighting personnel are needed, they must be immediately available on or in the vicinity of the heliport while helicopter movements are taking place.

(e) Rescue arrangements

(1) Rescue arrangements commensurate with the overall risk of the helicopter operation must be provided at the heliport.

(2) The provision of minimum equipment is recommended as listed below. Sizes of equipment are not detailed in this table, but should be appropriate for the types of helicopter expected to use the facility.

S. No	Equipment Description	Min Qty.
1	Adjustable wrench	1
2	Rescue axe, large (non-wedge or aircraft type)	1
3	Cutters, bolt	1
4	Crowbar, large	1
5	Hook, grab or salving	1
6	Hacksaw (heavy duty) and six spare blades	1
7	Blanket, fire resistant	1
8	Ladder (two-piece)*	1
9	Life line (5 mm circumference x 15 m in length) plus rescue harness.	1
10	Pliers, side cutting (tin snips)	1
11	Set of assorted screwdrivers	1
12	Harness knife and sheath or harness cutters**	**
13	Man-made mineral fiber (MMMF) filter masks**	**
14	Gloves, fire resistant**	**
14	Power cutting tool***	1

* For access to casualties in an aircraft on its side.
** This equipment is required for each helideck crew member.
*** Requires additional training by competent personnel only specified for helicopters above 24 m.

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

(f) Communication and alerting system

(1) A suitable alerting and/or communication system must be provided in accordance with the emergency response plan.

(g) Personnel

(1) Where provided, to determining the minimum number of rescue and firefighting personnel required a task resource analysis must be completed and the level of staffing documented in the heliport operation manual for certified heliports, the number of RFF personnel must be sufficient for the required task.

(2) Where provided, rescue and firefighting personnel must be trained to perform their duties, and maintain their competence.

(3) Rescue and firefighting personnel must be provided with protective equipment and respiratory equipment to enable them to perform their duties in an effective manner.

(h) Means of escape

(1) Elevated heliports and helidecks must be provided with a main access and at least one additional means of escape.

(2) Access points must be located as far apart from each other as is practicable.

(3) The provision of an alternative means of escape is necessary for evacuation and for access by rescue and firefighting personnel.

(4) The size of an emergency access/egress route must consider in design the number of passengers and of special operations like Helicopter Emergency Medical Services (HEMS) that require passengers to be carried on stretchers or trolleys.

SUBPART J – ELECTRICAL SYSTEMS

§ 138.701 Electrical power supply systems for air navigation facilities

The safety of operations at heliports depends on the quality of the supplied power supply and its systems reliability and must ensure the following:

(a) Adequate primary power supply must be available at heliports for the safe functioning of air navigation facilities.

(b) The design and provision of electrical power systems for heliport visual and radio navigation aids must be such that an equipment failure will not leave the pilot with inadequate visual and non-visual guidance or misleading information.

(c) Electric power supply connections to those facilities for which secondary power is required must be so arranged that the facilities are automatically connected to the secondary power supply on failure of the primary source of power.

(d) The time interval between failure of the primary source of power and the complete restoration of the services required must be as short as practicable, but not exceed 15 seconds except that for visual aids associated with non-precision requirements a secondary power supply for visual aids need not be provided when an emergency lighting system is provided and capable of being deployed in 15 minutes.

§ 138.703 Visual aids

(a) Power supply for visual aids on certified heliports must be provided in accordance with provisions given in this part and as defined in GACAR Part 139 Sub Part H– Electrical Systems.

§ 138.705 System design

(a) The electrical systems for the power supply, lighting and control of the lighting systems must be so designed that an equipment failure will not leave the pilot with inadequate visual guidance or misleading information.

(b) Where the secondary power supply at a heliport is provided, such supplies must be physically and electrically separate so as to ensure the required level of availability and independence.

§ 138.707 Monitoring

(a) A system of monitoring must be employed to indicate the operational status of the lighting systems. Where lighting systems are provided with radio control, such systems must be monitored automatically so as to provide an indication of any fault which may affect the control functions.

SUBPART K – OPERATIONAL SERVICES, EQUIPMENT AND INSTALLATIONS

§ 138.801 Wildlife strike hazard reduction

(a) The wildlife strike hazard on, or in the vicinity of, a heliport must be accessed by the heliport operator through:

(1) The collection of information from aircraft/helicopter operators, heliport and airport personnel etc. on the presence of wildlife on or around the heliport constituting a potential hazard to aircraft operations; and

(2) An ongoing evaluation of the wildlife hazard by competent personnel.

(b) Wildlife strike reports must be collected by heliport operator and forwarded to the President.

(c) The heliport operator must take action to decrease the risk to helicopter operations by adopting measures prescribed in wildlife management program to minimize the likelihood of collisions between wildlife and helicopters.

(d) The heliport operator must take action to eliminate or to prevent the establishment of garbage disposal dumps or any other source which may attracts wildlife to the heliport, or its vicinity, unless an appropriate wildlife assessment indicates that they are unlikely to create conditions conducive to a bird hazard problem. Where the elimination of existing sites is not possible, the heliport operator must ensure that any risk to the helicopters posed by these sites is assessed and reduced to as low as reasonably practicable.

(e) Heliport Operator must give due consideration to concerns related to land developments that may attract wildlife.

(f) Heliport Operator must take immediate action to alleviate wildlife hazards whenever they are detected.

(g) The wildlife hazard assessment required in paragraph (a) of this section must be conducted by a wildlife management biologist who has professional training and experience in wildlife hazard management at heliports. The wildlife hazard management program must contain at least the following:

(1) An analysis of the events or circumstances that prompted the assessment.

(2) Identification of the wildlife species observed and their numbers, locations, local movements, and daily and seasonal occurrences.

(3) Identification and location of features on and near the heliport that attract wildlife.

(4) A description of wildlife hazards to helicopter operations.

(5) Recommended actions for reducing identified wildlife hazards to the helicopter operations.

(h) The wildlife hazard assessment required under paragraph (a) of this section must be submitted to the President for acceptance and determination of the need for a wildlife hazard management program. In reaching this determination, the President will consider:

(1) The wildlife hazard assessment;

(2) Actions recommended in the wildlife hazard assessment to reduce wildlife hazards;

(3) The aeronautical activity at the heliport, including the frequency and size of the helicopters; and

(4) Any other known factors relating to the wildlife hazard of which the President is aware.

(i) When the President determines that a wildlife hazard management program is needed, the heliport operator must formulate and implement the program using the wildlife hazard assessment as a basis. The program must-

(1) Provide measures to alleviate or eliminate wildlife hazards to helicopter operations;

(2) Be submitted to, and accepted by, the president prior to implementation; and

(3) Become a part of the Heliport Operation Manual.

(j) The heliport operator must conduct a training program by a qualified wildlife hazard management biologist to provide heliport personnel with the knowledge and skills needed to successfully carry out the wildlife hazard management program required by paragraph (g) of this section.

§ 138.803 Disabled helicopter removal

(a) A plan for the removal of helicopter disabled on, or adjacent to, the movement area must be established for a heliport, and a coordinator designated to implement the plan, when necessary.

(b) The disabled helicopter removal plan must be based on the characteristics of the helicopter that may normally be expected to operate at the heliport, and include among other things:

(1) A list of equipment and personnel on, or in the vicinity of, the heliport which would be available for such purpose; and

(2) Arrangements for the rapid receipt of helicopter recovery equipment kits available from other heliports.

§ 138.805 Apron/Parking Stands management service

(a) When warranted by the volume of traffic and operating conditions, an appropriate apron management service must be provided on an apron by the heliport operator in order to:

(1) Regulate movement with the objective of preventing collisions between helicopters/aircraft, and between helicopters/aircraft and obstacles; and

(2) Ensure safe and expeditious movement of vehicles and appropriate regulation of other activities.

§ 138.807 Ground Servicing of helicopter

(a) Fire extinguishing equipment suitable for at least initial intervention in the event of fuel fire and personnel trained in its use must be readily available during the ground servicing of helicopter and there must be a means of quickly summoning the rescue and firefighting service in the event of a fire or major fuel spill.

(b) When helicopter refueling operations take place while passengers are embarking, on board or disembarking, ground equipment must be positioned so as to allow:

(1) The use of a sufficient number of exits for expeditious evacuation; and

(2) A ready escape route from each of the exits to be used in an emergency.

(c) Ground servicing facilities and equipment required for public and cargo handling must be provided at certified heliports.

§ 138.809 Vehicle Operations on Heliport

(a) A vehicle must be operated:

(1) On a maneuvering area only as authorized by the heliport operator; and

(2) On parking stands/apron only as authorized by the appropriate designated of the heliport in-charge.

(b) The driver of a vehicle on the movement area must comply with all mandatory instructions conveyed by marking and signs unless otherwise authorized by the heliport in-charge.

(1) The heliport control tower when on the maneuvering area; or

(2) The appropriate designated authority of the heliport operator when on the apron.

(c) The driver of a vehicle on the movement area must comply with all mandatory instructions conveyed by lights during nights/low visibility.

(d) The driver of a vehicle on the movement area must be appropriately trained for the tasks to be performed and must comply with the instructions issued by the heliport in-charge

(e) When on heliport, where heliport control is provided, the driver of a radio-equipped vehicle must establish satisfactory two-way radio communication with the heliport control tower before entering the maneuvering area/apron. The driver must maintain a continuous listening watch on the assigned frequency when on the movement area.

§ 138.811 Sitting of equipment and installations on operational areas

(a) Unless its function requires any equipment to be there for air navigation or for helicopter safety purposes, no equipment or installation must be provided on FATO, TLOF and Safety area. If such equipment is need to be provided, then must be done as described in relevant subparts of this part and GACAR Part 139 Subpart I.

§ 138.813 Security Fencing

(a) A fence or other suitable barrier must be provided on a heliport with provisions of access control and security oversight of movement aera.

(b) A fence or other suitable barrier must be provided on a heliport to prevent the entrance to the movement area of animals large enough to be a hazard to aircraft.

(c) A fence or other suitable barrier must be provided on a heliport to deter the inadvertent premeditated access of an unauthorized person on to a non-public area of the heliport.

(d) Suitable means of protection must be provided to deter the inadvertent or premeditated access of unauthorized persons into ground installations and facilities essential for the safety of civil aviation located off the heliport.

(e) The fence or barrier must be located so as to separate the movement area and other facilities or zones on the heliport vital to the safe operation of helicopters from areas open to public access.

(f) The fence hight for public heliports must be not less then 2.24 meter and in case of other heliport the height must be such that to prevent access of animals or unauthorised persons. The fence hight and location be such that to clear all requirements of obstacle and protection surfaces of the heliport.

(g) When greater security is thought necessary, a cleared area must be provided on both sides of the fence or barrier to facilitate the work of patrols and to make trespassing more difficult.

Consideration must be given to the provision of a perimeter road inside the heliport fencing for the use of both maintenance personnel and security patrols.

§ 138.815 Security lighting

(a) At a heliport, where it is deemed desirable for security reasons, a fence or other barrier provided for the protection of civil aviation activity on heliport and security fencing must be illuminated at a minimum essential level of five lux.

(b) Consideration must be given to locating lights so that the ground area on both sides of the fence or barrier, particularly at access points, is illuminated.

§ 138.817 Dangerous goods

(a) The operator of a certified heliport must make arrangements for special areas on the heliport to be set up for the storage of dangerous goods. The procedures must be explained in Heliport Operation Manual with defined responsibilities. The RFF personnel must be trained to handle the dangerous goods.

(b) In cases where a storage area is needed for any type of dangerous goods within a heliport facility, it must be approved by the KSA Civil Defence Authorities.

(c) Additionally, if the dangerous goods in § 138.817 (a) are to be transported by air, then the dangerous goods storage area must be approved by GACA in accordance with GACAR Part-109.

SUBPART L – HELIPORT MAINTENANCE

§ 138.901 General

(a) Heliport operators must develop a maintenance program, including preventive maintenance where appropriate, and implement at the heliport to maintain facilities in a condition which does not impair the safety, regularity, or efficiency of air navigation.

(b) The design and application of the maintenance must observe human factor principles.

§ 138.903 Surfaces and Pavements

(a) The surfaces of all movement areas including pavements (FATO, TLOF, Stands, Aprons and adjacent areas) must be inspected and their conditions monitored regularly as part of the heliport preventive and corrective maintenance program with the objective of avoiding and eliminating of any loose stones or other objects that might cause damage to helicopter/aircraft structures or engines, or impair the operation of other systems.

(b) The surface of a FATO and TLOF must be maintained in a condition such as to prevent formation of harmful irregularities.

(c) When there is reason to believe that the drainage characteristics of a FATO or TLOF, or portions thereof, are poor due to slopes or depressions, then corrective maintenance action must be taken as necessary.

§ 138.905 Removal of contaminants

(a) Standing water, mud, dust, sand, oil, rubber deposits, snow, slush, and other contaminants must be removed from the surface of FATO, TLOF and Stands/Apron in use and develop procedures to minimize accumulation.

(b) Chemicals to remove or to prevent the formation of ice and frost on heliport pavements, where such conditions prevail, must be used when conditions indicate their use could be effective. Caution must be exercised in the application of the chemicals so as not to create a more slippery condition.

(c) Chemicals which may have harmful effects on aircraft or pavements, or chemicals which may have toxic effects on the heliport environment, must not be used.

§ 138.907 Visual aids

(a) A system of preventive maintenance of visual aids must be employed to ensure lighting and marking system reliability.

(b) A light must be deemed to be unserviceable when the main beam average intensity is less than 50 per cent of the value specified for such lights.

(c) In-field measurement of intensity, beam spread, and orientation of lights included in approach and visual approach slope guidance systems must be undertaken by measuring all lights, as far as practicable, to ensure conformance with the applicable specification.

(d) Measurement of intensity, beam spread, and orientation of lights must be undertaken using a mobile measuring unit of sufficient accuracy to analyze the characteristics of the individual lights.

(e) The frequency of measurement of lights must be based on traffic density, the local pollution level, the reliability of the installed lighting equipment, manufacturer guidelines and the continuous assessment of the results of the in-field measurements but in any event must not be less than twice a year for in-pavement lights and not less than once a year for other lights.

(f) The system of preventive maintenance employed must have as its objective that, during any period of operations, all lights are serviceable, and that in any event at least:

(1) 85 per cent of the lights are serviceable in each system.

(2) In order to provide continuity of guidance, the allowable percentage of unserviceable lights must not be permitted in such a way as to alter the basic pattern of the lighting system. Additionally, an unserviceable light must not be permitted adjacent to another unserviceable light unless the light spacing is significantly less than that specified.

(g) During low visibility procedures the heliport operator must restrict construction or maintenance activities in the proximity of heliport lights and electrical systems.

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APPENDIX A TO C – CERTIFICATION & AUTHORIZATION

APPENDIX A-1. CONTENTS OF THE HELIPORT OPERATION MANUAL

Heliport Operation Manual (HOM)

(a) The Heliport Operation Manual is applicable for certified heliports. The certificate holder of a heliport must develop the heliport operation manual for the certified heliport. (The Heliport Operation Manual must be submitted along with application for certification as defined in this Part).

(b) The heliport operation manual, once accepted by the President, must be maintained including the up-to-date amendments by the heliport operator.

(c) The heliport operation manual must contain the following:

Part 1.0 Introduction

1.1 This section must contain a short explanation of the general terms and abbreviations used in the heliport operation manual including the following:

1.1.1 Purpose of the heliport operation manual.

1.1.2 Legal position regarding heliport certification as contained in the applicable regulation.

1.1.3 Distribution details of the heliport operation manual.

1.1.4 Procedures for amending the heliport operation manual.

1.1.5 Checklist of pages.

1.1.6 Preface by certificate holder.

1.1.7 Table of contents.

1.1.8 Glossary of terms.

Part 2.0 Technical Administration

2.1 Name and address of the heliport.

2.2 Name and address of the heliport operator.

2.3 Name of the accountable executive and heliport management personnel.

2.4 Organization chart of the heliport operator.

Part 3.0 Description of the heliport

3.1 Details of the following:

3.1.1 Latitude and longitude of the heliport reference point in World Geodetic System—1984 (WGS-84) format.
3.1.2 Elevations of the heliport.
3.1.3 Elevations of FATO/TLOF/Parking Stands

3.2 Layout Plans showing the position of the heliport reference point, dimensions of the heliport, FATO, TLOF, taxiways and aprons etc.; including the markings and lighting.

3.3 Description, height and location of obstacles that infringe upon the standard protection surfaces, whether they are lighted and if they are promulgated in the aeronautical publications.

3.4 Procedures for ensuring that the heliport layout plans are up to date and accurate.

3.5 Data for and the method used to calculate, declared distances and elevations at the beginning and end of each declared distance.

3.6 Details of the surfaces, dimensions and classification or bearing strengths of landing areas, taxiways and aprons and maximum allowable mass for FATO/ TLOF.

Part 4.0 List of authorized deviations, if any.

Part 5.0 Heliport Operational Procedures:

5.1 The applicant or certificate holder must develop operation procedures and include as part of heliport operation manual. This section must contain a policy explanation, personnel responsibilities and operation procedures for the following as applicable.

5.1.1 Promulgation of aeronautical information
5.1.2 Control of access
5.1.3 Emergency planning
5.1.4 Rescue and firefighting (RFF) services
5.1.5 Inspections of the movement area
5.1.6 Maintenance of the movement area
5.1.7 Hazardous meteorological conditions
5.1.8 Visual aids
5.1.9 Apron/parking stand management
5.1.10 Apron/parking stand safety management
5.1.11 Vehicles on the movement area
5.1.12 Wildlife hazard management

5.1.13 Obstacles
5.1.14 Removal of a disabled helicopters
5.1.15 Dangerous goods
5.1.16 Low visibility operations
5.1.17 Protection of sites for radar, navigation aids and meteorological equipment, if any.

5.2 The applicants or heliport authorization holders are not required to develop the heliport operation manual and other manuals as required for the certification of public heliports. However, the applicant or authorization holder may develop a separate procedures for heliport operations, safety management and emergency or a customized heliport procedures manual depending on the size and complexity of heliport requirements and operations incorporating required operation procedures, safety management systems, emergency procedures and must include detailed particulars and single point responsibility of the accountable executive and responsibilities of other management personnel, if employed, and the procedures for at least 5.1.1 (if applicable) 5.1.2, 5.1.3, 5.1.4, 5.1.5, 5.1.6, 5.1.7, 5.1.8, 5.1.10, 5.1.12, 5.1.13, and 5.1.16 as prescribed above in this appendix. The heliport authorization holder must prescribe safety policy and safety management procedures in its heliport operation procedures or manual to ensure safety of operations.

Part 6.0 Safety management system (SMS)

6.1 The heliport operator must establish a safety management system at heliport and safety management manual must be developed as per provisions in GACAR Part 5 and at least includes the following:

6.1.1 Safety policy.
6.1.2 Operator’s organization structure and responsibilities.
6.1.3 Training.
6.1.4 Complying with regulatory requirements relating to accidents, incidents and mandatory occurrence reporting.
6.1.5 Hazard analysis and risk assessment.
6.1.6 Management of change.
6.1.7 Safety criteria and indicators.
6.1.8 Safety audits.
6.1.9 Documentation.
6.1.10 Safety related committees.
6.1.11 Safety promotion.

APPENDIX D – DESIGN AND ESTABLISHMENT

APPENDIX D-1. DETAILS OF SITE AND ORIENTATION OF HELIPORTS

1.0 Siting and orientation of heliport FATO and approach and take-off climb surfaces

1.1 Many factors are considered in the determination of the siting and orientation of heliports FATO. Without attempting to provide an exhaustive list of these factors nor an analysis of their effects, it appears useful to indicate those which most frequently require study. These factors may be classified under four headings as given below. The weather and wind data analysis should be conducted to determine the orientation and dimensions of heliport FATO as prescribed in ICAO Doc 9157 Part and ICAO Doc 9184 Part-I.

1.1.1 Type of operation

Attention must be paid in particular to whether the heliport is to be used in all meteorological conditions or only in visual meteorological conditions, and whether it is intended for use by day and night or only by day.

1.1.2 Climatological conditions

A study of the wind distribution must be made to determine the usability factor. In this regard, the following must be taken into consideration:

(a) Wind statistics used for the calculation of the usability factor are normally available in ranges of speed and direction, and the accuracy of the results obtained depends, to a large extent, on the assumed distribution of observations within these ranges. In the absence of any sure information as to the true distribution, it is usual to assume a uniform distribution since, in relation to the most favorable orientations, this generally results in a slightly conservative usability factor.

(b) The selection of data to be used for the calculation of the usability factor must be based on reliable wind distribution statistics that extend over as long a period as possible, preferably of not less than five years. Authenticity of weather data must be established and should be from a reliable approved organization.

(c) There are some factors which may require to be considered at a particular heliport for design. These include:

(i) The wide variations which may exist, in handling characteristics and maximum permissible crosswind components for diverse types of helicopters (including future types) within various range groups of maximum permissible crosswind components;
(ii) Prevalence and nature of gusts;
(iii) Prevalence and nature of turbulence;
(iv) The dimensions of FATO;
(v) Considerations for temperatures and site elevations etc.
(vi) The surface conditions — water, snow and ice on the surface materially reduce the allowable crosswind component; and
(vii) The strength of the wind associated with the limiting crosswind component.

A study should also be made of the occurrence of poor visibility and/or low cloud base. Account must be taken of their frequency as well as the accompanying wind direction and speed. Detailed information on this topic is provided in Airport Planning Manual (Doc 9184), Part 1.

1.1.3 Topography of the site, its approaches, and surroundings, particularly:

(a) Compliance with the obstacle limitation surfaces;
(b) Current and future land use. The orientation and layout should be selected so as to protect as far as possible the particularly sensitive areas such as residential, school and hospital zones from the discomfort caused by helicopters noise. Detailed information on this topic is provided in the Airport Planning Manual (Doc 9184), Part 2;
(c) Future expansion plans to be provided;
(d) Construction costs; and
(e) Possibility of installing suitable non-visual and visual aids.

1.1.4 Air traffic in the vicinity of the heliport particularly:

(a) Proximity of other heliports, aerodromes or ATS routes;
(b) Traffic density; and
(c) Air traffic control and missed approach procedures.

2.0 Methodology for determination of orientation of approach and take-off climb surfaces

Methodology for determination of orientation of approach and take-off climb surfaces given in this part and ICAO Airport Planning Manual (Doc 9184) are

considered acceptable and must be followed while planning establishment of new heliports or operationalization of the existing heliports for type of classification prescribed in this part.

APPENDIX D-2. CONSIDERATION FOR AERONAUTICAL STUDY

1.0 Purpose

In case of any deviation from heliport specification, the heliport operator must conduct an aeronautical study, only if and where permitted by this part to assess the safety risk of deviations from the requirement and to take suitable mitigation action to maintain acceptable level of safety.

2.0 Definition

An aeronautical study is a study of an aeronautical problem to identify possible solutions and select a solution that is acceptable without degrading safety.

3.0 Technical Analysis

Technical analysis will provide justification for a deviation on the grounds that an equivalent level of safety can be attained by other means. It is generally applicable in situations where the cost of correcting a problem that violates a standard is highly excessive or non-implementable but where the unsafe effects of the problem can be overcome by some procedural means which offers both practical and reasonable solutions. The applicant or operators may also consult specialists in relevant areas.

When considering alternative procedures in the deviation approval process, it is essential to bear in mind the safety objective of the relevant regulations and the applicable standards so that the intent of the regulations is not circumvented and sufficient mitigation measures are implemented to ensure safety.

4.0 Approval of Deviations

Any deviations must have prior acceptance of the President. In some instances, the only reasonable means of providing an equivalent level of safety is to adopt suitable procedures and to require, as a condition of authorization or certification, that cautionary advice must be published in the appropriate AIS publications. The determination to require caution will be primarily dependent on two considerations:

(a) a pilot's need to be made aware of potentially hazardous conditions; and

(b) the responsibility of the heliport operator to publish deviations from standards that would otherwise be assumed under certification or authorization status.

APPENDIX E – HELIPORT DATA

Reserved.

APPENDIX F – PHYSICAL CHARACTERISTICS

APPENDIX F-1 – REQUIREMENTS FOR INSTRUMENT HELIPORTS WITH NON-PRECISION AND/OR PRECISION APPROACHES AND INSTRUMENT DEPARTURES

1. General

(Note. — The specifications in this appendix describe additional conditions beyond those found in GACAR Part 138, that apply to instrument heliports with non-precision and/or precision approaches. All specifications contained within the sub parts, are equally applicable to instrument heliports, but with reference to further provisions described in this Appendix).

2. Heliport Data

(a) Heliport elevation

The elevation of the TLOF and/or the elevation and geoid undulation of each threshold of the FATO (where appropriate) must be measured and reported to the aeronautical information services authority to the accuracy of:

(1) One-half center or foot for non-precision approaches; and

(2) One-quarter center or foot for precision approaches.

(b) Heliport dimensions and related information

The following additional data must be measured or described, as appropriate, for each facility provided on an instrument heliport:

(1) Distances to the nearest center or foot of localizer and glide path elements comprising an instrument landing system (ILS) or azimuth and elevation antenna of a microwave landing system (MLS) in relation to the associated TLOF or FATO extremities.

3. Physical Characteristics

(a) Surface-level and elevated heliports

Safety areas

A safety area surrounding an instrument FATO must extend: (See Figure F1-1)

(1) Laterally to a distance of at least 45 m on each side of the center line; and

(2) Longitudinally to a distance of at least 60 m beyond the ends of the FATO.

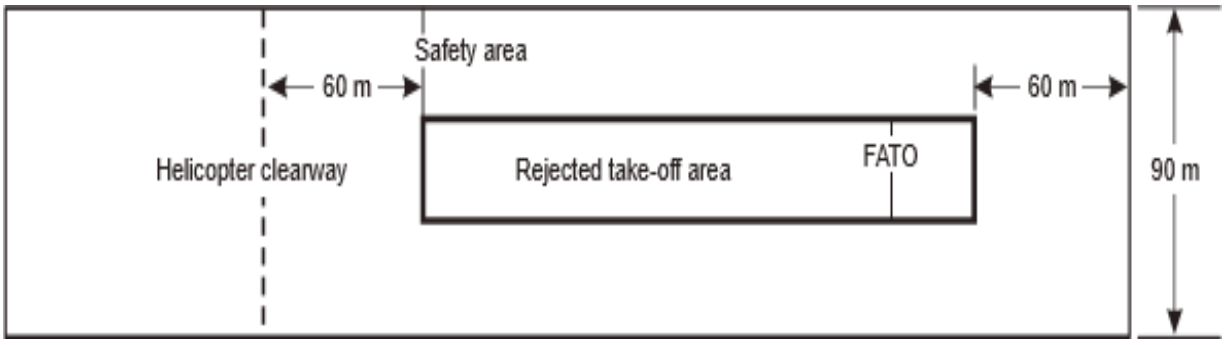

Figure F 1-1 Safety area for instrument FATO

4. Obstacle Environment

(a) Obstacle limitation surfaces and sectors

Approach surface

Characteristics- The limits of an approach surface must comprise:

(1) An inner edge horizontal and equal in length to the minimum specified width of the FATO plus the safety area, perpendicular to the center line of the approach surface and located at the outer edge of the safety area;

(2) Two side edges originating at the ends of the inner edge;

(i) For an instrument FATO with a non-precision approach, diverging uniformly at a specified rate from the vertical plane containing the center line of the FATO;

(ii) For an instrument FATO with a precision approach, diverging uniformly at a specified rate from the vertical plane containing the center line of the FATO, to a specified height above FATO, and then diverging uniformly at a specified rate to a specified final width and continuing thereafter at that width for the remaining length of the approach surface; and

(iii) An outer edge horizontal and perpendicular to the center line of the approach surface and at a specified height above the elevation of the FATO.

(b) Obstacle limitation requirements

(1) The following obstacle limitation surfaces must be established for an instrument FATO with a non-precision and/or precision approach:

(i) Take-off climb surface;
(ii) Approach surface; and
(iii) Transitional surfaces. See Figure F1-2 to F1-5.

(2) The slopes of the obstacle limitation surfaces must not be greater than, and their other dimensions not less than, those specified in Tables F1-1 to F1-3.

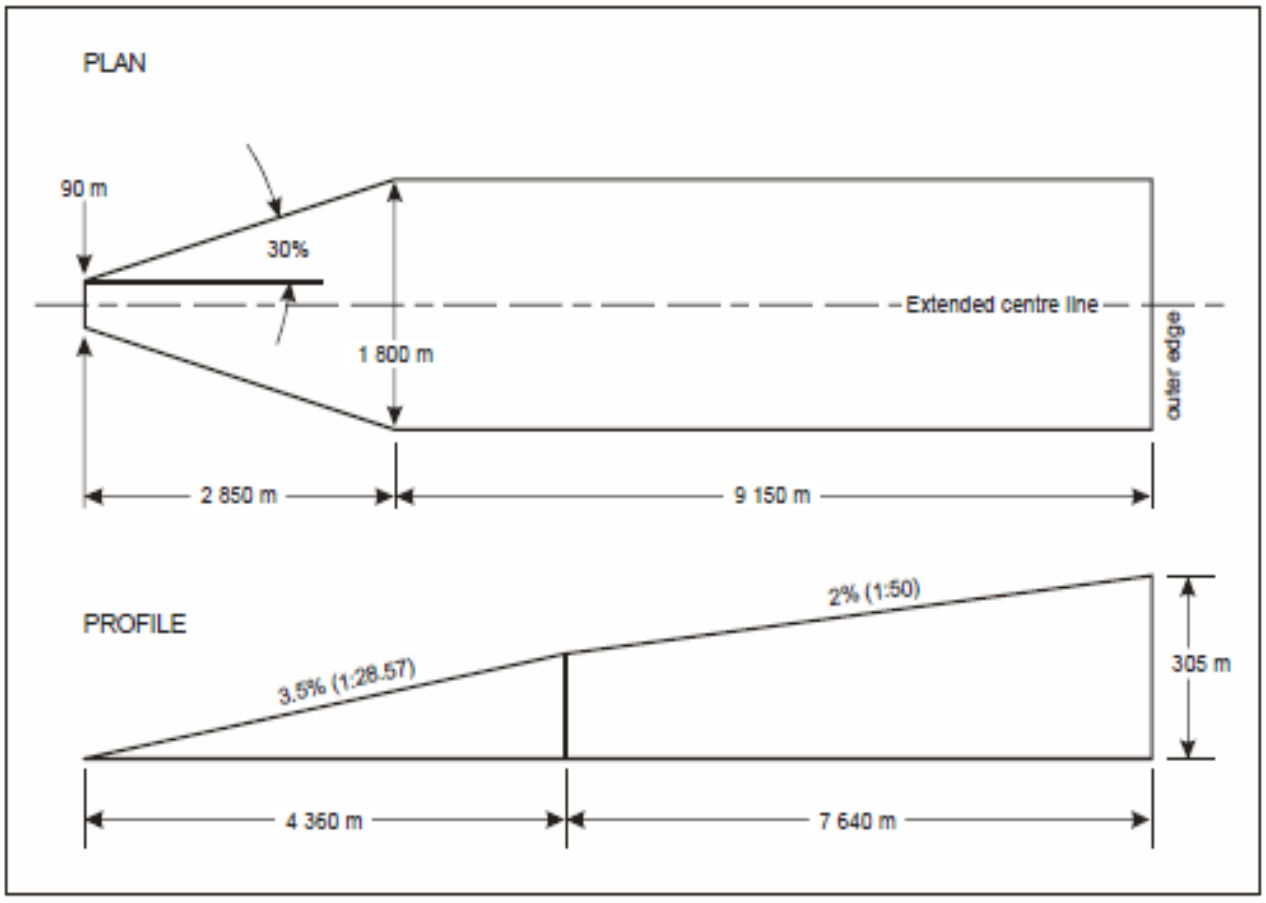

Figure F1-2. Take-off climb surface for instrument FATO

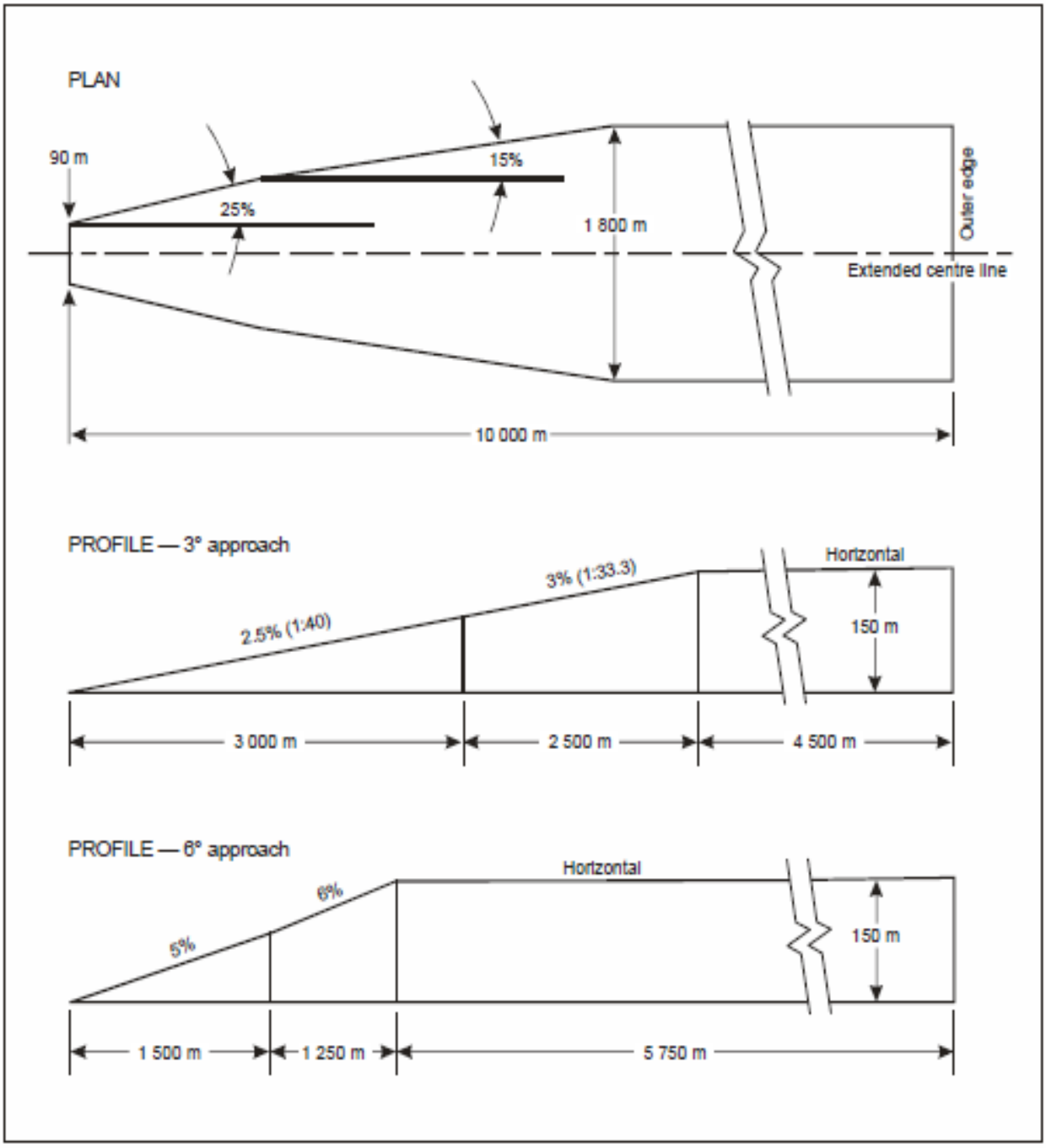

Figure F1-3. Approach surface for precision approach FATO

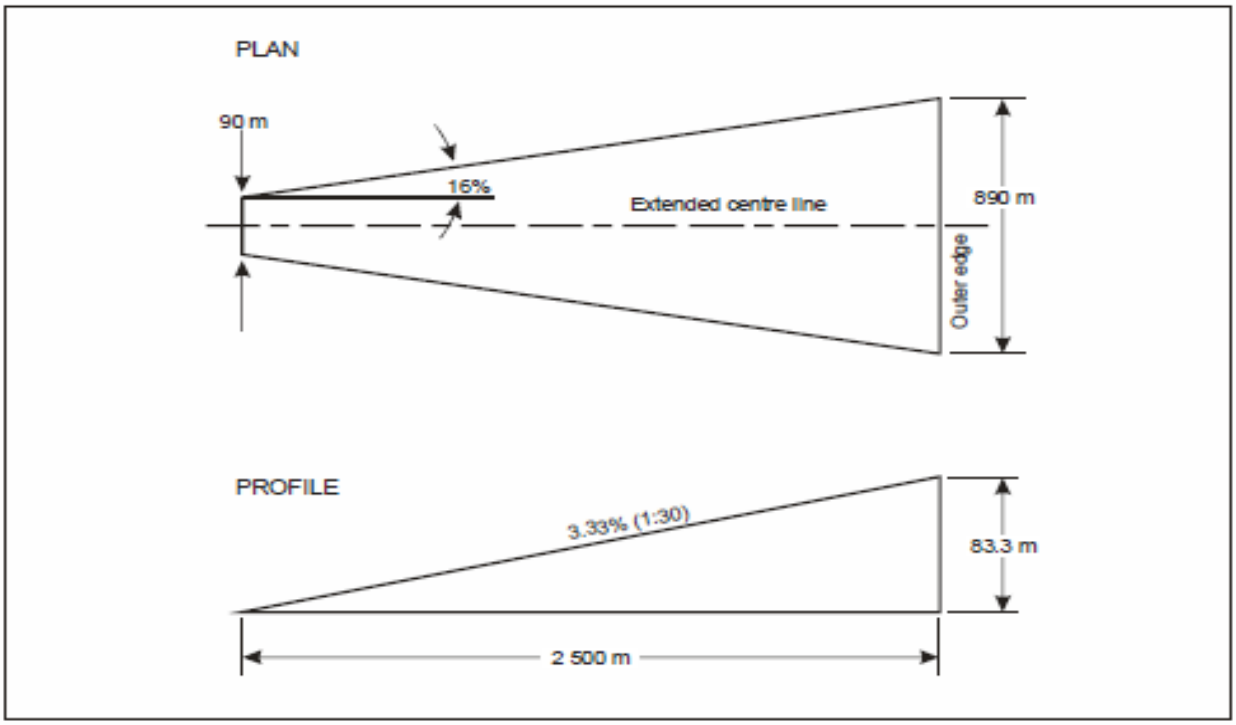

Figure F1-4. Approach surface for non-precision approach FATO

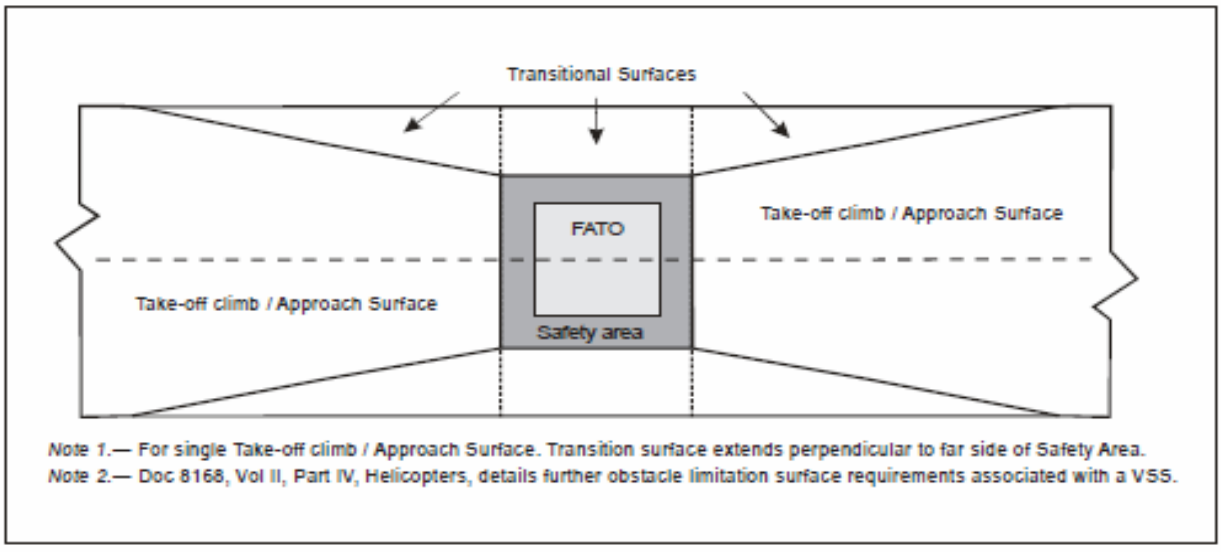

Figure F1-5. Transitional surfaces for an instrument FATO with a non-precision and/or precision approach

Table F1-1. Dimensions and slopes of obstacle limitation surfaces
Instrument (Non-precision) FATO

SURFACE and DIMENSIONS		
APPROACH SURFACE		
Width of inner edge		Width of safety area
Location of inner edge		boundary
First Section		
Divergence	— day	16%
	— night	
Length	— day	2 500 m
	— night	
Outer width	— day	890 m
	— night	
Slope (maximum)		3.33%
Second Section		
Divergence	— day	—
	— night	
Length	— day	—
	— night	
Outer width	— day	—
	— night	
Slope (maximum)		—
Third Section		
Divergence		—
Length	— day	—
	— night	
Outer width	— day	—
	— night	
Slope (maximum)		—
TRANSITIONAL		
Slope		20%
Height		45 m

Table F1-2. Dimensions and slopes of obstacle limitation surfaces Instrument (Precision) FATO

	3° approach				*6° approach*			
	Height above FATO				*Height above FATO*			
Surface and dimensions	*90 m (300 ft)*	*60 m (200 ft)*	*45 m (150 ft)*	*30 m (100 ft)*	*90 m (300 ft)*	*60 m (200 ft)*	*45 m (150 ft)*	*30 m (100 ft)*
APPROACH SURFACE								
Length of inner edge	90 m	90 m	90 m	90 m	90 m	90 m	90 m	90 m
Distance from end of FATO	60 m	60 m	60 m	60 m	60 m	60 m	60 m	60m
Divergence each side to height above FATO	25%	25%	25%	25%	25%	25%	25%	25%
Distance to height above FATO	1 745 m	1 163 m	872 m	581 m	870 m	580 m	435 m	290 m
Width at height above FATO	962 m	671 m	526 m	380 m	521 m	380 m	307.5 m	235 m
Divergence to parallel section	15%	15%	15%	15%	15%	15%	15%	15%
Distance to parallel section	2 793 m	3 763 m	4 246 m	4 733 m	4 250 m	4 733 m	4 975 m	5 217 m
Width of parallel section	1 800 m	1 800 m	1 800 m	1 800 m	1 800 m	1 800 m	1 800 m	1 800 m
Distance to outer edge	5 462 m	5 074 m	4 882 m	4 686 m	3 380 m	3 187 m	3 090 m	2 993 m
Width at outer edge	1 800 m	1 800 m	1 800 m	1 800 m	1 800 m	1 800 m	1 800 m	1 800 m
Slope of first section	2.5% (1:40)	2.5% (1:40)	2.5% (1:40)	2.5% (1:40)	5% (1:20)	5% (1:20)	5% (1:20)	5% (1:20)
Length of first section	3 000 m	3 000 m	3 000 m	3 000 m	1 500 m	1 500 m	1 500 m	1 500 m
Slope of second section	3% (1:33.3)	3% (1:33.3)	3% (1:33.3)	3% (1:33.3)	6% (1:16.66)	6% (1:16.66)	6% (1:16.66)	6% (1:16.66)
Length of second section	2 500 m	2 500 m	2 500 m	2 500 m	1 250 m	1 250 m	1 250 m	1 250 m
Total length of surface	10 000 m	10 000 m	10 000 m	10 000 m	8 500 m	8 500 m	8 500 m	8 500 m
TRANSITIONAL								
Slope	14.3%	14.3%	14.3%	14.3%	14.3%	14.3%	14.3%	14.3%
Height	45 m	45 m	45 m	45 m	45 m	45 m	45 m	45 m

Table F1-3. Dimensions and slopes of obstacle limitation surfaces

SURFACE and DIMENSIONS		*Instrument*
TAKE-OFF CLIMB		
Width of inner edge		90 m
Location of inner edge		Boundary of end of clearway
First Section:		
Divergence	— day — night	30%
Length	— day — night	2 850 m
Outer width	— day — night	1 800 m
Slope (maximum)		3.5%
Second Section:		
Divergence	— day — night	parallel
Length	— day — night	1 510 m
Outer width	— day — night	1 800 m
Slope (maximum)		3.5%*
Third Section:		
Divergence		parallel
Length	— day — night	7 640 m
Outer width	— day — night	1 800 m
Slope (maximum)		2%

* This slope exceeds the maximum mass one-engine-inoperative climb gradient of many helicopters which are currently operating.

5. Visual Aids

(a) Lights

Approach Lighting Systems

(1) Where an approach lighting system is provided for a non-precision FATO, the system must not be less than 210 m in length.

(2) The light distribution of steady lights must be as indicated in Figure H-11, Illustration 2 in this part except that the intensity should be increased by a factor of three for a non-precision FATO.

SURFACE AND DIMENSIONS	NON-PRECISION FATO	
Length of inner edge	Width of safety area	
Distance from end of FATO	60 m	
Divergence	15%	
Total length	2 500 m	
Slope	PAPI	A – 0.57°
	HAPI	A – 0.65°
	APAPI	A – 0.9°

Tables F1- 4. Dimensions and slopes of the obstacle protection surface

APPENDIX G – OBSTACLE ENVIRONMENT

(Note – Characteristics, Chromaticity's, Colors and Isocandela of the heliports visual aids for denoting obstacles markings and lighting systems must be the same as prescribed in relevant subpart of GACAR Part 139. Whenever, separate parameters of marking and lighting for denoting obstacles for heliports are developed and implemented, the same shall be prescribed under this appendix).

Reserved.

APPENDIX H – VISUAL AIDS

(Note – Characteristics, Chromaticity's and Isocandela of the heliports visual aids for navigations, markings, signs, panels and lighting systems must be as given in this part and as prescribed in relevant subpart and appendix of GACAR 139. Whenever, separate parameters of visual aids for heliports are developed and implemented, the same shall be prescribed under this appendix).

Reserved.

APPENDIX I – HELIPORT EMERGENCY RESPONSE

Reserved.

APPENDIX J – ELECTRICAL SYSTEMS

(Note – Electrical systems provided at heliport must be the same as prescribed in GACAR Part 139. Whenever, separate parameters of marking and lighting for denoting obstacles for heliports are developed and implemented, the same shall be prescribed under this appendix).

Reserved.

APPENDIX K – HELIPORT OPERATIONAL SERVICES, EQUIPMENT AND INSTALLATIONS

Reserved.

APPENDIX L – HELIPORT MAINTENANCE

Reserved.

APPENDIX M – CLOSED MARKINGS FOR HELIPORTS AND PARTS

1. General

Closed Heliport, FATO, and /or parts thereof

(a) Requirements for closed markings are the following:

(1) A closed marking must be displayed on a FATO, helicopter parking position, taxiway, or on any part of those areas, which is permanently closed to the use of all helicopters,

(2) When an area of the heliport is temporarily closed or the area is snow covered, the heliport operator need not display a closed marking if a notice of the closure has been reported in a Notice to Airmen (NOTAM),

(3) A closed marking must be superimposed on the aiming point marking of a closed FATO,

(4) A closed marking must be applied on any helicopter parking position associated with a closed FATO,

(5) A closed marking must be placed, at a minimum, at each end of a taxiway or part of a taxiway that is closed, and

(6) When a FATO, helicopter parking position, taxiway or part of those areas is permanently closed, then:

(A) All normal markings must be obliterated, and

(B) Lighting must not be operated except when required for maintenance purposes.

(b) Characteristics of closed markings are the following:

(1) Closed marking must be an X that is white when displayed on a FATO and TLOF; yellow when displayed on a taxiway or a helicopter parking position or helideck or shipboard heliport.

(2) On a FATO, the closed marking must be larger than the size of the aiming point marking by at least 25% in accordance with figure M-1; and

(3) On a helicopter parking position, a closed marking must be super imposed on the inner circle and must cover at least 75% of the diameter of the outer circle in accordance with figure M-1.

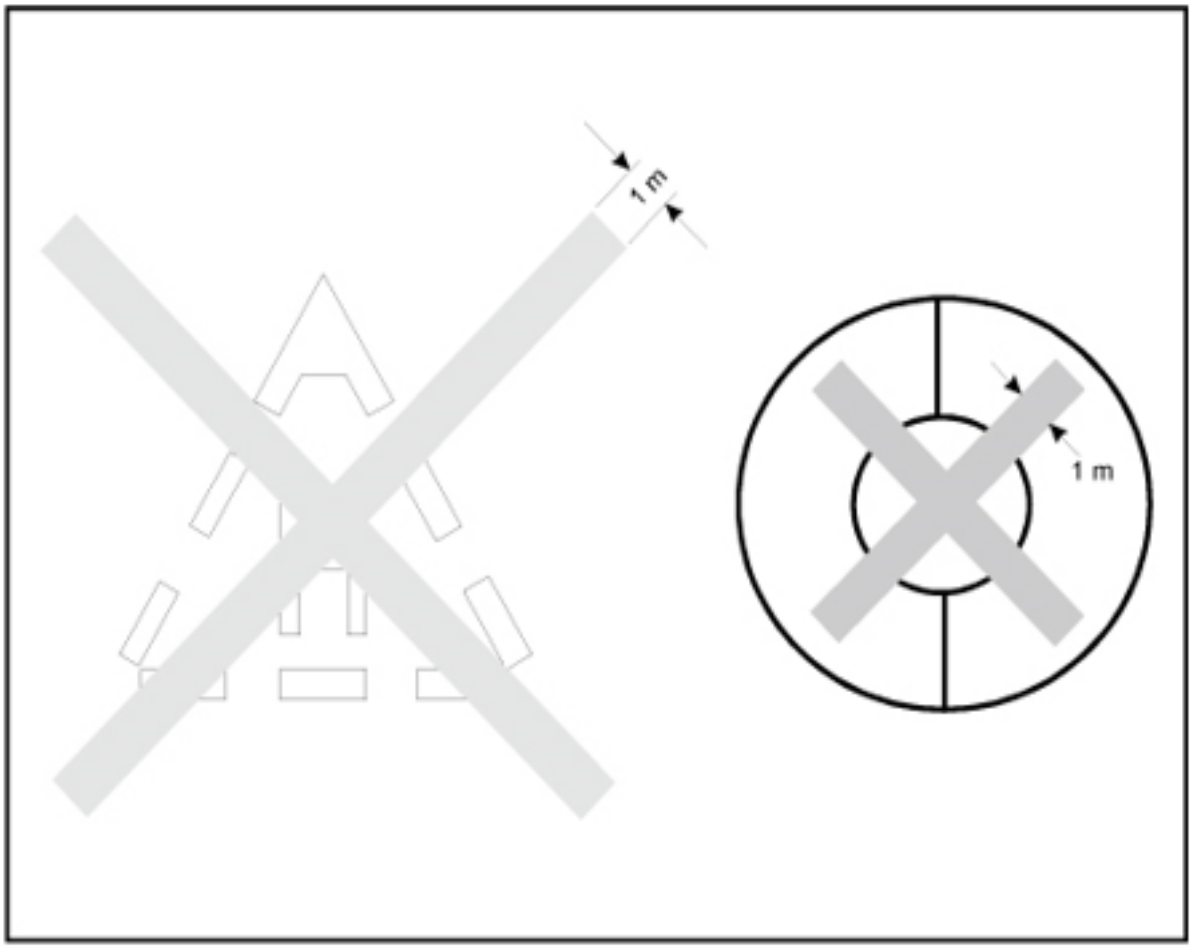

Figure M-1. Closed Heliport/FATO/Stand Markings

(c) Requirements in respect of un serviceability markers, are the following:

(1) Un serviceability markers must be displayed on any part of a taxiway, parking stand or apron that is unfit for the movement of helicopter;

(2) Un serviceability markers must be flags, cones, or marker boards;

(3) An un-serviceability cone must be at least 0.5 m high and red or international orange in combination with white;

(4) An un-serviceability flag must be at least 0.5 m square and red or international orange in combination with white;

(5) An un-serviceability marker board must be at least 0.5 m high and 0.9 m long, with alternate red and white or international orange and white vertical stripes; and

(6) Un-serviceability markers must be placed at intervals that permit to delineate the unserviceable area.

(e) Requirements, in respect of un-serviceability lights are the following:

(1) Un-serviceability lights must be displayed wherever any portion of a taxiway or parking stands used at night is unfit for the movement of helicopter;

(2) Un-serviceability lights must be placed at intervals that permit the unserviceable area be delineated; and

(3) An un-serviceability light must consist of a red fixed light intense enough to allow it to be easily identifiable in relation to adjacent lights and the general level of illumination against which it will be viewed but in no case, less than 10 candelas.

APPENDIX N – REFERENCES AND GUIDANCE MATERIALS

(Note: The GACAR Regulations are developed under references and guidance available in the following ICAO documents and references available in GACAR Part 1, Part 5 and Part 91, Part 119, Part 133 Part 141 and Part 149.)

1. ICAO Annex 14 Volume – I (Aerodrome Design and Operations)
2. ICAO Annex 14 Volume – II (Heliports)
3. ICAO Heliport Manual (Doc 9261)
4. ICAO Doc 9981 - Aerodromes – Procedures for Air Navigation Services
5. ICAO Doc 9774 - Manual on Certification of Aerodromes
6. ICAO Doc 8126 - Aeronautical Information Services Manual
7. ICAO Safety Management Manual (Doc 9859)
8. ICAO Doc 9184 Airport Planning Manual - Part I - Master Planning
9. ICAO Doc 9157- Aerodrome Design Manual
10. ICAO Doc 9137 - Airport Services Manual
    - (i) Part 1 — Rescue and Fire Fighting
    - (ii) Part 2 — Pavement Surface Conditions
    - (iii) Part 3 — Wildlife Control and Reduction
    - (iv) Part 5 — Removal of Disabled Aircraft
    - (v) Part 6 — Control of Obstacles
    - (vi) Part 7 — Airport Emergency Planning
    - (vii) Part 8 — Airport Operational Services
    - (viii) Part 9 — Airport Maintenance Practices