

**PERATURAN DIREKTUR JENDERAL PERHUBUNGAN UDARA
NOMOR : SKEP/131 / VI /2009**

TENTANG

**PETUNJUK DAN TATA CARA PERANCANGAN PROSEDUR PENERBANGAN
INSTRUMEN BAGIAN 173 (*ADVISORY CIRCULAR PART 173, INSTRUMENT FLIGHT
PROCEDURE DESIGN*)**

DENGAN RAHMAT TUHAN YANG MAHA ESA

DIREKTUR JENDERAL PERHUBUNGAN UDARA,

- Menimbang :**
- a. bahwa untuk menjamin keselamatan pengoperasian pesawat udara secara instrumen pada saat terbang jelajah, pendekatan, pendaratan dan lepas landas diperlukan prosedur penerbangan instrumen;
 - b. bahwa untuk melaksanakan ketentuan sebagaimana dimaksud pada huruf a, perlu diatur Petunjuk Dan Tata Cara Perancangan Prosedur Penerbangan Instrumen Bagian 173 (*Advisory Circular Part 173, Instrument Flight Procedure Design*), dengan Peraturan Direktur Jenderal Perhubungan Udara;
- Mengingat :**
1. Undang-undang Nomor 1 Tahun 2009 tentang Penerbangan (Lembaran Negara Tahun 2009 Nomor 1, Tambahan Lembaran Negara Nomor 4956);
 2. Peraturan Pemerintah Nomor 3 Tahun 2001 tentang Keamanan dan Keselamatan Penerbangan (Lembaran Negara Tahun 2001 Nomor 9, Tambahan Lembaran Negara Nomor 4075);
 3. Peraturan Presiden Nomor 9 Tahun 2005 tentang Kedudukan, Tugas, Fungsi, Kewenangan, Susunan Organisasi dan Tata Kerja Kementerian Negara Republik Indonesia sebagaimana telah diubah terakhir dengan Peraturan Presiden Nomor 94 Tahun 2006;

4. Peraturan Presiden Nomor 10 Tahun 2005 tentang Unit Organisasi dan Tugas Eselon I Kementerian Negara Republik Indonesia sebagaimana telah diubah terakhir dengan Peraturan Presiden Nomor 17 Tahun 2007;
5. Peraturan Menteri Perhubungan Nomor KM 43 Tahun 2005 tentang Organisasi dan Tata Kerja Departemen Perhubungan, sebagaimana telah diubah terakhir dengan Peraturan Menteri Perhubungan Nomor KM 20 Tahun 2008.
6. Peraturan Menteri Perhubungan Nomor KM 21 Tahun 2009 tentang Peraturan Keselamatan Penerbangan Sipil Bagian 173 (Civil Aviation Safety Regulation Part 173) tentang Perancangan Prosedur Penerbangan Instrument (Instrument Flight Procedure Design);

MEMUTUSKAN :

Menetapkan: PERATURAN DIREKTUR JENDERAL PERHUBUNGAN UDARA TENTANG PETUNJUK DAN TATA CARA PERANCANGAN PROSEDUR PENERBANGAN INSTRUMEN BAGIAN 173 (ADVISORY CIRCULAR PART 173, INSTRUMENT FLIGHT PROCEDURE DESIGN).

Pasal 1

Memberlakukan Petunjuk Dan Tata Cara Perancangan Prosedur Penerbangan Instrumen Bagian 173 (*Advisory Circular Part 173, Instrument Flight Procedure Design*).

- Pasal 2

Petunjuk Dan Tata Cara Perancangan Prosedur Penerbangan Instrumen Bagian 173 (*Advisory Circular Part 173, Instrument Flight Procedure Design*), sebagaimana tercantum dalam Lampiran Peraturan ini.

Pasal 3

Direktur Navigasi Penerbangan mengawasi pelaksanaan Peraturan ini.

Pasal 4

Peraturan ini mulai berlaku pada tanggal ditetapkan.

Ditetapkan di : Jakarta
Pada tanggal : 11 Juni 2009

DIREKTUR JENDERAL PERHUBUNGAN UDARA

ttd

HERRY BAKTI

SALINAN Peraturan ini disampaikan kepada :

1. Menteri Perhubungan;
2. Sekretaris Jenderal Departemen Perhubungan;
3. Inspektur Jenderal Departemen Perhubungan;
4. Sekretaris Direktorat Jenderal Perhubungan Udara;
5. Para Direktur di lingkungan Ditjen Perhubungan Udara.

Salinan sesuai dengan aslinya

**Kepala Bagian Hukum
Setditjen Hubud**


RUDI RICHARDO

Pasal 4

Peraturan ini mulai berlaku pada tanggal ditetapkan.

Ditetapkan di : Jakarta
Pada tanggal : 11 Juni 2009

DIREKTUR JENDERAL PERHUBUNGAN UDARA



HERRY BAKTI

SALINAN Peraturan ini disampaikan kepada :

1. Menteri Perhubungan;
2. Sekretaris Jenderal Departemen Perhubungan;
3. Inspektur Jenderal Departemen Perhubungan;
4. Sekretaris Direktorat Jenderal Perhubungan Udara;
5. Para Direktur di lingkungan Ditjen Perhubungan Udara.

Pasal 4

Peraturan ini mulai berlaku pada tanggal ditetapkan.

Ditetapkan di : Jakarta
Pada tanggal : 11 Juni 2009

z DIREKTUR JENDERAL PERHUBUNGAN UDARA *pa*



HERRY BAKTI

SALINAN Peraturan ini disampaikan kepada :

1. Menteri Perhubungan;
2. Sekretaris Jenderal Departemen Perhubungan;
3. Inspektur Jenderal Departemen Perhubungan;
4. Sekretaris Direktorat Jenderal Perhubungan Udara;
5. Para Direktur di lingkungan Ditjen Perhubungan Udara.

Lampiran Peraturan Direktur Jenderal
Perhubungan Udara
Nomor : **SKEP/131/VI/2009**
Tanggal : **11 JUNI 2009**

ADVISORY CIRCULAR (AC)

PART 173

Instrument Flight Procedure Design

ADVISORY CIRCULAR PART 173
Instrument Flight Procedure Design

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AC 173-1(0)

APPLICATIONS FOR PROCEDURE DESIGN CERTIFICATE

Subpart 1 : References

- CASR Part 173 — Instrument Flight Procedure Design
- MOS Part 173 — Standards applicable to Instrument Flight Procedure Design

Subpart 2 : Purpose

This AC provides guidance and information to applicants for certification as Instrument Flight Procedure Designers under CASR Part 173.

Subpart 3 : Status of This AC

This is the first AC to be issued on this subject.

Advisory Circulars are intended to provide recommendations and guidance to illustrate a means but not necessarily the only means of complying with the Regulations, or to explain certain regulatory requirements by providing interpretative and explanatory material.

Where an AC is referred to in a 'Note' below the regulation, the AC remains as guidance material.

ACs should always be read in conjunction with the referenced regulations.

Subpart 4 : Background

- a. The applicant for a certificate under CASR Part 173 is required to supply sufficient information to DGCA to permit an application to be properly considered.
- b. This AC sets out the information that will normally be expected to be provided in support of an application.

Subpart 5 : Compliance With Regulations

The applications must adequately address all relevant requirements of CASR Part 173, and in particular should specifically detail the manner in which the applicant will comply with the following regulations:

173.045 (c) (i)	Types of Procedure to be designed
173.075, 173.250	Operations Manual
173.090	Verification
173.095	Validation
173.110	Maintenance
173.115	Facilities
173.120	Organisation
173.125	Personnel
173.135	Chief Designer
173.140	Training and Checking Program
173.145	Safety Management System

173.155

Documents and records

173.160

Document and record control system

Subpart 6 : Information to be Supplied

a. General

An application shall include:

- (1) Applicant's name
- (2) Corporate structure and executive personnel
- (3) Place of Business
- (4) Summary of relevant experience
- (5) Details of organisational structure
- (6) Experience and qualifications of key personnel

b. Financial capacity

DGCA may ask an applicant to provide evidence as to the applicant's financial standing and financial capacity

c. Insurance

An applicant must supply details of the liability insurance cover that the applicant has or intends to obtain. An applicant who does not have adequate liability insurance provision may be considered by DGCA as unlikely to be a viable commercial organisation, and therefore not an appropriate person to hold a certificate under CASR Part 173.

d. Operation Manual

A complete operations manual is to be submitted for approval in accordance with the CASR Part 173 Manual of Standards (MOS).

e. Type of procedure

(1) The application shall state the types of procedure (refer CASR Part 173 MOS paragraph 6.1.1) that the designer proposes to design.

(2) Approval to design procedures of a particular type should be supported by evidence of adequate relevant design experience

f. Environment

(1) The manner in which it is proposed to satisfy the requirements of the *Indonesian Aviation Act Number 1 Year 2009 on Aviation* in regard to the design of procedures must be fully detailed.

(2) It is acceptable to contract to another organisation for the provision of environmental analysis, but the applicant must provide full details of these arrangements and the procedures to be used by the contracted organisation.

g. Verification

Standard operating procedures, including checklists, forms and record keeping procedures should be appropriately detailed in the company operating manual.

h. Organisation

The operations manual must contain details of the designer's organisational structure. Details of the duties, responsibilities, and authority of each relevant position in the organisation must be

i. Personnel

The qualifications and experience of all design staff should be included. Where appropriate, or where personnel are not identified, job descriptions and/or selection criteria may be used to support the application.

j. Chief Designer

An application will not be considered unless the applicant nominates a person as Chief Designer. The nominee must be able to satisfy the requirements for Chief Designer. See AC173-02 *Approval of the Appointment of a Chief Designer* for information/guidance on DGCA's assessment of these requirements. An application will be accepted prior to the approval of the Chief Designer, but a certificate will not be issued until the Chief Designer has been approved.

k. Resources

An applicant must provide sufficient detail of accommodation, equipment and other resources that are available to the designer to demonstrate that adequate resources are available which will permit the designer to carry out design work.

l. Training and Checking Program

(1) An applicant shall demonstrate that a suitable training and checking program is contained in the company operations manual, and that procedures are in place to effectively implement and monitor that program.

(2) The program must ensure that staff proficiency is formally assessed at appropriate intervals, and that adequate training is provided to ensure knowledge and skills in current and new procedures. Procedures must provide for records to be kept of checks completed, the results achieved and any remedial action or additional training provided to address any deficiency.

(3) In the case of Chief Designers, suitable procedures shall be provided to ensure that the Chief Designer is able to maintain adequate skills and knowledge.

m. Safety Management System

A safety management system is required as an integral part of the designer's operations.

n. Example of Product

(1) An applicant shall provide for examination by DGCA at least two complete designs of each type of procedure that the applicant intends to design. Examples shall include full documentation, including data, maps, computation sheets and finished charts in the format required for publication.

(2) Samples of designs may include designs carried out in the normal course of the designer's business at locations outside Indonesia, provided those examples are representative of work by current staff, and are designed to PANS-OPS criteria.

(3) Where examples of previously completed work are not available the applicant should consult with DGCA before preparing sample designs, to ensure that the proposed sample designs will be acceptable.

- (4) DGCA will assess product examples to determine that designs conform to ICAO PANS-OPS criteria and CASR Part 173 MOS and that the designs are accurate and complete.
- (5) In assessing submitted examples DGCA may employ appropriate expertise from organisation outside DGCA.
- (6) Where deficiencies are found in submitted examples, DGCA may require further examples to be supplied in accordance with current Indonesian Regulation.

AC 173-2(0)

APPROVAL OF THE APPOINTMENT OF A CHIEF DESIGNER

Subpart 1 : References

- CASR Part 173 — Instrument Flight Procedure Design
- MOS Part 173 — Standards applicable to Instrument Flight Procedure Design

Subpart 2 : Purpose

This AC provides guidance and information to applicants for approval of the appointment of a Chief Designer of an organization holding a certificate under CASR Part 173.

Subpart 3 : Status of This AC

This is the first AC to be issued on this subject.

Advisory Circulars are intended to provide recommendations and guidance to illustrate a means but not necessarily the only means of complying with the Regulations, or to explain certain regulatory requirements by providing interpretative and explanatory material.

Where an AC is referred to in a 'Note' below the regulation, the AC remains as guidance material. ACs should always be read in conjunction with the referenced regulations.

Subpart 4 : Background

- a. The holder of a procedure design certificate is required under CASR Part 173 to appoint a Chief Designer and that appointment must be approved by DGCA.
- b. This AC sets out the information that is required to enable DGCA to consider an application for approval and the method DGCA may use to assess an application.

Subpart 5 : Applications

- a. An application may be made by an instrument flight procedure design organisation that is the holder of a procedure design certificate, or has applied for a procedure design certificate.
- b. The application, in writing, must include:
 - (1) The name of the instrument flight procedure design organisation
 - (2) The name of the person appointed as Chief Designer
 - (3) Details of the Chief Designer's relevant qualifications and experience
- c. The application must address all relevant requirements of CASR Part 173, and in particular should specifically detail the manner in which the certificate holder will ensure that the Chief Designer's functions and duties are performed.

Subpart 6 : Approval Process

- a. DGCA will consider an application for approval in two stages
- b. An initial assessment will be made of the written application. If it is determined from that assessment that the Chief Designer possesses appropriate qualifications and experience, DGCA will proceed to the second stage, which will be an interview.

Subpart 7 : Assessment

DGCA will assess the Chief Designer's qualifications & experience in the following areas :

QUALIFICATIONS	
Basic qualification	Evidence of completion of an approved PANS-OPS course must be provided.
Advanced training	Evidence of advanced training must be provided. (Refer MOS para 3.1.2.1 (c)). It is expected that a person appointed as Chief Designer will have completed a number of advanced or refresher courses after gaining the initial qualification. Details of attendance and participation in relevant conferences including papers presented etc, should be included.
RELEVANT EXPERIENCE:	
Procedure design	Details of the Chief Designer's procedure design experience should be detailed. The Chief Designer must demonstrate experience in the design of each type of procedure for which he/she will be responsible. Experience shall be assessed by DGCA as sufficient for the Chief Designer to competently fulfill the duties and function of a Chief Designer. It is expected that the experience required for a Chief Designer to achieve competency would not normally be less than 2 years full-time experience in procedure design involving the design of a considerable number of individual procedures. The assessment of design experience relative to a particular type of procedure will take into account the number of approaches that an "experienced" designer is likely to design in the normal course of his/her duties. For example, the number of ILS designs that an "experienced" designer may have completed may be limited, but, taken in

	<p>the context of the designer's overall experience, may be assessed as satisfactory. Similarly a designer may be "experienced" in new types of procedures that because of their recent development only a relatively small number of procedures have been designed.</p> <p>Design of procedures in other countries, and to other design criteria, may be taken into account in the assessment of the Chief Designer's overall experience, but DGCA must be satisfied that the Chief Designer possesses detailed knowledge and experience in PANS-OPS procedures and Indonesian design rules & procedures.</p> <p>In the case of a Chief Designer who has extensive experience but limited recent experience DGCA may take into consideration appropriate recent training or other measures that the Chief Designer has taken to ensure that he/she is fully conversant with current procedure design and has adequate recent "hands-on" design experience.</p>
<p>Supervision & Management</p>	<p>The role of Chief Designer involves accepting responsibility for the work of other persons, including designers, and the effective management of an organisation and design work. A Chief Designer must demonstrate design experience in a supervisory role and/or equivalent supervisory or management experience in a related industry.</p>
<p>Relevant operational experience.</p>	<p>It is expected that a Chief Designer will possess experience in a relevant operational environment enabling them to apply design criteria with due regard to operational circumstances. Suitable experience will include experience as an instrument rated pilot, or navigator on IFR operations. In cases where the Chief Designer does not have such experience, evidence must be produced to satisfy DGCA that equivalent other experience has been gained which enables the Chief Designer to properly fulfil all the duties of Chief Designer.</p>

KNOWLEDGE:	
Note: The following criteria will normally be assessed during an interview.	
Current procedure design practices	A Chief Designer must demonstrate a high standard of detailed knowledge in respect of instrument flight procedure design.
Indonesian Operations	A Chief Designer must demonstrate a thorough knowledge of Indonesian operating rules & procedures as contained in Regulations related to Air Navigation.
CASR Part 173	The Chief Designer must demonstrate a thorough knowledge of CASR Part 173 – Instrument Flight Procedure Design, including the requirements for: <ul style="list-style-type: none"> • Staff qualifications & minimum experience • Supervision of staff • Recency
PANS-OPS	Detailed knowledge in the principles and practice of design in accordance with the rules contained in ICAO Doc 8168 is required.
Navigation Systems	A Chief Designer must demonstrate a thorough understanding of the principles of operation of relevant ground and space-based navigation systems.
Company operating procedures.	At interview the Chief Designer must demonstrate that he/she is fully conversant with the company operations manual. In general it is expected that except, in matters of detail, the Chief Designer can demonstrate this knowledge without reference to the operations manual. The Chief Designer must demonstrate detailed knowledge of all company operating procedures including: <ul style="list-style-type: none"> • Data management & control • Verification of designs • Record keeping • Environmental requirements • Publishing standards • Validation requirements • Procedure maintenance

Company safety management system	<p>A Chief Designer must demonstrate a high standard of knowledge of and a commitment to the principle of a Safety Management System.</p> <p>The Chief Designer must have a thorough knowledge of the company safety management system and be able to discuss action appropriate to typical safety management issues.</p>
Responsibilities as Chief Designer	<p>The Chief Designer must have a thorough understanding of the responsibilities of a Chief Designer. The assessment will include the ability of the Chief Designer to manage staff, including unqualified persons and support staff, and to conduct periodic assessment of staff competence.</p>

Subpart 8 : Approval

- a. If DGCA approves an appointment the applicant will be advised in writing and the Chief Designer will be issued a notice of approval of appointment.
- b. The notice of approval will contain:
 - (1) The name of the person appointed as Chief Designer
 - (2) The name of the organization holding a procedure design certificate in respect of which the appointment is made
 - (3) Any conditions that DGCA may impose
- c. The approval is not transferable.
- d. The approval will remain valid unless withdrawn by DGCA, a person ceases to occupy the position of Chief Designer, or the Chief Designer ceases to be employed by the procedure design certificate holder specified in the notice of approval.
- e. An appointment as Chief Designer will normally apply in respect of a single instrument flight procedure design organization. i.e. a person may not be the Chief Designer for more than one certificate holder.

Subpart 9 : Rejection of Application

- a. DGCA will notify the applicant in writing if an appointment is not approved. The advice will state the qualification, experience, or knowledge areas that have been assessed as unsatisfactory.
- b. An unsuccessful applicant may re-apply if additional evidence can be provided to rectify any deficiency in the original application.

AC 173-3(0)

APPROVAL OF COURSES

Subpart 1 : References

- CASR Part 173 — Instrument Flight Procedure Design
- MOS Part 173 — Standards applicable to Instrument Flight Procedure Design

Subpart 2 : Purpose

This AC provides guidance and information to applicants for the approval and/or recognition of ICAO PANS-OPS courses.

Subpart 3 : Status of This AC

This is the first AC to be issued on this subject.

Advisory Circulars are intended to provide recommendations and guidance to illustrate a means but not necessarily the only means of complying with the Regulations, or to explain certain regulatory requirements by providing interpretative and explanatory material.

Where an AC is referred to in a 'Note' below the regulation, the AC remains as guidance material.

ACs should always be read in conjunction with the referenced regulations.

Subpart 4 : Background

- a. CASR Part 173 requires that in order to be employed as a **qualified designer** a person must have satisfactorily completed a DGCA approved course in ICAO PANS-OPS Instrument Procedure design.
- b. This AC sets out the matters that DGCA may take into consideration in approving a course.

Subpart 5 : Applications For Approval

- a. General
 - A person may apply for :
 - (1) A course to be approved by DGCA, or
 - (2) A course to be considered as an approved course.
- b. Application for approval of a course
 - (1) A person may apply to DGCA in writing to DGCA for approval of a course.
 - (2) The application must include, in accordance with MOS Section 3.3, information regarding:
 - (i) Syllabus
 - (ii) Duration
 - (iii) Lecturer(s)
 - (iv) Provider/Institution

Subpart 6 : Assessment Of Courses

DGCA will consider the following in the assessment of a course :

a. Syllabus

- (1) An acceptable course syllabus is contained in Appendix A to this AC. The course syllabus should contain and include all basic procedure design elements including basic GNSS procedures.
- (2) The course shall define the pre-requisite for entry. Experience in procedure design shall not be a pre-requisite.
- (3) Practical course work must provide design experience at suitable stages of the course.
- (4) The syllabus must be adequate to enable a successful candidate to be capable of completing the design of a non-precision approach procedure under supervision of an experienced designer.
- (5) Applications must be accompanied by details of the assessment methods that are used and the provider's procedures for addressing unsatisfactory progress.

b. Duration of course

The syllabus contained in Appendix A is based on 6 weeks of full-time coursework. An application for approval must provide evidence that the course duration is sufficient to permit an average candidate to successfully achieve the course objectives.

c. Course lecturer

- (1) The applicant must provide details of the qualifications and experience of the course lecturer(s) or presenter(s).
- (2) Course lecturers must be experienced in instrument flight procedure design and possess recognised instructional qualifications.

d. Course provider

- (1) The applicant should provide details of the provider's experience in delivering PAN S-OPS and other aviation courses, its organisation and the facilities available for the conduct of the course. DGCA will take into account any information available in regard to courses conducted by the institution, and any approvals that may have been given by other aviation authorities.
- (2) Where the course is a new course DGCA may require that additional information be provided or that the course be assessed on-site. Such assessment may require attendance or observation and monitoring of the course by DGCA staff at the applicant's expense.

Subpart 7 : Courses Considered To Be Approved

- a. DGCA may consider a course to be an approved course, in accordance with CASR Part 173 MOS paragraph 3.3.1.3, where due to lapse of time since the course was completed, an assessment in accordance with Section 6 above is not possible.

- b. This provision is intended to avoid disadvantaging persons who have obtained appropriate qualifications prior to the introduction of CASR Part 173.
- c. A person applying for a course to be considered an approved course must provide documentary evidence.
- d. Evidence of course completion
 - (1) Evidence must be supplied to show that the course was satisfactorily completed by the applicant.
 - (2) Evidence may be in the form of a certificate issued by the course provider, or by a written statement from the institution.
 - (3) Where such documentation has been obtained but has been lost or is no longer obtainable, DGCA will consider an application supported by a statutory declaration or evidence such as a written statement from a person in a suitable position of authority. For example, a person who has been employed as a procedure designer may provide a statement from his/her employer that a course was satisfactorily completed.
 - (4) On-the-job training is not considered to be an acceptable form of training for this purpose and evidence must be provided of a formal structured course.
- e. Evidence of course standard
 - (1) Evidence must be supplied to demonstrate that the course was of a standard that was appropriate to the design of instrument flight procedures at the time it was completed.
 - (2) For example, a course, which, at the date of completion, was regarded by a Contracting State as an appropriate qualification for full-time employment as an instrument flight procedure designer, would be acceptable.
- f. Evidence of additional training or practical experience
 - (1) In circumstances where due to passage of time a course cannot be demonstrated to meet all of the above requirements, an applicant may provide evidence of training or practical experience that has been obtained since completion of the course.
 - (2) DGCA may take such evidence into account in determining that the training completed by the applicant should be considered to be an approved course.

Subpart 8 : Approved Courses

Enquiries regarding approved courses may be made to:

DGCA, Directorate of Air Navigation

Address:

Karya Building 23rd Floor

Medan Merdeka Barat No. 8

Jakarta 10110

APPENDIX

COURSE SYLLABUS

1. Executive Summary

- a. Organization of ICAO
- b. Organization of ICAO documentation
- c. Annexes and SARPS

2. Review of aviation principles and navigation principles for procedure design

3. General criteria

- a. Procedure segments
 - (1) Characteristics
 - (2) Obstacle clearance
 - (3) Principle of secondary areas
- b. Fixes
 - (1) Navigation performance
 - (2) Tolerance
 - (3) Application to area construction
 - (4) Forming fixes from navigation system and aircraft performance
- c. Aircraft speeds for procedure design
- d. True airspeed effects on procedure design
 - (1) Altitude
 - (2) Temperature
- e. Turn Radii
 - (1) Altitude effects
 - (2) Temperature
 - (3) Wind effects - ICAO wind spiral model
- f. Exercise

4. Initial approach

- a. Alignment
- b. Length
- c. Area
- d. Descent gradient
- e. Obstacle clearance

5. Intermediate segment

- a. Alignment
- b. Length
- c. Determining primary and secondary widths
- d. Descent gradient
- e. Obstacle clearance .

6. Final approach segment

- a. Runway alignment
- b. Minimum length parameters
- c. Maximum length conditions
- d. Area width and navigation performance
- e. Descent gradient
 - (1) FAF altitude
 - (2) Runway threshold location
 - (3) Descent rate effect
- f. Minimum obstacle clearance
 - (1) Standard
 - (2) Adjustments
- g. Exercise

7. Missed approach: non-precision

- a. Straight
 - (1) Initial phase
 - (2) Intermediate phase
 - (3) Final phase
- b. Exercise
- c. Turning
 - (1) Initial phase
 - (2) Intermediate phase
 - (3) Final phase
 - (4) Turn at altitude
 - (5) Turn at fix
- d. Complex missed approaches
- e. Exercise

8. Course reversal procedures

- a. Types of reversal
 - (1) Racetrack
 - (2) Procedure turn
 - (3) Base turn
- b. Template application and area construction
- c. Exercise

9. Visual manoeuvre (Circling) approaches

- a. Alignment
- b. Descent gradient
- c. Speed category application
- d. Area construction
- e. Obstacle evaluation
- f. Final OCA/H vs visual OCA/H

10. Non-precision approach laboratory exercise

11. Precision approach

- a. Principle of precision approach
- b. ILS and MLS obstacle assessment surfaces (OAS)
- c. Templates and system parameters
- d. Height loss and height loss adjustments
- e. Obstacle penetrations of precision segment
- f. Missed approach
 - (1) Straight
 - (2) Turning
- g. Establishing OCA/H
 - (1) Operational
 - (2) Approach obstacles
 - (3) Missed approach obstacles
 - (4) Obstacles after precision segment
- h. ICAO Collision Risk Model (CRM)
 - (1) General
 - (2) Modelling obstacles
 - (3) Building data base
 - (4) Running CRM
 - (5) Interpretation and analysis of results
 - (6) Establishing OCA/H
- i. Precision approach design laboratory

12. Earth-referenced navigation

- a. Earth model
- b. Waypoints
- c. Path definition

13. Principles of area navigation (RNAV) and VOR/DME (RNAV)

- a. Waypoint tolerance areas
- b. Area construction
- c. Turn construction
- d. Obstacle evaluation
 - (1) Straight segment
 - (2) Turns
 - (3) Missed approach areas

14. Global Navigation Satellite System (GNSS) Procedures

- a. WGS-84 Earth model
- b. Waypoints
- c. Path definitions
- d. Geodetic calculations for waypoint and path definitions
- e. System performance parameters related to procedure design
- f. Area construction
- g. Basic form of procedures (Y)
- h. Segments
 - (1) Initial(s)
 - (2) Intermediate
 - (3) Final
 - (4) Missed approach

- (i) Straight
- (ii) Turning
- (iii) Combination
- (iv) Optional area construction
- i. Application of course reversals
- j. GNSS procedure design laboratory

15. Final Examination

DIRECTOR GENERAL OF CIVIL AVIATION



HERRY BAKTI

Pembina Utama Muda (IV/c)

Nip. 19530419 198003 1 001

- (i) Straight
- (ii) Turning
- (iii) Combination
- (iv) Optional area construction
- i. Application of course reversals
- j. GNSS procedure design laboratory

15. Final Examination

DIRECTOR GENERAL OF CIVIL AVIATION *pb*



HERRY BAKTI
Pembina Utama Muda (IV/c)
Nip. 19530419 198003 1 001

- (i) Straight
- (ii) Turning
- (iii) Combination
- (iv) Optional area construction
- i. Application of course reversals
- j. GNSS procedure design laboratory

15. Final Examination

DIRECTOR GENERAL OF CIVIL AVIATION

ttd

HERRY BAKTI

Salinan sesuai dengan aslinya

**Kepala Bagian Hukum
Setditjen Hubud**


RUDI RICHARDO