



THAILAND CIVIL AVIATION REGULATION

TCAR OPS – Part NCC

Non-Commercial Air Operations with
Complex Motor Powered Aircraft

Issue 01

Revision 00

Date 30 SEPTEMBER 2021

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RECORD OF REVISIONS

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LIST OF EFFECTIVE PAGES

Change and amendment bar is placed against each paragraph affected.

Page No.	Revision No.	Date
1	00	30 SEP 2021
2	00	30 SEP 2021
3	00	30 SEP 2021
4	00	30 SEP 2021
5	00	30 SEP 2021
6	00	30 SEP 2021
7	00	30 SEP 2021
8	00	30 SEP 2021
9	00	30 SEP 2021
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13	00	30 SEP 2021
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INTRODUCTION AND APPLICABILITY

In this publication the word ‘must’ or ‘shall’ is used to indicate where the Director General requires the Organisation, owner or operator to respond to and comply with, or adhere closely to, the defined requirement.

If the Organisation’s/owner’s/operator’s response is deemed to be inadequate by the Director General, a specific requirement or restriction may be applied as a condition of the appropriate instrument to be issued under Thailand Civil Aviation Regulations.

TCAR OPS is based on the latest consolidated version of Commission Regulation (EU) No 965/2012 of 5 October 2012 laying down technical requirements and administrative procedures related to air operations, as amended up to (EU) No 2023/217. Notably, (EU) 2023/203 was not included as part of the initial issue.

TCAR OPS Part NCC is a part of the overall TCAR OPS Regulation set.

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TABLE OF CONTENT

RECORD OF REVISIONS	3
LIST OF EFFECTIVE PAGES	5
INTRODUCTION AND APPLICABILITY	7
TABLE OF CONTENT	9
SUBPART A: GENERAL REQUIREMENTS	14
NCC.GEN.100 The competent authority	14
NCC.GEN.101 Additional requirements for flight training organisations	14
NCC.GEN.105 Crew responsibilities	14
NCC.GEN.106 Pilot-in-command responsibilities and authority	15
NCC.GEN.110 Compliance with laws, regulations and procedures	16
NCC.GEN.115 Common language	16
NCC.GEN.119 Taxiing of aircraft	17
NCC.GEN.120 Taxiing of aeroplanes	17
NCC.GEN.125 Rotor engagement — helicopters	17
NCC.GEN.130 Portable electronic devices	17
NCC.GEN.131 Use of electronic flight bags (EFBs)	17
NCC.GEN.135 Information on emergency and survival equipment carried	17
NCC.GEN.140 Documents, manuals and information to be carried	18
NCC.GEN.145 Handling of flight recorder recordings: Preservation, production, protection and use	18
NCC.GEN.150 Transport of dangerous goods	20
SUBPART B: OPERATIONAL PROCEDURES	21
NCC.OP.100 Use of aerodromes and operating sites	21
NCC.OP.101 Altimeter check and settings	21
NCC.OP.105 Specification of isolated aerodromes — aeroplanes	21
NCC.OP.110 Aerodrome operating minima — general	21
NCC.OP.111 Aerodrome operating minima — NPA, APV, CAT I operations	22
NCC.OP.112 Aerodrome operating minima — circling operations with aeroplanes	23
NCC.OP.113 Aerodrome operating minima — onshore circling operations with helicopters	23
NCC.OP.115 Departure and approach procedures	23
NCC.OP.116 Performance-based navigation — aeroplanes and helicopters	24
NCC.OP.120 Noise abatement procedures	24
NCC.OP.125 Minimum obstacle clearance altitudes — IFR flights	24
NCC.OP.130 Fuel/energy scheme — aeroplanes and helicopters	24
NCC.OP.131 Fuel/energy scheme — fuel/energy planning and in-flight re-planning policy — aeroplanes and helicopters	24
NCC.OP.135 Stowage of baggage and cargo	26
NCC.OP.140 Passenger briefing	26
NCC.OP.145 Flight preparation	27
NCC.OP.147 Destination alternate aerodromes planning minima — aeroplanes	27
NCC.OP.148 Destination alternate aerodrome planning minima — helicopters	28
NCC.OP.150 Take-off alternate aerodromes — aeroplanes	28
NCC.OP.151 Destination alternate aerodromes — aeroplanes	28
NCC.OP.152 Destination alternate aerodromes — helicopters	29
NCC.OP.153 Destination aerodromes — instrument approach operations	29
NCC.OP.155 Refuelling with passengers embarking, on board or disembarking	29

NCC.OP.157	Refuelling with engine(s)and/or rotors turning – helicopters.....	30
NCC.OP.160	Use of headset	30
NCC.OP.165	Carriage of passengers.....	30
NCC.OP.170	Securing of passenger compartment and galley(s)	31
NCC.OP.175	Smoking on board	31
NCC.OP.180	Meteorological conditions.....	31
NCC.OP.185	Ice and other contaminants — ground procedures.....	31
NCC.OP.190	Ice and other contaminants — flight procedures	31
NCC.OP.195	Take-off conditions — aeroplanes and helicopters.....	32
NCC.OP.200	Simulated situations in flight	32
NCC.OP.205	NCC.OP.205 Fuel/energy scheme – in-flight fuel/energy management policy.....	32
NCC.OP.210	Use of supplemental oxygen	33
NCC.OP.215	Ground proximity detection	33
NCC.OP.220	Airborne collision avoidance system (ACAS)	33
NCC.OP.225	Approach and landing conditions — aeroplanes and helicopters.....	33
NCC.OP.230	Commencement and continuation of approach.....	33
NCC.OP.235	EFVS 200 operations.....	34
SUBPART C:	AIRCRAFT PERFORMANCE AND OPERATING LIMITATIONS.....	35
NCC.POL.100	Operating limitations — all aircraft.....	35
NCC.POL.105	Mass and balance, loading.....	35
NCC.POL.110	Mass and balance data and documentation.....	37
NCC.POL.111	Mass and balance data and documentation — alleviations	38
NCC.POL.115	Performance — general	38
NCC.POL.120	Take-off mass limitations — aeroplanes	38
NCC.POL.125	Take-off — aeroplanes.....	38
NCC.POL.130	En-route — one engine inoperative — aeroplanes	39
NCC.POL.135	Landing — aeroplanes	39
SUBPART D:	INSTRUMENTS, DATA AND EQUIPMENT	40
SECTION 1	Aeroplanes.....	40
NCC.IDE.A.100	Instruments and equipment — general	40
NCC.IDE.A.105	Minimum equipment for flight.....	41
NCC.IDE.A.110	Spare electrical fuses	41
NCC.IDE.A.115	Operating lights.....	41
NCC.IDE.A.120	Operations under VFR — flight and navigational instruments and associated equipment.....	41
NCC.IDE.A.125	Operations under IFR — flight and navigational instruments and associated equipment	42
NCC.IDE.A.130	Additional equipment for single-pilot operations under IFR.....	43
NCC.IDE.A.135	Terrain awareness warning system (TAWS)	43
NCC.IDE.A.140	Airborne collision avoidance system (ACAS)	43
NCC.IDE.A.145	Airborne weather detecting equipment	44
NCC.IDE.A.150	Additional equipment for operations in icing conditions at night.....	44
NCC.IDE.A.155	Flight crew interphone system	44
NCC.IDE.A.160	Cockpit voice recorder	44
NCC.IDE.A.165	Flight data recorder	45
NCC.IDE.A.170	Data link recording.....	45
NCC.IDE.A.175	Flight data and cockpit voice combination recorder	46
NCC.IDE.A.180	Seats, seat safety belts, restraint systems and child restraint devices	46
NCC.IDE.A.185	Fasten seat belt and no smoking signs	47

NCC.IDE.A.190	First-aid kit	47
NCC.IDE.A.195	Supplemental oxygen — pressurised aeroplanes	47
NCC.IDE.A.200	Supplemental oxygen — non-pressurised aeroplanes	48
NCC.IDE.A.205	Hand fire extinguishers	48
NCC.IDE.A.206	Crash axe and crowbar	49
NCC.IDE.A.210	Marking of break-in points	49
NCC.IDE.A.215	Emergency locator transmitter (ELT)	49
NCC.IDE.A.220	Flight over water	49
NCC.IDE.A.230	Survival equipment	50
NCC.IDE.A.240	Headset	51
NCC.IDE.A.245	Radio communication equipment	51
NCC.IDE.A.250	Navigation equipment	51
NCC.IDE.A.255	Transponder	51
NCC.IDE.A.260	Management of aeronautical databases	52
NCC.IDE.A.265	Surveillance Equipment	52
SECTION 2 Helicopters	53
NCC.IDE.H.100	Instruments and equipment — general	53
NCC.IDE.H.105	Minimum equipment for flight	54
NCC.IDE.H.115	Operating lights	54
NCC.IDE.H.120	Operations under VFR — flight and navigational instruments and associated equipment	54
NCC.IDE.H.125	Operations under IFR — flight and navigational instruments and associated equipment	55
NCC.IDE.H.130	Additional equipment for single-pilot operations under IFR	56
NCC.IDE.H.145	Airborne weather detecting equipment	56
NCC.IDE.H.150	Additional equipment for operations in icing conditions at night	56
NCC.IDE.H.155	Flight crew interphone system	56
NCC.IDE.H.160	Cockpit voice recorder	56
NCC.IDE.H.165	Flight data recorder	57
NCC.IDE.H.170	Data link recording	57
NCC.IDE.H.175	Flight data and cockpit voice combination recorder	58
NCC.IDE.H.180	Seats, seat safety belts, restraint systems and child restraint devices	58
NCC.IDE.H.185	Fasten seat belt and no smoking signs	58
NCC.IDE.H.190	First-aid kit	59
NCC.IDE.H.200	Supplemental oxygen — non-pressurised helicopters	59
NCC.IDE.H.205	Hand fire extinguishers	59
NCC.IDE.H.210	Marking of break-in points	60
NCC.IDE.H.215	Emergency locator transmitter (ELT)	60
NCC.IDE.H.225	Life-jackets	60
NCC.IDE.H.226	Crew survival suits	60
NCC.IDE.H.227	Life-rafts, survival ELTs and survival equipment on extended overwater flights	61
NCC.IDE.H.230	Survival equipment	61
NCC.IDE.H.232	Helicopters certified for operating on water — miscellaneous equipment	61
NCC.IDE.H.235	All helicopters on flights over water — ditching	62
NCC.IDE.H.240	Headset	62
NCC.IDE.H.245	Radio communication equipment	62
NCC.IDE.H.250	Navigation equipment	62
NCC.IDE.H.255	Transponder	63

NCC.IDE.H.260	Management of aeronautical databases	63
NCC.IDE.H.265	Surveillance Equipment.....	63

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SUBPART A: GENERAL REQUIREMENTS

NCC.GEN.100 The competent authority

For the purpose of TCAR OPS Part NCC, the CAAT is the competent authority exercising oversight, over operators subject to an authorisation obligation and having their principal place of business in the Kingdom of Thailand.

NCC.GEN.101 Additional requirements for flight training organisations

Approved training organisations that are required to comply with this part shall also comply with:

- (a) TCAR OPS Part ORO point ORO.GEN.310, as applicable; and
- (b) TCAR OPS Part ORO point ORO.MLR.105.

NCC.GEN.105 Crew responsibilities

- (a) The crew member shall be responsible for the proper execution of his/her duties that are:
 - (1) related to the safety of the aircraft and its occupants; and
 - (2) specified in the instructions and procedures in the operations manual.
- (b) During critical phases of flight or whenever deemed necessary by the pilot-in-command in the interest of safety, the crew member shall be seated at his/her assigned station and shall not perform any activities other than those required for the safe operation of the aircraft.
- (c) During flight, the flight crew member shall keep his/her safety belt fastened while at his/her station.
- (d) During flight, at least one qualified flight crew member shall remain at the controls of the aircraft at all times.
- (e) The crew member shall not undertake duties on an aircraft:
 - (1) if he/she knows or suspects that he/she is suffering from fatigue as referred to in the latest revision of the 'Notification of the Civil Aviation Authority of Thailand on Flight Time and Flight Duty Period Limitations' and TCAR OPS, as they may be applicable or feels otherwise unfit, to the extent that the flight may be endangered; or
 - (2) when under the influence of psychoactive substances or alcohol or for other reasons as referred to in TCAR OPS and other applicable Kingdom of Thailand Civil Aviation Regulations.
- (f) The crew member who undertakes duties for more than one operator shall:
 - (1) maintain his/her individual records regarding flight and duty times and rest periods as referred to in TCAR OPS Part ORO, Subpart FTL.
 - (2) provide each operator with the data needed to schedule activities in accordance with the applicable FTL requirements.
- (g) The crew member shall report to the pilot-in-command:
 - (1) any fault, failure, malfunction or defect, which he/she believes may affect the airworthiness or safe operation of the aircraft, including emergency systems; and
 - (2) any incident that was endangering, or could endanger, the safety of the operation.

NCC.GEN.106 Pilot-in-command responsibilities and authority

- (a) The pilot-in-command shall be responsible for:
- (1) the safety of the aircraft and of all crew members, passengers and cargo on board during aircraft operations as referred to in the air operations requirements of the Air Navigation Act B.E 2497, TCAR OPS and other Kingdom of Thailand Civil Aviation Regulations as they may be applicable;
 - (2) the initiation, continuation, termination or diversion of a flight in the interest of safety;
 - (3) ensuring that all instructions, operational procedures and checklists are complied with in accordance with the operations manual and as referred to in TCAR OPS and other Kingdom of Thailand Civil Aviation Regulations as they may be applicable.
 - (4) only commencing a flight if he/she is satisfied that all operational limitations referred to in the Air Navigation Act B.E.2497, TCAR OPS and other other Kingdom of Thailand Civil Aviation Regulations as they may be applicable are complied with, as follows:
 - (i) the aircraft is airworthy;
 - (ii) the aircraft is duly registered;
 - (iii) instruments and equipment required for the execution of that flight are installed in the aircraft and are operative, unless operation with inoperative equipment is permitted by the minimum equipment list (MEL) or equivalent document, as required in NCC.IDE.A.105 or NCC.IDE.H.105;
 - (iv) the mass of the aircraft and centre of gravity location are such that the flight can be conducted within the limits prescribed in the airworthiness documentation;
 - (v) all cabin baggage, hold luggage and cargo are properly loaded and secured;
 - (vi) the aircraft operating limitations as specified in the aircraft flight manual (AFM) will not be exceeded at any time during the flight;
 - (vii) each flight crew member holds a valid licence in accordance with TCAR PEL Part FCL;
 - (viii) flight crew members are properly rated and meet competency and recency requirements; and
 - (ix) any navigational database required for performance-based navigation is suitable and current;
 - (5) not commencing a flight if any flight crew member is incapacitated from performing duties by any cause such as injury, sickness, fatigue or the effects of any psychoactive substance;
 - (6) not continuing a flight beyond the nearest weather-permissible aerodrome or operating site, when the capacity of any flight crew member to perform duties is significantly reduced from causes such as fatigue, sickness or lack of oxygen;
 - (7) deciding on acceptance of the aircraft with unserviceabilities in accordance with the configuration deviation list (CDL) or minimum equipment list (MEL), as applicable;
 - (8) recording utilisation data and all known or suspected defects in the aircraft at the termination of the flight, or series of flights, in the aircraft technical log or journey log for the aircraft; and
 - (9) ensuring that:

- (i) flight recorders are not disabled or switched off during flight;
- (ii) in the event of an occurrence other than an accident or a serious incident that shall be reported according to ORO.GEN.160(a), flight recorders' recordings are not intentionally erased; and
- (iii) in the event of an accident or a serious incident, or if preservation of recordings of flight recorders is directed by the investigating authority:
 - (A) flight recorders' recordings are not intentionally erased;
 - (B) flight recorders are deactivated immediately after the flight is completed; and
 - (C) precautionary measures to preserve the recordings of flight recorders are taken before leaving the flight crew compartment.
- (b) The pilot-in-command shall have the authority to refuse carriage of or disembark any person, baggage or cargo that may represent a potential hazard to the safety of the aircraft or its occupants.
- (c) The pilot-in-command shall, as soon as possible, report to the appropriate air traffic services (ATS) unit any hazardous weather or flight conditions encountered that are likely to affect the safety of other aircraft.
- (d) Notwithstanding the provision of (a)(6), in a multi-crew operation the pilot-in-command may continue a flight beyond the nearest weather-permissible aerodrome when adequate mitigating procedures are in place.
- (e) The pilot-in-command shall, in an emergency situation that requires immediate decision and action, take any action he/she considers necessary under the circumstances in accordance with the air operations requirements of the Air Navigation Act B.E 2497 and TCAR OPS. In such cases he/she may deviate from rules, operational procedures and methods in the interest of safety.
- (f) The pilot-in-command shall submit a report of an act of unlawful interference without delay to the CAAT and shall inform the designated local authority.
- (g) The pilot-in-command shall notify the nearest appropriate authority by the quickest available means of any accident involving the aircraft that results in serious injury or death of any person or substantial damage to the aircraft or property.

NCC.GEN.110 Compliance with laws, regulations and procedures

- (a) The pilot-in-command shall comply with the laws, regulations and procedures of those States where operations are conducted.
- (b) The pilot-in-command shall be familiar with the laws, regulations and procedures, pertinent to the performance of his/her duties, prescribed for the areas to be traversed, the aerodromes or operating sites to be used and the related air navigation facilities as referred to in Sections 17, 18, 18/2, 19, 21, 22, 27 of the Air Navigation Act B.E. 2497 and Kingdom of Thailand Civil Aviation Regulation and other national provision as they may be applicable.

NCC.GEN.115 Common language

The operator shall ensure that all crew members can communicate with each other in a common language.

NCC.GEN.119 Taxiing of aircraft

The operator shall establish procedures for taxiing to ensure safe operation and to enhance runway safety.

NCC.GEN.120 Taxiing of aeroplanes

The operator shall ensure that an aeroplane is only taxied on the movement area of an aerodrome if the person at the controls:

- (a) is an appropriately qualified pilot; or
- (b) has been designated by the operator and:
 - (1) is trained to taxi the aeroplane;
 - (2) is trained to use the radio telephone, if radio communications are required;
 - (3) has received instruction in respect of aerodrome layout, routes, signs, marking, lights, air traffic control (ATC) signals and instructions, phraseology and procedures; and
 - (4) is able to conform to the operational standards required for safe aeroplane movement at the aerodrome.

NCC.GEN.125 Rotor engagement — helicopters

A helicopter rotor shall only be turned under power for the purpose of flight with a qualified pilot at the controls.

NCC.GEN.130 Portable electronic devices

The operator shall not permit any person to use a portable electronic device (PED) on board an aircraft that could adversely affect the performance of the aircraft's systems and equipment.

NCC.GEN.131 Use of electronic flight bags (EFBs)

- (a) Where an EFB is used on board an aircraft, the operator shall ensure that it does not adversely affect the performance of the aircraft systems or equipment, or the ability of the flight crew member to operate the aircraft.
- (b) Prior to using a type B EFB application, the operator shall:
 - (1) conduct a risk assessment related to the use of the EFB device that hosts the application and to the EFB application concerned and its associated function(s), identifying the associated risks and ensuring that they are appropriately managed and mitigated; the risk assessment shall address the risks associated with the human-machine interface of the EFB device and the EFB application concerned; and
 - (2) establish an EFB administration system, including procedures and training requirements for the administration and use of the device and the EFB application.

NCC.GEN.135 Information on emergency and survival equipment carried

The operator shall at all times have available for immediate communication to rescue coordination centres (RCCs) lists containing information on the emergency and survival equipment carried on board.

NCC.GEN.140 Documents, manuals and information to be carried

- (a) The following documents, manuals and information shall be carried on each flight as originals or copies unless otherwise specified:
- (1) the AFM, or equivalent document(s);
 - (2) the original certificate of registration;
 - (3) the original certificate of airworthiness (CofA);
 - (4) the noise certificate;
 - (5) the authorisation as specified in TCAR OPS Part ORO Subpart DEC;
 - (6) the list of specific approvals, if applicable;
 - (7) the aircraft radio licence, if applicable;
 - (8) the third party liability insurance certificate(s);
 - (9) the journey log, or equivalent, for the aircraft;
 - (10) details of the filed ATS flight plan, if applicable;
 - (11) current and suitable aeronautical charts for the route of the proposed flight and all routes along which it is reasonable to expect that the flight may be diverted;
 - (12) procedures and visual signals information for use by intercepting and intercepted aircraft;
 - (13) information concerning search and rescue services for the area of the intended flight;
 - (14) the current parts of the operations manual that are relevant to the duties of the crew members, which shall be easily accessible to the crew members;
 - (15) the MEL or CDL;
 - (16) appropriate notices to airmen (NOTAMs) and aeronautical information service (AIS) briefing documentation;
 - (17) appropriate meteorological information;
 - (18) cargo and/or passenger manifests, if applicable (for instance international flight); and
 - (19) any other documentation that may be pertinent to the flight or is required by the States concerned with the flight.
- (b) In case of loss or theft of documents specified in (a)(2) to (a)(8), the operation may continue until the flight reaches its destination or a place where replacement documents can be provided.

NCC.GEN.145 Handling of flight recorder recordings: Preservation, production, protection and use

- (a) Following an accident, a serious incident or an occurrence identified by the investigating authority, the operator of an aircraft shall preserve the original recorded data of the flight recorders for a period of 60 days or until otherwise directed by the investigating authority.
- (b) The operator shall conduct operational checks and evaluations of recordings, to ensure the continued serviceability of the flight recorders which are required to be carried.
- (c) The operator shall ensure that the recordings of flight parameters and data link communication messages required to be recorded on flight recorders are preserved. However, for the purpose

of testing and maintaining those flight recorders, up to 1 hour of the oldest recorded data at the time of testing may be erased.

- (d) The operator shall keep and maintain up to date documentation that presents the necessary information to convert raw flight data into flight parameters expressed in engineering units.
- (e) The operator shall make available any flight recorder recordings that have been preserved, if so determined by the CAAT.
- (f) Without prejudice to the Kingdom of Thailand Civil Aviation occurrence reporting regulation and other relevant national provisions.
 - (1) Except for ensuring flight recorder serviceability, audio recordings from a flight recorder shall not be disclosed or used unless all of the following conditions are fulfilled:
 - (i) a procedure related to the handling of such audio recordings and of their transcript is in place;
 - (ii) all crew members and maintenance personnel concerned have given their prior consent;
 - (iii) such audio recordings are used only for maintaining or improving safety.
 - (1a) When flight recorder audio recordings are inspected for ensuring flight recorder serviceability, the operator shall protect the privacy of those audio recordings and make sure that they are not disclosed or used for purposes other than ensuring flight recorder serviceability.
 - (2) Flight parameters or data link messages recorded by a flight recorder shall not be used for purposes other than for the investigation of an accident or an incident which is subject to mandatory reporting, unless such recordings meet any of the following conditions:
 - (i) are used by the operator for airworthiness or maintenance purposes only;
 - (ii) are de-identified;
 - (iii) are disclosed under secure procedures.
 - (3) Except for ensuring flight recorder serviceability, images of the flight crew compartment that are recorded by a flight recorder shall not be disclosed or used unless all the following conditions are fulfilled:
 - (i) a procedure related to the handling of such image recordings is in place;
 - (ii) all crew members and maintenance personnel concerned have given their prior consent;
 - (iii) such image recordings are used only for maintaining or improving safety.
 - (3a) When images of the flight crew compartment that are recorded by a flight recorder are inspected for ensuring the serviceability of the flight recorder, then:
 - (i) those images shall not be disclosed or used for purposes other than for ensuring flight recorder serviceability;
 - (ii) if body parts of crew members are likely to be visible on the images, the operator shall ensure the privacy of those images.

NCC.GEN.150 Transport of dangerous goods

- (a) The transport of dangerous goods by air shall be conducted in accordance with Annex 18 to the Chicago Convention as last amended and amplified by the *Technical Instructions for the Safe Transport of Dangerous Goods by Air* (ICAO Doc 9284-AN/905), including its supplements and any other addenda or corrigenda.
- (b) Dangerous goods shall only be transported by the operator approved in accordance with TCAR OPS Part SPA, Subpart G except when:
 - (1) they are not subject to the Technical Instructions in accordance with Part 1 of those Instructions; or
 - (2) they are carried by passengers or crew members, or are in baggage, in accordance with Part 8 of the Technical Instructions.
- (c) The operator shall establish procedures to ensure that all reasonable measures are taken to prevent dangerous goods from being carried on board inadvertently.
- (d) The operator shall provide personnel with the necessary information enabling them to carry out their responsibilities, as required by the Technical Instructions.
- (e) The operator shall, in accordance with the Technical Instructions, report without delay to the CAAT and the appropriate authority of the State of occurrence in the event of any dangerous goods accidents or incidents.
- (f) The operator shall ensure that passengers are provided with information about dangerous goods in accordance with the Technical Instructions.
- (g) The operator shall ensure that notices giving information about the transport of dangerous goods are provided at acceptance points for cargo as required by the Technical Instructions.

SUBPART B: OPERATIONAL PROCEDURES

NCC.OP.100 Use of aerodromes and operating sites

The operator shall only use aerodromes and operating sites that are adequate for the type of aircraft and operation concerned.

NCC.OP.101 Altimeter check and settings

- (a) The operator shall establish procedures for altimeter checking before each departure.
- (b) The operator shall establish procedures for altimeter settings for all phases of flight, which shall take into account the procedures established by the State of the aerodrome or the State of the airspace, if applicable

NCC.OP.105 Specification of isolated aerodromes — aeroplanes

For the selection of alternate aerodromes and the fuel/energy planning and in-flight re-planning policy, the operator shall not consider an aerodrome as an isolated aerodrome unless the flying time to the nearest weather- permissible destination alternate aerodrome is more than:

- (a) for aeroplanes with reciprocating engines, 60 minutes; or
- (b) for turbine-engined aeroplanes, 90 minutes.

NCC.OP.110 Aerodrome operating minima — general

- (a) The operator shall establish aerodrome operating minima for each departure, destination or alternate aerodrome that is planned to be used in order to ensure separation of the aircraft from terrain and obstacles and to mitigate the risk of loss of visual references during the visual flight segment of instrument approach operations.
- (b) The method used to establish aerodrome operating minima shall take all the following elements into account:
 - (1) the type, performance, and handling characteristics of the aircraft;
 - (2) the equipment available on the aircraft for the purpose of navigation, acquisition of visual references, and/or control of the flight path during take-off, approach, landing, and missed approach;
 - (3) any conditions or limitations stated in the aircraft flight manual (AFM);
 - (4) the dimensions and characteristics of the runways/final approach and take-off areas (FATOs) that may be selected for use;
 - (5) the adequacy and performance of the available visual and non-visual aids and infrastructure;
 - (6) the obstacle clearance altitude/height (OCA/H) for the instrument approach procedures (IAPs);
 - (7) the obstacles in the climb-out areas and necessary clearance margins;
 - (8) any non-standard characteristics of the aerodrome, the IAP or the environment;
 - (9) the composition of the flight crew, their competence and experience;

- (10) the IAP;
 - (11) the aerodrome characteristics and the available air navigation services (ANS);
 - (12) any minima that may be promulgated by the State of the aerodrome;
 - (13) (13) the conditions prescribed in any specific approvals for low-visibility operations (LVOs) or operations with operational credits; and
 - (14) (14) the relevant operational experience of the operator.
- (c) The operator shall specify a method of determining aerodrome operating minima in the operations manual.

NCC.OP.111 Aerodrome operating minima — NPA, APV, CAT I operations

- (a) The decision height (DH) to be used for a non-precision approach (NPA) flown with the continuous descent final approach (CDFA) technique, approach procedure with vertical guidance (APV) or category I (CAT I) operation shall not be lower than the highest of:
- (1) the minimum height to which the approach aid can be used without the required visual reference;
 - (2) the obstacle clearance height (OCH) for the category of aircraft;
 - (3) the published approach procedure DH where applicable;
 - (4) the system minimum specified in Table 1; or
 - (5) the minimum DH specified in the AFM or equivalent document, if stated.
- (b) The minimum descent height (MDH) for an NPA operation flown without the CDFA technique shall not be lower than the highest of:
- (1) the OCH for the category of aircraft;
 - (2) the system minimum specified in Table 1; or
 - (3) the minimum MDH specified in the AFM, if stated.

Table 1 System minima

Facility	Lowest DH/MDH (ft)
Instrument landing system (ILS)	200
Global navigation satellite system (GNSS)/Satellite-based augmentation system (SBAS) (Lateral precision with vertical guidance approach (LPV))	200
GNSS (Lateral Navigation (LNAV))	250
GNSS/Baro-vertical navigation (VNAV) (LNAV/VNAV)	250
Localiser (LOC) with or without distance measuring equipment (DME)	250
Surveillance radar approach (SRA) (terminating at ½ NM)	250

Facility	Lowest DH/MDH (ft)
SRA (terminating at 1 NM)	300
SRA (terminating at 2 NM or more)	350
VHF omnidirectional radio range (VOR)	300
VOR/DME	250
Non-directional beacon (NDB)	350
NDB/DME	300
VHF direction finder (VDF)	350

NCC.OP.112 Aerodrome operating minima — circling operations with aeroplanes

- (a) The MDH for a circling approach operation with aeroplanes shall not be lower than the highest of:
- (1) the published circling OCH for the aeroplane category;
 - (2) the minimum circling height derived from Table 1; or
 - (3) the DH/MDH of the preceding IAP.
- (b) The minimum visibility for a circling approach operation with aeroplanes shall be the highest of:
- (1) the circling visibility for the aeroplane category, if published; or
 - (2) the minimum visibility derived from Table 1.

Table 1 MDH and minimum visibility for circling vs. aeroplane category

	Aeroplane category			
	A	B	C	D
MDH (ft)	400	500	600	700
Minimum VIS (m)	1500	1600	2400	3600

NCC.OP.113 Aerodrome operating minima — onshore circling operations with helicopters

The MDH for an onshore circling operation with helicopters shall not be lower than 250 ft and the meteorological visibility not less than 800 m.

NCC.OP.115 Departure and approach procedures

- (a) The pilot-in-command shall use the departure and approach procedures established by the State of the aerodrome, if such procedures have been published for the runway or FATO to be used.

- (b) Notwithstanding (a), the pilot-in-command shall only accept an ATC clearance to deviate from a published procedure:
 - (1) provided that obstacle clearance criteria are observed and full account is taken of the operating conditions; or
 - (2) when being radar-vectoring by an ATC unit.
- (c) In any case, the final approach segment shall be flown visually or in accordance with the published approach procedures.

NCC.OP.116 Performance-based navigation — aeroplanes and helicopters

The operator shall ensure that, when PBN is required for the route or procedure to be flown:

- (a) the relevant PBN specification is stated in the AFM or other document that has been approved by the certifying authority as part of an airworthiness assessment or is based on such approval; and
- (b) the aircraft is operated in conformance with the relevant navigation specification and limitations in the AFM or other document mentioned above.

NCC.OP.120 Noise abatement procedures

The operator shall develop operating procedures taking into account the need to minimise the effect of aircraft noise while ensuring that safety has priority over noise abatement.

NCC.OP.125 Minimum obstacle clearance altitudes — IFR flights

- (a) The operator shall specify a method to establish minimum flight altitudes that provide the required terrain clearance for all route segments to be flown in IFR.
- (b) The pilot-in-command shall establish minimum flight altitudes for each flight based on this method. The minimum flight altitudes shall not be lower than that published by the State overflown.

NCC.OP.130 Fuel/energy scheme – aeroplanes and helicopters

- (a) The operator shall establish, implement, and maintain a fuel/energy scheme that comprises:
 - (1) a fuel/energy planning and in-flight re-planning policy; and
 - (2) an in-flight fuel/energy management policy.
- (b) The fuel/energy scheme shall:
 - (1) be appropriate for the type(s) of operation performed; and
 - (2) correspond to the capability of the operator to support its implementation.

NCC.OP.131 Fuel/energy scheme – fuel/energy planning and in-flight re-planning policy – aeroplanes and helicopters

- (a) As part of the fuel/energy scheme, the operator shall establish a fuel/energy planning and in-flight re-planning policy to ensure that the aircraft carries a sufficient amount of usable fuel/energy to safely complete the planned flight and to allow for deviations from the planned operation.

- (b) (b)The operator shall ensure that the fuel/energy planning of flights is based upon at least the following elements:
- (1) (1)procedures contained in the operations manual as well as:
 - (i) current aircraft-specific data derived from a fuel/energy consumption monitoring system, or, if not available;
 - (ii) (data provided by the aircraft manufacturer; and
 - (2) the operating conditions under which the flight is to be conducted including:
 - (i) aircraft fuel/energy consumption data;
 - (ii) anticipated masses;
 - (iii) anticipated meteorological conditions;
 - (iv) the effects of deferred maintenance items or configuration deviations, or both; and
 - (v) anticipated delays.
- (c) For aeroplanes, the operator shall ensure that the pre-flight calculation of the usable fuel/energy that is required for a flight includes:
- (1) taxi fuel/energy that shall not be less than the amount expected to be used prior to take-off;
 - (2) trip fuel/energy that shall be the amount of fuel/energy that is required to enable the aeroplane to fly from take-off, or from the point of in-flight re-planning, to landing at the destination aerodrome;
 - (3) contingency fuel/energy that shall be the amount of fuel/energy required to compensate for unforeseen factors;
 - (4) destination alternate fuel/energy:..
 - (i) when a flight is operated with at least one destination alternate aerodrome, it shall be the amount of fuel/energy required to fly from the destination aerodrome to the destination alternate aerodrome; or
 - (ii) when a flight is operated with no destination alternate aerodrome, it shall be the amount of fuel/energy required to hold at the destination aerodrome to compensate for the lack of a destination alternate aerodrome;
 - (5) final reserve fuel/energy that shall be the amount of fuel/energy that is calculated at holding speed at 1 500ft (450 m) above the aerodrome elevation in standard conditions according to the aircraft estimated mass on arrival at the destination alternate aerodrome, or destination aerodrome when no destination alternate aerodrome is required, and shall not be less than:
 - (i) for aeroplanes with reciprocating engines on visual flight rules (VFR) flights by night and instrument flight rules (IFR) flights, the fuel/energy to fly for 45 minutes; or
 - (ii) for aeroplanes with reciprocating engines on VFR flights by day, the fuel/energy to fly for 30 minutes;
 - (iii) for turbine-engined aeroplanes, the fuel/energy to fly for 30 minutes;
 - (6) additional fuel/energy, if required by the type of operation; it shall be the amount of fuel/energy to enable the aeroplane to perform a safe landing at a fuel/energy en route

- alternate aerodrome (fuel/energy ERA aerodrome critical scenario) in the event of an engine failure or loss of pressurisation, whichever requires the greater amount of fuel/energy, based on the assumption that such a failure occurs at the most critical point along the route; this additional fuel/energy is required only if the minimum amount of fuel/energy that is calculated according to points (c)(2) to (c)(5) is not sufficient for such an event;
- (7) extra fuel/energy to take into account anticipated delays or specific operational constraints; and
 - (8) discretionary fuel/energy, if required by the commander.
- (d) For helicopters, the operator shall ensure that the pre-flight calculation of the usable fuel/energy that is required for a flight includes all of the following:
- (1) fuel/energy to fly to the aerodrome or operating site of intended landing;
 - (2) if a destination alternate is required, destination alternate fuel/energy, which shall be the amount of fuel/energy that is required to execute a missed approach at the aerodrome or operating site of intended landing, and thereafter, to fly to the specified destination alternate, approach and land; and
 - (3) final reserve fuel/energy, which shall not be less than:
 - (i) for flights under VFR, fuel/energy to fly for at least 20 minutes at best-range speed; or
 - (ii) for IFR flights, fuel/energy to fly for at least 30 minutes at holding speed at 450 m (1 500ft) above the aerodrome or operating site of intended landing or destination alternate in standard temperature conditions.
- (e) The operator shall ensure that if a flight has to proceed to a destination aerodrome other than the one originally planned, in-flight re-planning procedures for calculating the required usable fuel/energy are available and comply with points (c)(2) to (c)(7) for aeroplanes, and point (d) for helicopters.
- (f) The pilot in command shall only commence a flight or continue in the event of in-flight re-planning, when satisfied that the aircraft carries at least the planned amount of usable fuel/energy and oil to safely complete the flight.

NCC.OP.135 Stowage of baggage and cargo

The operator shall establish procedures to ensure that:

- (a) only hand baggage that can be adequately and securely stowed is taken into the passenger compartment; and
- (b) all baggage and cargo on board that might cause injury or damage, or obstruct aisles and exits if displaced, is stowed so as to prevent movement.

NCC.OP.140 Passenger briefing

The pilot-in-command shall ensure that:

- (a) prior to take-off passengers have been made familiar with the location and use of the following:
 - (1) seat belts;
 - (2) emergency exits; and

- (3) passenger emergency briefing cards;
and if applicable:
- (4) life-jackets;
- (5) oxygen dispensing equipment;
- (6) life-rafts; and
- (7) other emergency equipment provided for individual passenger use;
and
- (b) in an emergency during flight, passengers are instructed in such emergency action as may be appropriate to the circumstances.

NCC.OP.145 Flight preparation

- (a) Before commencing a flight, the pilot-in-command shall ascertain by every reasonable means available that the space-based facilities, ground and/or water facilities, including communication facilities and navigation aids available and directly required on such flight, for the safe operation of the aircraft, are adequate for the type of operation under which the flight is to be conducted.
- (b) Before commencing a flight, the pilot-in-command shall be familiar with all available meteorological information appropriate to the intended flight. Preparation for a flight away from the vicinity of the place of departure, and for every flight under IFR, shall include:
 - (1) a study of the available current meteorological reports and forecasts; and
 - (2) the planning of an alternative course of action to provide for the eventuality that the flight cannot be completed as planned, because of meteorological conditions.

NCC.OP.147 Destination alternate aerodromes planning minima — aeroplanes

An aerodrome shall not be specified as a destination alternate aerodrome unless the available current meteorological information indicates, for the period from 1 hour before until 1 hour after the estimated time of arrival, or from the actual time of departure to 1 hour after the estimated time of arrival, whichever is the shorter period:

- (a) for an alternate aerodrome with an available instrument approach operation with DH less than 250 ft
 - (1) a ceiling of at least 200 ft above the DH or MDH associated with the instrument approach operation; and
 - (2) a visibility of at least the higher of 1 500m and 800 m above the instrument approach operation RVR/VIS minima; or
- (b) for an alternate aerodrome with an instrument approach operation with DH or MDH 250 ft or more,
 - (1) a ceiling of at least 400 ft above the DH or MDH associated with the instrument approach operation; and
 - (2) a visibility of at least 3 000m; or
- (c) for an alternate aerodrome without an instrument approach procedure,
 - (1) a ceiling of at least the higher of 2 000ft and the minimum safe IFR height; and

- (2) a visibility of at least 5 000m.

NCC.OP.148 Destination alternate aerodrome planning minima — helicopters

The operator shall only select an aerodrome as a destination alternate aerodrome if the available current meteorological information indicates, for the period from 1 hour before until 1 hour after the estimated time of arrival, or from the actual time of departure to 1 hour after the estimated time of arrival, whichever is the shorter period;

- (a) for an alternate aerodrome with an instrument approach procedure (IAP):
 - (1) a ceiling of at least 200 ft above the DH or MDH associated with the IAP; and
 - (2) a visibility of at least 1 500 m by day or 3 000 m by night; or
- (b) for an alternate aerodrome without an IAP:
 - (1) a ceiling of at least 2 000 ft or the minimum safe IFR height — whichever is greater; and
 - (2) a visibility of at least 1 500 m by day or 3 000 m by night.

NCC.OP.150 Take-off alternate aerodromes — aeroplanes

- (a) For IFR flights, the pilot-in-command shall specify at least one weather-permissible take-off alternate aerodrome in the flight plan if the meteorological conditions at the aerodrome of departure are at or below the applicable aerodrome operating minima or if it would not be possible to return to the aerodrome of departure for other reasons.
- (b) The take-off alternate aerodrome shall be located within the following distance from the aerodrome of departure:
 - (1) for aeroplanes having two engines, not more than a distance equivalent to a flight time of 1 hour at the single-engine cruise speed in still air standard conditions; and
 - (2) for aeroplanes having three or more engines, not more than a distance equivalent to a flight time of 2 hours at the one-engine-inoperative (OEI) cruise speed according to the AFM in still air standard conditions.
- (c) For an aerodrome to be selected as a take-off alternate aerodrome the available information shall indicate that, at the estimated time of use, the conditions will be at or above the aerodrome operating minima for that operation.

NCC.OP.151 Destination alternate aerodromes — aeroplanes

For IFR flights, the pilot-in-command shall specify at least one weather-permissible destination alternate aerodrome in the flight plan, unless:

- (a) the available current meteorological information indicates that, for the period from 1 hour before until 1 hour after the estimated time of arrival, or from the actual time of departure to 1 hour after the estimated time of arrival, whichever is the shorter period, the approach and landing may be made under visual meteorological conditions (VMC); or
- (b) the place of intended landing is designated as an isolated aerodrome and:
 - (1) an instrument approach procedure is prescribed for the aerodrome of intended landing; and

- (2) available current meteorological information indicates that the following meteorological conditions will exist from 2 hours before to 2 hours after the estimated time of arrival:
 - (i) a cloud base of at least 300 m (1 000ft) above the minimum associated with the instrument approach procedure; and
 - (ii) visibility of at least 5,5 km or of 4 km more than the minimum associated with the procedure.

NCC.OP.152 Destination alternate aerodromes — helicopters

For IFR flights, the pilot-in-command shall specify at least one weather-permissible destination alternate in the flight plan, unless:

- (a) an instrument approach procedure is prescribed for the aerodrome of intended landing and the available current meteorological information indicates that the following meteorological conditions will exist from 2 hours before to 2 hours after the estimated time of arrival, or from the actual time of departure to 2 hours after the estimated time of arrival, whichever is the shorter period:
 - (1) a cloud base of at least 120 m (400 ft) above the minimum associated with the instrument approach procedure; and
 - (2) visibility of at least 1500 m more than the minimum associated with the procedure; or
- (b) the place of intended landing is isolated and:
 - (1) an instrument approach procedure is prescribed for the aerodrome of intended landing;
 - (2) available current meteorological information indicates that the following meteorological conditions will exist from 2 hours before to 2 hours after the estimated time of arrival:
 - (i) the cloud base is at least 120 m (400 ft) above the minimum associated with the instrument approach procedure;
 - (ii) visibility is at least 1 500 m more than the minimum associated with the procedure;

NCC.OP.153 Destination aerodromes — instrument approach operations

The pilot-in-command shall ensure that sufficient means are available to navigate and land at the destination aerodrome or at any destination alternate aerodrome in the case of loss of capability for the intended approach and landing operation.

NCC.OP.155 Refuelling with passengers embarking, on board or disembarking

- (a) The aircraft shall not be refuelled with aviation gasoline (AVGAS) or wide-cut type fuel or a mixture of these types of fuel, when passengers are embarking, on board or disembarking.
- (b) For all other types of fuel/energy, necessary precautions shall be taken and the aircraft shall be properly manned by qualified personnel ready to initiate and direct an evacuation of the aircraft by the most practical and expeditious means available.

NCC.OP.157 Refuelling with engine(s) and/or rotors turning – helicopters

- (a) Refuelling with engine(s) and/or rotors turning shall only be conducted:
 - (1) with no passengers embarking or disembarking;
 - (2) if the operator of the aerodrome/operating site allows such operations;
 - (3) in accordance with any specific procedures and limitations in the aircraft flight manual (AFM);
 - (4) with JET A or JET A-1 fuel types; and
 - (5) in the presence of the appropriate rescue and firefighting (RFF) facilities or equipment.
- (b) The operator shall assess the risks associated with refuelling with engine(s) and/or rotors turning.
- (c) The operator shall establish appropriate procedures to be followed by all involved personnel, such as crew members and ground operations personnel.
- (d) The operator shall train its crew members and ensure that the involved ground operations personnel is trained appropriately.
- (e) The operator shall ensure that the helicopter refuelling procedure with engine(s) and/or rotors turning are specified in the operations manual. This procedure and any change thereto shall require prior approval by the competent authority.

NCC.OP.160 Use of headset

- (a) Each flight crew member required to be on duty in the flight crew compartment shall wear a headset with boom microphone or equivalent. The headset shall be used as the primary device for voice communications with ATS:
 - (1) when on the ground:
 - (i) when receiving the ATC departure clearance via voice communication; and
 - (ii) when engines are running;
 - (2) when in flight:
 - (i) below transition altitude; or
 - (ii) 10 000 ft, whichever is higher; and
 - (3) whenever deemed necessary by the pilot in command.
- (b) In the conditions of (a), the boom microphone or equivalent shall be in a position that permits its use for two-way radio communications.

NCC.OP.165 Carriage of passengers

The operator shall establish procedures to ensure that:

- (a) passengers are seated where, in the event that an emergency evacuation is required, they are able to assist and not hinder evacuation of the aircraft;
- (b) prior to and during taxiing, take-off and landing, and whenever deemed necessary in the interest of safety by the pilot-in-command, each passenger on board occupies a seat or berth and has his/her safety belt or restraint device properly secured; and
- (c) multiple occupancy is only allowed on specified aircraft seats occupied by one adult and one infant properly secured by a supplementary loop belt or other restraint device.

NCC.OP.170 Securing of passenger compartment and galley(s)

The pilot-in-command shall ensure that:

- (a) before taxiing, take-off and landing, all exits and escape paths are unobstructed; and
- (b) before take-off and landing, and whenever deemed necessary in the interest of safety, all equipment and baggage are properly secured.

NCC.OP.175 Smoking on board

The pilot-in-command shall not allow smoking on board:

- (a) whenever considered necessary in the interest of safety;
- (b) during refuelling of the aircraft;
- (c) while the aircraft is on the surface unless the operator has determined procedures to mitigate the risks during ground operations;
- (d) outside designated smoking areas, in the aisle(s) and lavatory(ies);
- (e) in cargo compartments and/or other areas where cargo is carried that is not stored in flame-resistant containers or covered by flame-resistant canvas; and
- (f) in those areas of the passenger compartments where oxygen is being supplied.

NCC.OP.180 Meteorological conditions

- (a) The pilot-in-command shall only commence or continue a VFR flight if the latest available meteorological information indicates that the weather conditions along the route and at the intended destination at the estimated time of use will be at or above the applicable VFR operating minima.
- (b) The pilot-in-command shall only commence or continue an IFR flight towards the planned destination aerodrome if the latest available meteorological information indicates that, at the estimated time of arrival, the weather conditions at the destination and at least one destination alternate aerodrome are at or above the applicable aerodrome operating minima.
- (c) If a flight contains VFR and IFR segments, the meteorological information referred to in (a) and (b) shall be applicable as far as relevant.

NCC.OP.185 Ice and other contaminants — ground procedures

- (a) The operator shall establish procedures to be followed when ground de-icing and anti-icing and related inspections of the aircraft are necessary to allow the safe operation of the aircraft.
- (b) The pilot-in-command shall only commence take-off if the aircraft is clear of any deposit that might adversely affect the performance or controllability of the aircraft, except as permitted under the procedures referred to in (a) and in accordance with the AFM.

NCC.OP.190 Ice and other contaminants — flight procedures

- (a) The operator shall establish procedures for flights in expected or actual icing conditions.
- (b) The pilot-in-command shall only commence a flight or intentionally fly into expected or actual icing conditions if the aircraft is certified and equipped to cope with such conditions as referred

to in the air operations requirements of the Air Navigation Act B.E 2497 and Kingdom of Thailand Civil Aviation Regulations, including TCAR OPS.

- (c) If icing exceeds the intensity of icing for which the aircraft is certified or if an aircraft not certified for flight in known icing conditions encounters icing, the pilot-in-command shall exit the icing conditions without delay, by a change of level and/or route, and if necessary by declaring an emergency to ATC.

NCC.OP.195 Take-off conditions — aeroplanes and helicopters

Before commencing take-off, the pilot-in-command shall be satisfied that:

- (a) the meteorological conditions at the aerodrome or the operating site and the condition of the runway/FATO intended to be used will not prevent a safe take-off and departure; and
- (b) the selected aerodrome operating minima are consistent with all of the following:
 - (1) the operative ground equipment;
 - (2) the operative aircraft systems;
 - (3) the aircraft performance;
 - (4) flight crew qualifications.

NCC.OP.200 Simulated situations in flight

- (a) The pilot-in-command shall, when carrying passengers or cargo, not simulate:
 - (1) situations that require the application of abnormal or emergency procedures; or
 - (2) flight in instrument meteorological conditions (IMC).
- (b) Notwithstanding (a), when training flights are conducted by an approved training organisation, referred to in TCAR PEL such situations may be simulated with student pilots on-board.

NCC.OP.205 NCC.OP.205 Fuel/energy scheme – in-flight fuel/energy management policy

- (a) The operator shall establish procedures to ensure that in-flight fuel/energy checks and fuel/energy management are performed.
- (b) The pilot-in-command shall monitor the amount of usable fuel/energy remaining on board to ensure that it is protected and not less than the fuel/energy that is required to proceed to an aerodrome or operating site where a safe landing can be made.
- (c) The pilot-in-command shall advise air traffic control (ATC) of a 'minimum fuel/energy' state by declaring 'MINIMUM FUEL' when the pilot-in-command has:
 - (1) committed to land at a specific aerodrome or operating site; and
 - (2) calculated that any change to the existing clearance to that aerodrome or operating site, or other air traffic delays, may result in landing with less than the planned final reserve fuel/energy.
- (d) The pilot-in-command shall declare a situation of 'fuel/energy emergency' by broadcasting 'MAYDAY MAYDAY MAYDAY FUEL' when the usable fuel/energy estimated to be available upon landing at the nearest aerodrome or operating site where a safe landing can be made is less than the planned final reserve fuel/energy.

NCC.OP.210 Use of supplemental oxygen

The pilot-in-command shall ensure that he/she and flight crew members engaged in performing duties essential to the safe operation of an aircraft in flight use supplemental oxygen continuously whenever the cabin altitude exceeds 10 000 ft for a period of more than 30 minutes and whenever the cabin altitude exceeds 13 000 ft.

NCC.OP.215 Ground proximity detection

When undue proximity to the ground is detected by a flight crew member or by a ground proximity warning system, the pilot flying shall take corrective action immediately in order to establish safe flight conditions.

NCC.OP.220 Airborne collision avoidance system (ACAS)

The operator shall establish operational procedures and training programs when ACAS is installed and serviceable so that the flight crew is appropriately trained in the avoidance of collisions and competent in the use of ACAS II equipment.

NCC.OP.225 Approach and landing conditions — aeroplanes and helicopters

- (a) the meteorological conditions at the aerodrome or the operating site and the condition of the runway/FATO intended to be used will not prevent a safe approach, landing or go-around, considering the performance information contained in the operations manual; and
- (b) the selected aerodrome operating minima are consistent with all of the following:
 - (1) the operative ground equipment;
 - (2) the operative aircraft systems;
 - (3) the aircraft performance; and
 - (4) flight crew qualifications.

NCC.OP.230 Commencement and continuation of approach

- (a) For aeroplanes, if the reported visibility (VIS) or controlling RVR for the runway to be used for landing is less than the applicable minimum, then an instrument approach operation shall not be continued:
 - (1) past a point at which the aeroplane is 1 000ft above the aerodrome elevation; or
 - (2) into the final approach segment (FAS) if the DH or MDH is higher than 1 000ft..
- (b) For helicopters, if the reported RVR is less than 550 m and the controlling RVR for the runway to be used for landing is less than the applicable minimum, then an instrument approach operation shall not be continued:
 - (1) past a point at which the helicopter is 1 000ft above the aerodrome elevation; or
 - (2) into the FAS if the DH or MDH is higher than 1 000ft.
- (c) If the required visual reference is not established, a missed approach shall be executed at or before the DA/H or the MDA/H.
- (d) If the required visual reference is not maintained after DA/H or MDA/H, a go-around shall be executed promptly.

- (e) Notwithstanding point (a), in the case where no RVR is reported, and the reported VIS is less than the applicable minimum, but the converted meteorological visibility (CMV) is equal or greater than the applicable minimum, then the instrument approach can be continued to the DA/H or MDA/H.
- (f) Notwithstanding points (a) and (b), if there is no intention to land, the instrument approach may be continued to the DA/H or the MDA/H. A missed approach shall be executed at or before the DA/H or the MDA/H.

NCC.OP.235 EFVS 200 operations

- (a) An operator that intends to conduct EFVS 200 operations with operational credits and without a specific approval shall ensure that:
 - (1) the aircraft is certified for the intended operations;
 - (2) only runways, FATOs and IAPs suitable for EFVS operations are used;
 - (3) the flight crew members are competent to conduct the intended operation, and a training and checking programme for the flight crew members and relevant personnel involved in the flight preparation is established;
 - (4) operating procedures are established;
 - (5) any relevant information is documented in the minimum equipment list (MEL);
 - (6) any relevant information is documented in the maintenance programme;
 - (7) safety assessments are carried out and performance indicators are established to monitor the level of safety of the operation; and
 - (8) the aerodrome operating minima take into account the capability of the system used.
 - (9) The operator shall not conduct EFVS 200 operations when conducting LVOs.
 - (10) Notwithstanding point (a)(1), the operator may use EVSs meeting the minimum criteria to conduct EFVS 200 operations, provided that this is approved by the CAAT

SUBPART C: AIRCRAFT PERFORMANCE AND OPERATING LIMITATIONS

NCC.POL.100 Operating limitations — all aircraft

- (a) During any phase of operation, the loading, the mass and the centre of gravity (CG) position of the aircraft shall comply with any limitation specified in the AFM, or the operations manual, if more restrictive.
- (b) Placards, listings, instrument markings, or combinations thereof, containing those operating limitations prescribed by the AFM for visual presentation, shall be displayed in the aircraft.

NCC.POL.105 Mass and balance, loading

- (a) The operator shall establish the mass and the CG of any aircraft by actual weighing prior to initial entry into service. The accumulated effects of modifications and repairs on the mass and balance shall be accounted for and properly documented. Aircraft shall be reweighed if the effect of modifications on the mass and balance is not accurately known.
- (b) The weighing shall be accomplished by the manufacturer of the aircraft or by an approved maintenance organisation.
- (c) The operator shall determine the mass of all operating items and crew members included in the aircraft dry operating mass by actual weighing, including any crew baggage, or by using standard masses. The influence of their position on the aircraft's CG shall be determined. When using standard masses the following mass values for crew members shall be used to determine the dry operating mass:
 - (1) 85 kg, including hand baggage, for flight crew/technical crew members; and
 - (2) 75 kg for cabin crew members.
- (d) The operator shall establish procedures to enable the pilot-in-command to determine the mass of the traffic load, including any ballast, by:
 - (1) actual weighing;
 - (2) determining the mass of the traffic load in accordance with standard passenger and baggage masses; or
 - (3) calculating passenger mass on the basis of a statement by, or on behalf of, each passenger and adding to it a predetermined mass to account for hand baggage and clothing, when the number of passenger seats available on the aircraft is:
 - (i) less than 10 for aeroplanes; or
 - (ii) less than six for helicopters.
- (e) When using standard masses the following mass values shall be used:
 - (1) for passengers, those in Tables 1 and 2, where hand baggage and the mass of any infant carried by an adult on one passenger seat are included:

Table 1 Standard masses for passengers — aircraft with a total number of passenger seats of 20 or more

Passenger seats	20 and more		30 and more
	Male	Female	All adult
Adults	88 kg	70 kg	84 kg
Children	35 kg	35 kg	35 kg

Table 2 Standard masses for passengers — aircraft with a total number of passenger seats of 19 or less

Passenger seats	1 – 5	6 – 9	10 – 19
Male	104 kg	96 kg	92 kg
Female	86 kg	78 kg	74 kg
Children	35 kg	35 kg	35 kg

- (2) for baggage:
- (i) for aeroplanes, when the total number of passenger seats available on the aeroplane is 20 or more, standard mass values for checked baggage in Table 3;

Table 3 Standard masses for baggage — aeroplanes with a total number of passenger seats of 20 or more

Type of flight	Baggage standard mass
Domestic	11 kg
Within the S.E Asia region	13 kg
Intercontinental	15 kg
All other	13 kg

- (ii) for helicopters, when the total number of passenger seats available on the helicopters is 20 or more, the standard mass value for checked baggage of 13 kg.

- (f) For aircraft with 19 passenger seats or less, the actual mass of checked baggage shall be determined:
 - (1) by weighing; or
 - (2) by calculation on the basis of a statement by, or on behalf of, each passenger. Where this is impractical, a minimum standard mass of 13 kg shall be used.
- (g) The operator shall establish procedures to enable the pilot-in-command to determine the mass of the fuel load by using the actual density or, if not known, the density calculated in accordance with a method specified in the operations manual.
- (h) The pilot-in-command shall ensure that the loading of:
 - (1) the aircraft is performed under the supervision of qualified personnel; and
 - (2) traffic load is consistent with the data used for the calculation of the aircraft mass and balance.
- (i) The operator shall establish procedures to enable the pilot-in-command to comply with additional structural limits such as the floor strength limitations, the maximum load per running metre, the maximum mass per cargo compartment and the maximum seating limit.
- (j) The operator shall specify, in the operations manual, the principles and methods involved in the loading and in the mass and balance system that meet the requirements contained in (a) to (i). This system shall cover all types of intended operations.

NCC.POL.110 Mass and balance data and documentation

- (a) The operator shall establish mass and balance data and produce mass and balance documentation prior to each flight specifying the load and its distribution in such a way that the mass and balance limits of the aircraft are not exceeded. The mass and balance documentation shall contain the following information:
 - (1) aircraft registration and type;
 - (2) flight identification, number and date, as applicable;
 - (3) name of the pilot-in-command;
 - (4) name of the person who prepared the document;
 - (5) dry operating mass and the corresponding CG of the aircraft;
 - (6) mass of the fuel/energy at take-off and mass of trip fuel/energy;
 - (7) mass of consumables other than fuel/energy, if applicable;
 - (8) load components including passengers, baggage, freight, and ballast;
 - (9) take-off mass, landing mass, and zero fuel/energy mass.
- (b) Where mass and balance data and documentation are generated by a computerised mass and balance system, the operator shall verify the integrity of the output data.
- (c) When the loading of the aircraft is not supervised by the pilot-in-command, the person supervising the loading of the aircraft shall confirm by hand signature or equivalent that the load and its distribution are in accordance with the mass and balance documentation established by the pilot-in-command. The pilot-in-command shall indicate his/her acceptance by hand signature or equivalent.

- (d) The operator shall specify procedures for last minute changes to the load to ensure that:
- (1) any last minute change after the completion of the mass and balance documentation is entered in the flight planning documents containing the mass and balance documentation;
 - (2) the maximum last minute change allowed in passenger numbers or hold load is specified; and
 - (3) new mass and balance documentation is prepared if this maximum number is exceeded.

NCC.POL.111 Mass and balance data and documentation — alleviations

Notwithstanding NCC.POL.110 (a)(5), the CG position may not need to be on the mass and balance documentation, if the load distribution is in accordance with a pre-calculated balance table or if it can be shown that for the planned operations a correct balance can be ensured, whatever the real load is.

NCC.POL.115 Performance — general

The pilot-in-command shall only operate the aircraft if the performance is adequate to comply with the Kingdom of Thailand or other applicable rules of the air and any other restrictions applicable to the flight, the airspace or the aerodromes or operating sites used, taking into account the charting accuracy of any charts and maps used.

NCC.POL.120 Take-off mass limitations — aeroplanes

The operator shall ensure that:

- (a) the mass of the aeroplane at the start of take-off shall not exceed the mass limitations:
- (1) at take-off as required in NCC.POL.125;
 - (2) en-route with one engine inoperative (OEI) as required in NCC.POL.130; and
 - (3) at landing as required in NCC.POL.135;
- allowing for expected reductions in mass as the flight proceeds and for fuel jettisoning;
- (b) the mass at the start of take-off shall never exceed the maximum take-off mass specified in the AFM for the pressure altitude appropriate to the elevation of the aerodrome or operating site, and if used as a parameter to determine the maximum take-off mass, any other local atmospheric condition; and
- (c) the estimated mass for the expected time of landing at the aerodrome or operating site of intended landing and at any destination alternate aerodrome shall never exceed the maximum landing mass specified in the AFM for the pressure altitude appropriate to the elevation of those aerodromes or operating sites, and if used as a parameter to determine the maximum landing mass, any other local atmospheric condition.

NCC.POL.125 Take-off — aeroplanes

- (a) When determining the maximum take-off mass, the pilot-in-command shall take the following into account:
- (1) the calculated take-off distance shall not exceed the take-off distance available with a clearway distance not exceeding half of the take-off run available;
 - (2) the calculated take-off run shall not exceed the take-off run available;

- (3) a single value of V_1 shall be used for the rejected and continued take-off, where a V_1 is specified in the AFM; and
- (4) on a wet or contaminated runway, the take-off mass shall not exceed that permitted for a take-off on a dry runway under the same conditions.
- (b) Except for an aeroplane equipped with turboprop engines and a maximum take-off mass at or below 5 700 kg, in the event of an engine failure during take-off, the pilot-in-command shall ensure that the aeroplane is able:
 - (1) to discontinue the take-off and stop within the accelerate-stop distance available or the runway available; or
 - (2) to continue the take-off and clear all obstacles along the flight path by an adequate margin until the aeroplane is in a position to comply with NCC.POL.130.

NCC.POL.130 En-route — one engine inoperative — aeroplanes

The pilot-in-command shall ensure that in the event of an engine becoming inoperative at any point along the route, a multi-engined aeroplane shall be able to continue the flight to an adequate aerodrome or operating site without flying below the minimum obstacle clearance altitude at any point.

NCC.POL.135 Landing — aeroplanes

The pilot-in-command shall ensure that at any aerodrome or operating site, after clearing all obstacles in the approach path by a safe margin, the aeroplane shall be able to land and stop, or a seaplane to come to a satisfactorily low speed, within the landing distance available. Allowance shall be made for expected variations in the approach and landing techniques, if such allowance has not been made in the scheduling of performance data.

SUBPART D: INSTRUMENTS, DATA AND EQUIPMENT

SECTION 1 Aeroplanes

NCC.IDE.A.100 Instruments and equipment — general

- (a) Instruments and equipment required by this Subpart shall be approved in accordance with the applicable airworthiness requirements if they are:
 - (1) used by the flight crew to control the flight path;
 - (2) used to comply with NCC.IDE.A.245;
 - (3) used to comply with NCC.IDE.A.250; or
 - (4) installed in the aeroplane.
- (b) The following items, when required by this Subpart, do not need an equipment approval:
 - (1) spare fuses;
 - (2) independent portable lights;
 - (3) an accurate time piece;
 - (4) chart holder;
 - (5) first-aid kits;
 - (6) survival and signalling equipment;
 - (7) sea anchor and equipment for mooring; and
 - (8) child restraint device.
- (c) Instruments and equipment or accessories not required under this TCAR OPS Part NCC as well as any other equipment which is not required under this Regulation, but carried on a flight, shall comply with the following requirements:
 - (1) the information provided by those instruments, equipment or accessories shall not be used by the flight crew members to comply with requirements of the Air Navigation Act B.E. 2497, Kingdom of Thailand Civil Aviation Regulations or points NCC.IDE.A.245 and NCC.IDE.A.250 of this TCAR Part;
 - (2) the instruments and equipment shall not affect the airworthiness of the aeroplane, even in the case of failures or malfunction.
- (d) Instruments and equipment shall be readily operable or accessible from the station where the flight crew member that needs to use it is seated.
- (e) Those instruments that are used by a flight crew member shall be so arranged as to permit the flight crew member to see the indications readily from his/her station, with the minimum practicable deviation from the position and line of vision which he/she normally assumes when looking forward along the flight path.
- (f) All required emergency equipment shall be easily accessible for immediate use.

NCC.IDE.A.105 Minimum equipment for flight

A flight shall not be commenced when any of the aeroplane's instruments, items of equipment, or functions, required for the intended flight are inoperative or missing, unless:

- (a) the aeroplane is operated in accordance with the operator's minimum equipment list (MEL);
- (b) the operator is approved by the CAAT to operate the aeroplane within the constraints of the master minimum equipment list ("MMEL") in accordance with TCAR OPS Part ORO point ORO.MLR.105(j); or
- (c) the aeroplane is subject to a permit to fly issued in accordance with the applicable airworthiness requirements.

NCC.IDE.A.110 Spare electrical fuses

Aeroplanes shall be equipped with spare electrical fuses, of the ratings required for complete circuit protection, for replacement of those fuses that are allowed to be replaced in flight.

NCC.IDE.A.115 Operating lights

Aeroplanes operated at night shall be equipped with:

- (a) an anti-collision light system;
- (b) navigation/position lights;
- (c) a landing light;
- (d) lighting supplied from the aeroplane's electrical system to provide adequate illumination for all instruments and equipment essential to the safe operation of the aeroplane;
- (e) lighting supplied from the aeroplane's electrical system to provide illumination in all passenger compartments;
- (f) an independent portable light for each crew member station; and
- (g) lights to conform with the International Regulations for Preventing Collisions at Sea if the aeroplane is operated as a seaplane.

NCC.IDE.A.120 Operations under VFR — flight and navigational instruments and associated equipment

- (a) Aeroplanes operated under VFR by day shall be equipped with a means of measuring and displaying the following:
 - (1) magnetic-heading;
 - (2) time in hours, minutes and seconds;
 - (3) barometric altitude;
 - (4) indicated airspeed;
 - (5) slip; and
 - (6) Mach number whenever speed limitations are expressed in terms of Mach number.
- (b) Aeroplanes operated under visual meteorological conditions (VMC) over water and out of sight of the land, or under VMC at night, or in conditions where the aeroplane cannot be maintained in a

desired flight path without reference to one or more additional instruments, shall be, in addition to (a), equipped with:

- (1) a means of measuring and displaying the following:
 - (i) turn and slip;
 - (ii) attitude;
 - (iii) vertical speed; and
 - (iv) stabilised heading;
 - (2) a means of indicating when the supply of power to the gyroscopic instruments is not adequate; and
 - (3) a means of preventing malfunction of the airspeed indicating system required in (a)(4) due to condensation or icing.
- (c) Whenever two pilots are required for the operation, aeroplanes shall be equipped with an additional separate means of displaying the following:
- (1) barometric altitude;
 - (2) indicated airspeed;
 - (3) slip, or turn and slip, as applicable;
 - (4) attitude, if applicable;
 - (5) vertical speed, if applicable;
 - (6) stabilised heading, if applicable; and
 - (7) Mach number whenever speed limitations are expressed in terms of Mach number, if applicable.

NCC.IDE.A.125 Operations under IFR — flight and navigational instruments and associated equipment

Aeroplanes operated under IFR shall be equipped with:

- (a) a means of measuring and displaying the following:
- (1) magnetic heading;
 - (2) time in hours, minutes and seconds;
 - (3) barometric altitude;
 - (4) indicated airspeed;
 - (5) vertical speed;
 - (6) turn and slip;
 - (7) attitude;
 - (8) stabilised heading;
 - (9) outside air temperature; and
 - (10) Mach number whenever speed limitations are expressed in terms of Mach number;

- (b) a means of indicating when the supply of power to the gyroscopic instruments is not adequate;
- (c) whenever two pilots are required for the operation, an additional separate means of displaying for the second pilot:
 - (1) barometric altitude;
 - (2) indicated airspeed;
 - (3) vertical speed;
 - (4) turn and slip;
 - (5) attitude;
 - (6) stabilised heading; and
 - (7) Mach number whenever speed limitations are expressed in terms of Mach number, if applicable;
- (d) a means of preventing malfunction of the airspeed indicating systems required in (a)(4) and (c)(2) due to condensation or icing;
- (e) an alternate source of static pressure;
- (f) a chart holder in an easily readable position that can be illuminated for night operations;
- (g) a second independent means of measuring and displaying altitude; and
- (h) an emergency power supply, independent of the main electrical generating system, for the purpose of operating and illuminating an attitude indicating system for a minimum period of 30 minutes. The emergency power supply shall be automatically operative after the total failure of the main electrical generating system and clear indication shall be given on the instrument or on the instrument panel that the attitude indicator is being operated by emergency power.

NCC.IDE.A.130 Additional equipment for single-pilot operations under IFR

Aeroplanes operated under IFR with a single pilot shall be equipped with an autopilot with at least altitude hold and heading mode.

NCC.IDE.A.135 Terrain awareness warning system (TAWS)

Turbine-powered aeroplanes with a maximum certified take-off mass (MCTOM) of more than 5 700 kg or a maximum operational passenger seating configuration (MOPSC) of more than nine shall be equipped with a TAWS that meets the requirements for:

- (a) class A equipment, as specified in an acceptable standard, in the case of aeroplanes for which the individual certificate of airworthiness (CofA) was first issued after 1 January 2011; or
- (b) class B equipment, as specified in an acceptable standard, in the case of aeroplanes for which the individual CofA was first issued on or before 1 January 2011.

NCC.IDE.A.140 Airborne collision avoidance system (ACAS)

Turbine-powered aeroplanes with an MCTOM of more than 5700 kg or an MOPSC of more than 19 shall be equipped with ACAS II.

NCC.IDE.A.145 Airborne weather detecting equipment

The following aeroplanes shall be equipped with airborne weather detecting equipment when operated at night or in IMC in areas where thunderstorms or other potentially hazardous weather conditions, regarded as detectable with airborne weather detecting equipment, may be expected to exist along the route:

- (a) pressurised aeroplanes;
- (b) non-pressurised aeroplanes with an MCTOM of more than 5 700 kg; and
- (c) non-pressurised aeroplanes with an MOPSC of more than nine.

NCC.IDE.A.150 Additional equipment for operations in icing conditions at night

- (a) Aeroplanes operated in expected or actual icing conditions at night shall be equipped with a means to illuminate or detect the formation of ice.
- (b) The means to illuminate the formation of ice shall not cause glare or reflection that would handicap flight crew members in the performance of their duties.

NCC.IDE.A.155 Flight crew interphone system

Aeroplanes operated by more than one flight crew member shall be equipped with a flight crew interphone system, including headsets and microphones for use by all flight crew members.

NCC.IDE.A.160 Cockpit voice recorder

- (a) The following aeroplanes shall be equipped with a CVR:
 - (1) aeroplanes with an MCTOM of more than 27 000 kg and first issued with an individual CofA on or after 1 January 2016; and
 - (2) aeroplanes with an MCTOM of more than 2 250 kg:
 - (i) certified for operation with a minimum crew of at least two pilots;
 - (ii) equipped with turbojet engine(s) or more than one turboprop engine; and
 - (iii) for which a type certificate is first issued on or after 1 January 2016.
- (b) The CVR shall be capable of retaining data recorded during at least:
 - (1) the preceding 25 hours for aeroplanes with an MCTOM of more than 27 000 kg and first issued with an individual CofA on or after 1 January 2022; or
 - (2) the preceding 2 hours in all other cases.
- (c) The CVR shall record with reference to a timescale:
 - (1) voice communications transmitted from or received in the flight crew compartment by radio;
 - (2) flight crew members' voice communications using the interphone system and the public address system, if installed;
 - (3) the aural environment of the flight crew compartment, including, without interruption, the audio signals received from each boom and mask microphone in use; and

- (4) voice or audio signals identifying navigation or approach aids introduced into a headset or speaker.
- (d) The CVR shall start automatically to record prior to the aeroplane moving under its own power and shall continue to record until the termination of the flight when the aeroplane is no longer capable of moving under its own power.
- (e) In addition to (d), depending on the availability of electrical power, the CVR shall start to record as early as possible during the cockpit checks prior to engine start at the beginning of the flight until the cockpit checks immediately following engine shutdown at the end of the flight.
- (f) If the CVR is not deployable, it shall have a device to assist in locating it under water. By 1 January 2020 at the latest, this device shall have a minimum underwater transmission time of 90 days. If the CVR is deployable, it shall have an automatic emergency locator transmitter.

NCC.IDE.A.165 Flight data recorder

- (a) Aeroplanes with an MCTOM of more than 5 700 kg and first issued with an individual CofA on or after 1 January 2016 shall be equipped with an FDR that uses a digital method of recording and storing data and for which a method of readily retrieving that data from the storage medium is available.
- (b) The FDR shall record the parameters required to determine accurately the aeroplane flight path, speed, attitude, engine power, configuration and operation and be capable of retaining data recorded during at least the preceding 25 hours.
- (c) Data shall be obtained from aeroplane sources that enable accurate correlation with information displayed to the flight crew.
- (d) The FDR shall start automatically to record the data prior to the aeroplane being capable of moving under its own power and shall stop automatically after the aeroplane is incapable of moving under its own power.
- (e) If the FDR is not deployable, it shall have a device to assist in locating it under water. By 1 January 2020 at the latest, this device shall have a minimum underwater transmission time of 90 days. If the FDR is deployable, it shall have an automatic emergency locator transmitter.

NCC.IDE.A.170 Data link recording

- (a) Aeroplanes first issued with an individual CofA on or after 1 January 2016 that have the capability to operate data link communications and are required to be equipped with a CVR shall record on a recorder, where applicable:
 - (1) data link communication messages related to ATS communications to and from the aeroplane, including messages applying to the following applications:
 - (i) data link initiation;
 - (ii) controller–pilot communication;
 - (iii) addressed surveillance;
 - (iv) flight information;
 - (v) as far as is practicable, given the architecture of the system, aircraft broadcast surveillance;

- (vi) as far as is practicable, given the architecture of the system, aircraft operational control data; and
 - (vii) as far as is practicable, given the architecture of the system, graphics;
- (2) information that enables correlation to any associated records related to data link communications and stored separately from the aeroplane; and
- (3) information on the time and priority of data link communications messages, taking into account the system's architecture.
- (b) The recorder shall use a digital method of recording and storing data and information and a method for readily retrieving that data. The recording method shall allow the data to match the data recorded on the ground.
- (c) The recorder shall be capable of retaining data recorded for at least the same duration as set out for CVRs in NCC.IDE.A.160.
- (d) If the recorder is not deployable, it shall have a device to assist in locating it under water. By 1 January 2020 at the latest, this device shall have a minimum underwater transmission time of 90 days. If the recorder is deployable, it shall have an automatic emergency locator transmitter.
- (e) The requirements applicable to the start and stop logic of the recorder are the same as the requirements applicable to the start and stop logic of the CVR contained in NCC.IDE.A.160(d) and (e).

NCC.IDE.A.175 Flight data and cockpit voice combination recorder

Compliance with CVR requirements and FDR requirements may be achieved by:

- (a) one flight data and cockpit voice combination recorder if the aeroplane has to be equipped with a CVR or an FDR; or
- (b) two flight data and cockpit voice combination recorders if the aeroplane has to be equipped with a CVR and an FDR.

NCC.IDE.A.180 Seats, seat safety belts, restraint systems and child restraint devices

- (a) Aeroplanes shall be equipped with:
 - (1) a seat or berth for each person on board who is aged 24 months or more;
 - (2) a seat belt on each passenger seat and restraining belts for each berth;
 - (3) a child restraint device (CRD) for each person on board younger than 24 months;
 - (4) a seat belt with upper torso restraint system incorporating a device that will automatically restrain the occupant's torso in the event of rapid deceleration:
 - (i) on each flight crew seat and on any seat alongside a pilot's seat; and
 - (ii) on each observer's seat located in the flight crew compartment; and
 - (5) a seat belt with upper torso restraint system on the seats for the minimum required cabin crew, in the case of aeroplanes first issued with an individual CofA after 31 December 1980.
- (b) A seat belt with upper torso restraint system shall have:
 - (1) a single point release;

- (2) on the seats for the minimum number of required cabin crew members, two shoulder straps and a seat belt that may be used independently; and
- (3) on flight crew seats and on any seat alongside a pilot's seat either of the following:
 - (i) two shoulder straps and a seat belt that may be used independently; or
 - (ii) a diagonal shoulder strap and a seat belt that may be used independently for the following aeroplanes:
 - (A) aeroplanes with an MCTOM of 5 700 kg or less and with an MOPSC of nine or less that are compliant with the emergency landing dynamic conditions defined in the applicable certification specification;
 - (B) aeroplanes with an MCTOM of 5 700 kg or less and with an MOPSC of nine or less that are not compliant with the emergency landing dynamic conditions defined in the applicable certification specification and having an individual CofA first issued before **25 August 2016**

NCC.IDE.A.185 Fasten seat belt and no smoking signs

Aeroplanes in which not all passenger seats are visible from the flight crew seat(s) shall be equipped with a means of indicating to all passengers and cabin crew when seat belts shall be fastened and when smoking is not allowed.

NCC.IDE.A.190 First-aid kit

- (a) Aeroplanes shall be equipped with first-aid kits in accordance with Table 1.

Table 1 Number of first-aid kits required

Number of passenger seats installed	Number of first-aid kits required
0 – 100	1
101 – 200	2
201 – 300	3
301 – 400	4
401 – 500	5
501 or more	6

- (b) First-aid kits shall be:
 - (1) readily accessible for use; and
 - (2) kept up-to-date.

NCC.IDE.A.195 Supplemental oxygen — pressurised aeroplanes

- (a) Pressurised aeroplanes operated at flight altitudes for which the oxygen supply is required in accordance with (b) shall be equipped with oxygen storage and dispensing apparatus capable of storing and dispensing the required oxygen supplies.
- (b) Pressurised aeroplanes operated above flight altitudes at which the pressure altitude in the passenger compartments is above 10 000 ft shall carry enough breathing oxygen to supply:
 - (1) all crew members and:

- (i) 100 % of the passengers for any period when the cabin pressure altitude exceeds 15 000 ft, but in no case less than 10 minutes' supply;
 - (ii) at least 30 % of the passengers, for any period when, in the event of loss of pressurisation and taking into account the circumstances of the flight, the pressure altitude in the passenger compartment will be between 14 000 ft and 15 000 ft; and
 - (iii) at least 10 % of the passengers for any period in excess of 30 minutes when the pressure altitude in the passenger compartment will be between 10 000 ft and 14 000 ft;
- (2) all the occupants of the passenger compartment for no less than 10 minutes, in the case of aeroplanes operated at pressure altitudes above 25 000 ft, or operated below that altitude, but under conditions that will not allow them to descend safely to a pressure altitude of 13 000 ft within 4 minutes.
- (c) Pressurised aeroplanes operated at flight altitudes above 25 000 ft shall, in addition, be equipped with:
- (1) a device to provide a warning indication to the flight crew of any loss of pressurisation; and
 - (2) quick donning masks for flight crew members.

NCC.IDE.A.200 Supplemental oxygen — non-pressurised aeroplanes

- (a) Non-pressurised aeroplanes operated at flight altitudes when the oxygen supply is required in accordance with (b) shall be equipped with oxygen storage and dispensing apparatus capable of storing and dispensing the required oxygen supplies.
- (b) Non-pressurised aeroplanes operated above flight altitudes at which the pressure altitude in the passenger compartments is above 10 000 ft shall carry enough breathing oxygen to supply:
- (1) all crew members and at least 10 % of the passengers for any period in excess of 30 minutes when the pressure altitude in the passenger compartment will be between 10 000 ft and 13 000 ft; and
 - (2) all crew members and passengers for any period that the pressure altitude in the passenger compartments will be above 13 000 ft.

NCC.IDE.A.205 Hand fire extinguishers

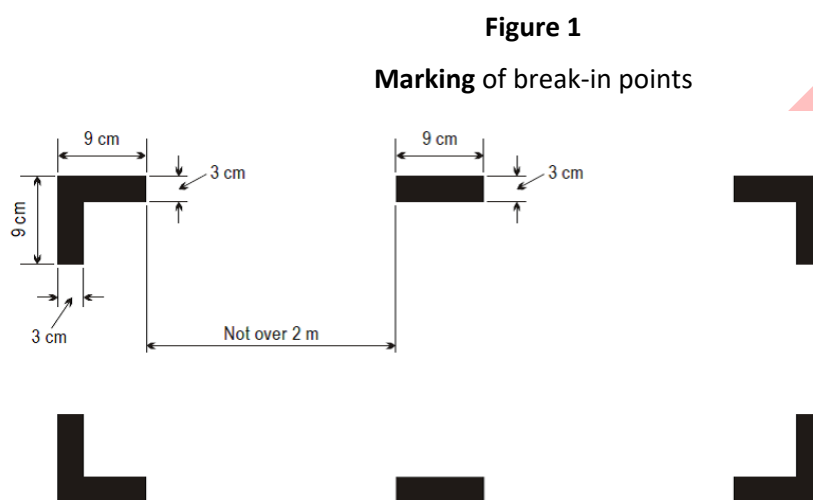
- (a) Aeroplanes shall be equipped with at least one hand fire extinguisher:
- (1) in the flight crew compartment; and
 - (2) in each passenger compartment that is separate from the flight crew compartment, except if the compartment is readily accessible to the flight crew.
- (b) The type and quantity of extinguishing agent for the required fire extinguishers shall be suitable for the type of fire likely to occur in the compartment where the extinguisher is intended to be used and to minimise the hazard of toxic gas concentration in compartments occupied by persons.

NCC.IDE.A.206 Crash axe and crowbar

- (a) Aeroplanes with an MCTOM of more than 5 700 kg or with an MOPSC of more than nine shall be equipped with at least one crash axe or crowbar located in the flight crew compartment.
- (b) In the case of aeroplanes with an MOPSC of more than 200, an additional crash axe or crowbar shall be installed in or near the rearmost galley area.
- (c) Crash axes and crowbars located in the passenger compartment shall not be visible to passengers.

NCC.IDE.A.210 Marking of break-in points

If areas of the aeroplane's fuselage suitable for break-in by rescue crews in an emergency are marked, such areas shall be marked as shown in Figure 1.



NCC.IDE.A.215 Emergency locator transmitter (ELT)

- (a) Aeroplanes shall be equipped with:
 - (1) an ELT of any type or an aircraft localisation means meeting the requirement of TCAR OPS Part CAT, CAT.GEN.MPA.210, when first issued with an individual CofA on or before 1 July 2008;
 - (2) an automatic ELT or an aircraft localisation means meeting the requirement of TCAR OPS Part CAT, CAT. GEN.MPA.210, when first issued with an individual CofA after 1 July 2008.
- (b) ELTs of any type shall be capable of transmitting simultaneously on 121,5 MHz and 406 MHz.

NCC.IDE.A.220 Flight over water

- (a) The following aeroplanes shall be equipped with a life-jacket for each person on board or equivalent individual floatation device for each person on board younger than 24 months, stowed in a position that is readily accessible from the seat or berth of the person for whose use it is provided:
 - (1) landplanes operated over water at a distance of more than 50 NM from land or taking off or landing at an aerodrome or operating site where, in the opinion of the pilot-in-command, the take-off or approach path is so disposed over water that there would be a likelihood of a ditching; and

- (2) seaplanes operated over water.
- (b) Each life-jacket or equivalent individual flotation device shall be equipped with a means of electric illumination for the purpose of facilitating the location of persons.
- (c) Seaplanes operated over water shall be equipped with:
 - (1) a sea anchor and other equipment necessary to facilitate mooring, anchoring or manoeuvring the aeroplane on water, appropriate to its size, weight and handling characteristics; and
 - (2) equipment for making the sound signals as prescribed in the International Regulations for Preventing Collisions at Sea, where applicable.
- (d) The pilot-in-command of an aeroplane operated at a distance away from land where an emergency landing is possible greater than that corresponding to 30 minutes at normal cruising speed or 50 NM, whichever is the lesser, shall determine the risks to survival of the occupants of the aeroplane in the event of a ditching, based on which he/she shall determine the carriage of:
 - (1) equipment for making the distress signals;
 - (2) life-rafts in sufficient numbers to carry all persons on board, stowed so as to facilitate their ready use in emergency; and
 - (3) life-saving equipment to provide the means of sustaining life, as appropriate to the flight to be undertaken.

NCC.IDE.A.230 Survival equipment

- (a) Aeroplanes operated over areas in which search and rescue would be especially difficult shall be equipped with:
 - (1) signalling equipment to make the distress signals;
 - (2) at least one survival ELT(S); and
 - (3) additional survival equipment for the route to be flown taking account of the number of persons on board.
- (b) The additional survival equipment specified in (a)(3) does not need to be carried when the aeroplane:
 - (1) remains within a distance from an area where search and rescue is not especially difficult corresponding to:
 - (i) 120 minutes at one-engine-inoperative (OEI) cruising speed for aeroplanes capable of continuing the flight to an aerodrome with the critical engine(s) becoming inoperative at any point along the route or planned diversion routes; or
 - (ii) 30 minutes at cruising speed for all other aeroplanes; or
 - (2) remains within a distance no greater than that corresponding to 90 minutes at cruising speed from an area suitable for making an emergency landing, for aeroplanes certified in accordance with the applicable airworthiness standard.

NCC.IDE.A.240 Headset

- (a) Aeroplanes shall be equipped with a headset with a boom microphone or equivalent for each flight crew member at their assigned station in the flight crew compartment.
- (b) Aeroplanes operated under IFR or at night shall be equipped with a transmit button on the manual pitch and roll control for each required flight crew member.

NCC.IDE.A.245 Radio communication equipment

- (a) Aeroplanes operated under IFR or at night, or when required by the applicable airspace requirements, shall be equipped with radio communication equipment that, under normal radio propagating conditions, shall be capable of:
 - (1) conducting two-way communication for aerodrome control purposes;
 - (2) receiving meteorological information at any time during flight;
 - (3) conducting two-way communication at any time during flight with those aeronautical stations and on those frequencies prescribed by the appropriate authority; and
 - (4) providing for communication on the aeronautical emergency frequency 121,5 MHz.
- (b) When more than one communication equipment unit is required, each shall be independent of the other or others to the extent that a failure in any one will not result in failure of any other.
- (c) For operations where communication equipment is required to meet an RCP specification for performance-based communication (PBC), an aeroplane shall be provided with communication equipment which will enable it to operate in accordance with the prescribed RCP specification(s)

NCC.IDE.A.250 Navigation equipment

- (a) Aeroplanes shall be equipped with navigation equipment that will enable them to proceed in accordance with:
 - (1) the ATS flight plan, if applicable; and
 - (2) the applicable airspace requirements.
- (b) Aeroplanes shall have sufficient navigation equipment to ensure that, in the event of the failure of one item of equipment at any stage of the flight, the remaining equipment shall allow safe navigation in accordance with (a), or an appropriate contingency action, to be completed safely.
- (c) Aeroplanes operated on flights in which it is intended to land in IMC shall be equipped with suitable equipment capable of providing guidance to a point from which a visual landing can be performed. This equipment shall be capable of providing such guidance for each aerodrome at which it is intended to land in IMC and for any designated alternate aerodromes.
- (d) For PBN operations the aircraft shall meet the airworthiness certification requirements for the appropriate navigation specification.
- (e) Aeroplanes shall be equipped with surveillance equipment in accordance with the applicable airspace requirements.

NCC.IDE.A.255 Transponder

Aeroplanes shall be equipped with a pressure altitude reporting secondary surveillance radar (SSR) transponder and any other SSR transponder capability required for the route being flown.

NCC.IDE.A.260 Management of aeronautical databases

- (a) Aeronautical databases used on certified aircraft system applications shall meet data quality requirements that are adequate for the intended use of the data.
- (b) The operator shall ensure the timely distribution and insertion of current and unaltered aeronautical databases to all aircraft that require them.
- (c) Notwithstanding any other occurrence reporting requirements as defined in the Kingdom of Thailand Civil Aviation Occurrence reporting Regulation, or other national provisions the operator shall report to the database provider instances of erroneous, inconsistent or missing data that might be reasonably expected to constitute a hazard to flight. In such cases, the operator shall inform flight crew and other personnel concerned, and shall ensure that the affected data is not used.

NCC.IDE.A.265 Surveillance Equipment

- (e) An aeroplane shall be provided with surveillance equipment which will enable it to operate in accordance with the requirements of air traffic services
- (f) For operations where surveillance equipment is required to meet RSP specification for performance-based surveillance (PBS), an aeroplane shall, in addition to the requirement specified at (a):
 - (i) be provided with surveillance equipment which will enable it to operate in accordance with the prescribed RSP specification(s);

PUBLIC CONSULTATION

SECTION 2 Helicopters

NCC.IDE.H.100 Instruments and equipment — general

- (a) Instruments and equipment required by this Subpart shall be approved in accordance with the applicable airworthiness requirements if they are:
 - (1) used by the flight crew to control the flight path;
 - (2) used to comply with NCC.IDE.H.245;
 - (3) used to comply with NCC.IDE.H.250; or
 - (4) installed in the helicopter.
- (b) The following items, when required by this Subpart, do not need an equipment approval:
 - (1) independent portable light;
 - (2) an accurate time piece;
 - (3) chart holder;
 - (4) first-aid kit;
 - (5) survival and signalling equipment;
 - (6) sea anchor and equipment for mooring; and
 - (7) child restraint device.
- (c) Instruments and equipment not required by this Subpart as well as any other equipment which is not required by other applicable TCAR OPS Parts, but is carried on a flight, shall comply with the following: Instruments and equipment or accessories not required under this part, as well as any other equipment which is not required under TCAR OPS Regulation, but carried on a flight, shall comply with the following requirements:
 - (1) the information provided by these instruments, equipment or accessories shall not be used by the flight crew to comply with the requirements of the Air Navigation Act B.E 2497, Kingdom of Thailand Civil Aviation Regulations or NCC.IDE.H.245 and NCC.IDE.H.250; and the information provided by those instruments, equipment or accessories shall not be used by the flight crew members to comply with airworthiness requirements or points NCC.IDE.H.245 and NCC.IDE.H.250 of this part;
 - (2) the instruments and equipment shall not affect the airworthiness of the helicopter, even in the case of failures or malfunction.
- (d) Instruments and equipment shall be readily operable or accessible from the station where the flight crew member that needs to use it is seated.
- (e) Those instruments that are used by a flight crew member shall be so arranged as to permit the flight crew member to see the indications readily from his/her station, with the minimum practicable deviation from the position and line of vision which he/she normally assumes when looking forward along the flight path.
- (f) All required emergency equipment shall be easily accessible for immediate use.

NCC.IDE.H.105 Minimum equipment for flight

A flight shall not be commenced when any of the helicopter's instruments, items of equipment or functions required for the intended flight are inoperative or missing, unless:

- (a) the helicopter is operated in accordance with the operator's minimum equipment list (MEL);
- (b) the operator is approved by the CAAT to operate the helicopter within the constraints of the master minimum equipment list ("MMEL") in accordance with TCAR OPS Part ORO point ORO.MLR.105(j); or
- (c) the helicopter is subject to a permit to fly issued in accordance with the applicable airworthiness requirements.

NCC.IDE.H.115 Operating lights

Helicopters operated at night shall be equipped with:

- (a) an anti-collision light system;
- (b) navigation/position lights;
- (c) a landing light;
- (d) lighting supplied from the helicopter's electrical system to provide adequate illumination for all instruments and equipment essential to the safe operation of the helicopter;
- (e) lighting supplied from the helicopter's electrical system to provide illumination in all passenger compartments;
- (f) an independent portable light for each crew member station; and
- (g) lights to conform with the International Regulations for Preventing Collisions at Sea if the helicopter is amphibious.

NCC.IDE.H.120 Operations under VFR — flight and navigational instruments and associated equipment

- (a) Helicopters operated under VFR by day shall be equipped with a means of measuring and displaying the following:
 - (1) magnetic heading;
 - (2) time in hours, minutes and seconds;
 - (3) barometric altitude;
 - (4) indicated airspeed; and
 - (5) slip.
- (b) Helicopters operated under VMC over water and out of sight of the land, or under VMC at night, or when the visibility is less than 1 500 m, or in conditions where the helicopter cannot be maintained in a desired flight path without reference to one or more additional instruments, shall be equipped, in addition to (a), with:
 - (1) a means of measuring and displaying the following:
 - (i) attitude;
 - (ii) vertical speed; and

- (iii) stabilised heading;
- (2) a means of indicating when the supply of power to the gyroscopic instruments is not adequate; and
- (3) a means of preventing malfunction of the airspeed indicating system required in (a)(4) due to condensation or icing.
- (c) Whenever two pilots are required for the operation, helicopters shall be equipped with an additional separate means of displaying the following:
 - (1) barometric altitude;
 - (2) indicated airspeed;
 - (3) slip;
 - (4) attitude, if applicable;
 - (5) vertical speed, if applicable; and
 - (6) stabilised heading, if applicable.

NCC.IDE.H.125 Operations under IFR — flight and navigational instruments and associated equipment

Helicopters operated under IFR shall be equipped with:

- (a) a means of measuring and displaying the following:
 - (1) magnetic heading;
 - (2) time in hours, minutes and seconds;
 - (3) barometric altitude;
 - (4) indicated airspeed;
 - (5) vertical speed;
 - (6) slip;
 - (7) attitude;
 - (8) stabilised heading; and
 - (9) outside air temperature;
- (b) a means of indicating when the supply of power to the gyroscopic instruments is not adequate;
- (c) whenever two pilots are required for the operation, an additional separate means of displaying the following (note single-pilot IFR operations are not authorised in the Kingdom of Thailand)
 - (1) barometric altitude;
 - (2) indicated airspeed;
 - (3) vertical speed;
 - (4) slip;
 - (5) attitude; and
 - (6) stabilised heading;

- (d) a means of preventing malfunction of the airspeed indicating systems required in (a)(4) and (c)(2) due to condensation or icing;
- (e) an alternate source of static pressure;
- (f) a chart holder in an easily readable position that can be illuminated for night operations; and
- (g) an additional means of measuring and displaying attitude as a standby instrument.

NCC.IDE.H.130 Additional equipment for single-pilot operations under IFR

(Note single-pilot IFR operations are not authorised in the Kingdom of Thailand)

Helicopters operated under IFR with a single pilot shall be equipped with an autopilot with at least altitude hold and heading mode.

NCC.IDE.H.145 Airborne weather detecting equipment

Helicopters with an MOPSC of more than nine and operated under IFR or at night shall be equipped with airborne weather detecting equipment when current weather reports indicate that thunderstorms or other potentially hazardous weather conditions, regarded as detectable with airborne weather detecting equipment, may be expected to exist along the route to be flown.

NCC.IDE.H.150 Additional equipment for operations in icing conditions at night

- (a) Helicopters operated in expected or actual icing conditions at night shall be equipped with a means to illuminate or detect the formation of ice.
- (b) The means to illuminate the formation of ice shall not cause glare or reflection that would handicap flight crew members in the performance of their duties.

NCC.IDE.H.155 Flight crew interphone system

Helicopters operated by more than one flight crew member shall be equipped with a flight crew interphone system, including headsets and microphones for use by all flight crew members.

NCC.IDE.H.160 Cockpit voice recorder

- (a) Helicopters with an MCTOM of more than 7 000 kg and first issued with an individual CofA on or after 1 January 2016 shall be equipped with a CVR.
- (b) The CVR shall be capable of retaining data recorded during at least the preceding 2 hours.
- (c) The CVR shall record with reference to a timescale:
 - (1) voice communications transmitted from or received in the flight crew compartment by radio;
 - (2) flight crew members' voice communications using the interphone system and the public address system, if installed;
 - (3) the aural environment of the cockpit, including, without interruption, the audio signals received from each crew microphone; and
 - (4) voice or audio signals identifying navigation or approach aids introduced into a headset or speaker.

- (d) The CVR shall start automatically to record prior to the helicopter moving under its own power and shall continue to record until the termination of the flight when the helicopter is no longer capable of moving under its own power.
- (e) In addition to (d), depending on the availability of electrical power, the CVR shall start to record as early as possible during the cockpit checks prior to engine start at the beginning of the flight until the cockpit checks immediately following engine shutdown at the end of the flight.
- (f) If the CVR is not deployable, it shall have a device to assist in locating it under water. By 1 January 2020 at the latest, this device shall have a minimum underwater transmission time of 90 days. If the CVR is deployable, it shall have an automatic emergency locator transmitter.

NCC.IDE.H.165 Flight data recorder

- (a) Helicopters with an MCTOM of more than 3 175 kg and first issued with an individual CofA on or after 1 January 2016 shall be equipped with an FDR that uses a digital method of recording and storing data and for which a method of readily retrieving that data from the storage medium is available.
- (b) The FDR shall record the parameters required to determine accurately the helicopter flight path, speed, attitude, engine power, configuration and operation and be capable of retaining data recorded during at least the preceding 10 hours.
- (c) Data shall be obtained from helicopter sources that enable accurate correlation with information displayed to the flight crew.
- (d) The FDR shall start automatically to record the data prior to the helicopter being capable of moving under its own power and shall stop automatically after the helicopter is incapable of moving under its own power.
- (e) If the FDR is not deployable, it shall have a device to assist in locating it under water. By 1 January 2020 at the latest, this device shall have a minimum underwater transmission time of 90 days. If the FDR is deployable, it shall have an automatic emergency locator transmitter.

NCC.IDE.H.170 Data link recording

- (a) Helicopters first issued with an individual CofA on or after 1 January 2016 that have the capability to operate data link communications and are required to be equipped with a CVR shall record on a recorder, where applicable:
 - (1) data link communication messages related to ATS communications to and from the helicopter, including messages applying to the following applications:
 - (i) data link initiation;
 - (ii) controller–pilot communication;
 - (iii) addressed surveillance;
 - (iv) flight information;
 - (v) as far as is practicable, given the architecture of the system, aircraft broadcast surveillance;
 - (vi) as far as is practicable, given the architecture of the system, aircraft operational control data; and
 - (vii) as far as is practicable, given the architecture of the system, graphics;

- (2) information that enables correlation to any associated records related to data link communications and stored separately from the helicopter; and
- (3) information on the time and priority of data link communications messages, taking into account the system's architecture.
- (b) The recorder shall use a digital method of recording and storing data and information and a method for readily retrieving that data. The recording method shall allow the data to match the data recorded on the ground.
- (c) The recorder shall be capable of retaining data recorded for at least the same duration as set out for CVRs in NCC.IDE.H.160.
- (d) If the recorder is not deployable, it shall have a device to assist in locating it under water. By 1 January 2020 at the latest, this device shall have a minimum underwater transmission time of 90 days. If the recorder is deployable, it shall have an automatic emergency locator transmitter.
- (e) The requirements applicable to the start and stop logic of the recorder are the same as the requirements applicable to the start and stop logic of the CVR contained in NCC.IDE.H.160(d) and (e).

NCC.IDE.H.175 Flight data and cockpit voice combination recorder

Compliance with CVR and FDR requirements may be achieved by one flight data and cockpit voice combination recorder.

NCC.IDE.H.180 Seats, seat safety belts, restraint systems and child restraint devices

- (a) Helicopters shall be equipped with:
 - (1) a seat or berth for each person on board who is aged 24 months or more;
 - (2) a seat belt on each passenger seat and restraining belts for each berth;
 - (3) for helicopters first issued with an individual CofA after 31 December 2012, a seat belt with an upper torso restraint system for each passenger who is aged 24 months or more;
 - (4) a child restraint device (CRD) for each person on board younger than 24 months;
 - (5) a seat belt with upper torso restraint system incorporating a device that will automatically restrain the occupant's torso in the event of rapid deceleration on each flight crew seat; and
 - (6) a seat belt with upper torso restraint system on the seats for the minimum required cabin crew, in the case of helicopters first issued with an individual CofA after 31 December 1980.
- (b) A seat belt with upper torso restraint system shall:
 - (1) have a single point release; and
 - (2) on flight crew seats, on any seat alongside a pilot's seat and on the seats for the minimum required cabin crew, include two shoulder straps and a seat belt that may be used independently.

NCC.IDE.H.185 Fasten seat belt and no smoking signs

Helicopters in which not all passenger seats are visible from the flight crew seat(s) shall be equipped with a means of indicating to all passengers and cabin crew when seat belts shall be fastened and when smoking is not allowed.

NCC.IDE.H.190 First-aid kit

- (a) Helicopters shall be equipped with at least one first-aid kit.
- (b) The first-aid kit(s) shall be:
 - (1) readily accessible for use; and
 - (2) kept up-to-date.

NCC.IDE.H.200 Supplemental oxygen — non-pressurised helicopters

- (a) Non-pressurised helicopters operated at flight altitudes when the oxygen supply is required in accordance with (b) shall be equipped with oxygen storage and dispensing apparatus capable of storing and dispensing the required oxygen supplies.
- (b) Non-pressurised helicopters operated above flight altitudes at which the pressure altitude in the passenger compartments is above 10 000 ft shall carry enough breathing oxygen to supply:
 - (1) all crew members and at least 10 % of the passengers for any period in excess of 30 minutes when the pressure altitude in the passenger compartment will be between 10 000 ft and 13 000 ft; and
 - (2) all crew members and passengers for any period that the pressure altitude in the passenger compartment will be above 13 000 ft.

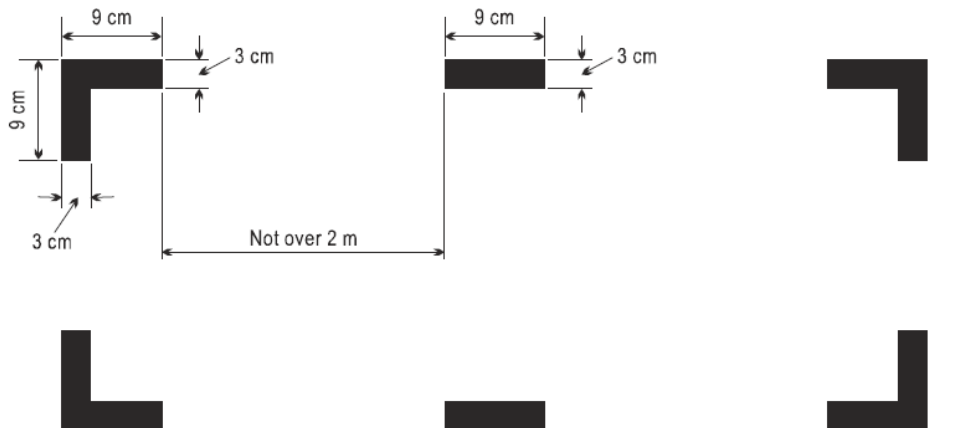
NCC.IDE.H.205 Hand fire extinguishers

- (a) Helicopters shall be equipped with at least one hand fire extinguisher:
 - (1) in the flight crew compartment; and
 - (2) in each passenger compartment that is separate from the flight crew compartment, except if the compartment is readily accessible to the flight crew.
- (b) The type and quantity of extinguishing agent for the required fire extinguishers shall be suitable for the type of fire likely to occur in the compartment where the extinguisher is intended to be used and to minimise the hazard of toxic gas concentration in compartments occupied by persons.

NCC.IDE.H.210 Marking of break-in points

If areas of the helicopter's fuselage suitable for break-in by rescue crews in an emergency are marked, such areas shall be marked as shown in Figure 1.

Figure 1 Marking of break-in points



NCC.IDE.H.215 Emergency locator transmitter (ELT)

- (a) Helicopters shall be equipped with at least one automatic ELT.
- (b) An ELT of any type shall be capable of transmitting simultaneously on 121,5 MHz and 406 MHz.

NCC.IDE.H.225 Life-jackets

- (a) Helicopters shall be equipped with a life-jacket for each person on board or equivalent individual flotation device for each person on board younger than 24 months, which shall be worn or stowed in a position that is readily accessible from the seat or berth of the person for whose use it is provided, when:
 - (1) operated on a flight over water at a distance from land corresponding to more than 10 minutes flying time at normal cruising speed, where in the case of the critical engine failure, the helicopter is able to sustain level flight;
 - (2) operated on a flight over water beyond autorotational distance from the land, where in the case of critical engine failure, the helicopter is not able to sustain level flight; or
 - (3) taking off or landing at an aerodrome or operating site where the take-off or approach path is over water.
- (b) Each life-jacket or equivalent individual flotation device shall be equipped with a means of electric illumination for the purpose of facilitating the location of persons.

NCC.IDE.H.226 Crew survival suits

Each crew member shall wear a survival suit when so determined by the pilot-in-command based on a risk assessment taking into account the following conditions:

- (a) flights over water beyond autorotational distance or safe forced landing distance from land, where in the case of a critical engine failure, the helicopter is not able to sustain level flight; and

- (b) the weather report or forecasts available to the commander/pilot-in-command indicate that the sea temperature will be less than plus 10 °C during the flight.

NCC.IDE.H.227 Life-rafts, survival ELTs and survival equipment on extended overwater flights

Helicopters operated:

- (a) on a flight over water at a distance from land corresponding to more than 10 minutes flying time at normal cruising speed, where in the case of the critical engine failure, the helicopter is able to sustain level flight; or
- (b) on a flight over water at a distance corresponding to more than 3 minutes flying time at normal cruising speed, where in the case of the critical engine failure, the helicopter is not able to sustain level flight, and if so determined by the pilot-in-command by means of a risk assessment;

shall be equipped with:

- (1) in the case of a helicopter carrying less than 12 persons, at least one life-raft with a rated capacity of not less than the maximum number of persons on board, stowed so as to facilitate their ready use in emergency;
- (2) in the case of a helicopter carrying more than 11 persons, at least two life-rafts, stowed so as to facilitate their ready use in an emergency, sufficient together to accommodate all persons capable of being carried on board and, if one is lost the remaining life-raft(s) having the overload capacity sufficient to accommodate all persons on the helicopter;
- (3) at least one survival ELT (ELT(S)) for each required life-raft; and
- (4) life-saving equipment, including means of sustaining life, as appropriate to the flight to be undertaken.

NCC.IDE.H.230 Survival equipment

Helicopters operated over areas in which search and rescue would be especially difficult shall be equipped with:

- (a) signalling equipment to make distress signals;
- (b) at least one survival ELT (ELT(S)); and
- (c) additional survival equipment for the route to be flown taking account of the number of persons on board.

NCC.IDE.H.232 Helicopters certified for operating on water — miscellaneous equipment

Helicopters certified for operating on water shall be equipped with:

- (a) a sea anchor and other equipment necessary to facilitate mooring, anchoring or manoeuvring the helicopter on water, appropriate to its size, weight and handling characteristics; and
- (b) equipment for making the sound signals prescribed in the International Regulations for Preventing Collisions at Sea, where applicable.

NCC.IDE.H.235 All helicopters on flights over water — ditching

Helicopters shall be designed for landing on water or certified for ditching in accordance with the relevant certification specifications or fitted with emergency flotation equipment when operated on a flight over water in a hostile environment at a distance from land corresponding to more than 10 minutes flying time at normal cruising speed.

NCC.IDE.H.240 Headset

Whenever a radio communication and/or radio navigation system is required, helicopters shall be equipped with a headset with boom microphone or equivalent and a transmit button on the flight controls for each required pilot and/or crew member at his/her assigned station.

NCC.IDE.H.245 Radio communication equipment

- (a) Helicopters operated under IFR or at night, or when required by the applicable airspace requirements, shall be equipped with radio communication equipment that, under normal radio propagating conditions, shall be capable of:
 - (1) conducting two-way communication for aerodrome control purposes;
 - (2) receiving meteorological information;
 - (3) conducting two-way communication at any time during flight with those aeronautical stations and on those frequencies prescribed by the appropriate authority; and
 - (4) providing for communication on the aeronautical emergency frequency 121,5 MHz.
- (b) When more than one communications equipment unit is required, each shall be independent of the other or others to the extent that a failure in any one will not result in failure of any other.
- (c) When a radio communication system is required, and in addition to the flight crew interphone system required in NCC.IDE.H.155, helicopters shall be equipped with a transmit button on the flight controls for each required pilot and crew member at his/her assigned station.
- (d) For operations where communication equipment is required to meet an RCP specification for performance-based communication (PBC), an aeroplane shall be provided with communication equipment which will enable it to operate in accordance with the prescribed RCP specification(s)

NCC.IDE.H.250 Navigation equipment

- (a) Helicopters shall be equipped with navigation equipment that will enable them to proceed in accordance with:
 - (1) the ATS flight plan, if applicable; and
 - (2) the applicable airspace requirements.
- (b) Helicopters shall have sufficient navigation equipment to ensure that, in the event of the failure of one item of equipment at any stage of the flight, the remaining equipment shall allow safe navigation in accordance with (a), or an appropriate contingency action, to be completed safely.
- (c) Helicopters operated on flights in which it is intended to land in IMC shall be equipped with navigation equipment capable of providing guidance to a point from which a visual landing can be performed. This equipment shall be capable of providing such guidance for each aerodrome at which it is intended to land in IMC and for any designated alternate aerodromes.

- (d) When PBN is required the aircraft shall meet the airworthiness certification requirements for the appropriate navigation specification.
- (e) Helicopters shall be equipped with surveillance equipment in accordance with the applicable airspace requirements.

NCC.IDE.H.255 Transponder

Helicopters shall be equipped with a pressure altitude reporting secondary surveillance radar (SSR) transponder and any other SSR transponder capability required for the route being flown.

NCC.IDE.H.260 Management of aeronautical databases

- (a) Aeronautical databases used on certified aircraft system applications shall meet data quality requirements that are adequate for the intended use of the data.
- (b) The operator shall ensure the timely distribution and insertion of current and unaltered aeronautical databases to all aircraft that require them.
- (c) Notwithstanding any other occurrence reporting requirements as defined in in the Kingdom of Thailand Civil Aviation Occurrence reporting Regulation, or other national provisions the operator shall report to the database provider instances of erroneous, inconsistent or missing data that might be reasonably expected to constitute a hazard to flight.

In such cases, the operator shall inform flight crew and other personnel concerned, and shall ensure that the affected data is not used.

NCC.IDE.H.265 Surveillance Equipment

- (a) An helicopter shall be provided with surveillance equipment which will enable it to operate in accordance with the requirements of air traffic services
- (b) For operations where surveillance equipment is required to meet RSP specification for performance-based surveillance (PBS), an aeroplane shall, in addition to the requirement specified at (a):
 - (i) be provided with surveillance equipment which will enable it to operate in accordance with the prescribed RSP specification(s);