25 Nov 2010

European Aviation Safety Agency

COMMENT RESPONSE DOCUMENT (CRD) TO NOTICE OF PROPOSED AMENDMENT (NPA) 2009-02B

for an Agency Opinion on a Commission Regulation establishing the Implementing Rules for air operations of Community operators

and

draft Decision of the Executive Director of the European Aviation Safety Agency on Acceptable Means of Compliance and Guidance Material related to the Implementing Rules for air operations of Community operators

"Part-OPS"

CRD c.6 – Comment Response Summary Table (CRST) CAT.POL

Scope

This CRST document shows summaries of comments received and responses to the NPA text of Subpart A Section III and Subpart B Section III.

Column A: displays the NPA rule version.

Column B: provides a summary of comments received, which have been coded as follows:

MS: Member State

INDUS: industry sector

INDIV: individual.

Column C: provides the responses, justifying the reasons for changing or retaining the NPA text.

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Explanatory Notes **Section III - Aircraft Performance and Operating Limitations**		
Paragraph 26	REP (1): The text that has been deleted (from JAR-OPS) contains a requirement that any deviations from Standard Masses should be reviewed every 5 years; this limitation on approval has now been removed.	Accepted Text will be inserted in AMC
Paragraph 28	REP (1): Notwithstanding the content of paragraph 28, in several places 'weight' can still be found in some texts	Noted: Consistency check will be performed throughout IRs and AMCs
Paragraph 30	REP (1): As part of the survey to be conducted for Standard Masses, it should be remembered that offshore operations have a specific population (usually heavier)and they should not be lumped in with the general survey.	Noted : This will be further assessed in rulemaking task OPS.027.

A: Rule	**B: Summary of comments**	**C: Reason for change, remarks**
Subpart A **Section III – Aircraft performance and operating limitations**	MS (1): Request to reinstate EU-OPS.	The proposed new rule text is based on EU-OPS and prepared on a new document with track changes to EU-OPS.
OPS.GEN.300 Operating limitations		
(a) During any phase of operation, the loading, the mass and, except for balloons, the centre of gravity (CG) of the aircraft shall comply with any limitation specified in the Aircraft Flight Manual (AFM).	1) (MS=6;INDIV=29; REP=3): Request to reinstate EU-OPS: (1) the structure of the NPA is not acceptable; (2) the use of IR/AMC does not properly separate IR and AMC/GM material. 2) (IND=1; REP=2): Request to add "or the Operations Manual, if more restrictive"; 3) REP (1): indicated that AFM's are not always available, therefore a POH could also be referenced. 4) MS (1): Text proposal: "AFM must be respected";	1) Accepted. Text aligned with EU-OPS. 2) Accepted. 3) Partly accepted. A new AMC will provide a definition of what is equivalent to AFM. 4) Noted. Text aligned with EU-OPS.
(b) An aeroplane shall be operated within the limitations imposed by compliance with the applicable noise certification standards.	(MS=1) By using the term 'aeroplanes' H were inadvertently excluded.	Accepted. Aeroplanes will be replaced by aircraft
OPS.GEN.305 Weighing		
(a) The mass and, except for balloons, the CG of an aircraft shall be established by actual weighing		

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prior to initial entry into service.		
(b) The accumulated effects of modifications and repairs on the mass and balance shall be accounted for and properly documented. The aircraft shall be reweighed whenever the effect of modifications on the mass and balance is not accurately known.		
(c) The mass and CG of complex motor-powered aircraft used in non-commercial operations and aircraft used in commercial operations shall be re-established by actual weighing:	INDIV (1) Does this include balloons as well? If yes should be reworded like: Except for balloons, the mass and CG…	Noted. As this requirement is aiming not only on complex motor-powered aircraft but also on any aircraft involved in commercial operations it is also applicable to balloon operations. However, the Agency is aware that for balloons no CG can be established and will exclude balloons from this requirement. As the determination of the mass is also an important planning item for balloons this part of the requirement will be kept in some of the rules. Furthermore, a separation of the specific requirements for balloon operations will be done.
(1) at least every 4 years if individual aircraft masses are used; or	1) (MS=1;IND=1; REP=2): Several requests to extend (c) to 5 and 10 years for practicality and as there is no	1) & 2) Noted. Text aligned with EU-OPS which requires 4 and 9 years

A: Rule	B: Summary of comments	C: Reason for change, remarks
	safety risk; 2) REP (1): requested not to apply this rule for certain non-commercial operations.	respectively.
(2) at least once every 9 years if aeroplane fleet masses are used.		
(d) The weighing shall be accomplished by the manufacturer of the aircraft or by a maintenance organisation approved in accordance with Part-M or Part-145.	(MS=1; INDIV=1; REP=9) 1) Suggestion to move (d) into Part M, since it is dealing with maintenance tasks, and to make appropriate changes to Part-M regarding weighing; 2) Suggestion to add to (d) "as appropriate", to clarify that for CAT, weighing has to be performed by a Part-145 organisation; 3) Request to allow weighing to be carried out by a qualified person without Part-M or Part-145 approval (e.g. re. Sailplanes). Suggested text: "The weighing shall be accomplished by the manufacturer of the aircraft of by a maintenance organisation or person qualified for the task." 4) Request to continue to allow weighing by companies without Part-M or Part-145 approval. Proposed additional wording: "… or working under the quality system of such approved organisation as permitted per 145.A.75 (b)". 5) Part M is not approved to perform Weight and balance measurements of aircraft and should therefore be removed here	1) - 4) Noted: Text aligned with EU-OPS which states that the weighing to be accomplished either by the manufacturer or by an approved maintenance organisation. All weighing related provisions will be transferred to regulation (EC) 2042/2003 with the rulemaking task MDM.047. 5) Noted: There is no specific rating/approval related to mass and balance measurements for Part M organizations because such measurements are AMM tasks, which can be performed by a maintenance organization.

A: Rule	B: Summary of comments	C: Reason for change, remarks
OPS.GEN.310 Mass and balance system - complex motor-powered aircraft used in non-commercial operations and aircraft used in commercial operations		
COMPLEX MOTOR-POWERED AIRCRAFT USED IN NON-COMMERCIAL OPERATIONS AND AIRCRAFT USED IN COMMERCIAL OPERATIONS	1) REP (2): proportionality: reject the Agency's approach of applying the same rule to operators of Very Light Jets and to major airlines; 2) INDIV (1): Written Mass and Balance is required also for those operations where the correct mass and balance is obvious. 3) INDIV (1) : Alleviation required for balloons. 4) REP (2): H organisation commented that it is not clear that a complex rule should be established with a bullet list of points. The original text sets objectives for most of the elements contained in this list.	1) Noted: The mass and balance system is a safety critical requirement and there is no justification to lower the safety objective for a CAT operator of a VLJ. However, the Appendix 1 to OPS 1.605 is proposed to be an AMC in order to allow sufficient flexibility to choose the appropriate method to meet the safety objective. 2) Accepted: This was the intent of the proposed rule. 3) Partially accepted. The Agency agrees that for certain elements (e.g. balance system, load distribution, zero fuel mass) of this requirement, alleviations for balloon operations are needed. The text will be changed accordingly. 4) Noted: Text is aligned with JAR.OPS 3

A: Rule	B: Summary of comments	C: Reason for change, remarks
(a) An operator of a complex motor-powered aircraft used in non-commercial operations or an aircraft used in commercial operations shall establish a mass and balance system specifying how the following items are accurately determined for each flight:	REP (1) : request for alternate AMC for BA as at many aerodromes it is not possible to weigh passengers or baggage (see comment to AMC2 OPS.GEN.310(a)(2));	Noted: In such case, the standard weights can be used.
(1) aircraft dry operating mass and CG, if applicable;		
(2) mass of the traffic load;		
(3) mass of the fuel load;		
(4) aircraft loading under the supervision of qualified personnel;	REP (2) INDIV (9): Request to clarify the intention of (a)(4) “under the supervision of qualified personnel” and (a)(8) on documentation, by re-aligning with EU-OPS;	Noted: Text aligned with EU-OPS Appendix 1 to OPS 1.605 (c) (1).
(5) load distribution;		
(6) take-off mass, landing mass and zero fuel mass, if applicable;		
(7) CG positions, if applicable; and		
(8) preparation and disposition of all documentation.	(REP=1): Alleviation for repetitive pleasure flights on the same day should be included.	Noted: The commentator is requested to submit a proposal with justification in order for EASA to consider a new rulemaking task.

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(b) The mass and balance computation based on electronic calculations shall be replicable by the flight crew.	(MS=1;INDIV=11; REP=1): Request to clarify 'replicable' in (b), or delete (b);	Accepted: The intent was that the flight crew shall be provided with a means of replicating and verifying any mass and balance computation based on electronic calculations. EU-OPS text has been re-instated.
AIRCRAFT USED IN COMMERCIAL OPERATIONS		
(c) For commercial operations, mass and balance documentation shall be prepared prior to each flight specifying the load and its distribution.	REP (1), INDIV (3): 1) Proportionality: request an exemption on (c) for commercial operations with non-complex aircraft, where payment between persons is to share costs only. Suggested wording: "For commercial operations except on non-complex aircraft, "; 2) Alleviation required also for balloons	1) Not Accepted: This is a safety critical requirement and there is no justification to lower the safety objective for other than complex motor-powered aircraft. The new proposed text is aligned with EU-OPS 1.625. 2) Partially accepted. The Agency agrees that the terminology used might not be adequate for balloon operations as the term "mass and balance" is not applicable to balloons (no CG to be determined and no distribution of load required). However, as the determination of the mass prior to each flight and a proper documentation should be also a common standard in balloon operations this part of the

A: Rule	B: Summary of comments	C: Reason for change, remarks
		requirement will be kept.
OPS.GEN.315 Performance - general		
(a) An aircraft shall only be operated if the performance is adequate to comply with the applicable rules of the air and any other restrictions applicable to the flight, the airspace or the aerodromes/operating sites used, taking into account the charting accuracy of any charts/maps used.		
(b) Except when necessary for take-off or landing at an approved operating site, an aircraft shall only be operated over the congested areas of cities, towns or settlements or over an open-air assembly of persons, if it is able to make a landing without undue hazard to the aircraft occupants or to third parties, in the event of a power-unit failure.	1) MS, IS (H): (b) intent of this rule should be to mitigate risk to third parties only; 2) MS: add "… to third parties and property…"; 3) MS: delete (b) as flight over congested areas is covered by the State's rules of the air. 4) MS: request to define "open air assembly of persons"; 5) MS: request to define "approved operating site", and to better align with ICAO Annex 6, Pt III, 3.1.4; 6) IS (BA): request for clarification if the rule applies during emergency situations.	1)-6) This requirement has been revised as a helicopter requirement.
OPS.GEN.320.A Take-off - complex motor-powered aeroplanes used in non-commercial operations and aeroplanes used in commercial operations		

A: Rule	B: Summary of comments	C: Reason for change, remarks
COMPLEX MOTOR-POWERED AEROPLANES USED IN NON-COMMERCIAL OPERATIONS AND AEROPLANES USED IN COMMERCIAL OPERATIONS	1) MS: add "… certificated under CS 25 conditions" 2) IS: Request to realign with EU-OPS and CS-23 and, for CS-23 'normal aircraft', not require published data for take-off and climb-out with OEI. Request to exempt CMPA with two or more turboprop engines, MTOM< 5 700 kg, MAPSC <=9 from providing such data; 3) Request to reconsider the applicability only to commercial operations and complex aircraft, since non-complex aircraft do not operate with a V1; 4) MS: request to require all aeroplanes on all operations to comply with WAT limitations for take-off (clear safety issue). Additional text "(a) All aeroplanes used in all operations: The take-off mass must not exceed the maximum take-off mass specified in the AFM for the pressure altitude and the ambient temperature at the aerodrome at which the take-off is to be made." New AMC for Class B aeroplanes (text provided in #1600) providing requirements where the AFM has no such data;	1)-4) Partly accepted. For CAT by aeroplane the text has been aligned with Subparts F-I of EU/JAR-OPS.
(a) When determining the maximum permitted take-off mass, the following shall be taken into account:	IS (ECA): realign with EU-OPS 1.490(b) by adding "(5) The accelerate-stop distance shall not exceed the accelerate-stop distance available";	Accepted. Text aligned with Subparts F-I of EU-OPS and added for Class A and Class C aeroplanes.
(1) the take-off distance shall not exceed the	IS (GA): request to define "clearway	Accepted. Added as definition to

A: Rule	B: Summary of comments	C: Reason for change, remarks
take-off distance available, with a clearway distance not exceeding half of the take-off run available;	distance";	the Annex I – Definitions.
(2) the 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; and	1) 2 MS: request to exempt single-engine aircraft from this requirement; 2) 2 IS: request to realign with JAR/EU-OPS 1.490, 1.565 to make this only applicable to CAT. Edit: (a)(3) text is duplicated in AMC1 OPS.CAT.326.A.1.d;	1) Partly accepted. Text aligned with Subparts G-I of EU –OPS. V1 is not required for Class B aeroplanes. 2) Accepted. Text aligned with Subparts G-I of EU–OPS.
(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.		
COMPLEX MOTOR-POWERED AEROPLANES		
(b) In the event of a critical engine failure during take-off, complex motor-powered aeroplanes shall be able to discontinue the take-off and stop within the runway available or, in the case of multi-engined aeroplanes, 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 OPS.GEN.325.	1) MS: width of runway should also be included when considering performance criteria. CS should require such data be included in the AFM. Justification: 'contaminated runway' is based on a required length and width being used;	1) Noted. This comment relates to Regulation 1702/2003 and was forwarded to the appropriate Department.
OPS.GEN.325 En-route - Critical engine inoperative - complex motor-powered aircraft		

A: Rule	**B: Summary of comments**	**C: Reason for change, remarks**
In the event of a critical engine becoming inoperative at any point along the route, a multi-engine complex motor-powered aircraft shall be able to continue the flight to an aerodrome without flying below the minimum obstacle clearance altitude at any point.	MS: request definition of "minimum obstacle clearance altitude"";	Text aligned with Subparts G-I of EU–OPS. EU-OPS text does not use the term minimum obstacle clearance altitude.
OPS.GEN.330.A Landing - complex motor-powered aeroplanes		
At any aerodrome, after clearing all obstacles in the approach path by a safe margin, the aeroplane shall be able to land and stop, a seaplane come to a satisfactorily low speed, within the landing distance available. Allowance may be made for expected variations in the approach and landing techniques, if such allowance has not been made in the scheduling of performance data.	1) MS: new requirement, not clear how an operator can comply. Amend text: "…low speed, from an appropriate screen height, within the …"; 2) IS: Add "at an *adequate* aerodrome"; 3) IS (GA): delete OPS.GEN.330.A – the PIC should determine whether the landing aerodrome is suitable; 4) MS: Request for a clear requirement for all aeroplanes to comply with the WAT limitations for landing. New AMC proposed for Class B aeroplanes (#1630);	1) Text aligned with Subparts G-I of EU–OPS. 2) This is a performance requirement and not a requirement for operational procedures. EU-OPS does not use the term adequate aerodrome in this context. 3) Noted. Text aligned with Subparts G-I of EU–OPS. 4) Text aligned with Subpart H of EU–OPS.
Subpart B - Commercial Air Transport		
Section III – Aircraft Performance and operating limitations		
OPS.CAT.316.A Performance General - Aeroplanes		

A: Rule	B: Summary of comments	C: Reason for change, remarks
(a) An operator shall:	1) IS (ECA): Request to align with EU-OPS, especially referring to "take into account the effect on an engine failure in all flight phases"; IS: proportionality and safety case for STOL with turbine powered propeller aircraft, MTOM <= 5 700 kg, <= 19 MAPSC: request to accept supplemental Performance Class B data in the AFM in order to permit continued operation of DHC6 Twin Otter to remote and island airfields. Request to amend AMC OPS.CAT.316(A)(1) (text provided in #3059).	1) Partly accepted. Text aligned with Subparts F-I of EU–OPS. For Class A aeroplanes consideration of engine failure in all flight phases is required. 2) Accepted. Text aligned with Subparts F-I of EU–OPS. A supplement to the performance data of the AFM shall be acceptable to the Authority.
(1) operate the aeroplane in accordance with the performance class as defined in the approved Operations Manual;		
(2) use the performance data in the Aeroplane Flight Manual (AFM) and complement it, as necessary;	MS: align with EU/JAR-OPS 1.485(a) to require the data be acceptable to the competent authority;	Accepted. Text aligned with Subpart F of EU–OPS.
(3) take into account the aeroplane configuration, environmental conditions and the operation of systems which have an adverse effect on performance; and		
(4) ensure that the mass of the aeroplane at any phase of the flight is not greater than permitted for the flight to be undertaken.	Ind: no allowance is given for approved weight reduction such as fuel jettisoning;	Accepted. Text aligned with Subpart F of EU–OPS.
(b) Single propeller-driven aeroplanes. An operator of an aeroplane powered by one propeller shall not	1) 2 MS: request to state that no commercial flights are allowed in IMC with single-engine	1)-2) Text aligned with Subparts F and I of EU–OPS. EU-OPS does

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operatethat aeroplane:	piston driven aeroplanes. Justification: no known reliability difference between propellers and jet-fans, though there is a slight difference between piston and turbine engines; 2) MS: permit single-engine IMC CAT (cargo) operations for turbo-propellers. Justification: some MS regulate these on the basis of NPA JAA OPS 29 and in accordance with ICAO Ann. 6, 5.4;	not differentiate between piston and turbine engines nor does it allow IMC CAT cargo operations. These suggestions however can be further evaluated in a new rulemaking task (MDM.031).
(1) at night; or		
(2) in instrument meteorological conditions except under Special Visual Flight Rules.		
(c) Two propeller-driven aeroplanes. Two propeller-driven aeroplanes which do not meet the applicable climb criteria shall be treated as single propeller-driven aeroplanes and shall comply with (b).	MS: confusing text: request to refer to "two multi-engined propeller driven aeroplanes". Request to amend (c): "Two multi-engined propeller driven aeroplanes which are not capable of a steady rate of climb in the en-route configuration with OEI of 150 fpm at (i) 1 500 ft above the altitude and air temperature of the departure aerodrome and (ii) 1 500 ft above the altitude and air temperature of the destination and destination alternate aerodromes do not meet the applicable climb criteria…" and delete AMC OPS.CAT.316.A(c).	Accepted. Text aligned with Subpart H of EU–OPS.
OPS.CAT.326.A Take-off requirements -Aeroplanes		
The take-off distance shall not exceed the take-off	1) MS, IS (ECA): realign with EU/JAR-OPS: delete OPS.CAT.326.A and AMC1	1) Accepted. Text aligned with

A: Rule	B: Summary of comments	C: Reason for change, remarks
distance available.	OPS.CAT.316.A(1), and revise OPS.GEN.320.A to refer to TOD/TODA/ASD/ASDA/TOR/TORA (these should be 'hard law'); 2) IS (Airbus): consistency check required on rules and AMC OPS.GEN.320.A(a)(1), OPS.CAT.326.A and AMC1 OPS.CAT.326. Check take-off distance vs. TODA/clearway; 3) MS: realign with EU-OPS 1.480 and define "take-off distance";	Subparts G-I of EU–OPS. 2) Noted. Text aligned with Subparts G-I of EU–OPS. 3) Term defined in the Annex I – Definitions.
OPS.CAT.327.A Take-off obstacle clearance - Aeroplanes		
The take-off flight path shall be cleared of all obstacles by lateral distance and horizontal or vertical distances depending on the aeroplane size and type of engines.	1) IS (ECA): request to move to part GEN as the rule is of a general nature; 2) MS, IS (ECA): realign with EU/JAR-OPS 1: reference should be made to the net/gross take-off flight path to ensure that climb gradient reductions according to the certification specifications are taken into account; 3) IS (Airbus): Request to realign with EU-OPS and replace "type of engines" by "performance class"; 4) IS (BA): request to amend text: "… aeroplane size, type of engines and navigation accuracy" as essential in determining safe lateral distance to obstacles/terrain;	1) Noted. Text aligned with Subparts G-I of EU–OPS. 2)-4) Accepted. Text aligned with Subparts G-I of EU–OPS.

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OPS.CAT.340.A En-Route requirements - Aeroplanes		
(a) Single-engined aeroplanes. In the event of an engine failure, single-engined aeroplanes shall be capable of reaching a place at which a safe forced landing can be made.	1) MS: this is a requirement which in many cases is not possible to achieve. Align according to ICAO Annex 2, 3.1.2.; 2) MS: realign with EU/JAR-OPS and ideally reinstate en-route paragraphs for Class A, B, C aeroplanes. Clarification requested if net or gross flight path shall be used; 3) Forced landings on places other than land should be limited to exceptional cases approved by the authority as reflected in EU-OPS 1.542(a);	1) Noted. Text aligned with EU-OPS 1.542. 2)-3) Accepted. Text aligned with Subparts F-I of EU-OPS.
(b) Multi-engined aeroplanes with all engines operative.		
(1) propeller-driven aeroplanes with a maximum take-off mass of 5 700 kg or less and a maximum passenger seating configuration (MPSC) of 9 or less; and		
(2) aeroplanes powered by reciprocating engines with a maximum take-off mass exceeding 5 700 kg or a maximum passenger seating configuration of more than 9		
shall at any point on the route or on any planned diversion therefrom, be capable of a rate of climb of at least 300 ft per minute with all engines operating within the maximum continuous power conditions	IS (ECA): Clarification that the climb gradient requirement also applies to diversion from intended route.	Noted. Text aligned with EU-OPS.

A: Rule	B: Summary of comments	C: Reason for change, remarks
specified:		
(i) at the minimum altitudes for a safe flight on each stage of the route to be flown; and	IS (ECA):Amend (i) "at the minimum **safe** altitudes…";	Noted. Text aligned with EU-OPS.
(ii) at the minimum altitudes necessary for compliance with the conditions prescribed in (c) and (d), as appropriate.		
(c) One engine inoperative. Multi-engined aeroplanes shall, in the event of one engine becoming inoperative at any point on the route or on any planned diversion there from, be capable of continuing the flight to an altitude above an aerodrome where a landing can be made in accordance with OPS.CAT.345.A. This shall be met with the other engine or engines operating within the maximum continuous power conditions specified.	1) IS: amend text for clarity: "… This **requirement** shall be met with the other engine…"; 2) Ind: does not specify 1 500 ft above diversion airfield;	1) and 2) Text aligned with Subparts G-I of EU-OPS.
(d) Three or more engines aeroplanes, two engines inoperative.	1) IS: a specific flight time duration should not be quoted in the IR. Change also suggested to AMC to (d)(2); 2) MS: add (3) regarding turbojet aeroplanes, MTOM <= 45 360 kg, MAPSC <=19: where approved by the competent authority, the threshold of 90 minutes can be extended up to 180 minutes OEI provided engine reliability and systems redundancy are sufficient. Text should not be more restrictive on three-engined aeroplanes than on two-engined aeroplanes. Small twin turbojets are currently allowed to be	1-2) Text aligned with EU-OPS and retained as IR.

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	operated up to 180 NM with authority approval;	
(1) An aeroplane with three or more engines shall, at no point along the intended track, be more than 90 minutes away from an aerodrome at which the performance requirements applicable at the expected landing mass can be met. This shall be met at the all-engines long range cruising speed at standard temperature in still air.		
(2) Notwithstanding (d)(1), the 90 minutes criteria may be exceeded, if, in the case of two engines inoperative en-route, the flight path with two engines inoperative permits the aeroplane to continue the flight to an aerodrome at which the performance requirements applicable at the expected landing mass are met. In this case, the diversion shall start from the point where two engines are assumed to fail simultaneously, to an aerodrome at which the performance requirements applicable at the expected landing mass are met.	IS (ECA): amend text to clarify intent: "…in the case of two engines inoperative en-route, the **net** flight path…";	Accepted. Text aligned with EU-OPS 1.505 which refers to the net flight path.
OPS.CAT.345.A Landing requirements - Aeroplanes		
LANDING DISTANCE		
(a) When the weather information available to the pilot-in-command indicates that the runway at the estimated time of arrival may be:	IS (BA): amend to "estimated time of **landing**" to ICAO (Doc 9713, Part 1) to clarify that this rule applies to conditions at	Accepted. Text aligned with Subparts F-I of EU-OPS which uses estimated time of landing.

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	touch down;	
(1) dry, the landing mass of the aeroplane shall allow a full stop landing from 50 ft above the threshold within a safe margin of the landing distance available at the destination aerodrome and at any alternate aerodrome which is appropriate to the performance class of the aeroplane; and	MS: realign with EU-OPS: Request to specify the specific factors for the "safe margin" for all classes of aeroplanes (upgrade AMC/GM material);	Accepted. Text aligned with Subparts F-I of EU-OPS and proposed as IR.
(2) wet or contaminated, the landing distance available in (a)(1) shall be:	MS: amend text "… the landing distance **required** available …";	Accepted. Text aligned with Subparts F-I of EU-OPS.
(i) calculated in accordance with any data provided in the AFM for wet and contaminated runways; or	MS, IS (ECA): realign with EU-OPS 1.520: Clarification requested so that it is clear that operations on contaminated runways without AFM data, which would be contradictory to AMC, is not allowed;	Accepted. Text aligned with Subparts F-I of EU-OPS.
(ii) multiplied by a factor of 1.15, in the case that no data is provided in the AFM.		
STEEP APPROACH	Statement requested that prohibits a steep approach followed by a short landing;	Text aligned with Subparts F-I of EU-OPS which clarifies the requested statement.
(b) The operator may apply Steep Approach procedures for the operation of turbojet-engined or propeller-driven aeroplanes using glide slope angles of 4.5° or more and with screen heights of less than 50 ft but not less than 35 ft, provided applicable criteria are met.	1) Definition of "suitable criteria" requested; 2) Ind: limit to 4.5° for performance benefits; 3) IS: align with other EASA documents, e.g. NPA 25B-267, where Steep Approach screen heights of 35 – 60 ft are used; 4) MS: JAA Performance Sub-Committee	1)-2) Noted. Text aligned with Subparts F-I of EU-OPS. The criteria are described in Appendices for Class A and B aeroplanes which are transposed into corresponding AMCs. 3)-4) Accepted. Screen height of 35-60ft is proposed to be

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	proposed correction to EU/JAR-OPS: The operator may apply Steep Approach procedures for the operation of turbojet-engined or propeller-driven aeroplanes using glide slope angles of 4.5°or more and with screen heights of not less than 35 ft, provided applicable criteria are met.”	consistent with NPA 25B-267 and the JAA Performance Sub-Committee.
SHORT LANDING OPERATIONS		
(c) The operator may use short landing operations for the operation of turbojet-engined or propeller-driven aeroplanes provided that suitable criteria are met.	IS (ECA): Move (c) to AMC-material, and ensure that short landings are only approved in exceptional cases;	Partly accepted. Text aligned with Subparts G-H of EU-OPS. To be approved in exceptional cases to be added for Class A aeroplanes. The requirement for an approval must remain as an Implementing Rule.
OPS.CAT.355.H Performance applicability - Helicopters	(MS=;IND=; INDIV=; REP=)30	

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	MS cannot agree to the move of major parts of the performance requirements into the AMC – material. Request to re-establish the performance requirements currently in place in JAR-OPS 3 and EU-OP in order to provide legal clarity.	**Accepted** Performance requirements re-established as in JAR-OPS 3. As this proposal has been accepted, other comments from this MS have not been added.
	MS 3 proposals - OPS.CAT.355H considers helicopter performance that is applicable to all helicopter operations. As such it should be placed under the OPS.COM or OPS.GEN heading.	**Not Accepted** The performance requirements for CAT are derived from ICAO Annex 6 Part III, Section II; there are no provision for AW in ICAO Annex 6 nor are there any performance Standards for GA in ICAO Annex 6, Section III – with the exception of operations to a Congested Hostile Environment, for which PC1 is prescribed (this requires a separate provision– unless it is left to the State to show compliance with the ICAO Standard). The Standards for CAT are not necessarily those which shall apply to AW or GA.
(a) Except as specified in (a)(3) below, helicopters shall be operated in performance class 1 when:	In OPS.COM.350 Category A is required for operating to/from an aerodrome/operating site located in a congested hostile environment;, where the OPS.CAT.355.H does not require Cat. A for operating to/from	**Noted** With the exception of HEMS, there is a de facto requirement in CAT for PC1. In addition,

A: Rule	**B: Summary of comments**	**C: Reason for change, remarks**
	an aerodrome/operating site located in a congested hostile environment, OPS.CAT.355.H should read:**(a) Except as specified in (a)(3) below, helicopters shall be operated in performance class 1 and certificated in category A when**:	operations in PC1 and 2 can only be conducted with aircraft certificated in Category A (see paragraph (d)).
(1) operating to/from an aerodrome/operating site located in a congested hostile environment; or		
(2) having a maximum passenger seating configuration (MPSC) of more than 19.		
(3) operations to a HEMS Operating Site or a Public Interest Site in a congested hostile environment; or operations to/from a helideck conducted with a helicopter having a MPSC of more than 19, may be operated in performance class 2.	A commenter suggests that a large number of HEMS Operating Bases are located in a congested hostile environment and they should be relieved from applying PC1.	**Noted** The NPA text is in line with JAR-OPS 3 – which has been in operation for more than 10 years. Most of the contents of this comment have already been addressed in TGL 43 – which has been in existence since November 2007. This leaflet has been put onto the list of priority actions for EASA. The following points from the comment are discussed: **General:** using CAT Helipad masses as an example of the limitation of the aircraft illustrated is of little interest; this are only

A: Rule	B: Summary of comments	C: Reason for change, remarks
		required when PC1 is mandated and only a helipad is available. A more representative illustration of required masses is contained in TGL 43. **1. Definitions:** the term 'Congested Area' is not used in JAR-OPS 3; in recognition of this, a more precise definition 'Congested Hostile Environment' is used – it excludes all of those areas in a congested area where there are safe-forced-landing opportunities. **2. HEMS Bases:** TGL discusses the situation of these bases; there is no specific requirement apart from the Performance requirements of JAR-OPS 3 – i.e. operations can be conducted in Performance Classes 1, 2 or 3 (with or without exposure). **3. HEMS Operating Site:** the minimum requirement at these sites is PC2 with exposure – regardless of their location. TGL 43 concluded that operations in PC2 in the mountains was not an issue (only requiring second segment climb) except under the

A: Rule	B: Summary of comments	C: Reason for change, remarks
		most extreme conditions. **4. Landing Sites at Hospital in a Hostile Environment:** it is correct that these sites have been seen as problematical – it was for this reason that the Public Interest Site Appendix was provided in JAR-OPS 3.
	1 manufacturer (2 comments) proposes that the alleviation from PC1 when passengers exceed 19 should not be extended to helideck ops. (concerned mainly with the EH101).	**Not Accepted** The issue of performance requirements at the helideck is well understood. Unless OEI HOGE performance is specified (considerably above the PC1 requirement and unwarranted), the environmental conditions will not permit the CAT A procedure to be flown as published. This is as true for the EH101 as any other helicopter. Although there is a requirement for OEI HOGE for Sea Pilot transfer under HHO (HEC Class D), such operations are only conducted with limited number on board and achieving of the Standard is not problematical; the same requirement for helidecks would likely reduce the number of passenger to similar numbers.

A: Rule	B: Summary of comments	C: Reason for change, remarks
		The introduction of the alleviation for helicopters, with a MAPSC of more than 19, was provided to level the playing field in the case when the existing helicopters are (usually) limited to 19 but where the EH101, if required to operate in PC1, would be barred from such operations.
	(MS=1; INDIV=17) 1 MS proposes to open up all operating areas to PC3.	**Not Accepted** The performance requirements were substantially as they were in JAR-OPS 3. To make the proposed change would be to nullify the whole performance criteria. Such a change would require an NPA so that the proposal could be exposed to the whole of the population of interested parties.
	2 MS: The performance conditions of the operations described in the paragraph have not been correctly transposed from JAR-OPS 3.470. The operations to/from a helideck for	**Accepted** When the requirements are restored to the JAR-OPS 3 form,

A: Rule	**B: Summary of comments**	**C: Reason for change, remarks**
	a MPSC of more than 19 are only approved if conducted in accordance with the conditions contained in OPS.SPA.SFL and the text of paragraph (a)(3) needs to be linked to (e). Additionally, the text would be better associated with paragraph (a)(2) for clarity.	this will have been rectified.
(b) Helicopters shall be operated in performance class 1 or 2 when having a MPSC of 19 or less and more than 9.		
(c) Helicopters shall be operated in performance class 1, 2 or 3 when having a MPSC of 9 or less.		
(d) Helicopters operated in:		
(1) performance class 1 or 2 shall be certificated in Category A; and		
(2) performance class 3 shall be certificated in either Category A or B.		
(e) Helicopters operated in performance class 2 or 3 may be operated without an assured safe forced landing capability during the landing and take-off phase under the conditions contained in OPS.SPA.SFL.	(MS=1; IND=1; INDIV=32; REP=1 – these number represent multiple comments by single parties and come almost entirely from the Alpine nations and it aimed at Appendix 1 to JAR-OPS 3.005(3)) 1 manufacturer suggests that performance Class 2 operations without an assured SFL capability are only allowed during take-off and landing phases, while, by consistency with OPS.SPA.005.SFL(d)(3), Performance Class 3 operations may be conducted without an assured safe forced landing capability not	**Noted** The alleviation contained in Appendix 1 to JAR-OPS 3.005(e) has not been provided in OPS.CAT.355.H (nor were they in JAR-OPS 3); the reason for the deliberate omission (of a pointer to this specific alleviation) in Subpart I of JAR-OPS 3 was because it was considered that the alleviation was an exception

A: Rule	B: Summary of comments	C: Reason for change, remarks
	only during take-off and landing phases but also en-route. Consequently the case of PC 3 operations is different from the case of PC 2 operations. Moreover the reference should be Subpart D Section VI instead of OPS.SPA.SFL.	which required its own set of conditions, was available to Performance Classes 2 and 3, and did not need (or would be unable) to fulfil the conditions of Appendix 1 to JAR-OPS 3.517 (in its pre-AL5 version). The special conditions under which an approval would be provided was explained in IEM to Appendix 1 to JAR-OPS 3.005(e) (which was not provided in this NPA): **To retain this alleviation as an exception, it is transposed in CAT.POL.H.420.**
OPS.CAT.360.H Performance General - Helicopters	(MS=;IND=; INDIV=; REP=)5	

A: Rule	B: Summary of comments	C: Reason for change, remarks
	OPS.CAT.360H considers helicopter performance that is applicable to all helicopter operations. As such it should be placed under the OPS.COM or OPS.GEN heading.	**Not Accepted** The performance requirements for CAT are derived from ICAO Annex 6 Part III, Section II; there are no provision for AW in ICAO Annex 6 nor are there any performance Standards for GA in ICAO Annex 6, Section III – with the exception of operations to a Congested Hostile Environment, for which PC1 is prescribed (this requires a separate provision – unless it is left to the State to show compliance with the ICAO Standard). The Standards for CAT are not necessarily those which shall apply to AW or GA.
(a) A helicopter shall be operated in such a way that the mass:		
(1) at the start of the take-off;		
or, in the event of in-flight re-planning		
(2) at the point from which the revised operational flight plan applies,		
is not greater than the mass at which the requirements of the appropriate performance class can be complied with for the flight to be undertaken, allowing for		

A: Rule	**B: Summary of comments**	**C: Reason for change, remarks**
expected reductions in mass as the flight proceeds, including any fuel jettisoning as appropriate.		
(b) When showing compliance with the requirements of the appropriate performance class, due account shall be taken of the following parameters:		
(1) mass of the helicopter;		
(2) helicopter configuration;		
(3) environmental conditions, in particular:		
(i) pressure-altitude and temperature;		
(ii) wind;		
(4) operating techniques; and		
(5) operation of any system which has an adverse effect on the performance.		
OPS.CAT.365.H Obstacle accountability - Helicopters	(MS=;IND=; INDIV=; REP=)2	

A: Rule	B: Summary of comments	C: Reason for change, remarks
	OPS.CAT.365.H considers helicopter performance that is applicable to all helicopter operations. As such it should be placed under the OPS.COM or OPS.GEN heading.	**Not Accepted** The performance requirements for CAT are derived from ICAO Annex 6 Part III, Section II; there are no provision for AW in ICAO Annex 6 nor are there any performance Standards for GA in ICAO Annex 6, Section III – with the exception of operations to a Congested Hostile Environment, for which PC1 is prescribed (this requires a separate provision – unless it is left to the State to show compliance with the ICAO Standard). The Standards for CAT are not necessarily those which shall apply to AW or GA.
(a) For the purpose of obstacle clearance requirements, an obstacle, including the surface of the earth, whether land or sea, located beyond the Final Approach and Take-off Area (FATO), in the take-off flight path or the missed approach flight path, shall be considered if its lateral distance from the nearest point on the surface below the intended flight path is not further than:		
(1) For VFR operations:		
(i) half of the minimum FATO (or the equivalent term used in the Flight Manual) width defined in the		

A: Rule	B: Summary of comments	C: Reason for change, remarks
Helicopter Flight Manual (or, when no width is defined 0.75 D), plus 0.25 times D (or 3 m, whichever is greater), plus:		
0.10 DR for VFR day operations; and		
0.15 DR for VFR night operations.		
(2) For IFR operations:		
(i) 1.5 D (or 30 m, whichever is greater), plus:		
0.10 DR for IFR operations with accurate course guidance; or		
0.15 DR for IFR operations with standard course guidance; or		
0.30 DR for IFR operations without course guidance.		
(ii) when considering the missed approach flight path, the divergence of the obstacle accountability area only applies after the end of the take-off distance available;		
(3) For operations with initial take-off conducted visually and converted to IFR/IMC at a transition point, the criteria required in (a)(1) apply up to the transition point then the criteria required in (a)(2) apply after the		

A: Rule	B: Summary of comments	C: Reason for change, remarks
transition point. The transition point cannot be located before the end of TODRH for helicopters operating in performance class 1 and before the DPATO for helicopters operating in performance class 2.		
(b) For take-off using a backup (or a lateral transition) procedure; for the purpose of obstacle clearance requirements, an obstacle, including the surface of the earth, whether land or sea, located in the back-up (or lateral transition) area, shall be considered if its lateral distance from the nearest point on the surface below the intended flight path is not further than:		
(1) half of the minimum FATO (or the equivalent term used in the Flight Manual) width defined in the Helicopter Flight Manual (or, when no width is defined 0.75 D), plus 0.25 times D (or 3 m, whichever is greater), plus 0.10 for VFR day, or 0.15 for VFR night, of the distance travelled from the back of the FATO.		
(c) Obstacles, including the surface of the earth, whether land or sea, may be disregarded if they are situated beyond:		
(1) 7 R for day operations if it is assured that navigational accuracy can be achieved by reference to suitable visual cues during the climb;	R is not defined.	**Accepted** Definition was reintroduced.
(2) 10 R for night operations if it is assured that navigational accuracy can be achieved by		

A: Rule	B: Summary of comments	C: Reason for change, remarks
reference to suitable visual cues during the climb;		
(3) 300 m if navigational accuracy can be achieved by appropriate navigation aids; or		
(4) 900 m in the other cases.		
OPS.CAT.370.H Flight hours reporting - Helicopters	(MS=3;IND=0; INDIV=2; REP=1)	
An operator shall make available to the competent authority the hours flown for each helicopter operated during the previous calendar year.	3 MS, I INDIV and 1 REP indicated that although this reporting was initially intended to be used in the assessment of engine reliability, it is not only for that purpose; reporting of flight hours is important for the state safety programme as it is used to assess the accident rates in all areas of operation.	**Not accepted.** The Review Group decided to leave this proposal as a future rulemaking task.
	1 INDIV asked 'Why?'	**Not accepted.** Although this reporting was initially intended to be used in the assessment of engine reliability, it is not only for that purpose; reporting of flight hours is important for the state safety programme as it is used to assess the accident rates in all areas of operation

A: Rule	B: Summary of comments	C: Reason for change, remarks
Subpart A **Section III – Aircraft performance and operating limitations**		
AMC1 OPS.GEN.305 Weighing		
1. New aircraft that have been weighed at the factory may be placed into operation without reweighing if the mass and balance records have been adjusted for alterations or modifications to the aircraft. Aircraft transferred from one community operator to another do not have to be weighed prior to use by the receiving operator, unless more than 4 years have elapsed since the last weighing.	(MS=; REP=1): 1) Request to change to 5 years since this is used today according Part M; 2) MS (1): Add: …..with an approved mass control programme	1) Not Accepted: Text aligned with EU-OPS / JAR OPS 3 which uses 4 years and 9 years respectively. 2) Not accepted Text aligned with EU-OPS JAR OPS 3. Mass and balance control is addressed under the continuing airworthiness provisions
2. The mass and centre of gravity (CG) of an aircraft should be revised whenever the cumulative changes to the dry operating mass exceed ± 0.5 % of the maximum landing mass or for aeroplanes the cumulative change in CG position exceeds 0.5 % of the mean aerodynamic chord. This may be done by weighing the aircraft or by calculation.	(IND=1): Should be "maximum structural landing mass" instead of "maximum landing mass".	Accepted.
AMC2 OPS.GEN.305.A Weighing		

A: Rule	**B: Summary of comments**	**C: Reason for change, remarks**
FLEET MASS AND CG POSITION FOR AEROPLANES USED IN COMMERCIAL AIR TRANSPORT	(IND=1): The subtitles of these AMC and GM show that they are applicable to aircraft used in commercial air transport only. One may wonder why these AMC/GM are located in AMC/GM Subpart A (General operating and flight rules) instead of Subpart B (Commercial Air Transport).	Accepted. The revised structure will result in these rules being placed back into the CAT text.
1. For a group of aeroplanes of the same model and configuration, an average dry operating mass and CG position may be used as the fleet mass and CG position, provided that: a. the dry operating mass of an individual aeroplane does not differ by more than ±0.5 % of the maximum structural landing mass from the established dry operating fleet mass; or b. the CG position of an individual aeroplane does not differ by more than ±0.5 % of the mean aerodynamic chord from the fleet CG.		
2. The operator should verify that, after an equipment or configuration change or after weighing, the aeroplane falls within the tolerances above.		
3. To obtain fleet values, the operator should weigh, in the period between two fleet mass evaluations, a certain number of aeroplanes as specified in the Table below. “n” is the number of aeroplanes in the fleet using fleet values. Those aeroplanes in the fleet which have not been weighed for the longest time should be selected first.		

A: Rule	B: Summary of comments	C: Reason for change, remarks
Table 1 of AMC2 OPS.GEN.305.A Weighing		
Number of aeroplanes in the fleet: Minimum number of weighings 2 or 3: n 4 to 9: (n + 3)/2 10 or more: (n + 51)/10 4. The interval between two fleet mass evaluations should not exceed 48 months.		
5. The fleet values should be updated at least at the end of each fleet mass evaluation.		
6. Aeroplanes which have not been weighed since the last fleet mass evaluation can be kept in a fleet operated with fleet values, provided that the individual values are revised by calculation and stay within the tolerances above. If these individual values no longer fall within the tolerances, the operator should determine new fleet values or operate aeroplanes not falling within the limits with their individual values.		
7. If an individual aeroplane dry operating mass is within the fleet mass tolerance but its CG position exceeds the tolerance, the aeroplane may be operated under the applicable dry operating fleet mass but with an individual CG position.		
8. Aeroplanes for which no mean aerodynamic chord has been published should be operated with their individual mass and CG position values. They may be operated under the dry operating fleet mass and CG position, provided that this can be justified by a study.		

A: Rule	**B: Summary of comments**	**C: Reason for change, remarks**
GM OPS.GEN.305.A Weighing		
MAXIMUM STRUCTURAL LANDING MASS AEROPLANE Maximum Structural Landing Mass is the maximum permissible total aeroplane mass upon landing under normal circumstances.	(MS=1; REP=1): Delete this GM This definition shall be transferred into OPS.GEN.010. Furthermore, OPS.GEN.305.A doesn't exist!	Accepted. Definition is placed in AMC definitions since it is only used in AMC.
AMC OPS.GEN.310(a)(1) Mass and balance system - complex motor-powered aircraft used in non-commercial operations and aircraft used in commercial operations		
DRY OPERATING MASS To calculate the dry operating mass and the associated CG of the aircraft, the operator should take into account the mass of all operating items and crew members, and the influence of their position on the aircraft CG. This should be done by weighing or using the standard masses of 85 kg for flight and technical crew members and 75 kg for cabin crew members, including hand baggage. Account shall be taken of any additional baggage. On flights where crew masses, including hand baggage, are expected to exceed the standard crew masses, the actual mass of the crew should be determined by weighing.	1) REP (1), INDIV (6): 7 comments related to passengers standard masses 2) REP (1) Split the definition of crew masses from the definition of the dry operating mass for clarity 3) MS (1): Request to review the standard mass since there seems to be an assumption that CC are female, and flight and technical crew are male; 4) INDIV (1):	1) See AMC2 OPS.GEN.310(a)(2) 2) Accepted Text aligned with EU-OPS/JAR-OPS 3 3) This will be addressed in rulemaking task OPS.027. 4) Text aligned with EU-OPS

A: Rule	**B: Summary of comments**	**C: Reason for change, remarks**
	This paragraph requires to take into account the exceedance of standard crew masses. This has serious implications for the quick sheet and keeping track of crewmember weight.	
AMC1 OPS.GEN.310(a)(2) Mass and balance system - complex motor-powered aircraft used in non-commercial operations and aircraft used in commercial operations	INDIV (3): 3 comments related to passengers standard masses	See AMC2 OPS.GEN.310(a)(2)
TRAFFIC LOAD Traffic load should be determined by actual weighing or using standard masses for passengers, persons other than crew members and baggage.		
AMC2 OPS.GEN.310(a)(2) Mass and balance system - complex motor-powered aircraft used in non-commercial operations and aircraft used in commercial operations	INDIV (1): Passenger classification form EU-OPS 1.607 is missing	Noted, Definitions are included in the Annex I – Definitions.
MASS VALUES FOR PASSENGERS/PERSONS OTHER THAN CREW MEMBERS[1] AND BAGGAGE	1) REP (1)(BA): Proportionality: request an additional AMC (to OPS.GEN.310(a)(2), (5)-(7)) be drafted for larger business	1) Accepted, Operators will get the possibility to propose an alternative means of compliance in order to comply with the objective

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[1] Persons other than crew members are usually involved in commercial operations other than commercial air transport (e.g. aerial photographer) and should be considered as passengers for this AMC.

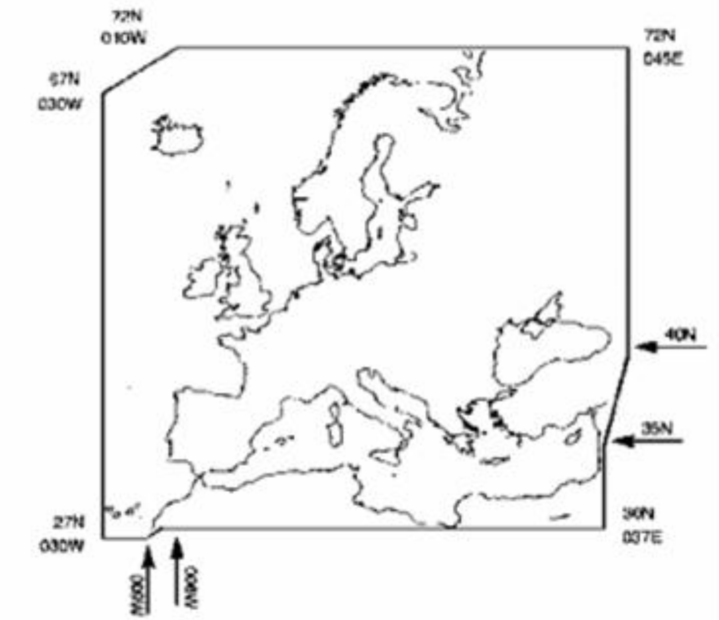
A: Rule	**B: Summary of comments**	**C: Reason for change, remarks**
	jets with MAPSC <=19, covering mass values for passengers, baggage, issues impacting on CG calculations. At many aerodromes used by BA, it is not possible to weigh passengers/baggage (see #1567). 2) REP (1)(BA): Request to add more guidance on how to check the baggage, e.g. with a visual verification; request to increase to "19 seats available", to include larger business jets;	of proportionality. 2) Noted This will be further assessed in rulemaking task OPS.027. Text aligned with EU-OPS and transposed as AMC.
1. When		
a. the number of passenger seats available is: i. less than 10 for aeroplanes; or ii. less than 6 for helicopters; or		
b. the number of passengers is less than 11 for balloons, c. passenger mass may be calculated on the basis of a statement by, or on behalf of, each passenger, adding to it a predetermined mass to account for hand baggage and clothing. d. The predetermined mass for hand baggage and clothing should be established by the operator on the basis of studies relevant to his	INDIV (1): Request to introduce standard masses for clothing and hand baggage, as usually in balloons they are not carried or very light. Request to extend the rule to	Partially accepted. On the first part of the comment it has to be highlighted that the proposed AMC wording already allows the operator to establish pre-determined

A: Rule	**B: Summary of comments**	**C: Reason for change, remarks**
particular operation. In any case, it should not be less than: i. 4 kg for clothing; and ii. 6 kg for hand baggage.	all balloons regardless of number of passengers	mass for hand baggage and clothing. The Agency agrees that the proposed minimum value for the hand baggage in the case of a balloon passenger flight might be too high. It was therefore decided to reduce this value to 3 kg. On the basis of studies relevant to his particular operation the operator might establish higher values. The Agency accepts the second part of the comment and will amend the text accordingly.
The passengers' stated mass and the mass of passengers' clothing and hand baggage should be checked prior to boarding and adjusted, if necessary.		
2. When determining the actual mass by weighing, passengers' personal belongings and hand baggage should be included. Such weighing should be conducted immediately prior to boarding the aircraft.		
3. When using standard mass values, the standard mass values in Tables 1 and 2 below should be used. The standard masses include hand baggage and, for helicopters, the mass of any infant below 24 months carried by an adult on one passenger seat. Infants occupying separate passenger seats are considered as children.		

<table>
<tr><th>A: Rule</th><th>B: Summary of comments</th><th>C: Reason for change, remarks</th></tr>
<tr><td>Table 1 of AMC2 OPS.GEN.310(a)(2) Mass and balance system - Mass values for passengers – 20 seats or more</td><td></td><td></td></tr>
<tr><td>
<table>
<tr><td rowspan="2">Passenger seats</td><td colspan="2">20 and more</td><td rowspan="2">30 and more
‘All adult’</td></tr>
<tr><td>Male</td><td>Female</td></tr>
<tr><td>All flights except holiday charters</td><td>88 kg</td><td>70 kg</td><td>84 kg</td></tr>
<tr><td>Holiday charters*</td><td>83 kg</td><td>69 kg</td><td>76 kg</td></tr>
<tr><td>Children</td><td>35 kg</td><td>35 kg</td><td>35 kg</td></tr>
</table>
* Holiday charter means a charter flight that is part of a holiday travel package. On such flights the entire passenger capacity is hired by one or more charterer(s) for the carriage of passengers who are travelling, all or in part by air, on a round- or circle-trip basis for holiday purposes. The holiday charter mass values apply provided that not more than 5 % of passenger seats installed in the aircraft are used for the non revenue carriage of certain passengers. Categories of passengers such as company personnel, tour operators’ staff, representatives of the press, authority officials etc. can be included within the 5% without negating the use of holiday charter mass values.
</td><td></td><td></td></tr>
<tr><td>Table 2 of AMC2 OPS.GEN.310(a)(2) Mass and balance system - Mass values for passengers – 19 seats or less</td><td></td><td></td></tr>
<tr><td>
<table>
<tr><td>Passenger seats</td><td>1 – 5</td><td>6 – 9</td><td>10 – 19</td></tr>
<tr><td>Male</td><td>104 kg</td><td>96 kg</td><td>92 kg</td></tr>
<tr><td>Female</td><td>86 kg</td><td>78 kg</td><td>74 kg</td></tr>
</table>
</td><td>MS (1):
Request to extend the possibility of deducting 6 kg to all operations: no safety case for limiting this option to helicopters and smaller</td><td>Noted:
Text aligned with EU-OPS and transposed as AMC. Operators will get the possibility to propose an alternative means of</td></tr>
</table>

<table>
<tr><th>A: Rule</th><th>B: Summary of comments</th><th>C: Reason for change, remarks</th></tr>
<tr><td><table><tr><td>Children</td><td>35 kg</td><td>35 kg</td><td>35 kg</td></tr></table>On aeroplanes flights with 19 passenger seats or less and all helicopter flights where no hand baggage is carried in the cabin or where hand baggage is accounted for separately, 6 kg may be deducted from the figures in Table 2 above. The following items are not considered hand baggage: an overcoat, an umbrella, a small handbag or purse, reading material or a small camera.</td><td>aeroplanes;</td><td>compliance to this table. The future rulemaking task OPS.027 will also address standard mass values.</td></tr>
<tr><td>For helicopter operations in which a survival suit is provided to passengers, 3 kg should be added to the passenger mass value.</td><td></td><td></td></tr>
<tr><td>4. Where the total number of passenger seats available on the aircraft is 20 or more, the standard mass values for checked baggage of Table 3 should be used.</td><td></td><td></td></tr>
<tr><td>Table 3 of AMC2 OPS.GEN.310(a)(2) Mass and balance system - Mass values for baggage - 20 or more seats</td><td>MS (1): Request to amend last row of the table as: "All other and all helicopter operations"</td><td>Not accepted: Table is already applicable for aircraft, not only for aeroplanes</td></tr>
<tr><td><table><tr><td>Type of flight</td><td>Baggage standard mass</td></tr><tr><td>Domestic</td><td>11 kg</td></tr><tr><td>Within the European region</td><td>13 kg</td></tr><tr><td>Intercontinental</td><td>15 kg</td></tr><tr><td>All other</td><td>13 kg</td></tr></table>Flights within the European region are flights conducted within the following area:</td><td></td><td></td></tr>
</table>

A: Rule	**B: Summary of comments**	**C: Reason for change, remarks**
– N7200 E04500 – N4000 E04500 – N3500 E03700 – N3000 E03700 – N3000 W00600 – N2700 W00900 – N2700 W03000 – N6700 W03000 – N7200 W01000 – N7200 E04500		

A: Rule	B: Summary of comments	C: Reason for change, remarks
 Figure 1 - European region		
Domestic flight means a flight with origin and destination within the borders of one State.		
Flights within the European region means flights, other than domestic flights, whose origin and destination are within the area specified above.		
Intercontinental flights are flights beyond the European region with origin and destination in different continents.		
For aircraft with 19 passenger seats or less, the mass of checked baggage should be determined by weighing.		

A: Rule	B: Summary of comments	C: Reason for change, remarks
For aircraft with 19 passenger seats or less used in non-commercial operations, the mass of checked baggage may also be calculated on the basis of a statement by, or on behalf of, each passenger. Where this is impractical, a minimum standard mass value of 13 kg should be used. The mass of checked baggage should be checked prior to loading and increased, if necessary.		
5. The operator should determine the actual mass of passengers or checked baggage by weighing or add adequate mass increments whenever it can be expected that a significant number of passengers, including hand baggage, or checked baggage exceeds the standard masses.	REP (1)(H): Improve clarity: "On any flight identified as carrying a significant number of passengers whose masses, including hand baggage, are expected to exceed the standard passenger mass, an operator must determine the actual mass of such passengers by weighing or by adding an adequate mass increment."	Accepted, Text aligned with EU/JAR–OPS 1/3.620 (h) and (i).
6. Other standard masses may be used provided they are calculated on the basis of a detailed weighing survey plan and a reliable statistical analysis method is applied. The standard mass values should only be used in circumstances comparable with those under which the survey was conducted. Where these standard masses exceed those in Tables 1 - 3, then such higher values should be used.	MS (1): Request to gain approval of the weighing survey plan from the Authority.	Accepted, Text will be aligned with EU-OPS/JAR-OPS 3,
AMC3 OPS.GEN.310(a)(2) Mass and balance system - complex motor-powered aircraft used in non-commercial operations and aircraft used in commercial operations		

A: Rule	**B: Summary of comments**	**C: Reason for change, remarks**
SPECIAL STANDARD MASSES FOR TRAFFIC LOAD In addition to standard masses for passengers/persons other than crew members and checked baggage, an operator may use standard mass values for other load items. These standard masses should be calculated on the basis of a detailed evaluation of the mass of the items.		
AMC4 OPS.GEN.310(a)(2) Mass and balance system - complex motor-powered aircraft used in non-commercial operations and aircraft used in commercial operations		
PROCEDURE FOR ESTABLISHING REVISED STANDARD MASS VALUES FOR PASSENGERS AND BAGGAGE FOR AIRCRAFT USED IN COMMERCIAL AIR TRANSPORT	IND(1): Subtitles of these AMC and GM show that they are applicable to aircraft used in commercial air transport only. Why these AMC/GM are located in AMC/GM Subpart A (General operating and flight rules) instead of Subpart B (Commercial Air Transport).	Accepted, With the amended structure the text is placed in Part-CAT.
1. Passengers		
a. Weight sampling method. The average mass of passengers and their hand baggage should be determined by weighing, taking random samples. The selection of random samples should by nature and extent be representative of the passenger volume, considering the type of operation, the frequency of flights on various routes, in/outbound flights, applicable season and seat capacity of the aircraft.		

A: Rule	**B: Summary of comments**	**C: Reason for change, remarks**
i. Sample size. The survey plan should cover the weighing of at least the greatest of:		
A. A number of passengers calculated from a pilot sample, using normal statistical procedures and based on a relative confidence range (accuracy) of 1 % for all adult and 2 % for separate male and female average masses; and		
B. For aircraft: 1. With a passenger seating capacity of 40 or more, a total of 2 000 passengers; or 2. With a passenger seating capacity of less than 40, a total number of 50 multiplied by the passenger seating capacity.		
b. Passenger masses should include the mass of the passengers' belongings which are carried when entering the aircraft. When taking random samples of passenger masses, infants should be weighted together with the accompanying adult.	(REP=1) Editorial: text should be 'weighed' and not 'weighted'.	Accepted,
c. The location for the weighing of passengers should be selected as close as possible to the aircraft, at a point where a change in the passenger mass by disposing of or by acquiring more personal belongings is unlikely to occur before passengers board the aircraft.		
d. Weighing machines used for passenger weighing should have a capacity of at least 150 kg. The mass should be displayed at minimum graduations of 500 g. The weighing machine should have an accuracy of at least 0,5 % or 200 g whichever is greater.		

A: Rule	B: Summary of comments	C: Reason for change, remarks
e. For each flight included in the survey the mass of the passengers, the corresponding passenger category (i.e. male/female/children) and the flight number should be recorded.		
2. Checked baggage The statistical procedure for determining revised standard baggage mass values based on average baggage masses of the minimum required sample size should comply with paragraph (a) for passengers above. For baggage, the relative confidence range (accuracy) amounts to 1 %. A minimum of 2000 pieces of checked baggage should be weighed.		
3. Determination of revised standard mass values for passengers and checked baggage		
a. To ensure that, in preference to the use of actual masses determined by weighing, the use of revised standard mass values for passengers and checked baggage does not adversely affect operational safety, a statistical analysis should be carried out. Such an analysis should generate average mass values for passengers and baggage as well as other data.		
b. On aeroplanes with 20 or more passenger seats, these averages should apply as revised standard male and female mass values.	(MS=1): Appendix 1 to JAR-OPS 3.620(h) paragraph c) 2 & 3 are the same as the EU-OPS requirement for aeroplanes. Hence amend subparagraph 3 b) and 3 c) to read aircraft in place of aeroplanes	Accepted,
c. On smaller aeroplanes, the following increments should be added to the average passenger mass to obtain the revised standard mass		

A: Rule	**B: Summary of comments**	**C: Reason for change, remarks**
values:		
Table 1 of AMC4 OPS.GEN.310(a)(2) Mass and balance system		
Alternatively, all adult revised standard (average) mass values may be applied on aeroplanes with 30 or more passenger seats. Revised standard (average) checked baggage mass values are applicable to aircraft with 20 or more passenger seats.		
d. All adult revised standard mass values should be based on a male/female ratio of 80/20 in respect of all flights except holiday charters which are 50/50. A different ratio on specific flights or routes may be used, provided supporting data shows that the alternative male/female ratio covers at least 84 % of the actual male/female ratios on a sample of at least 100 representative flights		
e. The resulting average mass values should be rounded to the nearest whole number in kg. Checked baggage mass values should be rounded to the nearest 0,5 kg figure, as appropriate.		
f. When operating on similar routes or networks, operators may pool their weighing surveys provided that in addition to the joint weighing		

Number of passenger seats	Required mass increment
1 – 5	16 kg
6 – 9	8 kg
10 – 19	4 kg

A: Rule	**B: Summary of comments**	**C: Reason for change, remarks**
survey results, results from individual operators participating in the joint survey are separately indicated in order to validate the joint survey results.		
GM1 OPS.GEN.310(a)(2) Mass and balance system - complex motor-powered aircraft used in non-commercial operations and aircraft used in commercial operations		
ADJUSTMENT OF STANDARD MASSES FOR AIRCRAFT USED IN COMMERCIAL AIR TRANSPORT When standard mass values are used, AMC2 OPS.GEN.310(a)(2) 5. states that the operator should identify and adjust the passenger and checked baggage masses in cases where significant numbers of passengers or quantities of baggage are suspected of exceeding the standard values. This implies that the operations manual should contain appropriate directives to ensure that:	IND=1: Subtitles of these AMC and GM show that they are applicable to aircraft used in commercial air transport only. Why these AMC/GM are located in AMC/GM Subpart A (General operating and flight rules) instead of Subpart B (Commercial Air Transport).	Accepted, With the amended structure the text is placed in Part-CAT.
1. Check-in, operations and cabin staff and loading personnel report or take appropriate action when a flight is identified as carrying a significant number of passengers whose masses, including hand baggage, are expected to exceed the standard passenger mass, and/or groups of passengers carrying exceptionally heavy baggage (e.g. military personnel or sports teams); and		
2. On small aircraft, where the risks of overload and/or CG errors are the greatest, pilots pay special attention to the load and its distribution and make proper adjustments.		
GM2 OPS.GEN.310(a)(2) Mass and balance system - complex motor-powered aircraft used in non-commercial operations and aircraft used		

A: Rule	**B: Summary of comments**	**C: Reason for change, remarks**
in commercial operations		
STATISTICAL EVALUATION OF PASSENGERS AND BAGGAGE DATA FOR AIRCRAFT USED IN COMMERCIAL AIR TRANSPORT	1) (IND=1): Subtitles of these AMC and GM show that they are applicable to aircraft used in commercial air transport only. Why these AMC/GM are located in AMC/GM Subpart A (General operating and flight rules) instead of Subpart B (Commercial Air Transport). 2) (INDIV=1): Suggest to put this guidance for statistical analysis into a specific document and to provide a reference in the GM	1)Accepted, With the amended structure the text is placed in Part-CAT. 2) Not Accepted, This was already an IEM in TGL 44,
1. Sample size.		
a. For calculating the required sample size it is necessary to make an estimate of the standard deviation on the basis of standard deviations calculated for similar populations or for preliminary surveys. The precision of a sample estimate is calculated for 95% reliability or 'significance', i.e. there is a 95% probability that the true value falls within the specified confidence interval around the estimated value. This standard deviation value is also used for calculating the standard passenger mass.		

A: Rule	**B: Summary of comments**	**C: Reason for change, remarks**
b. As a consequence, for the parameters of mass distribution, i.e. mean and standard deviation, three cases have to be distinguished: i. μ, σ = the true values of the average passenger mass and standard deviation, which are unknown and which are to be estimated by weighing passenger samples. ii. μ’, σ’ = the ‘a priori’ estimates of the average passenger mass and the standard deviation, i.e. values resulting from an earlier survey, which are needed to determine the current sample size. iii. x, s = the estimates for the current true values of m and s, calculated from the sample.		
The sample size can then be calculated using the following formula: $n \geq \frac{(1.96 * \sigma' * 100)^2}{(e'_r * \mu')^2}$ where: n = number of passengers to be weighed (sample size) e’r = allowed relative confidence range (accuracy) for the estimate of μ by x (see also equation in paragraph 3). The allowed relative confidence range specifies the accuracy to be achieved when estimating the true mean. For example, if it is proposed to estimate the true mean to within ± 1%, then e’r will be 1 in the above formula. 1.96 = value from the Gaussian distribution for 95% significance level of the resulting confidence interval.		

A: Rule	**B: Summary of comments**	**C: Reason for change, remarks**
2. Calculation of average mass and standard deviation. If the sample of passengers weighed is drawn at random, then the arithmetic mean of the sample (x) is an unbiased estimate of the true average mass (µ) of the population.		
a. Arithmetic mean of sample where: $\bar{x} = \frac{\sum_{j=1}^{n} x_j}{n}$ xj = mass values of individual passengers (sampling units).		
b. Standard deviation where: $s = \sqrt{\frac{\sum_{j=1}^{n} (x_j - \bar{x})^2}{n-1}}$ xj – = deviation of the individual value from the sample mean.		
3. Checking the accuracy of the sample mean. The accuracy (confidence range) which can be ascribed to the sample mean as an indicator of the true mean is a function of the standard deviation of the sample which has to be checked after the sample has been evaluated. This is done using the formula: $e_r = \frac{1 \cdot 96 * s * 100}{\sqrt{n} * \bar{x}} (\%)$		

A: Rule	**B: Summary of comments**	**C: Reason for change, remarks**
whereby er should not exceed 1% for an all adult average mass and not exceed 2% for an average male and/or female mass. The result of this calculation gives the relative accuracy of the estimate of μ at the 95% significance level. This means that with 95% probability, the true average mass μ lies within the interval: $\bar{x} \pm \frac{1.96 * s}{\sqrt{n}}$		
4. Example of determination of the required sample size and average passenger mass. a. Introduction. Standard passenger mass values for mass and balance purposes require passenger weighing programs be carried out. The following example shows the various steps required for establishing the sample size and evaluating the sample data. It is provided primarily for those who are not well versed in statistical computations. All mass figures used throughout the example are entirely fictitious.		
b. Determination of required sample size. For calculating the required sample size, estimates of the standard (average) passenger mass and the standard deviation are needed. The 'a priori' estimates from an earlier survey may be used for this purpose. If such estimates are not available, a small representative sample of about 100 passengers has to be weighed so that the required values can be calculated. The latter has been assumed for the example.		
Step 1: estimated average passenger mass.		
n x_j (kg) 1 79.9 2 68.1		

<table>
<tr><th>A: Rule</th><th>B: Summary of comments</th><th>C: Reason for change, remarks</th></tr>
<tr><td>
<table>
<tr><td>3</td><td>77.9</td></tr>
<tr><td>4</td><td>74.5</td></tr>
<tr><td>5</td><td>_ 54.1</td></tr>
<tr><td>6</td><td>x 62.2</td></tr>
<tr><td>7</td><td>89.3</td></tr>
<tr><td>8</td><td>108.7</td></tr>
<tr><td>.</td><td>.</td></tr>
<tr><td>85</td><td>63.2</td></tr>
<tr><td>86</td><td>75.4</td></tr>
<tr><td>$\sum_{j=1}^{86}$</td><td>6 071.6</td></tr>
</table>
</td><td></td><td></td></tr>
<tr><td>Step 2: estimated standard deviation.</td><td></td><td></td></tr>
<tr><td>
<table>
<tr><th>n</th><th>xj</th><th>(xj – x)</th><th>(xj – x)2</th></tr>
<tr><td>1</td><td>79.9</td><td>+9.3</td><td>86.49</td></tr>
<tr><td>2</td><td>68.1</td><td>–2.5</td><td>6.25</td></tr>
<tr><td>3</td><td>77.9</td><td>+7.3</td><td>53.29</td></tr>
<tr><td>4</td><td>74.5</td><td>+3.9</td><td>15.21</td></tr>
<tr><td>5</td><td>54.1</td><td>–16.5</td><td>272.25</td></tr>
<tr><td>6</td><td>62.2</td><td>–8.4</td><td>70.56</td></tr>
<tr><td>7</td><td>89.3</td><td>+18.7</td><td>349.69</td></tr>
</table>
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A: Rule	B: Summary of comments	C: Reason for change, remarks

8	108.7	+38.1	1 451.61
.	.	.	.
85	63.2	−7.4	54.76
86	75.4	−4.8	23.04
$\sum_{j=1}^{86}$	6 071.6		34 683.40

$$\mu' = \bar{x} = \frac{\sum x_j}{n} = \frac{6071{\cdot}6}{86}$$

= 70.6 kg

$$\sigma' = \sqrt{\frac{\sum (x_j - \bar{x})^2}{n-1}}$$

$$\sigma' = \sqrt{\frac{34\ 683{\cdot}40}{86-1}}$$

σ' = 20.20 kg

Step 3: required sample size.

The required number of passengers to be weighed should be such that the confidence range, e'r, does not exceed 1% as specified in paragraph 3.

$$n \geq \frac{(1{\cdot}96 * \sigma' * 100)^2}{(e'_r * \mu')^2}$$

$$n \geq \frac{(1{\cdot}96 * 20{\cdot}20 * 100)^2}{(1 * 70{\cdot}6)^2}$$

$n \geq 3145$

The result shows that at least 3 145 passengers have to be

A: Rule	**B: Summary of comments**	**C: Reason for change, remarks**
weighed to achieve the required accuracy. If e’r is chosen as 2 % the result would be n ≥ 786.		
Step 4: after having established the required sample size a plan for weighing the passengers is to be worked out.		
c. Determination of the passenger average mass. Step 1: Having collected the required number of passenger mass values, the average passenger mass can be calculated. For the purpose of this example it has been assumed that 3 180 passengers were weighed. The sum of the individual masses amounts to 231 186.2 kg. n = 3180 $\sum_{j=1}^{3180} x_j = 231186 \cdot 2 \text{ kg}$ $\bar{x} = \frac{\sum x_j}{n} = \frac{231186 \cdot 2}{3180} \text{ kg}$ $\bar{x} = 72 \cdot 7 \text{ kg}$		
Step 2: calculation of the standard deviation. For calculating the standard deviation the method shown in paragraph 4.2 step 2 should be applied. $\sum (x_j - \bar{x})^2 = 745145 \cdot 20$		

A: Rule	**B: Summary of comments**	**C: Reason for change, remarks**
$s = \sqrt{\frac{\sum (x_i - \bar{x})^2}{n - 1}}$ $s = \sqrt{\frac{745\,145.20}{3180 - 1}}$ s = 15.31 kg Step 3: calculation of the accuracy of the sample mean. $e_r = \frac{1.96 * s * 100}{\sqrt{n} * \bar{x}} \%$ $e_r = \frac{1.96 * 15.31 * 100}{\sqrt{3180} * 72.7} \%$ er = 0.73 % Step 4: calculation of the confidence range of the sample mean. $\bar{x} \pm \frac{1.96 * s}{\sqrt{n}}$ $\bar{x} \pm \frac{1.96 * 15.31}{\sqrt{3180}}$ kg 72.7 ± 0.5 kg The result of this calculation shows that there is a 95% probability of the actual mean for all passengers lying within the range 72.2 kg to 73.2 kg.		

A: Rule	B: Summary of comments	C: Reason for change, remarks
GM3 OPS.GEN.310(a)(2) Mass and balance system - complex motor-powered aircraft used in non-commercial operations and aircraft used in commercial operations		
GUIDANCE ON PASSENGER WEIGHING SURVEYS FOR AIRCRAFT USED IN COMMERCIAL AIR TRANSPORT	IND=1: Subtitles of these AMC and GM show that they are applicable to aircraft used in commercial air transport only. Why these AMC/GM are located in AMC/GM Subpart A (General operating and flight rules) instead of Subpart B (Commercial Air Transport).	Accepted. With the amended structure the text is placed in Part-CAT.
1. Information to the competent authority. An operator should advise the competent authority about the intent of the passenger weighing survey and explain the survey plan in general terms.		
2. Detailed survey plan.		
a. An operator should establish and submit to the competent authority a detailed weighing survey plan that is fully representative of the operation, i.e. the network or route under consideration and the survey should involve the weighing of an adequate number of passengers.		
b. A representative survey plan means a weighing plan specified in terms of weighing locations, dates and flight numbers giving a reasonable reflection of the operator’s timetable and/or area of operation.		

A: Rule	B: Summary of comments	C: Reason for change, remarks
c. The minimum number of passengers to be weighed is the highest of the following: i. The number that follows from the means of compliance that the sample should be representative of the total operation to which the results will be applied; this will often prove to be the overriding requirement; or ii. The number that follows from the statistical requirement specifying the accuracy of the resulting mean values which should be at least 2% for male and female standard masses and 1% for all adult standard masses, where applicable. The required sample size can be estimated on the basis of a pilot sample (at least 100 passengers) or from a previous survey. If analysis of the results of the survey indicates that the requirements on the accuracy of the mean values for male or female standard masses or all adult standard masses, as applicable, are not met, an additional number of representative passengers should be weighed in order to satisfy the statistical requirements.		
d. To avoid unrealistically small samples a minimum sample size of 2 000 passengers (males + females) is also required, except for small aircraft where in view of the burden of the large number of flights to be weighed to cover 2 000 passengers, a lesser number is considered acceptable.		
3. Execution of weighing programme. a. At the beginning of the weighing programme it is important to note, and to account for, the data requirements of the weighing survey report (see 6. below). b. As far as is practicable, the weighing programme should be		

A: Rule	B: Summary of comments	C: Reason for change, remarks
conducted in accordance with the specified survey plan. c. Passengers and all their personal belongings should be weighed as close as possible to the boarding point and the mass, as well as the associated passenger category (male/female/child), should be recorded.		
4. Analysis of results of weighing survey.		
4.1 The data of the weighing survey should be analysed as explained in GM3 OPS.GEN.310(a)(2). To obtain an insight to variations per flight, per route etc. this analysis should be carried out in several stages, i.e. by flight, by route, by area, inbound/outbound, etc. Significant deviations from the weighing survey plan should be explained as well as their possible effect(s) on the results.		
5. Results of the weighing survey.		
a. The results of the weighing survey should be summarised. Conclusions and any proposed deviations from published standard mass values should be justified. The results of a passenger weighing survey are average masses for passengers, including hand baggage, which may lead to proposals to adjust the standard mass values given in AMC2 OPS.GEN.310(a)(2) Tables 1 and 2. These averages, rounded to the nearest whole number may, in principle, be applied as standard mass values for males and females on aircraft with 20 and more passenger seats. Because of variations in actual passenger masses, the total passenger load also varies and statistical analysis indicates that the risk of a significant overload becomes unacceptable for aircraft with less that 20 seats. This is the reason for passenger mass increments on small aircraft.		

A: Rule	B: Summary of comments	C: Reason for change, remarks
b. The average masses of males and females differ by some 15 kg or more and because of uncertainties in the male/female ratio the variation of the total passenger load is greater if all adult standard masses are used than when using separate male and female standard masses. Statistical analysis indicates that the use of all adult standard mass values should be limited to aircrafts with 30 passenger seats or more.		
c. Standard mass values for all adults must be based on the averages for males and females found in the sample, taking into account a reference male/female ratio of 80/20 for all flights except holiday charters where a ratio of 50/50 applies. An operator may, based on the data from his weighing programme, or by proving a different male/female ratio, apply for approval of a different ratio on specific routes or flights.		
6. Weighing survey report The weighing survey report, reflecting the content of paragraphs 1–5 above, should be prepared in a standard format as follows:		
WEIGHING SUVEY REPORT 1 Introduction Objective and brief description of the weighing survey. 2 Weighing survey plan Discussion of the selected flight number, airports, dates, etc. Determination of the minimum number of passengers to be weighed. Survey plan.		

A: Rule	**B: Summary of comments**	**C: Reason for change, remarks**
3 Analysis and discussion of weighing survey results Significant deviations from survey plan (if any). Variations in means and standard deviations in the network. Discussion of the (summary of) results. 4 Summary of results and conclusions Main results and conclusions. Proposed deviations from published standard mass values. Attachment 1 Applicable summer and/or winter timetables or flight programmes. Attachment 2 Weighing results per flight (showing individual passenger masses and sex); means and standard deviations per flight, per route, per area and for the total network. **AMC OPS.GEN.310(a)(3) Mass and balance system - complex motor-powered aircraft used in non-commercial operations and aircraft used in commercial operations**		
FUEL LOAD The mass of the fuel load should be determined by using its actual relative density or a standard relative density.		
GM OPS.GEN.310(a)(3) Mass and balance system - complex motor-powered aircraft used in non-commercial operations and aircraft used		

A: Rule	**B: Summary of comments**	**C: Reason for change, remarks**
in commercial operations		
FUEL DENSITY		
1. If the actual fuel density is not known, the operator may use standard fuel density values for determining the mass of the fuel load. Such standard values should be based on current fuel density measurements for the airports or areas concerned.		
2. Typical fuel density values are: a. Gasoline (piston engine fuel) – 0.71 b. JET A1 (Jet fuel JP 1) – 0.79 c. JET B (Jet fuel JP 4) – 0.76 d. Oil – 0.88		
AMC OPS.GEN.310(a)(4) Mass and balance system - complex motor-powered aircraft used in non-commercial operations and aircraft used in commercial operations		
LOADING - STRUCTURAL LIMITS The loading should take into account additional structural limits such as the floor strength limitations, the maximum load per running metre, the maximum mass per cargo compartment, and/or the maximum seating limits as well as in-flight changes in loading (e.g. hoist operations).		
AMC OPS.GEN.310(a)(7) Mass and balance system - complex motor-powered aircraft used in non-commercial operations and aircraft used	IND=1: Subtitles of these AMC and GM	Accepted. With the amended structure

A: Rule	B: Summary of comments	C: Reason for change, remarks
in commercial operations	show that they are applicable to aircraft used in commercial air transport only. Why these AMC/GM are located in AMC/GM Subpart A (General operating and flight rules) instead of Subpart B (Commercial Air Transport).	the text is placed in Part-CAT.
CG LIMITS – OPERATIONAL CG ENVELOPE - COMMERCIAL AIR TRANSPORT Unless seat allocation is applied and the effects of the number of persons per seat row, of cargo in individual cargo compartments and of fuel in individual tanks is accounted for in the balance calculation, operational margins should be applied to the certificated CG envelope. In determining the CG margins, possible deviations from the assumed load distribution should be considered. Passengers should be evenly distributed in the cabin. Operator procedures should fully account for the worst case variation in CG travel during flight caused by passenger/crew movement and fuel consumption/transfer.	(IND=1; INDIV=7; REP=2): IS: regarding evenly passenger distribution and worst case scenario: request to re-align with EU-OPS Appendix 1 to 1.605 (d);	Accepted. Proposed new text aligned with Appendix 1 to 1.605.
GM OPS.GEN. 310(a)(7) Mass and balance system - complex motor-powered aircraft used in non-commercial operations and aircraft used in commercial operations	IND=1: Subtitles of these AMC and GM show that they are applicable to aircraft used in commercial air transport only. Why these AMC/GM are located in AMC/GM Subpart A (General operating and flight rules) instead of Subpart B (Commercial Air Transport).	Accepted With the amended structure the text is placed in Part-CAT.

A: Rule	**B: Summary of comments**	**C: Reason for change, remarks**
CG LIMITS – OPERATINAL CG ENVELOPE - COMMERCIAL AIR TRANSPORT In the Certificate Limitations section of the Aircraft Flight Manual, forward and aft CG limits are specified. These limits ensure that the certification stability and control criteria are met throughout the whole flight and allow the proper trim setting for take-off. An operator should ensure that these limits are observed by defining operational procedures or a CG envelope which compensates for deviations and errors as listed below:		
1. Deviations of actual CG at empty or operating mass from published values due, for example, to weighing errors, unaccounted modifications and/or equipment variations.		
2. Deviations in fuel distribution in tanks from the applicable schedule.		
3. Deviations in the distribution of baggage and cargo in the various compartments as compared with the assumed load distribution as well as inaccuracies in the actual mass of baggage and cargo.		
4. Deviations in actual passenger seating from the seating distribution assumed when preparing the mass and balance documentation. Large CG errors may occur when ‘free seating’ (freedom of passengers to select any seat when entering the aircraft) is permitted. Although in most cases reasonably even longitudinal passenger seating can be expected, there is a risk of an extreme forward or aft seat selection causing very large and unacceptable CG errors (assuming that the balance calculation is done on the basis of an assumed even distribution). The largest errors may occur at a load factor of approximately 50% if all passengers are seated in either the forward or aft half of the cabin. Statistical analysis indicates that the risk of such extreme seating adversely affecting the CG is greatest on small aircraft.		

A: Rule	B: Summary of comments	C: Reason for change, remarks
5. Deviations of the actual CG of cargo and passenger load within individual cargo compartments or cabin sections from the normally assumed mid position.		
6. Deviations of the CG caused by gear and flap positions and by application of the prescribed fuel usage procedure (unless already covered by the certified limits).		
7. Deviations caused by in-flight movement of cabin crew, galley equipment and passengers.		
AMC OPS.GEN.310(a)(8) Mass and balance system - complex motor-powered aircraft used in non-commercial operations and aircraft used in commercial operations		
DOCUMENTATION - COMPLEX MOTOR-POWERED AIRCRAFT USED IN NON-COMMERCIAL OPERATIONS The mass and balance computation may be available in flight planning documents or separate systems and may include standard load profiles.		
AMC OPS.GEN.310(a)(8) and (b) Mass and balance system - complex motor-powered aircraft used in non-commercial operations and aircraft used in commercial operations	1) (MS=1): Request to re-align with EU-OPS Appendix 1 to 1.625 for the competent authority to permit omissions from the mass and balance documentation;	1) Noted. The content of the mass and balance documentation is now included in AMC. The operator may propose an alternative means of compliance which needs to

A: Rule	**B: Summary of comments**	**C: Reason for change, remarks**
	2) (REP=2; MS=1) : request to cover on-board mass and balance systems, approved by authority. 3) (REP=1) : Put back into IR These requirements, except points 3 and 6, are vital for flight safety and shall not be subject to interpretation.	be approved by the competent authority. 2) Accepted. 3) Accepted. Contents of the mass and balance documentation is upgraded to IR.
DOCUMENTATION - COMMERCIAL OPERATIONS		
1. Mass and balance documentation should contain the following: a. Aircraft registration and type; b. Flight identification number and date; c. Pilot-in-command; d. Person who prepared the information; e. Dry operating mass and corresponding CG of the aircraft; f. Mass of the fuel at take-off and mass of trip fuel; g. Mass of consumables other than fuel; h. Load components including passengers, baggage, freight and ballast; i. Take-off Mass, Landing Mass and Zero Fuel Mass; j. Load distribution; k. Applicable aircraft CG positions; and		

A: Rule	**B: Summary of comments**	**C: Reason for change, remarks**
l. The limiting mass and CG values.		
2. For Performance Class B aeroplanes and for helicopters, the CG position may not need to be on the mass and balance documentation, if, for example, 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.		
3. The mass and balance documentation should: a. enable the pilot in command to determine that the load and its distribution are within the mass and balance limits of the aircraft; and b. include advise to the pilot in command whenever a non-standard method has been used for determining the mass of the load.	(MS=2;INDIV=6; REP=1) Editorial: There are two paragraphs 3.	Accepted.
3. The information above may be available in flight planning documents or mass and balance systems.		
4. Any last minute change should be brought to the attention of the pilot-in-command and entered in the flight planning documents containing the mass and balance information and mass and balance systems. The operator should specify the maximum last minute change allowed in passenger numbers or hold load. New mass and balance documentation should be prepared if this maximum number is exceeded.		
5. Where mass and balance documentation is generated by a computerised mass and balance system, the operator should verify the integrity of the output data at intervals not exceeding 6 months.		
6. A copy of the final mass and balance documentation may be sent to aircraft via data or may be made available to the pilot-in–command by	1) (MS=1):	1) Accepted. Aligned with Appendix 1 to

A: Rule	**B: Summary of comments**	**C: Reason for change, remarks**
other means for its acceptance.	clarify "via data"; 2) (REP=1): re-introduce requirement of APP.1 to OPS 1.625(d). a copy of the final mass & balance docs sent via datalink must be available on ground	OPS 1.625 which uses the term datalink. 2) Accepted.
7. The person supervising the loading of the aircraft should confirm by hand signature or equivalent that the load and its distribution are in accordance with the mass and balance documentation given to the pilot in command. The pilot in command should indicate his acceptance by hand signature or equivalent.		
AMC OPS.GEN.315.B(b) Performance - general		
BALLOON TAKE-OFF/LANDING IN CONGESTED AREAS A balloon, when becalmed over a congested area, should land within that congested area such that third parties on the ground, passengers and crew are not endangered.		
GM OPS.GEN.315.B(b) Performance - general		
APPROVED OPERATING SITE FOR BALLOONS In approving congested sites for take-off of balloons, the competent authority should consider the following:		

A: Rule	B: Summary of comments	C: Reason for change, remarks
1. availability of performance data to determine the climb-out performance of the balloon, taking into account the take-off area and the prevailing meteorological conditions;		
2. the surrounding area should permit a safe forced landing; and		
3. the performance of the balloon should be such that a continuous climb-out to the minimum safe altitude is ensured.		
AMC1 OPS.GEN.320.A(a) Take-off - complex motor-powered aeroplanes used in non-commercial operations and aeroplanes used in commercial operations		
TAKE-OFF MASS - COMPLEX MOTOR-POWERED AEROPLANES AND AEROPLANES USED IN COMMERCIAL OPERATIONS The following should be considered for determining the maximum take-off mass:	IS (ECA): move this list to OPS.GEN.320.A or OPS.GEN.315 as it does not need the flexibility of an AMC;	Accepted. Text aligned with Subparts G-I of EU-OPS and transposed as IR.
1. the pressure altitude at the aerodrome;		
2. the ambient temperature at the aerodrome;		
3. the runway surface condition and the type of runway surface;	Ind: Suggestion to upgrade 3. to IR.;	Accepted. Text aligned with Subparts G-I of EU-OPS and transposed as IR.
4. the runway slope in the direction of take-off;	IS (ECA): (4) Suggestion to add "…including the effects of	Noted. Text aligned with Subparts G-I of EU-OPS.

A: Rule	**B: Summary of comments**	**C: Reason for change, remarks**
	non-linear runway slope”;	
5. not more than 50% of the reported head-wind component or not less than 150% of the reported tailwind component; and	IS (BA): request better clarification to include or not include forecasted/expected gusts in the performance calculation;	Gusts are not to be considered for performance calculations.
6. the loss, if any, of runway length due to alignment of the aeroplane prior to take-off (for performance class A and class C aeroplanes an example is provided in appendix 2 to AMC OPS.CAT.A.316(a)(4)).		
AMC2 OPS.GEN.320.A(a) Take-off - complex motor-powered aeroplanes used in non-commercial operations and aeroplanes used in commercial operations		
CONTAMINATED RUNWAY PERFORMANCE DATA Wet and contaminated runway performance data, if made available by the manufacturer, should be taken into account. If such data is not made available, the operator should account for wet and contaminated runway conditions by using the best information available.	MS: Suggestion to add “…using the best information available, *acceptable to the Member State*”;	Accepted. Text aligned with EU-OPS. EU-OPS foresees that the data shall be acceptable to the Competent Authority.
GM1 OPS.GEN.320.A(a) Take-off - complex motor-powered aeroplanes used in non-commercial operations and aeroplanes used in commercial operations		
RUNWAY SURFACE CONDITION Operation on runways contaminated with water, slush, snow or ice implies uncertainties with regard to runway friction and contaminant drag and therefore		

A: Rule	B: Summary of comments	C: Reason for change, remarks
to the achievable performance and control of the aeroplane during take-off or landing, since the actual conditions may not completely match the assumptions on which the performance information is based. In the case of a contaminated runway, the first option for the pilot in command is to wait until the runway is cleared. If this is impracticable, he may consider a take-off or landing, provided that he has applied the applicable performance adjustments, and any further safety measures he/she considers justified under the prevailing conditions. The excess runway length available including the criticality of the overrun area should also be considered.		
AMC1 OPS.GEN.320.A(b) Take-off - complex motor-powered aeroplanes used in non-commercial operations and aeroplanes used in commercial operations	Request to upgrade to IR;	Accepted. Text aligned with Subparts G-I of EU-OPS and transposed as IR.
CONTINGENCY PROCEDURES FOR OBSTACLES CLEARANCES WITH ONE ENGINE INOPERATIVE – PERFORMANCE CLASS A AND CLASS C AEROPLANES IN COMMERCIAL AIR TRANSPORT OPERATIONS		
In the case of multi-engined aeroplanes, an operator should establish contingency procedures to provide a safe route, avoiding obstacles, to enable the aeroplane in the case of one engine inoperative to either comply with the en-route requirements or land at either the aerodrome of departure or at a take-off alternate aerodrome.		
GM1 OPS.GEN.320.A(b) Take-off - complex motor-powered aeroplanes used in non-commercial operations and aeroplanes used in commercial operations		
CONTINGENCY PROCEDURES FOR OBSTACLES CLEARANCES WITH ONE ENGINE INOPERATIVE – PERFORMANCE CLASS A AEROPLANES IN COMMERCIAL AIR TRANSPORT OPERATIONS		

A: Rule	**B: Summary of comments**	**C: Reason for change, remarks**
Engine failure procedures for performance class A aeroplanes. If these procedures are based on an engine failure route that differs from the all engine departure route or SID normal departure, a "deviation point" can be identified where the engine failure route deviates from the normal departure route. Adequate obstacle clearance along the normal departure with failure of the critical engine at the deviation point will normally be available. However, in certain situations the obstacle clearance along the normal departure route may be marginal and should be checked to ensure that, in case of an engine failure after the deviation point, a flight can safely proceed along the normal departure.		
AMC2 OPS.GEN.320.A(b) Take-off - complex motor-powered aeroplanes used in non-commercial operations and aeroplanes used in commercial operations		
ADEQUATE MARGIN The adequate margin should be defined in the operations manual.		
GM2 OPS.GEN.320.A(b) Take-off - complex motor-powered aeroplanes used in non-commercial operations and aeroplanes used in commercial operations	MS: request to clarify the reference with ICAO Annex 6 Pt I and clearly state required margin for take-off with CMPA. ;	Text aligned with ICAO Annex 6 Part I 5.2.8. The term "adequate margin" is illustrated by examples in Attachment C of Annex 6 Part I.
ADEQUATE MARGIN		
1. "An adequate margin" is illustrated by the appropriate examples included in Attachment C to ICAO Annex 6, Part I.		

A: Rule	**B: Summary of comments**	**C: Reason for change, remarks**
2. Critical power-unit is the power-unit failure of which gives the most adverse effect on the aircraft characteristics relative to the case under consideration. On some aircraft there may be more than one equally critical power-unit. In this case, the expression "the critical power-unit" means one of those critical power-units (ICAO Annex 8).		
GM OPS.GEN.325 One power-unit inoperative - complex motor-powered aircraft		
HIGH TERRAIN OR OBSTACLE ANALYSIS Further guidance material can be found in the applicable acceptable means of compliances with OPS.CAT.340.A and OPS.CAT.365.H.		
AMC OPS.GEN.330.A Landing - complex motor-powered aeroplanes		
ALLOWANCES These allowances should be stated in the operations manual.		
Subpart B - Commercial Air Transport		
Section III - Aircraft performance and operating limitations		
AMC OPS.CAT.316.A(a) Performance General – Aeroplanes		

A: Rule	**B: Summary of comments**	**C: Reason for change, remarks**
USE OF CHARTS FOR TAKE-OFF, IN-FLIGHT AND LANDING		
An operator should take account of the charting accuracy when assessing compliance with the performance requirements.	Ind: how should compliance be demonstrated?	As an example, the appropriate procedures should be developed and be put in the OM.
AMC OPS.CAT.316.A(a)(1) Performance General – Aeroplanes		
AEROPLANE PERFORMANCE CLASSES	Upgrade to hard law;	Text aligned with Subparts F-I of EU-OPS and mainly transposed as IR.
Aeroplanes should be classified into three performance classes:	Ind: what performance class is a single-engine turbojet aeroplane?	Not defined by EU-OPS. This item is already the subject of an rulemaking tasks.
1. Performance Class A. Performance class A aeroplanes should be multi-engined aeroplanes powered by turbo-propeller engines with a maximum passenger seating configuration of more than 9 or a maximum take-off mass exceeding 5 700 kg, and all multi-engined turbojet powered aeroplanes.	2 IS: STOL techniques in Performance Class A: request to recognise DHC6 Twin Otter as Performance Class B for STOL and amend (1) "… exceeding 5 700 kg may be classified as a performance B aeroplane at airfields where Performance A criteria cannot be met for reasons of airfield physical characteristics …" Further issues to be covered under this AMC for STOL should be: approval for	Text aligned with Subparts F-I of EU-OPS and mainly transposed as IR.

A: Rule	B: Summary of comments	C: Reason for change, remarks
	operations from competent authority; demonstrated need for STOL ops; A/C limitations; information required in Ops Manual; training for flight crew. Justification: good safety record servicing remote and island communities. Further text provided in #5883; (#1231)	
2. Performance Class B. Performance class B aeroplanes should be aeroplanes powered by propeller engines with a maximum passenger seating configuration of 9 or less and a maximum take-off mass of 5 700 kg or less.		
3. Performance Class C. Performance class C aeroplanes should be aeroplanes powered by reciprocating engines with a maximum passenger seating configuration of more than 9 or a maximum take-off mass exceeding 5 700 kg.		
AMC OPS.CAT.316.A(a)(2) Performance General – Aeroplanes		
AEROPLANE FLIGHT MANUAL DATA		
1. Operational factors. When applying factors, account may be taken of any operational factors already incorporated in the Aeroplane Flight Manual (AFM) performance data to avoid double application of factors.		
2. Reverse thrust credit for landing. Landing distance data included in the AFM (or Pilot Operating Handbook (POH), etc.) with credit for reverse thrust can only be considered to be approved for the purpose of showing		

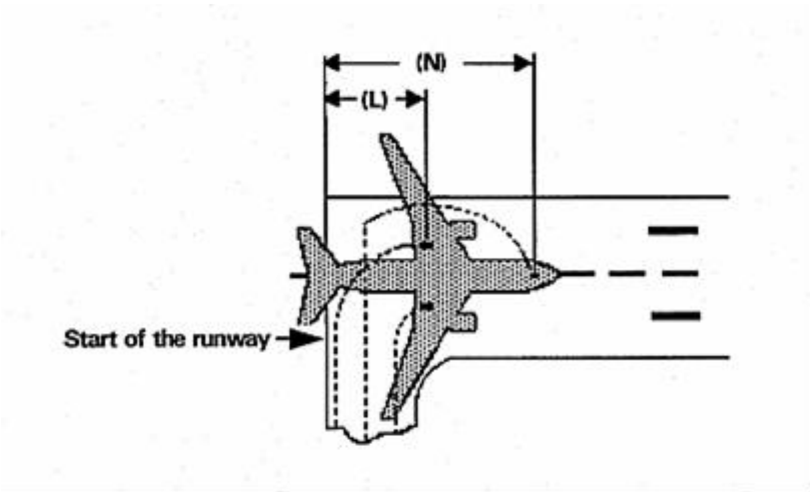
A: Rule	**B: Summary of comments**	**C: Reason for change, remarks**
compliance with the applicable requirements if it contains a specific statement from the applicable competent authority responsible for type design that it complies with a recognised airworthiness code (e.g. CS-23/25, FAR 23/25, JAR 23/25 or equivalent).		
3. Factoring of Automatic Landing Distance Performance Data for Performance Class A Aeroplanes. In those cases, where the landing requires the use of an automatic landing system, and the distance published in the AFM includes safety margins that are equivalent to those contained in AMC OPS.CAT.345(a).A, the landing mass of the aeroplane should be the lesser of: a. the landing mass determined in accordance with AMC OPS.CAT.325(a)(4).A, as appropriate; or b. the landing mass determined for the automatic landing distance for the appropriate surface condition as given in the AFM or equivalent document. Increments due to system features such as beam location or elevations, or procedures such as use of overspeed, should also be included.		
AMC OPS.CAT.316.A(a)(3) Performance General – Aeroplanes		
PERFORMANCE ON WET AND CONTAMINATED RUNWAYS		
1. For a wet and contaminated runway: a. the performance data should be determined in accordance with CS 25.1591 or equivalent; b. if the performance data has been determined on the basis of a measured runway friction coefficient, a procedure correlating the measured runway friction coefficient and the effective braking coefficient of friction of the aeroplane type over the required speed	MS: wet runway take-off performance certification requirements are in CS 25.109; realign the rule with the intent of JAR-OPS 1 by adding to 1.a. "… or equivalent that complies with Change 13 of JAR-25, or that appropriate	This has not been transposed and will be dealt with in the rulemaking task also taking into account the latest ICAO amendment in this area.

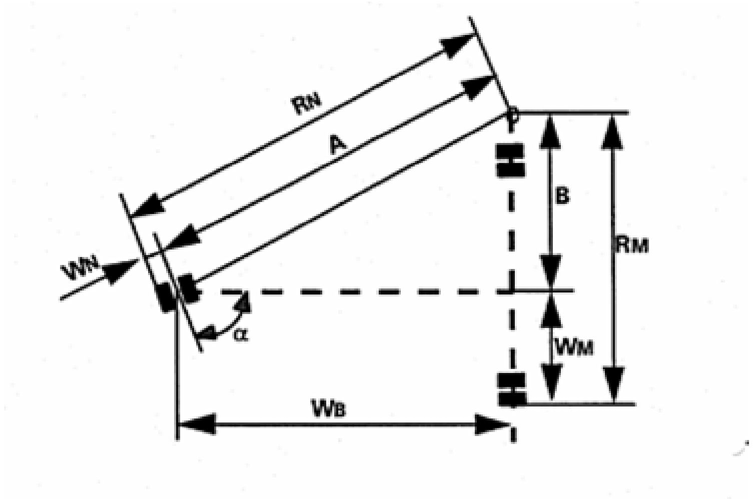
A: Rule	B: Summary of comments	C: Reason for change, remarks
range for the existing runway conditions should be applied; and c. on a wet or contaminated runway, the take-off mass should not exceed that permitted for a take-off on a dry runway under the same conditions.	to the type certification data, whichever is the later". Request a new GM explaining this AMC to clarify the intention, that the performance data need only account for the effect of the contaminant on runway performance, and that existing methodologies used in the certified performance data remain valid; MS: A calculation method by multiplying data for a dry runway with a certain factor should also be possible (CS 23 certified aeroplanes tend to have factors rather than performance data); MS: request to delete (b), since the issue is being examined by the ICAO Friction Task Force, and such data is almost unattainable;	
2. For performance purposes, an operator should consider a damp runway, other than a grass runway, to be dry.	2 IS (ECA, large airline): request to consider proposals in JAA-DNPA-OPS 47 and FAA, which consider a damp runway to be wet;	Not accepted. Text aligned with EU-OPS 1.475 and Amendment 33 of Annex 6 Part I which effectively consider a damp runway to be dry.

A: Rule	**B: Summary of comments**	**C: Reason for change, remarks**
AMC OPS.CAT.316.A(a)(4) Performance General – Aeroplanes		
MASS OF THE AEROPLANE FOR TAKE-OFF, IN-FLIGHT AND LANDING		
1. Take-off and in-flight mass. The mass of the aeroplane at the start of the take-off or, in the event of in-flight re-planning, at the point from which the revised operational flight plan applies should not be greater than the mass at which the requirements can be complied with for the flight to be undertaken allowing for expected reductions in mass as the flight proceeds, and for fuel jettisoning as is provided for in the particular provision.	MS: re-align 1. with EU/JAR-OPS 1.475(a) to improve clarity. Proposed text: "…than the mass at which the requirements ***of this section*** …".	Accepted. Text aligned with EU-OPS.
When determining the maximum permitted take-off mass, in addition to AMC1 OPS.GEN.320.A(a), an operator should also take into account the following: a. the impact of engine failures on the take-off distance required; b. the runway slope in the direction of take-off as indicated in Appendix 1 to AMC OPS.CAT.325.A(a)(4); and c. the loss, if any, of runway length due to alignment of the aeroplane prior to take-off as indicated in Appendix 2 to AMC OPS.CAT.325.A(a)(4).	1) MS: 1.a. refers to multiple engine failures, though airworthiness codes take one engine failure into account. Proposed text: "… the impact of ***an engine failure***…"; 2) IS (aerodromes): 1.b. runway slope should be effective runway slop;	1) Accepted. The intent was an engine failure. 2) Not accepted. Text aligned with EU-OPS.
2. Landing mass. The landing mass of the aeroplane should not exceed the maximum landing mass specified for the altitude and the ambient temperature expected for the estimated time of landing at the destination and alternate aerodrome.		
3. Landing mass for missed approach for Performance Class A aeroplanes.	IS: re-align with EU-OPS 1.510 and insert: "The use of alternative method must be	Not accepted. If an IR, the Article 14 procedure has to be applied. If the material is

A: Rule	B: Summary of comments	C: Reason for change, remarks
	approved by the Authority";	an AMC, the Competent Authority anyway has the opportunity to approve an alternative AMC.
a. For instrument approaches with a missed approach gradient greater than 2.5%. an operator should verify that the expected landing mass of the aeroplane allows a missed approach with a climb gradient equal to or greater than the applicable missed approach gradient in the one-engine inoperative missed approach configuration and speed (CS 25.121(d) / JAR-25.121(d)); and	MS (#4029): replace 3.a. and 3.b. with a single paragraph relevant to all instrument approaches, regardless of decision height, to be in alignment with CS-25/FAR 25.121(d) (extensive text provided in #5909). In addition, the method must be approved by the competent authority. Consider also changes to AMC1 OPS.CAT.345.A(a)(1), #5982);	This has been aligned with EU-OPS Subpart G and transposed in CAT.POL.A.225.
b. For instrument approaches with decision heights below 200 ft, an operator should verify that the expected landing mass of the aeroplane allows a missed approach gradient of climb, with the critical engine failed and with the speed and configuration used for go-around of at least 2.5%, or the published gradient, whichever is the greater (CS-AWO 243 / JAR-AWO 243).		
4. For Performance Class C aeroplanes, the maximum landing mass specified for the altitude and the ambient temperature expected for the estimated time of landing at the destination and alternate aerodrome is the one specified in the AFM.		
Appendix 1 to AMC OPS.CAT.316.A(a)(4) Performance General –		

A: Rule	**B: Summary of comments**	**C: Reason for change, remarks**
Aeroplanes		
RUNWAY SLOPE IN THE DIRECTION OF TAKE-OFF FOR PERFORMANCE CLASS B AND CLASS C AEROPLANES		
Unless otherwise specified in the AFM or other performance or operating manuals from the manufacturer, the take-off distance should be increased by 5% for each 1% of upslope except that correction factors for runways with slopes in excess of 2% should only be applied when the operator has demonstrated to the competent authority that he/she has the necessary data in the AFM, the Operations Manual (OM) contain the appropriated procedures and the crew is training to take-off in runway with slopes in excess of 2%.		
Appendix 2 to AMC OPS.CAT.316.A(a)(4) Performance General – Aeroplanes		
LOSS OF RUNWAY LENGTH DUE TO ALIGNMENT FOR TAKE-OFF - PERFORMANCE CLASS A AND C AEROPLANES		
1. The length of the runway which is declared for the calculation of Take-off Distance Available (TODA), Accelerate Stop Distance Available (ASDA) and Take-off Run Available (TORA), does not account for line-up of the aeroplane in the direction of take-off on the runway in use. This alignment distance depends on the aeroplane geometry and access possibility to the runway in use. Accountability is usually required for a 90° taxiway entry to the runway and 180° turnaround on the runway. There are two distances to be considered: a. The minimum distance of the main wheels from the start of the runway for determining TODA and TORA,”L”; and b. The minimum distance of the most forward wheel(s) from the start of		

A: Rule	**B: Summary of comments**	**C: Reason for change, remarks**
the runway for determining ASDA,"N".		
		
Where the aeroplane manufacturer does not provide the appropriate data, the calculation method given in 2. below may be used to determine the alignment distance.		
2. Alignment Distance Calculation		

<table>
<tr><th>A: Rule</th><th>B: Summary of comments</th><th>C: Reason for change, remarks</th></tr>
<tr><td>
</td><td></td><td></td></tr>
<tr><td>The distances mentioned in a. and b. of 1. above are:</td><td></td><td></td></tr>
<tr><td><table>
<tr><th></th><th>90° ENTRY</th><th>180° TURNAROUND</th></tr>
<tr><td>L=</td><td>RM + X</td><td>RN + Y</td></tr>
<tr><td>N=</td><td>RM + X + WB</td><td>RN + Y + WB</td></tr>
</table>
WB</td><td></td><td></td></tr>
<tr><td>where:RN = A + WN = ---------------- + WN
cos(90°-α)
and RM = B + WM = WB tan(90°-α) + WM
X = Safety distance of outer main wheel during turn to the edge of the runway</td><td></td><td></td></tr>
</table>

A: Rule	**B: Summary of comments**	**C: Reason for change, remarks**
Y = Safety distance of outer nose wheel during turn to the edge of the runway NOTE: Minimum edge safety distances for X and Y are specified in ICAO Annex 14 and FAA AC 150/5300-13. RN = Radius of turn of outer nose wheel RM = Radius of turn of outer main wheel WN = Distance from aeroplane centre-line to outer nose wheel WM = Distance from aeroplane centre-line to outer main wheel WB = Wheel base A = Steering angle		
AMC OPS.CAT.316.A(c) Performance General – Aeroplanes		
TAKE-OFF AND LANDING CLIMB FOR CLIMB CRITERIA FOR PERFORMANCE CLASS B AEROPLANES		
1. The climb criteria should be those required by the applicable airworthiness code (e.g. CS 23.63(c)(1); CS 23.63(c)(2) or equivalent).	MS: difficult for operators to determine OEI performance capability for those aircraft that do not have the required data in the AFM/POH. Request to amend OPS.CAT.316.A(c) and delete this AMC;	The revised rule text has been aligned with EU-OPS Subpart G and retained as IR (CAT.POlA.335).
2. Take-off Climb		
a. All Engines Operating (AEO)		

A: Rule	**B: Summary of comments**	**C: Reason for change, remarks**
The steady gradient of climb after take-off should be at least 4% with:		
i. take-off power on each engine;		
ii. the landing gear extended except that if the landing gear can be retracted in not more than 7 seconds, it may be assumed to be retracted;		
iii. the wing flaps in the take-off position(s); and		
iv. a climb speed not less than the greater of 1.1 V_{MC} and 1.2 V_{S1}.		
b. One Engine Inoperative (OEI)		
i. The steady gradient of climb at an altitude of 400 ft above the take-off surface should be measurably positive with: A. the critical engine inoperative and its propeller in the minimum drag position; B. the remaining engine at take-off power; C. the landing gear retracted; D. the wing flaps in the take-off position(s); and E. a climb speed equal to that achieved at 50 ft.		
ii. The steady gradient of climb should be not less than 0.75% at an altitude of 1 500 ft above the take-off surface with: A. the critical engine inoperative and its propeller in the		

A: Rule	**B: Summary of comments**	**C: Reason for change, remarks**
minimum drag position; B. the remaining engine at not more than maximum continuous power; C. the landing gear retracted; D. the wing flaps retracted; and E. a climb speed not less than 1.2 VS1.		
3. Landing Climb		
a. AEO		
The steady gradient of climb should be at least 2.5% with: i. not more than the power or thrust that is available 8 seconds after initiation of movement of the power controls from the minimum flight idle position; ii. the landing gear extended; iii. the wing flaps in the landing position; and iv. a climb speed equal to VREF.		
b. OEI		
The steady gradient of climb should be not less than 0.75% at an altitude of 1 500 ft above the landing surface with: i. the critical engine inoperative and its propeller in the minimum drag position; ii. the remaining engine at not more than maximum continuous power; iii. the landing gear retracted;		

A: Rule	**B: Summary of comments**	**C: Reason for change, remarks**
iv. the wing flaps retracted; and v. a climb speed not less than 1.2 VS1.		
GM OPS.CAT.316.A(c) Performance General – Aeroplanes		
TAKE-OFF AND LANDING CLIMB FOR PERFORMANCE CLASS B SINGLE-ENGINED AEROPLANES		
Limitations on the operation of single-engined aeroplanes are covered by the applicable operational procedures.		
AMC1 OPS.CAT.326.A Take-off requirements - Aeroplanes		
TAKE-OFF DISTANCES		
1. Operators of Performance Class A aeroplanes and for such Performance Class C aeroplanes, for which take-off field length data accounts for engine failures in their AFM, should meet the following when determining the maximum take-off mass: a. the accelerate-stop distance should not exceed the accelerate-stop distance available; b. the take-off distance should not exceed the take-off distance available, with a clearway distance not exceeding half of the take-off run available; c. the take-off run should not exceed the take-off run available; and d. compliance with this AMC should be shown using a single value of V1 for the rejected and continued take-off.	MS: for clarity amend 1.d. to “compliance with this AMC ***paragraph***…”. 1.b. should be deleted as it is a direct copy of OPS.GEN.320.A (a)(1)	Accepted. Text only proposed to be an IR.

A: Rule	**B: Summary of comments**	**C: Reason for change, remarks**
2. Operators of Performance Class C aeroplanes for which the AFM does not include engine failure accountability, the distance from the start of the take-off roll required to reach a height of 50 ft above the surface with AEO within the maximum take-off power conditions specified, should not exceed the take-off run available, when multiplied by a factor of either: a. 1,33 for aeroplanes having two engines; or b. 1,25 for aeroplanes having three engines; or c. 1,18 for aeroplanes having four engines.		
3. Operators of Performance Class B aeroplanes should ensure that the unfactored take-off distance, as specified in the AFM does not exceed:		
a. when multiplied by a factor of 1.25, the take-off run available; or		
b. when stopway and/or clearway is available, the following: i. the take-off run available; ii. when multiplied by a factor of 1.15, the take-off distance available; and iii. when multiplied by a factor of 1.3, the accelerate-stop distance available.	MS: add to 3.b. text to list new (b) the clearway available with a factor of 1.25 to calculate the take-off distance available; followed by (c) stopway and a factor of 1.25 to calculate the accelerate-stop distance, followed by the current text as (d). This maintains a distinction between stopway and clearway, enabling the operator to choose whether to use a stopway when available. In addition, clearway length should be limited to half of the runway length (as for Performance Class A	Accepted. Text changed accordingly.

A: Rule	B: Summary of comments	C: Reason for change, remarks
	aeroplanes) (#5931);	
AMC2 OPS.CAT.326.A Take-off requirements - Aeroplanes		
RUNWAY SURFACE CONDITION FOR PERFORMANCE CLASS B AEROPLANES		
1. Unless otherwise specified in the AFM or other performance or operating manuals from the manufacturer, the variables affecting the take-off performance and the associated factors that should be applied to the AFM data are shown in the table below. They should be applied in addition to the operational factors in 3. of AMC1 OPS.CAT.326.A.		
(table below) Notes:		
1. The soil is firm when there are wheel impressions but no rutting.		
2. When taking off on grass with a single-engined aeroplane, care should be taken to assess the rate of acceleration and consequent distance increase.		
3. When making a rejected take-off on very short grass which is wet, and with a firm subsoil, the surface may be slippery, in which case the distances		

Surface type	Condition	Factor
Grass (on firm soil) up to 0.2 m long	Dry	1.2
	Wet	1.3
Paved	Wet	1.0

A: Rule	B: Summary of comments	C: Reason for change, remarks
may increase significantly.		
GM1 OPS.CAT.326.A Take-off requirements - Aeroplanes		
RUNWAY SURFACE CONDITION FOR PERFORMANCE CLASS B AEROPLANES		
1. Due to the inherent risks, operations from contaminated runways are inadvisable and should be avoided whenever possible. Therefore, it is advisable to delay the take-off until the runway is cleared.		
2. Where this is impracticable, the pilot-in-command should also consider the excess runway length available including the criticality of the overrun area.		
GM2 OPS.CAT.326.A Take-off requirements - Aeroplanes		
RUNWAY SURFACE CONDITION FOR PERFORMANCE CLASS A AND CLASS C AEROPLANES		
1. Operation on runways contaminated with water, slush, snow or ice implies uncertainties with regard to runway friction and contaminant drag and therefore to the achievable performance and control of the aeroplane during take-off, since the actual conditions may not completely match the assumptions on which the performance information is based. In the case of a contaminated runway, the first option for the pilot-in-command is to wait until the runway is cleared. If this is impracticable, he may consider a take-off, provided that he has applied the applicable performance adjustments, and any further safety measures he considers justified under the prevailing conditions.		

A: Rule	**B: Summary of comments**	**C: Reason for change, remarks**
2. An adequate overall level of safety will only be maintained if operations in accordance with AMC 25.1591 or equivalent are limited to rare occasions. Where the frequency of such operations on contaminated runways is not limited to rare occasions, operators should provide additional measures ensuring an equivalent level of safety. Such measures could include special crew training, additional distance factoring and more restrictive wind limitations.		
AMC1 OPS.CAT.327.A Take-off obstacle clearance - Aeroplanes		
GENERAL CONSIDERATIONS		
1. When showing compliance with the take-off obstacle clearance requirements, an operator should take account of the following: a. the mass of the aeroplane at the commencement of the take-off run; b. the pressure altitude at the aerodrome; c. the ambient temperature at the aerodrome; and d. not more than 50% of the reported head-wind component or not less than 150% of the reported tail-wind component.	MS: are 1. and 2. applicable to all performance classes?	Text has been aligned with Subparts F-I of EU-OPS and all performance classes are addressed individually.
2. Adequate allowance should be made for the effect of bank angle (Appendix 1 to AMC1 OPS.CAT.327.A) on operating speeds and flight path including the distance increments resulting from increased operating speeds.		
3. For Performance Class B aeroplanes, it should be assumed that: a. failure of the critical engine occurs at the point on the all engine take-off flight path where visual reference for the purpose of avoiding obstacles is expected to be lost;		

A: Rule	B: Summary of comments	C: Reason for change, remarks
b. the gradient of the take-off flight path from 50 ft to the assumed engine failure height is equal to the average all-engine gradient during climb and transition to the en-route configuration, multiplied by a factor of 0.77; and c. the gradient of the take-off flight path from the height reached above to the end of the take-off flight path is equal to the OEI en-route climb gradient shown in the AFM.		
AMC2 OPS.CAT.327.A Take-off obstacle clearance - Aeroplanes		
DETERMINATION OF THE HORIZONTAL, VERTICAL AND LATERAL DISTANCES FOR THE TAKE-OFF FLIGHT PATH OBSTACLE CLEARANCES	IS (ECA): replace "flight path!" with "***net*** flight path" throughout this AMC, to include climb gradient reductions in the certification specifications are included when showing compliance with obstacle clearance criteria;	Partially accepted. Text has been aligned with Subparts F-I of EU-OPS. It should be noted that the net flight path is only applicable to performance class A aeroplanes.
1. Horizontal distances or vertical margins. Operators should ensure that the take-off flight path clears all obstacles by horizontal or vertical distances as following:		
a. for aeroplanes with a wingspan of 60 m or more, by a horizontal distance of at least 90 m plus 0.125 x D, where D is the horizontal distance the aeroplane has travelled from the end of the take-off distance available or the end of the take-off distance if a turn is scheduled before the end of the take-off distance available;		
b. for aeroplanes with a wingspan of less than 60 m, by a horizontal distance of half the aeroplane wingspan plus 60 m, plus 0.125 x D; or	MS: align with EU-OPS 1.495(a) to make 1.b. optional and amend text 1.b. "at the	Text has been aligned with Subparts F-I of EU-OPS and all performance classes are

A: Rule	**B: Summary of comments**	**C: Reason for change, remarks**
	option of the operator, for aeroplanes …”;	addressed individually.
c. for Performance Class A aeroplanes (Appendix 1 to AMC2 OPS.CAT.327.A), by a vertical margin of at least 35 ft and for any part of the net take-off flight path in which the aeroplane is banked by more than 15° by a vertical margin of at least 50 ft; or		
d. for Performance Class B (Appendix 2 to AMC2 OPS.CAT.327.A) and Performance Class C aeroplanes, by a vertical margins of at least 50 ft.	IS (ECA): Align with EU-OPS 1.570(a) by adding 1.e. “For Performance Class C by a vertical margin of at least 50 ft plus 0.01 x D”;	Text has been aligned with Subparts F-I of EU-OPS and all performance classes are addressed individually.
2. Where the intended take-off flight path does not require track changes of more than 15°, an operator does not need to consider those obstacles which have a lateral distance greater than: a. 300 m, if the pilot is able to maintain the required navigational accuracy (Appendix 3 to AMC2 OPS.CAT.327.A) through the obstacle accountability area; or b. 600 m, for flights under all other conditions.		
3. Where the intended take-off flight path does require track changes of more than 15°, an operator does not need to consider those obstacles which have a lateral distance greater than: a. 600 m, if the pilot is able to maintain the required navigational accuracy (Appendix 3 to AMC2 OPS.CAT.327.A) through the obstacle accountability area; or b. 900 m for flights under all other conditions.		

A: Rule	**B: Summary of comments**	**C: Reason for change, remarks**
4. For the compliance with 1. to 3. above, it should be assumed that:	IS (ECA): Align with EU-OPS 1.495(c) to clarify that $.a. – c. are operating limits;	Text has been aligned with Subparts F-I of EU-OPS and all performance classes are addressed individually.
a. track changes are not allowed up to the point at which: i. the take-off flight path for Performance Class B and C aeroplanes is not less than 50 ft above the elevation of the end of the take-off run available; and ii. the net take-off flight path for Performance Class A aeroplanes has achieved a height equal to one half the wingspan but not less than 50 ft above the elevation of the end of the take-off run available.		
b. thereafter, up to a height of 400 ft the aeroplane is banked by no more than 15°;		
c. above 400 ft, the aeroplane is banked by no more than 25° for Performance Class A and C aeroplanes.		
5. Operators of Performance Class A aeroplanes may use special procedures, to apply increased bank angles (Appendix 4 to AMC2 OPS.CAT.327.A) of not more than 20º between 200 ft and 400 ft, or not more than 30º above 400 ft.		
6. For showing compliance with 2.a. and 3.b above, operators of Performance Class B aeroplanes should ensure that the flight is conducted under conditions allowing visual course guidance navigation, or if navigational aids are available, enabling the pilot to maintain the intended flight path with the same accuracy.		
GM1 OPS.CAT.327.A Take-off obstacle clearance - Aeroplanes		

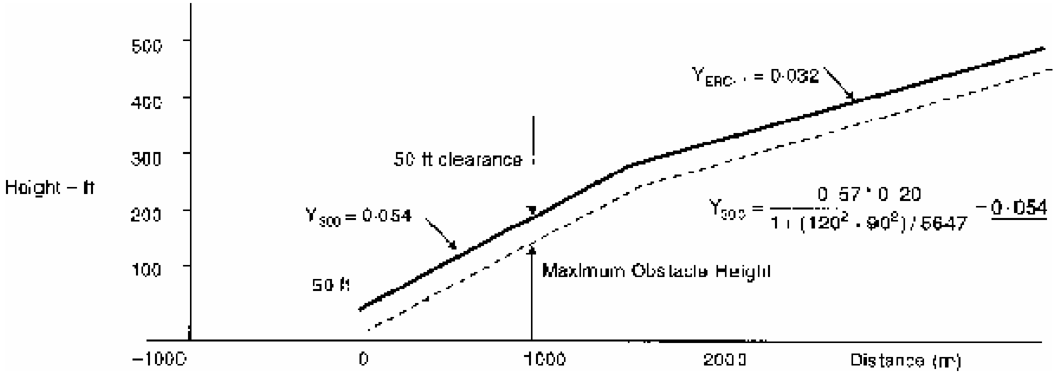
A: Rule	**B: Summary of comments**	**C: Reason for change, remarks**
OBSTACLE CLEARANCE IN LIMITED VISIBILITY FOR PERFORMANCE CLASS B AEROPLANES		
1. Unlike the airworthiness codes applicable for Performance Class A aeroplanes, those for Performance Class B aeroplanes do not necessarily provide for engine failure in all phases of flight. It is accepted that performance accountability for engine failure need not be considered until a height of 300 ft is reached.		
2. The weather minima given up to and including 300 ft imply that if a take-off is undertaken with minima below 300 ft a OEI flight path should be plotted starting on the all-engine take-off flight path at the assumed engine failure height. This path should meet the vertical and lateral obstacle clearance specified AMC2 OPS.CAT.327.A. Should engine failure occur below this height, the associated visibility is taken as being the minimum which would enable the pilot to make, if necessary, a forced landing broadly in the direction of the take-off. At or below 300 ft, a circle and land procedure is extremely inadvisable. The weather minima requirements specify that, if the assumed engine failure height is more than 300 ft, the visibility should be at least 1 500 m and, to allow for manoeuvring, the same minimum visibility should apply whenever the obstacle clearance criteria for a continued take-off cannot be met.		
Appendix 1 to AMC1 OPS.CAT.327.A Take-off obstacle clearance - Aeroplanes		
EFFECT OF BANK ANGLES		
1. The AFM generally provides a climb gradient decrement for a 15° bank turn.		

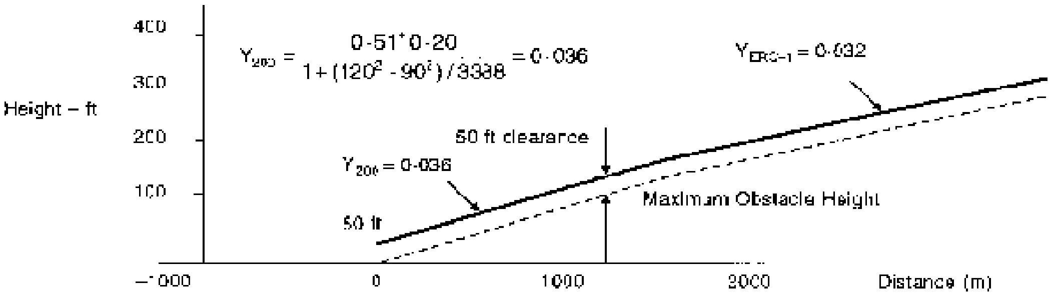
A: Rule	**B: Summary of comments**	**C: Reason for change, remarks**
2. Unless otherwise specified in the AFM or other performance or operating manuals from the manufacturer, acceptable adjustments to assure adequate stall margins and gradient corrections are provided by the following:		
BANK / SPEED / GRADIENT CORRECTION: 15° / V_2 / 1 x AFM 15° Gradient Loss 20° / V_2 + 5 kt / 2 x AFM 15° Gradient Loss 25° / V_2 + 10 kt / 3 x AFM 15° Gradient Loss 3. For bank angles of less than 15°, a proportionate amount should be applied, unless the manufacturer or the AFM provides other data.		
Appendix 1 to AMC2 OPS.CAT.327.A Take-off obstacle clearance - Aeroplanes		
TAKE-OFF OBSTACLE CLEARANCE FOR PERFORMANCE CLASS A AEROPLANES		
1. In accordance with the definitions used in preparing the take-off distance and take-off flight path data provided in the AFM:		
a. The net take-off flight path is considered to begin at a height of 35 ft above the runway or clearway at the end of the take-off distance determined for the aeroplane in accordance with b. below.		
b. The take-off distance is the longest of the following distances: i. 115% of the distance with AEO from the start of the take-off to the point at which the aeroplane is 35 ft above the runway or		

A: Rule	B: Summary of comments	C: Reason for change, remarks
clearway; or ii. the distance from the start of the take-off to the point at which the aeroplane is 35 ft above the runway or clearway assuming failure of the critical engine occurs at the point corresponding to the decision speed (V1) for a dry runway; or iii. if the runway is wet or contaminated, the distance from the start of the take-off to the point at which the aeroplane is 15 ft above the runway or clearway assuming failure of the critical engine occurs at the point corresponding to the decision speed (V1) for a wet or contaminated runway.		
2. The net take-off flight path, determined from the data provided in the AFM in accordance with 1.a. and 1.b. above, should clear all relevant obstacles by a vertical distance of 35 ft. When taking off on a wet or contaminated runway and an engine failure occurs at the point corresponding to the decision speed (V1) for a wet or contaminated runway, this implies that the aeroplane can initially be as much as 20 ft below the net take-off flight path in accordance with 1. above and, therefore, may clear close-in obstacles by only 15 ft. When taking off on wet or contaminated runways, the operator should exercise special care with respect to obstacle assessment, especially if a take-off is obstacle limited and the obstacle density is high.		
Appendix 2 to AMC2 OPS.CAT.335.A Take-off obstacle clearance - Aeroplanes		
TAKE-OFF FLIGHT PATH CONSTRUCTION FOR PERFORMANCE CLASS B AEROPLANES		
1. For demonstrating that an aeroplane clears all obstacles vertically, a flight path should be constructed consisting of an all-engine segment to the		

A: Rule	**B: Summary of comments**	**C: Reason for change, remarks**
assumed engine failure height, followed by an engine-out segment. Where the AFM does not contain the appropriate data, the approximation given in 2. below may be used for the all-engine segment for an assumed engine failure height of 200 ft, 300 ft, or higher.		
2. Flight Path Construction		
a. All-Engines Segment (50 ft to 300 ft). The average all-engines gradient for the all-engines flight path segment starting at an altitude of 50 ft at the end of the take-off distance ending at or passing through the 300 ft point is given by the following formula:		
VICKI EQUATION		
$Y_{300} = \frac{0.57(Y_{ERC})}{1+(V_{ERC}^2 - V_2^2)/5647}$		
where: Y300 = Average all-engines gradient from 50 ft to 300 ft YERC = Scheduled all engines en-route gross climb gradient VERC = En-route climb speed, all engines knots True Airspeed (TAS) V2 = Take-off speed at 50 ft, knots TAS		
A graphical presentation is shown in Figure 4 below.		
Note: The factor of 0.77 required in order to take into account the effect of engine failure is already included.		

A: Rule	**B: Summary of comments**	**C: Reason for change, remarks**
b. All-Engines Segment (50 ft to 200 ft). (May be used as an alternative to a. above where weather minima permits.) The average all-engine gradient for the all-engine flight path segment starting at an altitude of 50 ft at the end of the take-off distance ending at or passing through the 200 ft point is given by the following formula:		
$Y_{200} = \frac{0.51(Y_{ERC})}{1+(V_{ERC}^2 - V_2^2)/3388}$		
where: Y200 = Average all-engines gradient from 50 ft to 200 ft YERC = Scheduled all engines en-route gross climb gradient VERC = En-route climb speed, all engines, knots TAS V2 = Take-off speed at 50 ft, knots TAS		
A graphical presentation is shown in Figure 5 below.		
Note: The factor of 0.77 required in order to take into account the effect of engine failure is already included.		
c. All-Engines Segment (above 300 ft). The all-engines flight path segment continuing from an altitude of 300 ft is given by the AFM en-route gross climb gradient, multiplied by a factor of 0•77.		
d. The OEI Flight Path. The OEI flight path is given by the OEI gradient chart contained in the AFM.		
3. Examples of the method described are the following:		

A: Rule	**B: Summary of comments**	**C: Reason for change, remarks**
The examples shown below are based on an aeroplane for which the AFM shows, at a given mass, altitude, temperature and wind component the following performance data: Factored take-off distance = 1 000 m Take-off speed, V2 = 90 kt En-route climb speed, VERC = 120 kt En-route all-engine climb gradient, YERC = 0•200 En-route OEI climb gradient, YERC-1 = 0•032		
a. Assumed Engine Failure Height 300 ft. The average all-engine gradient from 50 ft to 300 ft may be read from Figure 4 or calculated with the following formula:		
$Y_{300} = \frac{0.57(Y_{ERC})}{1+(V_{ERC}^{2} - V_{2}^{2})/5647}$		
Figure 1		
		

A: Rule	**B: Summary of comments**	**C: Reason for change, remarks**
b. Assumed engine failure height 200 ft. The average all-engine gradient from 50 ft to 200 ft may be read from Figure 5 or calculated with the following formula:		
$Y_{200} = \frac{0.51(Y_{ERC})}{1+(V_{ERC}^2 - V_2^2)/3388}$		
Figure 2		
		
c. Assumed engine failure height less than 200 ft. Construction of a take-off flight path is only possible if the AFM contains the required flight path data.		
d. Assumed engine failure height more than 300 ft. The construction of a take-off flight path for an assumed engine failure height of 400 ft is shown in Figure 3.		
Figure 3		

A: Rule	B: Summary of comments	C: Reason for change, remarks

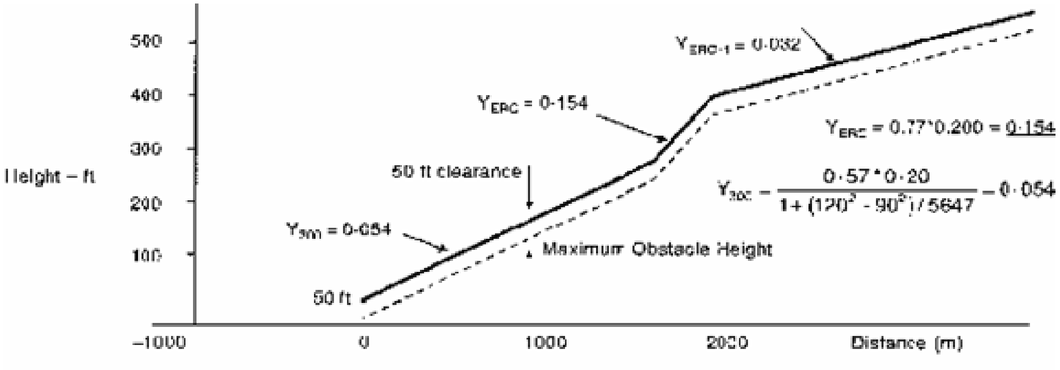



Figure 4		

A: Rule	B: Summary of comments	C: Reason for change, remarks

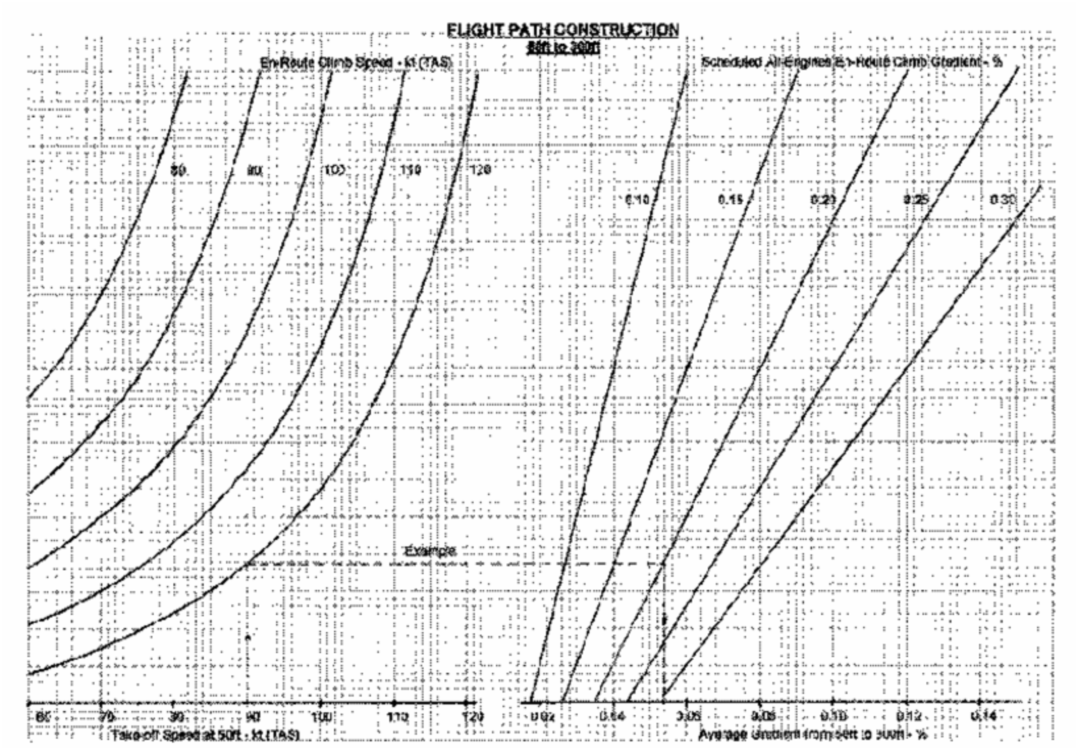
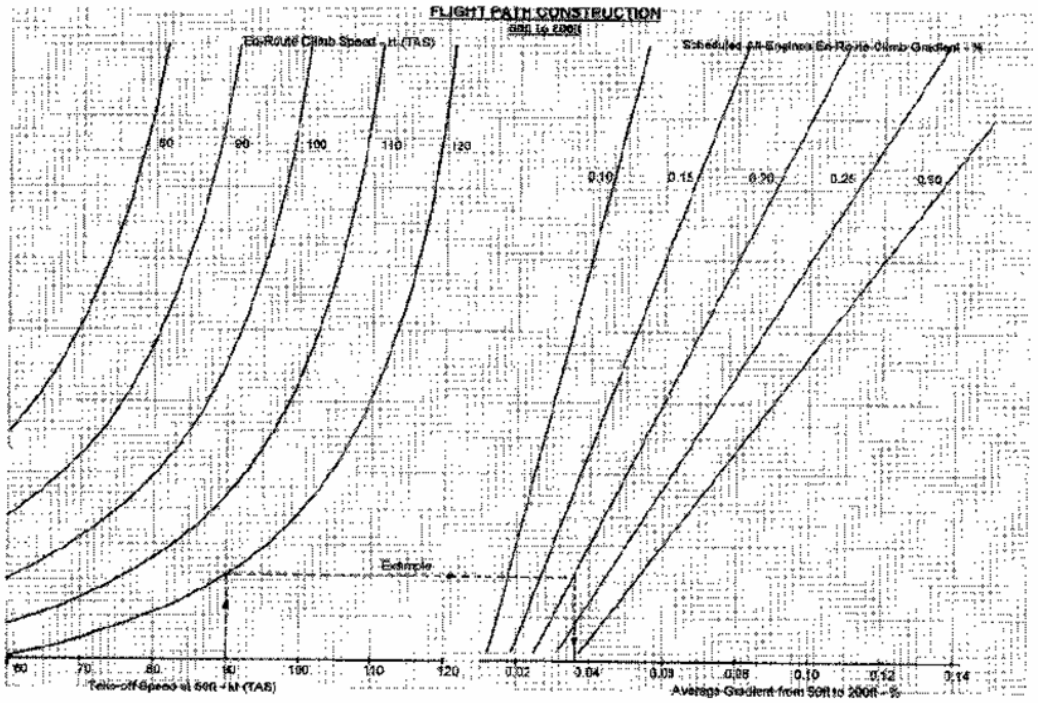



Figure 5		

A: Rule	**B: Summary of comments**	**C: Reason for change, remarks**
		
Appendix 3 to AMC2 OPS.CAT.327.A Take-off obstacle clearance - Aeroplanes		
TAKE-OFF FLIGHT PATH – REQUIRED NAVIGATIONAL ACCURACY FOR PERFORMANCE CLASS A AND CLASS B AEROPLANES		
1. Flight-deck systems. The obstacle accountability semi-widths of 300 m and 600 m may be used if the navigation system under OEI conditions provides a two standard deviation (2 s) accuracy of 150 m and 300 m respectively.		

A: Rule	**B: Summary of comments**	**C: Reason for change, remarks**
2. Visual Course Guidance		
a. The obstacle accountability semi-widths of 300 m may be used where navigational accuracy is ensured at all relevant points on the flight path by use of external references. These references may be considered visible from the flight deck if they are situated more than 45° either side of the intended track and with a depression of not greater than 20° from the horizontal.		
b. For visual course guidance navigation, an operator should ensure that the weather conditions prevailing at the time of operation, including ceiling and visibility, are such that the obstacle and/or ground reference points can be seen and identified. The OM should specify, for the aerodrome(s) concerned, the minimum weather conditions which enable the flight crew to continuously determine and maintain the correct flight path with respect to ground reference points, so as to provide a safe clearance with respect to obstructions and terrain as follows:		
i. the procedure should be well defined with respect to ground reference points so that the track to be flown can be analysed for obstacle clearance requirements;		
ii. the procedure should be within the capabilities of the aeroplane with respect to forward speed, bank angle and wind effects;		
iii. a written and/or pictorial description of the procedure should be provided for crew use;		
iv. the limiting environmental conditions (such as wind, the lowest cloud base, ceiling, visibility, day/night, ambient lighting, obstruction lighting) should		

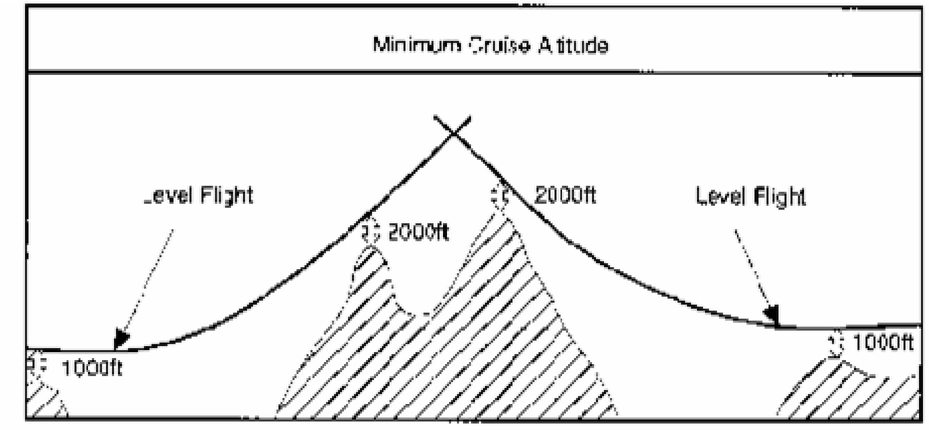
A: Rule	B: Summary of comments	C: Reason for change, remarks
be specified.		
Appendix 4 to AMC 2 OPS.CAT.327.A Take-off obstacle clearance - Aeroplanes		
APPROVAL OF INCREASED BANK ANGLES FOR PERFORMANCE CLASS A AEROPLANES		
For the use of increased bank angles, the following criteria should be met:		
1. the AFM should contain approved data for the required increase of operating speed and data to allow the construction of the flight path considering the increased bank angles and speeds;		
2. visual guidance should be available for navigation accuracy;		
3. weather minima and wind limitations should be specified for each runway and should be specified in the OM; and		
4. training in accordance with the applicable training requirements for flight crew in Part-OR.		
AMC OPS.CAT.340.A(a) En-Route requirements - Aeroplanes		
SINGLE-ENGINED AEROPLANES		
1. Operators should first increase the scheduled engine-inoperative gliding performance data by 0.5% gradient when verifying the en-route clearance		

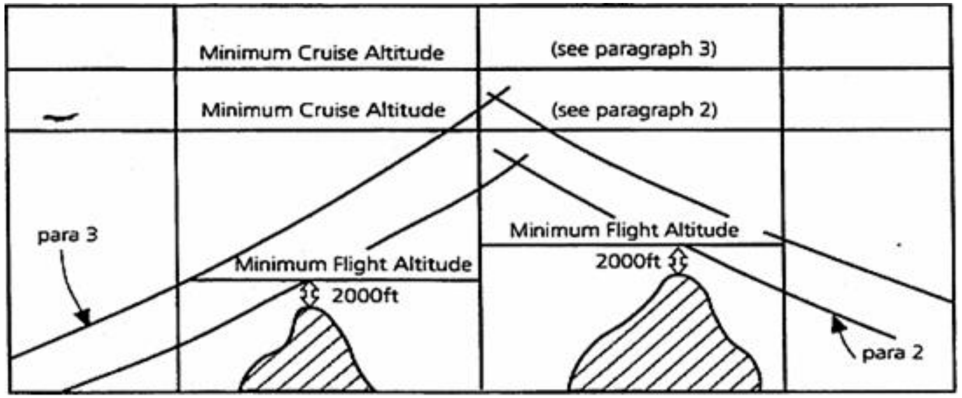
A: Rule	**B: Summary of comments**	**C: Reason for change, remarks**
of obstacles and the ability to reach a suitable place for a forced landing.		
2. OPS.CAT.340.A subparagraph (a) requires an operator to ensure that in the event of an engine failure, the aeroplane should be capable of reaching a point from which a successful forced landing can be made. Unless otherwise specified by the competent authority, this point should be 1 000 ft above the intended landing area.		
GM OPS.CAT.340.A(a) En-Route requirements - Aeroplanes		
SINGLE-ENGINED AEROPLANES		
1. In the event of an engine failure, single-engined aeroplanes have to rely on gliding to a point suitable for a safe forced landing. Such a procedure is clearly incompatible with flight above a cloud layer which extends below the relevant minimum safe altitude.		
2. The altitude at which the rate of climb equals 300 ft per minute is not a restriction on the maximum cruising altitude at which the aeroplane can fly in practice; it is merely the maximum altitude from which the engine-inoperative procedure can be planned to start.		
GM OPS.CAT.340.A(b) En-Route requirements - Aeroplanes		
MINIMUM ALTITUDES FOR SAFE FLIGHT		
The minimum altitudes for safe flight on each stage of the route to be flown or of any planned diversion therefrom should be specified in the OM.		

A: Rule	B: Summary of comments	C: Reason for change, remarks
AMC OPS.CAT.340.A(c) En-Route requirements - Aeroplanes		
ONE ENGINE INOPERATIVE		
1. For Performance Class A aeroplanes, the net flight path should take account of the following criteria:		
a. the flight path should clear obstacles (Appendix 1 to AMC OPS.CAT.340.A(c)) within 9.3 km (5 nautical miles (nm)) on either side of the intended track or by a vertical interval of at least 2 000 ft; and	IS: re-align with EU-OPS 1.500(b) and amend text: "the ***net*** flight path…";	Accepted. Text has been aligned with Subparts F-I of EU-OPS and all performance classes are addressed individually. For performance class A the net flight path is applicable.
b. the necessary increase of the width margins of sub-paragraph a. to 18.5 km (10 nm) if the navigational accuracy does not meet the 95% containment level;		
c. the engine is assumed to fail at the most critical point along the route;		
d. account is taken of the effects of winds on the flight path;		
e. fuel jettisoning is permitted to an extent consistent with reaching the aerodrome with the required fuel reserves, if a safe procedure is used; and		
f. the aerodrome where the aeroplane is assumed to land after engine failure should meet the following criteria:		

A: Rule	**B: Summary of comments**	**C: Reason for change, remarks**
i. the performance requirements at the expected landing mass are met; and ii. weather reports or forecasts, or any combination thereof, and field condition reports indicate that a safe landing can be accomplished at the estimated time of landing.		
2. For Performance Class B aeroplanes, the flight path should take account of the following criteria: a. the relevant minimum altitudes for safe flight should be stated in the OM to a point 1 000 ft above an aerodrome; b. the aeroplane should not be assumed to be flying at an altitude exceeding that at which the rate of climb equals 300 ft per minute with AEO within the maximum continuous power conditions specified; and c. the assumed en-route gradient with OEI should be the gross gradient of descent or climb, as appropriate, respectively increased by a gradient of 0.5%, or decreased by a gradient of 0.5%.		
3. For Performance Class C aeroplanes, the flight path should take account of the following criteria:		
a. the flight path should clear obstacles (Appendix 1 AMC OPS.CAT.340(c).A) within 9.3 km (5 nm) either side of the intended track by a vertical interval of at least: i. 1 000 ft when the rate of climb is zero or greater; or ii. 2 000 ft when the rate of climb is less than zero.		
b. the necessary increase of the width margins of 3.a. above to 18.5 km (10 nm) if the navigational accuracy does not meet the 95% containment level;		

A: Rule	B: Summary of comments	C: Reason for change, remarks
c. the flight path should have a positive slope at an altitude of 450 m (1 500 ft) above the aerodrome where the landing is assumed to be made after the failure of one engine.		
d. For the purpose of 3. the available rate of climb of the aeroplane should be taken to be 150 ft per minute less than the gross rate of climb specified; and		
e. fuel jettisoning is permitted to an extent consistent with reaching the aerodrome with the required fuel reserves, if a safe procedure is used.		
Appendix 1 AMC OPS.CAT.340.A(c) En-Route requirements - Aeroplanes		
1. For performance class A and C aeroplanes, the high terrain or obstacle analysis required in AMC OPS.CAT.A.340(c) may be carried out by making a detailed analysis of the route. This should be made using contour maps of the high terrain and plotting the highest points within the prescribed corridor's width along the route. The next step is to determine whether it is possible to maintain level flight with OEI 1 000 ft above the highest point of the crossing. If this is not possible, or if the associated weight penalties are unacceptable, a drift down procedure should be worked out, based on engine failure at the most critical point and clearing critical obstacles during the drift down by at least 2 000 ft. The minimum cruise altitude is determined by the intersection of the two drift down paths, taking into account allowances for decision making (Figure 1).		
Figure 1		

A: Rule	B: Summary of comments	C: Reason for change, remarks
		
2. For Performance class A aeroplanes, the published minimum flight altitudes (Minimum En-route Altitude (MEA), or Minimum Off Route Altitude (MORA)) may also be used for determining whether OEI level flight is feasible at the minimum flight altitude or if it is necessary to use the published minimum flight altitudes as the basis for the drift down construction (Figure 2). This procedure avoids a detailed high terrain contour analysis but may be more penalising than taking the actual terrain profile into account as in 1. above. One means of compliance with AMC OPS.CAT.340(c).A subparagraph 1.b. may be the use of MORA and MEA provided that the aeroplane meets the navigational equipment standard assumed in the definition of MEA.		
Figure 2		

A: Rule	**B: Summary of comments**	**C: Reason for change, remarks**
		
Note: MEA or MORA normally provide the required 2 000 ft obstacle clearance for drift down. However, at and below 6 000 ft altitude, MEA and MORA cannot be used directly as only 1 000 ft. clearance is ensured.		
AMC OPS.CAT.340.A(d) En-route requirements - aeroplanes		
THREE- OR MORE-ENGINED AEROPLANES - TWO ENGINES INOPERATIVE		
1. For Performance Class A aeroplanes: a. at altitudes and in meteorological conditions requiring ice protection systems to be operable, the effect of their use on the net flight path data should be taken into account; and b. the net flight path should have a positive gradient at 1 500 ft above the aerodrome where the landing is assumed to be made after the failure of two engines.		
2. For Performance Class A and Class C aeroplanes, the net flight path or		

A: Rule	**B: Summary of comments**	**C: Reason for change, remarks**
flight path respectively should take into account the following: a. the net flight path and flight path should clear vertically, by at least 2 000 ft all terrain and obstructions along the route within 9.3 km (5 nm) on either side of the intended track; and b. if the navigational accuracy does not meet the 95% containment level, an operator should increase the width margin given above to 18.5 km (10 nm).		
3. The two engines are assumed to fail at the most critical point of that portion of the route where the aeroplane is more than 90 minutes, at the all engines long range cruising speed at standard temperature in still air, away from an aerodrome at which the performance requirements applicable at the expected landing mass are met.	IS: replace "90 minutes" with "180 minutes", and delete "90 minutes" from the IR OPS.CAT.340.A (d).	Not accepted. EU-OPS Subpart G has been transposed and the rule is retained as IR (CAT.POL.A.220).
4. Fuel jettisoning is permitted to an extent consistent with reaching the aerodrome with the required fuel reserves, if a safe procedure is used.		
5. The expected mass of the aeroplane at the point where the two engines are assumed to fail should not be less than that which would include sufficient fuel to proceed to an aerodrome where the landing is assumed to be made, and to arrive there at least 1 500 ft directly over the landing area and thereafter to fly level for 15 minutes.		
AMC1 OPS.CAT.345.A(a)(1) Landing requirements - Aeroplanes		
DESTINATION AND ALTERNATE AERODROMES		
1. For Performance Class A aeroplanes, the required missed approach gradient may not be achieved by all aeroplanes when operating at or near maximum certificated landing mass and in engine-out conditions. Operators of such aeroplanes should consider mass, altitude and		

A: Rule	**B: Summary of comments**	**C: Reason for change, remarks**
temperature limitations and wind for the missed approach.		
2. As an alternative method, the operator may use an increase in the decision altitude/height or minimum descent altitude/height and/or a contingency procedure (AMC1 OPS.GEN.320.A(b)) providing a safe route and avoiding obstacles.	MS: align with the intent of JAR-OPS 1.510(a), (b): operators should consider mass, altitude and temperature limitations for the missed approach at aerodromes which are critical due to obstacles in the missed approach areas. A missed approach climb gradient not less than that required by JAR-OPS 1.510(a) may be used if the obstacle situation along the intended missed approach flight path allows;	Revised rule text is al aligned with the content of EU-OPS Subpart G.
AMC2 OPS.CAT.345.A(a)(1) Landing requirements - Aeroplanes		
DRY RUNWAYS		
1. To determine the landing distance, the operator should use either pressure altitude or geometric altitude for the operation and it should be reflected in the OM.	1) 2 MS, IS (ECA): completely revise this immature text and re-align with EU-OPS 1.515 as it contains many errors. 2.b. should reference factors under 2.a. Delete 6. As the same issues are covered under 2. 5. should state when 70% factor	1) and 2) Accepted. Text has been aligned with Subparts F-I of EU-OPS and all performance classes are addressed individually.

A: Rule	B: Summary of comments	C: Reason for change, remarks
	applies. Designate alternate aerodromes should be in full compliance with EU-OPS 1.515(a), (b), (c), not limited to a safe landing; 2) MS, IS: difficult to read. Re-structure (along with AMC2 OPS.CAT.345.A(a)(1)) along the lines of OPS 1 and TGL 44;	
2. For Performance Class A and B aeroplanes, two considerations in determining should be taken into account for the maximum permissible landing mass at the destination and alternate aerodromes:	1) IS: clarify that 2.a. and 2.b. apply only to flight planning, not for determining in-flight; 2) IS: "… two considerations in determining…" what?	1) and 2) Accepted. Text has been aligned with Subparts F-I of EU-OPS and all performance classes are addressed individually.
a. the aeroplane mass should be such that on arrival the aeroplane can be landed within 60% or 70% (as applicable) of the landing distance available on the most favourable (normally the longest) runway in still air. Regardless of the wind conditions, the maximum landing mass for an aerodrome/aeroplane configuration at a particular aerodrome cannot be exceeded; and	3 IS: 2.a. does not specify when 60% or 70% applies. Align with EU-OPS 1.515(a) and 1.550(a) specifications;	Accepted. Text has been aligned with Subparts F-I of EU-OPS and all performance classes are addressed individually.
b. the environmental conditions and circumstances at a particular aerodrome, e.g. the expected wind, or ATC and noise abatement procedures may indicate the use of a different runway. These factors may result in a lower landing mass than that permitted under the first consideration above, in which case, the dispatch should be based on this lesser mass. The expected wind is the wind expected to exist at the time of arrival.		

<table>
<tr><th>A: Rule</th><th>B: Summary of comments</th><th>C: Reason for change, remarks</th></tr>
<tr><td>3. For Performance Class B and C aeroplanes, unless otherwise specified in the AFM or other performance or operating manuals from the manufacturer, the variables affecting the landing performance and the associated factors to be applied to the AFM data are shown in the table below. It should be applied in addition to the factor specified in this AMC.</td><td></td><td></td></tr>
<tr><td><table>
<tr><th></th><th>SURFACE TYPE</th><th>FACTOR</th></tr>
<tr><td>Performance Class B</td><td>Grass (on firm soil up to 0.2 m long)</td><td>1,15</td></tr>
<tr><td>Performance Class C</td><td>Grass (on firm soil up to 0.13 m long)</td><td>1,20</td></tr>
</table>
Note: The soil is firm when there are wheel impressions but no rutting.</td><td></td><td></td></tr>
<tr><td>4. Threshold limit of the landing distance available. An operator of turbo-jet powered aeroplanes should ensure that the landing mass of that aeroplane for the estimated time of landing allows a full stop landing from 50 ft above the threshold within 60% of the landing distance available at the destination aerodrome and at any alternate aerodrome.</td><td></td><td></td></tr>
<tr><td>5. When ensuring that the aeroplane is able to operate a full stop landing from 50 ft above the threshold within 70% of the landing distance available at the destination, an operator should take account of the following:
a. the altitude at the aerodrome;
b. not more than 50% of the head-wind component or not less than 150% of the tail-wind component;
c. the runway surface condition and the type of runway surface; and
d. the runway slope in the direction of landing.</td><td>1) IS (ECA): amend text: 5.a. “the pressure altitude and ambient temperature at the aerodrome”;
2) 2 IS: if 5. applies to all aeroplanes, amend text: “… within 60% or 70% (as applicable) of the landing distance …”;
3) IS: re-align with EU-OPS</td><td>1)-3) Accepted. Text has been aligned with Subparts F-I of EU-OPS and all performance classes are addressed individually.</td></tr>
</table>

A: Rule	**B: Summary of comments**	**C: Reason for change, remarks**
	1.515: 5.a-d are also relevant to 4.	
6. When dispatching an aeroplane on a dry runway, an operator should assume that: a. the aeroplane should land on the most favourable runway, in still air; and b. the aeroplane should land on the runway most likely to be assigned considering the probable wind speed and direction and the ground handling characteristics of the aeroplane, and considering other conditions such as landing aids and terrain.		
7. If an operator is unable to land on the runway most likely to be assigned considering the weather, the direction and other characteristic of the aeroplane, the aeroplane may be dispatched if an alternate aerodrome is designated which permits a safe landing.		
8. If an operator of a Performance Class A aeroplanes is unable to land on the most favourable runway, in still air, for a destination aerodrome having a single runway where a landing depends upon a specified wind component, an aeroplane may be dispatched if 2 alternate aerodromes are designated which permit a safe landing. Before commencing an approach to land at the destination aerodrome, the pilot-in-command should ensure that a safe landing can be made.	1) MS: re-align with EU/JAR-OPS 1.515(d) and add: "… safe landing can be made ***in full compliance with OPS.CAT.345.A***"; 2) MS: re-write 7. and 8. to state that the aeroplane lands, not the operator;	1) – 2) Accepted. Text has been aligned with Subpart G of EU-OPS.
9. For Performance Class B and C aeroplanes, the landing distances required should be increased by 5% for each 1% of downslope unless otherwise specified in the AFM, or other performance or operating manuals from the manufacturer. The correction factors for runways with slopes in excess of 2% should only be applied when the operator has demonstrated to the competent authority that he/she has the necessary data in the AFM, the		

A: Rule	**B: Summary of comments**	**C: Reason for change, remarks**
OM contains the appropriated procedures and the crew is training to land in runway with slopes in excess of 2%. When an operator should take account of the runway slope in the direction of landing, that runway slope is applicable for Performance Class A aeroplanes only if it is greater than +/- 2%.		
AMC OPS.CAT.345.A(a)(2) Landing requirements - Aeroplanes		
WET AND CONTAMINATED RUNWAYS		
1. For a Performance Class A aeroplane, the landing distance available in case of wet or contaminated runways at arrival should be at least 115% of the required landing distance, determined in accordance with the type of aeroplane that will operate the landing.	1) MS: re-write (along with AMC OPS.CAT.324.A(a)(1)) as there are many errors and the meaning is unclear. For example, refer to landing distance *required*, not available; 2) IS: meaning unclear. Replace 1.-3. with EU-OPS 1.520 (a) – (e); 3) IS (ECA): 1. Should also be in compliance with AMC2 OPS.CAT.345(a)(1), clarify that the maximum permissible landing mass is affected, and calculations should be in relation to dry runway; 4) 2 MS: align with EU-OPS: separate paragraphs for wet and contaminated runways,	1) - 4) Accepted. Text has been aligned with Subparts F-I of EU-OPS and all performance classes are addressed individually.

A: Rule	**B: Summary of comments**	**C: Reason for change, remarks**
	and re-number subsequent paragraphs;	
2. For a Performance Class A aeroplane, a landing distance on a wet runway shorter than that required by 1. above, but not less than that required for dry runways, may be used if the AFM includes specific additional information about landing distances on wet runways.		
3. For a Performance Class A aeroplane, a landing distance on a specially prepared contaminated runway shorter than that required by 1. above, but not less than that required for dry runways, may be used if the AFM includes specific additional information about landing distances on contaminated runways.		
4. For a Performance Class B and C aeroplane, the landing distance available in case of wet runways at arrival should be multiplied by a factor of 1.5.	1) MS: align with EU-OPS and use a factor of ***1.15***; 2) IS: include 15% margin as required by EU-OPS 1.520.	1) - 2) Accepted. Text has been aligned with Subparts H and I of EU-OPS.
5. The landing distance available in cases of contaminated runways at arrival should in all cases be determined by using appropriate data from the AFM or equivalent data from the aircraft manufacturer.	IS (BA): bring into compliance with OPS.CAT.345.A (a)(2)(ii): data from AFM or manufacturer should be "if available" as older aeroplanes do not have such published data;	Accepted. Text has been aligned with Subparts F-I of EU-OPS and all performance classes are addressed individually.
6. For a Performance Class B aeroplane, a landing distance on a wet runway shorter than that required by 4. and 5. above combined, but not less than that required for dry runways may be used only if the AFM includes specific additional information about landing distances on wet runways.		

A: Rule	B: Summary of comments	C: Reason for change, remarks
GM OPS.CAT.345.A(a)(2) Landing requirements - Aeroplanes		
WET AND CONTAMINATED RUNWAYS		
The use of the wet factor (1.5) is, in case of doubt, recommended because it may not be possible for a pilot to determine accurately the degree of wetness (sometimes as much as 60%, 1.6 factor) of the grass, particularly when airborne.	2 IS (BA, ECA): wet factor should be 1.15. Amend subtitle to "wet and contaminated ***grass*** runways";	Accepted. Text has been aligned with Subparts F-I of EU-OPS and all performance classes are addressed individually. The rule titles are aligned with the EU-OPS titles.
AMC OPS.CAT.345.A(b) Landing requirements - Aeroplanes		
STEEP APPROACH		
1. For Steep Approach procedures, the operator should use landing distance data, as appropriate, based on a screen height of less than 50 ft, but not less than 35 ft.	IS: delete 1. as it is a repetition of OPS.CAT.345.A (b);	Accepted.
2. For operators of Performance Class A aeroplanes, the following criteria should be considered:	MS: re-align with EU-OPS 1.550(a)(1) and its Appendix 1, to cover Performance Class A and B aeroplanes.	Accepted. Text has been aligned with Subparts G-h of EU-OPS and all performance classes are addressed individually.
a. the AFM should state the maximum approved glideslope angle, any other limitations, normal, abnormal or emergency procedures for the steep approach as well as amendments to the field length data when		

A: Rule	B: Summary of comments	C: Reason for change, remarks
using steep approach criteria;		
b. a suitable glidepath reference system comprising at least a visual glidepath indicating system should be available at each aerodrome at which steep approach procedures are to be conducted; and		
c. weather minima should be specified and approved for each runway to be used with a steep approach. Consideration should be given to the following: i. the obstacle situation; ii. the type of glidepath reference and runway guidance such as visual aids, Microwave landing system (MLS), 3D–NAV, Instrument Landing System (ILS), Localiser (LLZ), VHF Omnidirectional Radio Range (VOR), Non-directional Beacon (NDB); iii. the minimum visual reference to be required at Decision Height (DH) and Minimum Descent Altitude (MDA); iv. available airborne equipment; v. pilot qualification and special aerodrome familiarisation; vi. AFM limitations and procedures; and vii. missed approach criteria.		
AMC OPS.CAT.345.A(c) Landing requirements - Aeroplanes		
SHORT LANDING OPERATIONS	MS: re-align with Appendix to EU/JAR-OPS rule and upgrade to IR. In particular SLO are alleviations and must be	Partially accepted. The text has been aligned with EU-OPS. The requirement for the approval is proposed to

A: Rule	B: Summary of comments	C: Reason for change, remarks
	supported by justification and compensating criteria;	be in an IR. The criteria for the approval are supposed to be in an AMC to allow for flexibility when appropriate.
1. For operators of Performance Class A and B, the distance used for the calculation of the permitted landing mass may consist of the usable length of the declared safe area plus the declared landing distance available. The following criteria should be met:		
a. the use of the safe area should be approved by the airport authority;	IS (BA): request to add that procedures are in place to ensure that any changes to the safe area are reported immediately to the operator, and the final decision to operate rests with the aeroplane operator (use of safe areas for short landing operations is essential for short runway aerodromes);	Noted. This comment cannot be addressed in OPS rules since the OPS rules are not addressed to the State of aerodromes. However, the comment will be considered when drafting the rules for aerodrome operations.
b. the useable length of the declared safe area should not exceed 90 m;		
c. the width of the declared safe area should not be less than twice the runway width or twice the wing span, whichever is the greater, centred on the extended runway centre line;		
d. the declared safe area should be clear of obstructions or depressions which would endanger an aeroplane undershooting the runway and no mobile object should be permitted on the declared safety area while the runway is being used for short landing operations;		

A: Rule	B: Summary of comments	C: Reason for change, remarks
e. the slope of the declared safe area should not exceed 5% upward nor 2% downward in the direction of landing; and		
f. for the purpose of this operation, the bearing strength requirement of the term "Landing distance available" need not apply to the declared safe area.		
2. The following criteria for operators of Performance Class A may be needed to be applied to be able to conduct short landing operations:		
a. Demonstration of the need for Short Landing Operations. There should be a clear public interest and operational necessity for the operation, either due to the remoteness of the airport or to physical limitations relating to extending the runway.	IS (BA): proportionality: request to delete 2.a. as consideration of public interest is beyond EASA's remit, and the economic impact of this issue could vary between operators;	Not accepted. Text aligned with Appendix 1 to EU–OPS1.515(a)(4). Furthermore, the public interest and the operational necessity have to be demonstrated to the Competent Authority but not to EASA.
b. Aeroplane and Operational Criteria. i. Short landing operation should only be used for aeroplanes where the vertical distance between the path of the pilot's eye and the path of the lowest part of the wheels, with the aeroplane established on the normal glide path, does not exceed 3 m; ii. when establishing aerodrome operating minima the visibility/RVR should not be less than 1.5 km. In addition, wind limitations should be specified in the OM; and iii. minimum pilot experience, training requirements and special aerodrome familiarisation should be specified for	IS (BA): b.i. request to permit increase of vertical distance to 5m for those aeroplanes equipped with an operative radio altimeter with associated altitude call outs (thereby mitigating the blind area). E.g. to permit suitably equipped Falcon and Gulfstream aeroplanes to fly SLO;	Not accepted. Text aligned with Appendix 1 to EU–OPS1.515(a)(4). However, it is proposed that the criteria for the approval of SLO are in an AMC. Any operator would have the possibility to notify an alternative AMC demonstrating that the same safety level can be achieved.

A: Rule	**B: Summary of comments**	**C: Reason for change, remarks**
such operations in the OM.		
c. It is assumed that the crossing height over the beginning of the usable length of the declared safe area is 50 ft.	IS (BA): 2.b.i. request to exempt aeroplanes with MAPSC <=19, MTOM < 45 360 kg from this rule;	Not accepted. Text aligned with Appendix 1 to EU–OPS1.515(a)(4). No safety justification available. However, it is proposed that the criteria for the approval of SLO are in an AMC. Any operator would have the possibility to notify an alternative AMC demonstrating that the same safety level can be achieved.
d. Additional conditions that are deemed necessary for a safe operation taking into account the aeroplane type characteristics, topographic characteristics in the approach area, available approach aids and missed approach/baulked landing considerations may be required for type of operations. Such additional conditions may be, for instance, the requirement for Visual Approach Slope Indicator/Precision Approach Path Indicator (VASI/PAPI) – type visual slope indicator system.	IS (ECA): error - re-align with Appendix 1 to EU-OPS 1.515(a)(4) and amend text: "~~topographic~~***orographic*** characteristics";	Accepted. Text aligned with EU-OPS.
3. The following criteria for operators of Performance Class B may be needed to be applied to be able to conduct short landing operations: a. it is assumed that the crossing height over the beginning of the usable length of the declared safe area should not be less than 50 ft; b. weather minima should be specified and approved for each runway to be used and should not be less than the greater of Visual Flight Rules		

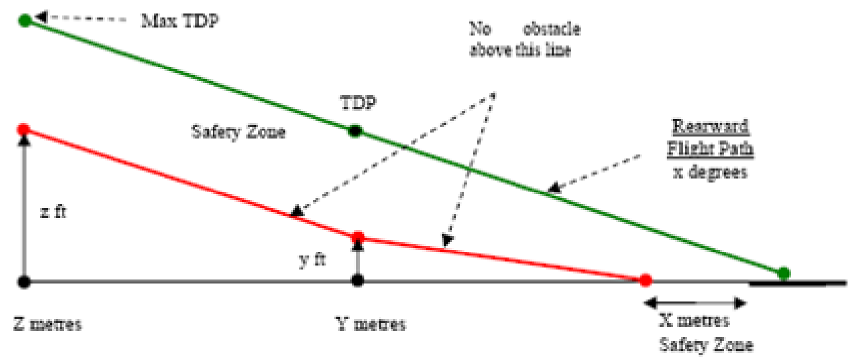
A: Rule	B: Summary of comments	C: Reason for change, remarks
(VFR) or non-precision approach minima; c. pilot requirements should be specified; d. Additional conditions that are necessary for safe operation taking into account the aeroplane type characteristics, approach aids and missed approach/baulked landing considerations may be required for the type of operations.		
AMC1 OPS.CAT.355.H Performance applicability - Helicopters	(MS=;IND=; INDIV=; REP=)4	
PERFORMANCE CLASS 1 CRITERIA		
1. Take-off		
a. The take-off mass should be such that: i. it is possible to reject the take-off and land on the Final Approach and Take-off Area (FATO) in case of the critical power-unit failure being recognised at or before the TDP (Take-off Decision Point); ii. the rejected take-off distance required does not exceed the rejected take-off distance available; and iii. the take-off distance required does not exceed the take-off distance available unless the helicopter can, when continuing the take-off, clear all obstacles to the end of the take-off distance required by a vertical margin of not less than 10.7 m (35 ft).		
b. The part of the take-off up to and including TDP should be conducted in sight of the surface such that a rejected take-off can be carried out.		

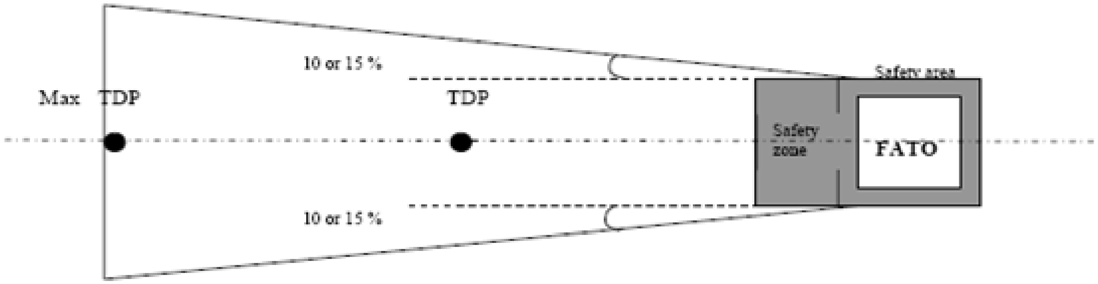
A: Rule	**B: Summary of comments**	**C: Reason for change, remarks**
c. For take-off using a backup (lateral transition) procedure, with the critical power-unit inoperative, all obstacles in the back-up (lateral transition) area can be cleared by an adequate margin.		
2. Take-off flight path		
From the end of the take-off distance required with the critical power-unit failure recognised at the TDP:		
a. The take-off mass should be such that the take-off flight path provides a vertical clearance of not less than 10.7 m (35 ft) for VFR operations and 10.7 m (35 ft) + 0.01 DR for Instrument Flight Rules (IFR) operations above all obstacles located in the climb path. Only obstacles as specified in OPS.CAT.365.H have to be considered.		
b. Where a change of direction of more than 15° is made, adequate allowance should be made for the effect of bank angle on the ability to comply with the obstacle clearance requirements. This turn should not be initiated before reaching a height of 61 m (200 ft) above the take-off surface unless permitted as part of an approved procedure in the Helicopter Flight Manual (HFM).		
3. En-route – critical power-unit inoperative		
a. The en-route flight path with the critical power-unit inoperative, appropriate to the meteorological conditions expected for the flight should comply with either i., ii. or iii. below at all points along the route.		
i. When it is intended that the flight will be conducted at any time out of sight of the surface, the mass of the helicopter permits a rate of climb of at least 50 ft/min with the critical		

A: Rule	**B: Summary of comments**	**C: Reason for change, remarks**
power-unit inoperative at an altitude of at least 300 m (1 000 ft), 600 m (2 000 ft) in areas of mountainous terrain, above all terrain and obstacles along the route within 9.3 km (5 nm) on either side of the intended track.		
ii. When it is intended that the flight will be conducted without the surface in sight, the flight path permits the helicopter to continue flight from the cruising altitude to a height of 300 m (1 000 ft) above a landing site where a landing can be made in accordance with 4. below. The flight path clears vertically, by at least 300 m (1 000 ft), 600 m (2 000 ft) in areas of mountainous terrain, all terrain and obstacles along the route within 9.3 km (5 nm) on either side of the intended track. Drift-down techniques may be used.		
iii. When it is intended that the flight will be conducted in Visual Meteorological Conditions (VMC) with the surface in sight, the flight path permits the helicopter to continue flight from the cruising altitude to a height of 300 m (1 000 ft) above a landing site where a landing can be made in accordance with 4. below, without flying at any time below the appropriate minimum flight altitude, obstacles within 900 m on either side of the route need to be considered.		
b. When showing compliance with 3.a.ii or 3.a.iii above: i the critical power-unit should be assumed to fail at the most critical point along the route; ii account should be taken of the effects of winds on the flight path; iii fuel jettisoning should be planned to take place only to an extent consistent with reaching the aerodrome/operating site with the required fuel reserves and using a safe		

A: Rule	**B: Summary of comments**	**C: Reason for change, remarks**
procedure; and iv fuel jettisoning should not be planned below 1 000 ft above terrain.		
c. The width margins of 3.a.i and 3.a.ii above should be increased to 18.5 km (10 nm) if the navigational accuracy cannot be met for 95% of the total flying time.		
4. Landing		
a. The landing mass should be such that:		
i. in the event of the critical power-unit failure being recognised at any point at or before the Landing Decision Point (LDP), it is possible either to land and stop within the FATO, or to perform a balked landing and clear all obstacles in the flight path by a vertical margin of 10.7 m (35 ft). Only obstacles as specified in OPS.CAT.365.H have to be considered.	(INDIV=4) Is it a balked or baulked landing (editorial)?	Noted It is a balked landing according to JAR-OPS and AC 29-2C.
ii. in the event of the critical power-unit failure being recognised at any point at or after the LDP, it is possible to: A. clear all obstacles in the approach path; and B. land and stop within the FATO.		
iii. that part of the landing from the LDP to touchdown, should be conducted in sight of the surface.		
AMC2 OPS.CAT.355.H Performance applicability - Helicopters		

A: Rule	B: Summary of comments	C: Reason for change, remarks
PERFORMANCE CLASS 1 CRITERIA - EN-ROUTE – CRITICAL POWER-UNIT INOPERATIVE (FUEL JETTISON)		
The presence of obstacles along the en-route flight path may preclude compliance with AMC1 OPS.CAT.355.H 3.a.i at the planned mass at the critical point along the route. In this case fuel jettison at the most critical point may be planned, provided that the procedures in AMC7 OPS.GEN.205.H paragraph 3 are complied with.		
GM1 OPS.CAT.355.H Performance applicability - Helicopters		
PERFORMANCE CLASS 1 CRITERIA - OBSTACLE CLEARANCE IN THE BACK-UP AREA		
1. The requirement in AMC1 OPS.CAT.355.H 1.c has been established in order to take into account the following factors:		
a. In the back-up; the pilot has few visual cues and has to rely upon the altimeter and sight picture through the front window (if flight path guidance is not provided) to achieve an accurate rearward flight path.		
b. In the rejected take-off; the pilot has to be able to manage the descent against a varying forward speed whilst still ensuring an adequate clearance from obstacles until the helicopter gets in close proximity for landing on the FATO.		
c. In the continued take-off; the pilot has to be able to accelerate to Vtoss whilst ensuring an adequate clearance from obstacles.		

A: Rule	B: Summary of comments	C: Reason for change, remarks
2. The requirements of AMC1 OPS.CAT.355.H 1.c. may be achieved by establishing that, in the backup area: a. no obstacles are located within the safety zone below the rearward flight path when described in the HFM (see Figure 1); (in the absence of such data in the HFM, the operator should contact the manufacturer in order to define a safety zone); or b. during the backup, the rejected take-off and the continued take-off manoeuvres, obstacle clearance has been demonstrated by a means acceptable to the authority.		
Figure 1 – Rearward flight path		
		
3. An obstacle, in the backup area, is considered if its lateral distance from the nearest point on the surface below the intended flight path is not further than half of the minimum FATO (or the equivalent term used in the HFM) width defined in the HFM (or, when no width is defined 0.75 D), plus 0.25 times D (or 3 m, whichever is greater); plus 0.10 for VFR day, or		

A: Rule	**B: Summary of comments**	**C: Reason for change, remarks**
0.15 for VFR night, of the distance travelled from the back of the FATO (see Figure 2).		
Figure 2 – Obstacle accountability		
		
GM2 OPS.CAT.355.H Performance applicability - Helicopters	(MS=;IND=; INDIV=; REP=)4	
PERFORMANCE CLASS 1 CRITERIA - APPLICATION OF ALTERNATIVE TAKE-OFF AND LANDING PROCEDURES		
1. Discussion		
A manufacturer's Category A procedure defines profiles and scheduled data for take-off, climb, performance at minimum operating speed and landing, under specific environmental conditions and masses.		
Associated with these profiles and conditions are minimum operating surfaces, take-off distances, climb performance and landing distances;		

A: Rule	B: Summary of comments	C: Reason for change, remarks
these are provided (usually in graphic form) with the take-off and landing masses and the TDP and LDP.		
The landing surface and the height of the TDP are directly related to the ability of the helicopter - following a power-unit failure before or at TDP - to reject onto the surface under forced landing conditions. The main considerations in establishing the minimum size of the landing surface are the scatter during flight testing of the reject manoeuvre, with the remaining engine operating within approved limits, and the required usable cue environment.		
Hence, an elevated site with few visual cues - apart from the surface itself - would require a greater surface area in order that the helicopter can be accurately positioned during the reject manoeuvre within the specified area. This usually results in the stipulation of a larger surface for an elevated site than for a ground level site (where lateral cues may be present).		
This could have the unfortunate side-effect that a FATO which is built 3 m above the surface (and therefore elevated by definition) might be out of operational scope for some helicopters - even though there might be a rich visual cue environment where rejects are not problematical. The presence of elevated sites where ground level surface requirements might be more appropriate could be brought to the attention of the competent authority.		
It can be seen that the size of the surface is directly related to the requirement of the helicopter to complete a rejected take-off following a power-unit failure. If the helicopter has sufficient power such that a failure before or at TDP will not lead to a requirement for rejected take-off, the need for large surfaces is removed; sufficient power for the application of alternative take-off and landing procedures is considered to be the power required for hover-out-of-ground-effect (HOGE) one-engine-inoperative		

A: Rule	B: Summary of comments	C: Reason for change, remarks
(OEI).		
Following a power-unit failure at or after the TDP, the continued take-off path provides OEI clearance from the take-off surface and the distance to reach a point from where climb performance in the first, and subsequent segments, is assured.		
If HOGE OEI performance exists at the height of the TDP, it follows that the continued take-off profile, which has been defined for a helicopter with a mass such that a rejected take-off would be required following a power-unit failure at or before TDP, would provide the same, or better, obstacle clearance and the same, or less, distance to reach a point where climb performance in the first, and subsequent segments, is assured.		
If the TDP is shifted upwards, provided that the HOGE OEI performance is established at the revised TDP, it will not affect the shape of the continued take-off profile but should shift the min-dip upwards by the same amount that the revised TDP has been increased - with respect to the basic TDP.		
Such assertions are concerned only with the vertical or the back-up procedures and can be regarded as achievable under the following circumstances: a. When the procedure is flown, it is based upon a profile contained in the HFM - with the exception of the necessity to perform a rejected take-off. b. The HOGE OEI performance is specified as in AC 29-2C, MG 12 for the Human External Cargo (HEC) Class D requirements. c. The TDP, if shifted upwards (or upwards and backward in the back-up procedure) will be the height at which the HOGE OEI performance is established.	GM2 OPS.CAT.355.H 1.b makes reference to AC29-2C MG12. This MG has been withdrawn. The requirements for OEI HOGE capability are now defined in AC29-2C,Chg 2 at page D-158 in paragraph (12)	Accepted

A: Rule	**B: Summary of comments**	**C: Reason for change, remarks**
d. If obstacles are permitted in the back-up area they should continue to be permitted with a revised TDP.		
2. Methods of Application:		
a. A reduction in the size of the take-off surface may be applied under the following conditions:		
i. Compliance with the requirements of AMC1 OPS.CAT.355.H 1., 2. and 4. can be assured with:		
A. a procedure based upon an appropriate Category A take-off and landing profile scheduled in the HFM;		
B. a take-off or landing mass not exceeding the mass scheduled in the HFM for a HOGE OEI in compliance with HEC Class D performance requirements ensuring that: 1. following a power-unit failure at or before TDP, there are adequate external references to ensure that the helicopter can be landed in a controlled manner; and 2. following a power-unit failure at or after the LDP there are adequate external references to ensure that the helicopter can be landed in a controlled manner.		
b. An upwards shift of the TDP and LDP may be applied under the following conditions:		

A: Rule	**B: Summary of comments**	**C: Reason for change, remarks**
i. Compliance with the requirements of AMC1 OPS.CAT.355.H 1., 2. and 4. can be assured with:		
A. a procedure based upon an appropriate Category A take-off and landing profile scheduled in the HFM;		
B. a take-off or landing mass not exceeding the mass scheduled in the HFM for a HOGE OEI in compliance with HEC Class D performance requirements ensuring that: 1. following a power-unit failure at or after TDP compliance with the obstacle clearance requirements of AMC1 OPS.CAT.355.H 1.a.iii and 2. can be met; and 2. following a power-unit failure at or before the LDP the balked landing obstacle clearance requirements of AMC1 OPS.CAT.355.H 4.a. and 2. can be met.		
c. Alternatively, an operator may use the Category A ground level surface provisions for a specific elevated FATO when it can be demonstrated that the usable cue environment at that FATO would permit such a reduction.		
AMC3 OPS.CAT.355.H Performance applicability - Helicopters	(MS=;IND=; INDIV=; REP=)4	
PERFORMANCE CLASS 2 CRITERIA		
1. Take-off		

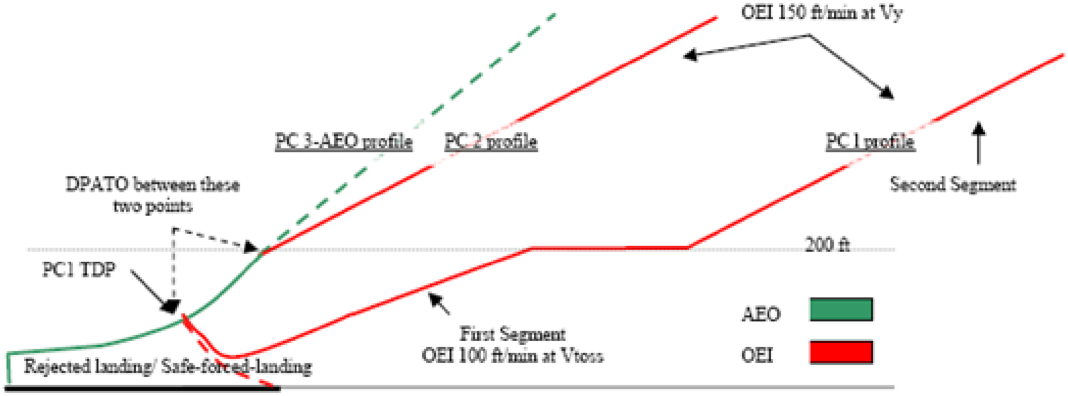
A: Rule	**B: Summary of comments**	**C: Reason for change, remarks**
a. The take-off mass should not exceed the maximum mass specified for a rate of climb of 150 ft/min at 300 m (1 000 ft) above the level of the aerodrome/operating site with the critical power unit inoperative and the remaining power units operating at an appropriate power rating.		
b. The take-off should be conducted in such a way that a safe forced landing can be executed until the point where safe continuation of the flight is possible.		
c. The part of the take-off before the provision of 2. is met should be conducted in sight of the surface.		
2. Take-off Flight Path		
An operator should ensure that from DPATO or no later than 200 ft above the take-off surface, with the critical power-unit inoperative the requirements of AMC1 OPS.CAT.355.H 2.a.i. and ii. are met.	(MS=1; REP=1) Text should be that: "...the requirements of AMC1 OPS.CAT.355.H 2.a. and b. are met	Noted Restoration of the JAR rules will resolve this issue
3. En-route - Critical power unit inoperative. An operator should ensure that the provision of AMC1 OPS.CAT.355.H 3. is met.		
4. Landing		
a. The landing mass at the estimated time of landing should not exceed the maximum mass specified for a rate of climb of 150 ft/min at 300 m (1 000 ft) above the level of the aerodrome/operating site with the critical power unit inoperative and the remaining power units		

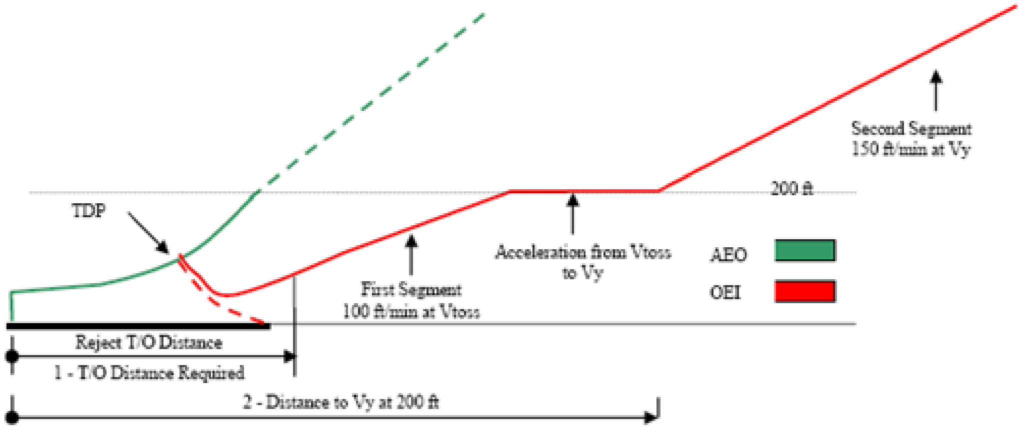
A: Rule	B: Summary of comments	C: Reason for change, remarks
operating at an appropriate power rating.		
b. If the critical power unit fails at any point in the approach path: i. a balked landing can be carried out meeting the provision of 2. above; or ii. the helicopter can perform a safe forced landing.	(MS=1; REP=1) The text does not work well due the use (in the referenced material) to DPATO it would be better as: "i. a balked landing can be carried out meeting the provision of AMC1 OPS.CAT.355.H 2.a. and b."	Noted Restoration of the JAR rules will resolve this issue
c. The part of the landing after which the requirement of 2. above cannot be met should be conducted in sight of the surface.	(MS=1; REP=1) The text does not work well due the use (in the referenced material) to DPATO it would be better as: "c. The part of the landing after which the requirement of b.i cannot be met should be conducted in sight of the surface."	Noted Restoration of the JAR rules will resolve this issue
GM3 OPS.CAT.355.H Performance applicability - Helicopters	(MS=;IND=; INDIV=; REP=)2	
PERFORMANCE CLASS 2 CRITERIA - OPERATIONS IN PERFORMANCE CLASS 2		

A: Rule	**B: Summary of comments**	**C: Reason for change, remarks**
1. Introduction		
This guidance material describes Performance Class 2 and has been produced for the purpose of:		
a. discussing the underlying philosophy of operations in Performance Class 2;		
b. showing simple methods of compliance; and		
c. explaining how to determine - with examples and diagrams: i. the take-off and landing masses; ii. the length of the safe-forced-landing area; iii. distances to establish obstacle clearance; and iv. entry point(s) into Performance Class 1.		
It discusses the derivation of Performance Class 2 from ICAO Annex 6 Part III and describes an alleviation which may be approved in accordance with OPS.SPA.SFL following a Risk Assessment.		
It reproduces relevant definitions; examines the basic requirements; discusses the limits of operation; and considers the benefits of the use of Performance Class 2.		
It contains examples of Performance Class 2 in specific circumstances, and explains how these examples may be generalised to provide the operators with methods of calculating landing distances and obstacle clearance.		

A: Rule	**B: Summary of comments**	**C: Reason for change, remarks**
2. Definitions		
To assist in the reading of this guidance material, the following definitions apply:		
Defined point before landing (DPBL). The point within the approach and landing phase, after which the helicopter's ability to continue the flight safely, with the critical power unit inoperative, is not assured and a forced landing may be required.		
Landing distance available (LDAH). The length of the final approach and take-off area plus any additional area declared available and suitable for helicopters to complete the landing manoeuvre from a defined height.		
Landing distance required (LDRH). The horizontal distance required to land and come to a full stop from a point 15 m (50 ft) above the landing surface.		
The following terms, which are not defined elsewhere in OPS.CAT.350.H, are used in the following text:	Para 2. OPS.CAT.350.H does not exist.	Noted. Restoration of the JAR rules will resolve this issue.
V_T A target speed at which to aim at the point of minimum ground clearance (min-dip) during acceleration from TDP to V_{TOSS}.		
V_{50} A target speed and height utilised to establish a flight manual distance (in compliance with the requirement of CS/JAR 29.63) from which climbout is possible.		
$V_{stay\text{-}up}$ A colloquial term used to indicate a speed at which a descent would not result following a power-unit failure. This speed is several knots		

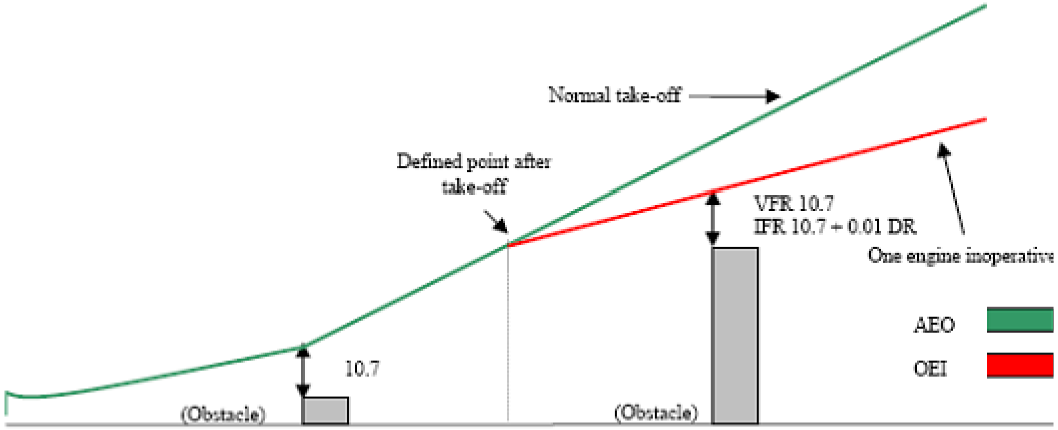
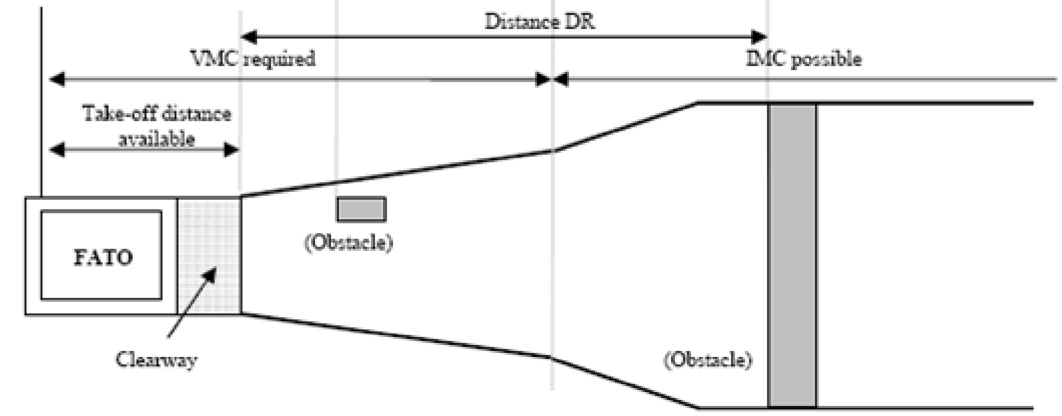
A: Rule	**B: Summary of comments**	**C: Reason for change, remarks**
lower than V_{TOSS} at the equivalent take-off mass.		
3. What defines Performance Class 2		
Performance Class 2 can be considered as Performance Class 3 take-off or landing, and Performance Class 1 climb, cruise and descent. It comprises an AEO obstacle clearance regime for the take-off or landing phases, and an OEI obstacle clearance regime for the climb, cruise, descent, approach and missed approach phases.		
Note: For the purpose of performance calculations, the CS 29.67 Category A climb performance criteria is used:	Para 3. Note. CS 29.67(a)(2) prescribes a ROC of 150ft/min at 1000 ft above the TO surface but not at V_y but at a speed selected by the applicant	Noted. The commenter is correct but that speed is represented as V_y (for simplicity).
- 150 ft/min at 1 000 ft (at V_y);		
and depending on the choice of DPATO:		
- 100 ft/min up to 200 ft (at V_{TOSS})		
at the appropriate power settings.		
3.1 Comparison of obstacle clearance in all Performance Classes		

A: Rule	**B: Summary of comments**	**C: Reason for change, remarks**
Figure 2 shows the profiles of the three Performance Classes - superimposed on one diagram.		
Performance Class 1; from TDP, requires OEI obstacle clearance in all phases of flight; the construction of Category A procedures, provides for a flight path to the first climb segment, a level acceleration segment to V_y (which may be shown concurrent with the first segment), followed by the second climb segment from V_y at 200 ft (see Figure 1).		
Figure 1 - All Performance Classes (a comparison)  		
a. Performance Class 2; requires AEO obstacle clearance to DPATO and OEI from then on. The take-off mass has the Performance Class 1 second segment climb performance at its basis therefore, at the point where V_y at 200 ft is reached, Performance Class 1 is achieved (see also Figure 3).		
b. Performance Class 3; requires AEO obstacle clearance in all phases.		

A: Rule	**B: Summary of comments**	**C: Reason for change, remarks**
Figure 2 - Performance Class 1 distances  		
3.2 Comparison of the discontinued take-off in all Performance Classes		
a. Performance Class 1 - requires a prepared surface on which a rejected landing can be undertaken (no damage); and		
b. Performance Class 2 and 3 - require a safe-forced-landing surface (some damage can be tolerated but there must be a reasonable expectancy of no injuries to persons in the aircraft or third parties on the surface).		
4. The derivation of Performance Class 2		
Performance Class 2 is primarily based on the text of ICAO Annex 6 Part III Section II and its attachments - which provide for the following:		

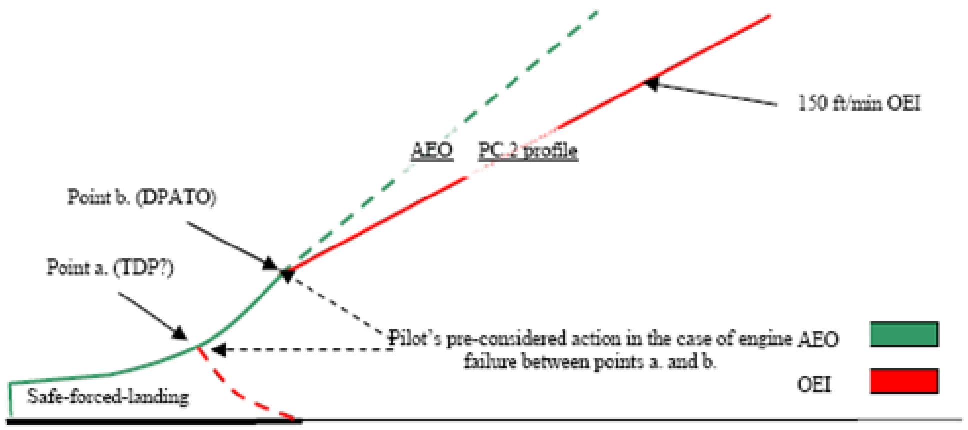
A: Rule	B: Summary of comments	C: Reason for change, remarks
a. Obstacle clearance before DPATO; the helicopter should be able, with AEO, to clear all obstacles by an adequate margin until it is in a position to comply with b. below.		
b. Obstacle clearance after DPATO; the helicopter should be able, in the event of the critical power-unit becoming inoperative at any time after reaching DPATO, to continue the take-off clearing all obstacles along the flight path by an adequate margin until it is able to comply with en-route clearances.		
c. Engine failure before DPATO; before the DPATO, failure of the critical power-unit may cause the helicopter to force land; therefore a safe-forced-landing should be possible (this is analogous to the requirement for a reject in Performance Class 1 but where some damage to the helicopter can be tolerated).		
5. Benefits of Performance Class 2		
Operations in Performance Class 2 permit advantage to be taken of an AEO procedure for a short period during take-off and landing - whilst retaining engine failure accountability in the climb, descent and cruise. The benefits include:		
a. Ability to use (the reduced) distances scheduled for the AEO - thus permitting operations to take place at smaller aerodromes and allowing airspace requirements to be reduced.		
b. Ability to operate when the safe-forced-landing distance available is located outside the boundary of the aerodromes.		
c. Ability to operate when the take-off-distance required is located outside the boundary of the aerodromes.		

A: Rule	B: Summary of comments	C: Reason for change, remarks
d. Ability to use existing Category A profiles and distances when the surface conditions are not adequate for a reject but are suitable for a safe-forced-landing (for example when the ground is waterlogged).		
6. Implementation of Performance Class 2		
The following sections discuss the principles of the implementation of Performance Class 2.		
6.1 Does ICAO spell it all out?		
ICAO Annex 6 does not give guidance on how DPATO should be calculated nor does it require that distances be established for the take-off. However, it does require that, up to DPATO AEO, and from DPATO OEI, obstacle clearance is established (see Figure 3 and Figure 4 which are simplified versions of the diagrams contained in Annex 6 Part III, Attachment A).		
Note: Annex 8 – Airworthiness of Aircraft (Part IV, Chapter 2.2.1.3.4) requires that an AEO distance be scheduled for all helicopters operating in Performance Classes 2 & 3. Annex 6 is dependent upon the scheduling of the AEO distances, required in Annex 8, to provide data for the location of DPATO.		
When showing obstacle clearance, the divergent obstacle clearance height required for IFR is - as in Performance Class 1 - achieved by the application of the additional obstacle clearance of 0.01 DR (DR = the distance from the end of 'take-off-distance-available' - see the pictorial representation in Figure 4 and the definition in section 2. above).		
As can also be seen from Figure 4, flight must be conducted in VFR until DPATO has been achieved (and deduced that if an engine failure occurs before DPATO, entry into IFR is not permitted (as the OEI climb gradient		

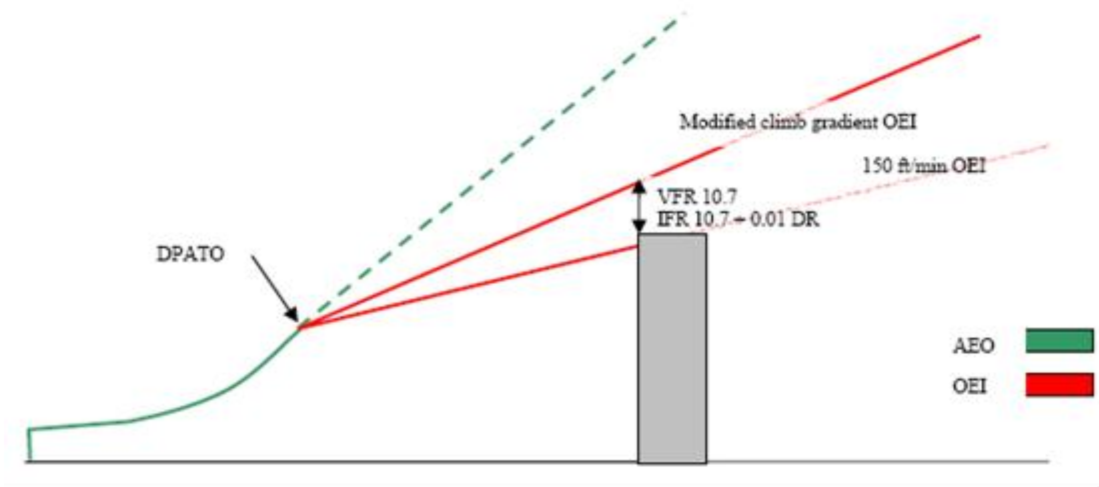
A: Rule	**B: Summary of comments**	**C: Reason for change, remarks**
will not have been established)).		
Figure 3 - Performance Class 2 Obstacle Clearance  		
Figure 4 - Performance Class 2 Obstacle Clearance (plan view)  		

A: Rule	**B: Summary of comments**	**C: Reason for change, remarks**
6.2 Function of DPATO		
From the preceding paragraphs it can be seen that DPATO is germane to Performance Class 2. It can also be seen that, in view of the many aspects of DPATO, it has, potentially, to satisfy a number of requirements which are not necessarily synchronised (nor need to be).		
It is clear that it is only possible to establish a single point for DPATO, satisfying the requirement of 4.b. and 4.c. above, when:		
a. accepting the TDP of a Category A procedure; or		
b. extending the safe-forced-landing requirement beyond required distances (if data is available to permit the calculation of the distance for a safe-forced-landing from the DPATO).		
It could be argued that the essential requirement for DPATO is contained in 4.b. - OEI obstacle clearance. From careful examination of the flight path reproduced in Figure 3 above, it may be reasonably deduced that DPATO is the point at which adequate climb performance is established (examination of Category A procedures would indicate that this could be (in terms of mass, speed and height above the take-off surface) the conditions at the start of the first or second segments - or any point between.)		
Note: The diagrams in Attachment A of ICAO Annex 6, do not appear to take account of drop down - permitted under Category A procedures; similarly with helideck departures, the potential for acceleration in drop down below deck level (once the deck edge has been cleared) is also not shown. These omissions could be regarded as a simplification of the diagram, as drop down is discussed		

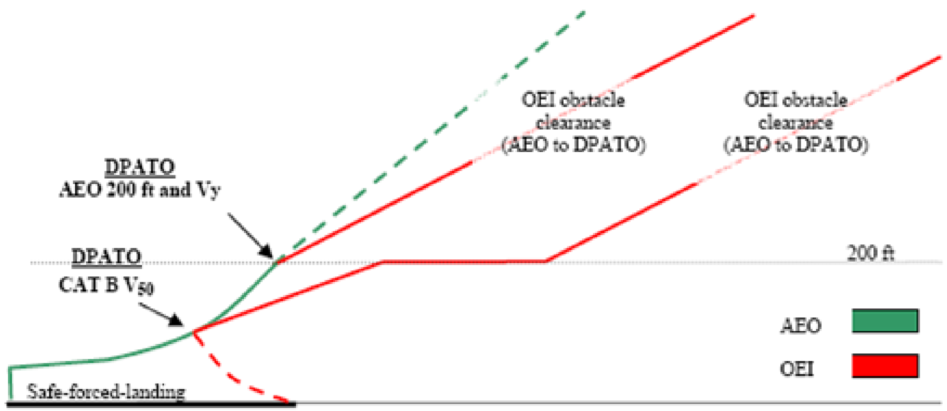
A: Rule	**B: Summary of comments**	**C: Reason for change, remarks**
and accepted in the accompanying ICAO text.		
It may reasonably be argued that, during the take-off and before reaching an appropriate climb speed (V_{TOSS} or V_y), $V_{stay-up}$ will already have been achieved (where $V_{stay-up}$ is the ability to continue the flight and accelerate without descent - shown in some Category A procedures as V_T or target speed) and where, in the event of an engine failure, no landing would be required.		
It is postulated that, to practically satisfy all the requirements of 4.a, b. and c. above, DPATO does not need to be defined at one synchronised point; provisions can be met separately - i.e. defining the distance for a safe-forced-landing, and then establishing the OEI obstacle clearance flight path.		
As the point at which the helicopter’s ability to continue the flight safely, with the critical power unit inoperative is the critical element, it is that for which DPATO is used in this text.		

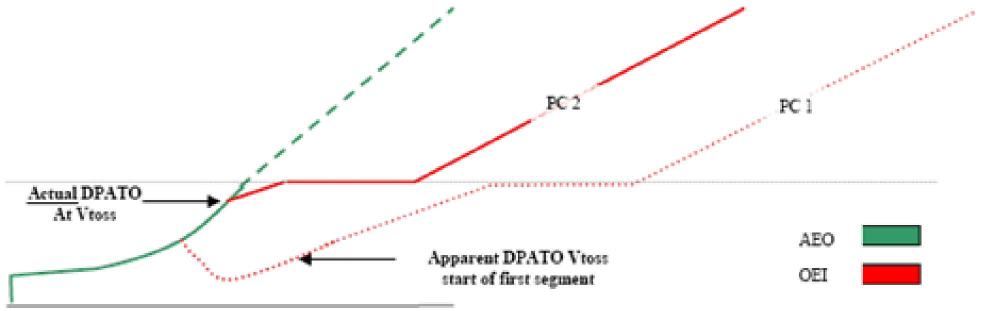
A: Rule	B: Summary of comments	C: Reason for change, remarks
Figure 5 - The three elements in a PC 2 take-off  		
6.2.1 The three elements from the pilot's perspective		
When seen from the pilot's perspective (see Figure 5), there are three elements of the Performance Class 2 take-off - each with associated related actions which need to be considered in the case of an engine failure: a. action in the event of an engine failure - up to the point where a forced-landing will be required. b. action in the event of an engine failure - from the point where OEI obstacle clearance is established (DPATO). c. pre-considered action in the event of an engine failure - in the period between a. and b.		
The action of the pilot in a. and b. is deterministic i.e. it remains the same for every occasion. For pre-consideration of the action at point c.; as is		

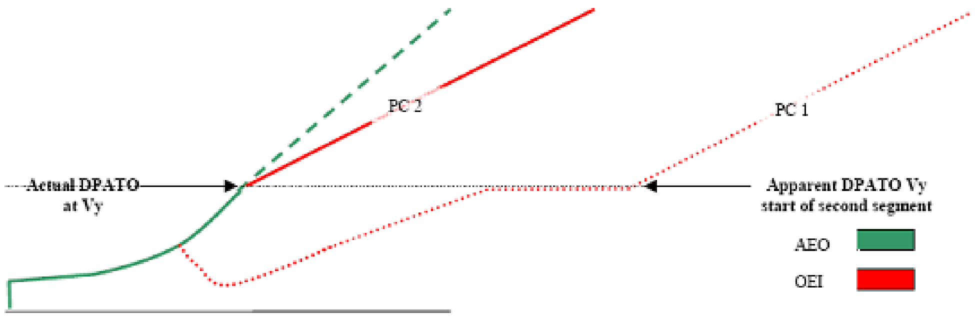
A: Rule	**B: Summary of comments**	**C: Reason for change, remarks**
likely that the planned flight path will have to be abandoned (the point at which obstacle clearance using the OEI climb gradients not yet being reached) the pilot must (before take-off) have considered his options and the associated risks, and have in mind the course of action that will be pursued in the event of an engine failure during that short period. As it is likely that any action will involve turning manoeuvres, the effect of turns on performance must be considered.		
Take-off mass for Performance Class 2		
As previously stated, Performance Class 2 is an AEO take-off which, from DPATO, has to meet the requirement for OEI obstacle clearance in the climb and en-route phases. Take-off mass is therefore the mass that gives at least the minimum climb performance of 150 ft/min at V_y, at 1 000 ft above the take-off point, and obstacle clearance.		
As can be seen in Figure 6 below, the take-off mass may have to be modified when it does not provide the required OEI clearance from obstacles in the take-off-flight path (exactly as in Performance Class 1). This could occur when taking off from an aerodrome where the flight path has to clear an obstacle such as a ridge line (or line of buildings) which can neither be:		
a. flown around using VFR and seen and avoided; nor		
b. cleared using the minimum climb gradient given by the take-off mass (150 ft/min at 1 000 ft)		
In this case, the take-off mass has to be modified (using data contained in the HFM) to give an appropriate climb gradient.		

A: Rule	**B: Summary of comments**	**C: Reason for change, remarks**
Figure 6 - Performance Class 2 (enhanced climb gradient)  		
6.3 Do distances have to be calculated?		
Distances do not have to be calculated if, by using pilot judgement or standard practice, it can be established that:		
a. A safe-forced-landing is possible following an engine failure (notwithstanding that there might be obstacles in the take-off path); and		
b. Obstacles can be cleared (or avoided) - AEO in the take-off phase and OEI in the climb.		
If early entry (in the sense of cloud base) into IMC is expected - an IFR departure should be planned. However, standard masses and departures can be used when described in the OM.		

A: Rule	**B: Summary of comments**	**C: Reason for change, remarks**
6.4 The use of Category A data		
In Category A procedures, TDP is the point at which either a rejected landing or a safe continuation of the flight, with OEI obstacle clearance, can be performed.		
For Performance Class 2 (when using Category A data), only the safe-forced-landing (reject) distance depends on the equivalent of the TDP; if an engine fails between TDP and DPATO the pilot has to decide what action is required - it is not necessary for a safe-forced-landing distance to be established from beyond the equivalent of TDP (see Figure 5 and discussion in 6.2.1 above).		
Category A procedures based on a fixed V_{TOSS} are usually optimised either for the reduction of the rejected take-off distance, or the take-off distance. Category A procedures based on a variable V_{TOSS} allow either a reduction in required distances (low V_{TOSS}) or an improvement in OEI climb capability (high V_{TOSS}). These optimisations may be beneficial in Performance Class 2 to satisfy the dimensions of the take-off site.		
In view of the different requirements for Performance Class 2 (from Performance Class 1), it is perfectly acceptable for the two calculations (one to establish the safe-forced-landing distance and the other to establish DPATO) to be based upon different Category A procedures. However, if this method is used, the mass resulting from the calculation cannot be more than the mass from the more limiting of the procedures.		
6.5 DPATO and obstacle clearance		
If it is necessary for OEI obstacle clearance to be established in the climb, the starting point (DPATO) for the (obstacle clearance) gradient has to be		

A: Rule	**B: Summary of comments**	**C: Reason for change, remarks**
established. Once DPATO is defined, the OEI obstacle clearance is relatively easy to calculate with data from the HFM.		
6.5.1 DPATO based on AEO distance		
In the simplest case; if provided, the scheduled AEO to 200 ft at V_y can be used (see Figure 7).		
Figure 7 -Suggested AEO locations for DPATO  		
Otherwise, and if scheduled in the HFM, the AEO distance to 50 ft (V_{50}) – determined in accordance with CS 29.63 - can be used (see Figure 7). Where this distance is used, it will be necessary to ensure that the V_{50} climb out speed is associated with a speed and mass for which OEI climb data is available so that, from V_{50}, the OEI flight path can be constructed.		
6.5.2 DPATO based on Category A distances		

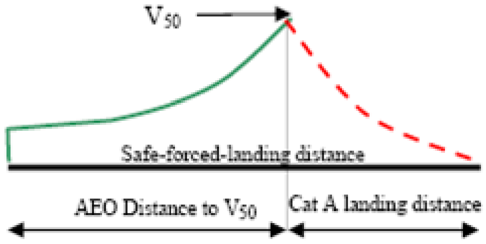
A: Rule	**B: Summary of comments**	**C: Reason for change, remarks**
It is not necessary for specific AEO distances to be used (although for obvious reasons it is preferable); if they are not available, a flight path (with OEI obstacle clearance) can be established using Category A distances (see Figure 8 and Figure 9) - which will then be conservative.		
Figure 8 - Using Cat A data; actual and apparent position of DPATO (Vtoss and start of first segment)  		
Note: the apparent DPATO is for planning purposes only in the case where AEO data is not available to construct the take-off flight path. The actual OEI flight path will provide better obstacle clearance than the apparent one (used to demonstrate the minimum requirement) - as seen from the firm and dashed lines in the above diagram.		

A: Rule	**B: Summary of comments**	**C: Reason for change, remarks**
Figure 9 - Using Cat A data; actual and apparent position of DPATO (Vy and start of second segment)  		
6.5.3 Use of most favourable Category A data		
The use of AEO data is recommended for calculating DPATO. However, where an AEO distance is not provided in the flight manual, distance to V_y at 200 ft, from the most favourable of the Category A procedures, can be used to construct a flight path (provided it can be demonstrated that AEO distance to 200 ft at V_y is always closer to the take-off point than the Category A OEI flight path).		
In order to meet the requirement of AMC3 OPS.CAT.355.H 2., the last point from where the start of OEI obstacle clearance can be shown is at 200 ft.		
6.6 The calculation of DPATO - a summary		
DPATO should be defined in terms of speed and height above the take-off surface and should be selected such that HFM data (or equivalent data) is available to establish the distance from the start of the take-off up to the		

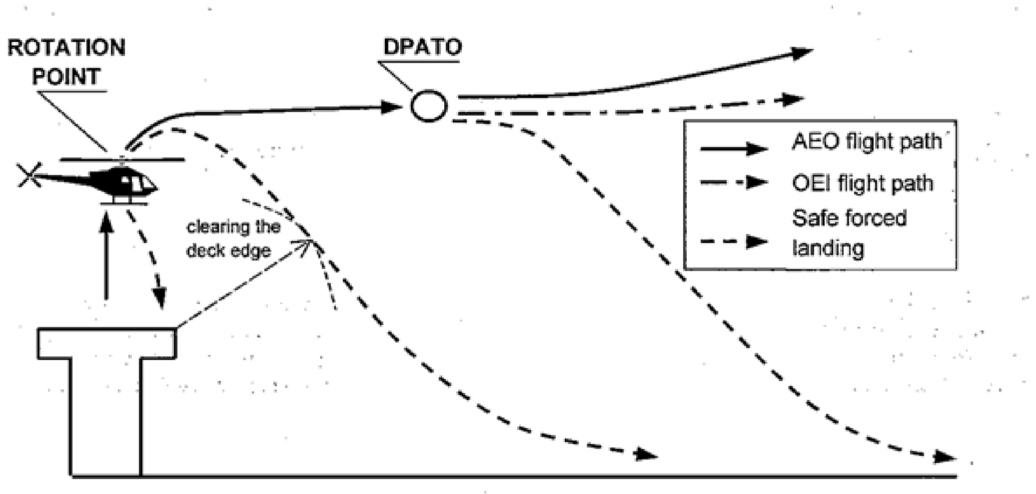
A: Rule	B: Summary of comments	C: Reason for change, remarks
DPATO (conservatively if necessary).		
6.6.1 First method		
DPATO is selected as the HFM Category B take-off distance (V_{50} speed or any other take-off distance scheduled in accordance with CS 29.63) provided that within the distance the helicopter can achieve:		
a. One of the V_{TOSS} values (or the unique V_{TOSS} value if is not variable) provided in the HFM, selected so as to assure a climb capability according to Category A criteria; or	Paragraphs 6.6.1 and 6.6.3 both omit 'it' where this is needed in each first subparagraph. It is suggested that 'it' is inserted between 'if' and 'is' in each subparagraph text in brackets thus: '(or the unique V_{TOSS} value if it is not variable)'.	Accepted
b. V_y.		
Compliance with AMC3 OPS.CAT.355.H 2. would be shown from V_{50} (or the scheduled Category B take-off distance).		
6.6.2 Second method		
DPATO is selected as equivalent to the TDP of a Category A clear area take-off procedure conducted in the same conditions.		
Compliance with AMC3 OPS.CAT.355.H 2.would be shown from the point at which V_{TOSS}, a height of at least 35 ft above the take-off surface and a		

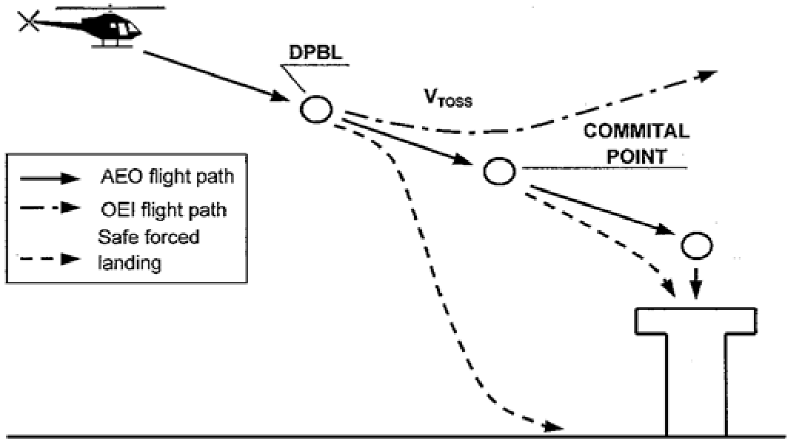
A: Rule	B: Summary of comments	C: Reason for change, remarks
positive climb gradient are achieved (which is the Category A clear area take-off distance).		
Safe-forced-landing areas should be available from the start of the take-off, to a distance equal to the Category A “clear area” rejected take-off distance.		
6.6.3 Third method		
As an alternative; DPATO could be selected such that HFM OEI data is available to establish a flight path initiated with a climb at that speed. This speed should then be:		
- One of the V_{TOSS} values (or the unique V_{TOSS} value if is not variable) provided in the HFM, selected so as to assure a climb capability according to Category A criteria; or	Paragraphs 6.6.1 and 6.6.3 both omit ‘it’ where this is needed in each first subparagraph. It is suggested that ‘it’ is inserted between ‘if’ and ‘is’ in each subparagraph text in brackets thus: ‘(or the unique V_{TOSS} value if it is not variable)’.	Accepted.
- V_y.		
The height of the DPATO should be at least 35 ft and can be selected up to 200 ft. Compliance with AMC3 OPS.CAT.355.H 2. would be shown from the selected height.		
6.7 Safe-forced-landing distance		

A: Rule	B: Summary of comments	C: Reason for change, remarks
Except as provided in 6.6.2 above, the establishment of the safe-forced-landing distance could be problematical as is not likely that Performance Class 2 specific data will be available in the HFM.		
By definition, the Category A reject distance may be used when the surface is not suitable for a reject, but may be satisfactory for a safe-force-landing (for example where the surface is flooded or is covered with vegetation).		
Any Category A (or other accepted) data may be used to establish the distance – however, once established it remains valid only if the Category A mass (or the mass from the accepted data) is used and the Category A (or accepted) AEO profile to the TDP is flown. In view of these constraints, the likeliest Category A procedures are the clear area or the short field (restricted area/site) procedures.		
From Figure 10, it can be seen that if the Category B V_{50} procedure is used to establish DPATO, the combination of the distance to 50 ft and the Category A 'clear area' landing distance, required by CS 29.81 (the horizontal distance required to land and come to a complete stop from a point 50 ft above the landing surface), will give a good indication of the maximum safe-forced-landing distance required (see also the discussion on Vstay-up above).		

A: Rule	**B: Summary of comments**	**C: Reason for change, remarks**
Figure 10 - Category B (V_{50}) safe-forced-landing distance  		
6.8 Performance Class 2 landing		
For other than Performance Class 2 operations to elevated FATO's of helidecks (see the discussion in GM OPS.SPA.005.SFL(c) subparagraph 2.4.1), the principles for the landing case are much simpler. As the performance requirement for Performance Class 1 and Performance Class 2 landings are virtually identical, the condition of the landing surface is the main issue.		
If the engine fails at any time during the approach, the helicopter is able either: to perform a go-around meeting the requirements of AMC3 OPS.CAT.355.H 2.; or perform a safe-forced-landing on the surface. In view of this, and if using Performance Class 1 data, the LDP should not be lower that the corresponding TDP (particularly in the case of a variable TDP).		
The landing mass will be identical to the take-off mass for the same site (with consideration for any reduction due to obstacle clearance - as shown in Figure 6 above).		

A: Rule	**B: Summary of comments**	**C: Reason for change, remarks**
In the case of a balked landing (i.e. the landing site becomes blocked or unavailable during the approach); the full requirement for take-off obstacle clearance must be met.		
GM4 OPS.CAT.355.H Performance applicability - Helicopters		
PERFORMANCE CLASS 2 CRITERIA - OPERATIONS TO/FROM ELEVATED FATOS OR HELIDECKS		
1. This GM describes types of operation to/from helidecks and elevated FATOs by helicopters operating in Performance Class 2, with an assured safe forced landing capability in the case of take-off and landing.		
2. Take Off - Non-Hostile Environment a. Figure 1 shows a typical take-off profile for Performance Class 2 operations from a helideck or an elevated FATO in a non-hostile environment. b. If an engine failure occurs during the climb to the rotation point, compliance with AMC3 OPS.CAT.355.H 1.b. will enable a safe landing or a safe forced landing on the deck. c. If an engine failure occurs between the rotation point and the DPATO, compliance with AMC3 OPS.CAT.355.H 1.b. will enable a safe forced landing on the surface, clearing the deck edge. d. At or after the DPATO, the OEI flight path should clear all obstacles by the margins specified in AMC3 OPS.CAT.355.H 2.		

A: Rule	**B: Summary of comments**	**C: Reason for change, remarks**
 Figure 1		
3. Landing - Non-Hostile Environment a. Figure 2 shows a typical landing profile for Performance Class 2 operations to a helideck or an elevated FATO in a non-hostile environment. b. The DPBL is defined as a “window” in terms of airspeed, rate of descent, and height above the landing surface. If an engine failure occurs before the DPBL, the pilot may elect to land or to execute a balked landing. c. In the event of an engine failure being recognised after the DPBL and before the committal point, compliance with AMC3 OPS.CAT.355.H 4.b. will enable a safe force landing on the surface. d. In the event of an engine failure at or after the committed point, compliance with AMC3 OPS.CAT.355.H 4.b. will enable a safe force		

A: Rule	B: Summary of comments	C: Reason for change, remarks
landing on the deck.		
 **Figure 2**		
AMC4 OPS.CAT.355.H Performance applicability - Helicopters		
PERFORMANCE CLASS 3 CRITERIA		
1. Operations in Performance Class 3 should only be conducted: a. from/to those aerodromes/operating sites and over such routes, areas and diversions contained in a non-hostile environment; b. in sight of the surface; c. during day;		

A: Rule	**B: Summary of comments**	**C: Reason for change, remarks**
d. when the ceiling is 600 ft or above; and e. when the visibility is 800 m or more.		
2. Take-off		
a. The take-off mass should not exceed the maximum take-off mass specified for a hover in ground effect with all power units operating at take-off power. If conditions are such that a hover in ground effect is not likely to be established, the take-off mass should not exceed the maximum take-off mass specified for a hover out of ground effect with all power units operating at take-off power.		
b. In the event of a power unit failure, the helicopter should be able to perform a safe forced landing.		
3. En-route a. The helicopter should be able, with all power units operating within the maximum continuous power conditions specified, to continue along its intended route or to a planned diversion without flying at any point below the appropriate minimum flight altitude. b. In the event of a power unit failure, the helicopter should be able to perform a safe forced landing.		
4. Landing		
a. The landing mass of the helicopter at the estimated time of landing should not exceed the maximum landing mass specified for a hover in ground effect, with all power units operating at take-off power. If conditions are such that a hover in ground effect is not likely to be established, the landing mass should not exceed the maximum		

A: Rule	B: Summary of comments	C: Reason for change, remarks
landing mass specified for a hover out of ground effect with all power units operating at take-off power.		
b. In the event of a power unit failure, the helicopter should be able to perform a safe forced landing.		
AMC OPS.CAT.360.H(b)(3)(ii) Performance General - Helicopters		
WIND COMPONENT FOR TAKE-OFF AND THE TAKE-OFF FLIGHT PATH		
1. For take-off, take-off flight path and landing requirements, accountability for wind should be no more than 50% of any reported steady head wind component of 5 knots or more.		
When precise wind measuring equipment enables accurate measurement of wind velocity over the point of take-off and landing, wind components in excess of 50% for take-off and the take-off flight path may be used provided: a. the proximity to the FATO, and accuracy enhancements, of the wind measuring equipment is considered; and b. appropriate procedures are contained in a supplement to the HFM; and c. a safety case has been established.		
2. Where take-off and landing with a tail wind component is permitted in the HFM, and in all cases for the take-off flight path, not less than 150% of any reported tail wind component should be taken into account.		

A: Rule	**B: Summary of comments**	**C: Reason for change, remarks**
AMC OPS.CAT.365.H(a)(2) Obstacle accountability - Helicopters		
COURSE GUIDANCE		
1. Standard course guidance includes Automatic Direction Finder (ADF) and VOR guidance.		
2. Accurate course guidance includes ILS, MLS or other course guidance providing an equivalent navigational accuracy.		
AMC OPS.CAT.370 - Flight hours reporting	3 MS, I INDIV and 1 REP indicated that the original AMC text of JAR-OPS 3 was missing.	Accepted. AMC text inserted under CAT.OP.
The requirement of OPS.GEN.370 may be achieved by making available either: - the flight hours flown by each aircraft – identified by its serial number and registration mark -during the elapsed calendar year; or - the total flight hours of each aircraft – identified by its serial number and registration mark – on the 31st of December of the elapsed calendar year. Where possible, the operator should have available, for each aircraft, the breakdown of hours for CAT, aerial work, general aviation. If the exact hours for the functional activity cannot be established, the estimated proportion will be sufficient.		