
BHUTAN CIVIL AVIATION AUTHORITY



GUIDANCE MATERIAL ON OCCURRENCE REPORTING

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List of Amendment

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Section A: General

1. Intent

This manual is interpretative material and provides guidance in order to determine which occurrences should be reported to the Agency, BCAA and to other organisations, and it provides guidance on the timescale for submission of such reports.

It also describes the objective of the overall occurrence reporting system including internal and external functions

2. Applicability

- (a) This manual only applies to occurrence reporting by persons/organisations regulated by BANRs & BCARs. It does not address reporting by aerodrome organisations, air navigation service providers and authorities themselves.
- (b) In most cases the obligation to report is on the holders of a certificate or approval, which in most cases are organisations, but in some cases can be a single person. In addition some reporting requirements are directed to persons. However, in order not to complicate the text, only the term 'organisation' is used.
- (c) The manual also does not apply to dangerous goods reporting. The definition of reportable dangerous goods occurrences is different from the other occurrences and the reporting system is also separate. This subject is covered in specific operating requirements and guidance and ICAO Documents namely:
 - (i) ICAO Annex 18, The safe Transport of Dangerous Goods by Air, Chapter 12
 - (ii) ICAO Doc 9284-AN/905, Technical Instructions for the Safe Transport of Dangerous Goods by Air

3. Objective of Occurrence Reporting

- (a) The occurrence reporting system is an essential part of the overall monitoring function. The objective of the occurrence reporting, collection, investigation and analysis systems described in the operating rules, and the airworthiness rules is to use the reported information to contribute to the improvement of aviation safety, and not to attribute blame, impose fines or take other enforcement actions.
- (b) The detailed objectives of the occurrence reporting systems are:
 - (i) To enable an assessment of the safety implications of each occurrence to be made, including previous similar occurrences, so that any necessary action can be initiated. This includes determining what and why it had occurred and what might prevent a similar occurrence in the future.
 - (ii) To ensure that knowledge of occurrences is disseminated so that other persons and organisations may learn from them.
- (c) The occurrence reporting system is complementary to the normal day to day procedures and 'control' systems and is not intended to duplicate or supersede any of them. The occurrence reporting system is a tool to identify those occasions where routine procedures have failed.
- (d) Occurrences should remain in the database when judged reportable by the person submitting the report as the significance of such reports may only become obvious at a later date.

4. Reporting to the Agency and BCAA

(a) Requirements

- (i) As detailed in the operating rules, occurrences defined as an incident, malfunction, defect, technical defect or exceedance of technical limitations that endangers or could endanger the safe operation of the aircraft must be reported to the authority.
 - (ii) The products and part and appliances design rules prescribe that occurrences defined as a failure, malfunction, defect or other occurrence which has resulted in or may result in an unsafe condition must be reported to the Agency.
 - (iii) According to the product and part and appliances production rules occurrences defined as a deviation which could lead to an unsafe condition must be reported to the Agency and the authority.
 - (iv) The maintenance rules stipulate that occurrences defined as any condition of the aircraft or aircraft component that has resulted or may result in an unsafe condition that could seriously hazard the aircraft must be reported to the authority.
 - (v) Reporting does not remove the reporter's or organisation's responsibility to commence corrective actions to prevent similar occurrences in the future. Known and planned preventive actions should be included within the report.
- (b) Paragraph 10(g) of this manual provides guidance as to what should be reported by an organisation to the authority. The list of criteria provided may be used as guidance for establishing which occurrences shall be reported by which organisation. For example, the organisation responsible for the design will not need to report certain operational occurrences that it has been made aware of, if the continuing airworthiness of the product is not involved.

5. Notification of Accidents and Serious Incidents

In addition to the requirement to notify the appropriate accident investigating authorities directly of any accident or serious incident, operators should also report to the authority in charge of supervising the reporting organisation.

6. Reporting Time

- (a) The period of 72 hours is normally understood to start from when the occurrence took place or from the time when the reporter determined that there was, or could have been, a potentially hazardous or unsafe condition.
- (b) For many occurrences there is no evaluation needed; it must be reported. However, there will be occasions when, as part of a Flight Safety and Accident Prevention programme or Quality Programme, a previously non-reportable occurrence is determined to be reportable.
- (c) Within the overall limit of 72 hours for the submission of a report, the degree of urgency should be determined by the level of hazard judged to have resulted from the occurrence:
 - (i) Where an occurrence is judged to have resulted in an immediate and particularly significant hazard the Agency and/or authority expects to be advised immediately, and by the fastest possible means (e.g. telephone, fax, telex, e-mail) of whatever

details are available at that time. This initial notification should then be followed up by a report within 72 hours.

- (ii) Where the occurrence is judged to have resulted in a less immediate and less significant hazard, report submission may be delayed up to the maximum of 72 hours in order to provide more details or more reliable information.

7. Content of Reports

- (a) The reports may be transmitted in any form considered acceptable to the Agency and/or authority. The amount of information in the report should be commensurate with the severity of the occurrence. Each report should at least contain the following elements, as applicable to each organisation:
 - (i) Organisation name
 - (ii) Approval reference (if relevant)
 - (iii) Information necessary to identify the aircraft or part affected.
 - (iv) Date and time if relevant
 - (v) A written summary of the occurrence
 - (vi) Any other specific information required
- (b) For any occurrence involving a system or component, which is monitored or protected by a warning and/or protection system (for example: fire detection/extinguishing) the occurrence report should always state whether such system(s) functioned properly.

8. Notification to Other Agencies

For approved operations organisations, in addition to reporting occurrences to the authority, the following agencies should also be notified in specific cases:

- (a) Reports relating to 'security incidents' should also be notified to the appropriate local security agency.
- (b) Reports relating to air traffic, aerodrome occurrences or bird strikes should also be notified to the appropriate air navigation, aerodrome or ground agency.

9. Reporting Between Organisations

- (a) Requirements exist that address the reporting of data relating to unsafe or unairworthy conditions. These reporting lines are:
 - (i) Production organisation to the organisation responsible for the design;
 - (ii) Maintenance organisation to the organisation responsible for the design;
 - (iii) Maintenance organisation to operator;
 - (iv) Operator to organisation responsible for the design;
 - (v) Production organisation to production organisation.
- (b) The 'organisation responsible for the design' is a general term, which can be any one or a combination of the following organisations:
 - (i) Holder of Type Certificate (TC) of an Aircraft, Engine or Propeller;

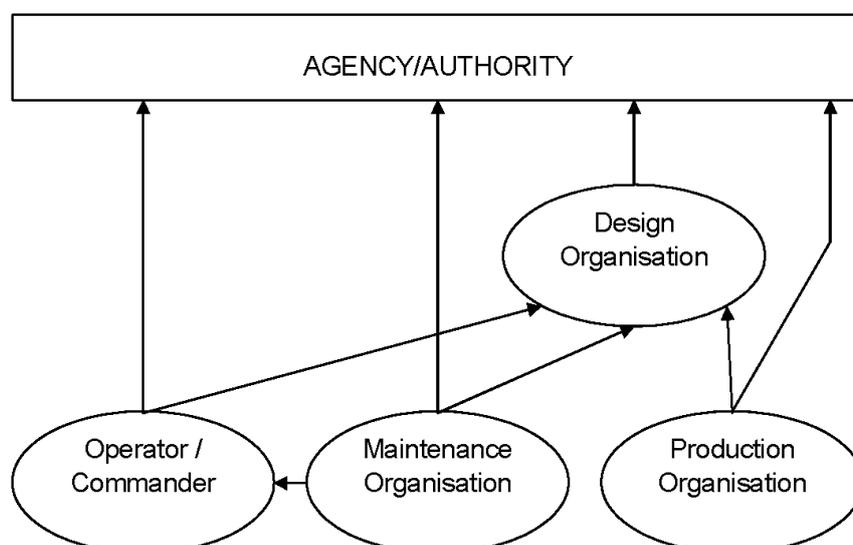
- (ii) Holder of a Supplemental Type Certificate (STC) on an Aircraft, Engine or Propeller;
 - (iii) Holder of Technical Standard Order Authorization; or
 - (iv) Holder of a Part Approval.
- (c) If it can be determined that the occurrence has an impact on or is related to an aircraft component which is covered by a separate design approval (TC, STC, TSO or PA), then the holders of such approval/authorization should be informed. If an occurrence happens on a component which is covered by an TC, STC, TSO or PA (e.g. during maintenance), then only that TC, STC, TSO Authorisation or PA holder needs to be informed.
- (d) The form and timescale for reports to be exchanged between organisations is left for individual organisations to determine. What is important is that a relationship exists between the organisations to ensure that there is an exchange of information relating to occurrences.
- (e) Paragraph 10(g) of this manual provides guidance as to what should be reported by an organisation to the authority. The list of criteria provided may be used as guidance for establishing which occurrences shall be reported to which organisation. For example, certain operational occurrences will not need to be reported by an operator to the design or production organisation.

10. Reportable Occurrences

- (a) General.

There are different reporting requirements for operators (and/or commanders), maintenance organisations, design organisations and production organisations. Moreover, as explained in point 4. and 9. above, there are not only requirements for reporting to the Agency and authority, but also for reporting to other (private) entities. The criteria for all these different reporting lines are not the same. For example the authority will not receive the same kind of reports from a design organisation as from an operator. This is a reflection of the different perspectives of the organisations based on their activities.

The figure below presents a simplified scheme of all reporting lines.



(b) Operations and Maintenance.

The list of examples of reportable occurrences offered below under (g) is established from the perspective of primary sources of occurrence information in the operational area (operators and maintenance organisations) to provide guidance for those persons developing criteria for individual organisations on what they need to report to the Agency and/or authority. The list is neither definitive nor exhaustive and judgement by the reporter of the degree of hazard or potential hazard involved is essential.

(c) Design.

The list of examples will not be used by design organisations directly for the purpose of determining when a report has to be made to the authority, but it can serve as guidance for the establishment of the system for collecting data. After receipt of reports from the primary sources of information, designers will normally perform some kind of analysis to determine whether an occurrence has resulted or may result in an unsafe condition and a report to the authority should be made. An analysis method for determining when an unsafe condition exists in relation to continuing airworthiness is detailed in the manual regarding the issuance of Airworthiness Directives.

(d) Production.

The list of examples is not applicable to the reporting obligation of production organisations. Their primary concern is to inform the design organisation of deviations. Only in cases where an analysis in conjunction with that design organisation shows that the deviation could lead to an unsafe condition, should a report be made to the Agency and/or authority (see also c. above).

(e) Customised list.

Each approval, certificate, authorisation other than those mentioned in sub paragraph (c) and (d) above, should develop a customised list adapted to its aircraft, operation or product. The list of reportable occurrences applicable to an organisation is usually published within the organisation's expositions/handbooks/manuals.

(f) Internal reporting.

The perception of safety is central to occurrence reporting. It is for each organisation to determine what is safe and what is unsafe and to develop its reporting system on that basis. The organisation should establish an internal reporting system whereby reports are centrally collected and reviewed to establish which reports meet the criteria for occurrence reporting to the Agency and/or authority and other organisations, as required.

(g) List of examples of reportable occurrences

The following is a generic list. Not all examples are applicable to each reporting organisation. Therefore each organisation should define and agree with the Agency and/or authority a specific list of reportable occurrences or a list of more generic criteria, tailored to its activity and scope of work (see also 10(e) above). In establishing that customised list, the organisation should take into account the following considerations:

Reportable occurrences are those where the safety of operation was or could have been endangered or which could have led to an unsafe condition. If in the view of the reporter an occurrence did not hazard the safety of the operation but if repeated in different but likely circumstances would create a hazard, then a report should be made. What is judged

to be reportable on one class of product, part or appliance may not be so on another and the absence or presence of a single factor, human or technical, can transform an occurrence into a serious incident or accident.

Specific operational approvals, e.g. RVSM, ETOPS, RNAV, or a design or maintenance programme, may have specific reporting requirements for failures or malfunctions associated with that approval or programme.

It is expected that all examples are qualified by the reporter using the general criteria that are applicable in his field, and specified in the requirement. (e.g. for operators: 'hazards or could have hazarded the operation').

Section B: Area of Occurrence

1. Aircraft Technical

A. Structural

Not all structural failures need to be reported. Engineering judgement is required to decide whether a failure is serious enough to be reported. The following examples can be taken into consideration:

- (1) Damage to a Principal Structural Element that has not been qualified as damage tolerant (life limited element). Principal Structural Elements are those which contribute significantly to carrying flight, ground, and pressurisation loads, and whose failure could result in a catastrophic failure of the aircraft.
- (2) Defect or damage exceeding admissible damages to a Principal Structural Element that has been qualified as damage tolerant.
- (3) Damage to or defect exceeding allowed tolerances of a structural element which failure could reduce the structural stiffness to such an extent that the required flutter, divergence or control reversal margins are no longer achieved.
- (4) Damage to or defect of a structural element, which could result in the liberation of items of mass that may injure occupants of the aircraft.
- (5) Damage to or defect of a structural element, which could jeopardise proper operation of systems. See paragraph B. below.
- (6) Loss of any part of the aircraft structure in flight.

B. Systems

The following generic criteria applicable to all systems are proposed:

- (1) Loss, significant malfunction or defect of any system, subsystem or set of equipment when standard operating procedures, drills etc. could not be satisfactorily accomplished.
- (2) Inability of the crew to control the system, e.g.:
 - (a) uncommanded actions;
 - (b) incorrect and or incomplete response, including limitation of movement or stiffness;
 - (c) runaway;
 - (d) mechanical disconnection or failure.
- (3) Failure or malfunction of the exclusive function(s) of the system (one system could integrate several functions).
- (4) Interference within or between systems.
- (5) Failure or malfunction of the protection device or emergency system associated with the system.
- (6) Loss of redundancy of the system.
- (7) Any occurrence resulting from unforeseen behaviour of a system.

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- (8) For aircraft types with single main systems, subsystems or sets of equipment: Loss, significant malfunction or defect in any main system, subsystem or set of equipment.
 - (9) For aircraft types with multiple independent main systems, subsystems or sets of equipment: The loss, significant malfunction or defect of more than one main system, subsystem or set of equipment.
 - (10) Operation of any primary warning system associated with aircraft systems or equipment unless the crew conclusively established that the indication was false provided that the false warning did not result in difficulty or hazard arising from the crew response to the warning.
 - (11) Leakage of hydraulic fluids, fuel, oil or other fluids which resulted in a fire hazard or possible hazardous contamination of aircraft structure, systems or equipment, or risk to occupants.
 - (12) Malfunction or defect of any indication system when this results in the possibility of misleading indications to the crew.
 - (13) Any failure, malfunction or defect if it occurs at a critical phase of flight and relevant to the operation of that system.
 - (14) Occurrences of significant shortfall of the actual performances compared to the approved performance which resulted in a hazardous situation (taking into account the accuracy of the performance calculation method) including braking action, fuel consumption etc.
 - (15) Asymmetry of flight controls; e.g. flaps, slats, spoilers etc.

Appendix I to this GM gives a list of examples of reportable occurrences resulting from the application of these generic criteria to specific systems.

C. Propulsion (including Engines, Propellers and Rotor Systems) and APUs

- (1) Flameout, shutdown or malfunction of any engine.
- (2) Overspeed or inability to control the speed of any high speed rotating component (for example: Auxiliary power unit, air starter, air cycle machine, air turbine motor, propeller or rotor).
- (3) Failure or malfunction of any part of an engine or powerplant resulting in any one or more of the following:
 - (a) non containment of components/debris;
 - (b) uncontrolled internal or external fire, or hot gas breakout;
 - (c) thrust in a different direction from that demanded by the pilot;
 - (d) thrust reversing system failing to operate or operating inadvertently;
 - (e) inability to control power, thrust or rpm;
 - (f) failure of the engine mount structure;
 - (g) partial or complete loss of a major part of the powerplant;

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- (h) Dense visible fumes or concentrations of toxic products sufficient to incapacitate crew or passengers;
 - (i) inability, by use of normal procedures, to shut down an engine;
 - (j) inability to restart a serviceable engine.
- (4) An uncommanded thrust/power loss, change or oscillation which is classified as a loss of thrust or power control (LOTIC):
- (a) for a single engine aircraft; or
 - (b) where it is considered excessive for the application, or
 - (c) where this could affect more than one engine in a multi-engine aircraft, particularly in the case of a twin engine aircraft; or
 - (d) for a multi engine aircraft where the same, or similar, engine type is used in an application where the event would be considered hazardous or critical.
- (5) Any defect in a life controlled part causing retirement before completion of its full life.
- (6) Defects of common origin which could cause an inflight shut down rate so high that there is the possibility of more than one engine being shut down on the same flight.
- (7) An engine limiter or control device failing to operate when required or operating inadvertently.
- (8) exceedance of engine parameters.
- (9) FOD resulting in damage.

Propellers and transmission

- (10) Failure or malfunction of any part of a propeller or powerplant resulting in any one or more of the following:
- (a) an overspeed of the propeller;
 - (b) the development of excessive drag;
 - (c) a thrust in the opposite direction to that commanded by the pilot;
 - (d) a release of the propeller or any major portion of the propeller;
 - (e) a failure that results in excessive unbalance;
 - (f) the unintended movement of the propeller blades below the established minimum in-flight low-pitch position;
 - (g) an inability to feather the propeller;
 - (h) an inability to command a change in propeller pitch;
 - (i) an uncommanded change in pitch;
 - (j) an uncontrollable torque or speed fluctuation;
 - (k) The release of low energy parts.

Rotors and transmission

- (11) Damage or defect of main rotor gearbox / attachment which could lead to in flight separation of the rotor assembly, and /or malfunctions of the rotor control.
- (12) Damage to tail rotor, transmission and equivalent systems.

APUs

- (13) Shut down or failure when the APU is required to be available by operational requirements, e.g. ETOPS, MEL.
- (14) Inability to shut down the APU.
- (15) Overspeed.
- (16) Inability to start the APU when needed for operational reasons.

D. Human Factors

- (1) Any incident where any feature or inadequacy of the aircraft design could have led to an error of use that could contribute to a hazardous or catastrophic effect.

E. Other Occurrences

- (1) Any incident where any feature or inadequacy of the aircraft design could have led to an error of use that could contribute to a hazardous or catastrophic effect.
- (2) An occurrence not normally considered as reportable (for example, furnishing and cabin equipment, water systems), where the circumstances resulted in endangering of the aircraft or its occupants.
- (3) A fire, explosion, smoke or toxic or noxious fumes.
- (4) Any other event which could hazard the aircraft, or affect the safety of the occupants of the aircraft, or people or property in the vicinity of the aircraft or on the ground.
- (5) Failure or defect of passenger address system resulting in loss or inaudible passenger address system.
- (6) Loss of pilots seat control during flight.

2. Aircraft Maintenance and Repair

- A. Incorrect assembly of parts or components of the aircraft found during an inspection or test procedure not intended for that specific purpose.
- B. Hot bleed air leak resulting in structural damage.
- C. Any defect in a life controlled part causing retirement before completion of its full life.
- D. Any damage or deterioration (i.e. fractures, cracks, corrosion, delamination, disbonding etc.) resulting from any cause (such as flutter, loss of stiffness or structural failure) to:
 - (1) primary structure or a principal structural element (as defined in the manufacturers' Repair Manual) where such damage or deterioration exceeds allowable limits specified in the Repair Manual and requires a repair or complete or partial replacement of the element;
 - (2) secondary structure which consequently has or may have endangered the aircraft;

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- (3) the engine, propeller or rotorcraft rotor system.
 - E. Any failure, malfunction or defect of any system or equipment, or damage or deterioration found as a result of compliance with an Airworthiness Directive or other mandatory instruction issued by Authority, when:
 - (1) it is detected for the first time by the reporting organisation implementing compliance;
 - (2) on any subsequent compliance where it exceeds the permissible limits quoted in the instruction and/or published repair/rectification procedures are not available.
 - F. Failure of any emergency system or equipment, including all exit doors and lighting, to perform satisfactorily, including when being used for maintenance or test purposes.
 - G. Non-compliance or significant errors in compliance with required maintenance procedures.
 - H. Products, parts, appliances and materials of unknown or suspect origin.
 - I. Misleading, incorrect or insufficient maintenance data or procedures that could lead to maintenance errors.
 - J. Failure, malfunction or defect of ground equipment used for test or checking of aircraft systems and equipment when the required routine inspection and test procedures did not clearly identify the problem when this results in a hazardous situation.

3. Facilities and Ground Services

- (1) Significant spillage during fuelling operations.
- (2) Loading of incorrect fuel quantities likely to have a significant effect on aircraft endurance, performance, balance or structural strength.
- (3) unsatisfactory ground de-icing / anti-icing.

4. Passenger Handling, Baggage and Cargo

- (1) Significant contamination of aircraft structure, or systems and equipment arising from the carriage of baggage or cargo.
- (2) Incorrect loading of passengers, baggage or cargo, likely to have a significant effect on aircraft mass and/or balance.
- (3) Incorrect stowage of baggage or cargo (including hand baggage) likely in any way to hazard the aircraft, its equipment or occupants or to impede emergency evacuation.
- (4) Inadequate stowage of cargo containers or other substantial items of cargo.
- (5) Dangerous goods incidents reporting: see operating rules.

5. Aircraft Ground Handling and Servicing

- (1) Failure, malfunction or defect of ground equipment used for test or checking of aircraft systems and equipment when the required routine inspection and test

procedures did not clearly identify the problem when this results in a hazardous situation.

- (2) Non-compliance or significant errors in compliance with required servicing procedures.
- (3) Loading of contaminated or incorrect type of fuel or other essential fluids (including oxygen and potable water).

Appendix I

Reportable occurrences to specific systems

The following subparagraphs give examples of reportable occurrences resulting from the application of the generic criteria to specific systems listed in paragraph 10(g) and 1.B of this GM.

1. Air conditioning/ventilation
 - (a) complete loss of avionics cooling.
 - (b) depressurisation.
2. Autoflight system
 - (a) failure of the autoflight system to achieve the intended operation while engaged.
 - (b) significant reported crew difficulty to control the aircraft linked to autoflight system functioning.
 - (c) failure of any autoflight system disconnect device.
 - (d) Uncommanded autoflight mode change.
3. Communications
 - (a) failure or defect of passenger address system resulting in loss or inaudible passenger address.
 - (b) total loss of communication in flight.
4. Electrical system
 - (a) loss of one electrical system distribution system (AC or DC).
 - (b) total loss or loss or more than one electrical generation system.
 - (c) failure of the backup (emergency) electrical generating system.
5. Cockpit/Cabin/Cargo
 - (a) pilot seat control loss during flight.
 - (b) failure of any emergency system or equipment, including emergency evacuation signalling system, all exit doors , emergency lighting, etc.
 - (c) loss of retention capability of the cargo loading system.
6. Fire protection system
 - (a) fire warnings, except those immediately confirmed as false.
 - (b) undetected failure or defect of fire/smoke detection/protection system, which could lead to loss or reduced fire detection/protection.
 - (c) absence of warning in case of actual fire or smoke.
7. Flight controls
 - (a) Asymmetry of flaps, slats, spoilers etc.
 - (b) limitation of movement, stiffness or poor or delayed response in the operation of primary flight control systems or their associated tab and lock systems.

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- (c) flight control surface run away.
 - (d) flight control surface vibration felt by the crew.
 - (e) mechanical flight control disconnection or failure.
 - (f) significant interference with normal control of the aircraft or degradation of flying qualities.
8. Fuel system
- (a) fuel quantity indicating system malfunction resulting in total loss or erroneous indicated fuel quantity on board.
 - (b) leakage of fuel which resulted in major loss, fire hazard, significant contamination.
 - (c) malfunction or defects of the fuel jettisoning system which resulted in inadvertent loss of significant quantity, fire hazard, hazardous contamination of aircraft equipment or inability to jettison fuel.
 - (d) fuel system malfunctions or defects which had a significant effect on fuel supply and/or distribution.
 - (e) inability to transfer or use total quantity of usable fuel..
9. Hydraulics
- (a) loss of one hydraulic system (ETOPS only).
 - (b) failure of the isolation system to operate.
 - (c) loss of more than one hydraulic circuits.
 - (d) failure of the backup hydraulic system.
 - (e) inadvertent Ram Air Turbine extension.
10. Ice detection/protection system
- (a) undetected loss or reduced performance of the anti-ice/de-ice system.
 - (b) loss of more than one of the probe heating systems.
 - (c) inability to obtain symmetrical wing de-icing.
 - (d) abnormal ice accumulation leading to significant effects on performance or handling qualities.
 - (e) crew vision significantly affected.
11. Indicating/warning/recording systems
- (a) malfunction or defect of any indicating system when the possibility of significant misleading indications to the crew could result in an inappropriate crew action on an essential system.
 - (b) loss of a red warning function on a system.
 - (c) for glass cockpits: loss or malfunction of more than one display unit or computer involved in the display/warning function.
12. Landing gear system /brakes/tyres

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- (a) brake fire.
 - (b) significant loss of braking action.
 - (c) unsymmetrical braking leading to significant path deviation.
 - (d) failure of the L/G free fall extension system (including during scheduled tests).
 - (e) unwanted gear or gear doors extension/retraction.
 - (f) multiple tyres burst.

13. Navigation systems (including precision approaches system) and air data systems

- (a) total loss or multiple navigation equipment failures.
- (b) total failure or multiple air data system equipment failures.
- (c) significant misleading indication.
- (d) Significant navigation errors attributed to incorrect data or a database coding error.
- (e) Unexpected deviations in lateral or vertical path not caused by pilot input.
- (f) Problems with ground navigational facilities leading to significant navigation errors not associated with transitions from inertial navigation mode to radio navigation mode.

14. Oxygen

- (a) for pressurised aircraft: loss of oxygen supply in the cockpit.
- (b) loss of oxygen supply to a significant number of passengers (more than 10%), including when found during maintenance or training or test purposes.
- (c) Bleed air system
- (d) hot bleed air leak resulting in fire warning or structural damage.
- (e) loss of all bleed air systems.
- (f) failure of bleed air leak detection system.

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