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Identification of serious incidents

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ICAO Reference Materials

- **Annex 13**
 - Chapters *4-Notifications, 7-ADREP Reporting and 8-Accident Prevention Measures*
- **Annex 19**
- **ICAO Doc 9756** Manual of Aircraft Accident and Incident Investigation, Part IV-Reporting
- **ICAO Doc 9859** Safety Management Manual
- **GASP** – ICAO Doc 10004
- **ICAO Doc 10151** Manual on Human Performance (HP) for Regulators
- **ADREP Taxonomy:**
 - ICAO link: <https://www.icao.int/safety/airnavigation/aig/pages/adrep-taxonomies.aspx>
 - Taxonomy browser available at: <https://e2.aviationreporting.eu/taxonomy>

Global high-risk categories of Occurrences

GASP (ICAO Doc 1004)



Global high-risk categories of occurrences (G-HRCs) that need to be addressed to mitigate the risk.

Outlined in the 2023-2025 edition of the GASP (ICAO Doc 10004):

- controlled flight into terrain (CFIT);
- loss of control in-flight (LOC-I);
- mid-air collision (MAC);
- runway excursion (RE); and
- runway incursion (RI).



Identification of serious incidents

G-HRC

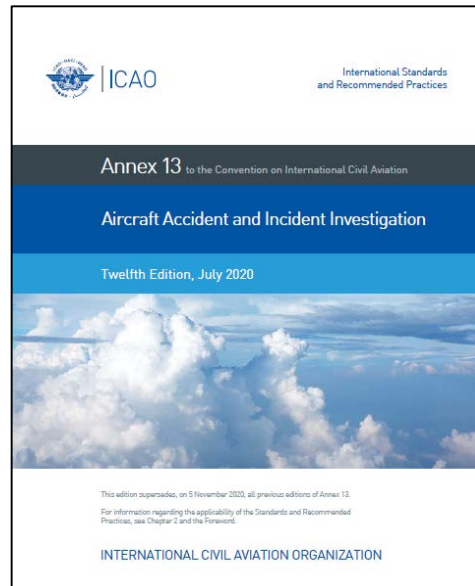
States, regions and industry should consider the G-HRCs in conducting regular safety risk assessments, and further analyse the underlying precursors and contributing factors.

It is therefore essential to assess the opportunity for investigating any incidents that might be associated with these G-HRCs in order to understand both their precursors and also what had prevented a more serious outcome



Identification of serious incidents

Definition and references



- Definition

Serious incident. An incident involving circumstances indicating that there was a **high probability of an accident** and associated with the operation of an aircraft which, in the case of a manned aircraft, takes place between the time any person boards the aircraft with the intention of flight until such time as all such persons have disembarked, or in the case of an unmanned aircraft, takes place between the time the aircraft is ready to move with the purpose of flight until such time as it comes to rest at the end of the flight and the primary propulsion system is shut down.

- Attachment C to Annex 13 provides a list of examples of serious incidents as well as guidance on the assessment and decision-making processes, using a risk-based analysis.

Investigation of serious incidents

Annex 13 — Aircraft Accident and Incident Investigation

Attachment C

Near collisions requiring an avoidance manoeuvre to avoid a collision or an unsafe situation or when an avoidance action would have been appropriate.

Collisions not classified as accidents.

Controlled flight into terrain only marginally avoided.

Aborted take-offs on a closed or engaged runway, on a taxiway¹ or unassigned runway.

Take-offs from a closed or engaged runway, from a taxiway¹ or unassigned runway.

Landings or attempted landings on a closed or engaged runway, on a taxiway¹, on an unassigned runway or on unintended landing locations such as roadways.

Retraction of a landing gear leg or a wheels-up landing not classified as an accident.

Dragging during landing of a wing tip, an engine pod or any other part of the aircraft, when not classified as an accident.

Gross failures to achieve predicted performance during take-off or initial climb.

Fires and/or smoke in the cockpit, in the passenger compartment, in cargo compartments or engine fires, even though such fires were extinguished by the use of extinguishing agents.

Events requiring the emergency use of oxygen by the flight crew.

Aircraft structural failures or engine disintegrations, including uncontained turbine engine failures, not classified as an accident.

Multiple malfunctions of one or more aircraft systems seriously affecting the operation of the aircraft.

Flight crew incapacitation in flight:

- a) for single pilot operations (including remote pilot); or
- b) for multi-pilot operations for which flight safety was compromised because of a significant increase in workload for the remaining crew.

Fuel quantity level or distribution situations requiring the declaration of an emergency by the pilot, such as insufficient fuel, fuel exhaustion, fuel starvation, or inability to use all usable fuel on board.

Runway incursions classified with severity A. The *Manual on the Prevention of Runway Incursions* (Doc 9870) contains information on the severity classifications.

Take-off or landing incidents. Incidents such as under-shooting, overrunning or running off the side of runways.

System failures (including loss of power or thrust), weather phenomena, operations outside the approved flight envelope or other occurrences which caused or could have caused difficulties controlling the aircraft.

Attachment C

Annex 13 — Aircraft Accident and Incident Investigation

Failures of more than one system in a redundancy system mandatory for flight guidance and navigation.

The unintentional or, as an emergency measure, the intentional release of a slung load or any other load carried external to the aircraft.

Examples of what may be serious incidents. However, the list is not exhaustive and, depending on the context, items on the list may not be classified as serious incidents if effective defences remained between the incident and the credible scenario

Identification of serious incidents

Risk-based approach (Annex 13 – Attachment C)

- To determine whether there may be a high probability of an accident:
 - a) consider whether there is a credible scenario by which this incident **could have escalated** to an accident; and
 - b) assess the **remaining defences** between the incident and the potential accident as:
 - i. **effective**, if several defences remained; or
 - ii. **limited**, if few or no defences remained, or when the accident was only avoided due to providence.

		<i>b) Remaining defences between the incident and the potential accident</i>	
		<i>Effective</i>	<i>Limited</i>
<i>a) Most credible scenario</i>	<i>Accident</i>	Incident	Serious Incident
	<i>No accident</i>	Incident	

Identification of serious incidents

Context for decision making

Assess if new or « refreshed » **safety lessons are expected and if other organizations** are likely to identify them in a proper way thanks to their internal safety process.

- Are there any expected lessons to be shared for the improvement of aviation safety?
 - Does any other organization « investigate » the incident? Would there be added value from the AIA investigation?
-
- Consider the possibility of using the occurrence in a **safety study**. In which case, the level of investigation may be adapted to the scope of the safety study.
 - Is it related to an on-going or a future safety study?
 - Is a safety study on this subject an option?



IDENTIFICATION OF SERIOUS INCIDENTS

Case Studies

Identification of serious incidents

Case study 1 – Aircraft upset

- An Airbus A321 was taking off from airport X, where it was snowing with a temperature of -11°C . Prior to departure the aircraft received a de-icing treatment. Multiple ADR faults appeared after takeoff. The climb was continued to an altitude of 8800 feet, which was reached just after 00:46 UTC. The flight then began a gradual descent until about 00:51 UTC and the pitch attitude oscillated between -23.9° and $+43.6^{\circ}$ and the roll angle between 50° to the right and 90° to the left. The aircraft altitude varied between 5000 ft and 14000 ft. Most flight parameters stabilized around 01:18 as the flight began to climb to cruising altitude. After control was regained it was decided to divert to Y Airport, where it arrived at 05:16 UTC. aircraft

		<i>b) Remaining defences between the incident and the potential accident</i>	
		<i>Effective</i>	<i>Limited</i>
<i>a) Most credible scenario</i>	<i>Accident</i>	Incident	Serious Incident
	<i>No accident</i>	Incident	

Identification of serious incidents

Case study 2 – Cabin decompression

- A Boeing 737 experienced a cabin decompression with use of oxygen masks while passing FL290. Emergency descend performed and MAYDAY call. Diversion to X airport.

		<i>b) Remaining defences between the incident and the potential accident</i>	
		<i>Effective</i>	<i>Limited</i>
<i>a) Most credible scenario</i>	<i>Accident</i>	Incident	Serious Incident
	<i>No accident</i>	Incident	

Identification of serious incidents

Case study 3 – Approach below glide path

- The crew of an Airbus A320 was conducting an RNP (LNAV/VNAV) approach to runway 27R at Paris-Charles de Gaulle. Due to a QNH error (1011 instead of 1001), the approach was flown below the glide path. The MSAW alarm was triggered. The crew aborted the approach at low height before the runway, without having acquired external visual references. The second approach was also conducted below the glide path and the MSAW alarm was triggered. After acquiring visual contact with the runway, the crew corrected the path and landed without further incident.

		<i>b) Remaining defences between the incident and the potential accident</i>	
		<i>Effective</i>	<i>Limited</i>
<i>a) Most credible scenario</i>	<i>Accident</i>	Incident	Serious Incident
	<i>No accident</i>	Incident	

Identification of serious incidents

Case study 4 – Runway incursion

- A Airbus 320 was taking off from runway 28 at X Airport in poor visibility when a runway control vehicle was approaching the runway 34/28 intersection.

		<i>b) Remaining defences between the incident and the potential accident</i>	
		<i>Effective</i>	<i>Limited</i>
<i>a) Most credible scenario</i>	<i>Accident</i>	Incident	Serious Incident
	<i>No accident</i>	Incident	



Thank You!