HAZARD

DEFINITIONS AND USAGE NOTES

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Hazard categories are used to identify and classify objects or conditions that cause or have the potential to cause aviation accidents or incidents.

RECORD OF REVISIONS

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TABLE OF TERMS

INTRODUCTION

The International Civil Aviation Organization (ICAO) and the Commercial Aviation Safety Team (CAST), which includes Government officials and aviation industry leaders, have jointly chartered the CAST/ICAO Common Taxonomy Team (CICTT). The team was charged with developing common taxonomies and definitions for aviation accident and incident reporting systems. The common taxonomies and definitions are intended to improve the aviation community's capacity to focus on common safety issues. CICTT includes experts from several air carriers, aircraft manufacturers, engine manufacturers, pilot associations, regulatory authorities, transportation safety boards, ICAO, and members from Canada, the European Union, Japan, and the United States. CICTT is co-chaired by a representative from ICAO and CAST.

To accomplish its objectives, CICTT has developed and released the following common taxonomies and definitions: Aircraft Make/Model/Series tables, Air Traffic Causal and Contributory Factors, Engine Make/Model/Series tables, Phase of Flight, Occurrence Categories, and Engine Occurrence Sub-Categories.

It is important to note that CICTT does not expect governments, international organizations, and corporations to immediately change existing data systems or existing definitions. The intent is to provide *target* taxonomies and definitions so that as organizations make plans for, and implement new safety systems, these new taxonomies and definitions are adopted.

The Hazards Common taxonomy is a high-level categorization of hazards types. Each type contains a main category definition to identify the family of hazards and sub-categories to further define the hazard type to aid in identification, analysis, and coding of hazards.

In reference to the development of this taxonomy and keeping in mind that hazards are not accidents or incidents in which an unsafe event occurred, different definitions exist; therefore, both definitions are included in this document until agreement is reached for a common definition for hazard by the different groups (typically the ICAO Safety Management Panel or the Safety Management International Collaboration Group (SM ICG)). The term hazard is defined in the ICAO Safety Management Manual (SMM) (Doc 9859) as:

> *A condition or object with the potential of causing injuries to personnel, damage to equipment or structures, loss of material, or reduction of ability to perform a prescribed function.*

The SM ICG has further developed its definition of a hazard. According to the recently published SM ICG Safety Management Terminology document, a hazard is defined as:

> *A condition that could cause or contribute to an aircraft incident or accident.*

In some States, references are made to unsafe conditions. In their definition an unsafe condition is also a condition or situation, but the definition does not include an object. However, examples provided include objects such as a component that is prone to failure. It does appear that the notion is to include objects as causing unsafe conditions, and thus the terms hazards and unsafe conditions become synonyms.

Hazards are classified in families of hazard types—logical groupings—to determine their potential consequences. These types of hazards were identified as Environmental, Technical, Organizational, and Human. Hazards are further classified below a certain family of hazard types as they relate to the hazard types.

Each of the environmental, technical, or organizational types of hazards may exist in a particular operational context. The operational contexts were identified as aerodrome services, air navigation service providers, flight operations, maintenance operations, and design and manufacturing. The human family of hazards includes conditions of humans that have the potential to cause injury to personnel, damage to equipment or structures, loss of material, or reduction of ability to perform a prescribed function, according to the hazard definition. Examples of hazard subcategories relating to the human hazard category are an unknown medical condition, physical limitation, or psychological condition. These do not relate to the behavior of the human being.

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ENVIRONMENTAL (*ENV*)

Hazards existing as a consequence of the habitat or environment within which operations related to the provision of services take place.

The environmental hazards category includes the following subcategories:

- Severe weather or climatic events: Factors related to hurricanes, winter storms, droughts, tornadoes, thunderstorms, lightening, and wind shear.
- Adverse weather conditions: Factors related to icing, freezing precipitation, heavy rain, snow, winds, extreme temperatures, and restrictions to visibility.
- Geographical events: Factors relating to earthquakes, volcanoes, tsunamis, floods, and landslides.
- Geography: Factors relating to mountainous terrain, aerodrome altitude, aerodrome terrain, and large bodies of water such as oceans.
- Natural events: Factors related to wildfires, wildlife activity, and insect or pest infestations.
- Public health events: Factors related to epidemics of influenza or other diseases.

Usage note:

- This category is used to describe factors of the environment that will have an effect on aviation operations. It needs to be described within an aviation context. For example, snow might not be a hazard on its own, but it becomes a hazard with potential consequences in an aerodrome operational context.
- The quantity is an important consideration for environmental events or conditions to become a hazard . A light wind could be advantageous to the operation; however a strong crosswind is a hazard for a landing aircraft.
- In order to add detail to the hazard description, a hazard within a subcategory may be further described in a third level code as a specific component of the hazard.

TECHNICAL (*TECH*)

Hazards existing as a consequence of technical deficiencies in aircraft and other machines.

The technical hazards category includes the following subcategories:

- Aircraft: Factors related to the aircraft, its components, systems, subsystems, and related equipment.
- Organizational facilities: Factors related to the facilities of the organization in relation to the objects and conditions such as tools, equipment, workshops, hangers, and storage facilities.
- External facilities: Factors related to the facilities, systems, sub-systems, and related equipment of organizations external to the operation.
- Physical ergonomics: Factors related to the human anatomical anthropometric, physiological, and biochemical characteristics as they relate to the physical activities of the operation.

Usage Notes:

- This category is used to describe technical factors that will have an effect on aviation operations. It needs to be described within an aviation context, such as aircraft maintenance or aerodrome operations.
- External facilities refers to the technical hazards that may exist in facilities of, contractors, service providers, or other organizations that will have an effect on the operation. If hazards exist in the facilities of contractors that repair aircraft parts on a contract basis, then this hazard might cause the failure of such repaired aircraft parts.
- Physical ergonomics relates to the *fit* between the frontline employees and their work place. It includes the ease with which humans interact with the machines they need to operate.

ORGANIZATIONAL (*ORG*)

Hazards existing as a consequence of the organization of the aviation entity.

The organizational hazards category includes the following subcategories:

- Economic growth/recession: Factors related to economic growth or recession.
- Operational policies/procedures: Factors related to operational policies and procedures of the operator or service provider.
- Materials/equipment acquisition: Factors related to the management procedures for the acquisition of materials and equipment and the associated costs of the material and equipment.
- Organizational culture: Factors related to the safety culture of the organization's personnel.
- Work paradigms/teamwork: Factors related to the paradigms of new work undertaken and teamwork by the organization's staff.

Usage Notes:

- This category is used to describe factors that will affect the organization of the aviation entity's operations because of economic changes. These economic changes could be global, State-wide, or confined to the organization. These changes need to be described within an aviation context.
- Economic growth/recession factors include the hazards caused by high rates of economic growth while the organization is unable to change at the same rate, thus allowing safety issues to lag behind. During a recession when the organization needs to cut back spending, hazards may develop as safety issues become less important.
- Hazards develop because of policies or procedures related to the acquisition of material/equipment. For example, hazards are generated by decisions to not purchase material or attempt to use less material, compromising the quality of maintenance. In the case of equipment, hazards arise when decisions are made to maintain equipment rather than replacing it, introducing the problems associated with aging equipment.
- The organizational procedures for material/equipment acquisition may be so tedious that it restricts personnel from obtaining the materials or equipment they need to keep the operation safe. The quality and reliability of the material/equipment could also be compromised.
- Operational policies and procedures are compiled with a balance between safety and production. Hazards can be built into the policies and procedures when they are based predominantly on production to obtain financial benefit.
- The subcategory dealing with hazards caused by the organization's safety culture covers the principle of, "Here, things are done *this* way,". The job is being done, but not necessarily by the industry's accepted best practice.

- The subcategory relating to hazards as a result of the paradigms of new work undertaken and teamwork by the staff of the organization includes hazards such as changing policies due to merging organizations or the operation of new aircraft types.

Hazards existing because of human limitations or impairments in the aviation context.

The human hazards category includes the following subcategories:

- Medical: Factors related to medical conditions of human beings.
- Psychological: Factors related to psychological functioning of the human being, including cognitive functioning as described below.
- Cognitive: Factors related to mental processes such as perception, memory, reasoning, and motor response, as they affect interactions among humans and other elements of a system.
- Physical limitation: Factors related to physical limitations of the human beings operating in the organization.

Usage Notes:

- This category is used to describe factors that will affect the aviation operations because of medical or psychological conditions or physical limitations that may exist in the organization's personnel. These hazards may exist due to the working conditions these affected personnel either experience or are, in some cases, unaware of. These factors need to be described in an aviation context.
- Medical factors include conditions of any severity, such as illness or heart attack, that create a hazard.
- Psychological factors include those that would negatively affect the operation if they exist in the organization's personnel. The hazards in this subcategory are closely related to human factors, such as a state of depression or fatigue.
- Cognitive factors include the psychological/cognitive functioning of human beings during their interactions with other humans and machines in the organizations they serve.
- Physical limitation factors need to describe the physical limitations of personnel working in the organization. This subcategory includes physical limitations that impair the person from executing a task.