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HAZARD IDENTIFICATION AND REPORTING

1. Purpose

- 1.1 This publication provides Meteorological Service Provider with supplementary guidance material on the identification and reporting of hazards as part of safety risk management. It is to be used as a supplement to the Manual of Standards – Meteorological Service for International Air Navigation.

2. Introduction

- 2.1 ICAO sets global standards for aviation safety management. To comply with these standards, ICAO Member States must ensure that their service providers implement an acceptable safety management system (SMS). For Meteorological Service Provider, the requirements for implementing an acceptable SMS are stated in the Manual of Standards – Meteorological service for International Air Navigation, Volume I, Chapter 2.

- 2.2 An SMS is an organised approach to managing safety, including the necessary organisational structures, accountabilities, policies and procedures. There are 4 major components of an SMS:

- a. Safety policy and objectives
- b. Safety risk management
- c. Safety assurance
- d. Safety promotion

- 2.3 This publication focuses on hazard identification and reporting as part of safety risk management. Meteorological Service Provider is advised to refer to ICAO Doc. 9859 - Safety Management Manual and Annex 19 on Safety Management (to be applicable on 14 November 2013) for a full detailed description of safety risk management and hazard identification.

3. Safety Risk Management

- 3.1 Meteorological Service Provider should ensure that safety risks encountered in aviation activities are controlled in order to achieve their safety performance targets. This process is called safety risk management and includes: (i) hazard identification; (ii) safety risk assessment; and (iii) the implementation of appropriate remedial actions. The safety risk management process is illustrated in Figure 1 below:

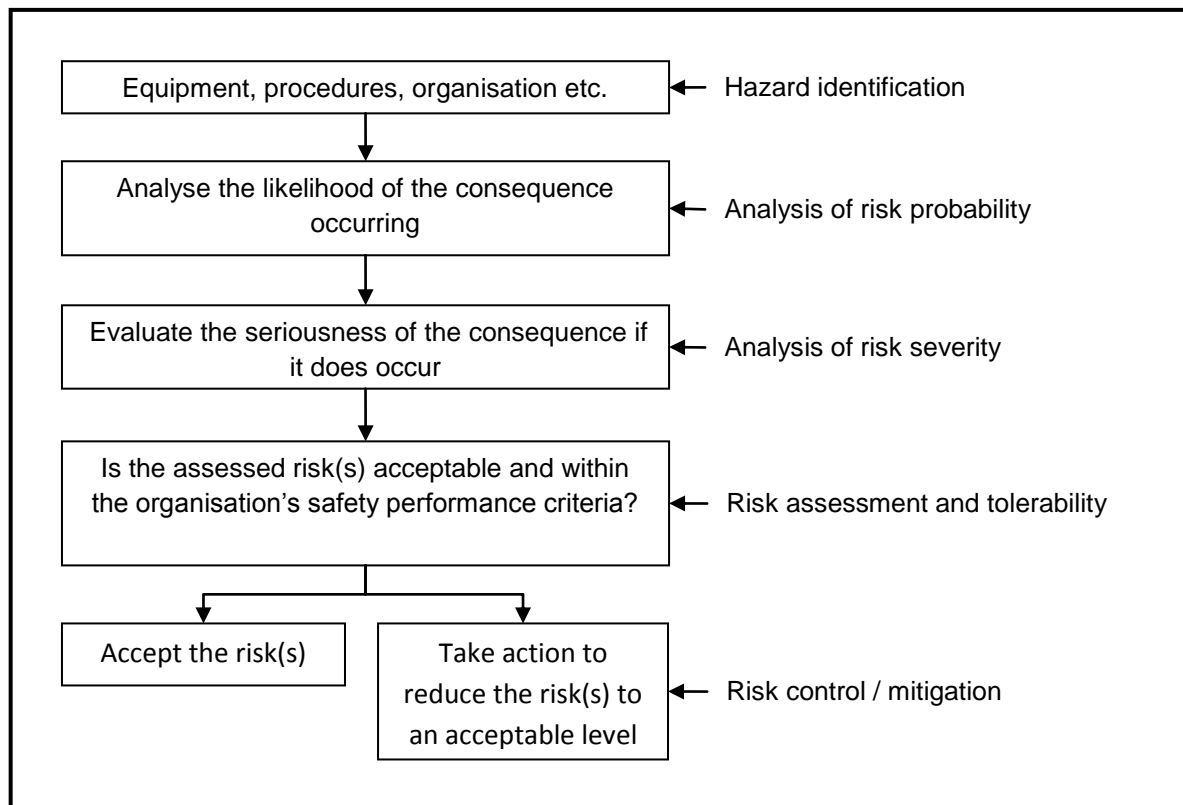


Fig.1 The process of safety risk management

4. Definition of Safety Hazards

4.1 A hazard is defined as anything (a condition or an object) that has a potential to cause injuries to personnel, damage to equipment or structures, loss of material, or reduction of ability to perform a prescribed function. For the purpose of aviation safety risk management, hazard identification should be focused on those conditions that could cause or contribute to unsafe operation of aircraft or aviation safety related equipment, products and services.

4.2 Hazards can be broadly classified into the following types:

- a. Natural hazards such as:
 - i. severe weather and adverse weather conditions.
 - ii. geophysical events (earthquakes, volcanic eruptions, tsunamis, etc).
 - iii. environmental events (wildfires, smoke haze, wildlife activity, etc).
 - iv. public health events (SARS, epidemic flu, etc).

In the Meteorological Service Provider's context, natural hazards involve those that have potential undesirable impact on their operations, for example, Observers exposed to lightning risk when performing outdoor

observations or Meteorological Service's facilities struck by lightning. It does NOT refer to the reporting of the occurrence of natural hazards or the forecast of such natural hazards.

- b. Technical hazards such as:
 - i. deficiency in an organisation's facilities, tools or equipment. This could also apply to related facilities or tools that are external to the organisation but essential to the provision of its services (eg. breakdown in AWOS owned by CAAS).
 - ii. workplace conditions (such as poor lighting, noise, lack of resources, fire hazards, etc).
- c. Organisational hazards such as:
 - i. weak management/leadership
 - ii. lack of safety policies or procedures or non-compliance with them
 - iii. poor staff behaviour/work performance (unsafe acts, human error, displaying unacceptable behaviour, incompetent, poorly trained, low morale, fatigue etc.)
- d. Economic hazards such as recession, poor economic growth, high cost of material or equipment, and terrorist attacks.

4.3 Hazards are not to be confused with their consequences or outcomes. A consequence is an outcome that could be triggered by a hazard. By first defining the hazard clearly, one can then project the proper consequence or outcome. For example, uncalibrated or poorly maintained observing equipment is a hazard. The consequence is an inaccurate weather report.

4.4 It may be noted that consequences can be multi-layered i.e. an intermediate unsafe event before resulting in an ultimate consequence (e.g. aircraft accident). The damaging potential of a hazard materialises through one or many consequences. For example, fatigue of a forecaster is a hazard. The immediate outcome could be his loss of ability to closely monitor the changing weather situation, followed by consequent errors in coding trend forecasts or lapses in issuing timely and accurate warnings. As a result, air traffic controllers may provide wrong information to pilots based on the inaccurate weather forecasts. The ultimate consequence could be an aircraft accident.

4.5 The description of consequences according to their plausible outcomes will facilitate the development and implementation of effective mitigation strategies through proper prioritisation and allocation of limited resources. Proper hazard identification leads to appropriate evaluation of their potential outcomes.

5. Identifying and Reporting Safety Hazards

5.1 Hazards exist at all levels in the organisation and are detectable through use of reporting systems, inspections or audits. Mishaps may occur when hazards

interact with certain triggering factors. As a result, hazards should be identified before they lead to accidents, incidents or other safety related occurrences.

- 5.2 Hazards can also be identified or extracted from review or study of weather reports during incident or accident occurrences. Thus, a systematic procedure to review such weather reports for outstanding hazards is a good mechanism to enhance an organisation's hazard identification system. This is particularly relevant where an organisation's safety culture may not have sufficiently matured to support an effective voluntary hazard reporting system yet.
- 5.3 An effective way to comprehensively identify hazards, particularly the subtle ones, is to involve operational staff at all levels. Meteorological Service Provider could employ the following methods to identify hazards:
- a. Brainstorming
 - b. Staff surveys or questionnaires
 - c. Formal review of standards, procedures and systems
 - d. One person standing back from the operation and monitoring it critically and objectively
 - e. Hazard reporting form
- 5.4 One of the best sources of information is direct reporting by operational staff since they would be able to observe hazards from their daily activities. An effective safety culture is one in which personnel are constantly encouraged to report hazards.
- 5.5 The 5 basic characteristics that are usually associated with effective safety reporting systems are given in Fig. 2 below.
- 5.6 Staff can be encouraged to report hazards via various channels such as e-mail or verbal reporting. A hazard reporting form could be designed to assist an organisation in gathering the necessary information to assist in safety risk management. An example of a hazard reporting form is in **Annex A**. Meteorological Service Providers should adapt the form to meet their specific objective.

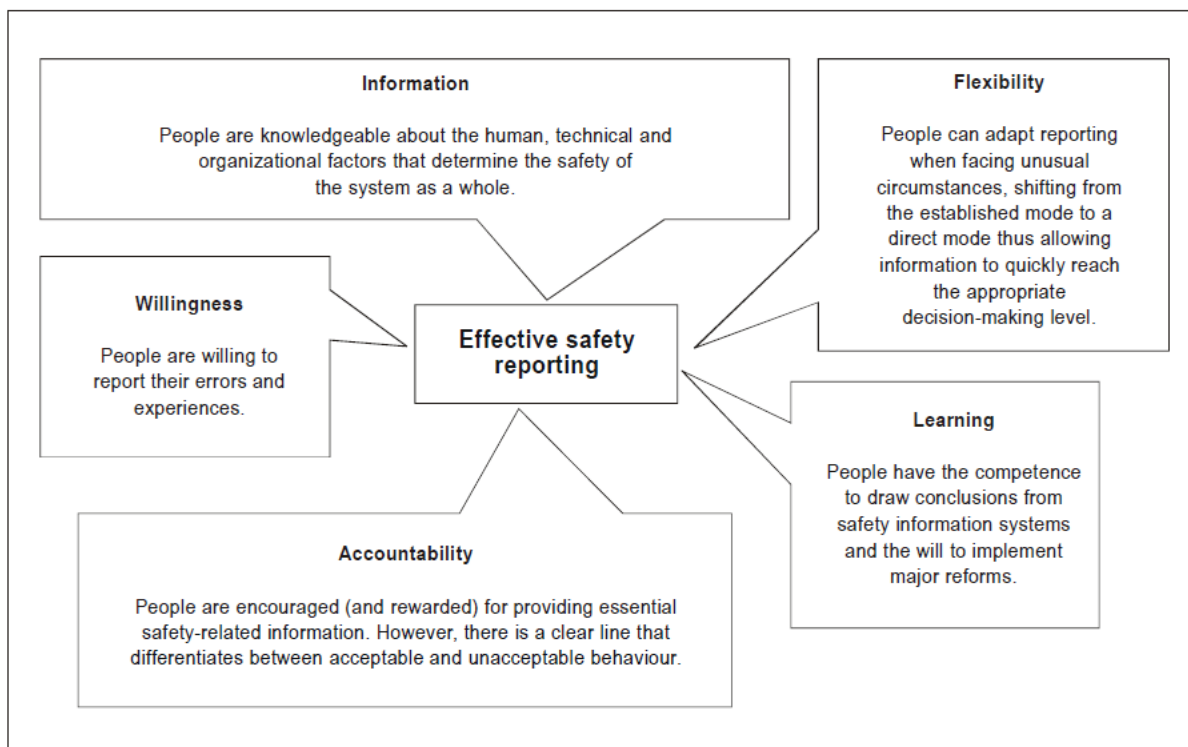


Fig.2 The 5 basic characteristics of an effective safety reporting system

6. Documentation and Implementation

- 6.1 All actual and potential hazards identified and/or reported should be systematically documented and their associated risks assessed. After having assessed the risks and put the controls in place, they should be documented and shared with the staff. It is important to document the risk assessment as they are likely to be changed in the future and would need to be reviewed and updated. Examples of changes would be when new equipment and procedures are introduced into the workplace. It is recommended that a review of the risk assessment be done at least once a year.
- 6.2 The risk control plans must not be shelved into the drawer, but must be implemented. A plan of action can be drawn to deal with the most significant risks first. However, an operation cannot continue if the risk is assessed to be “intolerable”, until it is mitigated to a tolerable or acceptable level.

If there are any queries with regard to this METSP, please address them to:

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Issued by Aerodrome and Air Navigation Services Regulation Division
For and on behalf of Director-General of Civil Aviation

Annex A

HAZARD IDENTIFICATION FORM (SAMPLE)

Reference No.

Thank you for your voluntary hazard reporting. By doing so, you have helped contribute to a strong safety culture in our organisation.

Please provide the relevant details and submit this form to the Safety Manager. You are encouraged to discuss the report with your direct Supervisor before submission.

SUBMITTER DETAILS

Name of officer making report	
Designation & Unit	
Contact number	
Date of submission	

HAZARD DESCRIPTION

Hazard Description	
Hazard Consequence	
Any action taken or Proposed Mitigation(s)	

Annex 1

SAFETY MANAGER USE ONLY

Date report received: _____

Action to be taken or recommended:

Supported by Process / Asset Owner: Yes/No

Name and Signature of Process / Asset Owner: _____

Is the risk assessment plan updated to include this hazard? Yes / No (Rmks: _____)

Date action implemented/closed: _____

Further Remarks:

Name and Signature of Safety Manager : _____