

**Advisory Circular
[AC/AD – 13]**

**Aeronautical Studies
[Safety Risk Assessment]**

**Second Edition
February 2022**

**CIVIL AVIATION AUTHORITY OF
NEPAL**

RECORD OF AMENDMENTS

Version/ Revision Number	Chapter Changed	Pages Replaced	Signature	Date

REVISION HISTORY

Edition No	Date	Chapter/ Section	Details
01	May 2013	All	Advisory Circular: Aeronautical Studies [Safety Risk Assessment]
02	February 2022	All	Advisory Circular: Aeronautical Studies[Safety Risk Assessment]

TABLE OF CONTENTS

RECORD OF AMENDMENTS	ii
REVISION HISTORY	iii
TABLE OF CONTENTS	iv
FOREWORD	v
1 Purpose	1
2 Applicability	2
3 Introduction	3
4 Objectives	4
5 A Typical Aeronautical Study	5
6 Submission of Aeronautical Study to ASSD	9
7 References	9
8 Queries	10
Appendix – A: Checklist for Aeronautical Study	11
Appendix – B: Safety Risk Assessment Process	12
1 Introduction	12
2 Definition of a safety concern and identification of the regulatory compliance	12
3 Hazard identification	13
4 Risk assessment and development of mitigation measures	13
5 Development of an implementation plan and conclusion of the assessment	14
Appendix – C: Hazard log	18
Appendix – D: Risk Probability & Severity, Risk Assessment Matrix and Risk Tolerability	19

FOREWORD

Nepal as a Contracting State to the Convention on International Civil Aviation has an obligation to the international community to ensure that civil aviation activities under its jurisdiction are carried out in strict compliance with the Standards and Recommended Practices contained in the eighteen Annexes to the Convention on International Civil Aviation in order to maintain the required aviation standards.

It is expected that the applicant of an Aerodrome Certificate will be benefited by this Advisory Circular as it explains the procedures for conducting aeronautical studies. It also explains that aerodrome physical facilities, equipment and aerodrome operating procedures shall meet the SARPs of CAR-14 Part 1.

Users of this Advisory Circular are requested that the provisions of the *Civil Aviation Authority Act - 1996 (2053 B.S.)*, *CAAN Airport Certificate Regulations - 2004 (First Amendment - 2016)* and *Civil Aviation Regulation 2002, (Third Amendment 2017)* rather than this Advisory Circular, determine the requirements of, and the obligations imposed by or under, the civil aviation legislation. Users should refer to the applicable provisions when any doubt arises.

This Advisory Circular provides guidance to aerodrome operators to carry out aeronautical studies while the facilities, equipment and procedures at the airport cannot meet the standards and recommended practices of CAR - 14, Part 1 and demonstrate that an equivalent level of safety can be achieved by the aerodrome operator to obtain new aerodrome certificate or renew the existing one under the CAAN ACR 2004 (First Amendment 2016).

This Authority may, without any prior notice, change the content of this Advisory Circular as appropriate.



Director General

Civil Aviation Authority of Nepal

Babarmahal, Kathmandu, Nepal

February 2022

1 Purpose

- 1.1 The purpose of this Advisory Circular (AC) is to provide supplementary guidance to aerodrome operator(s) to conduct aeronautical studies. It provides guidance on what is acceptable to the Aerodrome Safety Standard Department (ASSD) to demonstrate compliance with the Civil Aviation Requirement (CAR - 14) Part 1 Aerodrome Design and Operations.
- 1.2 Section 5 of this AC recommends and explains parts of a typical aeronautical study. By comprehensively addressing all the suggested parts, the aerodrome operator should be able to complete an aeronautical study to assess the viability of solutions to an aeronautical problem. An aeronautical problem may refer to an issue related to:
 - (a) operational regulations such as lack of procedures, insufficient maintenance programs and competency issue; or
 - (b) design regulations, such as terrain of object penetrating the Obstacle Limitation Surfaces (OLS), insufficient strip and Runway End Safety Area (RESA) (dimensions and/or quality), insufficient runway/taxiway separation and lack of or wrongly designed visual aids.
- 1.3 Safety risk assessments are conducted to analyse the impact of the safety. Operational restrictions are the most common mitigation measures for non-compliances. In aerodromes with less traffic throughput, non-compliances may be accepted with a simplified procedure. The same simplified procedure may be applied for very minor non-compliances at busier aerodromes which may only have minimal effect on aviation safety.
- 1.4 Appendix A of this AC contains a suggested checklist with the requirements to be included in an aeronautical study. The checklist can be used by the aerodrome operator as a guide to ascertain that all the requirements have been taken into consideration and documented in the aeronautical study. However, not all the requirements found in Appendix A will be applicable to every aeronautical study conducted. The aerodrome operator should therefore examine each requirement carefully to determine what is applicable.

2 Applicability

- 2.1 This AC applies to all aerodrome operators certified under Rule 4 of Airport Certificate Regulation 2004 (First Amendment 2016) and paragraph 1.4 of the Civil Aviation Requirement (CAR - 14) Part 1 Aerodrome Design and Operations.

3 Introduction

- 3.1 An aeronautical study is a study of an aeronautical problem to identify possible solutions, and to select a solution that is acceptable without degrading safety. A comprehensive aeronautical study allows both the aerodrome operator and the ASSD to be convinced that safety and regularity of operations of aircraft are not compromised in any way.
- 3.2 An aeronautical study is most frequently undertaken during the planning of a new airport or new airport facility, or during the certification of an existing aerodrome or subsequently, when the aerodrome operator applies for an exemption, as a result of development or a change in the aerodrome operational conditions from a specific Standard and Recommended Practices (SARPs) contained in the CAR - 14, PART 1.
- 3.3 Aerodrome operators should consult their stakeholders, senior management and affected divisions/departments in their organisations prior to the conduct of an aeronautical study. These consultations would allow the proposed deviation to be viewed from different perspectives and the different parties involved would be aware of the proposed deviation. The aeronautical study should also be approved by the senior management of the organization before it is submitted to the ASSD for consideration of acceptance by DG CAAN.
- 3.4 Aerodrome operators should note that the ASSD official(s) may choose to participate in the conduct of an aeronautical study as an observer where appropriate.
- 3.5 If ASSD is satisfied with the application, ASSD will issue an exemption to the aerodrome operator. Refer to CAAN **Exemption Procedure for Non-compliance at Aerodrome** for the guidance on exemption procedure.

4 Objectives

4.1 The objectives of an aeronautical study are as follows:

- a) To study the impact of deviations from the SARPs;
- b) To present alternative solutions to ensure the level of safety remains acceptable;
- c) To assess the effectiveness of each alternative; and
- d) To recommend operating procedures/restrictions or other mitigation measures to compensate for the deviation.

5 A Typical Aeronautical Study

5.1 Parts of an Aeronautical Study

5.1.1 An aeronautical study submitted to the ASSD for determination of acceptability should comprise the following parts:

- a) Aim of the Study;
- b) Background;
- c) Safety Assessment;
 - definition of a safety concern and identification of the regulatory compliance;
 - hazard identification and analysis;
 - risk assessment and development of mitigation measures; and
 - development of an implementation plan for the mitigation measures and conclusion of the assessment.
- d) Recommendations;
- e) Conclusion; and
- f) Monitoring of the Deviation

5.2 Aim of the Study

5.2.1 The aim of the study should be explicitly stated. It should:

- a) Address the safety concerns;
- b) Identify safety measures to be put in place to ensure safe aircraft operations in an aerodrome; and
- c) Make reference to the specific SARP in the CAR - 14, PART 1 which the study is meant to address.

5.2.2 An example to illustrate this would be as follows:

"The aim of this aeronautical study is to address the operation of Code F aircraft in a Code 4E airport, <name of airport> and to put in place <list of safety measures> necessary to ensure safe operation of Code F aircraft in <name of airport> with reference made to <reference to specific SARP>... "

5.3 Background

5.3.1 Information on the current situation faced by the aerodrome operator, current procedures that have been put in place and other relevant details should be clearly stated and explained in this sub-section. Clear explanation should be provided, particularly on the following:

- a) What is the current situation?
- b) Where are the areas that will be affected by the proposed deviation?
- c) When will the operator be able to comply with the specific standard if it is due to development of the aerodrome?
- d) Why is there a need to review the current processes and procedures?
- e) How will the proposed deviation affect the operation of aircraft at the aerodrome?

5.3.2 An example to illustrate this would be as follows:

"Currently, <name of airport> is Code 4E airport with some Code 4F capabilities. These Code 4F capabilities includes <list of the Code 4F capabilities>... <Name of airport> is required to handle Code F aircraft by <proposed date> and the following <list of affected areas> will be affected. Development of the <affected areas> is proposed to commence on <proposed date> and to be completed by <proposed date>. By then, <name of airport> will be upgraded to a Code 4F airport.

Upgrading <name of airport> from Code 4E to Code 4F airport requires the reviewing <name of processes and procedures that need to be reviewed> to ensure safe aircraft operation.

In addition, during this development, operation of aircraft at <name of airport> will be affected in the following ways..."

5.4 Safety Risk Assessment

5.4.1 The safety risk assessment conducted by the aerodrome operator is a core SMS function. Management approval and implementation of the safety risk assessment, including future updates and maintenance, are the responsibility of the aerodrome operator. The ASSD may, depending on the need and complexity of the application, require the submission of the specific safety risk assessment for approval/acceptance.

5.4.2 The ASSD establishes the type of safety risk assessments that are subject to approval or acceptance and determines the process used for that approval/acceptance.

5.4.3 The ASSD analyses the safety risk assessment and verifies that:

- appropriate coordination has been satisfactorily performed among the concerned stakeholders;
- the risks have been properly identified and assessed, based on documented arguments (e.g., physical or Human Factors studies, analysis of previous accidents and incidents);

- the proposed mitigation measures adequately address the risk and bring the risk to an acceptable level; and
- the time frames for planned fully compliance are acceptable.

5.4.4 On completion of the analysis of the safety risk assessment, the ASSD:

- either gives formal approval or acceptance of the safety risk assessment to the aerodrome operator as specified in paragraph 5.4.1; or
- if some risks have been underestimated or have not been identified, coordinates with the aerodrome operator to reach an agreement on safety acceptance; or
- if no agreement can be reached, rejects the proposal for possible resubmission by the aerodrome operator.

5.4.5 The ASSD may also opt to impose additional conditions to ensure safety.

5.4.6 The ASSD should ensure that the mitigation and/or additional conditions imposed as per paragraph 5.4.5 are properly implemented and that they fulfil their purposes.

5.5 ASSD Recommendations

5.5.1 To allow the aerodrome operator and ASSD to be convinced and assured that the proposed deviation will not pose a drop in the level of safety, the aerodrome operator should recommend operating procedures/restrictions or other measures that will address any safety concerns. In addition, the aerodrome operator should assess the effectiveness (through trials, surveys, simulations etc.) of each recommendation listed so as to identify the best means to address the proposed deviation.

5.5.2 The aerodrome operator should also ensure that the concerned stakeholders are well informed of such changes. The notification procedure including process flow, time frame and different means of notification such as the Aeronautical Information Publication (AIP) and Notice to Airmen (NOTAM) should be included in the study.

5.5.3 An example to illustrate this would be as follow:

"The following are some of the operating procedures/restrictions or other measures as well as their measured effectiveness, which could be adopted to ensure safe aircraft operations in <name of airport>:

<Name of the operating procedures/restrictions or other measures and their corresponding measured effectiveness>

The notification procedure to the affected parties is as follow:

Description of the notification procedure including process flow, time frame and different means of notification>

5.6 Conclusion

5.6.1 The aerodrome operator, after taking into account all the necessary considerations listed above, should be able to summarize and conclude the results of the aeronautical study, and come to a decision on any safety measures that should be adopted. The aerodrome operator should also specify a date to put in place all the necessary safety measures and show how they maintain the same level of safety with the recommended safety measures mentioned in the aeronautical study.

5.6.2 An example to illustrate this would be as follow:

"The results of this aeronautical study have concluded that <the proposed deviation> will indeed pose a drop in the level of safety. However, by adopting <type of the safety measures>, this drop in the level of safety can be safely addressed. These safety measures will be put in place on <proposed date> to address the proposed deviation. With these safety measures put in place, <to explain how to maintain the same level of safety>... "

5.7 Monitoring of the Deviation

- 5.7.1 After the completion of the aeronautical study, the aerodrome operator should monitor the status of the deviation and ensure that the implemented recommendations have been effectively carried out, and that the level of safety is not compromised at any time. This assessment is to allow feedback into the safety assessment process, if required.
- 5.7.2 An example would be as follow:

<Name of the aerodrome operator> will monitor the deviation's status <fixed period of time> and ensure the safety measures has been effectively carried out and the level of safety is not compromised at any time. <Name of the aerodrome operator> will review the safety assessment process, if required..."
- 5.7.3 The aerodrome operator shall be required to conduct annual review to ascertain that the mitigation measures are in place and effective. The review should also consider whether the non-compliance could be removed from ASSD findings. The outcomes of the review are required to be documented in the report to be submitted to ASSD for consideration.
- 5.7.4 For temporary deviations, the aerodrome operator should also notify ASSD after the deviation has been corrected.

6 Submission of Aeronautical Study to ASSD

- 6.1 The aerodrome operator should note the guidance provided in this AC and use the suggested checklist provided in Appendix - A to ensure that any aeronautical study submitted to ASSD for consideration of acceptance is thoroughly conducted and documented.
- 6.2 The accepted non-compliances shall be published in the AIP if it is related to CAR-14 Part 1 in accordance with CAR 15 Chapter 5.

7 References

- Airport Certificate Regulations, 2004 (First Amendment 2016);
- Civil Aviation Requirement (CAR - 14) Part 1; Aerodrome Design and Operations
- CAAN SMS Requirements, 2010;
- ICAO Doc 9774 - Manual on Certification of Aerodromes; and
- ICAO Doc 9859 -Safety Management Manual.

8 Queries

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

Director
Aerodrome Safety Standards Department (ASSD),
Civil Aviation Authority of Nepal
[Email: dass@caanepal.gov.np](mailto:dass@caanepal.gov.np)

Appendix – A: Checklist for Aeronautical Study

NOTE: The purpose of this Appendix - A is to provide aerodrome operators with a suggested checklist for reviewing of an aeronautical study. Aerodrome operators may use this checklist as a guide for developing an aeronautical study tailored to his individual situation.

The suggested checklist for reviewing of an aeronautical study is as shown below:

Checklist for Aeronautical Study	Yes	No	Remarks
1. Aim of the study including (a) Address safety concerns, (b) Identify safety measures, and (c) Refer to Specific SARPs in CAR - 14, Part 1;	<input type="checkbox"/>	<input type="checkbox"/>	
2. Consultation with stakeholders, senior management team and divisions/ departments affected;	<input type="checkbox"/>	<input type="checkbox"/>	
3. The study is approved by a senior executive of the organization;	<input type="checkbox"/>	<input type="checkbox"/>	
4. Background Information on the current situation;	<input type="checkbox"/>	<input type="checkbox"/>	
5. Proposed date for complying with the SARPs, if the deviation is due to development of the aerodrome;	<input type="checkbox"/>	<input type="checkbox"/>	
6. Safety assessment including (a) identification of hazards and consequences and (b) risk management;	<input type="checkbox"/>	<input type="checkbox"/>	
7. The safety assessment used in the study (E.g. hazard log, risk probability and severity, risk assessment matrix, risk tolerability and risk control/mitigation);	<input type="checkbox"/>	<input type="checkbox"/>	
8. Recommendations (including operating procedures/ restrictions or other measures to address safety concern) of the aeronautical study and how the proposed deviation will not pose a drop in the level of safety;	<input type="checkbox"/>	<input type="checkbox"/>	
9. Assessment of the effectiveness of each recommendation listed in the aeronautical study;	<input type="checkbox"/>	<input type="checkbox"/>	
10. Notification procedure including process flow, time frame and the publication used to promulgate the deviation;	<input type="checkbox"/>	<input type="checkbox"/>	
11. Conclusion of the study;	<input type="checkbox"/>	<input type="checkbox"/>	
12. Monitoring of the deviation; and	<input type="checkbox"/>	<input type="checkbox"/>	
13. Notification to ASSD once the temporary deviation has been corrected.	<input type="checkbox"/>	<input type="checkbox"/>	

Appendix – B: Safety Risk Assessment Process

1 Introduction

- 1.1 The primary objective of a safety risk assessment is to assess the impact of a safety concern, such as a design change or deviation in operational procedures at an existing aerodrome.
- 1.2 Such a safety concern can often impact multiple stakeholders; therefore, safety assessments often need to be carried out in a cross-organizational manner, involving experts from all the involved stakeholders. Prior to the assessment, a preliminary identification of the required tasks and the organizations to be involved in the process to be conducted.
- 1.3 A safety assessment is initially composed of four basic steps:
 - definition of a safety concern and identification of the regulatory compliance;
 - hazard identification and analysis;
 - risk assessment and development of mitigation measures; and
 - development of an implementation plan for the mitigation measures and conclusion of the assessment.

2 Definition of a safety concern and identification of the regulatory compliance

- 2.1 Any perceived safety concerns are to be described in detail, including timescales, projected phases, location, stakeholders involved or affected as well as their potential influence on specific processes, procedures, systems and operations
- 2.2 The perceived safety concern is first analysed to determine whether it is retained or rejected. If rejected, the justification for rejecting the safety concern is to be provided and documented
- 2.3 An initial evaluation of compliance with the appropriate provisions in the regulations applicable to the aerodrome to be conducted and documented.
- 2.4 The corresponding areas of concern are identified before proceeding with the remaining steps of the safety risk assessment, with all relevant stakeholders.
- 2.5 If a safety risk assessment was conducted previously for similar cases in the same context at an aerodrome where similar characteristics and procedures exist, the aerodrome operator may use some elements from that assessment as a basis for the assessment to be conducted. Nevertheless, as each assessment is specific to a particular safety concern at a given aerodrome the suitability for reusing specific elements of an existing assessment is to be carefully evaluated.

3 Hazard identification

- 3.1 Hazards related to infrastructure, systems or operational procedures are initially identified using methods such as brain-storming sessions, expert opinions, industry knowledge, experience, and operational judgement. The identification of hazards is conducted by considering:
- accident causal factors and critical events based on a simple causal analysis of available accident and incident databases;
 - events that may have occurred in similar circumstances or that are subsequent to the resolution of a similar safety concern; and
 - potential new hazards that may emerge during or after implementation of the planned changes
- 3.2 Following the previous steps, all potential outcomes or consequences for each identified hazard are identified.
- 3.3 The appropriate safety objective for each type of hazard should be defined and detailed. This can be done through:
- reference to recognized standards and/or codes of practices;
 - reference to the safety performance of the existing system;
 - reference to the acceptance of a similar system elsewhere; and
 - application of explicit safety risk levels.
- 3.4 Safety objectives are specified in either quantitative terms (e.g., identification of a numerical probability) or qualitative terms (e.g., comparison with an existing situation). The selection of the safety objective is made according to the aerodrome operator's policy with respect to safety improvement and is justified for the specific hazard.

4 Risk assessment and development of mitigation measures

- 4.1 The level of risk of each identified potential consequence is estimated by conducting a risk assessment. This risk assessment will determine the severity of a consequence (effect on the safety of the considered operations) and the probability of the consequence occurring and will be based on experience as well as on any available data (e.g. accident database, occurrence reports).
- 4.2 Understanding the risks is the basis for the development of mitigation measures, operational procedures and operating restrictions that might be needed to ensure safe aerodrome operations.

- 4.3 The method for risk evaluation is strongly dependent on the nature of the hazards. The risk itself is evaluated by combining the two values for severity of its consequences and probability of occurrence.

Note. – An example of risk categorization tool in the form of a safety risk matrix is available in Appendix D.

- 4.4 Once each hazard has been identified and analysed in terms of causes, and assessed for severity and probability of its occurrence, it must be ascertained that all associated risks are appropriately managed. An initial identification of existing mitigation measures must be conducted prior to the development of any additional measures.

- 4.5 All risk mitigation measures, whether currently being applied or still under development, are evaluated for the effectiveness of their risk management capabilities.

Note. – The exposure to a given risk (e.g. duration of a change, time before implementation of corrective actions, traffic density) is taken into account in order to decide on its acceptability.

- 4.6 In some cases, a quantitative approach may be possible, and numerical safety objectives can be used. In other instances, such as changes to the operational environment or procedures, a qualitative analysis may be more relevant.

- 4.7 ASSD should provide suitable guidance on risk assessment models for aerodrome operators.

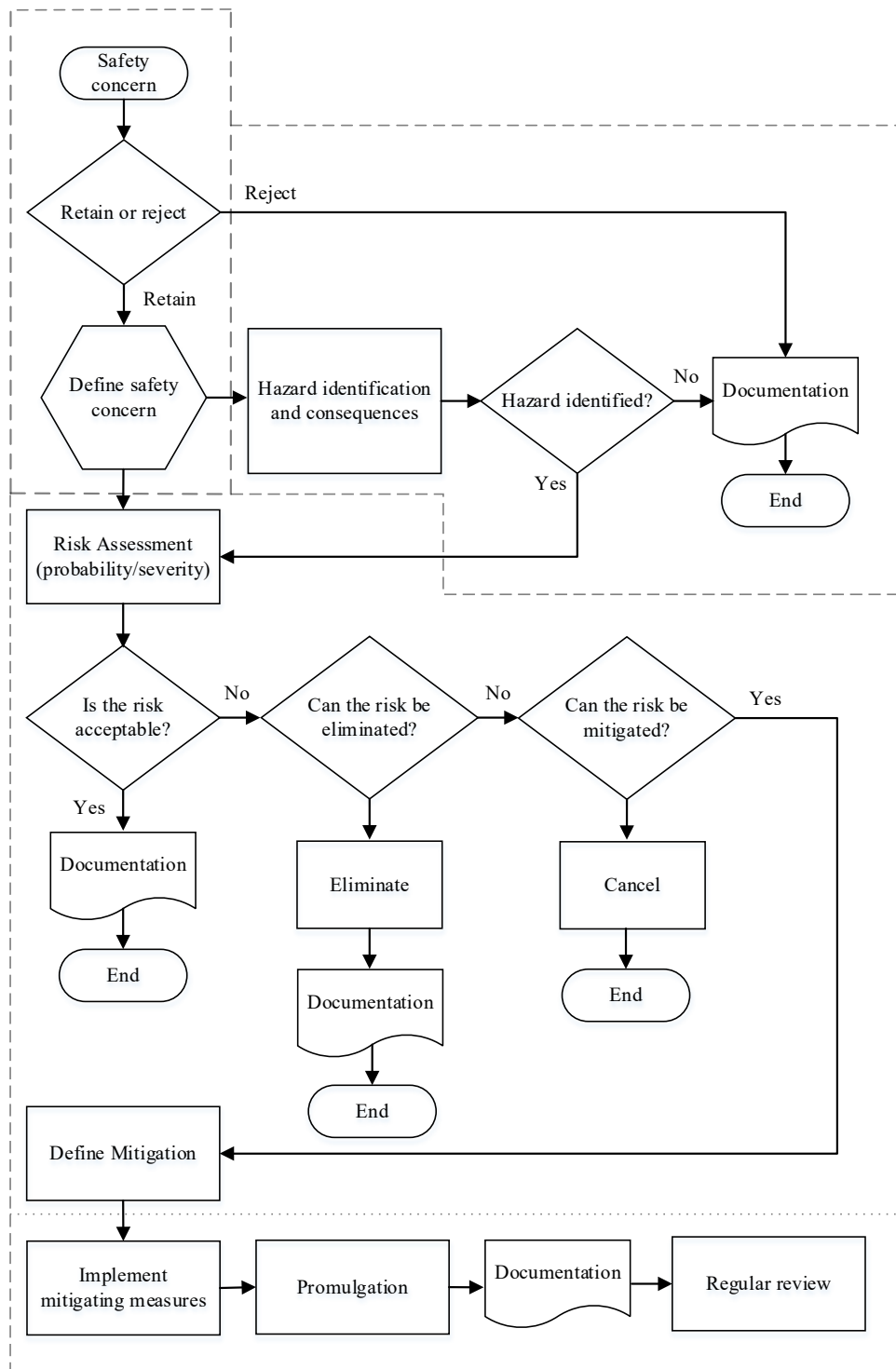
- 4.8 In some cases, the result of the risk assessment may be that the safety objectives will be met without any additional specific mitigation measures. This is likely to take place for cases where the level of risk falls into the green zone of the risk matrix.

Note - See Appendix D for an example of risk matrix.

5 Development of an implementation plan and conclusion of the assessment

- 5.1 The last phase of the safety assessment process is the development of a plan for the implementation of the identified mitigation measures.

- 5.2 The implementation plan includes time frames, responsibilities for mitigation measures as well as control measures that may be defined and implemented to monitor the effectiveness of the mitigation measures.

Safety Risk Assessment Flowchart

Template of Safety Risk Assessment Report

Note – This template is meant for providing an example of safety risk assessment report for aerodromes. The content of this example is only for illustration and should not be copied to an aerodrome safety risk assessment even if the subject is the same.

	Generic Component of Hazard	Specific components of Hazard (Safety Events)	Ultimate Consequences	Existing Mitigation Measures	Risk Index	Proposed Mitigation Measures	Residual Risk Index	Last Review Date	Next Review Date
1	<u>Docking of new Code E aircraft type at aircraft parking stand certified for Code E aircraft</u> [Organizational]	Visual docking guidance system (VDGS) could not recognize the new Code E aircraft type	Aircraft overshooting or undershooting the correct parking position Delay in arrival operations	Marshaller on scene to monitor the docking and provide hand signal if needed	2D	Nil (as the risk level is acceptable)	2D	1 Aug 2020	1 Oct 2020
				VDGS shows STOP signal to pilot if unable to recognize type					
				Parking stand under remote surveillance by Apron Control Centre					
2		Operator of passenger loading bridge (PLB) unfamiliar with the docking position of new Code E aircraft type	Minor aircraft damage Minor damage to PLB Delay in aircraft turn around operations	PLB operator received briefing on precautions for the new Code E aircrafts before duty	3D	PLB operations supervisor assigned on scene to provide additional guidance for operators during their first 5 docking	2D	1 Aug 2020	1 Oct 2020
				Proximity and pressure sensors on PLB					
				Enhanced lighting from PLB control position for night operations					
3		Servicing equipment unable to serve aircraft due to new location / design of	Minor aircraft damage Minor equipment damage Delay in turn around operations	Equipment operator received briefing on precautions for the new type before duty	4D	Apron service contractors will assign supervisors / trainers to provide additional guidance	2D	1 Aug 2020	1 Oct 2020

		doors and servicing pods							
				Proximity and pressure sensors on equipment		Airport operator will conduct random inspections on equipment operations for this new type for 1 month			
	[other items]								

Prepared and assessed by:	(Signature)	Recommended by:	(Signature)
	Name and Post (Appropriate Officer / Manager of Airport Operator) (Could be a group of personnel relevant to the project / subject)		Name and Post (Safety Manager of Airport Operator)
Date:		Date:	
		Approved by:	(Signature)
			Name and Post (Accountable Executive of Airport Operator)
		Date:	

Appendix – C: Hazard log

Note: The purpose of this Appendix – B is to provide aerodrome operations with a suggested hazard log for safety assessment of an aeronautical study. Aerodrome operators may use this log as a guide to formulate his own log. This log should be constantly updated throughout the aeronautical study life cycle.

A sample hazard log for safety assessment of an aeronautical study is as shown below:

S. N	Type of operation or activity	Generic hazard	Specific components of the hazard	Hazard-related consequences	Existing defenses to control safety risk(s) and safety risk index	Further action to reduce safety risk(s) and resulting safety risk index
1	<u>Aircraft operation</u>	Operation of Code 4F aircraft in <name of airport>. Code F aircraft using runway for landing and takeoff.....		<ul style="list-style-type: none"> Wing tip collision at <parking bay numbers>. Loss of control of aircraft during pushback/towing operations. 	<ul style="list-style-type: none"> Use of wing walkers; Aircraft to taxi at <speed value>. Training of staff for pushback/towing operations; Restrictions on other aircraft movements within <parking bay number> <p>Safety risk index: 3C Safety risk tolerability: Tolerable</p>	<ul style="list-style-type: none"> Conduct trials to study the effectiveness of the implementation. Resulting risk index: 2E <p>Safety risk index: 2D Safety risk tolerability: Acceptable</p>

Appendix – D: Risk Probability & Severity, Risk Assessment Matrix and Risk Tolerability

NOTE: The purpose of this Appendix - D is to provide aerodrome operators with a suggested risk probability and severity and risk assessment matrix to be included in an aeronautical study. Aerodrome operators may use this as a guide for developing their own risk probability and severity and risk assessment matrix tailored to his individual situation.

Risk Probability

Probability of Occurrence		
<i>Qualitative Definition</i>	<i>Meaning</i>	<i>Value</i>
Frequent	Likely to occur many times (has occurred frequently)	5
Occasional	Likely to occur sometimes (has occurred infrequently)	4
Remote	Unlikely to occur, but possible (has occurred rarely)	3
Improbable	Very unlikely to occur (not known to have occurred)	2
Extremely improbable	Almost inconceivable that the event will occur	1

Risk Severity

Severity of occurrence		
<i>Aviation Definition</i>	<i>Meaning</i>	<i>Value</i>
Catastrophic	— Equipment destroyed — Multiple deaths	A
Hazardous	— A large reduction in safety margins, physical distress or a workload such that the operators cannot be relied upon to perform their tasks accurately or completely — Serious injury — Major equipment damage	B
Major	— A significant reduction in safety margins, a reduction in the ability of the operators to cope with adverse operating conditions as a result of increase in workload, or as a result of conditions impairing their efficiency — Serious incident — Injury to persons	C
Minor	— Nuisance — Operating limitations — Use of emergency procedures — Minor incident	D
Negligible	— Few consequences	E

Risk Assessment Matrix

Risk probability	Risk severity				
	Catastrophic (A)	Hazardous (B)	Major (C)	Minor (D)	Negligible (E)
Frequent (5)	5A	5B	5C	5D	5E
Occasional (4)	4A	4B	4C	4D	4E
Remote (3)	3A	3B	3C	3D	3E
Improbable (2)	2A	2B	2C	2D	2E
Extremely Improbable (1)	1A	1B	1C	1D	1E

Risk Tolerability

Safety Risk Index Range	Safety Risk Description	Suggested Criteria [Acceptability/Action Required]
5A, 5B, 5C, 4A, 4B, 3A	Intolerable	Unacceptable under the existing circumstances. [Do not permit any operation until sufficient control measures have been implemented to reduce risk to an acceptable level.]
5D, 5E, 4C, 4D, 4E, 3B, 3C, 3D 2A, 2B, 2C, 1A	Tolerable	Acceptable based on risk mitigation. It may require management decision.
3E, 2D, 2E, 1B, 1C, 1D, 1E	Acceptable	Acceptable as is. No further safety risk mitigation required.