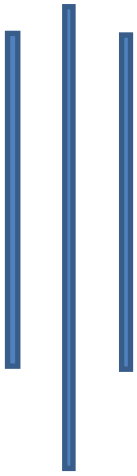
Safety Risk Management

(SRM)

Procedure Manual



First Edition

Issued by

Aviation Safety and Security Regulation Directorate

Civil Aviation Authority of Nepal

Safety Risk Management (SRM) Procedure Manual

Safety Management Division

Aviation Safety and Security Regulation Directorate

Civil Aviation Authority of Nepal

Approved for publication by the Director General, Civil Aviation Authority of Nepal, under the Article 82 of the Civil Aviation Rules, 2058 BS.

First Edition – January 2026

This Document is available at:

https://caanepal.gov.np/safety/safety-management-division/documents

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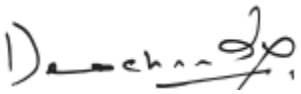
FOREWORD

ICAO Annex 19 requires State to implement a State Safety Programme (SSP) and Service providers to implement a Safety Management System (SMS) for effective safety management of all activities related to civil aviation in a State. For the effective safety management, the safety risk management is an essential process which should be carried out in an effective way.

This manual has been prepared to provide guidance for a standard framework to ensure consistent application of Safety Risk Management process across Civil Aviation organizations requiring to implement a State Safety Programme (SSP) and Safety Management System (SMS) in accordance with the Civil Aviation Requirement for Safety Management (CAR- 19) Para. 3.1 and Para. 4.1 respectively. This manual shall also help to implement a sound risk management methodology to diligently manage risk as an effective contribution to maintain the level of safety as envisioned by the State.



Deo Chandra Lal Karn
Act. Director General

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DETAILS OF EDITIONS AND AMENDMENTS

This manual shall be updated as and when necessary. The owner of the manual shall be responsible for ensuring that it is continuously kept up to date and that all required entries are properly recorded.

Edition	Amendment	Entered by/Date	Description of Edition or Amendment
01	00	SMD/January 2026	Initial edition

ABBREVIATIONS AND ACRONYMS

BQV	Barrier Quality Value
BSV	Barrier Strength Value
CAA	Civil Aviation Authority
CAAN	Civil Aviation Authority of Nepal
CBSV	Consolidated Barrier Strength Value
Doc.	Document
ECM	Existing Control Measure
ERB	Existing Recovery Barrier
ERC	Event Risk Classification
ICAO	International Civil Aviation Organization
NCM	New Control Measure
NRB	New Recover Barrier
ONB	Optimum Number of Barrier
Ops.	Operations
Rpt.	Report
SMS	Safety Management System
SRM	Safety Risk Management
SSP	State Safety Programme
UE	Unsafe Event

Chapter 1: GENERAL

1.1 Definitions

Defenses: Specific mitigating actions, preventive controls, or recovery measures put in place to prevent the realization of a hazard or its escalation into an undesirable consequence.

Hazard: A condition or an object with the potential to cause or contribute to an aircraft incident or accident.

Safety: The state in which risks associated with aviation activities, related to, or in direct support of the operation of aircraft, are reduced and controlled to an acceptable level.

Safety data: A defined set of facts or set of safety values collected from various aviation-related sources, which is used to maintain or improve safety.

Note— Such safety data is collected from proactive or reactive safety-related activities, including but not limited to:

a) accident or incident investigations;

b) safety reporting;

c) continuing airworthiness reporting;

d) operational performance monitoring;

e) inspections, audits, surveys; or

f) safety studies and reviews.

Safety information: Safety data processed, organized or analyzed in a given context so as to make it useful for safety management purposes.

Safety management system (SMS): A systematic approach to managing safety, including the necessary organizational structures, accountability, responsibilities, policies and procedures.

Safety oversight: A function performed by a State to ensure that individuals and organizations performing an aviation activity comply with safety-related national laws and regulations.

Safety risk: The predicted probability and severity of the consequences, or outcomes of a hazard.

State Safety Programme (SSP) : An integrated set of regulations and activities aimed at improving safety.

1.2 Purpose of the Manual

To provide direction for a framework that contributes to consistent application of Risk Management process across the SSP and SMS environments.

1.3 Applicability

This document is applicable to the Civil Aviation Authority of Nepal (CAAN) and aviation service-providing organizations required to implement SMS.

1.4 Authority for publication and amendment of the manual

This manual is developed, published and distributed pursuant to Civil Aviation Regulations, 2002.

The CAA Nepal is responsible for the issuance and control of amendments to this manual. All copies of the manual are numbered and issued in accordance with the distribution list. Individual holders are responsible for insertion of all amendments. One copy of the manual shall also be published on the official website of CAAN for the communication to all stakeholders at large.

All users of this manual are encouraged to submit recommendations for proposed revisions, additions or omissions to the Authority for consideration and inclusion in the amendments as appropriate.

This manual shall be reviewed and revised as necessary.

All the recommendations and suggestions for improvement should be directed to:

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Chapter 2

Process for Conduction of Safety Risk Management (SRM)

(This process should be read in consonant with ICAO Doc. 9859.)

2.1 Hazard registration

When a safety hazard is identified from any source, that hazard should be acknowledged, if applicable, and registered in a format that includes all essential elements of a hazard required during the subsequent risk assessment and mitigation processes. The essential elements of a hazard include, but are not limited to:

i. Hazard identified/reported date;
ii. Area/operation/equipment
iii. Description of hazard
iv. Hazard taxonomy,
v. Hazard Code
vi. Source of information
vii. The unsafe or top event
viii. Consequence
ix. Initial prioritization
x. Recommended actions
xi. Status
xii. Follow-up
xiii. Remarks

A sample hazard registration sheet has been included hereunder:

S.N	Identified/ Reported Date	Area/ Operation/ Equipment	Hazard (H)					Unsafe Event (UE)/ Top Event (Reported/ Projected)	Consequence (C) (Reported/projected	Initial Priority Level (H/M/L)	Recommended Action		Status	Follow-up	Remarks
			Description of Hazard	Threats of Hazard	Hazard Taxonomy	Code	Source of information				Corrective Action (yes/No)	SRM (Yes/ No)			

Hazard Registration Sheet

Explanatory Note with Examples:

i. *Hazard Identified/Reported Date: The date on which the hazard was identified or reported.*
ii. *Area/Operation/Equipment: The domain, function, or equipment related to the hazard, so that the responsible entity can address it.*
iii. *Description of Hazard: The content of hazard; what the hazard actually is, described in narrative form.*
iv. *Threat of Hazard: An event or condition that could potentially cause the hazard to exist or release a hazard by producing a top event.*
v. *Hazard Taxonomy: The classification to which the hazard belongs. There are various taxonomies, but the most appropriate is the ICAO Hazard Taxonomy: Environment, Organization, Technical, and Human.*
vi. *Hazard Code: A unique code assigned to a hazard to facilitate easy identification during SRM and subsequent monitoring of the processes (e.g., OPS/001/M/2024 - function/serial number of hazard/initial priority of hazard/year)*
vii. *Source of Information: The origin of hazard information, which may be extracted from - Voluntary Hazard Reports, Occurrence Notifications/Investigation Reports, Internal Audit Reports, External Audit Reports, Hazard Survey Reports, Operational Data Review Reports, or Operational Trial Reports.*
viii. *Unsafe /Top Event: Unsafe / Top Event: The occurrence of a hazardous event before it leads to a consequence.*
ix. *Consequence: The projected or reported most credible outcome of the hazard.*
x. *Initial Hazard Priority Level: The initial priority level, determined based on the projected (or reported) severity of the consequence (Accident, Serious Incident, or Incident) or by other procedures defined by the organization. Priority levels are: Accident - High (H); Serious Incident - Medium (M); Incident - Low (L).*
xi. *Recommended Action: Actions recommended to address the hazard. Actions could include:*
    a. *Corrective Action: If the Hazard can be effectively eliminated through conventional corrective action (e.g., disposal, repair, replacement, modification), annotate YES; otherwise annotate NO.*
    b. *SRM: When the hazard is not eliminated by corrective actions, a systematic process of risk management is required.*
xii. *Status: The current status of hazard, which could be open or closed. If the risk of the hazard has been effectively addressed, the status is closed with closing date, otherwise, the status remains open.*
xiii. *Follow up: The subsequent date to monitor the status of hazard to ensure no residual risk remains.*
xiv. *Remarks: Any additional information, including corrective actions taken to address the risk, responsibility assigned to address the hazard, deadline, if applicable, etc.*

2.2 Process for initial prioritization of hazard

When the hazard is identified or received, the initial risk of the hazard needs to be defined so as to determine the level of priority to give for addressing the hazard. The initial risk definition can be done by the methods which consider either severity (level of harm) alone or severity and

probability (likelihood) of consequence of hazards. Some of the methods have been explained hereunder. Organization can use anyone of the following methods. Moreover, organization can also apply other best approaches as well which should address the essence of the recommended methods, at the minimum, and should be acceptable to CAAN.

A. Consideration of severity of consequence of hazard:

Determination of initial risk by speculating the consequence (most credible outcome) of the hazard. In other words, what could have happened if the hazard had escalated failing all the available safety controls. This can be done by the following methods:

i. Discussing the consequence of hazard with the subject matter expert or;
ii. Discussing the consequence of hazard with the persons who have been directly exposed to the hazard or;
iii. By the combination of i and ii.

In this method, the severity of consequence of hazard are categorized as to be:

a. an accident; or
b. a serious incident; or
c. an incident.

The prioritization of hazard:

i. If the consequence is likely to be an accident, the priority should be High (H).
ii. If the consequence of hazard is likely to be a serious incident, priority should be given as medium (M) and
iii. If the consequence of hazard is likely to be an incident, priority should be given as Low (L).

B. Considering the severity and probability of consequence of hazard:

Another method for initial prioritization of hazard shall be applying the basic concept of Event Risk Classification (ERC) for safety risks screening. In this method, basically, two questions shall be discussed in the team, and on the basis of derived answers, the risk estimation and weight shall be identified and the level of priority is determined.

First question shall help get initial idea about the level of severity and second question shall help to get an initial idea about the probability of consequence of hazard.

Questions to be discussed (or asked) are:

i. If the hazard or event had escalated into an outcome, what would have been the most credible outcome?
ii. What was the effectiveness of the remaining barriers between the hazard or the event and the most credible resultant outcome?

Question no. 1 shall have 4 levels of outcomes (most severe to negligible) such as: catastrophic, major, minor and negligible. The process to define the level of severity of consequence of hazard shall be as per the criteria defined in the Event Risk Classification table.

Similarly Question no. 2 also shall have 4 levels of effectiveness (most effective to not effective) such as: effective, limited, minimum, not effective.

Notes:

While giving answer to question no. 2, consider the following points:

a. *To access the remaining "safety margin", consider both the number and robustness of the remaining barriers between this event and the most credible resultant outcome.*
b. *Barriers that already failed are ignored. Only the barrier which worked and any subsequent barriers still in place are taken into account.*
c. *To fill up the vertical column selection of Question no. 2 in Event Risk Classification table (see the table below), select the extreme right column (not effective), if the only thing separating the event from an outcome was pure luck or exceptional skill, which is not trained nor required. Select the 3rd column from the left (minimal), if some barrier(s) were still in place but their total effectiveness was "minimal" – e.g., this could be a GPWS warning just before an imminent CFIT. Select the 2nd column (Limited), if the effectiveness of the barrier(s) was "limited". Typically, this is an abnormal situation, more demanding to manage, but with still a considerable remaining safety margin – e.g., a moderate error in load sheet or loading vs. slight rotation problems at take-off. Select the extreme left column (Effective), if the safety margin was "effective", typically consisting of several good barriers – e.g., passenger smoking in the lavatory versus in-flight fire accident. (Source:* The ARMS Methodology for Operational Risk Assessment in aviation organizations, developed by the ARMS Working Group, 2007-2010).

By the combination of two questions with levels of outcomes and effectiveness, a 4*4 matrix is formed and the level of risk estimation or weight is determined.

Question No. 2 What was the effectiveness of the remaining barriers between this hazard or event and the most credible consequence?				Question No. 1 If this hazard or event had escalated into an outcome, what would have been the most credible consequence?	
Effective (E)	Limited (L)	Minimal (M)	Not Effective (N)		
E Ca	L Ca	M Ca	N Ca	Catastrophic (Ca)	Loss of aircraft/equipment, fatality
E Ma	L Ma	M Ma	N Ma	Major (Ma)	Serious incident, injury to persons, large or significant reduction on safety margin, major aircraft/equipment damage, physical distress or an increased workload resulting to impairment of efficiency so that operational personnel cannot perform their tasks accurately, completely or cannot cope with adverse operating conditions.
E Mi	L Mi	M Mi	N Mi	Minor (Mi)	Nuisance, minor damage to aircraft/equipment, operating limitation, use of emergency procedures
E Ne	L Ne	M Ne	N Ne	Negligible (Ne)	Few negligible consequences

Figure 1: Event Risk Classification table
Source: Methodology for Operational Risk Assessment ARMS Working Group, 2007-2010

There shall be three levels of risk estimations and weights (Red, Yellow or green) with following criteria:

i. If the risk estimation or weight falls in red, the level of risk is considered as high and high (H) level of priority should be given;
ii. If the risk estimation or weight falls in yellow (amber), the level of risk is considered as medium and medium (M) level of priority should be given and
iii. If the risk estimation or weight falls in green, the level of risk is considered as low (L) and low level of priority should be given addressing the hazard.

The Event Risk Classification (ERC) approach can also be used to screen/determine the level of risks of the occurrences (what could happen at the worst case).

The prioritization of hazard with addressing timelines:

a. The High (H) priority hazards shall be started to address immediately. The timeline to start addressing the hazard is immediate but not later than 24 hours from the time of receiving or identification of hazard;
b. The Medium (M) priority hazard shall be addressed with priority but not as urgently as High (H). The process to address the hazard should be started within 7 days (sooner is recommended) of receiving or identification of hazard;
c. The Low (L) priority hazard shall also be addressed by organization. The process to start addressing such hazards shall be started within 15 days (sooner is recommended) of receiving or identification of hazard or other timelines determined by organization considering the size, nature and complexity of operations.

Organizations are highly recommended to set more stringent timelines to prioritize safety matters.

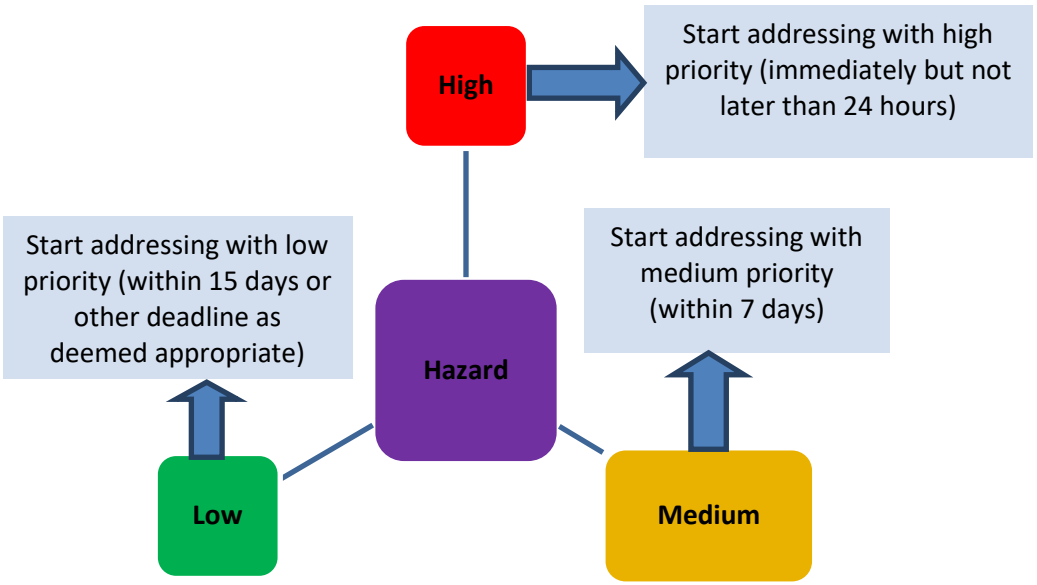

Figure 2: Initial Hazard Prioritizations and Timelines

2.3 Safety Risk Assessment and Mitigation

Conduct Bow-Tie analysis following the process given below:

Date:

2.3.1 Concept of Bow-Tie

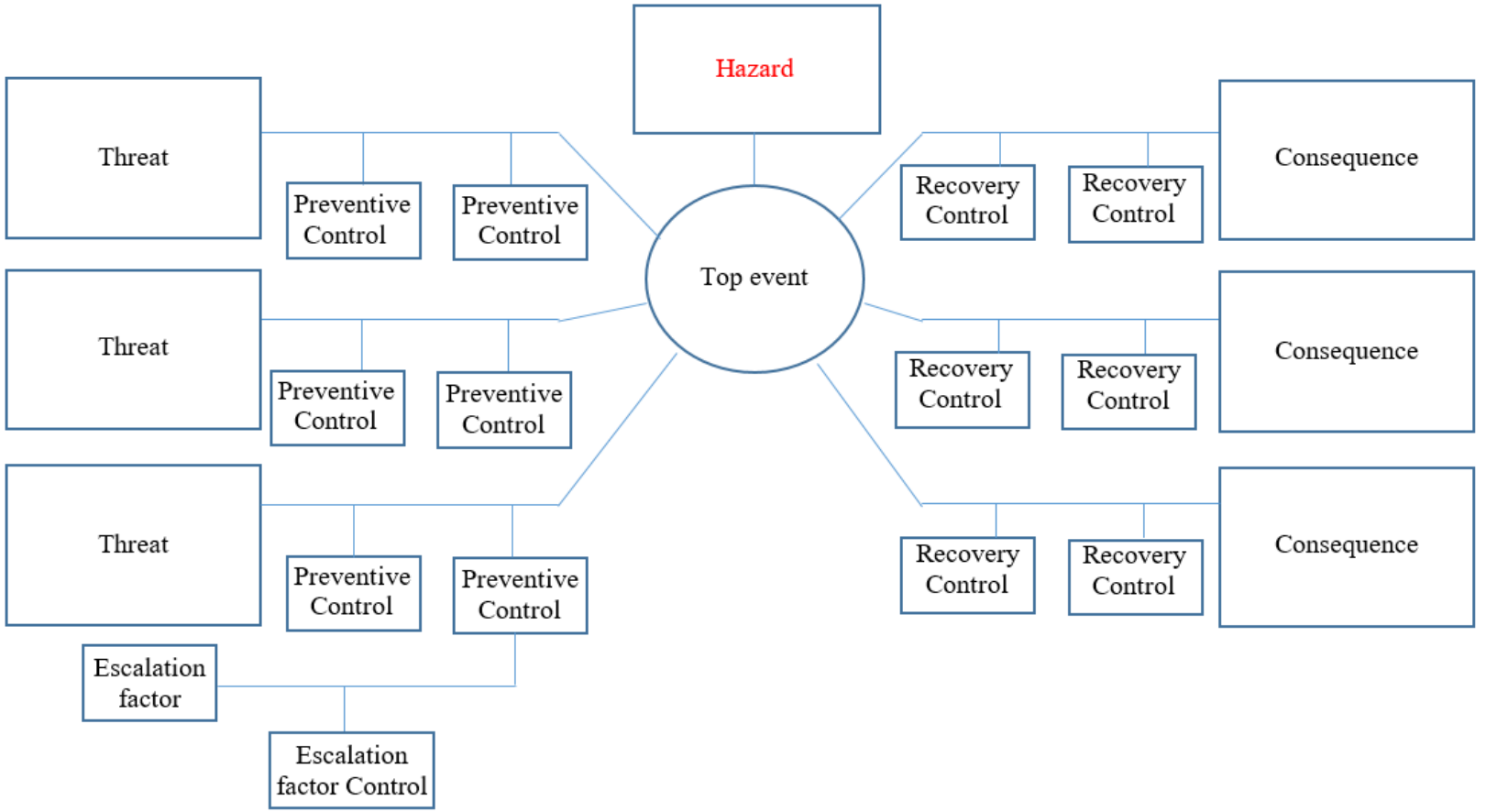

Figure 3: Bow Tie Analysis diagram

a. Process to conduct Bow-Tie Analysis:

1. Identify the Hazard from Hazard Registration Sheet for risk assessment and mitigation.
2. Determine the Top-Event of the Hazard.
3. Identify all the possible Threats resulting to Top Event.
4. Determine the Consequence of the Hazard.
5. Identify all existing and new Preventive Controls.
6. Identify all existing and new Recovery Measures.

Definitions:

1. Hazards: A condition or an object with the potential to cause or contribute to an aircraft incident or accident.
2. Top Event: The top event describes the point where control over the hazard is lost.
3. Threats: Events that may lead to an unsafe state (Top Event) if not managed with preventive controls.
4. Consequences: Undesirable events (usually accidents or safety-related incidents) that may result from the Top Event if not managed with recovery controls.
5. Preventive Controls: Measures taken to counter threats and prevent them from escalating to the Top Event. In a Bow Tie diagram, they are placed on the left-hand side of the Top Event.
6. Recovery Measures: Like preventive controls, these measures are placed on the right-hand side of the Top Event and indicate how the scenario should be managed to prevent an accident (consequence).

2.3.2 Risk Profile

(Fill the gaps in order from a-o)

Current Risk				**Resultant Risk**					
Existing Control Measures (ECM) (b)		Existing Recovery Barriers (ERB) (c)		New Control Measures (NCM) (i)			New Recovery Barriers (NRB) (j)		
Type of Measures	BSV	Type of Barriers	BSV	Type of Measures	BSV	Action by whom and when	Type of Barrier	BSV	Action by whom and when
Sub-total BSV:		Sub-total BSV:		Sub-total BSV:			Sub-total BSV:		
Total BSV (d):				Total BSV(k):					
Consolidated Barrier Strength Value (CBSV)(L) = (d+k)									
Risk Probability (e)				**Risk Probability (m)**					
Risk Severity (a)				**Risk Severity (h)**					
Risk Index (f)				**Risk Index (n)**					
Risk Tolerability(g)				**Risk Tolerability (o)**					

Explanatory Notes:

1. Existing Control Measures (ECM): Barriers which are in place and working to prevent the hazard from escalating to top event.
2. Existing Recovery Barriers (ERB): Barriers which are in place and working to prevent the top event in resulting to ultimate consequence.
3. New Control Measures (NCM): Barriers which are to be implemented in the future to prevent the hazard from escalating to top event.
4. New Recovery Barriers (NRB): Barriers which are to be implemented in the future to prevent the top event in resulting to ultimate consequence.
5. Type of Measures/Barriers: Recovery measures or Control barriers.
6. Existing Severity: Severity Value derived from supplementary 1 table a considering the 7 severity elements.
7. BSV: Barrier Strength Value derived from supplementary information 2 table a.
8. Existing Risk Probability: Probability value derived from supplementary information 3 table a or b or c or d or e, considering the Total BSV of existing measures and barriers.

9. Existing Risk Matrix and Tolerability: Risk Matrix and Tolerability values determined considering the existing probability and severity values with the help of supplementary information 4 and 5.
10. Resultant Severity: Severity Value derived from supplementary information 1 table a, considering the 7 severity elements after considering the existing and new control measures and recovery barriers.
11. Resultant Risk Probability: Probability value derived from supplementary information 3 table a or b or c or d or e considering the Consolidated BSV of existing and new measures and barriers.
12. Resultant Risk Matrix and Tolerability: Risk Matrix and Tolerability values determined from supplementary information 4 and 5 considering the resultant probability and severity values.

2.3.3 Acceptance of Risk

All the required processes of Safety Risk Management have been duly followed and the resultant risk is accepted.	
Team Leader/Safety Manager/Dept. Head or Similar Person *(Person having appropriate authority and knowledge to ensure the process of SRM).*	Name: Signature:
Accountable Executive/Department Head. Or Person having similar authority *(Person having appropriate authority of accepting the resultant risks).*	Name: Signature:

Note:

Once the entire risk assessment and mitigation process is complete, continuously monitor the implementation of barriers and the status of hazards by referring to the Barrier Register and Risk Register. If any barriers are not functioning as intended or the risk mitigation is in doubt, return to the beginning and repeat the process.

2.3.4 Barrier Register

Barrier Register helps list all the barriers applied in the Safety risks assessment and mitigation process. Also, it helps to know the current status of each barrier and its follow up date. Once the Safety risks assessment and mitigation process is completed, maintain the Barrier register.

S.N.	Barrier Description	Hazard Code	SRM Date	Barrier Type (Control/Recovery)	Barrier Strength	Implementation Status	Action by whom and when	Follow - up date

2.3.5 Risk Register

Risk Register helps to provide the whole risk picture of each hazard including its original and resultant risks. A complete Risk register reflects the safety health of an organization at a glance. As the final step of Safety risks assessment and mitigation, maintain the Risk register.

S.N.	Hazard Code	SRM Date	Consequence(s)	Existing Risk				Resultant Risk				Status		Follow up
				Severity	Probability	Risk Index	Risk Tolerability	Severity	Probability	Risk Index	Risk Tolerability	Open	Close/date	

2.3.6 Supplementary information

2.3.6.1 Determination of Severity Value of Consequence of Hazard.

Seven Impact Areas:

1. **Pax / Public [Safety]** (4x weighted)**:** Extent to which Consequence compromise/ impact people or passenger safety.
2. **Employee/ Worker [Safety]** (3x weighted)**:** Extent to which Consequence compromise/ impact employee or worker safety.
3. **Product / Service [Quality]** (2x weighted): Extent to which Consequence compromise/ impact service or product quality.
4. **Asset/ Financial [Loss]:** Extent to which Consequence result in loss of financial/ physical assets.
5. **Reputation [Loss]:** Extent to which Consequence result in loss of organizational or national reputation.
6. **Aviation Security [Breach]:** Extent to which Consequence compromise/ breach aviation or company security.
7. **Environmental [Damage]:** Extent to which Consequence result in damage to environment.

Table a - Consequence Impact Score Sheet (complete this table referring to fig. b and c).

	Details of Consequence	
Impact Areas	Impact Score *(referring to table b)*	Weighted score
1. Pax / Public – Safety	For Example: 5	**5*4= 20**
2. Employee/ Worker – Safety		
3. Product / Service – Quality		

4. Asset/ Financial – Loss		
5. Reputation – Loss		
6. Aviation Security – Breach		
7. Environmental – Damage		
Consolidated Impact Score:		
Correlated Severity Value:		

Table b: Impact levels

Impact Levels	Score
Very High	*5*
High	*4*
Moderate	*3*
Low	*2*
Negligible	*1*
Nil	*0*

Table c: Consolidated impact score to Severity Value correlation

Consolidated Impact Score Range	Consolidated Severity Value
1 to 12	**E**
13 to 25	**D**
26 to 38	**C**
39 to 51	**B**
52 to 65	**A**

Table d: Basic severity Table

Level	Descriptor	Severity Description
E	Insignificant	No significance to operational safety
D	Minor	Affects normal operating procedures or performance
C	Moderate	Results in injury to person(s) or failure of significant operational systems
B	Major	Results in serious injury to person(s) or major damage to equipment
A	Catastrophic	Results in multiple fatalities and/ or complete destruction of safety-critical equipment

Table e: Integrated severity table

Severity Level		Seven Impact Areas						
		Public/ Pax safety (1)	Worker/ Employee safety (2)	Service/ Product quality (3)	Asset/ Financial loss (4)	Reputation loss (5)	Av. Security compromise (6)	Environmental damage (7)
E	Insignificant	No injury	No injury	Not affected	No financial Loss	No Loss	No Breach	No Damage
D	Minor	Minor injury	Minor injury	Minor Non-conformance	Minor Loss < $__	Minor Loss	Localized Breach	Limited Localized Damage
C	Moderate	Serious injury	Serious injury	Substantial Non-conformance	Substantial Loss < $__	Contained Loss	Organizational Breach	National Damage
B	Major	Single fatality	Single fatality	Major Non-conformance	Major Loss < $__	Major Loss	National Breach	Regional Damage
A	Catastrophic	Multiple fatalities	Multiple fatalities	Critical Non-conformance	Massive Loss > $__	Massive Loss	Global Breach	Global Damage

2.3.6.2 Determination of Barrier Strength Value (BSV) of safety barriers

Table- a: Total Barrier Quality Value (TBQV) and corrected Barrier Strength Value (BSV)

Fill this table referring to fig. a.

Elements / Barrier	Effectiveness	Cost-Benefit	Practicality	Acceptability	Enforceability	Durability	Disinclination	Total BQV	Correlated BSV	Barrier Strength
	Existing Control Measures (ECM)									
For Example: ECM-1	5*3	5	5	5	5	5	5*2	50	5	Excellent
ECM-2										
	New Control Measures (NCM)									
NCM-1										
NCM-2										
	Existing Recovery Barrier (ERB)									
ERB-1										
ERB-2										
	New Recovery Barrier (NRB)									
NRB- 1										
NRB-2										

1. Barrier Quality elements definition:
   - i. Effectiveness: Extent to which the Barrier can mitigate (reduce likelihood/ severity) the risk.
   - ii. Cost-Benefit: Extent to which the perceived benefits of the Barrier outweigh the costs.
   - iii. Practicality: Extent to which the Barrier can be implemented, in terms of technology, financial and administrative resources.
   - iv. Acceptability: Extent to which the Barrier is consistent with other stakeholders' paradigms or requirements.
   - v. Enforceability: Extent to which the Barrier can be monitored or surveyed for compliance/ implementation.
   - vi. Durability: Extent to which the Barrier will be sustainable.
   - vii. Disinclination / Unintended consequences/ Escalation factor: extent of not introducing unintended hazards as a result of the mitigating actions being put in place.

2. Barrier Weightage System:

i. Effectiveness: **3X weighted**
ii. Cost Benefit: 1X weighted
iii. Practicality: 1X weighted
iv. Acceptability: 1X weighted
v. Enforceability: 1X weighted
vi. Durability: 1X weighted
vii. Disinclination: **2X weighted**

3. Give number value (score) to each quality element 1 to 5 (highest 5 to lowest 1 scores) referring to Fig. a.

Fig. a: Barrier Quality Element (BQE) Score Criteria

Barrier Quality	**Score**
Excellent	*5*
Good	*4*
Satisfactory	*3*
Fair	*2*
Poor	*1*

4. Determine the robustness (barrier strength) of each barrier referring to fig. a.

5. Find the correlated BSV from total barrier quality value (TBQV) range referring to fig. b.

Fig. b: TBQS to BSV correlation

Total Barrier Quality Score Range	**BSV**
10 to 17	**1**
18 to 25	**2**
26 to 33	**3**
34 to 41	**4**
42 to 50	**5**

2.3.6.3 Determination of Probability/Likelihood of consequence of hazard.

Fig. c: Optimum Number of Barriers & Applicable CBSV-Probability Tables

Severity Value	**Severity Descriptor**	**Optimum Number of Barriers (ONB)**	**Max CBSV** (ONB x 5 [Max BSV])	**Applicable CBSV-Likelihood Table**
E	Negligible	2	10	**A**
D	Minor	3	15	**B**
C	Moderate	4	20	**C**
B	Major	6	30	**D**
A	Catastrophic	8	40	**E**

(Determine the correlated probability value from total BSV range according to severity value referring to Table. A/B/C/D/E)

Table A: CBSV-Likelihood/probability correlation (Severity E)

OCBSV Range	Likelihood Value	Likelihood Descriptor
0-1	5	Certain/ frequent
2-3	4	Likely/ occasional
4-5	3	Possible/ remote
6-7	2	Unlikely/ improbable
8-10	1	Exceptional/ Extremely Improbable

Table B: CBSV-Likelihood/probability correlation (Severity D)

OCBSV Range	Likelihood Value	Likelihood Descriptor
0-2	5	Certain/ frequent
3-5	4	Likely/ occasional
6-8	3	Possible/ remote
9-11	2	Unlikely/ improbable
12-15	1	Exceptional/ Extremely Improbable

Table C: CBSV-Likelihood/probability correlation (Severity C)

OCBSV Range	Likelihood Value	Likelihood Descriptor
0-3	5	Certain/ frequent
4-7	4	Likely/ occasional
8-11	3	Possible/ remote
12-15	2	Unlikely/ improbable
16-20	1	Exceptional/ Extremely Improbable

Table D: CBSV-Likelihood/probability correlation (Severity B)

OCBSV Range	Likelihood Value	Likelihood Descriptor
0-5	5	Certain/ frequent
6-11	4	Likely/ occasional
12-17	3	Possible/ remote
18-23	2	Unlikely/ improbable
24-30	1	Exceptional/ Extremely Improbable

Table E: CBSV-Likelihood/probability correlation (Severity A)

OCBSV Range	Likelihood Value	Likelihood Descriptor
0-7	5	Certain/ frequent
8-15	4	Likely/ occasional
16-23	3	Possible/ remote
24-31	2	Unlikely/ improbable
32-40	1	Exceptional/ Extremely Improbable

2.3.6.4 Determination of Risk Matrix

Determine the risk matrix of consequence of hazard considering the Probability and Severity Values)

Safety Risk		*Severity*				
Probability		***Catastrophic*** ***A***	***Major*** ***B***	***Moderate*** ***C***	***Minor*** ***D***	***Insignificant*** ***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

2.3.6.5 Determining Risk Tolerability

Determine Risk tolerability of consequence of hazard referring the risk matrix

Tolerability Description	Assessed Risk Index	Suggested Criteria
Intolerable Region	**5A, 5B, 5C, 4A, 4B, 3A**	Unacceptable under the existing circumstances.
Tolerable Region	**5D, 5E, 4C, 4D, 4E, 3B, 3C, 3D, 2A, 2B, 2C, 1A**	Acceptable based on risk mitigation. It may require management decision.
Acceptable Region	**3E, 2D, 2E, 1B 1C, 1D, 1E**	Acceptable

2.3.6.6 Risks Mitigation and Acceptance

All the risks should be mitigated in accordance with the tolerability criteria suggested in the tolerability table above. while mitigating the risks to an acceptable level following should be considered.

- Apply optimum number of barriers, (if severity A - up to 8 Barriers, B - up to 6 Barriers, C- up to 4 barriers, D - up to 3 barriers, E- up to 2 barriers). If more than optimum number are in place, choose the most effective controls only for assessment of risks.
- There should be good mix of preventive and recovery controls
- Make sure all the threats of hazard are addressed by the controls
- Make sure there is no consideration of duplicated barriers while assessing the level of risks

Once the risk is mitigated to an acceptable level, the resultant risks should be accepted by the appropriate person having the authority to accept such level of risks. Risk acceptance authority cannot be delegated. While determining the authority to accept the risks, the initial level of risks should be duly considered. Following is the example of level of authorities to accept the different level of risks.