

# TECHNICAL GUIDANCE MATERIAL

## for

### Management of Change

**SUBJECT: TECHNICAL GUIDANCE MATERIAL FOR MANAGEMENT OF CHANGE**

**EFFECTIVE DATE: 20 MARCH 2023**

#### 1. APPLICABILITY

Any service providers operating within the confines of the SACAR Part 140.01.1 and SACAR Part 11 Subpart 4 requirements.

#### 2. PURPOSE

- 2.1 The purpose of this document is to provide guidance and a knowledge perspective to all stakeholders and technical personnel required to apply and systematically engage on safety risk assurance, specifically the management of change element.
- 2.2 It explains the concept of management of change primarily in the regulatory context and the scope of an SMS to provide guidance for the development of management of change processes and procedures with the operator's system description in mind.
- 2.3 It will assist organizations to appropriately classify changes and subsequently comply with their regulatory obligations.
- 2.4 This version of the TGM seeks to support all service providers as per SA CAR Part 140.01.1 applicability that require management of change processes.
- 2.5 This Technical Guidance Material will guide and provide the industry with a framework to formulate their Management of Change.

#### 3. REQUIREMENTS

- 3.1 In SMS, an entity is expected to have developed and maintained a management of change formal process to identify changes within the entity which may affect the level of safety risk, established processes and services; to describe the arrangements to ensure safety performance before implementing changes; and to eliminate or modify safety risk controls that are no longer needed or effective due to changes in the operational environment.
- 3.2 This supports the illustrated standard as set in SA CATS 140.01.3 2. 2.6 (2)(c), where an organisation shall ensure that their management of change review and risk assessment process also focuses on the situations as prescribed. Management of change within the SMS should only focus on hazard identification and controls / defences related to the safety of operations.
- 3.3 This TGM includes consideration of significant changes which require Authority approval, and the provision of guidance for the development of management of change processes and procedures. The references to this TGM provide template procedures and processes that the Authority believes applicable operators could use, to comply with their change management requirements, with minimal customization.
- 3.4 Changes occur in aviation organizations and typical changes can be:
  - a. organizational change such as a new company structure or new key personnel;
  - b. operational changes such as a new fleet, a new operational contract, introduction of a new major system, the introduction of a new route;
  - c. changes to operational or administrative processes or procedures;
  - d. physical change such as addition of a new base, moving to a new head office;
  - e. editorial changes or amendments to the organization's documentation.

- 3.5 Change has the potential to introduce new hazards or alter existing risks within an organization and may require the application of new risk controls. The level of change oversight and the specific change management processes should be proportionate to the potential impact the change may have on the ongoing risks associated with the operation. By taking a systematic approach to implementing change, organizations can clearly identify the objectives and the risks associated with a change and determine how to achieve the change effectively and efficiently, with safety in mind.
- 3.6 Where an organization is required by the CAR to have a safety management system (SMS), the relevant regulations require that risk management, including guidance materials and specific activities, forms part of the management of change process included in the SMS. Only after completing an initial evaluation of a specific change can an organization determine whether a more formal risk assessment is required.
- 3.7 As a recommendation, it is encouraged to also read or familiarizes with the following **TGMs** which are accessible through the SACAA website under **folder “Safety Management System”** located on the **tab “Industry”**.
  - a. Aviation Safety Hazard Identification
  - b. How to Conduct Aviation Safety Risk Assessment

**4. REFERENCE:**

- i. ICAO Annex 19
- ii. ICAO Doc 9859
- iii. Civil Aviation Regulations, 2011
- iv. SACAR Part 140
- v. SACATS 140
- vi. TGM: Hazard Identification
- vii. TGM: Safety Risk Assessment and Mitigation
- viii. TGM: Safety Case
- ix. TGM: Exemption, Alternative Means of Compliance or Special Approval Applications

**5. TERMS AND ABBREVIATIONS:**

TERM	DEFINITION
Probability	The likelihood that an unsafe event or condition might occur.
Risk	The assessment, expressed in terms of predicted <b>probability</b> and <b>severity</b> , of the consequence(s) of a hazard taking as reference the worst foreseeable situation. <i>i.e.:</i> <ul style="list-style-type: none"> <li>a) A wind of 15 knots blowing directly across the runway is a <b>hazard</b>.</li> <li>b) The potential that a pilot may not be able to control the aircraft during take-off or landing is one of the <b>consequences</b> of the hazard.</li> <li>c) The assessment of the consequences of the potential loss of control of the aircraft by the pilot expressed in terms of probability and severity is the <b>risk</b>.</li> </ul>
Safety Case	A document which provides substantial evidence that the system to which it pertains meets its safety objectives. (extracted from ICAO Guidance Material on Building A Safety Case for Delivery of An ADS-B Separation Service, Version 1.0 – September 2011)
Severity	The possible consequences of an unsafe event or condition, taking as reference the <b>worst foreseeable situation</b> .

ABBREVIATION	DESCRIPTION
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DCA	Director of Civil Aviation
SACARs	South African Civil Aviation Regulations
SACATS	South African Civil Aviation Technical Standards
SMS	Safety Management Systems
TGM	Technical Guidance Material
ALARP	As Low As Reasonably Practicable

## 6. GENERAL

### 6.1 Introduction to using this TGM

6.1.1 This TGM assists in assessing the safety risk and preparing mitigating factors to reduce the risk exposure to an as low as reasonably practical level (ALARP). It also ensures that appropriate supported mitigation measures are in place to address, achieve and maintain the required safety standard.

6.1.2 Change may influence the effectiveness of existing safety risk controls. In addition, new hazards and related safety risks may be inadvertently introduced into an operation when change occurs. Safety risks associated with the identified hazards should also be assessed and controlled as defined in the organisation's existing risk management process.

6.1.3 Disciplined application of change management can maximise the effectiveness of the change, engage staff, and minimise the risks inherent in the change. Regardless of the magnitude of the change, large or small, there must always be a predictive consideration for safety implications.

6.1.4 The magnitude of a change, its effect on safety, and its potential impact on human performance should be assessed in any change management process. Small incremental changes often go unnoticed, but the cumulative effect can be considerable. Particular attention should be given to identifying unintended consequences that can emerge by accidentally introducing new hazards into the system.

6.1.5 Change is most successful if all personnel affected by the change are engaged, involved and participate in the process.

6.1.6 The organisation should identify the changes likely to occur in the business/ operation which would have a noticeable impact on:

- a. resources – material and human
- b. management direction – processes, procedures, training
- c. management control.

6.1.7 Change is the catalyst for the organisation to seek out hazards and understand the risks they present. An organisation should establish a list of triggers the formal start for the change process. Some examples of changes that may trigger the formal change process include, but are not limited to the following situations:

- a. changes resulting from the installation of new equipment;
- b. new areas of operations, whether geographical or other;
- c. changes in response to operating experience;
- d. changes in an organisation's policies, procedures and manuals;
- e. changes in scope of the organisations' certificate;
- f. passenger safety information;
- g. products or services;
- h. operational changes;
- i. exemptions, special approvals or alternative means of compliance;
- j. for air operators, changes for purposes of maintaining cross fleet standardisation; and
- k. after major events (mergers, acquisitions, rapid growth, downsizing, accidents, and etc.);
- l. after significant occurrences involving the company or similar companies where unanticipated hazards or

- incidents were implicated; and
- m. after changes in relevant applicable safety regulations, or any time so directed by the DCA.

**7. RISK MANAGEMENT SYNOPSIS**

7.1 Risk Management aims at a balanced allocation of resources to address all risks and viable risk control and mitigation. This encompasses identification, analysis and elimination, and/or mitigation to an acceptable level of risks that threaten the capabilities of an organization.

7.2 The detailed illustration is as contained in **TGM: How to Conduct Safety Risk Assessment**.

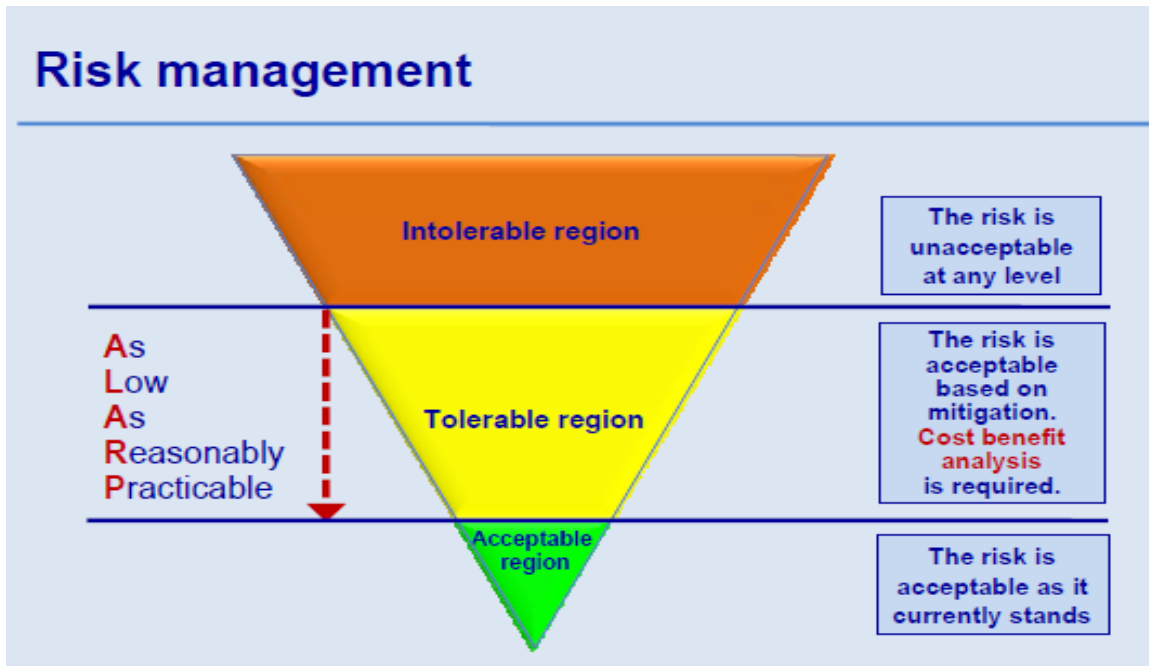


Figure 1: Risk Management Approach

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

Figure 2: Risk Probability

Severity of occurrences		
Aviation definition	Meaning	Value
<b>Catastrophic</b>	<ul style="list-style-type: none"> <li>➤ Equipment destroyed.</li> <li>➤ Multiple deaths.</li> </ul>	<b>A</b>
<b>Hazardous</b>	<ul style="list-style-type: none"> <li>➤ 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.</li> <li>➤ Serious injury.</li> <li>➤ Major equipment damage.</li> </ul>	<b>B</b>
<b>Major</b>	<ul style="list-style-type: none"> <li>➤ 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.</li> <li>➤ Serious incident.</li> <li>➤ Injury to persons.</li> </ul>	<b>C</b>
<b>Minor</b>	<ul style="list-style-type: none"> <li>➤ Nuisance.</li> <li>➤ Operating limitations.</li> <li>➤ Use of emergency procedures.</li> <li>➤ Minor incident.</li> </ul>	<b>D</b>
<b>Negligible</b>	➤ Little consequences	<b>E</b>

Figure 3: Severity Of Occurrence

Risk probability	Risk severity				
	Catastrophic A	Hazardous B	Major C	Minor D	Negligible E
Frequent 5	<b>5A</b>	<b>5B</b>	<b>5C</b>	<b>5D</b>	<b>5E</b>
Occasional 4	<b>4A</b>	<b>4B</b>	<b>4C</b>	<b>4D</b>	<b>4E</b>
Remote 3	<b>3A</b>	<b>3B</b>	<b>3C</b>	<b>3D</b>	<b>3E</b>
Improbable 2	<b>2A</b>	<b>2B</b>	<b>2C</b>	<b>2D</b>	<b>2E</b>
Extremely improbable 1	<b>1A</b>	<b>1B</b>	<b>1C</b>	<b>1D</b>	<b>1E</b>

Figure 4: Risk Severity

Risk management	Assessment risk index	Suggested criteria
	<b>5A, 5B, 5C, 4A, 4B, 3A</b>	Unacceptable under the existing circumstances
	<b>5D, 5E, 4C, 4D, 4E, 3B, 3C, 3D, 2A, 2B, 2C</b>	Acceptable based on risk mitigation. It might require management decision
	<b>3E, 2D, 2E, 1A, 1B, 1C, 1D, 1E</b>	Acceptable

Figure 5: Risk Mitigation Criteria

## 8. RISK MITIGATION OR CONTROL

8.1 **Mitigation** – Measures to address the potential hazard or to reduce the risk probability or severity.  
Therefore, Risk mitigation = Risk control (*Mitigate – To make milder, less severe or less harsh*)

### 8.2 Mitigation Strategies

8.2.1 **Avoidance** – The operation or activity is cancelled because risks exceed the benefits of continuing the operation or activity.

e.g.: *Operations into an aerodrome surrounded by complex geography and without the necessary aids are cancelled.*

8.2.2 **Reduction** – The frequency of the operation or activity is reduced, or action is taken to reduce the magnitude of the consequences of the accepted risks.

e.g.: *Operations into an aerodrome surrounded by complex geography and without the necessary aids are limited to daytime, visual conditions.*

8.2.3 **Segregation of exposure** – Action is taken to isolate the effects of the consequences of the hazard or build-in redundancy to protect against it.

e.g.: *Operations into an aerodrome surrounded by complex geography are limited to aircraft with specific/performance navigation capabilities, or Non RVSM equipped aircraft not allowed to operate into RVSM airspace.*



Figure 6: Risk Mitigation Defences Review

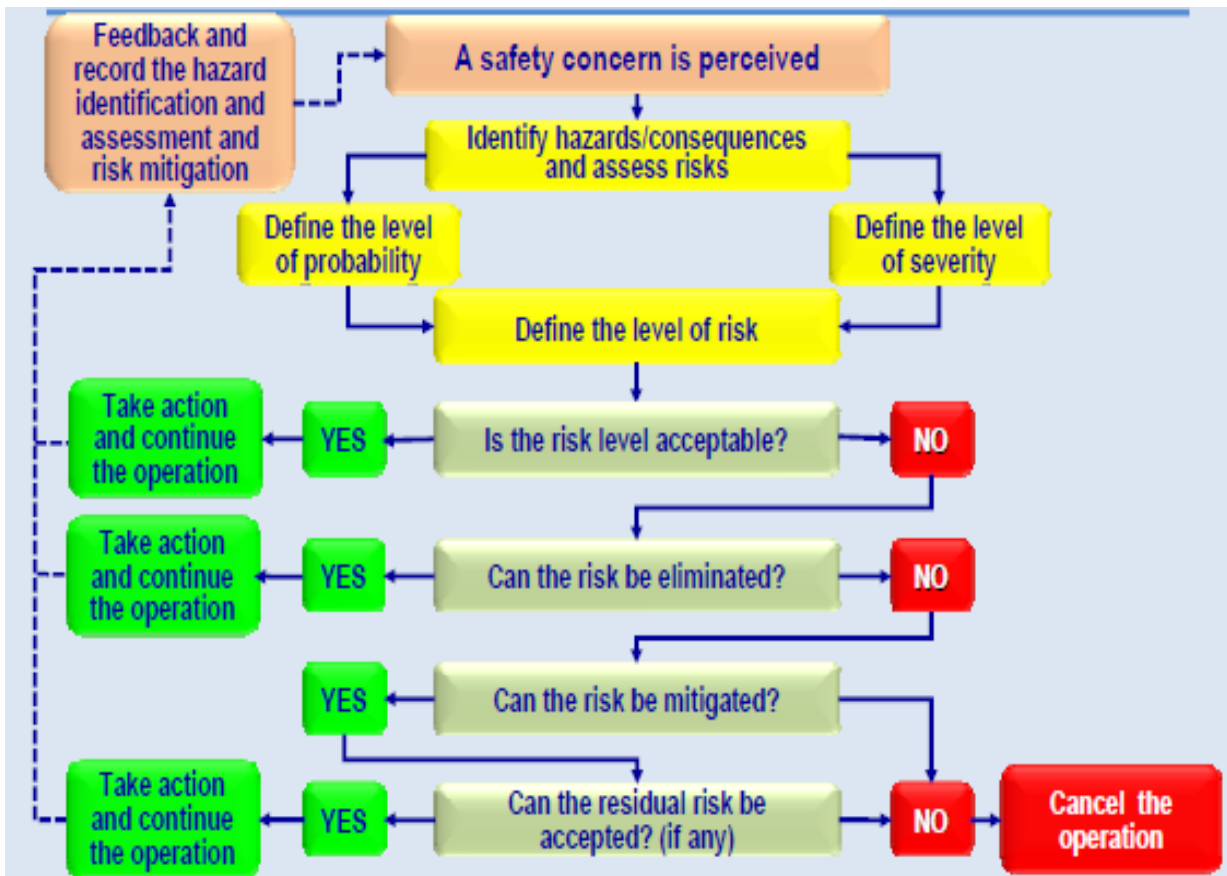


Figure 7: Typical Hazard Identification and Assessment



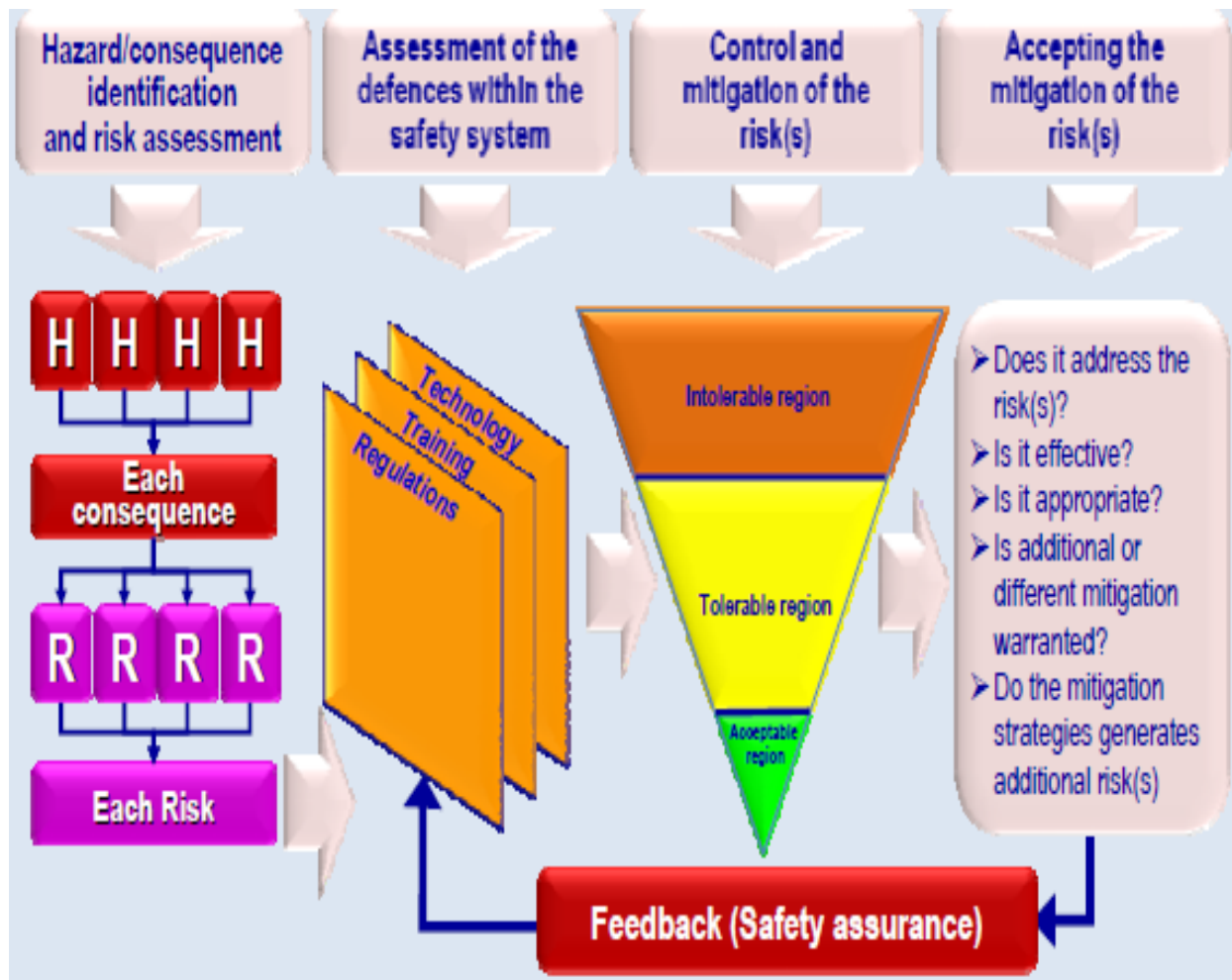


Figure 8: Typical Risk Mitigation and Assessment Approach

8.2.4 There is no such thing as absolute safety – In aviation it is not possible to eliminate all risks.

- a. Risks can be managed to a level “**as low as reasonably practicable**” (ALARP)
- b. Risk mitigation must be balanced against:
  - i. Time
  - ii. Cost
  - iii. Difficulty of taking measures to reduce or eliminate the risk (i.e., Managed).
- c. Effective risk management seeks to maximize the benefits of accepting a risk (a reduction in time and cost) while minimizing the risk itself.
- d. Communicate the rationale for risk decisions to gain acceptance by stakeholders affected by them.

## 9. SAFETY CONTROL STRATEGIES, MONITORING AND REVIEW

9.1 By taking a systematic approach to implementing change, organisations can gain a much clearer picture of the objectives of change and how to achieve them safely as well as complying with the regulatory change provisions. The steps in the change process are:

- 9.1.1 **Step 1:** Communicate and consult to define the change.
- 9.1.2 **Step 2:** Develop the case, identify who and what be will affected.
- 9.1.3 **Step 3:** Consider impact on known hazards / risk, and conduct risk assessment.

9.2 In this, one will *apply the fundamentals of risk management through the existing approved process for their organization.*

9.2.1 **Step 4:** Prepare the project plan.

9.2.2 **Step 5:** Obtain regulatory approval (if required; significant change)

9.2.3 **Step 6:** Implement the change.

9.2.4 **Step 7:** Do ongoing monitoring and review.

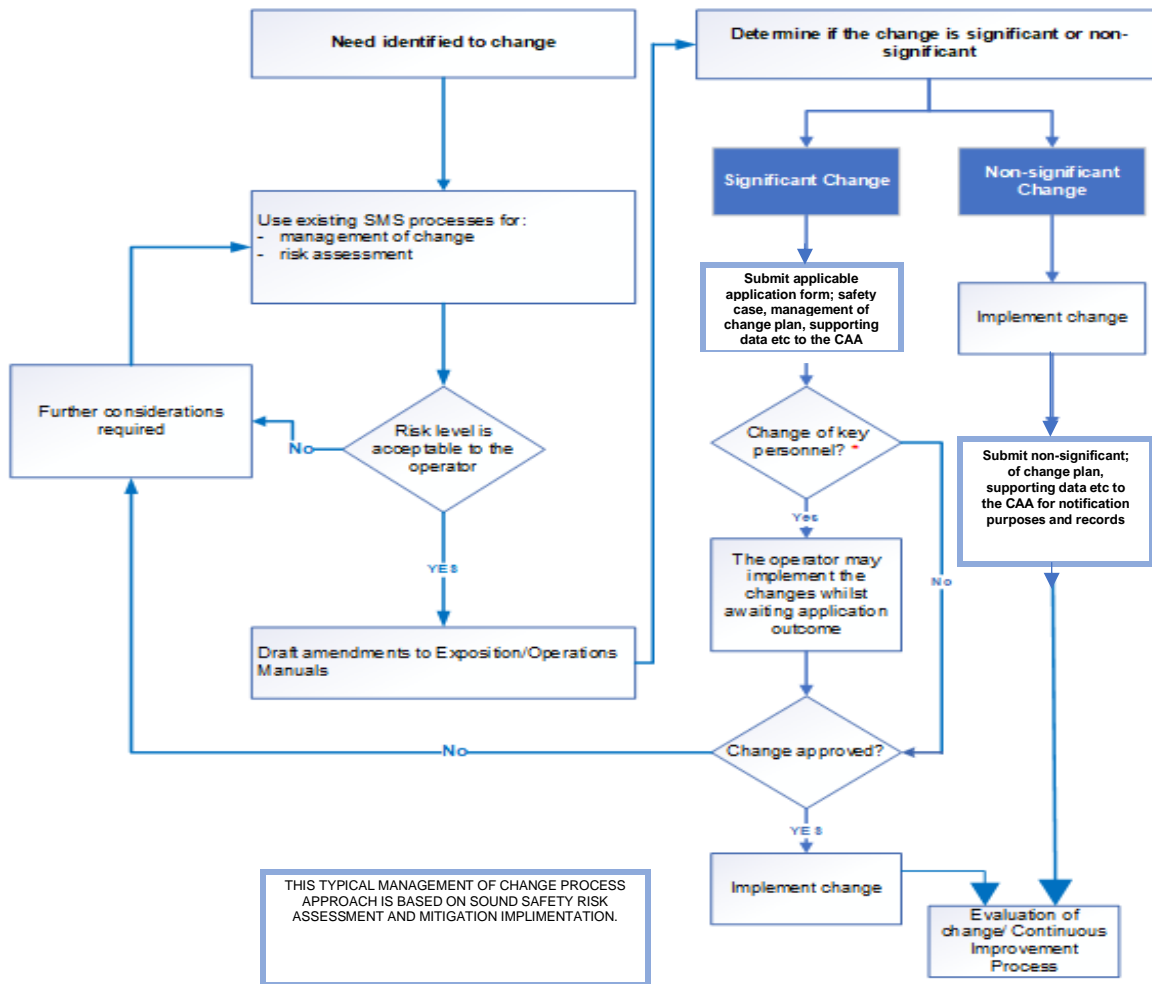


Figure 9: Typical Management of Change Element Review

9.3 Throughout all steps in the process, there must be ongoing communication and consultations with all those involved. Further information on this is contained in TGM: Hazard identification.

9.4 The outcome of the risk assessment conducted in Step 3 should determine the resources allocated to subsequent steps.

9.5 A Safety Case is a document that provides substantial evidence the system to which it pertains meets its safety objectives. A Safety Case is not an additional or separate requirement to an SMS, but rather documented evidence that the SMS activities associated with the change have been appropriately managed to maintain operations/activities are to an acceptably safe level.

9.6 A Safety Case would provide specific documented evidence that shows that the organisation has not only identified and implemented the appropriate change management necessary to deliver new activity/equipment,

but that the associated risk assessments were also conducted in support of implementation and ongoing activities associated with that change.

- 9.7 The Authority utilises Safety Cases as transitional evidence to support a regulatory application, exemption or variation. The Safety Case will include the applicable change and risk management activities in addition to revised operating procedures/exposition that will apply to the changed operations/activities. When accepted, these revisions should be incorporated into the relevant operating procedures/exposition. Activities must always be conducted in accordance with the relevant operating procedures/exposition rather than the Safety Case itself.

## 10. REGULATORY APPROACH

- 10.1 From the applicability of SA CAR Part 140.01.1 requirements, such organisations and operators are required to develop and maintain a formal process to identify changes within the organization and its operation, which may affect established processes and services. This describes the arrangements to ensure safety performance before implementing changes, and to eliminate or modify safety risk controls that are no longer effective due to changes in the operational environment. The organisation shall ensure their management of change review and risk assessment process also focuses on biological and psychosocial risks:

- 10.2 The management of change shall follow a risk-based approach and safety risk management which includes risk assessments. This element is satisfied when the organization uses the safety risk management system to proactively assess all major changes to the organization and its operations systematically.

- 10.3 Organizations and operators need to establish processes and perform formal hazard analyses and risk assessments for major operational changes, major organizational changes and changes in key personnel;

- a. Safety Case/Risk assessments in aviation system safety context
- b. Key stakeholders are involved in the change management process;
- c. During the change management process previous risk assessments and existing hazards are reviewed and
- d. Resolution implementation and its effectiveness is monitored.

- 10.4 This supports the requirement illustrated in SA CATS 140.01.3 2. 2.62) (c), where an organisation shall ensure their management of change review and risk assessment process also focuses on the situations as described. It is intended to be used to enable the organisation to be satisfied that a valid assessment of the change has been documented. It also provides a record of the evaluation.

- 10.5 This change documentation may come under different titles depending on the organisation and the Authority requirements but commonly these may be called safety cases, safety risk assessments and aeronautical studies amongst other typical considerations.

- 10.6 The Safety Manager or any responsible person within the organisation will need to judge the depth of the evaluation and whether the processes and procedures used by the organisation would be sufficient to uncover any significant flaws introduced by the change.

- 10.7 Due to the depth and complexity of many organisational changes it is recommended that a sampling approach is used as not every aspect can be fully assessed. The extent of the sample depends on the judgement of the Safety Manager or any responsible person within the organisation. In addition, a judgement of the organisation's capability and competence in managing the change safely and the Inspector's confidence in the organisation's management system should be considered. There are a set of questions to determine the level of involvement, complexity, justification and support necessary.

- 10.8 The evaluation has six interrelated steps:

### 10.8.1 **Assessment of the nature, scope and impact of the proposed change**

Review the submitted documentation to understand the change, that it has been adequately described, including the context and its impact internally and externally.

### 10.8.2 **Assessing hazard and consequence identification.**

Ensure that an appropriate hazard identification process has been carried out and the range of consequences have been identified and documented.

### 10.8.3 **Evaluation of the way that the risk has been assessed and accepted.**

Review and evaluate the probability and severity are classified, that the classifications are appropriate and justified, and is applied consistently to manage risks to an acceptable level.

#### 10.8.4 **Assessing the risk mitigation actions**

Evaluate the risk mitigations to determine the effectiveness of the actions taken to control the risk.

#### 10.8.5 **Assessing the justification and supporting evidence.**

Assessment of any supporting evidence and arguments used to justify that the change is valid and does not have an adverse effect on safety.

#### 10.8.6 **Assessing the assurance plan to manage the residual risk.**

Review how the organisation plans to monitor the change implementation and verify that risks mitigations are effectively managed after the change has been completed.

**Note:** Each step includes a series of actions to be taken by the organization. For each action there is guidance to assist the Organization and a comments box to record what was sampled and any comments. This thus aids in formulating a safety case for any eventuality.

### 11. **AUTHORITY'S REQUIREMENTS**

A formal process to manage changes in your organisation in a systematic manner. It includes a process to identify the impact of a specific change and putting in place risk mitigation strategies before the change. The aim is to manage any safety risks by controlling them to an acceptable level.

#### 11.1 **What's in the process**

11.1.1 The regulations do not mandate any specific elements for your management of change process, but a typical change process would consider:





- a. how changes are initiated and assessed
- b. how unexpected changes are managed
- c. the process for developing a case for the change, including:
  - i. assessing the safety impact of a change;
  - ii. assessing whether that change will reduce or improve safety;
  - iii. recording of how those assessments were made;
  - iv. the data or information that was used in the assessments; and
  - v. how the preceding steps will be documented.
- d. assessment of risk and planning processes, including:
  - i. implementing change in an incremental manner to minimise potential adverse safety effects (if necessary);
  - ii. ensuring use of resources to implement the change will not impact operational safety; and
  - iii. ensuring communication and consultation takes place with key safety-related stakeholders.
- e. preparation of a plan to implement the change;
- f. application for approval of the significant change, or notification to the Authority of a change that is not a significant change to the exposition/operations manual;
- g. implementation of the change; and
- h. ongoing monitoring and review of the change.

**Note:** The Authority highly recommends the use of the TGM:Safety Case in support of this process.

#### 11.2 **Conclusion**

11.2.1 To conduct efficient and effective aviation operations and to be aware of the safety-based risk factors, operators should have risk and change management-based safety systems. Operators in the aviation sector must improve and maintain a high level of safety by proactive risk management and holistic change management integration into safety management systems so as to minimize accidents, incidences and occurrences in air operations.

- 11.2.2 The existence of strong organizational cultures would make change management and risk management in establishing SMS systems entertain higher likelihoods of success.
- 11.2.3 The most critical steps of the change process for an airline that moves from a conventional system of safety compliance to an SMS type system are the diagnosis stage and the transition to the implementation phase. The diagnosis phase is important as the organization must determine where organizational performance is being adversely affected and needs to be changed. The implementation plan then sets out to correct or modify the defects noted in the diagnosis and represents a crucial step towards re-establishing organizational effectiveness.

<b>DEVELOPED BY:</b>		
	<b>KEBOITIHETSE FREDY TONG</b>	<b>20 MARCH 2023</b>
<b>SIGNATURE OF: SMS TO</b>	<b>NAME IN BLOCK LETTERS</b>	<b>DATE</b>
<b>REVIEWED BY:</b>		
	<b>GOODNESS MKHONZA</b>	<b>20 MARCH 2023</b>
<b>SIGNATURE OF M: QC &amp; AIIR</b>	<b>NAME IN BLOCK LETTERS</b>	<b>DATE</b>
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	<b>MARY STEPHENS</b>	<b>20 MARCH 2023</b>
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