

AMENDMENT OF TECHNICAL STANDARDS

CARcom has recommended in terms of regulation 11.03.2(7) of the Civil Aviation Regulations, 1997, that the Commissioner for Civil Aviation amends certain Technical Standards, namely, Document SA-CATS-OPS 121, 127 and 135; SA-CATS-AH; SA-CATS-ATO; SA-CATS-AMO; SA-CATS-MORG and SA-CATS-ATS. The Commissioner for Civil Aviation has in terms of regulation 11.04.5 of the said regulations accepted the said recommendation, as it would be in the interests of aviation safety. The stated Technical Standards as contained in the Schedules are herewith amended and the amendments shall come into operation on

Capt. Colin Jordaan
Commissioner for Civil Aviation
Date: _____

SCHEDULE 1

1.1 AMENDMENT OF TECHNICAL STANDARDS 121.04.2, 127.04.2 and 135.04.2

Technical standards 121.04.2; 127.04.2 and 135.04.2 are hereby amended by the substitution for item 2.1.3A of the following item:

“2.1.3A Safety management system

- (1) Safety management system is required to be established by an operator with effect from 1 January 2010.
 - (a) A description of the safety management system established in terms of paragraph (1) by the operator, to the satisfaction of the Commissioner, for the control and supervision of the services covered by the operation, which includes –
 - (i) the identification of safety hazards;
 - (ii) remedial action necessary to maintain an acceptable level of safety;
 - (iii) continuous monitoring and regular assessment of the safety level achieved; and
 - (iv) continuous improvement to the overall level of safety.
 - (b) The safety management system shall clearly define lines of safety accountability throughout the air transport operation, including a direct accountability for safety for senior management.

- (c) The safety management system must include:
 - (i) A clear definition of the safety performance indicators and targets that the operator intends to achieve.
 - (ii) Proof by the operator to the Commissioner that adequate safety measures to achieve and maintain the safety performance targets will be or are instituted.
 - (iii) The components and elements described in paragraph (e) below.
- (e) Components and elements required for a safety management system are as indicated in the paragraphs below.

(1) **Safety Policy & Objectives**

- (a) Management commitment and responsibility:
 - (i) The operator shall define its safety policy which shall be in accordance with the requirements of this technical standard, and which shall be signed by the accountable manager.
 - (ii) The safety policy shall reflect its commitments regarding safety; including a clear statement about the provision of the necessary human and financial resources for its implementation; and be communicated with visible endorsement, throughout the operation.
 - (iii) The safety policy shall be reviewed at least every second year to ensure it remains relevant and appropriate to the operator.
 - (iv) The operator shall establish safety objectives, indicators and targets for the organization that must be accepted by the Commissioner.

(b) **Safety accountabilities of managers:**

- (i) The accountable manager of the operator shall be ultimately accountable for the implementation and maintenance of the SMS.
- (ii) The accountable manager shall identify a person responsible for safety who, irrespective of other functions, shall have the responsibility for the implementation and maintenance of the SMS. This person must be acceptable to the Commissioner.
- (iii) The accountable manager may not fulfil this role, however the accountable manager must be able to demonstrate control of safety and risk management to the Commissioner.

- (iv) Safety accountabilities and authorities shall be assigned, documented and communicated throughout the operation.

(c) **Appointment of key safety personnel**

- (i) The operator may appoint as many safety officers as required to effectively implement the SMS.
- (ii) The responsible person for safety shall report directly to the accountable manager with respect to any significant safety concerns, implementation and maintenance of the SMS.
- (iii) Safety managers' and safety officers' selection criteria and suggested attributes and qualifications include, but are not limited to:
 - (aa) For the safety officer:
 - (A) Proven competence in the area of operation (technical area or specific job area e.g. flight dispatch) within any aviation organization (at least 5 years) to understand the systems that support operations; or as approved by the Commissioner.
 - (B) Sound knowledge of safety management principles and practices, through training, refresher training and experience;
 - (C) The completion of a recognized safety management course/s that meets the minimum requirements published by the Commissioner.
 - (bb) For the Safety manager:
 - (A) Proven competence in the area of operation (technical area or specific job area e.g. flight dispatch) within any aviation organization (at least 5 years) to understand the systems that support operations or as approved by the Commissioner.
 - (B) Operational management experience at supervisory level (at least 2 years) or as approved by the Commissioner.

- (C) Sound knowledge of safety management principles and practices, through training, refresher training and experience
- (D) The completion of a recognized safety management course/s that meets the minimum requirements published by the Commissioner.

(d) SMS implementation and operational plan/s:

(i) SMS Implementation Plan:

- (aa) The operator shall develop and maintain an SMS implementation plan that defines the operator's approach to the initial implementation of the SMS and ensures that they manage safety in a manner that meets the operator's safety needs.
- (bb) The SMS implementation plan of the operator shall explicitly address the coordination between the SMS of the operator and the SMS of other service providers that may affect aviation safety and security that the operator may interface with during the provision of services.
- (cc) The SMS implementation plan shall be endorsed by management of the operator.

(ii) Operational Plan:

- (aa) Once the SMS is in place the operator shall develop an annual operational plan that shall be endorsed by the management of the operator.
- (bb) The operational plan shall state how the operator would manage safety in a manner that meets the operator's safety needs, taking into account the resource needs for implementation of risk controls.

(e) Coordination of emergency response planning

The operator shall develop, coordinate and maintain an emergency response plan that ensures orderly and efficient transition from normal to emergency operations, and return to normal operations.

(f) Documentation

- (i) The operator shall develop and maintain SMS documentation to describe the safety policy and objectives, the SMS

requirements, the SMS procedures and processes, the accountabilities, responsibilities and authorities for procedures and processes, and the SMS outputs.

- (ii) The operator may incorporate its safety management documentation into its operations manual to communicate its approach to safety throughout the operation, or it may be contained in a separately approved SMS manual.

(2) **Safety risk management**

(a) Hazard identification process

The operator shall develop and maintain a formal process for effectively collecting, recording, acting on and generating feedback about hazards in operations and support services, based on a combination of reactive, proactive and predictive methods of safety data collection.

Note: *Reactive methods refer to methods of identifying hazards from reports on the investigation of occurrences. Proactive methods aim to use any other information within the organization for the identification of potential hazards. Predictive methods rely on data that is collected within the organization that could effectively be used to predict the existence of hazards, usually done by trend analysis.*

(b) Risk assessment and mitigation process

- (i) The operator shall develop and maintain a formal risk management process that ensures analysis (in terms of probability and severity of occurrence), assessment (in terms of tolerability or acceptability) and control (in terms of mitigation) of risks to an acceptable level.
- (ii) The following matrixes should be used for purposes of analyzing and assessing risk:

Risk Severity Matrix

Risk Severity definition	Description: Consequence (can lead to)...	Examples of what to look out for...
Category A Catastrophic	One or multiple deaths & complete loss/destruction of equipment	A major accident
Category B Hazardous	Serious injuries/Major Damage to equipment	Large reduction in safety margins, physical distress or workload such that the operators cannot be relied upon to perform their tasks accurately or completely.

Category C Major	Minor injuries/ Minor equipment damage	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
Category D Minor	Incidents	Operating limitations are breached. Procedures are not used correctly.
Category E Negligible	Negligible/Inconvenience	Little consequences No safety consequences Nuisance

Risk Probability Matrix

Likelihood/Probability Category	Description	Examples of what to look out for
1	Extremely improbable (Rare)	Almost inconceivable that the event will occur
2	Improbable (Seldom)	Very unlikely that the event will occur It is not known that it has ever occurred before.
3	Remote (Unlikely)	Unlikely but possible to occur. Has occurred rarely.
4	Occasional	Likely to occur sometimes. Has occurred infrequently
5	Frequent	Likely to occur many times/regularly. Has occurred frequently/regularly.

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 assessment Index	Suggested Criteria
5A, 5B, 5C, 4A, 4B, 4C, 3A, 3B, 2A	Unacceptable under the existing circumstances. Risk mitigation critical.
5D, 4D, 3C, 3D, 2B, 2C, 1A, 1B	Risk Mitigation required. It might require management decision.
5E, 4E, 3E, 2D, 2E, 1C, 1D, 1E	Acceptable

- (iii) The following strategies should be introduced for mitigation (risk control):

Avoidance	The operation or activity is cancelled because risks exceed the benefits of continuing the operation or activity.
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.
Segregation of exposure	Action is taken to isolate the effects of risks or build-in redundancy to protect against it.

- (iv) Alternative matrixes or means of analyzing, assessing and controlling risk may be implemented by the operator with the approval of the Commissioner.
- (v) All safety information reported to the Commissioner shall be in the format specified in the above matrixes.
- (vi) The operator shall also define those levels of management with authority to make decisions regarding safety risks tolerability/acceptability.
- (3) Safety assurance
- (a) Safety performance monitoring and measurement
- (i) The operator shall develop and maintain the means to verify the safety performance of the operation compared to the safety targets, safety policy and objectives, and to validate the effectiveness of safety risks controls, through means of an objective audit of the SMS. (This may be combined with the internal auditing function within the operator but should be separated from the safety department to ensure that hazard reporting is not compromised,)
- (ii) The safety reporting procedures related to safety performance and monitoring shall clearly indicate which types of operational behaviours are acceptable or unacceptable, and include the conditions under which immunity from disciplinary action would be considered. A non-punitive policy is required to enhance the reporting culture. Immunity from disciplinary

action may not be granted in instances of violation and negligence.

- (iii) The operator shall ensure that, when contracting any service to a third party, safety audits are performed beforehand and during the period of the contract by the safety department to ensure that the contracted services meet the requirements of the operator's SMS.

- (b) The management of change

The operator shall develop and maintain a formal process to identify changes within the organization which may affect 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.

- (c) Continuous improvement of the SMS

The operator shall develop and maintain a formal process to identify the causes of sub-standard performance of the SMS, determine the implications of sub-standard performance in operations, and eliminate such causes. This may be achieved through audits of the SMS to ensure its effective implementation.

(4) Safety promotion

- (a) Training and education

- (i) The operator shall develop and maintain a safety training skills plan that ensures that personnel responsible for the associated functions as contained in the SMS are trained and competent to perform the SMS duties.
- (ii) The scope of the safety training shall be appropriate to each individual's involvement in the SMS.
- (iii) Initial and recurrent training courses shall be approved by the Commissioner. The training may be conducted by the operator when authorised under the operating approval or by a Part 141 ATO.
- (iv) A training requirements document providing the requirements and syllabus for the initial training shall be published by the Commissioner.

- (b) Safety communication

The operator shall develop and maintain formal means for safety communication, that –

- (i) ensures that all personnel are fully aware of the SMS;
- (ii) conveys safety critical information; and

- (iii) explains why particular safety actions are taken and why safety procedures are introduced or changed.
- (5) Safety reporting requirements
- (a) The operator shall report any significant safety concern identified through its SMS to the Commissioner within 7 days of it being verified.
 - (b) The operator shall report the following safety information to the Commissioner on an annual basis, as per a schedule agreed to with the Commissioner:
 - (i) The top 20 hazards identified by the operator; and
 - (ii) The mitigation strategies implemented to address the risk.

SCHEDULE 2

2.1 SUBSTITUTION OF TECHNICAL STANDARD 139.02.4A

The following technical standard is hereby substituted for technical standard 139.02.4A:

139.02.4A SAFETY MANAGEMENT SYSTEM

1. Minimum Standards for the Safety Management System

- (1) The aerodrome operator shall establish a safety management system as prescribed in ICAO Doc 9774 and Doc 9859 in an acceptable format to the Commissioner for the control and supervision of the services covered by the operation.
- (2) The minimum standards for a safety management system shall be as prescribed below:
- (3) The safety management system must include –
 - (a) A clear definition of the achievable level of safety the aerodrome operator intends to achieve.
 - (b) Proof by the operator to the Commissioner that adequate safety measures to maintain the required level of safety will be or are instituted.
 - (c) The minimum content of the components and elements described in paragraph 2 below, to ensure that the required level of safety is achieved.

2. Components and elements required for a safety management system

(1) Safety Policy & Objectives

(a) Management commitment and responsibility

- (i) The aerodrome operator shall define its safety policy which shall be in accordance with the requirements of this Part, and which shall be signed by the accountable manager.
- (ii) The safety policy shall reflect its commitments regarding safety; including a clear statement about the provision of the necessary human and financial resources for its implementation; and be communicated, with visible endorsement, throughout the operation.
- (iii) The aerodrome operator shall establish safety objectives and targets for the organization that must be accepted by the Commissioner.
- (iv) The safety policy shall be reviewed at least every second year to ensure it remains relevant and appropriate to the aerodrome operator.
- (v) The aerodrome operator shall submit all amendments to the Safety Management System to the Commissioner for approval.

(b) Safety accountabilities of managers

- (i) The accountable manager of the aerodrome operator shall be ultimately accountable for the implementation and maintenance of the SMS.
- (ii) The aerodrome operator shall identify the manager at executive level (or in the case of smaller aerodromes, senior management level) who, irrespective of other functions, shall have delegated responsibility and accountability for the implementation and maintenance of the SMS. The accountable manager may not fulfil this role.
- (ii) The aerodrome operator shall identify the safety accountabilities of all members of executive and senior management, irrespective of their other functions. Safety accountabilities and authorities shall be assigned, documented and communicated throughout the operation.

(c) Appointment of key safety personnel

- (i) The aerodrome operator shall identify a safety manager or in the case of a smaller aerodrome a safety officer; if he or she is not already performing this function to be the responsible individual and

focal point for the implementation and maintenance of an effective SMS. The safety manager and/or safety officer must be acceptable to the Commissioner. (This appointee can be the same person as mentioned in paragraph (1) (b)(ii) above.

- (ii) The aerodrome operator may appoint as many additional safety officers as required to effectively implement the SMS. (One safety officer per 50 employees is good practice).
- (iii) The safety manager or safety officer (in the case of smaller aerodromes) shall report directly to the delegated executive and/or the accountable manager of the operator, organisation or provider with respect to any significant safety concerns with unacceptable risk and with respect to implementation and maintenance of the SMS.
- (iv) Safety managers' and safety officers' selection criteria and suggested attributes and qualifications include but are not limited to:
 - (aa) For the safety officer:
 - (A) (Proven competence in the area of operation (technical area or specific job area e.g. fire and rescue services) within the organization (at least 5 years) to understand the systems that support operations;
 - (B) Sound knowledge of safety management principles and practices, through training, refresher training and experience;
 - (C) The completion of a recognized safety management course/s that meets the minimum requirements published by the Commissioner.
 - (bb) For the safety manager:
 - (A) Proven competence in the area of operation (technical area or specific job area e.g. fire and rescue services) within the organization (at least 5 years) to understand the systems that support operations;
 - (B) operational management experience at supervisory level (at least 2 years);
 - (C) Sound knowledge of safety management principles and practices, through training, refresher training and experience;
 - (D) The completion of a recognized safety management course/s that meets the minimum requirements published by the Commissioner which shall include:

- (AA) Airports Council International Diploma in safety management systems;
 - (BB) IATA Diploma in safety management systems; or
 - (CC) IATA Diploma in Airport Operations.
- (d) SMS implementation and operational plans:
 - (i) Implementation Plan:
 - (aa) The aerodrome operator shall develop and maintain an SMS implementation plan that defines the operator's approach to initial implementation of the SMS and ensures that they manage safety in a manner that meets the operator's safety needs.
 - (bb) The SMS implementation plan of the aerodrome operator shall explicitly address the coordination between the SMS of the operator and the SMS of any other service provider that may affect aviation safety and security that the operator may interface with during the provision of services.
 - (iii) The SMS implementation plan shall be endorsed by the executive or senior management of the operator.
 - (ii) Operational Plan:
 - (aa) Once the SMS is in place the aerodrome operator shall develop an annual operational plan that shall be endorsed by the executive or senior management of the operator.
 - (bb) The operational plan shall state how the aerodrome operator would manage safety in a manner that meets the operator's safety needs, taking into account the resource needs for implementation of risk controls.
- (e) Coordination of emergency response planning
 - (i) The aerodrome operator shall develop, coordinate and maintain an emergency response plan that ensures orderly and efficient transition from normal to emergency operations, and return to normal day-to-day operations in accordance with the requirements published by the Commissioner.
 - (ii) The aerodrome Emergency Management System (Aircraft related) is a separate document under regulation 139.02.6 and should be in accordance with the guidelines in ICAO Doc 9137-AN/898 Part 7, and should be listed in the Aerodrome operations manual.

- (f) Documentation
 - (i) The aerodrome operator shall develop and maintain SMS documentation to describe the following:
 - (aa) safety policy and objectives;
 - (bb) the SMS standards to be achieved;
 - (cc) the SMS procedures and processes;
 - (dd) the accountabilities, responsibilities and authorities for procedures and processes; and
 - (ee) the SMS areas of applicability;
 - (ii) the aerodrome operator may incorporate its safety management documentation into its operations manual to communicate its approach to safety throughout the operation including the provision of applicable portions to airports tenants, or it may be contained in a separately approved SMS manual.

(2) Safety risk management shall include, but not limited to:

- (a) Hazard identification process

The aerodrome operator shall develop and maintain a formal process for effectively collecting, recording, acting on and generating feedback about hazards in operations and support services, based on combination of reactive, proactive and predictive methods derived through safety data collection.

Note: *Reactive methods refer to methods of identifying hazards from reports on the investigation of occurrences. Proactive methods aim to use any other information within the organization for the identification of potential hazards. Predictive methods rely on data that is collected within the organization that could effectively be used to predict the existence of hazards, usually done by trend analysis.*

- (b) Risk assessment and mitigation process

- (i) The aerodrome operator shall develop and maintain a formal risk management process that ensures analysis (in terms of probability and severity of occurrence), assessment (in terms of tolerability or acceptability) and control (in terms of mitigation) of risks to an acceptable level.
- (ii) The following matrixes should be used for purposes of analyzing and assessing risk:

Risk Severity Matrix

Risk Severity definition	Description: Consequence (can lead to)...	Examples of what to look out for...
Category A Catastrophic	One or multiple deaths & complete loss/destruction of equipment	A major accident
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Category E Negligible	Negligible/Inconvenience	Little consequences No safety consequences Nuisance

Risk Probability Matrix

Likelihood/Probability Category	Description	Examples of what to look out for
1	Extremely improbable (Rare)	Almost inconceivable that the event will occur
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4	Occasional	Likely to occur sometimes. Has occurred infrequently
5	Frequent	Likely to occur many times/regularly. Has occurred frequently/regularly.

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 assessment Index	Suggested Criteria
5A, 5B, 5C, 4A, 4B, 4C, 3A, 3B, 2A	Unacceptable under the existing circumstances. Risk mitigation critical.
5D, 4D, 3C, 3D, 2B, 2C, 1A, 1B	Risk Mitigation required. It might require management decision.
5E, 4E, 3E, 2D, 2E, 1C, 1D, 1E	Acceptable

- (iii) The following is an example of strategies that can be introduced for mitigation

Avoidance	The operation or activity is cancelled because risks exceed the benefits of continuing the operation or activity.
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.
Segregation of exposure	Action is taken to isolate the effects of risks or build-in redundancy to protect against it.

- (iv) Alternative matrixes or means of analyzing, assessing and controlling risk may be implemented by the aerodrome operator with the approval of the Commissioner.
- (v) All safety information reported to the Commissioner shall be in the format specified in the above matrixes.
- (vi) The aerodrome operator shall also define those levels of management with authority to make decisions regarding safety risks tolerability/acceptability, and the introductions of mitigating measures.

(3) **Safety assurance**

(a) Safety performance monitoring and measurement

- (i) The aerodrome operator shall develop and maintain the means to verify the safety performance of the operation compared to the safety policy and objectives, and to validate the effectiveness of safety risks controls, through means of an objective audit of the SMS. (This may be combined with the internal auditing function of the operator but should be separated from the safety department/section to ensure that hazard reporting are not compromised).
- (ii) The safety reporting procedures related to safety performance and monitoring shall clearly indicate which types of operational behaviours are acceptable or unacceptable, and include the conditions under which immunity from disciplinary action would be considered. A non-punitive policy is required to enhance the reporting culture. Immunity from disciplinary action may not be granted in instances of violation and negligence.
- (iii) The aerodrome operator shall create an environment where voluntary reporting mechanisms are established apposed to collections of safety related information by purely relying on an investigative process.
- (iv) The operator shall ensure that, when contracting of any service to a third party, safety audits are performed beforehand and during the period of the contract by the safety department/section to ensure that the contracted services meet the requirements of the operator's SMS.

(b) The management of change

The aerodrome operator shall develop and maintain a formal process to identify changes within the organization which may affect 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.

(c) Continuous improvement of the SMS

The aerodrome operator shall develop and maintain a formal process to identify the causes of sub-standard performance of the SMS, determine the implications of sub-standard performance in operations, and eliminate such causes. This may be achieved through audits of the SMS to ensure its effective implementation.

(4) **Safety promotion**

(a) Training and education

- (i) The aerodrome operator shall develop and maintain a safety training programme that ensures that personnel responsible for the associated functions as contained in the SMS are trained and competent to perform their respective duties and thus not compromising SMS goals.
- (ii) The scope of the safety training shall be appropriate to each individual's involvement in the SMS.

(b) Safety communication

The aerodrome operator shall develop and maintain formal means for safety communication, that ensures that all personnel are fully aware of the SMS, conveys safety critical information, and explains why particular safety actions are taken and why safety procedures are introduced or changed.

(5) Safety reporting requirements

- (a) The aerodrome operator shall report any significant safety concern identified through its SMS to the Commissioner within 7 days of it being verified.
- (b) The aerodrome operator shall report the following safety information to the Commissioner on an annual basis, as per a schedule agreed to with the Commissioner:
 - (i) The top 20 hazards identified by the aerodrome operator; and
 - (ii) the mitigation strategies implemented to address the risk.

SCHEDULE 5

5.1 SUSTITUTION OF TECHNICAL STANDARD 141.02.3A

The following technical standard is hereby substituted for technical standard 141.02.3A:

“141.02.3A SAFETY MANAGEMENT SYSTEM

1. Minimum standards for safety management system

The safety management system referred to in Regulation 141.02.3A shall include :

- (i) the components and elements described in paragraph 2 below.

2. Components and elements required for a safety management system

(1) Safety Policy & Objectives

(a) Management commitment and responsibility

- (i) The approved training organization shall define its safety policy which shall be in accordance with the requirements of this Part, and which shall be signed by the accountable manager (who shall be CEO or MD).
- (ii) The safety policy shall reflect its commitments regarding safety; including a clear statement about the provision of the necessary human and financial resources for its implementation; and be communicated, with visible endorsement, throughout the organization.
- (iii) The safety policy shall be reviewed at least every second year to ensure it remains relevant and appropriate to the organization.
- (iv) The operator shall establish safety objectives and targets for the organization that must be accepted by the Commissioner.

(b) Safety accountabilities of managers

- (i) The accountable manager of the organisation shall be ultimately accountable for the implementation and maintenance of the SMS.
- (ii) The accountable manager shall identify a manager at executive level who, irrespective of other functions, shall have delegated responsibility and accountability for the implementation and maintenance of the SMS. The accountable manager may not fulfil this role.
- (iii) The approved training organization shall identify the safety accountabilities of all members of executive and senior management, irrespective of other functions. Safety accountabilities and authorities shall be assigned, documented and communicated throughout the organization.

(c) Appointment of key safety personnel

- (i) The approved training organization shall identify a safety manager to be the responsible individual and focal point for the implementation and maintenance of an effective SMS. The Safety Manager must be acceptable to the Commissioner. (This appointee can be the same person as mentioned in paragraph (1)(b)(ii) above.

- (ii) The operator may appoint as many safety officers as required to effectively implement the SMS. (One safety officer per 50 employees is good practice).
- (iii) The safety manager shall report directly to the delegated executive manager and the accountable manager of the operator, organization or provider with respect to any significant safety concerns with unacceptable risk and with respect to implementation and maintenance of the SMS.
- (i) Safety managers and safety officers selection criteria and suggested attributes and qualifications include but are not limited to:
 - (aa) For the safety officer:
 - (A) Proven competence in the area of operation (technical area or specific job area e.g. flight dispatch) within the organization (at least 5 years) to understand the systems that support operations;
 - (B) Sound knowledge of safety management principles and practices, through training, refresher training and experience;
 - (C) The completion of a recognized safety management course/s that meets the minimum requirements published by the Commissioner.
 - (bb) For the safety manager:
 - (A) Proven competence in the area of operation (technical area or specific job area e.g. flight dispatch) within the organization (at least 5 years) to understand the systems that support operations
 - (B) operational management experience at supervisory level (at least 2 years)
 - (C) Sound knowledge of safety management principles and practices, through training, refresher training and experience
 - (D) The completion of a recognized safety management course/s that meets the minimum requirements published by the Commissioner.
- (d) SMS implementation and operational plans:
 - (i) Implementation plan
 - (aa) The approved training organization shall develop and maintain an SMS implementation plan that defines the organization's

approach to the initial implementation of the SMS and ensure that they manage safety in a manner that meets the organization's safety needs.

- (bb) The SMS implementation plan of the approved training organization shall explicitly address the coordination between the SMS of the approved training organization and the SMS of service providers that may affect safety and security that the approved training organization must interface with during the provision of services.
- (cc) The SMS implementation plan shall be endorsed by executive management of the organization.

(ii) Operational Plan:

- (aa) Once the SMS is in place the operator shall develop an annual operational plan that shall be endorsed by the executive management of the operator.
- (bb) The operational plan shall state how the operator would manage safety in a manner that meets the operator's safety needs, taking into account the resource needs for implementation of risk controls.

(e) Coordination of emergency response planning

The approved training organization shall develop, coordinate and maintain an emergency response plan that ensures orderly and efficient transition from normal to emergency operations, and return to normal operations in accordance with the requirements published by the Commissioner.

(f) Documentation

- (i) The approved training organization shall develop and maintain SMS documentation to describe the following:
 - (aa) safety policy and objectives;
 - (bb) the SMS requirements;
 - (cc) the SMS procedures and processes;
 - (dd) the accountabilities, responsibilities and authorities for procedures and processes; and
 - (ee) the SMS outputs.
- (ii) The approved training organization may incorporate its safety management documentation into its manual of procedures to

communicate its approach to safety throughout the organization, or it may be contained in a separately approved SMS manual.

- (iii) An SMS manual developed in terms of any other part of the Civil Aviation Regulations will be acceptable, provided the approved training organization is associated with the holder of the approval.

(2) **Safety risk management**

(a) Hazard identification process

The approved training organization shall develop and maintain a formal process for effectively collecting, recording, acting on and generating feedback about hazards in operations, and support services based on a combination of reactive, proactive and predictive methods of safety data collection.

Note: *Reactive methods refer to methods of identifying hazards from reports on the investigation of occurrences. Proactive methods aim to use any other information within the organization for identification of potential hazards. Predictive methods rely on data that is collected within the organization that could effectively be used to predict the existence of hazards, usually done by trend analysis.*

(b) Risk assessment and mitigation process

- (i) The approved training organization shall develop and maintain a formal risk management process that ensures analysis (in terms of probability and severity of occurrence), assessment (in terms of tolerability or acceptability) and control (in terms of mitigation) of risks to an acceptable level.
- (ii) The following matrixes should be used for purposes of analyzing and assessing risk:

Risk Severity Matrix

Risk Severity definition	Description: Consequence (can lead to)...	Examples of what to look out for...
Category A Catastrophic	One or multiple deaths & complete loss/destruction of equipment	A major accident
Category B Hazardous	Serious injuries/Major Damage to equipment	Large reduction in safety margins, physical distress or workload such that the operators cannot be relied upon to perform their tasks accurately or completely.

Category C Major	Minor injuries/ Minor equipment damage	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
Category D Minor	Incidents	Operating limitations are breached. Procedures are not used correctly.
Category E Negligible	Negligible/Inconvenience	Little consequences No safety consequences Nuisance

Risk Probability Matrix

Likelihood/Probability Category	Description	Examples of what to look out for
1	Extremely improbable (Rare)	Almost inconceivable that the event will occur
2	Improbable (Seldom)	Very unlikely that the event will occur It is not known that it has ever occurred before.
3	Remote (Unlikely)	Unlikely but possible to occur. Has occurred rarely.
4	Occasional	Likely to occur sometimes. Has occurred infrequently
5	Frequent	Likely to occur many times/regularly. Has occurred frequently/regularly.

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 assessment Index	Suggested Criteria
5A, 5B, 5C, 4A, 4B, 4C, 3A, 3B, 2A	Unacceptable under the existing circumstances. Risk mitigation critical.
5D, 4D, 3C, 3D, 2B, 2C, 1A, 1B	Risk Mitigation required. It might require management decision.
5E, 4E, 3E, 2D, 2E, 1C, 1D, 1E	Acceptable

- (iii) The following strategies should be introduced for mitigation (risk control):

Avoidance	The operation or activity is cancelled because risks exceed the benefits of continuing the operation or activity.
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.
Segregation of exposure	Action is taken to isolate the effects of risks or build-in redundancy to protect against it.

- (iv) Alternative matrixes or means of analyzing, assessing and controlling risk may be implemented by the approved training organization with the approval of the Commissioner.
- (v) All safety information reported to the Commissioner shall be in the format specified in the above matrixes.
- (vi) The approved training organization shall also define those levels of management with authority to make decisions regarding safety risks tolerability/acceptability.

(3) **Safety assurance**

- (a) **Safety performance monitoring and measurement**
- (i) The approved training organization shall develop and maintain the means to verify the safety performance of the organization compared to the safety policy and objectives, and to validate the effectiveness of safety risks controls, through means of an objective audit of the SMS. (This may be combined with the internal auditing function within the organisation but should be separated from the safety department to ensure that hazard reporting is not compromised,)
- (ii) The safety reporting procedures related to safety performance and monitoring shall clearly indicate which types of operational behaviours are acceptable or unacceptable, and include the conditions under which immunity from disciplinary action would be

considered. A non-punitive policy is required to enhance the reporting culture. Immunity from disciplinary action may not be granted in instances of violation and negligence.

- (iii) The approved training organisation shall ensure that, when contracting any service to a third party, safety audits are performed beforehand and during the period of the contract by the safety department to ensure that the contracted services meet the requirements of the approved training organisation's SMS.

(b) The management of change

The approved training organization shall develop and maintain a formal process to identify changes within the organization which may affect 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.

(c) Continuous improvement of the SMS

The approved training organization shall develop and maintain a formal process to identify the causes of sub-standard performance of the SMS, determine the implications of sub-standard performance in operations, and eliminate such causes. This may be achieved through audits of the SMS to ensure its effective implementation.

(4) **Safety promotion**

(a) Training and education

- (i) The approved training organization shall develop and maintain a safety training programme that ensures that personnel responsible for the associated functions as contained in the SMS are trained and competent to perform the SMS duties.
- (ii) The scope of the safety training shall be appropriate to each individual's involvement in the SMS.

(b) Safety communication

The approved training organization shall develop and maintain formal means for safety communication, that ensures that all personnel are fully aware of the SMS, conveys safety critical information, and explains why particular safety actions are taken and why safety procedures are introduced or changed.

(5) **Safety reporting requirements**

- (a) The approved training organization shall report any significant safety concern identified through its SMS to the Commissioner within 7 days of it being verified.
- (b) The approved training organization shall report the following safety information to the Commissioner on an annual basis as per a schedule agreed to with the Commissioner:
 - (i) The top 20 hazards identified by the approved training organization; and
 - (ii) the mitigation strategies implemented to address the risk.

SCHEDULE 6

6.1. SUBSTITUTION OF TECHNICAL STANDARDS 145.02.3A; 145.03.3A; 145.04.3A; 145.05.3A; 145.06.3A; 145.07.3A AND 145.08.3A

The following technical standard is hereby substituted for technical standards 145.02.3A; 145.03.3A; 145.04.3A; 145.05.3A; 145.06.3A; 145.07.3A and 145.08.3A:

145.02.3A SAFETY MANAGEMENT SYSTEM

1. Minimum standards for safety management system

The safety management system referred to in Regulation 145.02.3A shall include:

- (a) A clear definition of the level of safety the organisation intends to achieve.
- (b) Proof by the operator to the Commissioner that adequate safety measures to maintain the required level of safety will be/are instituted.
- (c) The components and elements described in paragraph 2 below.

2. Components and elements required for a safety management system

(1) Safety Policy & Objectives

- (a) Management commitment and responsibility
 - (i) The aircraft maintenance organisation shall define its safety policy which shall be in accordance with the requirements, of this Part and which shall be signed by the accountable manager (who shall be the CEO or MD).

- (ii) The safety policy shall reflect its commitments regarding safety; including a clear statement about the provision of the necessary human and financial resources for its implementation; and be communicated, with visible endorsement, throughout the organisation.
 - (iii) The safety policy shall be reviewed at least every second year to ensure it remains relevant and appropriate to the organisation.
 - (iv) The aircraft maintenance organisation shall establish safety objectives and targets for the organization that must be accepted by the Commissioner.
- (b) Safety accountabilities of managers
- (i) The accountable manager of the operator shall be ultimately accountable for the implementation and maintenance of the SMS.
 - (ii) The accountable manager shall identify a manager at executive level who, irrespective of other functions, shall have delegated responsibility and accountability for the implementation and maintenance of the SMS. The accountable manager may not fulfil this role.
 - (iii) The aircraft maintenance organisation shall identify the safety accountabilities of all members of executive and senior management, irrespective of their other functions. Safety accountabilities and authorities shall be assigned, documented and communicated throughout the organisation.
- (c) Appointment of key safety personnel
- (i) The aircraft maintenance organisation shall identify a safety manager to be the responsible individual and focal point for the implementation and maintenance of an effective SMS. The Safety Manager must be acceptable to the Commissioner. (This appointee can be the same person as mentioned in paragraph (1)(b)(ii) above.
 - (ii) The aircraft maintenance organisation may appoint as many safety officers as required to effectively implement the SMS. (One safety officer per 50 employees is good practice)
 - (iii) The safety manager shall report directly to the delegated executive manager and the accountable manager of the operator, organization or provider with respect to any significant safety concerns with unacceptable risk and with respect to implementation and maintenance of the SMS.
 - (iv) Safety managers and safety officers selection criteria and suggested attributes and qualifications include but are not limited to:

- (aa) For the safety officer:
 - (A) Proven competence in the area of operation (technical area or specific job area e.g. flight dispatch) within the organization (at least 5 years) to understand the systems that support operations;
 - (B) Sound knowledge of safety management principles and practices, through training, refresher training and experience;
 - (C) The completion of a recognized safety management course/s that meets the minimum requirements published by the Commissioner.

- (bb) For the safety manager:
 - (A) Proven competence in the area of operation (technical area or specific job area e.g. flight dispatch) within the organization (at least 5 years) to understand the systems that support operations
 - (B) operational management experience at supervisory level (at least 2 years)
 - (C) Sound knowledge of safety management principles and practices, through training, refresher training and experience
 - (D) The completion of a recognized safety management course/s that meets the minimum requirements published by the Commissioner.

- (d) SMS implementation and operational plans:
 - (i) Implementation plan
 - (aa) The aircraft maintenance organisation shall develop and maintain an SMS implementation plan that defines the organisation's approach to the initial implementation of the SMS and ensures that they manage safety in a manner that meets the organization's safety needs.

 - (bb) The SMS implementation plan of the aircraft maintenance organisation shall explicitly address the coordination between the SMS of the aircraft maintenance organisation and the SMS of other service providers that may affect safety and security that the aircraft maintenance organisation may interface with during the provision of services.

(cc) The SMS implementation plan shall be endorsed by executive management of the organisation.

(ii) Operational Plan:

(aa) Once the SMS is in place the aircraft maintenance organisation shall develop an annual operational plan that shall be endorsed by the executive management of the operator.

(bb) The operational plan shall state how the aircraft maintenance organisation would manage safety in a manner that meets the organisation safety needs, taking into account the resource needs for implementation of risk controls.

(e) Coordination of emergency response planning

The aircraft maintenance organisation shall develop, coordinate and maintain an emergency response plan that ensures orderly and efficient transition from normal to emergency operations, and return to normal operations in accordance with the requirements published by the Commissioner.

(f) Documentation

(i) The aircraft maintenance organisation shall develop and maintain SMS documentation to describe the following:

(aa) safety policy and objectives;

(bb) the SMS requirements;

(cc) the SMS procedures and processes;

(dd) the accountabilities, responsibilities and authorities for procedures and processes; and

(ee) the SMS outputs.

(ii) the aircraft maintenance organisation may incorporate its safety management documentation into its manual of procedures to communicate its approach to safety throughout the organisation, or it may be contained in a separately approved SMS manual.

(2) **Safety risk management**

(a) Hazard identification process

The aircraft maintenance organisation shall develop and maintain a formal process for effectively collecting, recording, acting on and generating feedback about hazards in operations, and support services based on a

combination of reactive, proactive and predictive methods of safety data collection.

Note: *Reactive methods refer to methods of identifying hazards from reports on the investigation of occurrences. Proactive methods aim to use any other information within the organization for the identification of potential hazards. Predictive methods rely on data that is collected within the organization that could effectively be used to predict the existence of hazards, usually done by trend analysis.*

- (b) Risk assessment and mitigation process
 - (i) The aircraft maintenance organisation shall develop and maintain a formal risk management process that ensures analysis (in terms of probability and severity of occurrence), assessment (in terms of tolerability or acceptability) and control (in terms of mitigation) of risks to an acceptable level.
 - (ii) The following matrixes should be used for purposes of analyzing and assessing risk:

Risk Severity Matrix

Risk Severity definition	Description: Consequence (can lead to)...	Examples of what to look out for...
Category A Catastrophic	One or multiple deaths & complete loss/destruction of equipment	A major accident
Category B Hazardous	Serious injuries/Major Damage to equipment	Large reduction in safety margins, physical distress or workload such that the operators cannot be relied upon to perform their tasks accurately or completely.
Category C Major	Minor injuries/ Minor equipment damage	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
Category D Minor	Incidents	Operating limitations are breached. Procedures are not used correctly.
Category E Negligible	Negligible/Inconvenience	Little consequences No safety consequences Nuisance

Risk Probability Matrix

Likelihood/Probability Category	Description	Examples of what to look out for
1	Extremely improbable (Rare)	Almost inconceivable that the event will occur
2	Improbable (Seldom)	Very unlikely that the event will occur It is not known that it has ever occurred before.
3	Remote (Unlikely)	Unlikely but possible to occur. Has occurred rarely.
4	Occasional	Likely to occur sometimes. Has occurred infrequently
5	Frequent	Likely to occur many times/regularly. Has occurred frequently/regularly.

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 assessment Index	Suggested Criteria
5A, 5B, 5C, 4A, 4B, 4C, 3A, 3B, 2A	Unacceptable under the existing circumstances. Risk mitigation critical.
5D, 4D, 3C, 3D, 2B, 2C, 1A, 1B	Risk Mitigation required. It might require management decision.
5E, 4E, 3E, 2D, 2E, 1C, 1D, 1E	Acceptable

- (iii) The following strategies should be introduced for mitigation (risk control):

Avoidance	The operation or activity is cancelled because risks exceed the benefits of continuing the operation or activity.
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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.
Segregation of exposure	Action is taken to isolate the effects of risks or build-in redundancy to protect against it.

- (iv) The aircraft maintenance organisation shall also define those levels of management with authority to make decisions regarding safety risks tolerability/acceptability.
- (iv) Alternative matrixes or means of analyzing, assessing and controlling risk may be implemented by the organisation with the approval of the Commissioner.
- (v) All safety information reported to the Commissioner shall be in the format specified in the above matrixes.

(3) Safety assurance

(a) Safety performance monitoring and measurement

- (i) The aircraft maintenance organisation shall develop and maintain the means to verify the safety performance of the organization compared to the safety policy and objectives, and to validate the effectiveness of safety risks controls, through means of an objective audit of the SMS. (This may be combined with the internal auditing function within the operator but should be separated from the safety department to ensure that hazard reporting is not compromised,)
- (ii) The aircraft maintenance organisation shall ensure that, when contracting any service to a third party, safety audits are performed beforehand and during the period of the contract by the safety department to ensure that the contracted services meet the requirements of the aircraft maintenance organisation's SMS.
- (iii) The safety reporting procedures related to safety performance and monitoring shall clearly indicate which types of operational behaviours are acceptable or unacceptable, and include the conditions under which immunity from disciplinary action would be considered. A non-punitive policy is required to enhance the reporting culture. Immunity from disciplinary action may not be granted in instances of violation and negligence.

(b) The management of change

The aircraft maintenance organisation shall develop and maintain a formal process to identify changes within the organization which may affect 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.

(c) Continuous improvement of the SMS

The aircraft maintenance organisation shall develop and maintain a formal process to identify the causes of sub-standard performance of the SMS, determine the implications of sub-standard performance in operations, and eliminate such causes. This may be achieved through audits of the SMS to ensure its effective implementation.

(4) **Safety promotion**

(a) Training and education

(i) The aircraft maintenance organisation shall develop and maintain a safety training programme that ensures that personnel responsible for the associated functions as contained in the SMS are trained and competent to perform the SMS duties.

(ii) The scope of the safety training shall be appropriate to each individual's involvement in the SMS.

(b) Safety communication

The aircraft maintenance organisation shall develop and maintain formal means for safety communication, that ensures that all personnel are fully aware of the SMS, conveys safety critical information, and explains why particular safety actions are taken and why safety procedures are introduced or changed.

(5) **Safety reporting requirements**

(a) The aircraft maintenance organisation shall report any significant safety concern identified through its SMS to the Commissioner within 7 days of it being verified.

(b) The aircraft maintenance organisation shall report the following safety information to the Commissioner on an annual basis, as per a schedule agreed to with the Commissioner:

(i) The top 20 hazards identified by the aircraft maintenance organisation and the mitigation strategies implemented to address the risk.

SCHEDULE 7

7.1 SUBSTITUTION OF TECHNICAL STANDARD 148.02.4A OF THE REGULATIONS

The following technical standard is hereby substituted for technical standard 148.02.4A:

148.02.4A SAFETY MANAGEMENT SYSTEM

SAFETY MANAGEMENT SYSTEM

1. Minimum standards for safety management system

The safety management system referred to in Regulation 148.02.4A, must include –

- (a) A clear definition of the level of safety the organisation intends to achieve.
- (b) Proof by the manufacturing organisation to the Commissioner that adequate safety measures to maintain the required level of safety will be or have been instituted.
- (c) The components and elements described in 2 below.

2. Components and elements required for a safety management system

(1) Safety Policy & Objectives

- (a) Management commitment and responsibility
 - (i) A manufacturing organisation shall define its safety policy which shall be in accordance with the requirements, of this Part and which shall be signed by the accountable manager (who shall be the CEO or MD).
 - (ii) The safety policy shall reflect its commitments regarding safety; including a clear statement about the provision of the necessary human and financial resources for its implementation; and be communicated, with visible endorsement, throughout the organisation.
 - (iii) The safety policy shall be reviewed at least every second year to ensure it remains relevant and appropriate to the organisation.

- (iv) The manufacturing organisation shall establish safety objectives and targets for the organization that must be accepted by the Commissioner.
- (b) Safety accountabilities of managers
- (i) The accountable manager of the organization shall be ultimately accountable for the implementation and maintenance of the SMS.
 - (ii) The accountable manager shall identify a manager at executive level who, irrespective of other functions, shall have delegated responsibility and accountability for the implementation and maintenance of the SMS. The accountable manager may not fulfil this role.
 - (iii) Manufacturing organisation shall identify the safety accountabilities of all members of executive and senior management, irrespective of their other functions. Safety accountabilities and authorities shall be assigned, documented and communicated throughout the organisation.
- (c) Appointment of key safety personnel
- (i) Manufacturing organisation shall identify a safety manager to be the responsible individual and focal point for the implementation and maintenance of an effective SMS. The Safety Manager must be acceptable to the Commissioner. (This appointee can be the same person as mentioned in paragraph (1)(b)(ii) above.
 - (ii) The operator may appoint as many safety officers as required to effectively implement the SMS. (One safety officer per 50 employees is good practice).
 - (iii) The safety manager shall report directly to the delegated executive manager and the accountable manager of the operator, organization or provider with respect to any significant safety concerns with unacceptable risk and with respect to implementation and maintenance of the SMS.
 - (iv) Safety managers and safety officer's selection criteria and suggested attributes and qualifications include but are not limited to:
 - (aa) For the safety officer:
 - (A) Proven competence in the area of operation (technical area or specific job area e.g. flight dispatch) within the organization (at least 5 years) to understand the systems that support operations;

- (B) Sound knowledge of safety management principles and practices, through training, refresher training and experience;
 - (C) The completion of a recognized safety management course/s that meets the minimum requirements published by the Commissioner.
 - (bb) For the safety manager:
 - (A) Proven competence in the area of operation (technical area or specific job area e.g. flight dispatch) within the organization (at least 5 years) to understand the systems that support operations
 - (B) operational management experience at supervisory level (at least 2 years)
 - (C) Sound knowledge of safety management principles and practices, through training, refresher training and experience
 - (D) The completion of a recognized safety management course/s that meets the minimum requirements published by the Commissioner.
- (d) SMS implementation and operational plan/s:
 - (i) SMS implementation plan
 - (aa) A manufacturing organisation shall develop and maintain an SMS implementation plan that defines the organization's approach to the initial implementation of the SMS and ensures that they manage safety in a manner that meets the organisation's safety needs.
 - (bb) The SMS implementation plan of a manufacturing organisation shall explicitly address the coordination between the SMS of a manufacturing organisation and the SMS of any other service providers that may affect aviation safety and security that a manufacturing organisation may interface with during the provision of services.
 - (cc) The SMS implementation plan shall be endorsed by executive management of the organisation.
 - (ii) Operational Plan:
 - (aa) Once the SMS is in place the manufacturing organisation shall develop an annual operational plan that shall be endorsed by the executive management of the operator.

(bb) The operational plan shall state how the manufacturing organisation would manage safety in a manner that meets the operator's safety needs, taking into account the resource needs for implementation of risk controls.

(e) Coordination of emergency response planning

A manufacturing organisation shall develop, coordinate and maintain an emergency response plan that ensures orderly and efficient transition from normal to emergency operations, and return to normal operations in accordance with the requirements published by the Commissioner.

(f) Documentation

(i) A manufacturing organisation shall develop and maintain SMS documentation to describe the following:

- (aa) safety policy and objectives,
- (bb) the SMS requirements,
- (cc) the SMS procedures and processes,
- (dd) the accountabilities, responsibilities and authorities for procedures and processes, and
- (ee) the SMS outputs.

(ii) A manufacturing organisation may incorporate its safety management documentation into its Manual of Procedures to communicate its approach to safety throughout the organisation, or it may be contained in a separately approved SMS Manual.

(2) **Safety risk management**

(a) Hazard identification process

Manufacturing organisation shall develop and maintain a formal process for effectively collecting, recording, acting on and generating feedback about hazards in operations, and support services, based on a combination of reactive, proactive and predictive methods of safety data collection.

Note: *Reactive methods refer to methods of identifying hazards from reports on the investigation of occurrences. Proactive methods aim to use any other information within the organization for the identification of potential hazards. Predictive methods rely on data that is collected within the organization that could effectively be used to predict the existence of hazards as per a schedule agreed to with the Commissioners.*

- (b) Risk assessment and mitigation process
- (i) Manufacturing organisation shall develop and maintain a formal risk management process that ensures analysis (in terms of probability and severity of occurrence), assessment (in terms of tolerability or acceptability) and control (in terms of mitigation) of risks to an acceptable level.
- (ii) The following matrixes should be used for purposes of analyzing and assessing risk:

Risk Severity Matrix

Risk Severity definition	Description: Consequence (can lead to)...	Examples of what to look out for...
Category A Catastrophic	One or multiple deaths & complete loss/destruction of equipment	A major accident
Category B Hazardous	Serious injuries/Major Damage to equipment	Large reduction in safety margins, physical distress or workload such that the operators cannot be relied upon to perform their tasks accurately or completely.
Category C Major	Minor injuries/ Minor equipment damage	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
Category D Minor	Incidents	Operating limitations are breached. Procedures are not used correctly.
Category E Negligible	Negligible/Inconvenience	Little consequences No safety consequences Nuisance

Risk Probability Matrix

Likelihood/Probability Category	Description	Examples of what to look out for
1	Extremely improbable (Rare)	Almost inconceivable that the event will occur
2	Improbable (Seldom)	Very unlikely that the event will occur It is not known that it has ever occurred before.
3	Remote (Unlikely)	Unlikely but possible to occur. Has occurred rarely.

4	Occasional	Likely to occur sometimes. Has occurred infrequently
5	Frequent	Likely to occur many times/regularly. Has occurred frequently/regularly.

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 assessment Index	Suggested Criteria
5A, 5B, 5C, 4A, 4B, 4C, 3A, 3B, 2A	Unacceptable under the existing circumstances. Risk mitigation critical.
5D, 4D, 3C, 3D, 2B, 2C, 1A, 1B	Risk Mitigation required. It might require management decision.
5E, 4E, 3E, 2D, 2E, 1C, 1D, 1E	Acceptable

- (iii) The following strategies should be introduced for mitigation (risk control):

Avoidance	The operation or activity is cancelled because risks exceed the benefits of continuing the operation or activity.
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.
Segregation of exposure	Action is taken to isolate the effects of risks or build-in redundancy to protect against it.

- (iv) Alternative matrixes or means of analyzing, assessing and controlling risk may be implemented by the organisation with the approval of the Commissioner.

- (v) All safety information reported to the Commissioner shall be in the format specified in the above matrixes.
- (vi) Manufacturing organisation shall define those levels of management with authority to make decisions regarding safety risks tolerability/acceptability.

(3) **Safety assurance**

(a) Safety performance monitoring and measurement

- (i) Manufacturing organisation shall develop and maintain the means to verify the safety performance of the organisation compared to the safety policy and objectives, and to validate the effectiveness of safety risks controls, through means of an objective audit of the SMS. (This may be combined with the internal auditing function within the organisation but should be separated from the safety department to ensure that hazard reporting is not compromised,)
- (ii) The safety reporting procedures related to safety performance and monitoring shall clearly indicate which types of operational behaviours are acceptable or unacceptable, and include the conditions under which immunity from disciplinary action would be considered. A non-punitive policy is required to enhance the reporting culture. Immunity from disciplinary action may not be granted in instances of violation and negligence.
- (iii) The manufacturing organisation shall ensure that, when contracting any service to a third party, safety audits are performed beforehand and during the period of the contract by the safety department to ensure that the contracted services meet the requirements of the organisation's SMS.

(b) The management of change

Manufacturing organisation shall develop and maintain a formal process to identify changes within the organisation which may affect 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.

(c) Continuous improvement of the SMS

Manufacturing organisation shall develop and maintain a formal process to identify the causes of sub-standard performance of the SMS, determine the implications of sub-standard performance in operations, and eliminate such causes. This may be achieved through audits of the SMS to ensure its effective implementation.

(4) **Safety promotion**

(a) Training and education

- (i) Manufacturing organisation shall develop and maintain a safety training programme that ensures that personnel responsible for the associated functions as contained in the SMS are trained and competent to perform the SMS duties.
- (ii) The scope of the safety training shall be appropriate to each individual's involvement in the SMS.

(b) Safety communication

Manufacturing organisation shall develop and maintain formal means for safety communication, that ensures that all personnel are fully aware of the SMS, conveys safety critical information, and explains why particular safety actions are taken and why safety procedures are introduced or changed.

(5) **Safety reporting requirements**

- (a) The organisation shall report any significant safety concern identified through its SMS to the Commissioner within 7 days of it being verified.
- (b) The organisation shall report the following safety information to the Commissioner on an annual basis, as per a schedule agreed to with the Commissioner:
 - (i) The top 20 hazards identified by the organisation; and
 - (ii) the mitigation strategies implemented to address the risk.

SCHEDULE 8

8.1 SUBSTITUTION OF TECHNICAL STANDARD 172.03.2A

The following technical standard is hereby substituted for technical standard 172.03.2A:

172.03.2A SAFETY MANAGEMENT SYSTEM

1. Minimum standards for safety management system

The safety management system referred to in Regulation 172.03.2A, must include –

- (a) A clear definition of the target level of safety the air traffic service provider intends to achieve.
- (b) Proof by the air traffic service provider to the Commissioner that adequate safety measures to maintain the required level of safety will be/are instituted.
- (c) The components and elements described in paragraph 2 below.

2. Components and elements required for a safety management system

(1) Safety Policy & Objectives

- (a) Management commitment and responsibility
 - (i) The air traffic service provider shall define its safety policy which shall be in accordance with the requirements, of this Part, and which shall be signed by the accountable manager (who shall be the CEO or MD).
 - (ii) The safety policy shall reflect its commitments regarding safety; including a clear statement about the provision of the necessary human and financial resources for its implementation; and be communicated, with visible endorsement, throughout the air traffic service provider.
 - (iii) The safety policy shall be reviewed within the air traffic service provider by senior management at least every second year to ensure it remains relevant and appropriate to the service provider.
 - (iv) The air traffic service provider shall establish safety objectives and targets for the organization that must be accepted by the Commissioner.
- (b) Safety accountabilities of managers
 - (i) The accountable manager of the air traffic service provider shall be ultimately accountable for the implementation and maintenance of the SMS.
 - (ii) The accountable manager shall identify a manager at executive level who, irrespective of other functions, shall have delegated responsibility and accountability for the implementation and maintenance of the SMS. The accountable manager may not fulfil this role.
 - (iii) The air traffic service provider shall identify the safety accountabilities of all members of executive and senior management, irrespective of their other functions. Safety accountabilities and authorities shall be

assigned, documented and communicated throughout the organization.

(c) Appointment of key safety personnel

- (i) The air traffic service provider shall identify a safety manager to be the responsible individual and focal point for the implementation and maintenance of an effective SMS. The Safety Manager must be acceptable to the Commissioner. (This appointee may be the same person as mentioned in paragraph (1)(b)(ii) above).
- (ii) The air traffic service provider may appoint as many safety officers as required to effectively implement the SMS.
- (iii) The safety manager shall report directly to the delegated executive manager and the accountable manager of the air traffic service provider with respect to any significant safety concerns with unacceptable risk and with respect to implementation and maintenance of the SMS.
- (iii) Safety managers and safety officers' selection criteria and suggested attributes and qualifications include but are not limited to:
 - (aa) For the safety officer:
 - (A) Proven competence in the area of operation (technical services, air traffic control or similar) within the organization (at least 2 years) to understand the systems that support operations;
 - (B) Sound knowledge of safety management principles and practices, through training, refresher training and experience;
 - (C) The completion of a recognized safety management course/s that meets the minimum requirements published by the Commissioner.
 - (bb) For the safety manager:
 - (A) Proven competence in the area of operation within the organization (at least 5 years) to understand the systems that support operations;
 - (B) operational management experience at supervisory level (at least 2 years);
 - (C) Sound knowledge of safety management principles and practices, through training, refresher training and experience;
 - (D) The completion of a recognized safety management course/s that meets the minimum requirements published by the Commissioner;

(E) The completion of a Diploma in Safety Management Systems by a recognised institution.

(d) SMS implementation and operational plan/s:

(i) SMS implementation plan

(aa) The air traffic service provider shall develop an SMS implementation plan that defines the organization's approach to the initial implementation of the SMS and ensures that they manage safety in a manner that meets the organization's safety needs.

(bb) The SMS implementation plan of the air traffic service provider shall explicitly address the coordination between the SMS of the air traffic service provider and the SMS of other organizations that may affect aviation safety and security that the service provider may interface with during the provision of services.

(cc) The SMS implementation plan shall be endorsed by executive management of the air traffic service provider.

(ii) Operational Plan:

(aa) Once the SMS is in place the air traffic service provider shall develop an annual operational plan that shall be endorsed by the executive management of the operator.

(bb) The operational plan shall state how the air traffic service provider shall manage safety in a manner that meets the operator's safety responsibilities, taking into account the resource requirements for implementation of risk controls.

(e) Coordination of emergency response planning

The air traffic service provider shall develop, coordinate and maintain contingency plans that ensure orderly and efficient transition from normal to emergency operations, and return to normal operations, in accordance with the requirements published by the Commissioner.

(f) Documentation

(i) The air traffic service provider shall develop and maintain SMS documentation to describe the following:

(aa) safety policy and objectives;

(bb) the SMS requirements;

(cc) the SMS procedures and processes;

- (dd) the accountabilities, responsibilities and authorities for procedures and processes; and
- (ee) the SMS outputs.

- (ii) the service provider may either incorporate its safety management documentation into its manual of procedures to communicate its approach to safety throughout the organization, or it may be contained in separate approved SMS manual.

(2) **Safety risk management**

(a) Hazard identification process

The air traffic service provider shall develop and maintain a formal process for effectively collecting, recording, acting on and generating feedback about hazards in operations, and support services based on a combination of reactive, proactive and predictive methods of safety data collection.

Note: *Reactive methods refer to methods of identifying hazards from reports on the investigation of occurrences. Proactive methods aim to use any other information within the organization for identification of potential hazards. Predictive methods rely on data that is collected within the organization that could effectively be used to predict the existence of hazards, usually done by trend analysis.*

(b) Risk assessment and mitigation process

- (i) The air traffic service provider shall develop and maintain a formal risk management process that ensures analysis (in terms of probability and severity of occurrence), assessment (in terms of tolerability or acceptability) and control (in terms of mitigation) of risks to an acceptable level.
- (ii) The following matrixes should be used for purposes of analyzing and assessing risk:

Risk Severity Matrix

Risk Severity definition	Description: Consequence (can lead to)...	Examples of what to look out for...
Category A Catastrophic	One or multiple deaths & complete loss/destruction of equipment	A major accident
Category B Hazardous	Serious injuries/Major Damage to equipment	Large reduction in safety margins, physical distress or workload such that the operators cannot be relied upon to perform their tasks accurately or completely.

Category C Major	Minor injuries/ Minor equipment damage	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
Category D Minor	Incidents	Operating limitations are breached. Procedures are not used correctly.
Category E Negligible	Negligible/Inconvenience	Little consequences No safety consequences Nuisance

Risk Probability Matrix

Likelihood/Probability Category	Description	Examples of what to look out for
1	Extremely improbable (Rare)	Almost inconceivable that the event will occur
2	Improbable (Seldom)	Very unlikely that the event will occur It is not known that it has ever occurred before.
3	Remote (Unlikely)	Unlikely but possible to occur. Has occurred rarely.
4	Occasional	Likely to occur sometimes. Has occurred infrequently
5	Frequent	Likely to occur many times/regularly. Has occurred frequently/regularly.

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 assessment Index	Suggested Criteria
5A, 5B, 5C, 4A, 4B, 4C, 3A, 3B, 2A	Unacceptable under the existing circumstances. Risk mitigation critical.
5D, 4D, 3C, 3D, 2B, 2C, 1A, 1B	Risk Mitigation required. It might require management decision.
5E, 4E, 3E, 2D, 2E, 1C, 1D, 1E	Acceptable

- (iii) The following strategies should be introduced for mitigation (risk control):

Avoidance	The operation or activity is cancelled because risks exceed the benefits of continuing the operation or activity.
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.
Segregation of exposure	Action is taken to isolate the effects of risks or build-in redundancy to protect against it.

- (iv) Alternative matrixes or means of analyzing, assessing and controlling risk may be implemented by the air traffic service provider with the approval of the Commissioner.
- (v) All safety information reported to the Commissioner shall be in the format specified in the above matrixes.
- (vi) The air traffic service provider shall also define those levels of management with authority to make decisions regarding safety risks tolerability/acceptability.

(3) **Safety assurance**

(a) Safety performance monitoring and measurement

- (i) The air traffic service provider shall develop and maintain the means to verify the safety performance of the organization compared to the safety policy and objectives, and to validate the effectiveness of safety risks controls through means of an objective audit of the SMS. (This may be combined with the internal auditing function within the air traffic service provider.
- (ii) The safety reporting procedures related to safety performance and monitoring shall clearly indicate which types of operational behaviours are acceptable or unacceptable, and include the conditions under which immunity from disciplinary action may be

considered. A non-punitive policy may be considered by the air traffic service provider to enhance the reporting culture. Immunity from disciplinary action should not be granted in instances of violation and negligence.

- (iii) The air traffic service provider shall ensure that, when contracting any related air traffic service or navigation service to a third party, safety assessments or audits are performed beforehand to ensure that the third party conform to the air traffic service provider's safety requirements. During the period of the contract, further audits should be conducted by the safety department to ensure that the contracted services meet the requirements of the air traffic service provider SMS unless the third party is unable to show that they meet such requirements through their own SMS.

- (b) The management of change

The air traffic service provider shall develop and maintain a formal process to identify changes within the organization which may affect 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.

- (c) Continuous improvement of the SMS

The air traffic service provider shall develop and maintain a formal process to identify the causes of sub-standard performance of the SMS, determine the implications of sub-standard performance in operations, and eliminate such causes. This may be achieved through audits of the SMS to ensure its effective implementation.

(4) **Safety promotion**

- (a) Training and education

- (i) The air traffic service provider shall develop and maintain a safety training programme that ensures that personnel responsible for the associated functions as contained in the SMS are trained and competent to perform these duties.

- (ii) The scope of the safety training shall be appropriate to each individual's involvement in the SMS.

- (b) Safety communication

The service provider shall develop and maintain formal means for safety communication, that –

- (i) ensures that all personnel are fully aware of the SMS,
- (ii) conveys safety critical information,

- (iii) explains why particular safety actions are taken; and
- (iv) explains why safety procedures are introduced or changed.

(5) **Safety reporting requirements**

- (a) The air traffic service provider shall report any significant safety concern that may pose a threat to the aviation infrastructure or the air traffic service provider's identified through its SMS to the Commissioner within 7 days of such being verified.
- (b) The air traffic service provider shall report the following safety information to the Commissioner on an annual basis, as per a schedule agreed to with the Commissioner:
 - (i) The top 20 hazards that impacted on operations, identified by the air traffic service provider; and
 - (ii) the mitigation strategies implemented to address the risk.