澳門特別行政區
REGIÃO ADMINISTRATIVA ESPECIAL DE MACAU
民航局
AUTORIDADE DE AVIAÇÃO CIVIL
CIVIL AVIATION AUTHORITY

Number: SN-2021/08

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SAFETY NOTICE

SUBJECT: **Runway Safety Maturity Checklist**

GENERAL: Safety Notices (SNs) are issued by the Civil Aviation Authority – Macao, China to convey advisory information to Macao aviation entities to enhance safety. SNs contain safety-related recommendations, guidance and/or industrial best practices to specific subjects which may or may not have been addressed by established requirements and regulations.

RELATED REGULATIONS:
AC/GEN/006 Macao Runway Safety Programme
AC/AGA/008 Manual of Standards – Aerodromes
AC/CNS/001 Aeronautical Telecommunication and Radio Navigation Service
AC/ATS/006 Manual of Standards – Air Traffic Management
AC/OPS/002 Operations Manual Requirements

APPLICABILITY: This SN applies to Macao Aerodrome Operator, Macao Aeronautical Telecommunication and Radio Navigation Service Provider, Macao Air Traffic Service Provider and Macao AOC Holders**.**

CANCELLATION: This SN is the first SN issued on this subject.

REFERENCES: The following material was referred to for the development of this SN:

- Runway Safety Maturity Check list - Civil Air Navigation Services Organization (CANSO)

1. Introduction

1.1 This Safety Notice is issued to provide information to Aerodrome Operator, Aeronautical Telecommunication and Radio Navigation Service Provider, Air Traffic Service Provider and AOC Holders on runway safety improvement by utilizing the Runway Safety Maturity Checklist to mitigate the runway safety risks.

2. Background

2.1 Enhancing runway safety is a top priority for the International Civil Aviation Organization (ICAO) and the aviation industry as a whole. With this in mind, the Civil Air Navigation Services Organization (CANSO) has developed an array of materials designed to aid runway safety improvement. One of these materials is the Runway Safety Maturity Checklist. The checklist is designed for use across the industry including Aerodrome Operator, Aeronautical Telecommunication and Radio Navigation Providers, Air Navigation Service Providers and Airlines, etc. A copy of the original CANSO document is also available at the following ICAO RASG-APAC Safety Tools page https://www.icao.int/APAC/RASG/eDocs/Forms/AllItems.aspx.

3. Runway Safety Maturity Checklist

3.1 The checklist is a tool to benchmark the maturity levels with regard to managing runway safety risks. It identifies key risk elements and uses a series of questions calling for each element.

For example:

- Is there a process in place? Is the process documented?
- Are employees trained, checked and assessed?
- Is the process working? How do you know?
- How could you improve on this element?

3.2 The checklist is also designed to assist organization in identifying and prioritizing areas for runway safety improvement from different angles, such as the areas on safety benefit, financial and stakeholder impact, complexity and dependencies should be considered.

4. Recommended Actions

4.1 Aerodrome Operator, Aeronautical Telecommunication and Radio Navigation Service Provider, Air Traffic Service Provider and Air Operators are encouraged to note the information contained in this Safety Notice and review its policies, procedures and training to reflect the safety issues contained in this SN.

- End -

Runway Safety Maturity Checklist

ATC	**Element** **What** are you looking for? For example, "Do you have….."	**Objective** **Why** are you looking for it?	**Does the element exist?** Is it written down (e.g. procedure)? Does it exist (e.g. equipment, signs, markings etc)? Details	**Training** Are people trained in the use of the element? Remedial and/or Refresher training? Details	**Is it working?** How do you know? (e.g. incident reports, analysis, corrective action, feedback) Details	**Improvement** What could you do to improve this element?	**Index**
ATC	ATC procedures to ensure that ATIS is updated in a timely manner and the action is recorded and/or directly broadcasted e.g. including a) SPECIs b) Wind shear reports (pilot and/or system derived) c) PIREP d) Soliciting Pilots for updates e) Runway Surface Conditions f) Approach aid status (unavailability) e) Other	Meteorological information is provided, timely and accurate					
ATC	Agreement between ATC and Meteorological office to notify ATC of changing weather conditions	ATC receives accurate and timely weather information where PIREPs are not provided or meteorological conditions are different from the ATIS.					
ATC	ATC procedures for provision of timely, accurate and clear instructions to Flight Crew including position, track and distance information based on aircraft type and performance to convey traffic management intentions e.g. following a) any updates b) change to sequence c) turning a/c in close d) vectoring e) before approach gate (e.g. 5nm from airport or 1nm from final approach fix which ever is farther) provide position and distance information. f) vector aircraft to intercept the glidepath from below g) aircraft off published approach due wx, wake turbulence separation etc. h) other	ATC providing instructions to establish / maintain / re- establish a stabilised approach					

ATC	**Element** **What** are you looking for? For example, "Do you have….."	**Objective** **Why** are you looking for it?	**Does the element exist?** Is it written down (e.g. procedure)? Does it exist (e.g. equipment, signs, markings etc)? Details	**Training** Are people trained in the use of the element? Remedial and/or Refresher training? Details	**Is it working?** How do you know? (e.g. incident reports, analysis, corrective action, feedback) Details	**Improvement** What could you do to improve this element?	**Index**
ATC	ATC flow control procedures manage ATC capacity to ensure provision of track and distance information allowing for prevailing meteorological conditions	ATC workload is managed to ensure timely, accurate and clear instructions are provided to Flight Crew including required position, track and distance information					
ATC	ATC supervisor and controller roles and responsibilities require monitoring of controller environment, workload, distractions, and internal or external pressures are not influential.						
ATC	ATC procedures for late notice runway changes that reduce track miles require planning and assessment of a) aircraft type and performance capability b) vectoring and resequencing to re-establish aircraft profile c) tail wind affect on profile speed d) approach type (i.e. precision/non-precision/visual) e) ICAO noise / capacity criteria for approach requirements dictate acceptability of runway selection f) other	ATC providing instructions to establish / maintain / re- establish a stabilised approach					
ATC	ATC procedures to review aircraft performance guidance material in consultation with Airlines.	Alignment between ATC instruction and airline SOPs for aircraft type, performance and stable approach criteria.					

ATC	**Element** **What** are you looking for? For example, "Do you have….."	**Objective** **Why** are you looking for it?	**Does the element exist?** Is it written down (e.g. procedure)? Does it exist (e.g. equipment, signs, markings etc)? Details	**Training** Are people trained in the use of the element? Remedial and/or Refresher training? Details	**Is it working?** How do you know? (e.g. incident reports, analysis, corrective action, feedback) Details	**Improvement** What could you do to improve this element?	**Index**
ATC	ATC procedures require: a) speed control is only applied outside final approach fix b) ATC monitoring of separation c) query any pilot deviation with speed, or other instruction d) effective communication and coordination between Tower and Approach e) other	Prescribed wake turbulance separation standards are maintained					
ATC	ATC procedures to monitor air speed through Mode S down link of actual aircraft parameters to controller	Controller situation awareness					
ATC	NOTAM system requires publication of approach aid status, runway surface condition (SNOWTAM)	Accurate information to pilots					
ATC	ATC procedures specify the criteria for offering visual approaches recognising the priority of precision/non-precision approaches over visual approaches	Fly precision approaches when available - reduce risk of visual approach					
ATC	ATC procedures require ATC to visually scan aircraft on approach and alert Flight Crew of significant flight path/profile deviation, and respond to pilot requests.	Independent prompt to pilot to consider go-around					
ATC	ATC procedures provide criteria to aid decision making in go around situations (e.g. piggy back issue)	Correct ATC actions to manage separation assurance in go around situations					
ATC	ATC procedures require notification and update to Flight Crew of runway surface condition, including request for runway surface / state inspection	Clear expectation to pilots with regard to required braking system settings					

ATC	**Element** **What are you looking for? For example, "Do you have….."**	**Objective** **Why are you looking for it?**	**Does the element exist?** **Is it written down (e.g. procedure)? Does it exist (e.g. equipment, signs, markings etc)?** **Details**	**Training** **Are people trained in the use of the element? Remedial and/or Refresher training?** **Details**	**Is it working?** **How do you know? (e.g. incident reports, analysis, corrective action, feedback)** **Details**	**Improvement** **What could you do to improve this element?**	**Index**
ATC	ATC procedures for selection of active runway include consideration of runway surface conditions.	To have runway in use suitable for prevailing conditions					
ATC	ATC procedures detail requirements for protection of critical and sensitive areas of approach aids and runway strip including notifications of obstructions to flight crew.	Prevent deviations in guidance information					
ATC	ATC procedures require monitoring of approach aid status.	Detect failure in approach aid to inform pilot					
ATC	ATC training, checking and assessment regimes verify use of ICAO compliant phraseology including readback/hearback techniques	Standard phraseology applied by all parties					
ATC	ATC procedures require taxiway exit requests only to be provided to landing aircraft after completion of the landing phase.	To enable pilot to maintain directional control of the aircraft					
ATC	ATC provide a mechanism to gain feedback from Airlines regarding ongoing suitability of approach procedures.	Continual improvement					
ATC	Just culture policy and procedures	Robust and complete reporting, trusting non-punitive environment					
ATC	Fatigue risk management system	Controllers fit for duty					
ATC	Drug and alcohol management program	Controllers fit for duty					

ATC	**Element** **What are you looking for? For example, "Do you have….."**	**Objective** **Why are you looking for it?**	**Does the element exist?** **Is it written down (e.g. procedure)? Does it exist (e.g. equipment, signs, markings etc)?** **Details**	**Training** **Are people trained in the use of the element? Remedial and/or Refresher training?** **Details**	**Is it working?** **How do you know? (e.g. incident reports, analysis, corrective action, feedback)** **Details**	**Improvement** **What could you do to improve this element?**	**Index**
ATC	Fitness for Duty policy and procedures	Controllers fit for duty					
ATC	CRM/TEM/MCRM procedures	Teamwork, improved risk management, appropriate decision making					
ATC	Human Factors training	Understanding human performance and limitations					
ATC	OHS policy and procedures (conducive workplace environment e.g. lighting, temperature, humidity, air quality, ergonomics, noise, distraction etc)	Environment to support optimal performance					

Runway Safety Maturity Checklist

AIRLINE	**Element** **What are you looking for? For example, "Do you have….."**	**Objective** **Why are you looking for it?**	**Does the element exist?** **Is it written down (e.g. procedure)? Does it exist (e.g. equipment, signs, markings etc)?** **Details**	**Training** **Are people trained in the use of the element? Remedial and/or Refresher training?** **Details**	**Is it working?** **How do you know? (e.g. incident reports, analysis, corrective action, feedback)** **Details**	**Improvement** **What could you do to improve this element?**	**Index**
Airline	Pilot SOPs indicate the stage of approach (e.g. TOD, pre flight briefing) ATIS should be monitored and require a PIREP is to broadcast if the meteorological conditions are different to the ATIS. Eg a) Wind shear reports b) Wake turbulence c) Request ATC updates d) TAF and METAR d) Other						
Airline	Airline SOPs require pilot monitoring of track miles, height or speed on approach including a) confirmation with ATC of new track distance, height or speed information and ATC plans b) rejection of instructions that are outside the SOPs including interception above glidepath	Sufficient / accurate track and distance information is provided by ATC (including sequence change, deviation from track)					
Airline	Airline SOPs require the use of local knowledge in assisting with determining required track miles.						
Airline	Airline SOPs to advise ATC of changes to aircraft type, performance and stable approach criteria.						

AIRLINE	**Element** **What are you looking for? For example, "Do you have….."**	**Objective** **Why are you looking for it?**	**Does the element exist?** **Is it written down (e.g. procedure)? Does it exist (e.g. equipment, signs, markings etc)?** **Details**	**Training** **Are people trained in the use of the element? Remedial and/or Refresher training?** **Details**	**Is it working?** **How do you know? (e.g. incident reports, analysis, corrective action, feedback)** **Details**	**Improvement** **What could you do to improve this element?**	**Index**
Airline	Airline SOPs require Flight Crew to: a) Utilise precision approaches where available b) Brief appropriately for non-precision / visual approach when precision approaches are not available. c) Bpply Airline SOPs criteria for use of non-precision and visual approaches d) Request appropriate published instrument approach procedure to a runway with visual vertical guidance (e.g. PAPI, VASIS etc) e) Other						
Airline	Airline SOPs to ensure cross cockpit communication minimises internal/external pressures and power gradient so that decision to continue can be instantly challenged without recourse.						
Airline	Airline procedures support a Just Culture where a go-around or refected take-off is required. (e.g. management support for PF decision to initiate a go-around)	Initiate a go-around when aircraft becomes unstable as specified in Airline SOPs					
Airline	Airline SOPs detail energy management on approach and landing phase: a) for airspeed, thrust, drag, flight path, braking application etc b) standard calls by PNF to alert PF including current automation mode c) to ensure correct profile or initiate go-around.						

AIRLINE	**Element** **What are you looking for? For example, "Do you have….."**	**Objective** **Why are you looking for it?**	**Does the element exist?** **Is it written down (e.g. procedure)? Does it exist (e.g. equipment, signs, markings etc)? Details**	**Training** **Are people trained in the use of the element? Remedial and/or Refresher training? Details**	**Is it working?** **How do you know? (e.g. incident reports, analysis, corrective action, feedback) Details**	**Improvement** **What could you do to improve this element?**	**Index**
Airline	Airline SOPs require cross check of information (e.g. rad alt Vs distance) and appropriate response to on-board alerts and cross checks including approach aid status						
Airline	Airline SOPs to assure appropriate use of automation						
Airline	Pilot procedures require notification to ATC of runway surface condition.	ATC will advise other pilots of runway surface condition, may change runway in use.					
Airline	Airline SOPs prescribe braking settings according to runway surface conditions						
Airline	Airline SOPs for recovery from : a) failure of avionics b) failure of undercarriage or braking systems c) failure of flight and propulsion systems d) FMS indicated gross error check						
Airline	Training, checking and assessment to verify use of ICAO compliant phraseology including readback/hearback procedures						
Airline	Mechanism to provide feedback to ATC regarding ongoing suitability of approach procedures.						

AIRLINE	**Element** **What** are you looking for? For example, "Do you have….."	**Objective** **Why** are you looking for it?	**Does the element exist?** Is it written down (e.g. procedure)? Does it exist (e.g. equipment, signs, markings etc)? Details	**Training** Are people trained in the use of the element? Remedial and/or Refresher training? Details	**Is it working?** How do you know? (e.g. incident reports, analysis, corrective action, feedback) Details	**Improvement** What could you do to improve this element?	Index
Airline	Conducting effective pre-flight planning and pre-departure briefing including flight planning packages / NOTAM summaries						
Airline	Airline SOPs detail pre-flight review, walkarounds, acceptance of Minimum Equipment List (MEL), system checks						
Airline	Just culture policy and procedures						
Airline	Fatigue risk management system						
Airline	Drug and alcohol management program						
Airline	CRM/TEM/MCRM procedures						
Airline	Fitness for Duty policy and procedures						
Airline	Human Factors training						
Airline	OHS policy and procedures (conducive workplace environment e.g. lighting, temperature, humidity, air quality, egonomics, noise, distraction etc)						
Airline	Airline enables improvement by providing evidence of reports, analysis, recommendations and implementation of change to procedures/practices/facilities to improve runway safety performance	Application of the SMS for continual improvement to procedures and practices to maximise runway safety performance					

Runway Safety Maturity Checklist

AERODROME	**Element** **What** are you looking for? For example, "Do you have….."	**Objective** **Why** are you looking for it?	**Does the element exist?** Is it written down (e.g. procedure)? Does it exist (e.g. equipment, signs, markings etc)? Details	**Training** Are people trained in the use of the element? Remedial and/or Refresher training? Details	**Is it working?** How do you know? (e.g. incident reports, analysis, corrective action, feedback) Details	**Improvement** What could you do to improve this element?	**Index**
Aerodrome	Provision of weather information systems (ATIS / AWIS / Windsock / Windshear alerting system/weather radar/runway visibility and range monitoring systems) to provide real-time meteorological information.						
Aerodrome	Provision of available, reliable and accurate precision approach aids a) Redundancy / diversity in system architecture						
Aerodrome	Aerodrome procedures for a) conduct of runway inspections including surface conditions and state b) reporting and repair (e.g. contamination, FOD, damage) c) periodic inspection, reporting and maintenance of lighting, signage, markings and taxiway condition						
Aerodrome	Aerodrome procedures for provision of runway visibility information to ATC.						
Aerodrome	Runway and taxiway layout is designed to optimise runway safety performance by a) being consistent with ICAO requirements b) include RESA and/or other arrestor systems c) appropriate position, length, width, gradient and surface characteristics, friction coatings, grooving, surface texturing and drainage optimised for prevailling conditions, including alternatively aligned runway d) provision of adequate runway (edge & centreline) / taxiway lighting						

AERODROME	**Element** **What** are you looking for? For example, "Do you have….."	**Objective** **Why** are you looking for it?	**Does the element exist?** Is it written down (e.g. procedure)? Does it exist (e.g. equipment, signs, markings etc)? Details	**Training** Are people trained in the use of the element? Remedial and/or Refresher training? Details	**Is it working?** How do you know? (e.g. incident reports, analysis, corrective action, feedback) Details	**Improvement** What could you do to improve this element?	Index
Aerodrome	Availability of ICAO compliant aviation rescue and fire fighting service						
Aerodrome	Emergency planning arrangements which include Airlines, ATC, Aerodrome and emergency services						
Aerodrome	Training, checking and assessment to verify use of ICAO compliant phraseology including readback/hearback procedures (airside vehicle operators)						
Aerodrome	Transponder equipage of vehicles required to operate airside where ground surveillance is available						
Aerodrome	Provision of adequate taxiway and holding point lighting in accordance with ICAO standards						
Aerodrome	Development and implementation of a Snow and Ice Control Plan						
Aerodrome	Partial and full closure of taxiway and runways in accordance with ICAO defined criteria including use of displaced thresholds.						
Aerodrome	Established means to address aerodrome runway safety issues between airlines, ATC and aerodrome operators through a) Established Runway Safety Teams b) Airport safety committees where runway safety is a standing agenda item c) other						
Aerodrome	Just culture policy and procedures						

AERODROME	**Element** **What are you looking for? For example, "Do you have….."**	**Objective** **Why are you looking for it?**	**Does the element exist?** **Is it written down (e.g. procedure)? Does it exist (e.g. equipment, signs, markings etc)?** **Details**	**Training** **Are people trained in the use of the element? Remedial and/or Refresher training?** **Details**	**Is it working?** **How do you know? (e.g. incident reports, analysis, corrective action, feedback)** **Details**	**Improvement** **What could you do to improve this element?**	**Index**
Aerodrome	Fatigue risk management system						
Aerodrome	Drug and alcohol management program						
Aerodrome	CRM/TEM/MCRM procedures						
Aerodrome	Fitness for Duty policy and procedures						
Aerodrome	Human Factors training						
Aerodrome	OHS policy and procedures (conducive workplace environment e.g. lighting, temperature, humidity, air quality, egonomics, noise, distraction etc)						
Aerodrome	Aerodrome enables improvement by providing evidence of reports, analysis, recommendations and implementation of change to procedures/practices/facilities to improve runway safety performance	Application of the SMS for continual improvement to procedures and practices to maximise runway safety performance					

Runway Safety Maturity Checklist

ATEL/ANAV	**Element** **What are you looking for? For example, "Do you have….."**	**Objective** **Why are you looking for it?**	**Does the element exist?** **Is it written down (e.g. procedure)? Does it exist (e.g. equipment, signs, markings etc)?** **Details**	**Training** **Are people trained in the use of the element? Remedial and/or Refresher training?** **Details**	**Is it working?** **How do you know? (e.g. incident reports, analysis, corrective action, feedback)** **Details**	**Improvement** **What could you do to improve this element?**	**Index**
ATEL/ANAV	System maintenance regime to ensure sufficient availability and reliability of ATIS/AWIS etc. When system is not in service, an appropriate alternative method of providing meteorological information should be available.						
ATEL/ANAV	System design requirements specify requirement to flag out of date information presented at the ATC console	Correct meteorological information displayed at ATC console					
ATEL/ANAV	Integrated air traffic management system includes meteorological information integrated into Flow control	Planning of runway changes to minimise negative impact on Airlines					
ATEL/ANAV	Just culture policy and procedures						
ATEL/ANAV	Fatigue risk management system						
ATEL/ANAV	Drug and alcohol management program						
ATEL/ANAV	CRM/TEM/MCRM procedures						
ATEL/ANAV	Fitness for Duty policy and procedures						
ATEL/ANAV	Human Factors training						

ATEL/ANAV	**Element** **What are you looking for? For example, "Do you have….."**	**Objective** **Why are you looking for it?**	**Does the element exist?** **Is it written down (e.g. procedure)? Does it exist (e.g. equipment, signs, markings etc)?** **Details**	**Training** **Are people trained in the use of the element? Remedial and/or Refresher training?** **Details**	**Is it working?** **How do you know? (e.g. incident reports, analysis, corrective action, feedback)** **Details**	**Improvement** **What could you do to improve this element?**	**Index**
ATEL/ANAV	OHS policy and procedures (conducive workplace environment e.g. lighting, temperature, humidity, air quality, egonomics, noise, distraction etc)						
ATEL/ANAV	ATEL/ANAV provider enables improvement by providing evidence of reports, analysis, recommendations and implementation of change to procedures/practices/facilities to improve runway safety performance	Application of the SMS for continual improvement to procedures and practices to maximise runway safety performance					