

SAFETY PERFORMANCE MANAGEMENT METHODOLOGIES SERIES

RUNWAY INCURSION



This document was developed to complement the guidance in the Safety Management Manual (Doc 9859). It is intended to support aviation safety professionals in establishing effective safety performance management for their organizations. Any comments should be forwarded to safetymanagement@icao.int.

About This Template

This document is one example in the Safety Performance Management Methodologies Series. It follows a standardized five-section structure that should be applied when developing examples for other aviation risk areas. The explanatory text in Sections 2, 3, and 4 is fixed and remains the same across all examples in the series. Only the risk-area specific content: the safety objectives, SPIs, SPTs, and key considerations changes from one example to the next.

1. INTRODUCTION

- 1.1 Runway incursions remain among the most significant operational risks in aviation, with the potential to result in aircraft collisions, loss of aircraft control, damage to the aircraft or infrastructure, and fatalities.
- 1.2 Monitoring these risks requires organizations to develop:
 - a) safety objectives - statements of desired safety outcomes aligned to the organization's top safety risks;
 - b) safety performance indicators (SPIs) - measurable indicators showing where the organization has been, where it is now, and where it is headed; and
 - c) safety performance targets (SPTs) - short- and medium-term milestones to track achievement of safety objectives, where appropriate.

The following sections provide practical guidance on how to structure these elements for runway incursion prevention.

2. SAFETY OBJECTIVES

- 2.1 In accordance with Section 5.2 of Doc 9859, safety objectives are statements of desired safety outcomes. They provide direction to the organization's activities and should reflect its most significant safety risks. Safety objectives may be:
 - a) Outcome-oriented - targeting the containment of accidents or operational losses (e.g. "Prevent...", "Reduce..."); or
 - b) Process-oriented - targeting safe behaviours or risk management actions (e.g. "Enhance...", "Increase...").
- 2.2 Organizations should develop a mix of both types. Where possible, objectives should be SMART - Specific, Measurable, Achievable, Relevant and Timely and reviewed regularly, not treated as 'set and forgotten' (Sections 5.2.5 and 5.2.9 of Doc 9859).
- 2.3 The following safety objectives have been identified for this risk area:

RI-1 Outcome-oriented

Prevent runway incursions through improved surface movement situational awareness, communication discipline, and adherence to ATC clearances.

RI-2 Process-oriented

Enhance identification and mitigation of runway incursion risks through effective safety reporting, Runway Safety Team (RST) engagement, and corrective action tracking.

3. SAFETY PERFORMANCE INDICATORS AND TARGETS

3.1 Safety performance indicators (SPIs) provide a view of the organization's safety performance — where it has been, where it is now, and where it is headed (Section 5.3 of Doc 9859). SPIs are classified as:

- a) Leading - measuring processes and inputs being implemented to improve or maintain safety (activity or process-based); and
- b) Lagging - measuring outcomes that have already occurred (outcome-based).

A combination of leading and lagging SPIs is recommended for a complete and accurate picture of an organization's safety performance (Section 5.3.12 of Doc 9859).

3.2 Safety performance targets (SPTs) define short- and medium-term milestones that provide confidence the organization is on track to achieve its safety objectives (Section 5.5 of Doc 9859). Not all SPIs require a defined SPT as some are better monitored for trends. Where targets are marked as indicative, organizations should establish a baseline monitoring period before setting their own figures (Sections 5.5.7 to 5.5.9 of Doc 9859).

3.3 The following tables present sample SPIs and indicative SPTs for each safety objective. SPIs are organized by stakeholder responsibility: ✓ Primary (holds primary responsibility), ✓ Contributes (provides data or actions), ✓ Uses (uses the data), or (not applicable).

RI-1 - Reduce the occurrence and severity of runway incursions through improved surface movement situational awareness and communication discipline.

Safety Performance Indicator (SPI)	Type	Aerodrome Operator	ANSP	Aircraft Operator
Number of reported surface movement hazards (signage, markings, lighting)	Leading	✓ Primary	✓ Contributes	✓ Contributes
Target: ≥ 15–25% year-on-year increase (until reporting stabilizes), then maintain ≥ 5 reports per 10,000 movements				
Target: ≤ 0.30 per 100,000 movements (with progressive reduction of 5% annually)				
Number of high-severity incursions (Category A/B)	Lagging	✓ Contributes	✓ Primary	✓ Contributes
Target: 0 occurrences annually				
% compliance with read-back procedures for runway clearances	Leading	✓ Contributes	✓ Primary	✓ Contributes
<i>SPT (indicative): ≥ 99% compliance. Establish baseline before setting target. Monitor: monthly.</i>				
Number of runway incursions by ICAO category (A/B/C/D)	Lagging	✓ Contributes	✓ Contributes	✓ Primary
<i>SPT (indicative): 0 Category A or B incursions. Monitor all categories for trend. Severity distribution informs risk prioritization.</i>				
Number of pilot deviations from ATC surface movement instructions	Lagging	—	✓ Contributes	✓ Primary
<i>SPT (indicative): To be defined after establishing baseline. Monitor for trend. A declining trend indicates improved crew adherence to clearances.</i>				

% of surface movement control positions equipped with A-SMGCS or equivalent surface surveillance	Leading	✓Contributes	✓ Primary	—
<i>SPT (indicative): To be defined by the aerodrome operator based on infrastructure plans and applicable ICAO standards (Annex 14).</i>				

RI-2 - Enhance identification and mitigation of runway incursion risks through effective reporting and runway safety teams.

Safety Performance Indicator (SPI)	Type	Aerodrome Operator	ANSP	Aircraft Operator
% of aerodromes with active Runway Safety Teams (RSTs)	Leading	✓ Primary	✓ Contributes	✓ Contributes
Target: ≥ 90% of applicable aerodromes with quarterly meetings conducted				
Number of runway incursion risk assessments (hotspots, procedures)	Leading	✓ Primary	✓ Participates	✓ Participates
Target: ≥ 2 formal risk assessments per aerodrome per year (including hotspot reviews)				
Number of unresolved runway incursion hotspots (>12 months)	Lagging	✓ Primary	✓ Contributes	✓ Contributes
Target: 0 unresolved hotspots beyond 21 months				
<i>SPT: Monitor for trend. An increasing trend may reflect a maturing reporting culture, not necessarily deteriorating safety performance.</i>				
Target: ≥ 10% reduction within 12–24 months following implementation of mitigation measures				
Number of runway incursion occurrences reported through the safety reporting system	Leading	✓Primary	✓ Contributes	✓ Primary
<i>SPT: Monitor for trend. An increasing trend may reflect a maturing reporting culture, not necessarily deteriorating safety performance.</i>				
% of reported runway incursion occurrences subject to safety investigation within 30 days	Leading	✓ Primary	✓ Primary	✓ Contributes
<i>SPT (indicative): ≥ 95% investigated within 30 days. Establish baseline before formalizing target. Monitor: quarterly.</i>				
% of corrective actions arising from runway incursion investigations closed within agreed timelines	Leading	✓ Primary	✓ Primary	✓ Contributes
<i>SPT (indicative): ≥ 90% of corrective actions closed within agreed timelines. Review open actions quarterly at RST.</i>				

Number of Runway Safety Team (RST) meetings held per year	Leading	✓ Contributes	✓ Contributes	✓ Contributes
<i>SPT (indicative): % of RST reviews conducted as planned (Doc 9870). Monitor participation rate, action closure rates, and continuous improvement</i>				

* A combination of leading and lagging SPIs is recommended for a complete picture of safety performance (Section 5.3.12 of Doc 9859).

* Where SPTs are not yet defined, organizations should establish a baseline monitoring period before setting realistic targets (Sections 5.5.7 to 5.5.9 of Doc 9859).

4. KEY CONSIDERATIONS

- 4.1 In line with Section 5.7 of Doc 9859, SPM is a cyclical process and SPIs and SPTs should be reviewed periodically to ensure they remain meaningful and aligned with safety objectives. The following considerations apply to this risk area:
- a) Start simple and refine over time: Initial SPIs for runway incursion may be developed using safety reports and ATC occurrence data. As reporting matures and RST processes are established, organizations should refine the scope of SPIs and SPTs to better align with their safety objectives (Section 5.7.3 of Doc 9859).
 - b) Scale to organizational complexity: Aerodromes with complex surface layouts or high traffic volumes may require deeper-scope SPIs that differentiate by runway, taxiway, or movement area. Smaller organizations may begin with aggregate indicators and build over time (Section 5.7.4 of Doc 9859).
 - c) Review SPIs regularly: SPIs that consistently report the same value, duplicate another indicator, or relate to an objective that has been met or superseded should be updated or discontinued (Section 5.7.5 of Doc 9859).
 - d) Ensure targets remain realistic: SPTs should be reviewed to confirm they continue to reflect achievable performance levels as baseline data accumulates and operational conditions change, and that they do not drive undesirable behaviour such as under-reporting (Section 5.7.2 of Doc 9859).

5. REFERENCES

- a) Doc 9859 - *Safety Management Manual* - Chapter 5 (Safety Performance Management), in particular Sections 5.2, 5.3, 5.5, and 5.7.
- b) Annex 19 - *Safety Management* - Chapter 3 and Appendix 2.
- c) Doc 9870 - *Manual on the Prevention of Runway Incursions* - runway incursion categorization and prevention strategies, including RST guidance.
- d) Annex 14, Volume I - *Aerodrome Design and Operations* - requirements for runway and taxiway markings, lighting, and signage.
- e) Doc 10004 - *Global Aviation Safety Plan (GASP)* - runway safety as a high-priority risk area under GASP Effective Implementation objectives.