United Kingdom Overseas Territories Aviation Circular

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191-15

Prevention of Runway Incursions and Excursions

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GENERAL

Overseas Territories Aviation Circulars are issued to provide advice, guidance and information on standards, practices and procedures necessary to support Overseas Territory Aviation Requirements. They are not in themselves law but may amplify a provision of the Air Navigation (Overseas Territories) Order or provide practical guidance on meeting a requirement contained in the Overseas Territories Aviation Requirements.

PURPOSE

The International Civil Aviation Organisation has identified runway incursions as a major threat to flight safety. This Circular contains guidance on prevention of runway incursions.

RELATED REQUIREMENTS

This Circular relates to OTAR Parts OTAR Parts 91, 119, 121, 125, 135, 139, 172, 190 and 191.

CHANGE INFORMATION

Issue 5.00 includes references to new aerodrome OTARs.

ENQUIRIES

Enquiries regarding the content of this Circular should be addressed to Air Safety Support International at the address on the ASSI website www.airsafety.aero or to the appropriate Overseas Territory Aviation Authority.

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1 Introduction

1.1 Research by ICAO and others has determined that runway incursions and excursions have been a significant factor in a number of accidents. The worst aviation accident ever, occurred as a result of an incursion and involved 2 Boeing 747 aircraft at Tenerife Los Rodeos aerodrome in fog. Accidents with fatal consequences have also occurred at numerous other airports, including Milan Linate.

1.2 Prevention of runway incursion and excursion events has been accorded a high priority by ICAO as a means of enhancing flight safety and preventing accidents. Runway incursion and excursion prevention will involve many agencies – aerodrome operators, aircraft operators and air traffic service providers amongst others. Prevention programmes will require co-ordinated action between the various agencies involved.

1.3 A runway incursion and excursion prevention programme will form one part of a comprehensive runway safety programme.

1.4 This Circular provides some guidance on runway incursion prevention to assist agencies in the Territories.

2 Definitions

2.1 ICAO defines a runway incursion as:

> "Any occurrence at an aerodrome involving the incorrect presence of an aircraft, vehicle or person on the protected area of a surface designated for the landing and take-off of aircraft."

2.2 ICAO defines a runway excursion as:

> "A veer-off or overrun off the runway surface"

2.2 The runway incursion definition is not precise, but a useful and concise means of determining whether an incursion has occurred is to consider whether the obstacle limitation surfaces associated with the runway are penetrated by the intruder. Essentially an intruding object would constitute an obstacle to aircraft taking off or landing, even if an aircraft is not doing so at the time of incursion.

2.3 Note that the ICAO definition does not include wildlife. Guidance on wildlife management can be found in OTAC 139-6.

3 General

3.1 Runway incursions and excursions have been identified as critical flight safety hazards by a number of States and have been a factor in a number of aircraft accidents. With the historical and predicted growth in air traffic and the consequential rise in aircraft movements, the incidence of runway incursion and excursions has increased, and are set to do so in future unless preventative measures are taken.

3.2 A number of States have implemented prevention plans, an example of which is the European Action Plan for Prevention of Runway Incursions and Global Action Plan for the Prevention of Runway Excursions.

European Action Plan for Prevention:

http://www.eurocontrol.int/sites/default/files/publication/files/european-action-plan-prevention-runway-incursions2.0.pdf

Note: this is a large download (7Mb)

Global Action Plan for the Prevention of Runway Excursions:

https://www.eurocontrol.int/sites/default/files/2021-05/gappre-recommendations-guidance-best-practice.pdf

4 Where and when do runway incursions/excursions happen?

4.1 Runway incursions can occur at any aerodrome at any time and involve any type of aircraft, vehicle or person.

4.2 In good weather pilots or Air Traffic Service staff are often able to detect intruding traffic visually and initiate appropriate avoidance action. Catastrophic results are usually avoided, but the potential is certainly there.

4.3 In poor weather the probability of successful detection and timely avoidance is lower. The risk of catastrophic outcome is therefore higher for each event. The collisions at Tenerife Los Rodeos and Milan Linate both occurred in fog, which gave no opportunity for the pilots concerned to take avoiding action.

5 Why do runway incursions/excursions happen?

5.1 There are many reasons why runway incursions occur, and a reading of accident reports where runway incursion was a factor will highlight many of these. The report of the Milan Linate accident is particularly instructive:

http://www.aaiu.ie/sites/default/files/ANSV%20Italy%20Accident%20Boeing%20MD-87%20SE-DMA%20and%20Cessna%20D-IEVX%20Milan%20Linate%20Airport%202001-10-08.pdf

There are also many reasons why runway excursions occur. The main groups of factors are pilot errors, weather conditions including wind velocity, runway friction and an aircraft malfunction.

5.2 Runway incursions/excursions may occur because of inevitable human failings which human factors engineering have not anticipated or adequately mitigated. These failings can take many forms:

5.2.1 lack of comprehension of instructions such as clearances due to poor communications quality or cultural differences;

5.2.2 confusion caused by lack of clarity in instructions, markings, signage, lighting and publications;

5.2.3 susceptibility to suggestion caused by cultural or commercial factors;

5.2.4 loss of situational awareness; and

5.2.5 distractions and excessive workload.

6 Countering runway incursions

6.1 Firstly, study available reference material for ideas on addressing the problems. The hyperlinks in this Circular are a good place to start, and there are other materials provided by larger aviation regulators here:

6.1.1 FAA: http://www.faa.gov/airports/airport_safety/call_to_action/.

6.1.2 UK CAA: http://publicapps.caa.co.uk/modalapplication.aspx?catid=1&pagetype=65&appid=11&mode=detail&id=5661.

6.2 Ensure that runway incursions are accorded a high priority in the aerodrome operator's safety management system. The incidence of runway incursions should be monitored for a trial period to determine the scale of the problem. Any runway incursion incidents must be investigated to determine causal factors. Any causal factor trends will need to be addressed, and this is best done through the safety management system.

6.3 All runway incursion incidents must be reported through the Mandatory Occurrence Reporting System (MORS). Such reports contribute to global statistics and research into runway incursions, which in turn leads to the internationally co-ordinated development of countermeasures.

6.4 Establish an appropriate Runway Safety Programme to reduce runway incursions. Ensure that the action plan addresses all agencies operating at the aerodrome, and that the Runway Safety Programme is managed by a multi-disciplinary Runway Safety Team. The Runway Safety Team may be a standalone committee or part of an existing aerodrome safety committee.

6.5 Ensure that an aerodrome-wide runway safety awareness campaign is undertaken.

6.6 Ensure that internal safety audit teams are tasked specifically to ensure that aerodrome facilities comply with ICAO SARPS and OTARs.

7 Recommendations for each organisation

7.1 Aerodrome operators

7.1.1 Ensure that all markings, signs and lights are compliant with standards, serviceable, and effective in all conditions. Ensure that the airport maintenance programme is effective in maintaining serviceability.

7.1.2 Ensure that all airport users are trained in airside movement and are familiar with airside procedures, and that personnel driving vehicles airside are licensed and competent to do so, including in the use of radios. Ensure that the Aerodrome Manual, local regulations and procedures, training and guidance materials are kept up to date and are promulgated properly.

7.1.3 During work in progress or other temporary changes, ensure that all aerodrome users are familiar with the changes and their effect on airside operations. Ensure any changes to airside procedures are properly notified and promulgated.

7.1.4 Undertake the necessary risk analyses for changes to airside aerodrome infrastructure or procedures. Ensure that perimeter fencing is adequate and frequently inspected to prevent incursion by wildlife or persons.

7.2 Air Traffic Service providers

7.2.1 Ensure proper use of correct radio telephony procedures. Ensure correct language and phraseology is used. Do not tolerate non-standard radio telephony usage by aerodrome users. In particular, use full callsigns to avoid confusion.

7.2.2 Ensure that clearances issued to aircraft and vehicles are unambiguous and read back correctly, particularly when giving clearance to enter the runway. Where there is any suspicion of miscomprehension, repeat the clearance.

7.2.3 Ensure clearances are passed to pilots at periods of low workload, preferably whilst the aircraft is stationary, and not prior to runway crossing. Avoid the use of conditional clearances (eg “after the landing *nnnn* line up runway 26, *callsign*”).

7.3 Aircraft Operators

7.3.1 Ensure pilots are knowledgeable about aerodrome markings, signs and lights, particularly if the aerodrome is large, complex, busy or subject to temporary work.

7.3.2 Ensure pilots adhere strictly to correct radio telephony procedures, in particular the use of full callsigns to avoid confusion in busy radio environments.

7.3.3 Promote effective sterile flight deck procedures whilst the aircraft is in motion, to ensure minimal distraction of pilots.

7.3.4 Ensure proper use of cockpit resource management during ground movement to ensure that at least one pilot is dedicated to ground manoeuvring.

7.3.5 Ensure that pilots understand clearances and read them back explicitly.

7.3.6 Ensure pilots receive timely information on changes to aerodrome facilities, if necessary by ATIS or ATC broadcast.

8 Countering runway excursions

8.1 The measures taken to mitigate runway excursions are very similar to those taken to prevent runway incursions. Additionally, each organisation should consider certain factors that may be critical in preventing future occurrences of these incidents.

8.2 Aerodrome operators

8.2.1 Ensure that runways are constructed, resurfaced, and repaired in accordance with applicable national or regional regulations, ensuring adequate friction and drainage.

8.2.2 A suitable programme should be implemented effectively to ensure that contaminants are removed from the runway surface as quickly and completely as possible to prevent accumulation and preserve the runway's friction characteristics.

8.2.3 Maintain approach radio navigation aids (eg ILS) and visual aids (eg AGL, PAPIs, and surface markings) in accordance with ICAO Standards and Recommended Practices, if provided.

8.2.4 A suitable method for inspecting and evaluating the deterioration of markings should be implemented.

8.2.5 Ensure that robust procedures are in place for calculating temporary reduced declared distances, for example, due to runway work in progress. When reduced declared distances are in effect, ensure that temporary markings, lighting, and signs accurately depict the reduced distances and that they are communicated to the state's aeronautical information services for publication and to the appropriate ATS units in a timely manner.

8.2.6 Ensure that procedures for assessing runway surface conditions in accordance with the ICAO Global Reporting Format include both reactive and proactive surface assessment in order to ensure that all potentially hazardous changes are identified and communicated in a timely manner.

8.2.7 Ensure that robust procedures are in place for communicating information about changing surface conditions to the appropriate services as frequently as possible in accordance with the ICAO Global Reporting Format. The roles and responsibilities of stakeholders, as well as procedures for coordination, should be defined.

8.2.8 Wind sensors and wind direction indicators (wind-socks) should be located in accordance with ICAO standards to provide the best possible indication of runway and touchdown zone conditions.

8.2.9 Ensure appropriate coordination with the meteorological service provider, ATS and aircraft operators to determine the relevance of weather data on a regular basis.

8.2.10 Ensure that runway exits are appropriately named using a sequential sequence of numbers and letters to avoid potential ambiguity.

8.2.11 Information about air operations hazards or specificities in the airport vicinity should be identified and communicated to pilots on the Local Runway Safety Team (LRST), as well as published in an appropriate manner.

8.2.12 Runway condition codes should be compared to pilot-reported braking actions to ensure the accuracy of information provided to pilots.

8.3 Air Traffic Service providers

8.3.1 Whenever a runway change is planned in advance, notify flight crews as soon as possible, including by adding pertinent information in ATIS, where available.

8.3.2 Avoid changing the assigned runway for aircraft on approach or taxiing for departure, as far as practicable.

8.3.3 Accept the flight crew's preference for a runway when requested "due to performance limitations" when operationally possible.

8.3.4 Examine available data (eg occurrence reports, go-around / missed approach data, etc) to identify ATC-related runway excursion contributing factors and relevant mitigations, such as improved airspace design and procedures and ATCO training and procedures. Share the identified runway excursion contributing factors and relevant mitigations at the network level.

8.3.5 Evaluate processes for providing essential information on aerodrome conditions such as weather, wind, and runway surface conditions (for example, when 'wet' or contaminated) to ensure:

- A consistent, timely, and accurate broadcast of aerodrome information,

- The integrity of the essential information supply chain from the source (eg Met Office/Aerodrome Operator) to the user (eg flight crews, ATS, Met Office, aerodrome operator, and AIS provider).

- Relevant operational staff receive training on the use of ATIS/D-ATIS.

- Adherence to the ICAO Global Reporting Format for assessing and reporting runway surface conditions, including training of relevant ANSP personnel.

8.3.6 Ensure that flight crews are informed of the Take-off Run Available (TORA) or Landing Distance Available (LDA) if these differ from the published data using appropriate means. Any alternate runways that may be available should be included in the information.

8.3.7 Participate in runway excursion safety information sharing at the network level to facilitate the free exchange of pertinent information about actual and potential safety deficiencies using just culture principles.

8.4 Aircraft Operators

8.4.1 Participate in networks for sharing safety information with all relevant stakeholders. This should enable the free flow of pertinent runway safety information, such as identified risks, safety trends, and best practises.

8.4.2 Incorporate realistic, evidence- and competency-based scenarios requiring threat and error management for runway excursion prevention during take-off and landing into their training programmes

8.4.3 Establish policies prohibiting flight crews from accepting ATC procedures and clearances that have the potential to reduce the flight crew's safety margins to an unacceptably low level, thereby increasing the risk of runway excursions. This includes procedures and clearances that increase the likelihood of an unsafe approach path management resulting in a safe landing, such as those that expose the aircraft to the risk of being unstabilised at the landing gate or high-energy approaches. These policies should be supplemented by the establishment of effective standard operating procedures and flight crew training. Flight crews should be required to report such risks to their operators via their SMS, and the aircraft operator should report such risks to the ATS via established reporting systems.

8.4.4 Implement policies governing safe descent and approach planning, stabilised approach, safe landing, and go-around, and ensure that these policies are followed during training. Specify which provisions of these policies must be included and highlighted during flight crew approach briefings.

8.4.5 Implement policies or standard operating procedures requiring flight crews not to conduct take-off or approach following any runway change until all necessary set-up, planning, performance calculations (including independent calculations and cross-checks by at least two pilots) and re-briefings have been completed. When a take-off runway change is received while the aircraft is taxiing, the flight crew should perform the above without haste and while the aircraft is stationary.

8.4.6 Every time a runway change is anticipated, probable, or occurs, the briefing should address runway-excursion-related TEM.

8.4.7 Implement policies or standard operating procedures allowing flight crews to request a more favourable runway for take-off or landing for any reason that could jeopardise the flight's safety, and to communicate the safety reasons to ATC.

8.4.8 Implement policies or SOPs requiring flight crews to confirm that the actual conditions (weather and aircraft configuration) are better than or equal to the values used in performance calculations prior to initiating the take-off or landing phase. When operational limitations are predicted, flight crews should be required to identify the limiting parameters and incorporate them into their TEM briefing.

8.4.9 Establish company-specific cross- and tailwind limits for each type of aircraft operated. Additionally, explicit guidance on runway conditions and gust components should be provided. Establish clear policies that allow flight crews to deviate from established limits for safety reasons during actual flight operations.

8.4.10 Issue specific guidance and training to their flight crews regarding crosswind take-off and landing techniques, particularly when the runway is wet, slippery, or contaminated. This should include proper touchdown and stopping techniques that utilise all available control and deceleration devices, as well as TEM topics and methods for effective PM monitoring and intervention.

8.4.11 If available, advice from aircraft manufacturers should be incorporated.

8.4.12 Publish standard operating procedures (SOPs) and guidance that address runway excursion mitigation in connection with rejected take-off decision-making and rejected take-off manoeuvres. Training should be provided in an appropriate manner.

8.4.13 Develop SOPs that include an assessment of landing performance, possibly prior to the top of descent, based on the most current and best-available weather information. This calculation should not be made using weather data from the dispatch centre. Flight crews should be informed of the type of data available for landing distances (factored or unfactored) and the corresponding safety factors. When possible, the crew should complete descent, approach, planning, set-up, and briefings prior to reaching the top-of-descent.

8.4.14 Develop a clear go-around policy, which should be supplemented by a set of standard operating procedures and guidance materials for implementing the policy. Unless an emergency dictates otherwise, this go-around policy should allow any flight crew member on the flight deck to request a go-around at any time.

8.4.15 In all cases, the SOPs should require both pilots to possess and maintain the required visual reference below DA/MDA, with a mandatory go around call if either pilot loses it. Additionally, if the approach becomes unstabilised below the specified approach/landing gate, a go-around should be required.

8.4.16 Recurrent simulator training on safe go-around skills should be provided at various stages of the approach and landing, including just prior to or during touchdown (before activation of thrust reversers).

8.4.17 Require flight crews to conduct a thorough risk assessment prior to selecting/accepting an approach and landing runway, taking into account factors such as weather conditions (particularly cross and tailwind), runway condition (dry, wet, or contaminated/slippery), inoperable equipment and aircraft, and flight crew performance, in order to minimise the risk of runway excursion.

8.4.18 In their operations manual, define stabilised approach, landing, and go-around policies. These policies must be consistent with applicable regulations and manufacturer guidance. Supplemental SOPs should include a requirement for completing the landing checklist and flying at the defined approach/landing gate's final approach speed as soon as possible. These SOPs should include adequate means for the pilot monitoring (PM) to monitor and, if necessary, intervene effectively.

8.4.19 Provide appropriate training to ensure proper implementation of defined policies and procedures.

8.4.20 Publish standard operating procedures and guidance, as well as provide training, emphasising the critical nature of active monitoring and effective intervention by the pilot monitoring (PM) during descent, approach, approach path management, and landing.

8.4.21 The PM's actions and the PF's required responses should be clearly documented in an official publication (eg SOPs or Operations Manual, FCOM, or similar). These publications should include guidance on how to perform effectively as a PM regardless of rank or experience.

8.4.22 Clearly define their policy for safe landings and incorporate it into their standard operating procedures and operations manuals. This policy should clearly define acceptable touchdown limits and prohibit purposefully long and short landings, for example, to reduce runway occupancy or taxi time to the gate. Supplemental standard operating procedures and guidance should include means, methods, and responsibilities for how a crew will identify and act on such limits.

8.4.23 Classroom and simulator training should be provided as necessary.

8.4.24 Publish standard operating procedures and landing technique guidance that are consistent with the ICAO Global Reporting Format and manufacturer's recommendations for all runway states and environmental conditions.

8.4.25 Require their flight crews to always opt for a go-around or diversion over landing when approaching wet, slippery, or contaminated runways with insufficient stopping margin and/or in limiting wind conditions.

8.4.26 Appropriate training, including instruction in the ICAO Global Reporting Format, should be provided.

8.4.27 Publish SOPs instructing flight crews to fully utilise all deceleration means, including speed brakes, wheel braking, and reverse thrust, regardless of noise-related restrictions, until a safe stop is assured, unless this results in controllability issues.

8.4.28 Publish standard operating procedures and guidance, as well as provide training, emphasising the importance of active monitoring, which includes monitoring the activation of stopping devices during landing and effective intervention during landing associated with pilot monitoring duties and performance. Training should be provided in a timely manner.

8.4.29 Implement policies, technical solutions, or standard operating procedures (SOPs) that confirm the aircraft is aligned on the planned runway, its centreline, and via the proper intersection.

8.4.30 Publish SOPs and guidance instructing flight crews not to accept line-up, backtrack, or take-off clearances until pre-take-off preparations (including cabin secure), procedures, and checklists are completed to the point that the associated manoeuvre can be performed without delay and until they report to ATC "ready for departure." Aircraft operators should publish a specific standard operating procedure (SOP) for "rolling take-offs."

8.4.31 Foster a culture that rewards safe behaviour and encourages flight crews to make risk-averse decisions.

8.3.32 Define an unstable approach followed by a landing as a mandatory flight crew reporting event.

8.4.33 Reduce the need to report a go-around due to an unstable approach unless another significant event, such as flap overspeed, occurs during the go-around.

8.4.34 For aircraft equipped with Electronic Flight Bags (EFBs), and where technically feasible, should compare the EFB take-off performance logs to the relative FDM data to identify take-off runway excursion risks.

8.4.35 When technically feasible, aircraft equipped with EFBs should visualise the FULL RWY with their intended TO RWY holding position on the EFB to increase the crew's situational awareness for the intended T/O position.

8.4.36 Consider using observational procedures (eg Line Operations Safety Audits) to identify runway excursion safety risks and best practises that cannot be captured through traditional reporting or FDM.