



SAFETY ALERT 2018-15

Issue 02

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SUBJECT:

PREVENTION OF RUNWAY AND TAXIWAY INCURSIONS

REFERENCE PUBLICATION:

GCAA CAR Part IV

GCAA CAR Part VIII

GCAA CAR Part IX

GCAA CAR Part X

GCAA AMC 22

ICAO ANNEX 19

ICAO Document 9432

ICAO DOC 9870

EAPPRE V3.0 European Action Plan for the Prevention of Runway Incursions

REASON:

Runway and Taxiway Incursions¹ occur when a pilot, driver, or person enters a runway or taxiway as a consequence of a failure to comply with a valid ATC clearance, or compliance with an inappropriate ATC clearance.

The GCAA, through its monitoring and oversight of National Safety Performance Levels within the UAE Aviation Industry, has identified an increasing trend in the numbers of both taxiway and runway incursions.

Due to this recent increase, efforts are now required by all concerned stakeholders to identify root causes, implement appropriate mitigations and to reverse the trend. To that end, the recommendations within this Safety Alert should be implemented as appropriate.

¹ **RUNWAY INCURSION:** 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.

TAXIWAY INCURSION: Any occurrence at an aerodrome involving the incorrect presence of an aircraft, vehicle or person on the taxiway or within the taxiway strip.



The Safety Alert is issued to:

- Ensure that all Aircraft Operators, ANSPs and Aerodrome Operators are applying best practice for the prevention of Runway and Taxiway Incursions, and
- Provide recommendation and guidance on the proactive and preventive measures that should be implemented.
- This Issue 02 of the Safety Alert is published to review actions taken by the industry and planned activities for the coming year.

In most cases, runway/taxiway incursions come from a combination of the above factors, and in which environmental characteristics such as airport layout, procedures and behavioural habits may play a part in inducing a runway/taxiway incursion.

RECOMMENDATIONS:

Recommendation No. 1:

Aircraft Operators (including Air Training Organisation), Aerodrome Operators and Air Navigation Service Providers should conduct a review of their safety management system, including training, procedures and awareness programs, to prevent runway and taxiway incursion. The review should consider the applicable recommendations outlined in this Safety Alert including Appendix I (which includes Typical Runway / Taxiway Incursion Scenarios) and above provided references.

Recommendation No. 2:

Aircraft Operators should:

- a) actively participate in Local Runway Safety Teams to support the promotion of specific joint training and familiarisation in the prevention of runway/taxiway incursions. This may include participation to such equivalent collaborative cooperation at an aerodrome outside UAE.
- b) Ensure that their system collects the most updated and accurate information about the physical characteristics of or other information relevant to every aerodrome they operate from/to (e.g. AIP along with any other pertinent sources that provide more accurate information than the AIP) and ensure that such information is communicated to the concerned staff in a timely manner;
- c) assess how the subject of Runway Safety can be included within initial and recurrent training for their staff and as applicable to the contracted ground personnel.
- d) Ensure that adequate information is collected and derived from all runway/taxiway incursion incidents so that probable causes and contributing factors are identified, resolved, de-identified and disseminated among and used as lessons learned for their staff and as applicable to the contracted ground personnel.
- e) monitor the effective implementation of the applicable radiotelephony phraseologies standards at the concerned aerodrome, and adapt the training and/or procedures accordingly. For aerodrome outside UAE, aircraft operator should realise that those standards may be different from those applicable in the UAE;



- f) monitor effectively the competence of flight crews regarding Stop Bars, Aerodrome signage, markings and lighting, and adapt the training and/or procedures accordingly.
- g) ensure that flight crew procedures explicitly require for ATC clearances to cross any runway. This includes non-active runways.
- h) Ensure that aerodrome charts or equivalent electronic device are easily accessible and used by the flight crew while taxiing. This includes when operating at the home aerodrome.
- i) Review their Crew Resource Management (CRM) capability to promote runway and taxiway safety and enhance the efficiency of flight operations while operating on the ground.
- j) Regularly Review the implemented means that assist flight crews to maintain good situational awareness. Procedures should also support flight crews to maintain a sterile cockpit environment and maintain situational awareness whilst taxiing or during critical stages of operation.
- k) Ensure that flight crews carefully re-prepare their flight following a last minute instruction for runway change issued by ATC.

Recommendation No. 3:

Aerodrome Operators should:

- a) Continuously and actively lead the implementation and maintenance of Local Runway Safety Team (LRST), and the development of runway safety actions. Such action should include foreign aircraft operators too.
- b) Regularly implement local runway safety awareness campaign plans and assess their effectiveness. Such awareness campaign should be to the attention of Air Traffic Controllers, Pilots and ground personnel including persons who permanently or temporarily operate on or near the runway/taxiway. Consider format, method of delivery, frequency and feedback.
- c) Ensure that their system collects the most updated and accurate information about the physical characteristics of or other information relevant to their aerodrome and ensure that such information is communicated to the concerned staff (ATC, Flight crews, ground personnel) in a timely manner;
- d) Ensure that all infrastructure, practices and procedures related to runway operations are in compliance with applicable CAR and associated provisions.
- e) Promote and make available specific training and familiarisation information to flight crews, Air Traffic Controllers and ground personnel for the prevention of runway/taxiway incursions.
- f) Assess how the subject of Runway Safety is included within initial and refresher/recurrent training for their staff and as applicable to the contracted ground personnel.
- g) Ensure that adequate information is collected and derived from all runway/taxiway incursion incidents so that probable causes and contributing factors are identified, resolved, de-identified and disseminated among and used as lessons learned for their staff, ATC, flight crews and as applicable to the contracted ground personnel.
- h) Assess the current arrangements governing changes to manoeuvring area procedures, including works in progress. Consider the complexity of multiple concurrent changes when assessing work plans.
- i) Ensure that signs, markings and lights are clearly visible, adequate, maintained adequately and unambiguous to the users and appropriate for the intended use even in adverse conditions.



- j) Evaluate initial and refresher training and assessment programs of ground vehicle drivers (including practical training and proficiency checks) to increase their awareness and in particular their RTF communications and standard phraseologies competencies. The latter should also apply to other personnel who works on or near the runway/taxiway.
- k) Ensure significant aerodrome information which may affect operations on or near the runway (in addition to that found in NOTAMS and on the ATIS) is promptly communicated to manoeuvring area drivers and pilots.
- l) Apply and actively encourage Team Resource Management (TRM) principles towards their staff while in operations to promote runway and taxiway safety.
- m) Consider the use of ground radar, ground equipment/sensors allowing/facilitating of information to ATC and the fitment of all ground vehicle with Transponders.
- n) Regularly Review the implemented means that assist ground vehicle drivers to maintain good situational awareness.

Recommendation No. 4:

Air Navigation Service Providers should:

- a) actively participate in Local Runway Safety Teams to support the promotion of specific joint training and familiarisation in the prevention of runway/taxiway incursions.
- b) assess how the subject of Runway Safety can be included within initial and recurrent training for their staff and as applicable to the contracted personnel.
- c) Ensure that adequate information is collected and derived from all runway/taxiway incursion incidents so that probable causes and contributing factors are identified, resolved, de-identified and disseminated among and used as lessons learned for their staff and as applicable to the contracted ground personnel.
- d) monitor effectively the compliance and use of Stop Bars, Aerodrome signage, markings and lighting, and adapt the training and/or procedures accordingly.
- e) Assess the current arrangements governing changes to manoeuvring area procedures, including works in progress. Consider the complexity of multiple concurrent changes when assessing work plans.
- f) monitor the effective implementation of the applicable radiotelephony phraseologies standards at the concerned aerodrome, and adapt the training and/or procedures accordingly. Air Navigation Service Providers should realise that standards used by foreign operators may be different from those applicable in the UAE;
- g) If conditional clearances are used in accordance with ICAO provisions, ensure clear procedures are developed and implemented regarding when conditional clearances are considered acceptable.
- h) Ensure significant aerodrome information which may affect operations on or near the runway (in addition to that found in NOTAMS and on the ATIS) is promptly communicated to manoeuvring area drivers and pilots.
- i) Regularly Review the implemented means that assist air traffic controllers to maintain good situational awareness. Procedures should also support pilots to maintain a sterile cockpit environment and maintain situational awareness whilst taxiing or during critical stages of operation.



- j) Consider the implementation of emerging technology that can improve situational awareness and improve safety nets. This could include the implementation of enhanced A-SMGCS functionalities or alternative surveillance technologies.
- k) Ensure that ATC considers the time flight crews require to re-prepare their flight following an instruction for runway change.
- l) Assess runway occupancy status and support the implementation of memory aids considering also the availability of new/emerging technologies.
- m) Develop, implement and continuously review and test, in conjunction with Aerodrome Operator, procedures to identify aircraft or vehicle on the manoeuvring area which becomes lost or uncertain of its position, and immediately prevent the situation from becoming a hazard to other traffic or person.
- n) Continuously Review the runway capacity enhancing procedures when used either individually or in combination (intersection departures, multiple line-up, conditional clearances etc.) to identify any potential hazards and, if necessary, develop appropriate mitigation strategies.
- o) Regularly review Human Machine Interface (HMI), Controller Working Position (CWP) ergonomics and ATC procedures for enhancing the Human Factor and Performance and hence improving the controller 'visual scan' of the manoeuvring area, even during adverse weather conditions.
- p) Apply and actively encourage Team Resource Management (TRM) principles towards their staff while in operations to promote runway and taxiway safety.

Recommendation No. 5:

Aerodrome Operators, Air Navigation Service Providers, and Aircraft Operators should:

- a) Conduct a review of actions and activities taken in response to each applicable recommendation within this Safety Alert
- b) Produce a report detailing:
 - 1) Actions and activities taken in response to each applicable recommendation in this Safety Alert, stating which have been implemented. Also including a justification and/or action plan on any recommendations not yet implemented.
 - 2) Planned actions or activities to address runway and/or taxiway incursions for the next 12 months.
- c) The report in (b) should be a single document provided to the relevant Principal Inspector by 30 September 2022.
- d) The report in (b) should also be presented for discussion, coordination, and implementation at the Local Runway Safety Team (LRST).

CANCELLATION:

This Issue 02 cancels and supersedes Issue 01 dated 13 November 2018.

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APPENDIX I: Typical Runway / Taxiway Incursion Scenarios

Often a misunderstanding or communication breakdown between operational staff (e.g. pilots, vehicle drivers on the manoeuvring area and air traffic controllers) leads to a loss of situational awareness and a subsequent ground navigation error.

In addition, the significant on-going development and expansion projects at UAE airports introduces additional threats, hence increasing the risk of runway and taxiway incursions.

The majority of runway incursions occur during taxiing out and departure operations, whilst the majority of taxiway incursions happen after landing.

Incursions typically occur as a result of:

- Incorrect entry of an aircraft or vehicle onto the protected area (without or contrary to ATC clearance or due to inappropriate ATC clearance)
- Incorrect presence of a vacating aircraft or vehicle onto the runway protected area
- Incorrect runway crossing by an aircraft or vehicle (without or contrary to ATC clearance or due to inappropriate ATC clearance)
- Incorrect spacing between successive arriving, or arriving and departing, or departing and arriving aircraft
- Landing without ATC clearance
- Take-off without ATC clearance

Factors Leading to Runway / Taxiway Incursion:

1. *Misunderstanding* is the most frequently occurring contributory factor to runway and taxiway incursions.

2. *Failing to see or hear information clearly or correctly* is a frequent cause of incursions when left unchallenged.

3. *Communication breakdown*. In today's Air Traffic Management system, compliance with ICAO requirements to use aviation English on the manoeuvring area is a vital safety net. From studies of investigation reports and surveys regarding runway safety occurrences, it is apparent that communication issues are frequently a factor. Examples of communication breakdown on the manoeuvring area include:

- Complex instructions to different aircraft
- Controller high speech rate
- Two different languages



- Frequency congestion / blocked frequency
- Use of non-standard ICAO phraseology by air traffic control
- Callsign confusion
- Poor read-back procedure
- Inadequate aviation English
- Different frequencies associated with runway operations
- Inadequate driver communication training

4. *Incomplete or incorrect read-backs* feature frequently when conditional clearances are used.

Approximately half of all reported runway incursions including a conditional clearance involve an incomplete read-back. Note: It is important to differentiate between an *incomplete* read-back and an *incorrect* read-back.

5. *Conditional clearances on the manoeuvring area*. Limit the use of conditional clearances and the number of subjects being instructed where possible.

6. *Change to an air traffic control instruction near the runway* increases the risk of incursion or other ground navigation error such as a taxiway departure.

7. *Reference to other aircraft in an instruction* is a cause of pilot confusion whether it is by airline name or aircraft type. Certain phrases such as “follow” should be used with care.

8. *Misuse of lighting, e.g. stop bars*, can lead to runway incursions and loss of situational awareness.

9. *ICAO compliant signage* helps to obtain situational awareness on the ground. Consider depictions of hot spots placed near to the working position so that Air Traffic Control can relate to what a lost pilot or driver is seeing.

10. *Transition into and out of Low Visibility Operations* is of significant concern. Low cloud where the visibility under the cloud is good can be misleading, and aircraft exceed their clearance limits into the localiser sensitive area.

11. *Go-around/missed approach events* are a regular feature of runway incursions.

12. *Shift handover* may create information gaps, especially at locations where all handovers are made at the same time, i.e. approach, tower, ground.

13. *Landing Without a valid ATC Clearance*. In the cases of landing without a valid ATC clearance, the subject aircraft had either not been transferred to the Tower frequency, had forgotten to check in on the Tower



frequency when transferred, selected the wrong frequency, or not received the instruction for some reason even though they were on the correct frequency (communication error).

14. Crew involved in take off without a clearance. Preoccupation on the flight deck with departure checks, ATC requests to expedite, airline scheduling constraints, weather considerations, frequency congestion, poor radiotelephony - are just some of the contributing factors to take offs without a valid ATC clearance or compromising departure instructions embedded in the ATC clearance.

15. Works in progress changes the surface of the aerodrome temporarily or permanently. The infrastructure you leave behind at the end of your shift or flight, may be different when you return. Controllers should expect to provide “real-time” significant aerodrome information which may affect operations on or near the runway when NOTAMs and ATIS, which are normally used to advise pilots of significant information regarding runway operations, are not available.