57th CONFERENCE OF DIRECTORS GENERAL OF CIVIL AVIATION ASIA AND PACIFIC REGIONS

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AGENDA ITEM 3: AVIATION SAFETY

RUNWAY EXCURSIONS - CAUSES AND MITIGATION

Presented by India

SUMMARY

Runway excursions are the major contributor for the accidents and the serious incidents and remain the focus area of ICAO Global Aviation Safety Plan (GASP). This paper provides the status of the runway excursions in India and the effective measures being taken for the mitigation of runway excursions.

The paper invites Conference to:

- Consider adoption of collaborative approach for FDA parameters by the States;
- Promote collaborative assessment on safety risks for prevention of runway excursions.

RUNWAY EXCURSIONS - CAUSES AND MITIGATION

1. INTRODUCTION

1.1 Globally, majority of accidents and serious incidents at airports are related to runway excursions and incursions. Runway excursions pose a significant issue for India, particularly during the monsoon season.

1.2 According to IATA 2021 Safety Report, for the period 2017 to 2021, 24% of the accidents involved runway excursion. The report also indicates that majority of these accidents occurred during landing. The report shows the highest accident frequency and fatality risk in the APAC region and indicates regulatory oversight (36%), safety management (34%) and flight operations (28%) as the major contributory factors. Further, report identifies top three crew errors as manual handling (41%), Non-adherance to SOP (31%) and failure to go around from a destabilised approach (24%) and top three threats as Meteorology (48%), Airport Facilities (43%) and Wind Shear/ Gusty winds (33%).

1.3 During the period from 2009 to 2022 (till date), 41% of accidents to scheduled commercial aircraft operation in India are related to runway excursions. Further, 33.3%of these accidents are due to un-stabilized approach wherein the aircraft continued to land and remaining accidents have been attributed to system component failure, wildlife strike and erroneous crew action/non adherence to the SOP after landing, deep landings and compounded by the runway/weather conditions etc. Of these, 22.2% accidents (two accidents) resulted in fatality involving loss of 179 lives.

1.4 During the same period, 9.17% of serious incidents involved runway excursion. Further, 45% of these serious incidents are due to un-stabilized approach where the aircraft continued to land and the remaining serious incidents have been attributed due to erroneous crew action/ non adherence to SOP after landing and have been compounded by the runway/ weather conditions. The data also includes accident/serious incident to foreign registered aircraft operating in India.

1.5 While recognizing the serious consequences of the runway excursions, India, under its National Aviation Safety Plan, has made “Runway Excursion and Overruns” as the Key Safety Priority with an objective to reduce them. The following associated safety indicator are being monitored for achieving the desired objective:

- Unstabilised approach
- Unstabilised approach that continue to land
- Unstabilised approach while precision approach
- Unstabilised approach while non-precision approach
- Unstabilised approach while visual approach
- Near runway excursions
- Runway excursions

1.6 To achieve the desired objective, India has developed a safety action plan in consultation with the stakeholders and taking into considerations the global and regional SEIs developed by ICAO, IATA etc. The safety action plan has been integrated by the stakeholders in their operations.

2. DISCUSSION

2.1 In order to monitor the effectiveness of the safety action plan, data is being collected through mandatory reporting system, voluntary reporting system, flight data analysis programme (FDAP) and analysis of investigation reports.

2.2 All occurrences which conform to the safety indicators for Key Safety Performance Indicator "Runway excursion and overruns" are being investigated.

2.3 Analysis of data indicates following as the common cause for unstabilised approach:

- Aircraft not on profile (Vertical and/or lateral)
- Excessive ROD
- Pilots ignoring GPWS warnings
- In majority of cases, pilots committed to land rather than going around
- Late touchdown with excessive speed
- Long float and long landing

2.4 Analysis of data for the period from 2018 to 2021 indicates that there is 20% increase in the number of un-stabilized approaches wherein the approach has been discontinued and go-around initiated. Although there is a continuous increase in the number of go-arounds during un-stabilized approaches, however, un-stabilized approaches which continue to land pose a risk of a serious incident or an accident.

2.5 Data shows main reasons for an un-stabilised approach as high rate of descent and/ or power management and also identifies the airports which have experienced the most number of un-stabilised approaches.

2.6 India has taken following actions involving regulations, guidance, training of flight crew, and effective monitoring of flight data for exceedance to reduce events of runway excursions attributable to un-stablised approaches:

2.6.1 Regulations/ Guidance:

a) **Operation Circular 6 of 2022:** Instructions for encouraging pilots to go-around in case of un-stabilized approach were initially issued in the year 2013 (Operation Circular 1 of 2013), and criteria and guidance for stabilized approach were issued in year 2017 (Operation Circular 3 of 2017). These guidance have now been incorporated in Operations Circular 6 of 2022 which also provides phase wise guidance for safe operations.

b) **CAR Section 2 Series I Part VII:** Installation of EGPWS has been made mandatory from 1st January 2007on all aircrafts with certified take off mass in excess of 5700 kgs. The requirements are in line with ICAO Standards.

c) **Operations Circular 03 of 2014:** Guidance on all-weather operations training programme.

d) **Operations Circular 09 of 2017:** Approach and Landing Accidents Reduction (ALAR) and Controlled flight into terrain (CFIT) reduction tool kit.

e) **Operations Circular 01 of 2019:** Operation to/from Airports with Performance Limiting Conditions.

f) **CAR Section 4 Series B Part I:** Provision of RESA has been made mandatory. On airports, wherein it is not possible to provide RESA, due to geographical constraints, risk assessment and mitigation measures are enforced.

g) **CAR Section 8 Series C Part I:** All Weather Operations

2.6.2 Training of flight crew with emphasis on the following areas:

a) ALAR, TEM (Threat and Error Management), past and recent accidents/ incidentsreview and mitigation strategies, case studies.

b) Safety lectures with emphasis on benefits/ hazard and risk of stabilized and approaches respectively. Increased emphasis on situational awareness with respect to traffic on approach/departures/taxiing on runways.

c) Safety News Letters - unstabilised approaches where crew continued to land
d) CRM with increased emphasis on coordination between two pilots with respect to traffic clearances given by ATC

2.6.3 Effective monitoring of flight data:

DFDR data of all flights are monitored subject to the limitation of the provisions of MEL. Based on the analysis, corrective actions are taken by the operators which includes counselling/training of flight crew including review of policy and procedures. Amongst other issues, Flight Data Analysis Programme (FDAP) focusses on identifying long landing/ deep landings, long flare, energy state etc. Standardisation of FDA parameters is being undertaken across the fleet of aircraft in the country and has been achieved for B737, A320 and B787 aircraft types. This would ensure uniformity of collection of the safety data and corrective actions.

2.7 Collaborative Approach on Safety Risk Assessment associated with Aerodrome/Runways:

Aerodrome/ runways may present latent risk for excursion due to their physical characteristics, surface conditions, geographical locations, local environment conditions (e.g. seasonal strong winds, excessive rains), topography, obstacle clearance requirements etc. A collaborative assessment by the local runway safety team comprised of the representatives from the aerodrome operator, the aircraft operator, Air Traffic Controller and other stakeholders should identify hazards with respect to runway physical characteristics, implementation of global reporting format (assessment and reporting of runway conditions report), other latent conditions and their resultant reduction in the operating margins.

3. ACTION BY THE CONFERENCE

3.1 The Conference is invited to:

a) Note the information contained in this paper ;
b) Consider adoption of collaborative approach for FDA parameters by the States;
c) Promote collaborative assessment on safety risks for prevention of runway excursions.

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