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ACTION FOR PREVENTION OF RUNWAY EXCURSION: AN IDENTIFIED GLOBAL-HIGH RISK CATEGORY OF OCCURRENCES

(Presented by India)

EXECUTIVE SUMMARY

Runway excursions are a major contributor to aviation accidents and serious incidents, making it a key focus of the ICAO Global Aviation Safety Plan (GASP). This paper outlines the status of runway excursions in India and the measures being implemented to mitigate their occurrence and effectiveness of the controls.

To enhance aviation safety, India actively monitors safety performance indicators, including unstabilized approaches, runway conditions, and discrepancies in reported winds. To address these risks, regulatory measures have been enforced, pilot training programs have been strengthened, and utilization of flight data analysis program to minimize runway excursions. Additionally, collaborative assessments of aerodromes/ runways are conducted to identify and mitigate latent hazards, ensuring safer flight operations.

<i>Strategic Goals:</i>	This working paper relates to <i>Every Flight is Safe and Secure</i> .
<i>Financial implications:</i>	Not applicable
<i>References:</i>	Doc 10004, 2020-2022 <i>Global Aviation Safety Plan</i> ICAO Safety Reports

1. INTRODUCTION

1.1 Runway excursions are one of the significant categories of aviation accidents occurring globally, posing serious risks to passengers and causing substantial damage to aircraft. A runway excursion happens when an aircraft unintentionally leaves the designated runway during landing or take off, either by veering off the sides or overrunning the end.

1.2 The ICAO Global Aviation Safety Plan recognizes runway excursions as a global high-risk category of occurrence (G-HRC) and has identified various safety enhancement initiatives (SEIs) to mitigate

the associated risks. According to annual ICAO Safety Reports, it has been established that 12 per cent of scheduled aircraft accidents between 2017 and 2023 involved runway excursions, resulting in 119 fatalities (<https://www.icao.int/safety/pages/safety-report.aspx>).

1.3 While recognizing the serious consequences of the runway excursions, India, under its National Aviation Safety Plan, has identified “runway excursion” as the one of the national high-risk category of occurrences (N-HRCs) with an objective to reduce them. To achieve the desired objective, India has formulated a safety action plan in collaboration with stakeholders, incorporating global and regional SEIs to mitigate the risk of runway excursion.

2. DISCUSSION

2.1 Runway excursions: Accidents and serious incidents in India

2.1.1 During the period from 2014 to 2024, 32 per cent of accidents in scheduled commercial aircraft operation in India are attributed to Runway Excursions wherein, 16 per cent accident (one accident) resulted in 21 fatalities. Further, 47 per cent of these accidents are due to un-stabilized approach wherein the aircraft continued to land while remaining accidents have been attributed to wildlife strike, non-adherence to the standard operating procedure (SOP) pilot handling issue, loss of situational awareness and compounded by the runway/weather conditions etc.

2.1.2 During the same period, 8 per cent of serious incidents to scheduled commercial aircraft operations in India attributed to Runway Excursions. Further, 44 per cent of these serious incidents are due to un-stabilized approach where the aircraft continued to land while 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.

2.2 Runway excursions: One of the national high-risk category of occurrences

2.2.1 While recognizing the serious consequences of the runway excursions, India, under its National Aviation Safety Plan, has identified “runway excursion” as the one of the N-HRCs with an objective to reduce them. The following associated safety performance indicators are being monitored for achieving the desired objectives:

- a) unstabilized approach that continue to land;
- b) unstabilized approach while precision approach;
- c) unstabilized approach while non-precision approach;
- d) unstabilized approach while visual approach;
- e) near runway excursions;
- f) runway excursions;
- g) percentage of aerodromes using instruments for runway surface condition reporting; and
- h) number of reports pertaining to difference between air traffic services (ATS)/ meteorological (MET) reported winds and aircraft system reported winds.

2.2.2 To achieve the desired objective, India has formulated a Safety Action Plan in collaboration with stakeholders, incorporating global and regional SEIs developed by ICAO. DGCA India also acknowledges the Global Action Plan for Prevention of Runway Excursion (GAPPRE) and has formulated SEIs tailored to the country specific operational context. Stakeholders have effectively integrated this safety action plan into their operations.

2.3 **Performance monitoring based on safety action plan**

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

2.3.2 According to accident/ incident investigation reports, the most common cause of runway excursions was **unstabilized approaches**. Analyzing FDAP data from Indian scheduled airlines revealed that the two most common reasons for unstabilized approaches were:

- a) high rate of descent; and
- b) high approach speed

2.3.3 Analysis of FDAP data for the period from 2014 to 2024 indicates that there is 67 per cent increase in the number of un-stabilized approaches wherein the approach has been discontinued and go-around was initiated. It shows that 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 high risk of serious incident or an accident and remains a safety concern.

2.4 **Action taken by India**

2.4.1 Regulations/ Guidance issued:

2.4.1.1 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.

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

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

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

2.4.1.5 Aerodrome Advisory Circular 01 of 2021: Runway Surface Condition Reporting Format using Standard Runway Condition Report (RCR).

2.4.1.6 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.

2.4.1.7 CAR Section 8 Series C Part I: All Weather Operations

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

2.4.2.1 ALAR, TEM (Threat and Error Management), past and recent accidents/ incidents review and mitigation strategies, case studies.

2.4.2.2 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.

2.4.2.3 Safety newsletters - unstabilized approaches where crew continued to land.

2.4.2.4 CRM with increased emphasis on coordination between two pilots with respect to traffic clearances given by air traffic control (ATC).

2.4.3 Effective monitoring of flight data:

2.4.3.1 FDAP data of all scheduled commercial flights are monitored subject to the limitation of the provisions of MEL. Based on the analysis, corrective actions are taken by the operators, if any, which includes counselling/training of flight crew including review of policy and procedures. Amongst other issues, 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 B787, B737, A320 family and ATR72 aircraft types. This would ensure uniformity of collection of the safety data and corrective actions.

2.4.4 Collaborative approach on safety risk assessment associated with aerodrome/runways:

2.4.4.1 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.

2.5 As a result to effectiveness of the aforementioned mitigation measures, no runway excursion-related accidents to scheduled airlines have occurred in India over the past four years. Additionally, it is noteworthy that no serious runway excursion incidents have been reported to scheduled airlines in the last two years.