**ELEVENTH MEETING OF THE REGIONAL AVIATION SAFETY GROUP - ASIA AND PACIFIC REGIONS (RASG-APAC/11)**

*(Video Teleconference, 25-26 November 2021 at 10:00-13:00 hrs. Bangkok Time, UTC+7)*

**Agenda Item 4: ICAO / Member State / Industry Presentations**

# Sharing experience of selection and management of High Risk Category (HRCs) – focusing on international air operators

*(Presented by Republic of Korea)*

**SUMMARY**

In 2020, the Korean CAAs and its airlines selected 11 High Risk Categories (HRCs) regarding aircraft operations based on safety data analysis and global safety reports. We also set HRC as High-risk Low-frequency SPIs and prepared leading indicators for each HRC. Through this paper, we would like to share the latest information and experiences on safety management activities related to HRCs in Korea.

## 1. INTRODUCTION

1.1 The vision of the GASP is to achieve and maintain the goal of zero fatalities in commercial operations by 2030 and beyond. GASP says a series of HRCs need to be addressed to mitigate the risk of fatalities

1.2 In order to identify HRC, Korean CAA and its airlines conducted risk analysis and risk assessment for about 2,800 safety data including aircraft accidents, serious incidents, and incidents submitted through safety reporting system to derive safety risk profiles. Since Republic of Korea has no fatal accident for 8 consecutive years since 2014, we also include non-fatal accidents data into the analysis. We also referred ICAO GASP and Asia-Pacific RASP to reflect global and regional operational safety risks.

## 2. ROK'S HRCs REGARDING AIRCRAFT OPERATIONS

2.1 ROK's HRCs regarding aircraft operations are as follows.

a) Runway Excursion (RE)

b) Runway Incursion (RI)

c) Loss of Control (LOC)

d) Controlled flight into Terrain (CFIT)

e) Mid-air Collision (MAC)

f) Injuries in-flight

g) High Speed Rejected Take-off

h) Abnormal Runway Contact (ARC)

i) Ground Collision/Damage

j) Fire/Smoke

k) In-flight Engine Shutdown

2.2 RE, LOC, CFIT and MAC are global and regional HRCs included in ICAO GASP and Asia-Pacific RASP, and although no such case has occurred in ROK, they are selected as national HRCs in consideration of global and regional safety trends.

2.3 RI and Injuries in-flight are the most relevant HRCs to aircraft accidents and serious incidents of ROK. In the case of RI, there have been 4 cases in the last five years, mainly landings on unauthorized runways, and Injuries in-flight were mostly cabin crew injuries caused by turbulence and 5 cases have occurred in the last five years.

2.4 High-Speed RTO is one of the Key Risk Factors in Korea and is newly added to the HRC in 2021. Until last year, all RTOs had been managed as low-risk occurrences, but RTOs conducted at speeds exceeding 80 to 100kts are classified as High-Speed RTOs and are managed separately, considering that hazard, potential consequences and risks differ depending on the speed at the time of aborting take-off.

2.5 ARC and Ground Collision/damage tend to occur approximately 1 case a year, but it is analysed to have a high correlation with the pilot's human performance. During COVID19 pandemic, considering reduced recent experiences, Republic of Korea is trying to intensively managing these HRCs to prevent related trends from increasing.

2.6 In the case of Fire/Smoke, about one occurrence every year, and it is caused by various causes such as fire of portable auxiliary batteries possessed by passengers and shortage of lamp in the cabin due to the wiring design. IFSD tends to decrease significantly from 3 to 5 cases every year to 0 cases in 2021.

## 3. RISK MANAGEMENT OF HRCS

3.1 In order to effectively reduce operational safety risks and prevent relevant occurrences, the Korean CAA and the aviation experts from 11 airlines formed T/F, discover matters requiring pre-emptive safety enhancement activities for each HRC, and adopt them as leading indicators. The Korean CAA have developed a list of leading indicators discussed in the T/F as a guideline for airline industry and distributed them to airlines. The airlines established and are implementing their own leading indicator action plans customized for their size, complexity and recent safety performance.

3.2 Leading indicators for HRCs includes flight and ground training for aviation personnel, optimization of maintenance program, revision of manual/procedure, risk-based safety audit, safety promotion and etc. Examples of specific leading indicators are in the Appendix 1.

3.3 The Republic of Korea selects HRCs as High Severity Low Frequency (HSLF) SPI, monitors their safety trends every month. In conjunction with the national risk based oversight system, such as adjusting the numbers and timing of inspection activities are taken when areas that exceed safety performance targets or deteriorating safety performance are observed.

## 4. ACTION BY THE MEETING

4.1 The Meeting is invited to take note the ROK's HRCs and its leading indicators to effectively manage the safety operational risk and prevent relevant occurrences and share the information and experiences regarding each states' safety activities.

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## Appendix 1. Example of leading indicator guideline for HRCs

| HRC | Leading indicators | | Target (Number of implementation per year) |
|---|---|---|---|
| RE | Flight training | Landing with Gust or Max Crosswind speed including de-crabbing manoeuver | X times |
| | | Auto landing with yawing system malfunction | X times |
| | Ground training | Aircraft performance and landing distance calculation | X times |
| | Manuals/ Procedures/ Practices | Update A/V training material for each destination airports including Runway/taxiway information and making them available for all flight crew | X times |
| | Aircraft maintenance | Review maintenance reliability program data and, if necessary, adjust the maintenance task regarding;<br>a) Anti-skid system<br>b) Auto-braking system | X times |
| RI | Flight training | Ground manoeuvring with situations such as low visibility, complicated communication under similar call-sign, etc. | X times |
| | Ground training | Flight crew CRM with landing runway change situation | X times |
| | | Request ATC Assistance for turbulence avoidance | X times |
| | Manuals/ Procedures/ Practices | Revise In-flight checklist<br>Double check when landing runway is changed during flight | By the end of 2021 |
| | | Analyse wrong runway/taxiway vulnerability (Hot Spot) trend for each airports and update hot spot information periodically<br>Information sharing among flight crew and dispatchers | X times |
| | Safety Audits | Pilot proficiency assessment<br>- Ground moving speed and standard callout<br>- Runway/Taxiway awareness | X times |
| | Safety Promotion | Campaign – Stop and Confirm | X times |
| Injuries in-flight | Flight training | Joint-CRM training : Windshear avoidance during flight with dispatcher | X times |
| | Ground training | Weather radar characteristics and performance | X times |
| | Manuals/ Procedures/ Practices | Revise Cabin crew manual<br>- Encountering Turbulence, Cabin crew Sit down First procedure | By the first half of 2021 |

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|---|---|---|---|
| | | Analyse severe turbulence region | X times |
| | Aircraft maintenance | Review maintenance interval of service cart rocking | By the first half of 2021 |
| | Safety promotion | Campaign - Cabin crew Sit down First | X times |
| Ground Collision/Damage | Flight training | Ground movement at low visibility condition | X times |
| | Ground training | For pilots – Circling radius per each aircraft model with visual training aids | X times |
| | | For ground service providers – Collision avoidance training | X times |
| | Manuals/ Procedures/ Practices | Dispatch sufficient wing guards | By the first half of 2021 |
| | | Do not move unless having confidence on sufficient separation distance<br>- If possible, request confirmation with ATC or ground staff | By the first half of 2021 |
| Abnormal Runway Contact | Flight training | Upset Recovery Training including T/O, L/D, Bank angle at cross and tail wind conditions (including manual operations) based on Flight Data Analysis and CBT | X times |
| | Manuals/ Procedures/ Practices | Develop proper flight intervention guide for Instructors during Operation Experience (OE) flights | By the end of 2021 |
| | | Flight data analysis on unstable approach and precursor events for each pilot | At all times |
| | Safety audit | Standard Call-out for unstable approach | X times |
| High Speed RTO | Flight training | High speed RTO simulation training<br>- e.g. fire alarm occurs over 100kts | X times |
| | Ground training | RTO Decision making with ground speed of above 80-100kts to V1 based on Pilot Operations Manual | X times |
| | Manuals/ Procedures/ Practices | Before takeoff, double check of takeoff configuration | By the first half of 2021 |
| | Aircraft maintenance | Analyse maintenance data and identify any system that may cause high speed RTO including but not limited to;<br>- Fire protection<br>- Engine<br>- Predictive windshear warning<br>Review maintenance reliability program and adjust maintenance task | By the end of 2021 |

*Note – The above means to be implemented in addition to the legal requirements.
** All airlines registered in ROK are required to develop both leading indicators and implementation action plan of their own. The target frequency can be depending on each airlines' size, complexity and their safety performance.