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ASSEMBLY — 39TH SESSION

TECHNICAL COMMISSION

Agenda Item 33: Aviation safety and air navigation monitoring and analysis

SHARING EXPERIENCE IN USING TOOLS FOR SAFETY MANAGEMENT

(Presented by the Republic of Korea)

EXECUTIVE SUMMARY

According to the Annex 19 - Safety Management, the regulators and the service providers are required to conduct reactive and proactive safety management. Even though the Standard and Recommended Practices (SARPs) related to this subject were introduced since the early 2000, the Safety Management System (SMS) for service providers related to Annex 11 – Air Traffic Service and Annex 14 - Aerodrome, it is still a challenge because of its newly introduced methodologies in managing safety. The Republic of Korea (ROK) believes that sharing information and experience related to this issue is essential for further improvement. This information paper shares experience of the ROK in developing safety management tools related to Safety Risk Management and Safety Assurance for the State Safety Programme (SSP) and the SMS.

The Assembly is invited to note the information and experiences of the ROK included in this information paper and further to consider introducing these experiences in the relevant document of the ICAO.

<i>Strategic Objectives:</i>	This working paper relates to Safety Strategic Objectives.
<i>Financial implications:</i>	Not applicable.
<i>References:</i>	Annex 19 – Safety Management, 2nd Edition Doc 9859 – Safety Management Manual, 3rd edition

1. INTRODUCTION

1.1 The State Safety Programme (SSP) and the Safety Management System (SMS) are still challenging subjects for the Member States and service providers as they are requiring new methodologies for managing safety. In this regards, supporting materials such as effective tools could be helpful for States and service providers to understand and implement SSP and SMS more effectively.

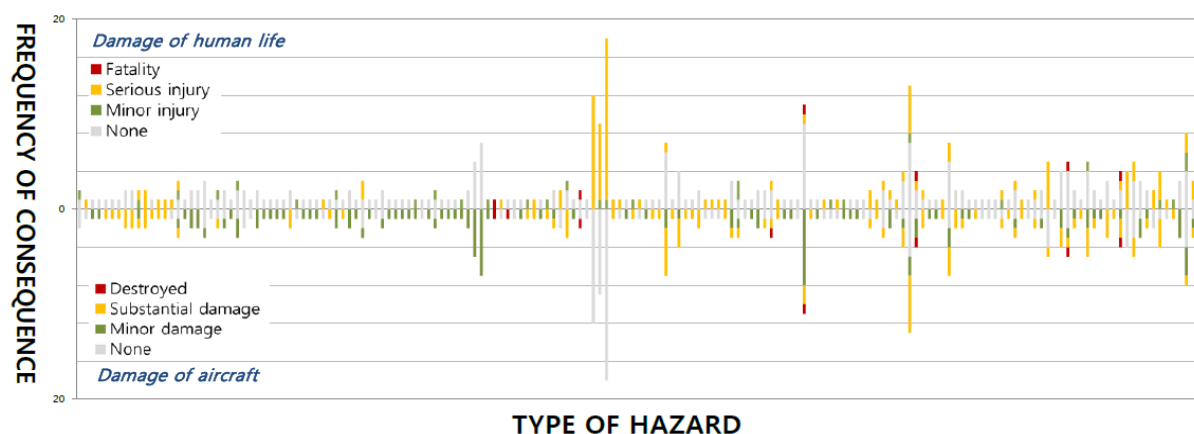
1.2 Therefore, the Republic of Korea (ROK) is trying to develop some useful tools for regulators and the service providers to support successful paradigm shift in safety management. This information paper is to share experience of the ROK in developing tools for safety management.

2. HAZARD-RISK CHROMATOGRAPHY

2.1 Doc 9859 – *Safety Management Manual*, 3rd Edition introduces the safety risk assessment matrix as a methodology for safety risk assessment. It shows the probability, severity and tolerability of a single type of safety risk, at a glance. However, this risk assessment matrix does not identify the details of the risk, such as fatalities or destruction of aircraft, which are the most important safety indicators for the most Member States.

2.2 To resolve this problem, the ROK has developed a new tool for risk assessment which shows the severity of damage of human life and aircraft, separately. The newly developed tool, named as hazard-risk chromatography, presents the distribution of severity by each hazard in a stacked bar chart, as the Figure 1. The three main components of this figure are the likelihood of consequence, the severity of consequence in aircraft damage and human life of each hazard. To get multiple trends of each hazard, the principle of chromatography was applied. The different color of each bar indicates the severity of damage of human life and aircraft. As the hazard-risk chromatography shows the risk of various different types of hazard at a glance, it is easy to prioritise them for remedial actions.

*Figure 1 Hazard-risk Chromatography*¹



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3. **GAP ANALYSIS FOR CONTINUOUS IMPROVEMENT OF THE SMS**

3.1 Service providers having Safety Management System (SMS) are required to monitor and assess its SMS processes to maintain or improve its overall effectiveness. Continuous improvement of SMS is related to the maturity and effectiveness of the SMS. Internal evaluations and audits could be conducted to achieve the goal of this element.

3.2 Related to this element of the SMS, a gap analysis checklist for assessing the maturity of the SMS was developed. The purpose of this gap analysis is identifying gaps in terms of resource distribution of each activity in SMS. Through this information paper ROK is able to share only the methodology of this gap analysis as each organization has its own typical SMS.

3.3 Appendix 1 is an example of the gap analysis checklist, developed by a pilot project, focused on air transport operator. The items for the checklist should be identified initially through discussion with SMS specialists within its organization. In addition, the expectation of importance of each item should be prioritized. Table 1 used the elements and factors included in basic SMS, Operation (actual operation, training) and culture as the source of the items on the checklist.

3.4 For the next step, items for each source, having the highest priority, should be selected to be included in the checklist with weighted value number. With the finalized gap analysis checklist, a survey is required to be conducted targeting personnel responsible for the SMS. The gap of each item, expressed as a number, could be a reference indicating the tolerability of corrective action.

4. **CONCLUSION**

4.1 The safety of international aviation could be improved with effective sharing of information and experience among Member States and stakeholders. The action item of this paper is to note the information and experience of the ROK and consider introducing these experiences in the relevant document, for example the upcoming edition of Doc 9859 - Safety Management Manual.

APPENDIX
EXAMPLE OF A GAP ANALYSIS CHECKLIST
FOR CONTINUOUS IMPROVEMENT OF THE SMS

Item (Tier 1)	Weight1 (W1)	Sub-item (Tier 2)	Weight2 (W2)	Total Weight (T=W1×W2)	Result of Survey (R)	Total Value (T-R)
SMS Activities	0.355	Activities of the Safety Committee	0.203	0.072		
		Effectiveness of safety reporting procedure	0.223	0.079		
		Effectiveness of safety reporting analysis	0.203	0.072		
		Effectiveness of Fatigue Risk Management	0.371	0.132		
Actual Operation	0.176	Operation on New Routes	0.114	0.020		
		Increase of Irregular operation	0.417	0.073		
		Significant Weather Condition	0.289	0.051		
		Management of Flight Schedule	0.180	0.032		
Education /Training	0.226	Frequency of Safety Training	0.417	0.094		
		Adequacy of Flight Operation Training	0.184	0.042		
		Rate of Operation of the Flight Training Devices	0.209	0.047		
		Introduction of new Flight Training Devices	0.191	0.043		
Culture	0.243	Effectiveness of Safety Communication	0.362	0.088		
		Maturity of Just Culture	0.359	0.087		
		Attitude of Management personnel	0.146	0.036		
		Effectiveness of Sharing safety information	0.133	0.032		
Total				1.000		

Remarks. The tolerability of the corrective action could be determined as follows:

*One standard deviation: $0.9408 \leq \text{Total Final Value} < 0.9704$: Attention

**Two standard deviation: $0.9112 \leq \text{Total Final Value} < 0.9408$: Caution

***Three standard deviation: $\text{Total Final Value} < 0.9112$: Warning

****MAX Deviation: +/- 20%