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Korea's Aviation SAFETY Manual: Discussion on Earthquake and Flood Damage

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Abstract

Until now, there has been a number of cases of aviation accidents occurred in Korea, such as the kidnapping case of Changrang-Ho by North Korea(1958), KAL YS-11 kidnapping case(1969), KAL F-27 kidnapping case(1969), KAL B727 attempted kidnapping(1985), KAL KE858 Air Explosion Case(1987), KAL B747 attempted kidnapping(1988), KAL 388 attempted kidnapping(1993), etc.

In response to such accidents, the South Korean government allowed air security personnel to carry weapons, along with the uniformed police officer after the 1969 aircraft kidnapping case and has allowed the petition police to carry out the work of aviation security personnel since 1970. Also, it introduced a new system in which security personnel board the aircraft by a visa agreement with the United States in 2008.

Therefore, under the influence of the Air Marshall system of the United States, in the case of airline flights suspected of terrorism in Korea, security personnel are confidently carrying on counter-terrorism work within the aircraft, and such aviation security services are also being studied in academia.

However, as humankind is experiencing an increasing number of national emergencies due to natural disasters compared with the past, the study of the occurrence of aviation safety accidents caused by earthquakes and storm and flood has not been conducted yet. So, in this study, I would like to introduce and discuss Korea's aviation safety manual for earthquake and storm and flood accidents.

[Keywords] Aviation Safety, Airport, Crisis Management, Earthquake, Storm and Flood

1. The Need for Study

The dangers of the past were external threats, mainly from nature, such as floods, droughts, earthquakes, and epidemics, but today's risks are derived from the inherent risks, such as climate change, radiation exposure, environmental destruction, bird flu, foot and mouth disease, threats of nuclear weapons, and aviation terrorism which are caused by the progress in industry and technology. Also, today's dangers are neither directly visible nor directly perceived. Because risks unable to perceive directly are difficult to predict and uncertain, the public is easily overwhelmed by collective anxiety[1].

Safety ignorance in Korea has been deeply formed in our hearts because the safety education from the university to the industrial fields has not been properly implemented in the midst of high growth from the 1960s to 1980s. By doing research and doing business with unfounded vague expectations that it will be just fine, and accumulated such poor practices caused a series of accidents like a collapse of buildings and bridges that would endure for 100 years, the aircraft crashed, ships sank, the trains derailed, and city gas exploded. Also, due to frequent incidents related to industrial accidents, it was reported that workers were exposed to toxic substances so that they became sick or lost their

lives at factories that deal with hazardous materials.

The threat to aviation safety that can result from this safety ignorance can possibly lead to a major accident even with a small mistake so the management of aviation safety is very important. It is almost impossible to convert the loss cost caused by aircraft accident to economic value because it leads to loss of cost, social and economic loss, degradation of public morale, distrust of the government, and the diplomatic breakdown of national status, as well as dozens of casualties which could up to hundreds of. Nevertheless, small

and medium-sized aircraft accidents have continued to occur since the launch of the civil aviation business in 1969.

Thus, this study aims to introduce and discuss Korean aviation safety manual for earthquake and storm and flood accidents.

2. Analysis of Preceding Studies

The following <Table 1> summarizes preceding studies related to aviation safety in Korea.

Table 1. Analysis of preceding studies.

Researcher	Contents
Lee (2001)	As part of efforts, such as establishing fundamental policies on aviation safety of the government and arranging airline's institutional devices based on aviation safety policy, to reduce airline accidents caused by airlines, National Airlines claims to be able to help strengthen its foreign competitiveness[2].
Kim (2008)	The results that caused by the path dependence of the Korean civil aviation safety management system and the institutional changes suggest that it is a desirable policy agreement of the civil aviation safety management system in the future [3].
Kim (2012)	It is argued that the legal and institutional supplement that prioritizes aviation safety from the airport development stage is necessary because it may reduce air traffic accidents further if the airport or airport facilities are good enough to guarantee the safety[4].
So & Lee (2014)	It is claimed that the appropriate resources are allocated for aviation safety activities and safety management skills should be kept through employee education and training, and the performance-based inspections such as assessing the achievement of safety objectives and risk assessment should be accompanied with the inspection of safety standards and procedure conduct[5].
Im & Han & Lee (2015)	In order to improve the safety of the aviation industry, it is necessary to construct a proactive and active preventive system, for this, it is necessary to integrate, share, and actively utilize the related database[6].
Chang (2015)	It argued that the government should not spare the effort to form an atmosphere in which the safety culture is settled by thoroughly carrying out education targeting airline operating site along with the improvement of the system[7].

3. Aviation Safety Concept

3.1. The concept of aviation safety

Without defining the terms of aviation safety separately. The Chicago Convention, as well as the domestic aviation regulations stipulate international aviation safety standards. Aviation safety is a compound word that combines 'aviation' and 'safety'.

There are three important risk factors that impede aviation safety, including a state in which there is no risk of human injury or material damage, a state in which the degree of risk is reduced to an acceptable level, and a state in which the risk factor can be controlled.

3.2. Aviation safety accidents

The International Civil Aviation Organization(ICAO) defines the aviation safety accident as all accidents involving that aircraft and caused by the operation of the aircraft, such as death and injury of people or damage to an aircraft between the time when the aircraft is taken off, the flight crews or passengers boarded, and until the passengers got off the aircraft. More than half of all aviation accidents occur at the flight phase of takeoff and landing, often caused by one or more complex factors.

4. Aviation Safety

4.1. Earthquake crisis response manual

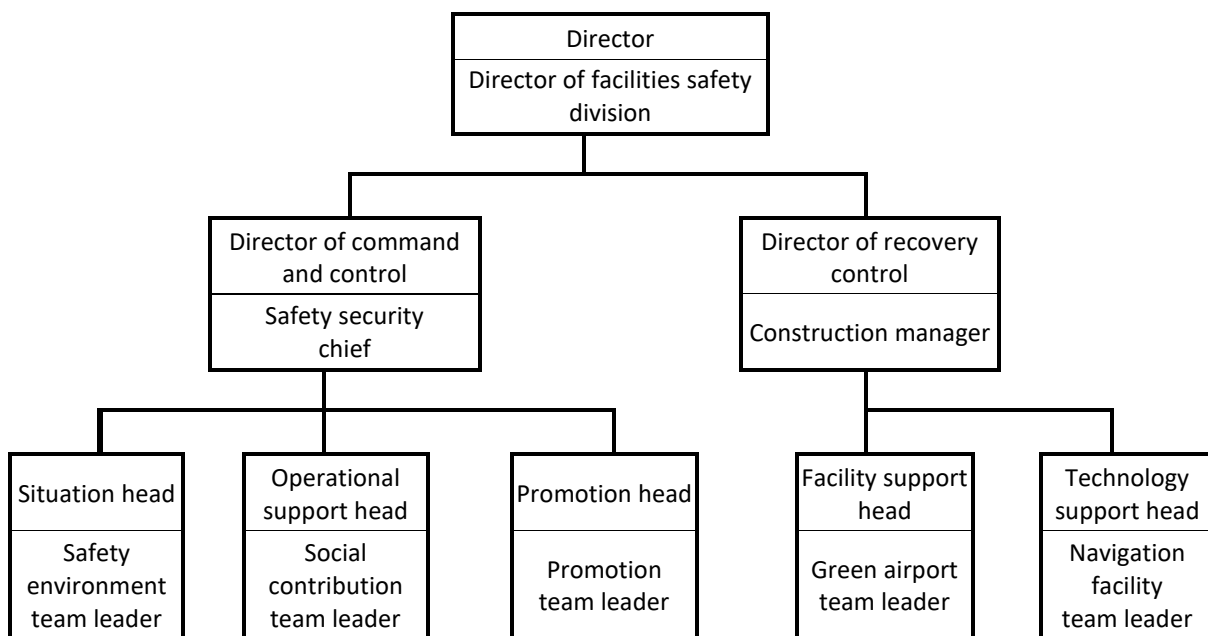
The purpose of this manual is to minimize damages with a systematic and prompt response by defining the mission, role, and action of headquarters and branch offices when an earthquake occurs.

This manual is applied to the activities of the Korea Airports Corporation headquarters

and branch offices to deal with the earthquake which causes a large-scale damage or concerns of the possible damage, but it is excluded in case of a tsunami.

In the case of a crisis, when a large-scale airport facility is damaged by a strong earthquake, it is aimed at quickly responding to the situation and minimizing the scale/scope of the damage by early detection. As a response to rapid emergency response measures for rapid propagation of situations, identification of damage situations, rapid decision-making, and prevention of secondary damage, the disaster and safety countermeasures headquarters perform the tasks as shown in <Figure 1> to ensure the establishment of means of communication between disaster situations and related agencies and maintenance of communication system, quick configuration and operation of the headquarters situation section and branch accident investigation headquarters, and rapid identification, reporting, and response of damage scope and scale.

Figure 1. Earthquake disaster prevention headquarters.



4.2. Storm and flood crisis manual

This manual intends to minimize the damage with a systematic and prompt response by defining the duties, roles, and measures of the respective departments when a major disaster occurs or concerns with typhoon and heavy rain, and has a legal basis in 「Disaster and Safety Management Basic Law」, 「Natural Disaster Countermeasures Act」 and 「Meteorological Law」. The scope of application covers the preparation and response

activities of Korean airlines related to the implementation of storm and flood disaster crisis management operations and applies to situations where large-scale damage or concerns take place due to the occurrence of storm and flood damage.

In the form of a crisis, alarms are divided into the stages shown in <Table 2> below when the damage to airport facilities due to typhoons and heavy rains and the situation where the operation of the airports may be interrupted.

Table 2. Storm and flood hazard crisis alarm level.

Stage	Judgment standard	Remarks
Attention (Blue)	- Period during which typhoons or heavy rainfall occur frequently - When typhoons are likely to affect Korea	- Sign observation activity
Caution (Yellow)	- When there is a possibility of a disaster occurring as the announcement of a storm or a storm special warning or warning	- Meteorological observation and forecast monitoring - Operation of cooperation system - Operation of situation section
Warning (Orange)	- When a typhoon / heavy rain warning is issued and there is a high possibility of a disaster	- Preparation planning check - Operation of the situation section
Critical (Red)	- When a typhoon/heavy rain warning is issued and when a disaster is likely to occur or a disaster occurs	- Immediate response - Operation of disaster prevention headquarters

Crisis alarms can be issued locally, regardless of the order. The goals of the response aim at preventive activities, rapid detection of the situation, and initial measures to minimize damage scale and scope with the measures of disaster prevention facility inspection, maintenance, and restoration material acquisition, stockpiling, prompt informing the relevant institutions and airport users, identification of damage situation, quick decision making. Rapid emergency response measures to be taken to prevent secondary

damage include the responding through the inspection and refurbishment of vulnerable facilities against disasters, the establishment and operation of storm and flood countermeasures, the establishment of communication means between related agencies, the maintenance of cooperation system, the rapid identification and response of damage range and size, restoration of airport function and minimization of facility damage, the Disaster Prevention Headquarters is carrying out the tasks as shown in <Figure 2>.

Figure 2. Storm and flood disaster prevention headquarters.



5. Discussion

As there has been a sharp rise in the number of international travelers every year, the number of passengers on the airplane is steadily increasing in Korea. With the prospect of increased use of air traffic, it has been used at home and abroad for an air raid, terrorism, aircraft abduction, etc, which poses a serious threat to the safety of passengers and air navigation[8].

Accordingly, South Korea plans to establish six strategies and implement data-based aviation safety management system. In order to do this, the system of non-punishment and confidentiality protection for unintentional matters will be introduced to enable active data collection. It also establishes the national aviation safety program by setting up national safety indicators and constant monitoring. For airline companies, it tries to eliminate risk factors by the introduction of a safety investment disclosure system and the continuous measurement of safety culture. It is said that the safety of airplanes will be up-

graded by introducing voluntary safety culture participation and introducing a safety assessment system for airline and disclosing evaluation results to the public.

In addition, it will build an aircraft certification system at the level of advanced countries and expand the aviation safety agreement with the system capabilities such as aircraft failure reporting, defect analysis and risk analysis to improve the aircraft certification and maintenance system. Finally, in order to keep pace with the rapid growth of the air transportation industry, it is preparing to build capacity-based training and evaluation systems based on the recommendations of the International Aviation Organization for manpower management and capacity building for aviation personnel through demand forecast analysis.

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