60th CONFERENCE OF DIRECTORS GENERAL OF CIVIL AVIATION ASIA AND PACIFIC REGIONS

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AGENDA ITEM 3: AVIATION SAFETY

AIRPORT EQUIPMENT CERTIFICATION MANAGEMENT SYSTEM IN CHINA

(Presented by the People's Republic of China)

Summary

Given that airport equipment such as Ground Service Equipment (GSE) and visual aid lighting has a direct impact on airport operations and flight safety, China has established a stringent standard certification and access approval system, requiring that all airport equipment must be certified prior to being used at airports. This paper analyzes the potential impact of various types of equipment on safety, points out the challenges brought by technological advancement in airport equipment, and calls on States to prioritize the safety management of airport equipment so as to ensure the stable operation of airport equipment across States and jointly safeguard the safe development of civil aviation airports in the Asia-Pacific region.

AIRPORT EQUIPMENT CERTIFICATION MANAGEMENT SYSTEM IN CHINA

1. INTRODUCTION

1.1 Airport equipment is closely related to the smooth operation of airports and flight safety. To ensure that airport equipment is safe, reliable, stable and applicable, China strictly enforces certification management of safety standards for such equipment. Uncertified airport equipment is not permitted for use at airports in China.

1.2 The airport equipment that requires safety certification mainly includes: Ground Service Equipment (GSE) such as passenger boarding bridges, catering trucks, and lift platforms; visual aid lighting such as approach lights, PAPI, runway lights, taxiway lights; and systems and equipment related to airport operational safety, such as passenger baggage handling systems, FOD detection equipment, and coefficient of friction test equipment.

1.3 In terms of the airport ground service equipment, there is a globally widespread risk of aircraft damage caused by ground collisions, which compromises flight safety. Related events include unexpected movement of lift equipment damaging aircraft, passenger boarding bridge adjustments causing harm to aircraft cabin doors, instability of airport power and air supply equipment, as well as collisions between various ground service equipment (GSE) and aircraft during approach operations. To address such safety risks, organizations like IATA and ISO have released numerous technical standards, and ICAO's Airport Services Manual also puts forward safety requirements.

1.4 In terms of visual aid lighting, the optical characteristics of lighting—such as light intensity, color temperature, and beam angle—are strictly regulated to ensure reliable and safe visual guidance for aircraft. Globally, unsafe events involving improperly designed ground lighting systems are frequently seen, such as abnormal PAPI light color providing wrong guidance, insufficient light intensity of runway edge lights and approach lights failing to provide effective visual references. In recent years, with the widespread use of LED lights worldwide, the glare of excessive lighting causing pilot dazzlement has also been reported multiple times, and China faces the same challenges. Therefore, ICAO requires all Member States to strictly adhere to the technical parameters specified in Annex 14 to the Convention on International Civil Aviation to ensure consistent and universally accepted safety standards are implemented globally.

1.5 In terms of other equipment and systems, the passenger baggage handling system, aid lighting monitoring system, and FOD detection equipment are becoming increasingly critical to the safe operations of airports. As airports worldwide grow in size and complexity, these systems have also become more intricate, making them more prone to unsafe events compared to simpler traditional systems. For instance, at large airports, a malfunction in the passenger baggage sorting system can lead to massive baggage backlog and flight delays, thereby creating safety risks; similarly, failures in the aid lighting monitoring system, such as erroneous switching, have taken place both globally and in China, leaving profound lessons. Consequently, ICAO, ISO and the relevant states have established universal safety standards.

1.6 Currently, China has established both management regulations and safety technical standards for equipment, requiring 64 categories of airport equipment to comply with these safety technical standards. The equipment must undergo safety certification by standardized institutions accredited by bodies such as CNAS and ILAS. Once certified, the equipment will have its compliance reports published on the equipment information website of the Civil Aviation Administration of China (CAAC). Airports can then query, purchase, and use the equipment based on these reports.

2. DISCUSSION

2.1 To ensure that airports and airlines accurately understand information on certified airport equipment, the equipment information website of CAAC provides access to details such as

airport equipment models, manufacturer information, physical photos of the equipment, equipment nameplates, and key technical parameters, along with the compliance reports issued by the accredited certification body. The entire website is presented in both Chinese and English.

2.2 To ensure that performance indicators meet safety technical standards, China has formulated and issued 99 airport equipment standards so far. With technological advancement and the analysis of unsafe events, these standards are dynamic revised annually, with approximately 10 standards updated each year. At present, the average validity period of the standards in China's airport standard system is 6.8 years.

2.3 In recent years, in response to unsafe events in China - such as disconnected baggage tow tractors causing towed equipment collisions with aircraft, or water service vehicles causing damage to aircraft after driving off without disconnecting service connectors - China promptly revised its standards. The updated regulations now mandate that all equipment service connectors must feature either unplugged connector alarms or quick-release functions, and that tractors must be equipped with a towing lock function. Following the identification of misaligned filter plates in PAPI light at a certain airport, requirements for fixation of PAPI light filters were specified. In response to events where aircraft were scratched or damaged by ground support equipment operating close to the fuselage**,** functions for approaching aircraft safely were specified, such as installing proximity detection devices and enforcing low-speed approach operations. In line with China's firm commitment to global carbon reduction goals and vigorous promotion of electric ground service equipment, nearly all types of service equipment in China now have electric-powered models. To prevent battery-related fire risks such as thermal runaway, China has established stringent standards for batteries and electric GSE, such as strict technical indicators for battery monitoring, thermal runaway alarms and performance specifications.

2.4 The equipment safety certification system established by China requires not only that equipment samples comply with technical standards, but also that manufacturing facilities meet consistent quality control requirements. Additionally, assembly lines are also required to go through quality management system certification. Only after both the sample compliance certification and the quality system certification can the relevant information be published on the equipment information website of CAAC.

2.5 With the global trend towards greener, smarter, and more electric civil aviation, airport equipment is evolving towards unmanned operations, full electrification, and the adoption of new materials and processes. For instance, innovations such as autonomous passenger boarding bridges and unmanned baggage tow tractors have already been widely used at airports in Hong Kong SAR and Amsterdam. The rapid development of electrified ground service equipment has shown a trend of fully replacing fuel-powered vehicles. Meanwhile, the widespread adoption of LED lighting has introduced new global challenges due to glare issues. In this regard, we call on all States to pay attention to it and collaborate on relevant research. By establishing regulations and technical standards, safety performance indicators for newly developed airport equipment can be defined to ensure stable operations of the equipment and safeguard airport safety.

2.6 Conclusion:

1) Member States pay attention to the importance of the stable operation of airport equipment (i.e. GSE, visual aids for navigation, and key airport operation systems) to meet the requirements of flight safety;

2) Member States to share their best practices on airport equipment safety certification management system to ensure the safe and reliable operation of airport equipment; and

3) Member States to jointly participate in the research programme on safety technical indicators of airport equipment standards inviting organizations, such as ICAO, IATA, ISO, and IEC, to improve equipment reliability;

3. ACTION BY THE CONFERENCE

3.1 The Conference is invited to note the information contained in this paper:

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