57th CONFERENCE OF DIRECTORS GENERAL OF CIVIL AVIATION ASIA AND PACIFIC REGION

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AGENDA ITEM 3: AVIATION SAFETY

STANDING WATER DETECTOR

Presented by Indonesia

INFORMATION PAPER

SUMMARY

In order to improve aviation safety, Indonesia has developed "Standing Water Detector", an automated real-time monitoring system to detect water level changes in the runway of the airport. This system helps to identify potential standing water that could occur due to weather condition. The system has been successfully tested in New Yogyakarta International Airport and indicating well performance.

STANDING WATER DETECTOR

1. INTRODUCTION

1.1 Indonesia with its strategic location in the equator have a fairly high rainfall occurrence in several areas that potentially cause puddles of water (standing water) on the runway which can endanger the take-off and landing process and may lead to disruption of flight schedules and delays. According to IATA (2021), one of the threats that contributed greatly to the occurrence of runway/taxiway excursions was due to meteorology (weather), with percentage contribution around 55%. In 2016-2020 there have been 70 incidents with victims reaching 79 people (IATA, 2021). In the National Transportation Safety Committee (NTSC) Preliminary Report on the Lion Air plane excursion at Kualanamu International Airport in 2020, it is stated that standing water can increase the risk of slippery runway and hydroplaning (NTSC, 2020).

1.2 Currently, checking the height of standing water on the runway is still done manually and in order to protect officers from lightning strike, it needs to be conducted after the rain stops, so real-time monitoring was relatively impossible. In this case, an automated system to identify standing water on runways or may called “Standing Water Detector” is become important.

2. DISCUSSION

2.1 In order to be able to monitor standing water on the runway in real-time, the Transportation Policy Agency in collaboration with the DGCA, NTSC, and university has succeeded in developing a prototype of Standing Water Detector (SWD). This development has been carried out from 2018 to 2020, and continues to be checked, monitored, and improved through field test at New Yogyakarta International Airport (YIA). The field tests showed a tremendous result, that it is able to detect changes in the water level on the runway.

2.2 The SWD prototype system installed on 8 (eight) points at airport runways to determine the level of standing water on the aircraft trajectory by utilizing pressure sensors, temperature sensors, humidity sensors and parallel plate sensors. The SWD device is installed in the aiming point marking area as the touch down target of the aircraft during landing. The distance between SWD devices is 30 meters and the control panel distance from the runway is 20 meters. This installation is carried out in compliance with the relevant regulations (ICAO Annex 14) so as not to interfere with the existing airport flight activities.

2.3 This sensors system works by reading the number of puddles on the runway due to rain and measuring the height of the puddle. The data obtained by the sensors then transmitted from the SWD prototype to the airport control center using a wireless system. Wireless system is used to speed up the installation process and enable cost efficiency. This device uses solar cells as the source of electrical energy, therefore it can be installed in areas where electricity is not yet available. The SWD prototype has a water level measurement range of 0-50 mm, with a resolution of 0.5 mm. The SWD prototype can work optimally at air humidity between 0-80%RH and the optimum temperature is 20^{o}-70^{o} Celsius.

3. ACTION BY THE CONFERENCE

3.1 The Conference is invited to note the information contained in this Paper.

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