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**ICAO/WMO ASIA/PACIFIC METEOROLOGY/AIR TRAFFIC
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**Discussion Topic 2: Meteorological impacts on ATM and MET information required for Air
Traffic Flow Management**

INFLUENCE OF THE WEATHER FORECAST ON AIR TRAFFIC MANAGEMENT

(Presented by Japan)

SUMMARY

This paper provides the information of the flow control based on the weather forecast and the influence of the weather forecast on ATM.

1. INTRODUCTION

1.1 Inclement weather was expected through 7th to 8th October 2009 because of the typhoon. Due to a high wind was expected at Tokyo International Airport, we changed the capacity of the airport to carry out flow controls based on the forecast given by the ATMetC.

1.2 At first, we will introduce the situation on the day and make a report on the effect of its exact weather forecast for air traffic management. And we will clarify subjects to work on forward through the examination of the relation between the weather forecast and air traffic management.

**2. INTRODUCTION OF THE FLOW CONTROL IMPLEMENTED AT TOKYO
INTERNATIONAL AIRPORT**

2.1 The detail information about the influence caused by the typhoon had already been notified on the previous day. The ATMetC also provided subsequent detail information at the CDM conference on the day at 23:45 UTC. The airlines participated in the conference could share the same information. The information shared at the conference were as follows;

- a) Possibility to effect on the departure and arrival would last until 03:00 UTC due to a strong wind;
- b) The peak of the south wind was at 01:00UTC;
- c) Possibility to effect on the radar vector within the approach controlled area would last around 03:00 ~ 05:00UTC due to lower strong wind.

2.2 To properly implement flow controls, we changed the airport capacity several times till several hours ahead after receiving a briefing made by ATMetC. CAPA 15-17 were normally set up for arrivals per 30 minutes at Tokyo International Airport. The set-up CAPAs were as follows:

- a) ~ 01:00 CAPA10
- b) 01:00 ~ 03:00 CAPA11
- c) 03:00 ~ 04:30 CAPA13
- d) 04:30 ~ CAPA15

2.3 The weather generally changed along with the forecast made by the ATMetC. The gap between the CAPA set up in advance and the actual CAPA was not so significant. We were smoothly able to implement Air Traffic Management as scheduled. This is one of the good examples to show how air traffic flow management preceded keeping in good cooperation with the ATMetC.

3. THE STUDY OF THE RELATION BETWEEN WEATHER FORECAST AND AIR TRAFFIC MANAGEMENT

3.1 In the case of having to reduce traffic volume in accordance with the deteriorating weather condition, the difference between weather forecasts and actual conditions may result in serious confusion in ATC or create wasteful space.

3.2 If the weather condition is getting worse than the forecast or affected time is getting longer than expected, the actual handling capacity will be lower than expected, which will generate excessive traffic volume and incur the following concerns.

- a) Excessive radar vector
- b) Occurrence and expansion of holding
- c) Ground stop

3.3 In contrast, when the weather condition is getting better than the forecast or affected time is getting shorter than expected, the actual handling capacity will be higher than expected, which will incur the following concerns.

- a) Waste of the airspace capacity
- b) Waste of the runway capacity
- c) Unnecessary delay

3.4 Flow controls are roughly categorized into two, in-flight delay control and ground delay control. In-flight delay control can enhance the precision of flow control. But it will make the permissible delay smaller and lead to the poor fuel efficiency.

3.5 Ground delay control can provide more permissible range of delay than in-flight delay control and also curb wasteful fuel consumption. Especially when considerable inclement weather is expected, fewer aircraft can be simultaneously controlled and less airspace can be used for air-born holding. This would make ground delay control much more beneficial to airspace users. We should keep it in mind, however, that in order to delay departures the implementation of flow control should be determined before the passenger boarding time at the departure airport.

3.6 When hazardous weather conditions are anticipated at specific airports or airspace, handling levels and methods for air traffic management will be different in accordance with how much influence the weather can have on aircraft operation and ATC capacity, and how much impact it can have on the handling capacity at airports and airspace.

4. HURDLES TO CLEAR

4.1 The examination of 3.1, 3.2, 3.3 above proved that in order to implement safe and efficient air traffic management the meteorological agency and the ATM organization should both take initiatives to challenge the following problems.

4.2 The meteorological organization should provide the following information as precise as possible to the ATM organization a few hours before the concerned weather phenomena are observed. The provision of information should be phased as needed. The precise information should be provided fully at each phase.

- a) weather phenomena
- b) the range of affected area
- c) the time of occurrence
- d) The time of recovery

4.3 Referring to past cases, the ATM organization should analyze and study the degree of influence to which forecasted weather conditions impact the airport and airspace capacity, and invent some formulaic patterns to apply capacity value and flow control methods in accordance with forecasted weather conditions.
