International Civil Aviation Organization

Eighth Meeting of the Aerodromes Operations and Planning Sub-Group (AOP/SG/8)

Bangkok, Thailand, 15 to 19 July 2024

Agenda Item 9: Any other business

- **State's update on Implementation of ACR-PCR Method of Reporting Aerodrome Pavement Bearing Strength**

CHALLENGES AND COUNTERMEASURES FOR THE ADJUSTMENT OF AERODROME PAVEMENT STRENGTH REPORT FORMAT

(Presented by China)

SUMMARY

This paper presents the challenges and countermeasures adopted by China in the transition from the ACN-PCN to the ACR-PCR method for reporting airport pavement bearing strength, in order to share the experience with Member States/Administrations and propose reasonable suggestions.

1. INTRODUCTION

1.1 The International Civil Aviation Organization (ICAO) will officially implement the Aircraft Classification Rating - Pavement Classification Rating (ACR-PCR) method for reporting airport pavement bearing strength globally by November 28, 2024, completely replacing the Aircraft Classification Number-Pavement Classification Number (ACN-PCN) method. The related work includes:

a) Establishing the PCR calculation methods of individual country;

b) Calculating PCR;

c) Revising and reporting the data of aerodrome pavement bearing strength in Aeronautical Information Publication (AIP).

1.2 Following challenges are facing during the implementation process:

a) How to establish the PCR evaluation method in one country according to the ICAO PCR calculation theoretical framework;

b) How to determine the relevant parameters in PCR calculation and how to obtain these statistical parameters;

c) How to implement the calculation of PCR for such great number of airports, especially some of them have complex pavement structures;

d) How to ensure the accuracy of the PCR calculation results;

e) How to achieve a large amount of aeronautical information data revision and release it in a timely manner.

In response to these difficulties and challenges, CAAC needs to solve and complete them one by one like all other countries.

2. DISCUSSION

2.1 Currently, China has 260 commercial transport airports. Among them, there are 39 ultra-large airports with passenger throughput of more than 10 million, all with large pavement areas and complex pavement structure parameters due to long service life. For ensuring that the PCR calculation of runways, taxiways and aprons of all airports are able to complete on time, China has formed a team of airport experts to make a work plan for handling.

2.2 The work plan includes three stages. The first stage is the preparation, which mainly includes the formulation of calculation methods, calculation software and the organization of typical airports to carry out calculation and verification; the second stage is the actual calculation, mainly for calculating all the airports; and the last stage is the data reporting.

2.3 In the preparation, researching and determining pavement calculation methods under the ICAO framework and clarifying the work of related parameters are the main tasks. It should be noticed that the PCR calculation is the inverse process of the airport pavement design method, involving the performance state, the mechanical response of the pavement and the fatigue equation under aircraft load. Although ICAO has developed the theoretical framework of PCR calculation, different countries have different pavement structures, so each country needs to develop PCR evaluation methods and software with the actual situation. Under this consideration, CAAC adopts the following countermeasures:

a) Form a professional scientific research team to study the international theoretical and technical documents on airport PCR;

b) Study and elaborate the PCR evaluation method of China airports' pavement, and develop the calculation software;

c) Organize 25 airports with different runway and surface structures to test, calculate and verify the software.

2.4 Ended to June 30, 2024, all of the 260 airports in China have completed the calculation of the PCR value. In the actual calculation stage, we have faced with the problem of whether the airport personnel accurately grasp the calculation method, the accuracy of the calculation and how to implement the calculation in airports with complex pavement structures. Thus, China has conducted the following work:

a) Explain the PCR calculation method to all airports, including the calculation principle, calculation parameters and the use of the software;

b) Develop the template of PCR calculation information collection, the purpose is to give unified guidance to all the airports in China, clarify the parameters required for PCR calculation, and suggest the acquisition of relevant parameters;

c) Establish work contact group of all the airports in China in order to facilitate the question presenting at any time, and the professional research team is able to give timely suggestions. CAAC will regularly organize and publish Q&A reports to the industry for reference;

d) Require each airport to report the PCR calculation progress, and provide specific guidance for airports facing difficulties and making slow progress.

2.5 It should be noticed that during the calculation the airport operators may likely face situations like the parameters do not match with the actuality, or the software is not appropriately used. Thus, CAAC has adopted the following strategies:

a) Organize a professional research team to review the PCR calculation results of all airports;

b) The airport is required to evaluate and confirm the PCR calculation result through the airports' safety council, which consists of airport operators, air carriers or their agents and ATC, and the evaluation records of this mechanism shall be considered as the basis for the modification of the airport manual.

2.6 China has completed the calculation and has entered the third stage currently. It is conducting aeronautical information report, airport manual modification and training for the air carriers.

2.7 It should be noticed that the submitting the original aeronautical information of all airports at the same time will cause the overload of work for the AIS. Thus, CAAC adopts the following countermeasures:

a) The AIS should deploy in advance, arrange the working time from August to October especially for the review of PCR data, and other less important information data modification should be avoided this period;

b) If some airports are not able to complete the calculation on time or make subsequent adjustments, the airport PCR data can be temporarily reported through NOTAM, and AIP revision can be applied later.

2.8 There are several other concerns for all Member States/Administrations:

a) The ACR data is the basis of airport PCR calculation, but so far there are a few aircraft manufacturers have not provided ACR data, which brings great difficulties to the calculation.

b) Compared with the empirical evaluation method, technical evaluation method considered the factors like pavement structure performance and air traffic capacity, which is able to reflect the actual bearing strength better. experience evaluation method mainly depends on the actual operation experience that may cause big differences. So far, it is suggested to all Member States/Administrations to use the technical evaluation method priority.

3. CONCLUSION

3.1 In conclusion, the following are some suggestions for consideration by this meeting:

a) The airport pavement strength report format adjustment involves a wide range of tasks, which has a great influence to the airport operation and faces many challenges. It is suggested that all Member States/Administrations pay attention to it and carry out the work as soon as possible;

b) ACR of the critical aircraft is the basis for PCR calculation, and it is suggested that ICAO shall promote the relevant manufacturers to release positively the model parameters soon;

c) Experience evaluation method can barely ensure the scientific nature and accuracy, it is suggested that Member States/Administrations give priority to the technical evaluation method.

4. ACTION BY THE MEETING

4.1 The meeting is invited to:

a) note the information contained in this paper; and

b) encourage other Member States/Administrations to share their experience during the adjustment of airport pavement strength bearing report format, in this way we jointly promote the successful implementation of this work.

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