



ICAO

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Agenda Item 4: Provision of AOP in the Asia/Pacific Region

– Planning & Design of Aerodromes

DRAFT REGIONAL GUIDELINES FOR DESIGN AND OPERATION OF PLATEAU AIRPORTS

(Presented by China)

SUMMARY

Based on the experience of China in the design, construction and operation of plateau airports, this paper reviewed the distribution of the plateau airports over the world, discussed the typical instance of the plateau airports, and put forward suggestions for further improvement of the design and operation of plateau restricted airports.

1. INTRODUCTION

1.1 In General, plateau airport contains High-elevation airport (elevation between 5,000ft to 8,000ft) and Higher-plateau airport (elevation greater than 8,000ft). There exist 32 Higher-plateau airports in the world till 2020, and most of them located in the Asia-Pacific region, including 20 in China, 5 in Peru, 3 in Bolivia, 2 in Nepal, and 1 each in India and Ecuador.

1.2 Based on the experience in the design, construction and operation of the plateau airports, some typical instance of the plateau airports were discussed and suggestions for further improvement of the design and operation of plateau airports were proposed.

2. DISCUSSION

2.1 There exist 20 Higher-plateau airports in China, and 12 of them are in southwest, 7 in Northwest and 1 in Central China. The information of these airports are shown in the Table 1 to Table 3. The elevation of these airports range from 2,585m to 4,411m. And the Daocheng Yading Airport is the highest airport in the world with an elevation of 4,411m.

Table 1. The 12 Higher-plateau airports in Southwest China

Airport	Airport elevation (m)
Daocheng Yading Airport	4411
Qamdo Bamda Airport	4333
Ngari Gunsar Airport	4274
Kangding Airport	4238
Garze Gesar Airport	4067
Xigaze peace airport	3801
Gongga International Airport in Lhasa	3570

Airport	Airport elevation (m)
Aba Hongyuan Airport	3540
Jiuzhai Huanglong Airport	3448
Ninglang Luguhu Airport	3293
Diqing Xianggelila Airport	3288
Nyingchi Mainling Airport	2949

Table 2. The 7 Higher-plateau airports in Northwest China

Airport	Airport elevation (m)
Yushu Batang Airport	3905
Guoluo Maqin Airport	3788
Gannan Xiahe Airport	3190
Haibei Qilian Airport	3163
Haixi Huatugou Airport	2905
Haixi Delingha Airport	2862
GOLMUD Airport	2843

Table 3. The Higher-plateau airports in Central South

Airport	Airport elevation (m)
Hongping airport in Shennongjia	2585

2.2 The difficulties of the design, construction and operation of Plateau Airport including:
 (1) Poor natural conditions: alpine hypoxia, high altitude, and high seismic intensity.
 (2) Difficult to build: Super high excavation and filling, difficult to stabilize the slope, difficult to deal with the location, and long settlement period. (3) High safety pressure: Aging of equipment, personnel are prone to fatigue, and poor supporting facilities. (4) Difficult to fly for airplanes: The weather conditions are complex, and poor clearance conditions.

2.3 Take the Ganzi airport as an example, Ganzi airport is located in Ganzi County, Ganzi Autonomous Prefecture, Northwest Sichuan Province. The airport has an altitude of 4,068 meters and a flight area grade of 4C, and a 4,000 meter long and 45 meter wide runway is constructed. It contains 4 stations of class C aircraft. The terminal complex covers an area of 16,000 square meters.

2.4 The integrated construction of the terminal area building unit will create the first domestic branch airport. Ganzi airport breaks through the traditional distributed building layout mode of Branch Airport, and integrates the functional units of the terminal area as far as possible. The main building of the terminal area is only one terminal complex building, with different zones including terminal area, air traffic management area, locomotive yard service area, power facilities area and staff living area, and realizes independent functional zone and non-interference of streamline.

2.5 Design innovation based on the concept of humanistic airport. The innovative design is carried out from the landscape, traditional Gesar culture, oxygen supply system and living base. It was awarded as "Humanistic airport" in 2020 type 4 airport demonstration project by CAAC.

2.6 Airport smart energy management system based on dynamic change. The purpose of this paper is to break the existing mode of independent planning, design and independent operation of heating energy supply system. In the planning, design, construction and operation stage, the airport energy supply is realized step by step utilization and coordinated dispatching through organic coordination and optimization of various energy production, transmission, distribution, transformation, storage and consumption.

2.7 Based on the experience in the design, construction and operation of the plateau airports in China, the characteristics of the plateau area include: The topography of plateau area fluctuates greatly, and the small passenger throughput in plateau area.

2.8 The topography of plateau area fluctuates greatly, which brings the following problems: (1) It is difficult to tie, and at this situation, the reinforced retaining wall and the retaining dam slope were suggested; (2) It is difficult to set navigation light tower, some towers are super high, and subsequent maintenance is difficult; The way of tower and trestle can be adopted, and the position of the tower can be relatively flexible and convenient for maintenance; Intelligent lifting system is set up on the top of the tower to optimize the height of the tower; and (3) Due to the difficulty of field level and the limited area of flat ground, the protection area of glide antenna is often not enough, so the reflective network or end fire glide antenna can be used.

2.9 The small passenger throughput in plateau area brings the following problems: (1) The prospect of urban development is general, and the possibility of airport expansion is low. The terminal area can be built in whole or in part to achieve the purpose of intensive land use and investment saving; (2) There are few flights, but the utilization rate of tower is low, and the plateau area itself is vast and sparsely populated, and there is a shortage of professionals. Remote tower can be used to realize remote aviation management. For example, the remote tower of Luguhu airport in Lijiang Airport can realize optical dynamic tracking of aircraft.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

- a) consider Member States and Organizations in the Asia/Pacific Region to pay attention to the design and operation of plateau restricted airports. CAAC is willing to share its experience in this field.
- b) encourage other Member States to share their experience in the design and operation of plateau or similar airports.

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