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Analysis of wind load effect on the roof of low-rise building in the mountain Terrain`

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Keywords: the mountain terrain, the low-rise building, wind load on roof, CFD, characteristics of wind field

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Introduction

Mountains are widely distributed in the typhoon-prone areas in China's southeast coastal provinces. Generally the low-rise housing in the complex mountain terrain are not paid enough attention in the design of wind-resistant ability. As they have different characteristics of landforms, the conditions of wind field vary. When the typhoon comes, the possibility of structural damage is increasing by the negative effects of wind in the special topography, easy to cause the serious personnel casualty and the economic loss[1-3].

Li Guowei, etc. from Zhejiang University pointed out in the disaster's characteristic analysis of typhoon called "YUNNA" to the private residence, that in the typhoon disaster, the area which the private residence suffered injury was big, the scope was broad, creating huge economic loss. Although the quantity of low-rise housing located at mountain massif nearby is few, but the damage ratio is big, especially to two-floor housing. Viewed as a whole, its destruction often starts from superficial enclosure system, particularly from the destruction of roof system[4-5].Therefore, though the study of roof wind load of the low-rise housing in the mountain terrain, it's worth revealing the characteristics of wind field, the wind pressure distribution of roof, and the effects of wind directions and mountain altitudes to roof wind pressure, in order to guide engineering practice.

Calculation model and numerical simulation parameters setting

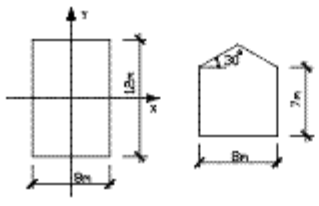

Fig.1 Low-rise housing geometry

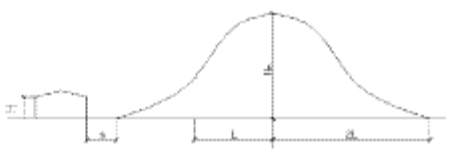

Fig.2 Computational model