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EFFECTS OF CORIOLIS FORCE ON STRUCTURES AND TALL BUILDINGS

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Abstract

This paper focused on the effect of fictitious forces on tall buildings and structures, fictitious forces which consists of both centrifugal and Coriolis forces have a significant effects on constructions, these forces affects on the wind speed and direction which can be converted to be a storm. In non-vector terms: at a given rate of rotation of the observer, the magnitude of the Coriolis acceleration of the object is proportional to the velocity of the object and also to the sine of the angle between the direction of movement of the object and the axis of rotation. Coriolis force is a result of the Coriolis acceleration. This paper focused on Coriolis force and its effects on structures. It is found that wind speed and Coriolis force are related to each other as the Coriolis force increases (depending on altitude) the wind speed magnitude and direction varies and sometimes such wind converted into a storm affects the structures. The paper presents an analytical model to find and modeling the effects of Coriolis forces on wind speed and then on the tall buildings. It is very important to take care of the Coriolis forces effects on tall buildings and this effects increases as the vibration of the buildings increases and if it reaches to any mode of its natural frequency the dangers increases and hence the failure may becomes approached.

Keywords : Coriolis force, fictitious forces, constructions, wind, vibration.

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