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## Abstract

Wind loads on buildings in real environments can be quite different from those measured on isolated buildings. Surroundings can significantly increase or decrease the wind forces on the interfered buildings. Improvements of computer facilities and computational fluid dynamics (CFD) software in recent years have enabled prediction and assessment of the pedestrian wind environment around buildings.

In this paper, peak pressure coefficients between two buildings were studied by using CFD for various heights of buildings in a row and the normal wind direction. The measured pressure coefficients were compared to those obtained from a study on an isolated building. Furthermore, the mean interference effects between two tall buildings were studied. It is shown that IF(min) increased with increase in height ratios of an interfering building (range of IF(min) is 0.85 for $H_r$=0.5 to 4.59 for $H_r$=2). Obtained results for the studied interference effects between two tall buildings are presented and discussed.

**Keywords: Interference effects, Peak pressure coefficients, Computational fluid dynamics (CFD), wind tunnel**

## 1. INTRODUCTION

The interference effects of tall buildings tends to decrease or increase the mean wind loads on the principal building. It is difficult to predict wind loads because there are a large number of variables involved, such as building size and shape, locations of interfering building, wind directions and so on. Khanduri et al. [1] reported behaviors of drag and lift coefficients on a building, They used interference influence grids to simplify and generalize their results obtained from wind pressure experiments to provide guidance for real structure design. Advanced technology makes computers faster and more powerful, which allows CFD procedures to be applied to many experimental flow problems. Today, increasing applications of CFD to wind engineering problems included wind load of building. Prognostic models that solve the Reynolds-averaged Navier–Stokes (RANS) equations have been used to describe the flow field around two buildings [2-3]. This model used the simple k-ε turbulence model in the RANS equations to determine the mean flow and turbulence and, hence, were basically non-linear flow models solved using either finite difference, finite element, or finite volume solution techniques. Lien et al. simulate mean flow over a two dimensional (2D) building array and reported the non-linear k-ε model with the standard k-ε model gives a better prediction of the mean stream wise velocity and turbulence kinetic energy (TKE) profile in many places [4].

In this paper, the k-ε model of turbulence within the RANS modeling framework have been used to simulate the developing flow through and over a 2D array two tall buildings with different height ratios of interfering buildings. It investigates pressure coefficients for all heights and normal wind direction on principal building. The measurements are presented and discussed.

## 2. NUMERICAL FRAMEWORK

A schematic of the two-dimensional building array is shown in Fig. 1. This array consisted of two tall buildings with different height ratios, $H_r$ (principal and interfering building). The principal building at a length scale of 1:400 was 70 mm × 280 mm in height . The prototype dimensions of the principle building were thus 28 m × 112 m in height. The interfering building considered as height ratios $H_r=H_i/H$=0.5, 0.7, 1.0,

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