

Abstract Submitted
for the DFD06 Meeting of
The American Physical Society

Experimental Investigation of the Effect of Reynolds Number and H / δ Value on Flow Fields in Street Canyons with Cubical Buildings

BHAGIRATH ADDEPALLI, ERIC PARDYJAK, University of Utah — Previous research on flows within idealized street canyons has documented that the aspect ratio determines the flow regime in the canyon. Although various works have recommended critical Reynolds Numbers to achieve Reynolds Number independent flows within street canyons, numerous papers have cited different flow regimes for different aspect ratios. The purpose of this study is to investigate the discrepancies in the relationships between flow regimes and aspect ratios. 2D PIV measurements were taken and the various flow regimes were investigated at different Reynolds Numbers, H/δ ratios and aspect ratios. Based on 200 cases considered over Reynolds Numbers between 4363 and 82,424, it is proposed that the flow regimes are not solely dependent on the aspect ratio but also on other parameters such as the ratio of the height of the building (H) to the depth of the incoming boundary layer (δ) for wind tunnel experiments. Other observations made during the course of this study that add insight into the urban flow physics are also presented.

Eric Pardyjak
University of Utah

Date submitted: 07 Aug 2006

Electronic form version 1.4