

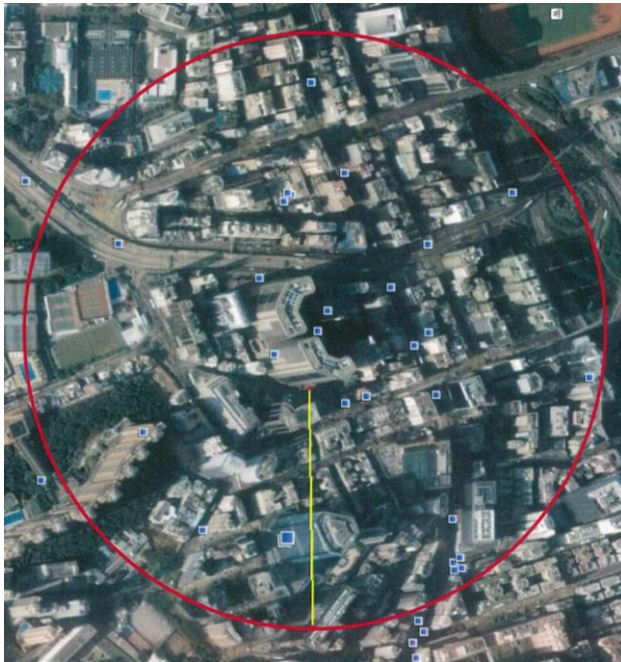


CHAM

Pioneering CFD Software for Education & Industry

Wind Flow Around Urban Buildings in a Hilly Terrain

PHOENICS Case Study - Environmental

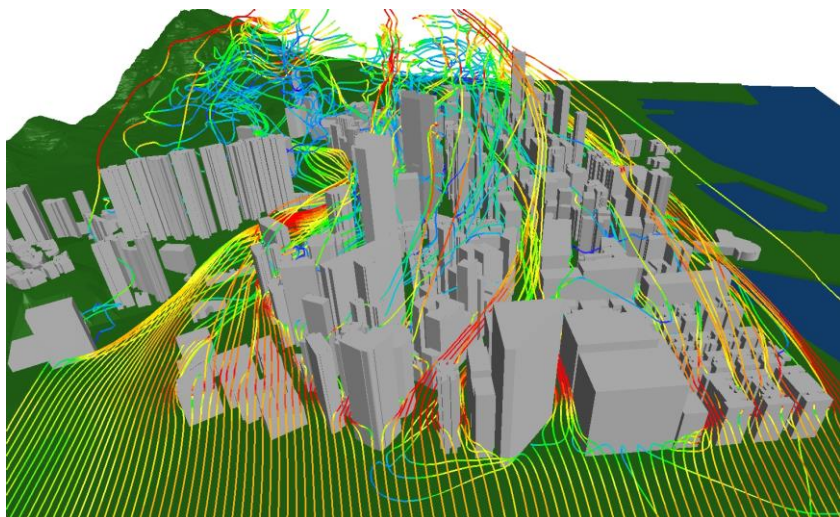


Hong Kong-based consultants, Scott Wilson, utilise the 64-bit parallel-processing Windows variant of PHOENICS, together with the FLAIR building services module, to assist with Air Ventilation Assessment (AVA) studies undertaken on behalf of the Hong Kong Planning Department.

For this project, the area of interest, shown left, involved a conglomeration of high-rise buildings around Hong Kong's Times Square, and the hilly terrain beyond. The purpose of the study was to investigate the potential effects of a new building design upon the local conditions prevailing in the square. Especial consideration was focussed upon factors that might affect pedestrian comfort and local environmental conditions.

The model was created by importing the building cityscape and the terrain as two separate objects from CAD. The FLAIR 'Wind' object was used to specify the wind characteristics in terms of direction, strength and profile.

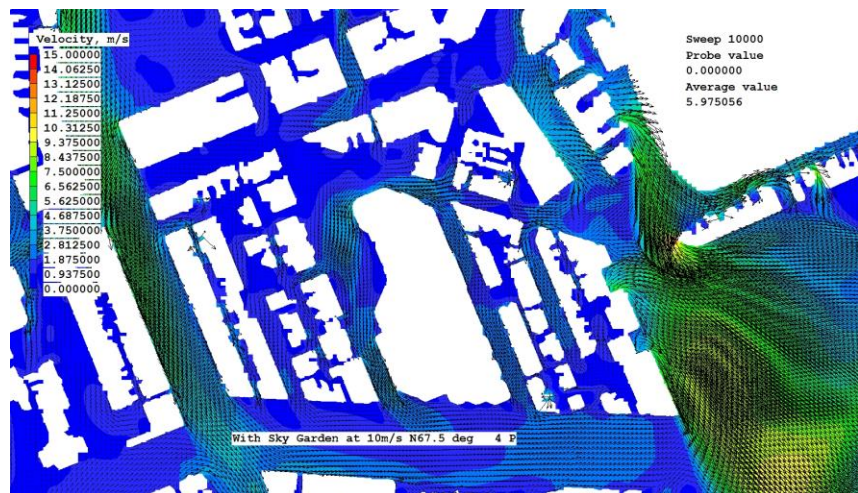
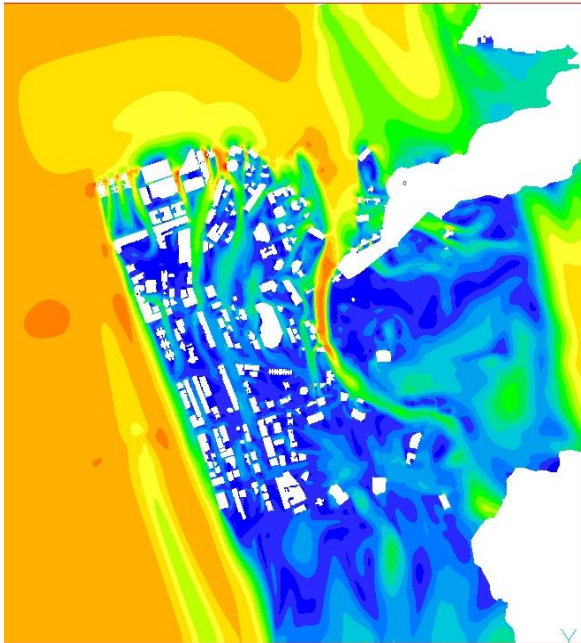
Following an analysis of the existing scheme, a third object was added representing the proposed design for the new high-rise complex in Times Square, and the case was re-run for comparison under varying wind conditions. The cases were run on a quad-core 64-bit Windows computer.



Streamlines @ 20m height, coloured by velocity



The 12 million cell Cartesian mesh required 7.6Gb of the 8Gb RAM available, and was run as a steady-state calculation for 48 hours to achieve a fully converged solution. The default 'PARSOL' (PARTIAL SOLid) cut-cell facility automatically catered for the non-uniformity of the building and terrain.



This baseline study formed the pre-cursor to a series of further investigations of varying wind conditions and alternate building designs.