CHAM Product Update

PHOENICS – Your Gateway to CFD Success

PHOENICS Direct

Urban-VWT Mk1.1.1 May 2015

[Urban – Virtual Wind Tunnel]

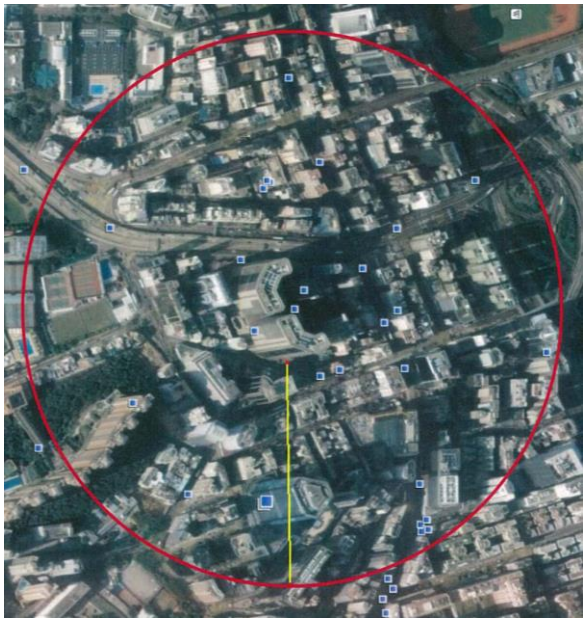
CFD software for fluid flow simulation for the external built environment

PHOENICS-Direct is a low-cost, simplified user interface for CHAM's PHOENICS CFD software package. The **Urban-VWT**, embodied within PHOENICS Direct, simulates wind flow and heat transfer around buildings and other structures. Its menu based interface leads the user directly to just the capabilities required, and produces the needed results.

The function of **Urban-VWT** is to simulate the air flow and temperature distribution around individual or groups of buildings, incorporating measured wind statistics to obtain yearly averaged results for the modelled wind direction. It will predict:

- Forces on the exterior of buildings, roofs and walls.
- Pedestrian comfort information including:
  - Wind Amplification Factors.
  - Probability of the wind speed to exceed a set threshold value
  - NEN8100 Dutch standard for Wind Comfort and Wind Danger in the Built Environment.
  - Other pedestrian wind comfort standards can be implemented.
- Rates of heat loss or gain between buildings, atmosphere and sky (prototype Heatisle module.)

Urban-VWT is intended for architects, building engineers, urban planners, local authorities and environment engineers. Urban-VWT enables users to visualise, understand, evaluate and refine the air-flow patterns in steady-state scenarios, in micro- as well as macro-scale. Transient (time-dependent) conditions are straightforward to implement, if required.

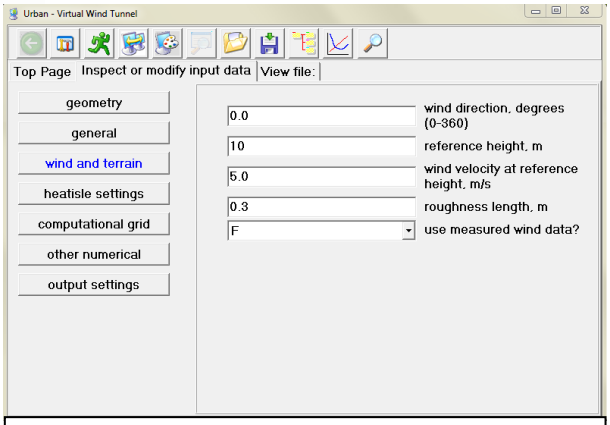


Urban-VWT offers:

- CAD import features.
- Automatic grid generation with refinement in the region of interest.
- Grid aligned with the prevailing wind direction to avoid numerical-diffusion inaccuracies.
- Wind and wind profiling.
- Solar gain.
- Incorporation of measured wind statistics to the results.

The **Urban-VWT** inputs are:

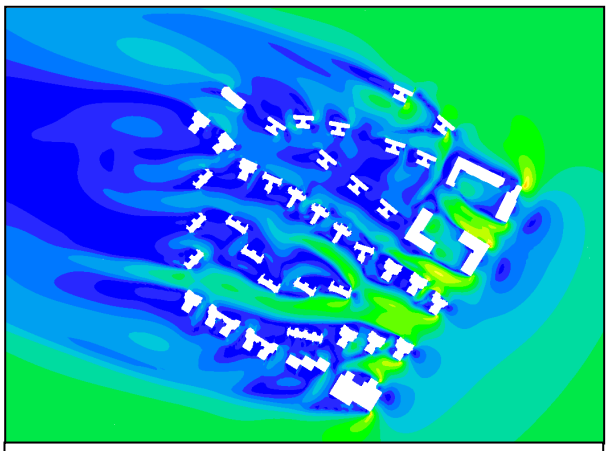
- CAD geometry file for the building(s).
- Size of the domain to simulate.
- Wind profile and Sun characteristics.
- Measured wind statistics.
- Size and position of a region of special interest.
- Resolution in the region of interest and the surrounding buildings.
- Configuration of result plots
- Other basic numerical settings.



Urban-VWT interface: Wind and terrain menu

Urban-VWT can generate automatically plots for:

- Pedestrian wind comfort results at a user defined height
  - Wind Amplification Factor
  - Probability of the wind speed to exceed a set threshold value
  - NEN8100 Dutch standard for Wind Comfort and Wind Danger in the Built Environment.
- Wind forces
  - Pressure coefficients on the buildings
- Air flow patterns
  - Turbulence intensity
  - Streamlines
- Temperature distribution / stratification.



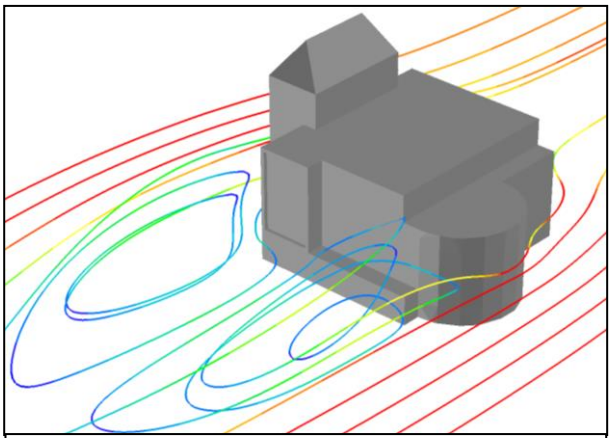
Wind Amplification Factor @ 2m height for E-S-E wind direction

FLAIR-EFS permits:

- Addition of user-defined materials
- Addition of user-defined properties

Urban-VWT applications include:

- Pedestrian comfort
- Wind loading on structures
- Cityscape street canyons
- Urban Heat Islands (UHI)



Velocity streamlines over a single building

For further information contact Sales@cham.co.uk or call +44 (0)20 8947 7651

CHAM Ltd, Bakery House, 40 High Street, Wimbledon Village, London SW19 5AU, UK
Tel: +44 (0)20 8947 7651 Fax: +44 (0)20 8879 3497 Email: phoenics@cham.co.uk
Web: http://www.cham.co.uk