

Case 7/2019

Issue: Methodology Report for Wind Tunnel Test

Recommendation: To accept the following methodology and parameters for wind tunnel test at the proposed development:

(1) Topographic Model

Model scale: 1: 4,000

(2) Proximity Model

(i) Model scale: 1: 400

(ii) Extent of model: all known existing and proposed surrounding buildings and structures within a radius of 500m from the subject site will be modeled.

(3) Wind Climate Study Results

Directional characteristics of typhoons affecting HK based on a Monte Carlo typhoon simulation performed by Applied Research Associates, Inc. (ARA).

(4) Removal of adjacent buildings that could provide significant shelter

1 building group was proposed to be removed in the Proximity Model.

(5) Design Wind Loads Adopted in Superstructure Design

The following in the superstructure design were proposed:

(i) The finally adopted peak design combined wind moment will not be less than 70% of the maximum design wind moment based on code calculation in the most critical direction as derived from the design values given in the Code of Practice on Wind Effects in Hong Kong 2004 (the Wind Code);

(ii) If the peak design combined wind moment determined in the wind tunnel test is found greater than the maximum design wind moment based on code calculation in the most critical direction as derived from the design values given in the Wind Code, the peak design combined wind moment determined in the wind tunnel test will be adopted for design;

(iii) The storey wind shears adopted for design shall be

determined from the peak design combined wind moment established in accordance with sub-paragraphs (i) and (ii) above; and

- (iv) The peak building acceleration assessment on human comfort under wind loads determined in the wind tunnel test shall be in accordance with the Code of Practice for Structural Use of Concrete 2013 clause 7.3.2. Limiting maximum peak acceleration at the top occupied floor of a non-residential building to  $0.25\text{m/s}^2$  should be adopted.

(6) Design Wind Loads Adopted in Cladding Design

- (i) The finally adopted peak design cladding pressure will not be less than 70% of the maximum design pressure based on code calculation as derived from the design values given in the Wind Code. Shall the test result cladding pressure be higher than that prescribed in the wind code, the test result will be adopted in the actual design.
- (ii) The highest peak net and differential design pressures and suctions, relevant to the design of the cladding elements and cladding systems of the proposed development will be provided based on the 50-year return period design wind speed i.e.  $59.5\text{m/s}$  at  $500\text{m}$ . Code based internal pressure is allowed to generate the most adverse net pressure on the facade.
- (iii) The pressures on the facade of the proposed development will be presented as peak net cladding pressures, which incorporate internal pressures for using pressure coefficients of  $-0.3$  and  $+0.2$  with the requirements of the Wind Code and the Explanatory Materials to the Wind Code 2004 (“Explanatory Materials”).
- (iv) The wind pressures on architectural features of the proposed development where both sides of surfaces are exposed to the wind, will be assessed as peak differential pressures, i.e resulting net wind force.

Decision:

Having noted the background information and arguments together with RSE’s supervision arrangement, members endorsed the recommendation.