

ABSTRACT

This research concentrates on the National Energy Complex, consists of tower A : the two-oil-drip shape building, tower B : the rectangular with rounded corner, and tower C: the podium. Due to this uncommon shape, which the wind pressure coefficients are not specified in the code, and the effect of its surrounding, so the wind tunnel test study is performed.

This research consists of two parts. The first is wind tunnel experiment without statistic analysis results consideration. The results are in pressure coefficient. When consider this result with return period of 50 years, the expected extreme value of local pressures for cladding design is evaluated. For the peak local pressures are in the range of 100 to 125 kg/m² for all tower A, B and C, while the peak local suctions are in the range of 125 to 300 kg/m² and 100-200 kg/m² for most parts of tower A and tower B-C, respectively. The comparisons between wind tunnel test and DPT standards 1311-50 for wind load calculation and response of tower B show that the peak local suction in each elevation from wind tunnel test are 15-50% higher than the DPT standards 1311-50 calculations. For tower C, the wind tunnel test results are 15-45% lower than the standard. In addition, the peak local pressures in each elevation of tower B from wind tunnel test are 10-35% lower than the standard. For tower C, the wind tunnel test results are 0-60% lower than the standard.

The second part of this research concentrates on determination of peak pressure coefficients by 3 methods of statistic analysis compare with the results of wind tunnel test. Method 1, extreme value distribution type I, the analyzed results are 0 to -10% higher than the results from wind tunnel test. Method 2, generalized extreme value distribution, the analyzed results are 5 to -5% differences from the results of wind tunnel test. Method 3, predictions of the parent distribution of the largest of the peak, the analyzed results are 5 to -5% differences from the results of wind tunnel test.

In conclusion, the appropriate statistic analysis method of wind tunnel test data results in economically and safely wind load resistance design for cladding.