

NUMERICAL EVALUATION OF INTERACTION PHENOMENON BY USING WAKE OSCILLATOR MODEL

Fundamental study on vibration mechanism of three-dimensional prisms in consideration of wake interaction (Part 2)

On the across-wind response of vibrating bluff bodies, lots of experimental studies have been already carried out. Based on such studies, it was pointed out that nonlinear behavior of wake behind a bluff body plays significant role in generating vortex-induced oscillation or aerodynamic instability.

This paper presents numerical evaluation on interaction mechanism between three-dimensional square prism and wake. The purpose of this discussion is to propose numerical model for the simulation of vortex-induced oscillation or aerodynamic instability such as galloping. New parameter related to wake stagnation point in the averaged wake field obtained by PIV (Particle Image Velocimetry) measurement was introduced, when the past wake-oscillator model was modified. The result of numerical analysis by the proposed model showed that it was agreeable with the result of past wind tunnel experiment and it can be applicable to the condition of not only uniform flow but also turbulent flow.