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Spectral analysis of chimney vibrations

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Abstract: The rapid development of technology causes that modern construction objects have high strength parameters with low structural stiffness and low damping coefficient. These objects are particularly susceptible to dynamic loads such as wind, seismic or paraseismic shocks. These structures include among others: chimneys and masts. In the paper, the response of chimney in turbulent wind flow with use of the spectral method is investigated. The analysis is performed for wind flow model that reflects the real conditions. Numerical analysis investigates the vibrations of the chimney due to different parameters of turbulence. Spectra of longitudinal wind velocity for the numerical case, as well as the spectra of Karman, FSU are analysed. The structure response for selected steel strengths and chimney cross-section reduction is analysed. The frequency response functions for each case are performed.

Keywords: chimney vibration, spectral method, wind turbulence spectra.

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