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# Study of Flow-Induced Noise Control Effects on Flat Plate through Biomimetic Mucus Injection

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**Abstract :** Fishes can secrete high molecular weight fluid on their body skin to enable their rapid movement in the water. In this work, we employ a hybrid method that combines Computational Fluid Dynamics (CFD) and Finite Element Method (FEM) to investigate the effects of different mucus viscosities and injection velocities on fluctuation pressure in the boundary layer and flow-induced structural vibration noise of a flat plate model. To accurately capture the transient flow distribution on the plate surface, we use Large Eddy Simulation (LES) while the mucus inlet is positioned at a sufficient distance from the model to ensure effective coverage. Mucus injection is modeled using the Volume of Fluid (VOF) method for multiphase flow calculations. The results demonstrate that mucus control of pulsating pressure effectively reduces flow-induced structural vibration noise, providing an approach for controlling flow-induced noise in underwater vehicles.

**Keywords :** mucus, flow control, noise control, flow-induced noise
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