

Abstract Submitted
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Experiments on Dust Levitation due to Foot Motion¹ HIROSHI HIGUCHI, YOSHIHIRO KUBOTA, Syracuse University — Near wall aerodynamics and dust levitation process from the floor due to human foot stomping and walking were investigated. Actual human foot kinematics was first recorded, and input to the laboratory experiment. At present, the foot movement was limited in the vertical direction without any ankle articulation. To focus on the aerodynamic effect on dust suspension and avoid the floor vibration, the model was stopped immediately before contacting the floor. Sole geometries ranged from a disk, an elongated flat plate to an indoor slipper. The suspended particle pattern showed the zone from which particles were suspended effectively. With the elongated plate and the shoe shape, strong directionality in particle suspension was shown associated with a concentrated area of vertical structure. Lateral streaks on the particle pattern were considered to be caused by vortex instabilities. The upward foot motion was also found to be effective in dust levitation from the floor. The time-dependent velocity field was measured with a PIV, and the particle concentration measurement with image analysis was conducted. Basic fluid dynamics as well as its practical implications will be addressed.

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Hiroshi Higuchi
Syracuse University

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