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Numerical Study of Mechanism of Deep Erosion Pit in High-speed Liquid Droplet Impingement YUKA IGA, Institute of Fluid Science, Tohoku University, HIROTOSHI SASAKI, Department of Finemechanics, Tohoku University — In the process of the liquid droplet impingement erosion from the deceleration period to the final steady period, certain number deep pits are caused, and the pits grows deeper and deeper with keeping the number and the diameter of the pit. Namely, even though the many droplets uniformly impinge on the material surface, the material surface is not evenly but selectively eroded with a certain number of the pit. The purpose of this study is to clarify the progress mechanism of deep erosion pit of the liquid droplet impingement erosion by numerical analysis. In the numerical results, the Rayleigh wave, which is a surface wave of a material, caused by the droplet impingement propagates on the inner surface of the pit and reaches the pit bottom, and it focuses. Then, the equivalent stress drastically increases in the pit bottom although the droplet does not impinge directly on there. According to increase of the offset between the pit and droplet centers, the focus becomes weak. When the droplet impinges the region of flat material surface, the impingement pressure attenuates inside the liquid film. Therefore, these numerical results explain why a certain number of deep pits are selectively formed on the material surface in the liquid droplet impingement erosion.

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