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Numerical Analysis on Oil Leakage of Fluid Dynamic Bearing for External Impact Test SUNGHOON BAEK, SIMON SONG, Hanyang University — We conducted numerical simulations on the behaviors of lubricant in the fluid dynamic bearing of a mini motor shocked by external impact using a commercial software. Numerical studies on the behaviors are necessary because it is very difficult to observe the behaviors of lubricant oil and air interface in experiments although the oil leakage have to be prevented for a mini motor used for hard disk drive. To investigate the behaviors of a free surface between lubricating oil and air in the bearing, an unsteady volume-of-fluid model was utilized as well as a Navier-Stokes equation solver. Also, hybrid meshes were adapted: unstructured grids were generated in the most of large and complex geometric regions while structured grids were used in the small regions of very thin gap (a few microns) between rotor and stator. In addition, dynamic mesh and sliding mesh techniques were employed for the stable dynamic deformation of meshes corresponding to the motion of the rotor due to the impact. The results show that an oil break-up doesn't occur at the first period of an impact of 1000 $\sim$ 1800G along the rotor axis but it occurs in consecutive periods of 1800G. This presentation will include the effects of Weber number on the oil break-up as well as the numerical results in detail.

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