Head Disk Interface Response during Operational Shock with Disk-Ramp Contact

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Abstract

In hard disk drives (HDD) the ramp load/unload (LUL) technology has proved to be a better alternative to the contact start-stop (CSS) approach due to the advantages of increasing areal density and greater durability. However, the application of the LUL ramps in HDDs introduces the possibility of collisions between the disk and the ramps since the ramps must slightly overlap the disk’s outer radius. Therefore, it is important to study the ramp effects on the HDD’s response during a shock. A reduced model of a deformable ramp is developed and implemented into a multi-body operational shock (op-shock) model. Numerical analyses using three different ramp models (no-ramp, rigid ramp and deformable ramp) are carried out to study the HDD’s failure dependence on the different ramp models.