Parametric Investigations at the Head Disk Interface of Thermal Fly-height Control Sliders in Contact

Sripathi V Canchi* and David B Bogy

Computer Mechanics Laboratory
Mechanical Engineering
University of California,
Berkeley, CA, USA

Abstract:

Accurate touchdown power (TDP) detection is a pre-requisite for read-write head to disk spacing calibration and control in current hard-disk drives (HDD), which use the thermal fly-height control (TFC) slider technology. The slider air bearing surface (ABS) and head gimbal assembly (HGA) design have a significant influence on the touchdown behavior and this paper reports experimental findings to help understand the touchdown process. The dominant modes/frequencies of excitation at touchdown can be significantly different leading to very different touchdown signatures. The pressure under the slider at touchdown and hence the TFC efficiency as well as the propensity for lubricant pick-up show correlation with touchdown behavior that may be used as metrics for designing sliders with good touchdown behavior. Experiments are device to measure friction at the head disk interface (HDI) of a TFC slider actuated into contact. Parametric investigations are conducted to study the effect of disk roughness, disk lubricant parameters and the ABS design on the friction at the HDI as well as slider burnishing/wear and reported.