

An Improvement on Shear Test Equipment for HGA and GR&R Analysis in a Magnetic Head Operation

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Abstract

A vital components of a hard disk drive is the head gimbal assembly (HGA) comprised of two major components which are read-write head or slider and suspension. The slider is attached onto the bonding pad of the suspension by the adhesive. In this paper, the method of shear test was studied. Since HGA is a moving part in a hard disk drive, the shear strength of adhesive bonding between slider and suspension have to be measured to guarantee the product quality. After evaluation on the current test method, it was found that most of sliders were sheared at flexure which was not adhesive bonding area. Then, a new fixture and the testing unit were designed to improve the shear position. Next, Gauge Repeatability and Reproducibility (GR&R) which is the statistical analysis was employed to evaluate source of variation of the current and new testing equipment. Since shear test is the destructive test, the GR&R analysis utilized the nested factorial experiment was conducted and found that the variance contributing from appraisers is zero gf^2 while the variance due to the repeatability of gage is around 853.28 gf^2 . Further investigation was done and revealed that the bigger the dot size of adhesive it was, the higher the shear strength it obtained. However, the variance within each group classified by dot size of adhesive were not significant different. It can be concluded that the proposed shear equipment can be used for measuring the shear strength of adhesive bonding. The major source variation is the repeatability resulting from variation of parts.

Keywords:

Gauge Repeatability and Reproducibility, Head Gimbal Assembly (HGA), Shear Test, Adhesive Bonding.