

Abstract...

An effective vibration isolation system is important for hard disk drives (HDD) used in a harsh mechanical environment.

This paper describes how to design concepts on how to achieve satisfactory shock and vibration isolation for HDD are described. The concepts are tested and further enhanced by the design case studies presented here. It is shown that an effective vibration isolation system, that will allow a HDD to operate well when subjected to severe shock and random vibration, is feasible.

1. Introduction

The topic on how to design an optimum shock and vibration isolation for general type of devices has been discussed quite extensively in the literatures. However, the vibration isolation design for sophisticated systems needs to be attended in a special manner. For instance, the design of vibration isolation for an infrared equipment has been discussed in detail. In this paper, the authors would like to focus on the design and analysis of shock and vibration isolation of hard disk drives. The vibration in HDD has been increasingly studied due to the fact that HDDs have been increasingly used in various mobile applications, in which the HDD may be subjected to severe shock and random vibration inputs. It remains a big challenge for HDD manufacturers to make the HDD robust to harsh environmental conditions. This is predominantly due to the fact that originally HDD used to be designed for operation in stationary environments. There are basically three methods to handle the shock and vibration problems in HDD. The first is to design a robust servo control mechanism to prevent read/write head error. The second is to design a robust mechanical system and slider/disk interface. The third is to design suitable vibration isolation for the HDD. The first and second methods have been widely used in the academic and industrial research, but the third has not been addressed sufficiently in the literature. Some research work done focused on vibration isolators installed inside the HDD. But little attention is given to external vibration isolation of HDD. There has been a published work related to this specific area by the same authors. However, the previous work did not address the shock problem.

Shock Vibration Concepts In Eng Design

M Walker

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