TECHNOLOGY

Non-Contact Magnetostrictive Torque Sensor

OVERVIEW

As sensors become integrated in more applications, interest in Magnetostrictive sensor technology has blossomed. Magnetostrictive sensors take advantage of the efficient coupling between the elastic and magnetic states of a material to facilitate sensing a quantity of interest.

Researchers at the department of Aerospace Engineering at the University of Maryland, College Park have developed a new technology that relies on the unique combination of the class of iron-based ductile magnetostrictive alloys such as Galfenol, that can be produced as thin ribbons and rolled sheet for making torque sensors which can be applied to metallic and non metallic shafts for detection of torsion strains and loads in a manner similar to the ease with which strain gages can be applied to structures for detection of strains and loads.

The main difference between this invention and traditional strain gages is that the magnetostrictive properties allow detection of the strains using non-contact sensors. The new class of ductile iron-based magnetostrictive alloys such as Galfenol allows the design and fabrication of conformal magnetostrictive torque sensors that were not previously possible without complex approaches such as sputtering. Galfenol and similar ductile, iron based Magnetostrictive alloys that can be rolled into thin sheet, offer a new alloy for the development of high bandwidth, high sensitivity, and non-contact torque sensors.

Aerospace applications that could benefit from advances in torque measurement and ease of installation /retrofit through the use of non-contact torque sensors (no slip rings required) include monitoring of performance and health of engine components, gear boxes, and rotorcraft blade loads.

Two key enabling technologies are: 1) the ability to roll thin sheet and make ribbons of these iron-based Magnetostrictive alloys such as Galfenol and 2) the ability to introduce a magnetic bias state in thin sheet using either field annealing or stress annealing that can reduce the need for extra weight for the purpose of biasing the Magnetostrictive alloy to its most sensitive position.

For additional information, please contact the Office of Technology Commercialization, University of Maryland College Park, via phone at (301) 405 -3947 or e-mail at otc@umd.edu.

CONTACT INFO

UM Ventures
0134 Lee Building
7809 Regents Drive
College Park, MD 20742
Email: umdtechtransfer@umd.edu
Phone: (301) 405-3947 | Fax: (301) 314-9502

Additional Information

INSTITUTION

University of Maryland, College Park

PATENT STATUS

Patent(s) pending

LICENSE STATUS

Contact OTC for licensing information

CATEGORIES

- Devices
- Sensors/Monitors

EXTERNAL RESOURCES

PS-2007-020