

INTRODUCTION

Automotive industry is changing everyday. Billions of dollars are invested in research and development for building safer, cheaper and better performing vehicles. One such investment is the x-by-wire topics which have been introduced to improve the existing mechanical systems on automobiles. The term of x-by-wire means that the mechanical systems in the vehicles are replaced with electromechanical systems that are able to do the same task in a faster, more reliable and accurate way than the pure mechanical systems. The work in this research project is part of the continuous efforts in the development of brake-by-wire system in automobiles.

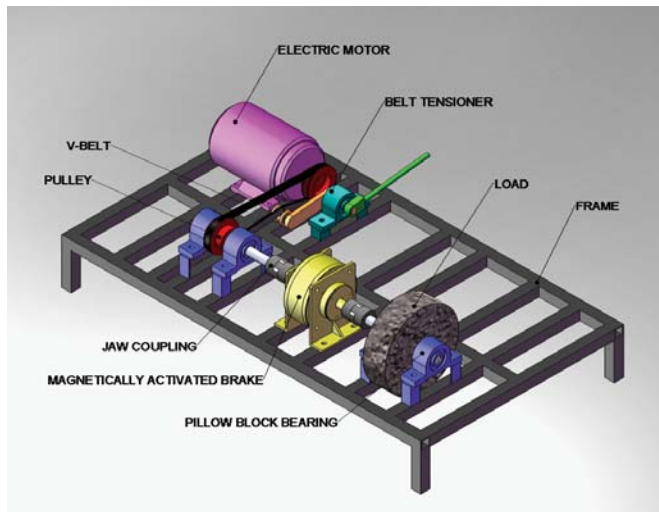


Figure 1: 3D Representation of the Magneto-rheological Brake Prototype

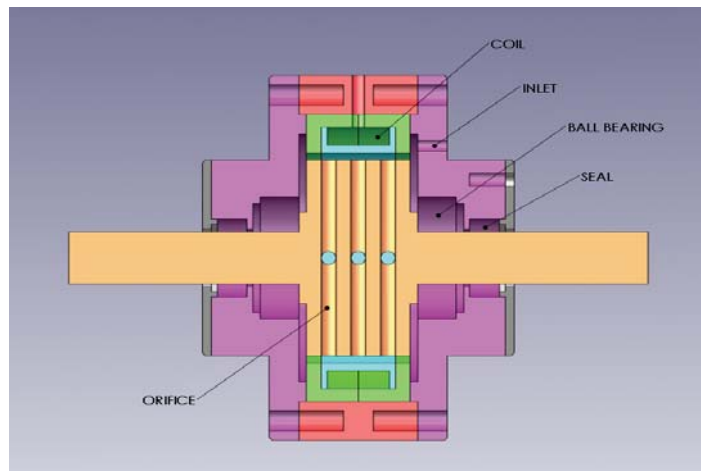


Figure 2: Detail Design of the Magnetorheological Brake System

ADVANTAGES & POTENTIAL APPLICATIONS

The main contribution of this research work is the development of a new magneto-rheological brake system prototype for automotive application. The prototype is a pure electronically controlled actuator and as a result, it has the potential to further reduce the braking time and stopping distance, as well as easier integration with the existing and new advanced control features in automobiles such as anti-lock braking system (ABS), vehicle stability control (VSC), electronic parking brake (EPB), etc. This type of braking system has the following advantages: faster response, easy implementation of a new controller or existing controllers (e.g. ABS, VSC, EPB, etc.), less maintenance requirements since there is no material wear and lighter overall weight since it does not require the auxiliary components used in conventional hydraulic brakes.

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