

HEAT REDUCTION IN BRAKE DRUM

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ABSTRACT

The project is about cooling system used for reduction of heat in the vehicle's brake drum system which comprises thermo electric cooler (chip). After the supply of power, the TEC provide a cooling surface which is fitted on the brake system. The function of TEC chip is to absorb heat from one surface and releases to other surface. It is expected that the working temperature of the brake drum system may be decreased and braking force may be increased considerably.

In the combination of TEC chip and brake drum of metal matrix composite (MMC), we can reduce the temperature generation in the considerable manner. So the braking force can be maintained effective when the driver applies the brake and provides safety for the driver. So it is expected that the efficiency and life time can be increased considerably.

INTRODUCTION

The commercial brake system uses disc brake for front wheels and drum brake for the rear wheels. Gray cast iron is the conventional material used for making brake drums of light and heavy motor vehicle. An Al MMC brake drum has been designed to replace the heavy cast iron brake drum of a typical passenger vehicle. The design parameters such as inner radius, outer radius, and

the width of drum, load and allowable shear stress are kept same for both cast iron and MMC brake drum.

PROPERTIES OF AL MMC COMPOSITE

Aluminium alloy reinforced with SiC particles exhibit increased strength and stiffness as compared to non-reinforced aluminium alloy. In contrast to the base metal, the composite retains its room temperature tensile strength at higher temperatures. Discontinuous silicon carbide or aluminium MMCs are being developed by the aerospace industry for use in airplane skins, intercoastal ribs, and electrical equipment. In the liquid metal processing technique, the molten aluminium has the tendency to react with the reinforcing materials. The severity of the reaction is based on the kinetics and the prevailing thermodynamic conditions. The presence of alloying elements in the matrix has the influence on viscosity, contact angle and reaction rate with the dispersed particles

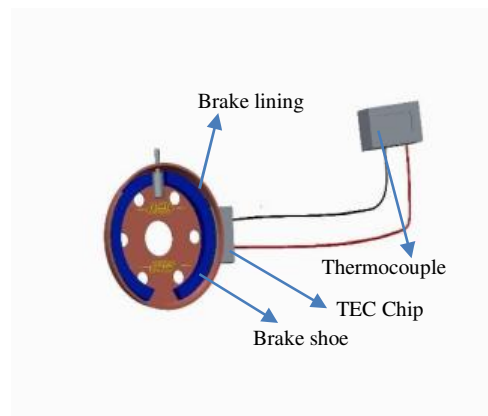
Property	Cast Iron	Al MMC
Tensile strength (MPa)	276	300
Young's modulus (GPa)	100	112
Poisson's ratio	0.3	0.3
Density (kg/m ³)	7228	2828
Thermal conductivity (Nm/hm K)	174465	374400
Specific heat (Nm/kg K)	419	970

EXPERIMENTAL PROCEDURE

- Al MMC brake drum
- TEC chip
- PN Junction Module All these

parts are to be

designed and assembled firstly into the component and this is applied to the two wheeler. We have installed this setup in two wheeler. Heat transfer takes place due to peltier effect. And the digital thermocouple is used to indicate the analysis of temperature before and after fixation of TEC chip. The main advantage in this setup is that the whole assembly does not have any kind of moving parts and does not disturb the efficiency or any external factors by installing this on two wheelers.



CONCLUSION

Hence from this project we are trying to reduce the heat in brake drum resulting in increase in efficiency and provides safety for the driver. This concludes that the brake failure gets reduced due to decrease in temperature and it is expected that it reduces the wear of brake drum.

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