

Performance of hybrid nano-micro reinforced mg metal matrix composites brake calliper: simulation approach

N Fatchurrohman* and S T Chia

Faculty of Manufacturing Engineering, Universiti Malaysia Pahang,
Kuala Pahang, 26600 Pekan, Pahang, Malaysia

Corresponding author email: fatchurrohman@ump.edu.my

Abstract. Most commercial vehicles use brake calliper made of grey cast iron (GCI) which possesses heavy weight. This contributes to the total weight of the vehicle which can lead to higher fuel consumption. Another major problem is GCI calliper tends to deflect during clamping action, known as “bending of bridge”. This will result in extended pedal travel. Magnesium metal matrix composites (Mg-MMC) has a potential application in the automotive industry since it having a lower density, higher strength and very good modulus of elasticity as compared to GCI. This paper proposed initial development of hybrid Mg-MMC brake calliper. This was achieved by analyzing the performance of hybrid nano-micro reinforced Mg-MMC and comparing with the conventional GCI brake calliper. It was performed using simulation in ANSYS, a finite element analysis (FEA) software. The results show that hybrid Mg-MMC has better performance in terms of reduction the weight of the brake calliper, reduction in total deformation/deflection and better ability to withstand equivalent elastic strain.

