BIRMINGHAM CITY University

Fuel Consumption and Carbon Emissions Reduction from Automobiles through Lightweighting

José Ricardo Sodré – Senior Lecturer, School of Engineering and the Built Environment

Abstract

A way to reduce automotive fuel consumption and, consequently, carbon dioxide (CO_2) emissions is the use of lightweight materials. Magnesium is a promising material for vehicle light weighting, as it is 33% lighter than aluminium and 75% lighter than steel or cast-iron components. The corrosion resistance of high-purity magnesium alloys is better than that of conventional aluminium die cast alloys. Magnesium alloys have distinct advantages over aluminium and ferrous materials by virtue of better manufacturability. Solidification is faster due to lower latent heat so that approximately 25-50% more castings can be produced per unit time compared to aluminium. Previous investigations concluded that 18 kg vehicle mass reduction improved fuel consumption by 0.07 L/100 km, ant the replacement of an engine cylinder block, front cover and oil pan from conventional materials by diecasting magnesium AZ91caused a reduction of 7% on total engine weight.

Join Birmingham City University on 20th July for more insights on hidden benefits of Magnesium.