Reynolds Technology Ltd.

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Extracts from report 27th June 2006 – independent study by CERAM, UK.

Background

Reynolds Technology Ltd currently manufactures high-strength products for automotive, industrial and sporting goods sectors: the products are formed from a variety of butted metal tubing using aluminium, magnesium, steel and titanium. Reynolds Technology is active in developing materials with the aim of pushing the boundaries in weight reduction whilst maintaining durability and safety. Reynolds Technology Ltd wants to expand the market for their existing products whilst further pushing the boundaries of weight reduction through design optimisation.

Reynolds Technology Ltd has recognised that computational modelling can provide the necessary design comparisons to demonstrate the advantages of its products. CERAM proposes that an existing product design should be modelled using both traditional tube and butted tube designs. The goal is to deliver stress, strain and buckling calculations that show the benefits of butted tube technology.

Conclusion

The combination of butted tubes and Reynolds 953 steel has a significant advantage on weight, maximum Von Mises Stress, deformation, safety factor and fatigue stress over traditional tubes with Cr-Mo or 3Al-2.5V ASTM Grade 9. The butted tubes had a weight reduction of 18% compared to traditional tubes. Even though the maximum Von Mises stress for the butted tube was slightly less than the traditional tubes, it can be considered equal for all practical purposes. The benefit of the butted tube was the location of the maximum Von Mises stress away from the edge of the tube and thus away from the weld region.