Shpend Gerguri et al., J Appl Mech Eng 2016, 5:3(Suppl)
http://dx.doi.org/10.4172/2168-9873.C1.002

The use of the theory of inventive problem solving for the design optimisation of 3D structural printed parts

Shpend Gerguri, Matteo Moretti and **Gareth Neighbour**
Oxford Brookes University, UK

Rapid manufacture, such as 3D printing stereolithography is being utilised in many manufacturing sectors where the demand for assessing products at an early stage of the design cycle is of paramount importance. In the case of 3D printed parts made from plastic materials, some of the limitations for the parts to be utilised as load bearing structures stem as a result of the inherent low material property values, for example stiffness, tensile strength and elongation at break. One way these can be accounted for is by optimising the shape of the part, and this is shown here by a detailed case study of 3D printed lugs made from VeroGray RGD850 as part of the development of 'next generation' bamboo bicycle frame. The RP machine used to print the lugs is Object30 Prime PolyJet. The optimisation process is based on the theory of inventive problem solving (TRIZ), by the followings steps: system functional analysis; subject-action-object; derivation of technical curves and the determination and translation of inventive principles into lug concepts. These concepts are simulated using Finite Element Analysis (FEA) for their load-bearing capabilities and conclusions drawn on the applicability of TRIZ principles on providing optimised solutions for structural parts is demonstrated.

Biography

Shpend Gerguri has completed his PhD at Oxford Brookes University in the area of metal-to-ceramic joints. He is a Senior Lecturer in Engineering Design and Subject Coordinator for BEng/MEng Automotive and Mechanical Engineering fields. He has many years of experience in managing academic projects in product design from conception to completion. In terms of research and knowledge transfer activities, he performs extensive consultancy for various well known organisations, leads various Technology Strategy Board (TSB) funded industrial partnerships as well as being recognised as the designer of the first UK-built bamboo bike.

s.gerguri@brookes.ac.uk

Notes: