

## Investigation of laser beam forming process on AISI 1008 mild steel via material characterization studies

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**M**etal forming traditionally involves the application of mechanical forces to change the shape and form of the material permanently. The stress values created must be larger than the yield strength, yet smaller than the fracture strength of the material being formed, in order to achieve permanent deformation. New technologies like laser forming allow us to use non-contact methods to achieve similar results. Laser forming causes deformation by introducing thermal stresses from an external heat source as opposed to the simple application forces in mechanical forming. In this study, samples were formed mechanically by using a dynamic press brake machine, whereby, a punch and die apply the force. A 4.4 kW Nd:YAG laser system was used to form a second set of samples made from cold rolled AISI 1008 mild steel using laser forming. The research studied the mechanical and metallurgical properties of the unformed, mechanically formed and laser formed samples. The objective is to compare these properties amongst the different samples in order to analyze the impact of the varying methodologies especially the laser energy effects on the samples. The conclusions from these tests have provided information on the variations in mechanical and metallurgical properties resulting from laser beam and mechanical forming.

### Biography

Bradley Brossard is in his final year studying for his B.S. in Mechanical Engineering at Milwaukee School of Engineering. He was selected to be a part of the 2013 International Research Experience for Students (IRES) Program, to conduct research at the Non-Ferrous Materials Technology Development Centre located in Hyderabad, India. He is currently working on a medical applications senior design team project. Following completion of his degree, Bradley is looking to enter industry in a sales engineer position.

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