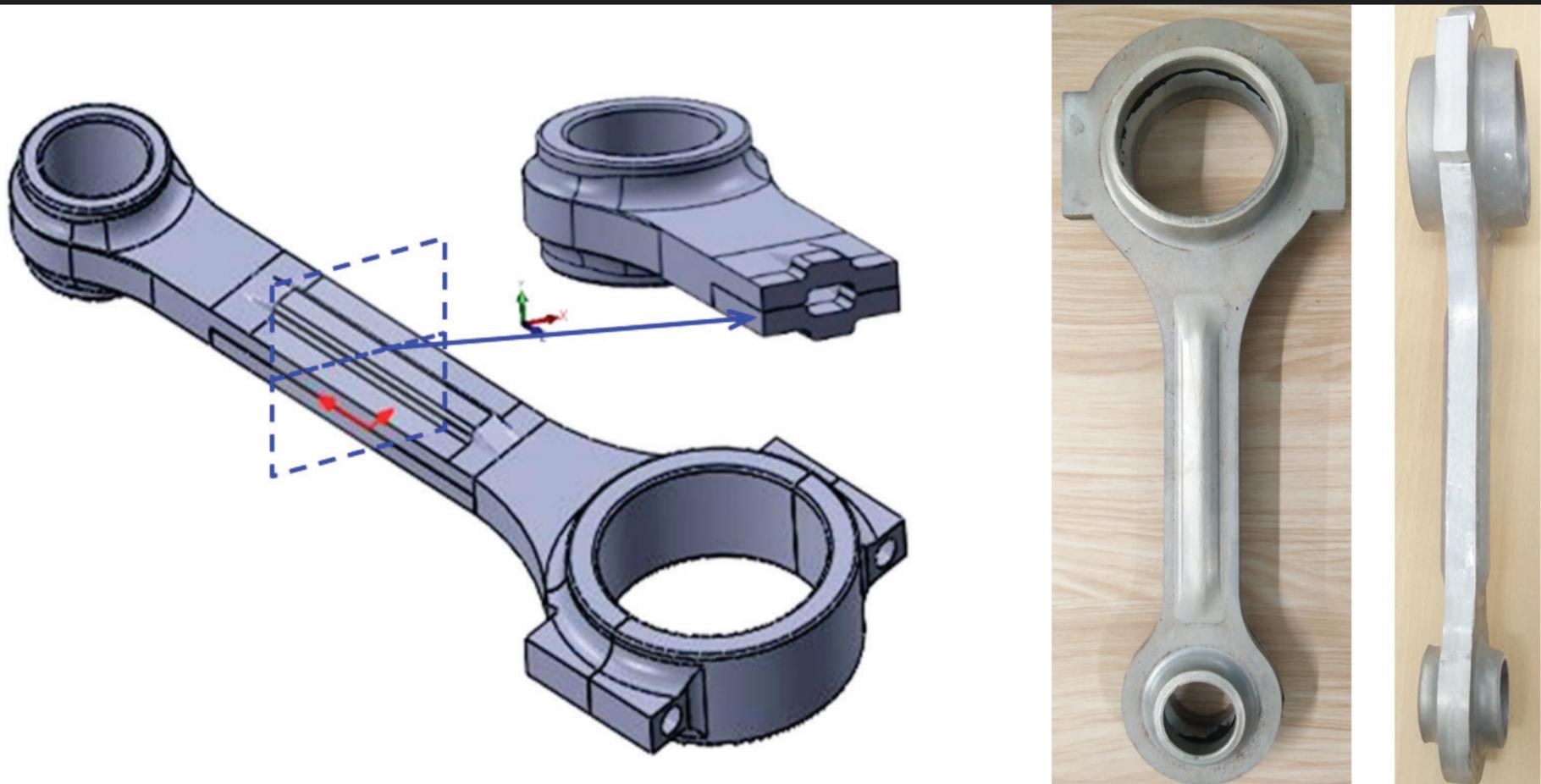


Future of Lightweighting Entry



Indian Institute of Technology Bombay Sheet metal connecting rod

Connecting rods are traditionally made by the forging process. The connecting rod is subjected to axial tension and compression, bending and shear stresses of varying magnitudes over a complete stroke, causing fatigue loading and inertial forces contribute to enhance the piston slap. Lightweighting of the connecting rod will therefore help decrease the inertial component of the loads. This will allow a reduction in piston slap and hence the piston noise will reduce. This will also lead to improvements in fuel consumption due to the connecting rod's lighter weight. Use of lighter material is an obvious alternative to make a lightweight connecting rod. Changing the cross section can also be used to enhance the section modulus. Hence, instead of a rib and web forging that is traditionally used to make the connecting rod, one that is made from sheet metal with a hollow section will be much lighter. In the present work, close to 25% weight reduction can be anticipated. The connecting rod is suitably redesigned for manufacturing using sheet metal. The manufacturing involves punching holes at either end and embossing the two halves, followed by hole flanging at either end in the two halves. These operations can be simultaneously performed in a single setup reducing the number of manufacturing steps and facilitating superior dimensional control. The two halves are subsequently joined using methods like laser welding and those relying on a large surface area of contact, like diffusion bonding.

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