Melt conditioned twin-roll casting (MC-TRC) of an Al-Sn bearing alloy at Federal Mogul Powertrain, USA

J.B. Patel, Y. Zhang, X.L. Yang and K.W Al-Helal

This interest was sparked from a published journal paper available online which focussed on MC-TRC of Al-alloys. Federal Mogul Powertrain is in the business of manufacturing lightweight bearings for automotive applications.

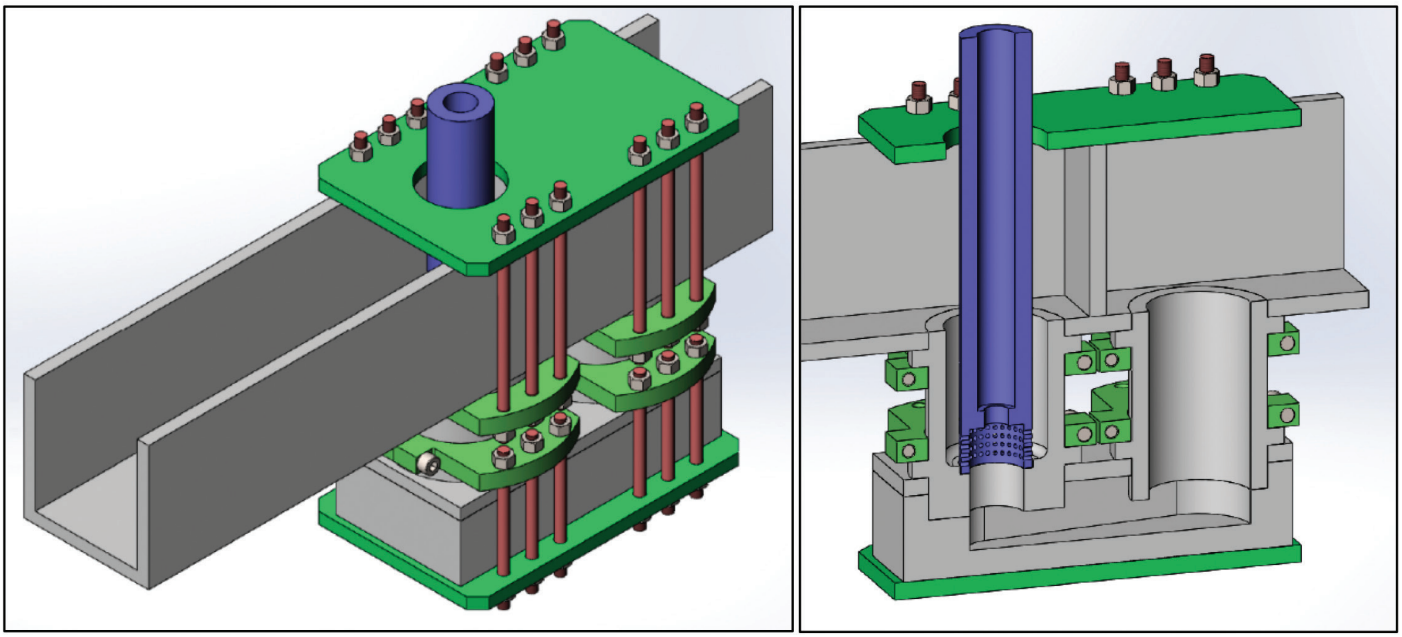

FIGURE 1. Schematic illustrations of the new BCAST in-line high shear melt conditioning system.

These bearings are innovatively and precisely manufactured with mixed layers of polymer and metallic materials, giving them the characteristics of self-lubrication, zero maintenance and a longer service time. Al and Sn do not mix very well due to low solubility of Sn in molten Al, with Sn having a melting point much lower than Al and a density much higher than Al. However, when Sn is added to Al-alloys, it gives the solid Al surface better sliding properties and an increased wear resistance. Hence, a fine and uniform distribution of the Sn-phase in the Al-matrix is highly necessary for better performance. They currently produce the Al-Sn alloy strips by the twin roll casting process, where they need to improve the distribution of the Sn phase in order to gain better performance. The HSMC technology possesses the characteristics of both distributive and dispersive mixing, hence the motivation behind this trial is to improve the size and distribution of the Sn-phase, together with the rest of the advantages of intensive melt shearing. This trial is currently at the design stage, where the HSMC technology will be implemented and integrated into the existing launder system that feeds the twin roll caster, instead of the two holding furnaces, to avoid the challenge of scaling up the HSMC equipment and to apply intensive melt shearing as close as possible to the twin rolls, for better preservation and solidification of the Sn-phase.