Melt conditioned direct chill (MC-DC) casting of 6xxx series Apple Inc. Al-alloys

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An investigation was performed on three specially selected Apple Inc. Al-alloys to evaluate the effect of MC-DC casting, and to assess the benefits of not using commercial grain refiner (Al-Ti-B type) during casting. These MC-DC trials were conducted within our Advanced Metal Casting Centre (AMCC) at Brunel University London, to produce billets of 150 mm in diameter and 2 m in length.

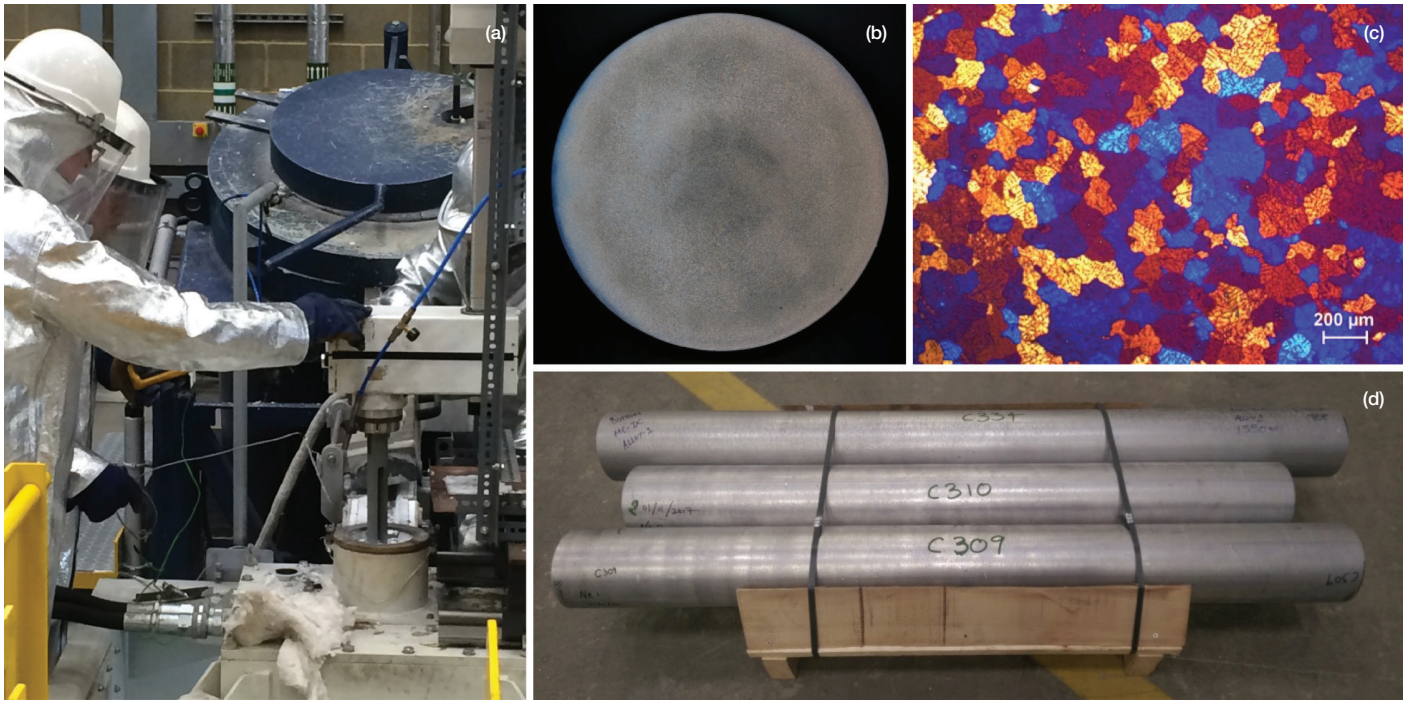

FIGURE 1. (a) MC-DC casting in operation without Al-Ti-B grain refiner. (b) MC-DC billet slice with no-crack in the centre. (c) MC-DC fine equiaxed grain structure. (d) Final manufactured MC-DC billets ready for shipment.

The billets were cast at optimal parameters and shipped to Apple for extrusion into thin profiles for subsequent analysis of their microstructure and chemical segregation integrity. Furthermore, the surface finish was carefully inspected after extrusion, with the ambition of eliminating surface streak marks which are caused by the addition of Al-Ti-B based grain refiners.