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TITLE OF INVENTION	Fluid Dynamic Melted Aluminium Refinement In A Designed Furnace Through A Mathematical Model
FIELD OF INVENTION	MECHANICAL ENGINEERING
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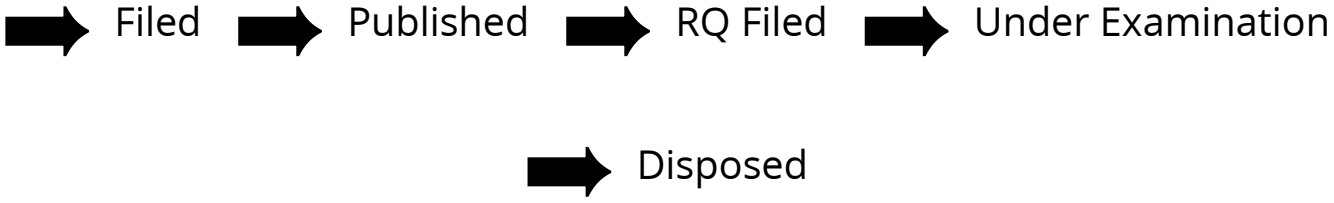

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(57) Abstract :
Abstract Mathematical modelling, as well as simulative optimization, were two of the challenges in the design of an aluminium superheated furnace. A mathematical model of the aluminium production process was initially developed using fluid dynamics. The model is then used to mimic an aluminium alloy melting reverberator furnace with a spherical form. Modelling and simulation are used to forecast complex flow behaviour, geometry, and temperature distribution of the mixture-gas air in the main chamber and the melting tower connected to the furnace to obtain the best furnace thermal efficiency. Based on the results, the burner's position and angle were determined to be optimal, guaranteeing that the combustion gases were circulated through the melting chamber as well as the cooling chamber of the tower. A proper arrangement of refractory materials is also devised so that the furnace's outer surface does not lose heat to the atmosphere. It is also necessary to obtain temperature profiles to perform optimization on the final furnace design. An improvement in aluminium processing, including magnesium removal for finer alloys, as well as an increase in the rate of aluminium chip accession, are all possible with the simulation-based optimal furnace design.

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