Casting Simulation Analyses of A390 Aluminum Brake Shoe

ABSTRACT

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The A390 aluminum alloy brake shoe is widely used in automotive industries. However, there have been some problems with its thermal expansion, which can lead to brake lining wear and decreases braking efficiency. This research aims to solve this problem by studying the influences of gating system designs on the A390 alloy brake shoe and analyzing the flow behavior to reduce thermal expansion. The computer-aided engineering (CAE) method is used to simulate and analyze the flow behavior of the A390 alloy brake shoe.

Chapter 1: Introduction

1. Literature Review

This chapter outlines the research objectives and reviews the relevant literature on casting simulations and aluminum alloys. It also introduces the experimental methods and the computer-aided design of the brake shoe.

Chapter 2: Experiment Method

2.1 Casting Using Aluminum Alloys

This chapter describes the casting process of aluminum alloys, including the casting material, the experimental methods, and the computer-aided design of the brake shoe.

Chapter 3: Analysis of Filling and Solidification

3.1 Filling Simulation

This chapter discusses the filling simulation of the brake shoe, focusing on the optimization of the gating and riser systems for the A390 alloy brake shoe.

Chapter 4: Results and Discussion

4.1.1 A1 Scheme - No Spurway with 1:2:2 gating

This chapter presents the results and discussion of the casting simulation, focusing on the impact of the gating system design on the A390 alloy brake shoe.


