DC鋁胚鑄造程序之溫度變化與缺陷探討

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摘 要

鋁胚連續鑄造的過程中，影響鑄造工件品質的因素很多，如：鑄造速度、冷卻水水量、環境溫度、鑄造溫度等。這些因素使得鑄件產生翹曲變形，嚴重的甚至於破裂或斷裂。針對此問題，本研究建立一預測系統來模擬鋁胚之連續鑄造過程的熱散失與翹曲變形的現象，並依此預測系統進行鋁胚連續鑄造之製程改善。 本研究採用有限元素軟體Workbench CFX來模擬鋁金屬液、鑄模與冷卻水之間的熱傳行為，使用CFX中熱-流耦合分析來處理鋁胚受冷卻水凝固時熱釋放的問題。本文將上述分析之熱傳導係數導入ANSYS軟體中，作為熱-固耦合模擬分析時之初始資料，運用ANSYS 的Birth and Death技術，進行鋁合金7075的鑄造模擬，並針對不同之鑄造速度，來做鋁胚缺陷分析的比較。 由模擬計算結果發現鑄造速度愈快，鋁胚中心溫度沿鑄造方向之下降會越減緩、翹曲程度越小、表面凹陷量越少，鋁胚凸肚量則是越大。對照實際鑄造完成的鋁胚變形情況，結果顯示與模擬之形變現象一致。

關鍵詞 : 鋁胚、DC鑄造、側凹

目錄

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