# ABSTRACT

Vertical direct chill (VDC) casting plays a crucial role in determining the success and efficiency of aluminum billet production. Controlling process parameters, particularly temperature, is essential to ensure consistency in the casting process. Excessively high temperatures can slow down the cooling process, leading to imbalances in the cooling process within the aluminum. This imbalance is significant because overly slow or uneven cooling can affect the uniformity of the microstructure within the aluminum. This study utilizes a mathematical model to analyze the influence of parameters such as water flow, gas pocket flow, metal level, billet length, and casting speed on temperature. A multiple linear regression model was constructed using the parameters most correlated with temperature. The correlation results indicate that metal level and gas pocket flow have the strongest relationship with temperature compared to other parameters. The model evaluation yielded a Root Mean Squared Error (RMSE) of 37.24, a Mean Absolute Error (MAE) of 27.90, and an R-squared value of 0.82, indicating that the model explains 82% of the variability in the temperature data. However, while the model suggests that multiple linear regression can provide insight into the influence of metal level on temperature, the results for gas pocket flow indicate a discrepancy.

**Keywords: Temperature, Spearman Correlation, Multiple Linear Regression, Aluminium billet, Vertical Direct Chill Casting**