THE MAKING OF RIGHT QUALITY MANGANESE STEEL USING CHARGE CALCULATION

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ABSTRACT
The production of alloyed steel in Delta Steel Company Foundry was typified by the making of High Manganese Steel X120MnCr4, known as MNS710 in the company, but quality analyses showed a very high degree of compositional disparity. A sample of twenty-two (22) heats, produced before 1990, showed that melt charges were as varied as the melt composition and even when charges are the same, the analysis still varied widely. This problem was studied and melt charge calculation was used as a means of establishing baseline quantities for melt charges. Charge calculation was carried out using material balance. The optimum composition of manganese steel is 1.2%C, 12.5%Mn and 0.5%Si and through charge calculation, it was established that a furnace charge constituting 83.63% billet crop ends with average composition of 0.2%C, 0.5%Mn and 0.2%Si; 16.1% ferro-manganese (FeMn) of composition 7.0%C, 75%Mn and 1.0%Si; and 0.27% ferro-silicon (FeSi) of composition 0.1%C and 75%Si will yield a melt with a theoretical composition of 1.3%C, 12.1%Mn and 0.51%Si, which is within acceptance limits. The charge percentages were adopted as baseline values for charging the furnace and these yielded better melt compositions. However, melts acceptance was still based on spectrometric analysis because of the inability to have a base metal charge (billet crop ends) that exactly had the composition assumed in the charge calculation.