

Evaluating the Johanson theory for titanium powder

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Abstract

Direct powder rolling (DPR)/roll compaction has been labelled a complex and sample sensitive process. As such the design of the instrument and the determination of the optimal processing conditions for a given feed are very challenging. The challenge is attributed to a wide range of operating parameters and material properties. Several theoretical models can be used to evaluate the interaction of the different parameters and properties and how their changes affect the rolling process. In this study, the Johanson theory was used to determine the rolling parameters of titanium powder. Preliminary results of the nip angle, nip pressures and maximum horizontal pressures of the mill for the powder rolled on a 55mm diameter roll with roll gap sizes of 0.175, 0.15 and 0.05 mm were obtained. The results were found to be acceptable for the nip angle estimation; however improvement on predicting the maximum horizontal pressure is required.