1 Afshar, Sepideh (2015) Modelling and infrared thermal imagery of hot particle curtains. PhD thesis, James Cook University.

1.1 Quotable

1.1.1 Introduction

- Particle curtains are defined as a stream of particles falling a fixed distance through a gas or fluid phase.
- They are very common in industrial drying, particularly in the minerals and food industry.
- Typical unit operations in drying industry are fluidised beds, spray dryers, flighted rotary dryers (FRD) and solid particle receivers (SPR).
- Flighted rotary dryers are used widely in industry because of their simplicity and their ability to handle very large throughputs.
- Particle curtains are important in flighted rotary dryers.
- Researchers have found that the properties of the individual particles, such as particle temperature and particle size, and the operational characteristics such as flow rates and curtain depth, solid volume fraction and rates of heat transfer are important in characterising the behaviour of particle curtains.
- CFD has applied successfully to model 5particle curtains in isothermal conditions; however, there are relatively few CFD studies of hot particle curtains. Furthermore, the use of CFD to approximate bulk curtain behaviour has not been described.
- There are a few examples of the use of image analysis to characterise particle curtains. These have shown promise and suggest that infrared thermal imagery might provide good data for characterising the thermal properties of particle curtains. However, there are no examples of this application to two-phase systems. This illustrates a gap in our understanding.

1.2 General Ideas

1.2.1 Introduction

- Drying is governed by two-phase heat and mass transfer processes.
- Characterising the interaction between gas and particles has spurred the interest of researchers for decades.
- Despite the importance of particle curtains in flighted rotary dryers, a comprehensive model that describes the influence of these properties has yet to be developed.
- There are a few examples of the use of image analysis to characterise particle curtains.

2 Andrew LEE, (2008) Modelling the Solids Transport Phenomena Within Flighted Rotary Dryers. PhD Thesis, James Cook University

2.1 Quotable

2.1.1 Introduction

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2.2 General Ideas

2.2.1 Introduction

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