

Stress distribution inside powder: does Janssen's model applicable locally in a granular medium?

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Abstract

The objective is to establish the bidimensionnal cartography of vertical stress in an ensiled real granular medium for which particle motions are frustrated due to irregular shapes. Horizontal non-uniformity of the vertical stress appears from a critical length (λ_c), identified to the depth at which the lateral percolation threshold of force chains is achieved. Such a result can be explained by wall effects attributed to shielding. It allows us to invalidate Janssen's hypothesis of lateral uniformity of vertical stress over the horizontal axis.

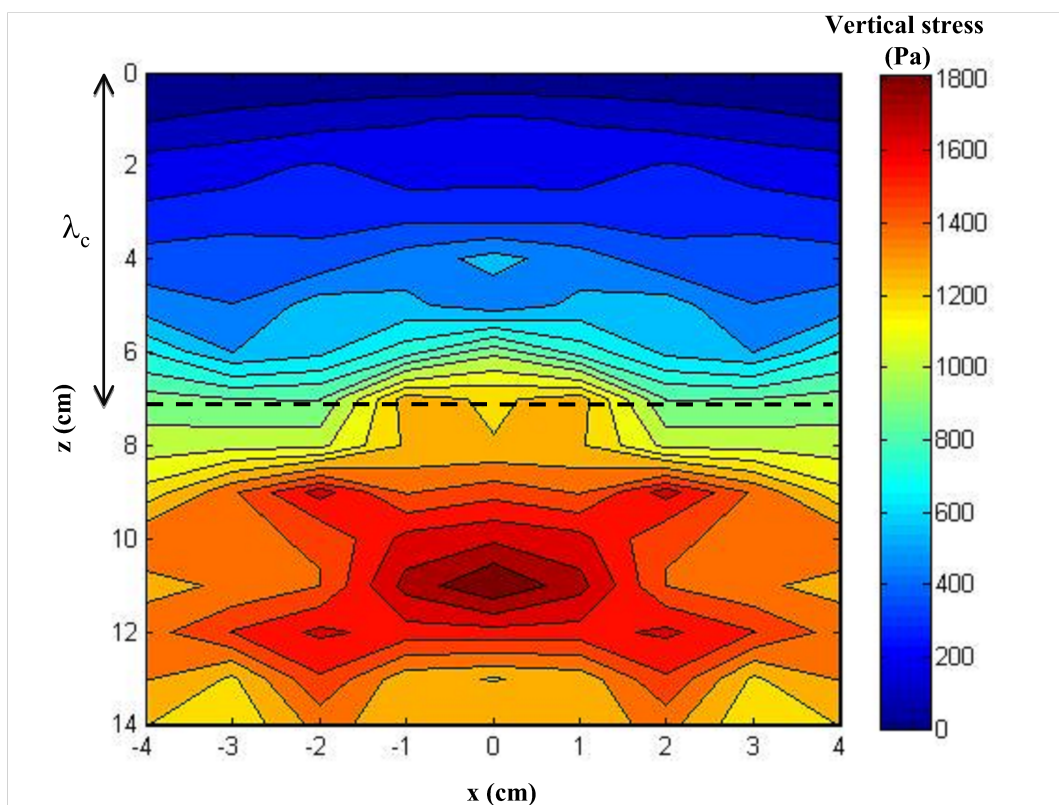


Figure 1: bidimensional cartography of vertical stress in a confined semolina powder

Keywords: vertical stress profile ; ensiled granular medium ; Janssen's law ; wall effect ; shielding.