

Analysis of extrusion compaction of fibrous agricultural residues for fuel applications

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Abstract

The consolidation stage in the compaction of fibrous agricultural materials in an extrusion press has been analysed in order to provide design equations for the optimal choice of die length and estimation of the pulsation domain (region of the die where the material expands and is recompacted repeatedly), for minimisation of die wear. An analysis of the heat flow and transfer processes in the die and the material is also provided. Application of the analyses to the development of a non-frictionally heated biaxial press is discussed. The heated press is designed to be a compromise between conventional extrusion and piston presses, to optimise the qualities of briquettes with power input into material compaction.

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Keywords: extrusion; briquetting; biaxial press; equipment design; heat transfer; design equations

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