

ADVANCED COMPUTING FOR HIGH SPEED BRIQUETTING OF METAL CHIPS AND POWDERS

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Abstract. In the paper is investigated the possible to produce briquettes from chips of aluminum alloy and iron powder. Chips of different shapes and sizes are compared, some of which are free of water and oil (cleaned chips), while the rest are left without cleaning (soiled chips). Upsetting and reverse extrusion of the briquettes were studied. The results show that may be accomplished a large extent of deformation of the briquettes when using processes with predominant compressive stresses. Preparation of briquettes of metal chips with good density and quality is of great importance for the efficiency of this process. The results of impact briquetting of grey cast iron chips with rectangular shape and dimensions 15x25x1 mm are presented. Density and quality of briquettes of these chips are compared with those obtained in another work of the authors using cast iron chips with smaller sizes. It has been found that by using a rectangular chips with a large size are produced briquettes with a very low density and poor quality. From the photographs taken by X-ray tomography, it is clear that the reason for this is the orientation of the chip in the peripheral wall of the briquettes, which does not allow of the air to escape from it. It was concluded that in order to obtain briquettes of cast iron chips with a large size, these chips must first be ground, for example in a small ball mill. In the paper is investigated the possible to produce briquettes from chips of two types of metal. Chips of different shapes and sizes are compared, some of which are free of water and oil (cleaned chips), while the rest are left without cleaning (soiled chips). For briquetting with controlled impact a rocket engine is used. For 3D reconstruction of the internal structure a X-ray tomography is used. The results of experiments for sealing of aluminum alloy and iron powder are presented. The experiments were conducted in the laboratory "Smart lab" with using of laboratory stand and industrial rocket engine. System is used for complex (combined) impact.

Keywords: impact, iron powder compacting, powder metallurgy, rocket engine