

EFFECT OF ENVIRONMENT ATMOSPHERE ON THE SINTERING OF THAI LIGNITE FLY ASHES

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Abstract

Sintering of ash particles, related to deposit formation in a pulverized coal-fired boiler, was investigated for two lignite fly ashes obtained from Mae Moh and Bangpudum coal seams. The tests involved measuring the compressive strength of cold sintered pellets at varying sintering temperature, both under oxidizing (air) and non-oxidizing atmospheres (CO₂)

Under ambient air condition, Mae Moh fly ash which contained higher amount of glassy phase gave significantly higher sinter strength than Bangpudum fly ash. The role of glassy phase was confirmed by the lowering of sinter strength when HF-extracted fly ash was tested. Sintering under CO₂ environment resulted in larger strength development than sintering in air. Under this non-oxidizing condition, the pellet color turned black, indicating that most of the iron was in the reduced state and could form additional low melting-point glassy phase, hence facilitated sintering rate. In addition, blending of the two ashes yielded intermediate maximum strength, under both air and CO₂ environments. This observation substantiates the important role of glassy phase in the sintering process and indicates the possibility of lowering deposit strength by judicious mixing of different raw coal fees.