Adhesion Strength of Biomass Ash Deposits

Ash deposition on boiler surfaces is a major problem encountered during biomass combustion. Ash deposition adversely influences the boiler efficiency, may corrode heat transfer surfaces, and may even completely block flue gas channels in severe cases, causing expensive unscheduled boiler shutdowns. Therefore, timely removal of ash deposits is essential for optimal boiler operation. In order to improve the qualitative and quantitative understanding of deposit shedding in boilers, this study investigates the shear adhesion strength of biomass ash deposits on superheater tubes. Artificial biomass ash deposits were prepared on superheater tubes and sintered in an oven at temperatures up to 1000 °C. Subsequently, the deposits were sheared off by an electrically controlled arm, and the corresponding adhesion strength was measured. The results reveal the effect of temperature, ash/deposit composition, sintering duration, and steel type on the adhesion strength.

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