

Developing sub-bituminous coal sintering ratio for predicting coal ash slagging factors

ABSTRACT

Fossil fuels such as coal, gas, and distillate are the core fuels for thermal plants. The thermal coal-fired power plant accounts for 40% of global electricity generation. The thermal coal plant is expected to continue generating electricity until 2040, covering roughly 60–75% of the energy demand. Coal is largely used as fuel in thermal power plants in generating electricity. Coal ash causes slagging and fouling at the boiler in the furnace, superheater tube, and pendant tube. Thus, the prediction of coal slagging and fouling is imperative for forecasting boiler repair work and outage. Therefore, this study was conducted in a thermal coal-fired power plant generating 700 megawatts. X-ray diffraction analysis (XRD) was applied to analyze the ash composition. A coal sintering method was developed as an indicator to predict ash slagging. Several coals with different characteristics were selected to conduct the coal ash analysis. Furthermore, sub-bituminous coal sintering indexes for predicting coal ash slagging factors were also developed. From this study, there are minimal ash deposition tendencies for sub-bituminous coal ash with a low sinter ratio of 0.2, whereas the ash deposition tendencies are high for high sinter ratios of 0.8 and above.

Keyword: Coal ash slagging; Sintering ratio; Slagging factors; Sub-bituminous coal