Automated Foam Index Testing of Coal Ashes

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The foam index test is used to gauge the effect coal combustion ashes (CCA) have on specification-required chemical admixtures like air entraining agents (AEA) when CCA's replace cement in concrete. It has always been a qualitative, user-dependent, time-consuming and often frustrating technique. These drawbacks, inherent to measuring foam stability/instability by visual observations, have been overcome by the development of an automated foam index test (*A*FIT™). *A*FIT™ instrument operation requires only that an ash sample be manually loaded into a cell. Then, computer control takes over, adding prescribed amounts of water, step-wise titrating and stirring of AEA into the ash/water mixtures, listening for foam stability/instability and then draining and washing of the cell to make it ready for the next test. Such repeatability dramatically improves the applicability of foam index values. *A*FIT™ data are shown to be quantitative, and comparisons are given between the foam index values from freshly collected ashes and the same ashes after triboelectric separating carbon from ash or chemically modifying AEA-carbon reactivity. Additionally, the effects of AEA titration volume and mixing time on foam index values are presented and foam dynamics are discussed relative to carbon-ash chemical and physical properties.

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