Standardization aspects concerning High Calcium Fly Ashes

Ioanna Papayianni[1], Stamatis Tsimas[2], Aggeliki Moutsatsou[2]

[1]Aristotle University of Thessaloniki, Aristotle University Campus, 54124, P.O. Box 482, Thessaloniki, Greece ; [2]National Technical University of Athens, 9 Heroon Polytechniou, 157 73, Zografou Campus, Athens, Greece

KEYWORDS: high calcium fly ash, standardization

ABSTRACT

High Calcium Fly Ashes are reactive materials that often do not meet the limits of the standards. Therefore, most of the quantity produced annually in the world, due to lignite burning, remains unexploited and charges the environment. Efforts of standardizing these materials as supplementary cementitious materials in Europe failed because there were some bad experiences and many doubts about the consistency of materials' characteristics and performance in concrete mixtures. The only way of utilization allowed is these fly ashes to be used in the blended cement industry. Actually, a low percentage of the materials is absorbed at a permanent basis from the cement industry and huge amounts are rejected or used for reclamation of mining areas. However, investigation on these materials has shown which the weak points are and how they could be overcome by using advances in materials technology. Moreover, they could be classified in categories relative to application fields where their addition in concrete mixtures is advantageous. Following this concept, National Specifications for the use of calcareous fly ash in concrete were established and are in force in Greece, where only such fly ashes are produced at the power stations of the Public Power Corporation. Therefore, categorization of calcareous fly ashes was made according to their free lime content, sulphate content and fineness, which are considered the most influential characteristics on the performance of fly ashes. Then, criteria for their pozzolanicity and volume stability were suggested, following the pattern of the EN 450 Standard for low-calcium fly ashes, but modified in order to be more realistic for calcareous fly ashes. A complete methodology of testing these fly ashes is accompanying the National Specification document, since it was found that some modifications on the relevant methodologies were necessary. The authors, who played a leading role in the more than five year old national effort, believe that this regulative frame provides flexibility in the utilization of calcareous fly ashes and promotes their marketing.

Submitted for consideration in the 2009 World of Coal Ash Conference, May 4-7, 2009.