Interfacial Transition Zone in Standard Mortars: Properties, Characteristics and Behaviour

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The Interfacial Transition Zone, ITZ, between aggregates and cement paste is a question in permanent discussion. In the present study, two siliceous standard sands, ASTM C 109 and EN 196-1, have been used. In spite of the fact that the chemical composition of both sands is almost the same, other properties such as their own size distribution, physical properties, shape and surface texture (by means of digital image analysis) show great differences. Furthermore, European standard sand from Spain has higher roughness and lower circularity factor than ASTM C 109, and as the increase of the specific surface area of grains is totally implicit, its specific surface area BET is three times greater than the one of ASTM C 109. For this reason, the extension and microstructure of Interfacial Transition Zone, ITZ, originated in mortars of PC, prepared and tested with both sands in accordance with European standard EN 196-1, have been different as well.

On the other hand, the settings of these mortars were monitored through amplitude and energy of ultrasonic pulses, as well as in hardened state through attenuation and dispersion curves from ultrasonic pulses, whereas their dynamic elastic modulus was determined by means of longitudinal resonance technique in specimens ASTM 1038-89 type.

An explanation of the differences has been supported by means of SEM analysis to show the different quality of both ITZ. Finally, results confirm that the physical properties of the sands have a more active role than could be expected in the final behaviour of their mortars and in their ITZ originated

Key words: *ITZ, dynamic elastic modulus, ultrasonic pulses, SEM analysis, standard sands, chemical properties, digital image analysis.*