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Moisture expansion: the evaluation method

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All solid materials expand when in contact with water (vapor or liquid). So, ceramic tiles inevitably will present this behavior and it is necessary to find ways to live with. Moisture expansion may result in two undesirable consequences: crazing and detachment. This work is concerned with the last one, detachment. Detachment occurs when the stresses surpass the bond strength at the interface. So, it is necessary to establish maximum acceptance limits for the moisture expansion and the bonding strength, and reliable methods to evaluate these characteristics. This paper is only concerned with the moisture expansion. To evaluate the moisture expansion it is necessary to accelerate the hydration and the dehydration processes. The hydration is usually done by two processes: boiling water and autoclave. The dehydration is usually done in a furnace. Another important aspect in the evaluation process is the equipment used to measure the expansion, caliper and dilatometer. In the dilatometer the dehydration and length variation are simultaneous. In this scenario the objective of the present work was to contribute to improve the evaluation process. To achieve this, the moisture expansions of several commercial samples, with different water absorptions, were evaluated using all possible combinations between the hydration, dehydration and measurement processes. The results suggest that the evaluation combining autoclave and dilatometer are more reliable than the other possibilities.

POSTER PRESENTATION