

Innovative Acoustic Emission Techniques for Concrete Health Monitoring

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Abstract : This research is an attempt to investigate the wide range of events using acoustic emission (AE) sensors of the concrete cubes subjected to different stress condition loading and unloading of concrete cubes. A total of 27 specimens were prepared and tested including 18 cubic (6"x6"x6") and nine cylindrical (4"x8") specimens were molded from three batches of concrete using w/c of 0.40, 0.50, and 0.60. The compressive strength of concrete was determined from concrete cylinder specimens. The deterioration of concrete was evaluated using the occurrence of felicity and Kaiser effects at each stress condition. It was found that acoustic emission hits usually exceeded when damage increases. Additionally, the correlation between AE techniques and the load applied were determined by plotting the normalized values. The influence of w/c on sensitivity of the AE technique in detecting concrete damages was also investigated.

Keywords : acoustic emission, concrete, felicity ratio, sensors

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