

Influence of earthquake disturbance on concrete strength at early age

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ABSTRACT

Construction projects commonly run for years in earthquake zones always have certain seismic risks during the construction process. For early-age concrete that has not fully reached the design strength, whether earthquake action will affect its final strength, and to what extent, needs to be studied. This paper experimentally studied the influence of earthquake on final strength of concrete of grade C30 and C35 with earthquake simulation shaking table at the curing age of 3 h (h) and 8 h (h). Seismic wave speed of 0.1g, 0.2g, 0.3g, 0.4g, 0.5g was applied to the test blocks except for control specimens. After being disturbed by the earthquake at the age of 3h, it still has certain fluidity and can be well recovered by hydration process, hence the strength reduction is less than 4%. In contrast, at the age of 8h, the concrete block is in the final setting stage and become a solid state. After being disturbed by earthquakes, the compressive strength of these specimens has a significant decrement trend compared to the control specimen. Based on the findings, concrete at initial setting stage is less affected by seismic wave. While the seismic wave speed has a more obvious effect on the final strength for concrete at the final setting stage, i.e. when peak acceleration disturbance is greater than 0.4g. It was also observed that the final strength decreases with the increase of the acceleration peak value.

KEYWORDS

Compressive strength; Early age concrete; Seismic action; Strength reduction

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