

ABSTRACT

USING STRUCTURAL HEALTH MONITORING DATA TO EVALUATE PERFORMANCE OF RAPID-SET® CONCRETE AND USING LEAD-CORE RUBBER BASE ISOLATOR TO PROTECT HIGHWAY BRIDGES

Structural health monitoring was performed to newly constructed highway panels on Highway 99 at Second Street in Selma, California. Two approach and three nonapproach highway panels were instrumented by various strain gauges. Comparisons between Conventional Concrete Panels (CC) and the Rapid-Set® Panels (RS) were made to assess the advantages of using Rapid-Set® cement technology. The comparisons were measured by the amount of damage and strain rate in each panel. Experimental results showed that RS technology is worth the high cost to be used in both approach and nonapproach slabs because it has lower strain growth rate and damage compared to CC in the long term, which means RS can reduce the frequency of the closure of the road due to maintenance, causing traffic delays and saving maintenance costs and time. Moreover, acceleration data from the monitoring were used to study the possibility of using Lead-Core rubber isolator (LCR) to protect the highway bridges girders from traffic loads. The study showed that LCR alone is not a good way to protect bridge girders because it causes more girder displacement.

Kittinan Dhiradhamvit
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