Case Study System Identification Of A Phased Construction Bridge During Construction

Khalid ALKADY, Christine WITTICH

Despite the practicality of phased construction, the curing of bridge decks under the effect of continuous traffic-induced vibration raises concerns about the durability of those decks. Therefore, to investigate the concerns raised regarding phased-construction bridges thoroughly in this study, a bridge in Nebraska was monitored before, during, and after the two stages of phased construction intensively for hours. To closely monitor the dynamic response, the girders, deck, and deck reinforcement of the bridge were extensively instrumented with accelerometers. A signal processing framework was developed to extract the dynamic characteristics of both decks of the bridge from the acceleration data. The results showed that within 6-7 hours of the second-phase deck pour, the two phases of the bridge converged dynamically and began to behave as a single structure. Therefore, this study was able to characterize the dynamic response of phased-construction bridges throughout construction.