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Condition Assessment of an Aging PSC Bridge in Karachi

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Abstract

With many of the Karachi bridges that are built before the adoption of modern philosophies of design, are structurally deficient and degraded, owing to the ageing effects and non-existent maintenance. In most cases, these bridges as they approach their service lifetime are now carrying much higher volume and heavier loaded freight vehicles, which warrants continuous assessment of their safety to increased operational loads and seismicity, before deciding on their optimal management.

A pre-stressed concrete bridge (PSC) located in Karachi is investigated for structural deficiencies and possible weakening based on a three-tier approach, including Non-Destructive Evaluation (NDE) and seismic evaluation. The study results show that the overall behaviour of the bridge structure has adequate strength to meet the West Pakistan Highway Code (WPHC) [1] and American Association of State Highway and Transportation Officials (AASHTO) 2006 [2] code demands.

Keywords: bridge condition assessment, bridge inspection, structural health monitoring, bridge management system, risk management

1 Introduction

Capital-intensive bridges require regular maintenance and inspection. Detailed condition assessment plays a diagnostic role for the structurally deficient aging bridges and inadequately maintained within the transport network that requires them to remain in operation beyond their service life. It should also be noted that limited documentation and the presence of hard finishes in many areas make it difficult to fully and easily assess the current condition of the existing structural elements. A structurally deficient bridge is not necessarily unsafe, until a reliable review of their capacity to increased operational loads and seismicity is performed before deciding on their optimal operation.

2 Approach to condition assessment

Condition assessment largely relates to operating goal checks and requires the classification and

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