

A Method of Section Replacement for Pile-Bent Pier Rehabilitation

Atitep Srikongsri^{1, a*}, Alonggorn Sopapun^{2, b}

¹Department of Civil Engineering, Kasem Bundit University, 1761 Pattanakarn Rd., Suanluang, Bangkok 10250, Thailand

²Department of Civil Engineering, Kasem Bundit University, 1761 Pattanakarn Rd., Suanluang, Bangkok 10250, Thailand

^aatiteps@gmail.com, ^balonggorn@hotmail.com

Keywords: pile-bent pier, concrete bridge, deterioration, rehabilitation, repair

Abstract. This paper presents a case of repair practice for a concrete bridge that was classified as imminent failure condition. The bridge is slab-type with an equal span of 10 meters long. Each pier is built up of six driven concrete piles. Over 30 years, critical deterioration occurred to concrete pier columns with many severe corrosion spots on reinforcing bars. A concept of section replacement was used to develop a repair technique to remove an entire body of deteriorated materials and restore with selected new materials, was used to develop a repair method. The method involved several stages of works that included: site investigation, damage inspections; work area preparation and installation of temporary structure; material replacement; and work completion. The lesson learned from repair practice suggests the number of key success factors that are needed to complete the task safely.

Background

In Thailand, pile-bent pier is commonly used to support concrete slab bridges. Refer to typical types given by Department of Highways [2]. It is simply constructed by multiple driven piles arranging as foundation and then all pile heads are capped together with a concrete beam casted in-place. An upper part comprises concrete columns of equal section to those piles extended to reach a level of bridge supporting beam.

The bridge in this case study is located in a central region province. A photograph is shown in figure 1. It is 8 m wide and 130 m long, supported by 14 piers on an equal distance of 10 m pier-to-pier. All piers and upper column have the same cross-section size of 400x400 mm.



Figure 1. Photograph of bridge and site condition