

Veterans Home Bridge Rehabilitation

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Abstract

Bridge rehabilitation projects are completed to permit current design loads and State legal loads on existing structures. This paper presents a rehabilitation case study of the Veterans Home Bridge, a historic orthotropic steel deck arch structure that was constructed with distinctive aesthetics and in an era that warrants its listing in the National Register of Historic Places (NRHP) as a contributing element to the Minnesota Soldiers' Home Historic District. Following a fracture critical inspection which identified critical deficiencies that required urgent repairs, a load rating analysis was completed for the steel truss, which resulted in a 12 Ton Gross Vehicle Weight (G.V.W.) load posting requirement. Because minimum emergency vehicle G.V.W.s exceed this load restriction, the bridge was closed to the public. Multiple repair options were evaluated and a detailed rehabilitation design was completed to facilitate American Association of State Highway Officials (AASHTO) HS-20 Design Truck loading and to meet the aesthetic requirements of the Minnesota State Historic Preservation Office (SHPO).

Keywords: bridge; historic bridge; truss; arch truss; load rating; rehabilitation; repair; structural strengthening; steel design.

1 Introduction

State and local transportation agencies throughout North America employ different methods of infrastructure management to determine, prioritize, and select rehabilitation and replacement projects for implementation. When the condition of a structure is found deficient or if it is unable to meet vehicle loading requirements specified by current design codes, multiple corrective options including rehabilitation and replacement are available. To determine whether rehabilitation or replacement is the optimal choice, an engineering analysis is typically completed to compare the cost-effectiveness of each option throughout its life cycle, with consideration of additional technical, social, and environmental factors. The purpose of this paper is to show a study case for a historic bridge rehabilitation project to show the different phases the project went through during the duration of it. For the Veterans Home Bridge, historical significance played a major role in the decision-making process.

2 Structure Information and Historical Background

The Veterans Home Bridge (Figure 1), formerly known as the Old Soldiers Home Bridge, is located downstream of Minnehaha Falls in Minneapolis, Minnesota. The bridge was constructed in 1908 for the Minneapolis Board of Park Commissioners to carry vehicular traffic over Minnehaha Creek to the Minnesota Soldiers' Home (now the Minneapolis Veterans Home) from Minnehaha Park.



Figure 1. Veterans Home Bridge ^[1]