Synthesis: Rapid Bridge Rehabilitation

QUARTERLY REPORT

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A. DESCRIPTION OF RESEARCH PROJECT
Accelerated Bridge Construction (ABC) has received significant research attention in recent years. For the most part, these research endeavors have focused on means and methods for decreasing impact to the traveling public during new bridge construction. At the same time, there are great opportunities to reduce traffic impacts by decreasing construction time associated with bridge rehabilitation. Most bridges undergo several small and one or two major rehabilitations during their useful lives and decreasing the traffic impacts during these events could have significant benefits. Fortunately, many of the new construction concepts may be able to be adapted for use in rehabilitation scenarios. In still other cases, new means and methods may be needed. This research will complete a synthesis of available rehabilitation alternatives and solutions that could be used by practitioners to complete rapid rehabilitation projects. In some cases these alternatives will be adaptations of new construction methods and in others they will be strictly for rehabilitation activities. This document will provide a comprehensive summary of available solutions. Where appropriate, design and construction procedures will be provided.

A.1. PROBLEM STATEMENT
B. Accelerated Bridge Construction (ABC) has received significant research attention in recent years. For the most part, these research endeavors have focused on means and methods for decreasing impact to the traveling public during new bridge construction. At the same time, there are great opportunities to reduce traffic impacts by decreasing construction time associated with bridge rehabilitation. Most bridges undergo several small and one or two major rehabilitations during their useful lives and decreasing the traffic impacts during these events could have significant benefits. Fortunately, many of the new construction concepts may be able to be adapted for use in rehabilitation scenarios. In still other cases, new means and
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B.1. CONTRIBUTION TO EXPANDING USE OF ABC IN PRACTICE
C. There exists a great opportunity to expand the growing ABC knowledgebase to activities and needs beyond new construction. In this manner, research dollars already expended will derive even more benefits by find wider applicability.

C.1. RESEARCH APPROACH AND METHODS
D. To accomplish this work a comprehensive synthesis will be performed. This compilation of innovative methods will include examples of projects completed across the country. To garner even more value from this synthesis the work will include information on extending ABC to bridge widening. In the event that deficiencies are noted in particular areas, recommendations for additional needed research will be made.

D.1. DESCRIPTION OF TASKS TO BE COMPLETED IN RESEARCH PROJECT
E. The conduct of this synthesis will be conducted following the general procedures utilized by the National Cooperative Research Program. Specifically, the research team will collect information (Task 1), synthesize it (Task 2), and prepare a written report (Task 3).
Tasks 1 and 2 have been completed. To complete Task 1 information related to the project were collected. This included using search engines available online and at the Iowa State University Parks Library. These pieces of information were documented by creating a working list of identified resources, topical information contained within each one, authorship, date, etc. The identified resources were then categorized by the topical information contained within each one. Following the collection of available information, the information was synthesized as part of Task 2. To accomplish Task 2 each piece of literature was first read from beginning to end to gain an understanding of the information contained within. Then each piece of literature was reviewed once again such that the important pieces of information could be extracted. These important points were logged and added to a complete listing of findings. Then, each piece of literature was summarized completely making sure to track the important points while also ensuring that the broad scope was well represented. A draft of the project front matter is included below. This draft front matter gives a good representation of the types of information that has been identified and synthesized. Additionally, a list of cited works is given below.

In short, the results of the synthesis revealed that there has been very little research/development of technologies/techniques that are specifically targeted towards rapid bridge rehabilitation. This is likely an area where additional research efforts could be made. Fortunately, it does appear that there are numerous ABC technologies used for new construction that could be used in rapid repair and/or rehabilitation. As is probably not too surprising, the majority of information that could be adapted from new construction relates to decks. Further, the information related to decks ranges from rapid protection all the way to rapid full replacement.
Information on rehabilitation of superstructures is available but very limited. And, information pertaining to substructures is even more limited. It is felt that the greatest opportunity for developmental work would be in the area of developing rapid means of widening existing superstructures and substructures. These technologies would be more about how to facilitate widening/etc. without disrupting traffic on the existing portion of the structure.

This project is complete and the final report can be found here:

http://www.intrans.iastate.edu/research/projects/detail/?projectID=-446980958
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E.1. EXPECTED RESULTS AND SPECIFIC DELIVERABLES

F. The expected result is a comprehensive document that can be used by practitioners to identify alternatives/solutions for bridge rehabilitation. This useful document will describe the alternatives and provide design and construction information when appropriate and available.

A.6 Other Comments, Challenges, Modifications, etc

None