

The differences in bridge deck maintenance for concrete and steel due to corrosion

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Introduction

A cost-effective bridge is a bridge in which its maintenance over its entire service is focused not only visible defects, but underlying defects such as corrosion. If corrosion mechanisms are avoided, a bridge can cost considerably less to maintain, and it can serve its maximum design service life

Aims and objectives

- Investigate current issues/potential problems that can occur to a bridge deck
- Research various types of maintenance methods within concrete decks.
- Find out how these methods are implemented.
- Perform a cost analysis for various maintenance measures. This includes, the unit cost, service life and the effectiveness of the maintenance.
- Find out how a bridge can have guaranteed safety after the maintenance is complete.
- Find out if these maintenance methods can be improved on for future implementation within the construction industry.

Methodology

For this research paper, the author has investigated the question of ‘The differences in bridge deck maintenance for concrete and steel due to corrosion’. This question has been addressed as a lack of awareness of concretes long-term efficiency and the extent of the state of exposure has created serious problems. Already existing concrete bridges have shorter service life than expected due to higher deterioration levels caused by various deterioration factors such as corrosion. Such concerns have shortened the structures service life, or have required substantial maintenance, all of which come at a considerable cost. This research is a look into how a bridge can be better maintained and also how corrosion damaged can be mitigated or even eliminated in the near future due to the methods listed in this research.

Questionnaire results

Questions	Answers
1) Is a preventative maintenance method the best approach for a bridge deck?	Yes – 82% No – 18%
2) Can Non-destructive test methods for bridge maintenance replace physical and visual inspection?	Yes – 12% No – 88%
3) Can accelerated corrosion tests help with potential problems early on in a bridge’s life span?	Yes – 93% No – 7%
4) Is Non-destructive test methods a cost-effective way of maintenance?	Yes – 88% No – 12%
5) Is bridge washing a crucial method for the longevity of a bridge’s life span?	Yes – 66% No – 34%
6) Does epoxy coated reinforced steel provide the best protection from corrosion?	Yes – 98% No – 2%
7) Is concrete deck patching an adequate form of repair?	Yes – 58% No – 42%
8)Out of the prevention and preservation method in maintenance, which is more beneficial and why?	1 Example: A preventative approach would be classed as more beneficial as it helps eliminate potential problems that could arise early on in the deck of the bridge. By finding these issues early on it can mitigate destructive damage causing costly bridge repairs or even replacements, thus saving money, time and effort.
9) Can the onset of corrosion be controlled?	Yes – 87% No – 13%

Table 1 Questionnaire results

Conclusion

To conclude this research. The author has investigated different aspects within the desired subject area and has completed a questionnaire to help provide a stable foundation for the research. These findings have shown that a preventative maintenance approach is best suited when it comes to maintaining concrete and steel bridge decks. The use of nondestructive test methods (NDT) is a great way to accomplish bridge maintenance as an environmentally friendly method which produces minimal waste. In addition to this corrosion tests are necessary to find problems early on in a bridge's life span, as these tests can provide substantial evidence to what causes corrosion within the structure. Epoxy coated reinforced steel is another great benefit to helping prevent corrosion within the structure which will help mitigate future problems.

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