



Inspection Information Preprocessing for Regional Bridge Condition Assessment

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Abstract

Condition assessment of bridges on a regional level can provide an accurate assessment of bridges lack of inspection data and reliable prediction of structural condition for regional bridges. The core work of regional bridge condition assessment (RBCA) is the establishment of regional deterioration models, which requires a large amount of historical health data of bridges provided by inspection reports throughout service history. An inspection information pre-processing framework is proposed in this study, including data extraction, integration, and storage. The proposed framework can greatly reduce the amount of time and work invested in the information gathering process, providing richer data support for (RBCA). The framework is applied to 2 sets of inspection reports of 2 different highway bridge networks in Shandong.

Keywords: regional bridge condition assessment (RBCA); structural condition assessment (SCA); inspection data; regional bridges.

1 Introduction

Massive construction of civil infrastructure has been launched in China since the 1980s. Up to 2021, more than 913 thousand bridges are in service, with a total mileage of 662,855 kilometres in China[1]. Suffering from environmental erosion, overloading, and natural and human hazards, it is inevitable that bridges are constantly deteriorating [2]. Due to the constant deterioration, regular maintenance is required to ensure the safety and utility of bridges. However, bridge maintenance has always been a trade-off between cost and effectiveness. A short maintenance cycle can lead

to a satisfying maintenance outcome and a huge budget. An imprecise maintenance strategy may significantly reduce the cost of time and effort and leave safety hazards undiscovered. Therefore, it is essential to assess structural condition accurately, preventing waste of limited maintenance resources.

Structural condition assessment (SCA) always is the focus of the civil engineering community. New theories and technologies kept been emerging in the past few decades. Current SCA theories can be divided into two categories: theories based on probabilistic reliability models and theories based on historical health data[3]. For theories based on probabilistic reliability models (PRM), the key to