Research and Application of Bridge Detection and Condition Assessment

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Abstract. The development of society and the innovation of science and technology have promoted the construction of bridges. Bridges have also played an increasingly important role in people's production and life. Therefore, the safety of bridge construction has drawn more and more attention. Bridge detection technology is an important technology to verify and evaluate the safety of bridges. However, the time of appearance of this technology in our country is not very long and needs to be further improved in many aspects. Therefore, bridge detection and condition evaluation should be given a certain degree of attention and scientific testing and assessment techniques can be on the comprehensive performance of the bridge, especially the safety of accurate assessment. This paper mainly analyzes the research and application of bridge detection and condition evaluation.

Introduction

Bridge construction is a very important link in infrastructure construction. Bridge also provides great convenience for people's production and life. Therefore, its function and safety are also very important for people. Bridge construction generally goes through construction preparation stage and construction Stage and bridge construction after the completion of the testing and evaluation stages of these stages of the quality of the construction of the bridge has a very big impact, each link should not allow sloppy slogan, which links have problems will have a very large bridge quality Impact. The bridge inspection and evaluation system can well evaluate the safety and service life of the bridge. The timely detection of the quality problems and potential safety hazards of the bridge can well serve to save bridge maintenance costs.

Bridge Quality Inspection and Status Assessment

The carrying capacity of the bridge is the key issues that need to be considered prior to the construction of the bridge. The carrying capacity of Qiao Liang also largely reflects the pros and cons of the bridge's functionality and the value of its use. For example, the stiffness and strength of the bridge can meet the relevant provisions and requirements for load-bearing during use, and so on. In the work of bridge inspection and condition assessment, load test is a very effective work to directly test the overall performance of the bridge. This method can better test whether the bridge can run smoothly under load and thus Good to the bridge construction quality and carrying capacity to judge and assess. The quality and durability of the bridge construction directly affect the service life of the bridge. Qiao Liang durability includes the durability of raw materials used for bridge construction and the durability of the structure. A lot of work needs to be done in the assessment of the durability of the bridge. First, specific consideration should be given to the durability of the material. After the completion of the bridge construction, the structural durability of the bridge should also be tested in detail. In the inspection process, a variety of methods can be selected so as to obtain more accurate assessment results. Finally, it is necessary to ensure that the assessment results of the bridge safety are scientific and reasonable. In the bridge construction before construction of the bridge model to be further determined. Among them, the value of the bridge is one of the important factors to judge the quality of the bridge model. The value of the bridge mainly focuses on the following factors: whether the traffic is smooth; second, whether the vehicle is driving safely; whether the vehicle is comfortable during driving; bridge structure assessment

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mainly includes four aspects: first, to evaluate the appearance of the bridge; second, to evaluate the structure of the bridge; third, to evaluate the condition of the bridge; and fourth, to evaluate the state parameters of the bridge. This method cannot estimate the safety loss and degradation rate of the bridge. However, the rationality of bridge assessment is also one of the most important criteria for measuring the comprehensive performance of bridges. The current bridge structure assessment methods are apparent detection method, local detection method, static detection method, dynamic detection method. Concrete assessment methods should be based on the actual situation to determine the strength of the concrete bridge test as an example, the strength of concrete over time will produce some changes. The strength of the test methods are rebound method, ultrasonic method, ultrasonic rebound synthesis method, penetration method and fracture method, coring method which rebound method, ultrasonic method is non-destructive testing methods so the more widely used. The humidity of concrete has a certain impact on the rebound value and ultrasonic pulse speed.

Test preparation for the assessment. All aspects of the bridge need to be understood before testing so testing and evaluation needs to be well-prepared. From the status quo and characteristics of the bridge to detect the object has an overall grasp of a clear direction of detection work under test requirements to develop testing tasks. Collect all data used in the construction of bridge Results of the comprehensive assessment of the data River as a reference for the assessment of the bridge should also collect other related materials of the bridge construction This is conducive to inspectors to assess the bridge obtained an objective and fair results .

The Dilemma and Optimization Measures of Bridge Detection Application

At present, in the field of bridge construction in our country, the assessment methods of bridges are still not verified in actual bridge assessment. Therefore, for the moment, the technology of bridge inspection and evaluation in our country is still in a theoretical state as a whole. Many specific techniques and the measures did not get a comprehensive and in-depth application in concrete bridge engineering. Therefore, we need to further study the feasibility of the detection and evaluation techniques, and use various tests and models to verify and verify the bridge detection and evaluation techniques repeatedly to confirm their practical value. Finally, they are applied to actual bridge detection and evaluation.

At this stage, different countries and regions have different grades of bridge structure and do not have uniform standards. This has caused our country to be influenced to some extent in the technology of bridge inspection and evaluation based on other countries. However, since each country already has its own bridge design standards and load ratings, it is more difficult to require uniform testing standards from all countries under different design and load conditions. Based on this, our country needs to standardize the testing and evaluation technology of our country's bridges on the basis of referring to the foreign standards and the construction situation and development trend of our country, so as to provide effective data and materials for our country's bridge construction projects, and then to improve our country's bridges construction project quality, and promote the full use of its various functions.

For the detection and assessment of bridges, it is an important task for the smooth development and implementation of the collection of materials and data which are also needed for the detection of bridges based on the collection of a large amount of relevant data. At this stage, the relevant departments of Chinese bridge construction are still not enough for the accumulation of bridge data and data, and the establishment of its data database still needs to be perfected, among which there are still many loopholes and drawbacks. In response to this problem, our country can strengthen the database system to perfect and establish multi-party links, in particular, need to strengthen the exchange and communication of foreign experts to collect data and data in many aspects, so as to enrich our database of bridge inspection and then make the function of the database give full play to it.

In the current bridge inspection and evaluation work in our country, the application of sensing equipment is quite extensive, and its scale is relatively large. Under the interference of sensing

equipment, most of the bridge monitoring systems are bound to be affected to some extent by their normal operation, so that the monitoring system Failure to perform routine tasks and prevent the monitoring system from performing effective damage localization becomes a challenge in providing accurate and reliable data for assessments. In response to this dilemma, it is necessary to develop an anti-interference device in the field of bridge construction in China, just as it is to prevent signal transmission by mobile phones. However, how to block signals in a completely open environment still requires further research by researchers and the research content needs to focus on the improvement of equipment life and anti-jamming performance and core.

If the overall quality of testing and evaluation of staff is low, will inevitably lead to the effectiveness of the bridge testing and evaluation cannot be effectively played. At present, there is an urgent need for a large number of testing and evaluation personnel in the field of bridge construction. As a result, some personnel with lower professional skills and less responsible personnel are involved in the field, which has negatively affected the progress of the testing and assessment of bridges. Therefore, the bridge inspection and evaluation departments need to carry on the strict selection to the staff carry on the actual training and training to it, so as to improve its technical operation ability and professional quality, and provide an effective basis for the efficient detection and evaluation of the bridge.

Bridge assessment method is still in the theoretical stage. Most bridge assessment methods have not been validated in actual bridge assessment and are still in an ideal state of the art and have been applied in concrete bridge engineering. To this end, we need to further study the feasibility of the method cannot blindly use the pool can create a bridge model test to repeatedly verify the actual value of detection methods to draw practical application of value finally applied to the actual bridge detection.

Bridge structural status level is not clear. Different countries and regions to divide the level of the bridge structure has a uniform standard of different segments for our country to learn from other countries in terms of bridge detection technology has a certain impact. However, as each country has its own design code and load rating, it is not feasible to require uniform testing standards from all countries under different circumstances of design and load. Therefore, we should regulate our country's bridge with reference to the construction of bridges in our country for the reference of foreign standards testing standards.

Affected by the sensing device monitoring system does not work. Sensing equipment is now widely used in large scale. Most bridge monitoring systems do not function properly with the interference of sensing equipment, resulting in the monitoring system not being able to locate the damage and provide the correct and reliable data for the assessment. An anti-jamming device should be developed for sensing device impact issues just as it would be for cell phones to propagate signals but how to block the signal in a completely open environment that requires further research by researchers to focus on how Improve equipment life and anti-jamming performance.

The collection of bridge information is not sufficient. The detection and evaluation of bridges need to collect a large amount of relevant information The collection of data is also an important task in preparation for testing bridges one month ago, relevant departments generally did not have enough data and data on bridges to build bridge data databases. In response to this problem, we can strengthen the database system to establish a multi-link work to improve, in particular, to strengthen exchanges with foreign experts in this field, to collect a wide range of information and research to enrich the database.

Conclusion

Bridge inspection evaluation plays a very important role in the construction and use of the bridge. It can make a concrete and reasonable assessment of the comprehensive performance of the bridge such as safety, suitability and durability. It can better ensure the construction quality of the bridge. Therefore, under the general situation that the quantity and scale of the existing bridge construction are increasing day by day, the continuous development and improvement of the bridge detection and evaluation technology have played an important role in promoting the development of the

bridge construction in our country.

References

[1] Gao Junlong. SensisStruct based on the detection of the bridge arm structure sensitivity and size optimization analysis [J]. Automotive Practical Technology. 2017 (16)

[2] Xia Jie, Cai Guanyu, Dang Xianbin, Zhang Lei, Wang Fuqiang. 22 meters truss bridge detection vehicle [J]. Practical vehicle technology. 2017 (15)

[3] Zhao Rui.Design and calculation of the key structure of trussed bridge detection vehicle [J]. Road construction machinery and construction mechanization. 2017 (08)

[4] Gan Xiaolong. Bridge detection technology development and prospects [J]. Science and Technology Economic Guide. 2017 (26)

[5] Wang Fuqiang, Xia Jie, Cai Guanyu, Zhang Lei, Gao Wei. Several measures to improve the safety of bridge detection vehicle operation [J]. Practical vehicle technology. 2017 (18)

[6] Wang Xiaojun. Perfect bridge detection technology to improve the quality of bridge testing [J]. Technology wind. 2017 (20)

[7] Li Xiaoxiao, Dong Weiwei, Wu Qing. Discussion on the Application of Safety Management in Highway Bridge Detection [J]. Urban Geography. 2017 (18)