

Development of Remote Control System for Bridge Inspection Using Robot and Digital Image Processing Technology

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ABSTRACT:

After 1994, highway bridges are maintained under the Special Law on Structure Safety in Korea. To keep a structure good condition, inspection of the structure has to be performed periodically. The inspection is hard work and needs a lot of time and many inspectors to inspect the structure that is important or damaged. Generally, this contains subjectivity of inspector, and so the result of inspection is not objective and reliable. And the inspection has a limit to only the bridges that access is possible to bottom of it. The purpose of this study is to develop new inspection technique and equipment to solve above problems and to provide convenient inspection work. The new inspection method may be able to make the inspection of bridge deck more efficient and reliable. This new inspection technique makes inspection job scientific and systematic. Digital image processing technology and Robotics are used in this inspection system. This study can be divided into three parts. 1) A study on development of digital image processing system. This system can stitch each image and detect cracks of bottom of bridge deck. Also, it can extract an investigation drawing from the picture. 2) Development of remote controlled robot system with camera and boom system. Pictures of bottom of bridge deck can be captured easily by using robot controlled on the deck remote. 3) A study on construction of Database of digital images obtained by remote controlled robot system. We can compare the pictures obtained periodically. So we can find changes of surface and crack propagations from the images. As a result of this study, inspection work with naked eye could replace with the new inspection system. The system is manufactured including digital camera module, remote controlled robot, boom system and vehicle, and global positioning system.

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