4-wire suspended bridge inspection robot system - Bridge View -

نظام روبوتي معلق بأربعة كابلات لفحص الجسور

- منظر الجسر -

System Overview

- In this system, a robot is suspended under the girder from the bridge surface, and a camera mounted on the robot detects any damage to the bridge. The system eliminates the need for maintenance workers to work at heights, and makes inspections safer.

- Cracks up to 0.1 mm in width can be measured and a measurement database with positional coordinates is constructed.

- The system is less susceptible to strong winds and applicable to bridges with a width of up to 30 m.

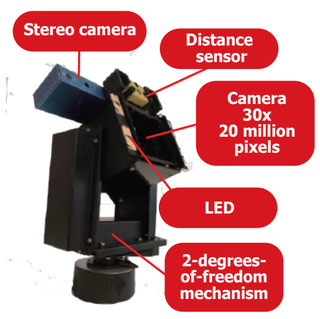
- No need to restrict the traffic on the roadway because the robots fit within the width of the shoulder.

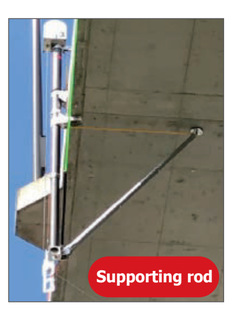
- All processes from installation to inspection are carried out on the bridge surface. Possible to inspect regardless of the conditions under the girder.

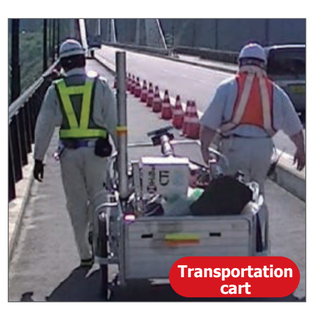
Technologies Developed

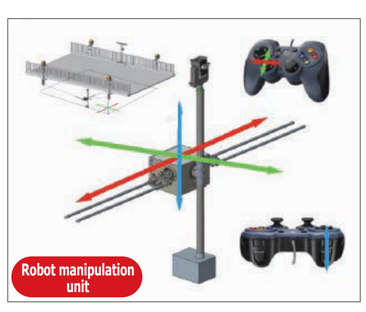
- This inspection system consists of support rods with 4 reels installed on the side of the bridge, a mobile unit supported by 4 wires, and a camera-equipped arm extending 2.5 m in any direction from the mobile unit. With the control of the wire length and arm posture, all parts of the bridge can be photographed.

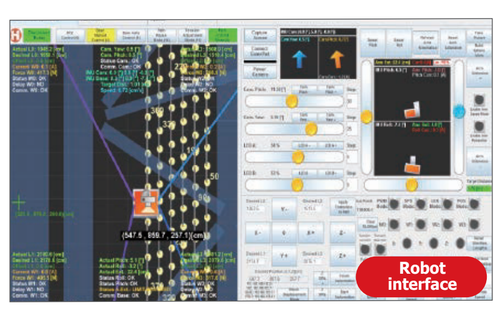
- Also developed an information processing system that analyzes image data efficiently and automatically displays cracks in concrete.











Field Experiments

1. **Enable to inspect the underside of bridge girders that are usually difficult to access by inspection vehicles** such as cable-stayed bridges, extradosed bridges and suspension bridges.

2. Even if a bridge has a lot of traffic and traffic lane regulation is difficult, **it can be inspected using only the shoulder and sidewalk.**

3. **Possible to inspect narrow parts** such as between the attached parts or support parts, and the underside of extendable devices.

4. As the system uses 4 suspension wires, it is **possible to inspect wide gauge bridges (up to 30 m).**

5. **Operation is confirmed at a maximum instantaneous wind speed of about 11 m/s,** and it is possible to inspect under the same wind speed conditions as normal inspection.

6. **Possible to inspect even if the space under girder is narrow (about 1.5 m).**

7. By seamlessly connecting the captured images, it is possible to **accurately determine the location and size of damage.**

8. Automated data acquisition and easy manual operation of the controller allow the inspector to focus on damage detection.

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