

# Visual verification of civil engineering structures by UAV

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## **ABSTRACT:**

In Japan, many superannuated civil engineering structures from which 50 years have passed since it was built exist. Therefore, those civil engineering structures should maintain for a safety. In order to decide which civil engineering structures are maintained, it is necessary to perform initial check. Initial check is usually performed by viewing and sounding using a hammer by a skilled engineer. However, since a skilled engineer and a budget for initial check are insufficient, we are anxious about check fully not being performed. As it being shown, serious accidents have occurred, such as tunnel collapse. Therefore, it is expected to develop the method of initial check for civil engineering structures from simple and low cost.

In this study, we have developed and verified the method of initial check for civil engineering structures by using the UAV. A digital camera and IR digital camera were loaded on the UAV. The IR digital camera was modified to remove an infrared cut filter and to put on an infrared pass filter from an ordinary digital camera. Visual verification was performed in places where viewing is usually difficult, such as the floor slab of a bridge, using the developed system.

As the results, the omission of the bolt, exfoliation of the concrete surface, etc., Were detected. But the verification was difficult at the dark place by a shadow. It turned out that the devices of lighting on visible and IR is required.

UAV turned out, essential to visual verification of civil engineering structures.

**KEY WORDS:** UAV, Near infrared imagery, Photogrammetry, Civil verification