Concrete-Wall-Climbing Testing Robot

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Abstract : A concrete-wall-climbing testing robot, has been developed. This robot adheres and climbs concrete walls using two sets of suction cups, as well as being able to rotate by the use of the alternating motion of the suction cups. The maximum climbing speed is about 60 cm/min. Each suction cup has a pressure sensor, which monitors the adhesion of each suction cup. The impact acoustic method is used in testing concrete walls. This robot has an impact acoustic device and four microphones for the acquisition of the impact sound. The effectiveness of the impact acoustic system was tested by applying it to an inspection of specimens with artificial circular void defects. A circular void defect with a diameter of 200 mm at a depth of 50 mm was able to be detected. The weight and the dimensions of the robot are about 17 kg and 1.0 m by 1.3 m, respectively. The upper limit of testing is about 10 m above the ground due to the length of the power cable.

Keywords : concrete wall, nondestructive testing, climbing robot, impact acoustic method
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