6. Development of Moist Curing System for Concrete Slab - Integration of an Evaluation System for Wet Conditions on Slab and Watering Facilities for Labor Savings -

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Maintaining optimal moisture conditions on the surface of concrete slabs after pouring and finishing helps prevent surface cracking and other problems, a critical factor in construction quality management. However, surface conditions are often judged by visual inspections alone. Accurate quantitative judgments are often difficult to make. Furthermore, the task of watering requires a lot of labor.

In the study reported herein, we developed a moist curing system integrated between the system where an autonomous mobile robot evaluates wet and dry conditions on the slab and watering facilities that can be connected to evaluation results. We confirmed that the values measured by this system correlate with changes on the slab surface. Setting thresholds for these measured values allowed evaluations at three stages: wet, semi-dry, and dry. The watering system consists of the water taps and vinyl hoses typically found on construction sites. When the system evaluates an area as dry, it activates the watering process through the control of solenoid valves.

We deployed this system as part of a construction project involving a floor slab area of 500m^2 and confirmed that using this system allows us to maintain a sufficiently moist condition. Additionally, we confirmed that this system can contribute to a labor saving of approximately 65% labor and also resource savings for the materials used.

Keywords: slab, autonomous mobile robot, labor savings, automatic watering, resource savings