SCALE-TRON

Perfecting the Art of Concrete Production

EVALUATING THE RADARTRON MOISTURE SENSOR

The measurement of moisture in sand (or other aggregates) is an imperfect art; many factors prevent perfect measurements, making it almost impossible to prove conclusively that the sensor performs to any given degree of accuracy. Microwave sensors like RadarTron are still valuable, however, since they can make measurements and allow corrections which are better that any other method in the past.

Consider an 18 inch square gate through which sand is flowing. A small portion of this sand in the centre of the gate is measured by the sensor but the bulk of the sand, even though it passes through the gate, is not measured. This means that, if a very wet or very dry portion slips down one side of the gate, the sensor may not measure it, and an incorrect reading results. This can and does happen occasionally. Unfortunately, if a person is taking a sample from the side of the gate on which this occurs, his sample and the sensor reading will not match. Neither the sample nor the sensor reading are incorrect but the evaluator concludes that the sensor is unreliable. This type of evaluation is not recommended and is a waste of time for everyone concerned.

In concrete production, the sand moisture value is used to compensate for the water in the sand, to give the correct dry sand weight per the mix design. The amount of added water is also adjusted in proportion to this moisture value, the result being concrete which is more consistent regarding yield, workability and slump. The easiest to measure, and usually the most important, is slump because it dictates the strength of the concrete when cured. If the moisture sensor is connected to the batching computer and used as above, the slump variation from batch to batch should immediately improve. This can be measured by doing slump tests or, more conveniently, by measuring mixer motor power or current. If the motor power is plotted along with the sand moisture readings, the power curve will be seen to flatten when the sensor is switched "on-line", i.e. used for compensation.

In the example below, before compensation the slump is seen to vary in proportion to the sand moisture. After compensation, the slump will vary much less and will be unrelated to the variations in sand moisture. This proves that the moisture sensor is correctly compensating for the water in the sand. The evaluation test is direct, is easy to do and is meaningful.

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