CONCRETE PIPE ABSORPTION

In view of the trend toward more restrictive leakage requirements, it is extremely important to evaluate the impact of absorption by the concrete, which is perceived as leakage.

A test program was established in order to better understand concrete pipe absorption. The test set up consisted of a bulkheaded pipeline of a particular diameter and length, and a measuring tank that was pressurized for a period of time, after which the water loss in the tank due to absorption of the pipeline was recorded. Tests were conducted at various production facilities.

The test was conducted over a period of 72 hours. First the pipeline was soaked for 24 hours under no pressure and then for additional 48 hours under 5psi pressure. This process was chosen to correlate the results with ASTM C969, which allows up to 72 hours of soaking to account for water absorption in the pipe.

The average absorption rate for all pipelines tested was 60 Gal/(in•mile•24hr) for the 48 hour test period which commenced on completion of the 24 hour soaking period. Considering that ASTM C969 allows 200 Gal/(in•mile•24hr) leakage rate for the infiltration/exfiltration test, these tests show that on average, approximately 30% of this rate is still being absorbed by the pipe after the soaking period.

Also, the total water absorbed in the 48 hour time period represents approximately 1.7% of the total weight of the pipelines. The allowable absorption rate for quality concrete per ASTM C76 is a maximum of 9% (Method A, C497). When we compare the water absorbed in the tests with that allowed by ASTM C76 for example, one recognizes the potential increase in absorption was still high at the end of the test period; not all of the potential water was absorbed during the test period.

In conclusion, the actual water loss therefore is considerably less than the perceived loss indicated by the test. In cases where leakage limits are more restrictive than 200 Gal/(in•mile•24hr) as per ASTM C969, the pipeline may potentially fail the test because of absorption, and not because of leakage.