

Case Study: An AIRtrac™ System at Armtec, Calgary, AB

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Taking Concrete Quality to a New Level

When asked a couple of years ago by Ed Mansky from Grace Construction Products, “What is your toughest hurdle in producing consistent concrete and what would be on your wish list with regards to producing the best quality concrete possible?” My response was, “I would like to know what the air content is for every batch of concrete while it is in the mixer.” The feedback I received was that Grace was working on that and to stay tuned.

Fast forward 8 months later and the first prototype AIRtrac device was installed for our evaluation and testing.

The AIRtrac works using a probe located in the floor of the mixer which allows the observation of the temperature and air entrainer reaction during the entire batch cycle. It enables the operator to track changes in the mix as the cycle progresses, for example when the air drops and re-building after the addition of a vma or accelerator the changes are tracked and the data is reported live. The mix can be discharged at the optimal time for each mix design, not only when the mix is within specification, but also avoiding any unnecessary extended mixing.

The plant also has the ability to maximize the efficiency of the mix with adjustments in sequencing; this ensures that the air is stable, giving a robust and viscous mix. It is no longer necessary to make frequent adjustments to air dosages or if we do, it is in small increments due to the ability to see how the temperature affects the air. For example; if we observe that the mix is losing air and slump, we will also see the concrete temperature rise. Our new process is to start adjusting the cold water to get to our desired concrete temperature and the air and slump will begin to stabilize. Utilizing this method, an adjustment to the air entrainment is often not required.

Rejected concrete is costly in many ways; the cost per cubic metre of the rejected mix, disposal costs, production delays to the pour that could in turn affect the entire plant, product quality (possible pour lines, cold joints could develop). The AIRtrac can reduce air concerns and the temperature monitoring helps eliminate slump concerns that are typically the main causes for rejected concrete.

The frequency for the air content tests varies from project to project; it could be every 10 m³, 20 m³, or 30 m³, or it may require testing every bucket of concrete. The AIRtrac gives the batch plant confidence in their mix by giving the operator the ability to know when it is discharged into the bucket all the customer requirements are met and we are providing a quality, robust and homogenous concrete.

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An excellent example of the AIRtrac advantage is a current bridge project with increased frequency of testing. The specifications have a 260mm maximum slump and requires that the air, temperature and slump to be tested on every bucket. We are able achieve the tight tolerances pour after pour with confidence and without affecting the quality or the pouring of the element.

Another example of its value was a recent DOT project which had a very tight air specification of 5%-6.5%. We were able to utilize the AIRtrac and adjust the mixing parameters correctly allowing the batch operator to know exactly when to discharge the concrete and ensured that the air was within the required parameters stipulated by the client.

The benefits of the AIRtrac to the production and operations process improves the pour cycles, no extended delays in pouring of the precast element due to additional mix testing and adjustments. This provides our customers and our team, with peace of mind in knowing that the highest standards of quality are maintained in the concrete produced, as well as the element that it is cast into.

