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John Biesak
Cidra Concrete Systems Inc.
HQ 11485 Valley View Road
Eden Prairie, MN 55344

Dear John,

My introduction to AIRtrac was during my employment with Tilcon Connecticut Inc. as Technical Services Manager and has carried through to my present position as a consultant to the Concrete Industry. My recent review of a white paper written by Dr. Kenneth C. Hover, titled "Benefits of Real-Time Monitoring of Air Content in Fresh Concrete" dated January 2019 has reminded me of the importance of this document and the effects it could have on our industry and the way we approach air entrainment testing . In my view, AIRtrac is an improvement to current practices.

While researching the existing methods for determining the air content of fresh concrete, there seems to be a couple common denominators:

- All current methods require a "human element", including sampling the concrete and exact procedures operating required equipment.
- The equipment currently in use requires regular calibration.
- The precision and bias paragraphs included in both ASTM and AASHTO designations provide factual documentation that the recognized air content test procedures present tolerances or contestable language that could affect the acceptance or rejection of the fresh concrete.
- In most cases the concrete is already in-place prior to successful or failing tests resulting in potential liabilities for the producer.

The AIRtrac system is available for automatic "real-time monitoring" of fresh concrete during all stages of delivery (from batch plant to job-site) while providing the concrete producer a permanent record traceable to each delivery. I personally refer to AIRtrac as "Total Air Management", because of what it provides the QC Departments of concrete producers. What do I mean by "Total Air Management"? Producers work with manufactured sand, different cements, pozzolans, set retarders, set accelerators, water reducers, and various other specialty chemicals to improve or modify their concrete products. All of these could affect the air entrainment of the concrete. This is where "Total Air Management" can be extremely helpful. Prior to arrival on the jobsite, AIRtrac is accurately monitoring all changes in real time. Commonly an increase in air content will appear after batching, followed by a steady decline in air content as truck travels to job-site. Producers need to understand this change from batch plant to job-site. The AIRtrac system is also measuring concrete temperature, drum rotation direction and speed, volume of concrete returning from a job

and has a revolution counter and timer. All this information is important to a producer's quality control & operations team.

I would like to share an experience I had while developing a specialty mix for our state DOT. The requirement of the mix design was 2500 psi in 6 hours for full-depth highway repairs. In the past, we have always had difficulty controlling the air content of these high, early-strength mixes because of above normal dosages of non-chloride accelerators, hardening agents and elevated temperatures. In most cases we were increasing the dosage of the air entrainment chemical by four times to achieve the required air percentage. By utilizing a truck equipped with an AIRtrac system, we were able to witness in real- time the changes taking place. The air content quickly dropped as we watched the AIRtrac results live. Our next move was to conduct a trial batch while holding back the additional chemicals. The results were apparent, as we manually added the chemicals into the back of the truck with the AIRtrac system. We were able to achieve successful, steady air control. After the test batch, we reconfigured our batching sequence at the plant to increase the delay and allow the concrete to establish a stronger initial air content before introducing all the admixtures. This is only one of the many circumstances that the AIRtrac system has given us the "Total Air Management" knowledge, in real-time, needed for precise control over our concrete batching, sequencing and delivery.

John, I strongly believe AIRtrac will soon become an industry standard. The acoustic technology does not depend on middle of the load sampling, complicated and error prone equipment, multi-operator variations, inaccurate computations or calculations. Perhaps the greatest advantage of the AIRtrac system is allowing the producer "Total Air Management" in real-time on every load of concrete leaving the plant.

Sincerely,

Kevin E. Miller

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Consulting and Training for the Concrete Industry