

COMMANDbatch Precision Water System

Case Study | Arizona Metro Mix

Profile

Arizona Metro Mix (AMM) is a four plant, 42 truck contractor/producer providing concrete to the Greater Phoenix Metro Area. In that market the temperature range spans from 90 degrees Fahrenheit (32 C) at sun up to over 120 degrees (49 C) during the latter part of the day. Controlling the slump, air, and color content of mixes in this environment is already challenging…but Arizona Metro Mix also contends with changing sand equivalency (SE [1]) which can vary by nearly 35% over a period of a few days.

The Challenge

AMM was award a job where the concrete, with tight requirements for air content, was required to be delivered up the side of a mountain. Bob Matthews, Operations Manager for AMM, originates from Michigan where air entrainment is used all the time…however, they don't use much in Arizona and historically the company had struggled to contain entrained air variation to no more than one and one-half percent (± 1.5%) from load to load.

"(Precision Water System) really has been the best thing for Ready Mix Concrete since computers were added to the process."

Arizona Metro Mix (AMM) doesn't have a separate QC department. AMM had used probes before which were, in their opinion, only slightly better than nothing. Sand coming in from the quarry varies from 0% to 4% from load to load, with an upper range of 12%. Using the probes AMM has historically used, if the incoming sand varied by more than 2%, they would have to recalibrate. Since the material was constantly coming in AMM was always "chasing" the moisture and slumps were "… all over the place." Recalibration with the old probes was frequently required three times per day. Concern about being thrown off jobs for inconsistencies was never far out of mind.

Before the mountain job started the old probe quit and the company was forced to act. AMM chose to add the Precision Water System on their worst plant where the SE of the fine aggregate can vary from 68 to 92 over a period of a few days.

The Result

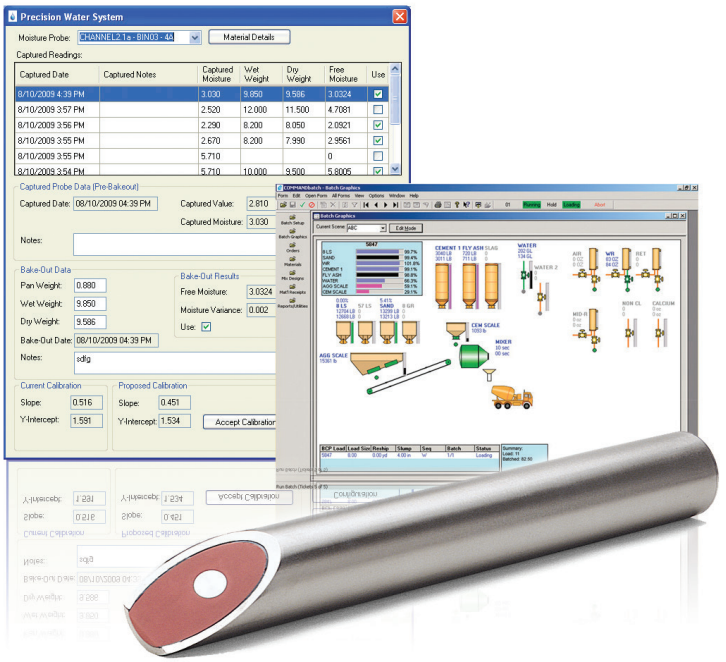
- The company delivered 200 loads up the mountain to the job site.
- The company had estimated 10 loads of concrete to be rejected because of air issues.
- The total number of rejected loads? Zero.

COMMANDbatch Precision Water System
Secrets of Success

Companies spend millions of dollars on equipment to produce concrete while missing the systematic control of water and its effect. Arizona Metro Mix (AMM) believes that tools are available to help. Since their "mountain" project, Arizona Metro Mix continues to leverage the Precision Water System to the benefit of their customers providing improved service, customer satisfaction and retention through consistency.

Bob Matthews, Operations Manager at AMM, is a former contractor who relies on his experience along with great products from Command Alkon to achieve results. This experience reinforced his belief that if the water is controlled then results will be predictable. The proper amount of water stabilizes the strength, the bleed water, finishing effort, and set time characteristics of the concrete.

Consistent water also means control of the entrapped air. Bob likes to say that air "travels" in the paste (wa¬ter, cement, some sand). A consistent amount of paste, with a consistent amount of air entrainment agent, will yield consistent results. For a specific example, if sand is running at 5% moisture, 1800 lbs. (818 kg) of sand contains 90 lbs. (40 L) of water. That's over 10 US gallons. If not compensated for this is extra water which must go somewhere… either to the bottom of the slab, create excessive bleeding off, or break out of the (finished) concrete later which leads to cracks and/or reduced wear-ability. If there is too much sand, the finished concrete can be too dense, smothering the hydration process, preventing the bleed water from properly evaporating. Rock is less of a problem…but enough rock is needed to create voids so the water can escape. Remember: 20 to 50 pounds (9 to 23 kg) per yd3 (.76 m3) of sand that is not moisture adjusted can have a substan¬tial effect on the curing behavior.



AMM also provides a substantial amount of colored concrete. Many will agree that colored concrete can be problematic. Bob has discovered that problems with color in his market are primarily due to sand and water. To be successful first keep the sand color consistent. Just as importantly, closely monitor the water. Colored concrete is a bit like paint…if you vary the water in a can of paint the color will vary… the same applies for colored concrete. AMM has used the Precision Water System to deliver 2500 yd3 (1923 m3) for colored panels and has not had a single panel rejected.

Maricopa County, where AMM is located, specify recipe (prescription) mixes. On those mixes, the standard deviation for breaks has dropped 36% to 346 lb. (2.38 MPa) since the addition of Precision Water System. On the (non-reci¬pe) production mixes AMM has used this consistency to drop about a half a sack of cement per load equating to annual savings of $40,000.

Before AMM, Bob worked at a company that delivered a job requiring 10,000 PSI (68.9 MPa) concrete in seven days from a COMMANDbatch equipped with Precision Water System. The requirement was for 24" (60 cm) to 30" (76 cm) spread. Every load was tested, and Bob never lost a load due to water variation. During one stretch he hit the 26" (66 cm) spread target on 22 straight loads.

Improved productivity is another benefit. If the concrete is right, the drivers don't need to wait or spend time at the slump stand. Getting them out in 5 min vs 7 can save 2-3 trucks on a 300 yd3 (230 m3) pour.

Find out more about Precision Water System from your Command Alkon Sales representative.

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[1] Sand Equivalency is measured by standardized test methods such as ASTM D2419, AASHTO T176, and EN 933-8. The test is used to qualify aggregates for applications where sand is desirable but fines and dust are not. A higher sand equivalent value indicates that there is less clay-like material in a sample. The proportion of clay/sand affects the finishing of the concrete.

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