Command Alkon®

PRECISION WATER SYSTEM

Arizona Metro Mix

Arizona Metro Mix is a four plant, 42 truck contractor/producer providing concrete to the Greater Phoenix Metro Area.

The Challenge

Arizona Metro Mix 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 Arizona Metro Mix, 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. Arizona Metro Mix doesn't have a separate QC department. Arizona Metro Mix 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 Arizona Metro Mix has historically used, if the incoming sand varied by more than 2%, they would have to recalibrate. Since the material was constantly coming in Arizona Metro Mix was always "chasing" the moisture and slumps were "… all over the place." Recalibration with the old probes was frequently required three times per day.

The Solution

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. Arizona Metro Mix 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.

LOCATION
Phoenix

INDUSTRY
Producer

RESULTS
Zero Rejected Loads

The Result

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

Companies spend millions of dollars on equipment to produce concrete while missing the systematic control of water and its effect. Arizona Metro Mix 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 Arizona Metro Mix, 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 (water, 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 substantial effect on the curing behavior. Arizona Metro Mix 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. Arizona Metro Mix 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 Arizona Metro Mix 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-recipe) production mixes Arizona Metro Mix has used this consistency to drop about a half a sack of cement per load equating to annual savings of $40,000.

Before Arizona Metro Mix, 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.