



Baker beats the heat with *intelliRock* and saves CEMEX \$130k

Baker Concrete's commitment to excellence and innovation brought the new CEMEX headquarters in on schedule, under-budget, and with LEED points



CEMEX Headquarters

*The 325,000 square foot CEMEX headquarters is one of the largest green buildings in Houston. What made this possible? Use of a leaner mix design containing fly ash and a maturity program with *intelliRock*. This combination also saved money, kept the project on schedule, and earned LEED points for the environmentally-conscious owner.*

The Situation

Past experience had shown that a High Early mix could help maintain a 24-hour pour and post tension schedule. Thus the use of a High Early mix design was planned for constructing and post tensioning decks at the new CEMEX headquarters in Houston. But if a lower cost mix design containing fly ash could be used on the project while keeping the pour and post tension schedule, CEMEX could save money on materials *and* earn LEED points. Senior Project Executive Aaron Smith of Baker Concrete believed it could be done and planned to combine Baker innovation with cutting-edge technology from Engiuis to prove it.

Both Aaron and brother Matt Smith, Senior Project Engineer with Baker Concrete, had become impressed with *intelliRock* on a previous job. So, too, was Gary Hermann, Baker Concrete Project Manager. Impressed enough that Aaron called a meeting with general contractor Anslow Bryant, engineering firm Haynes Whaley, and owner CEMEX to discuss using the *intelliRock* maturity system for this project.

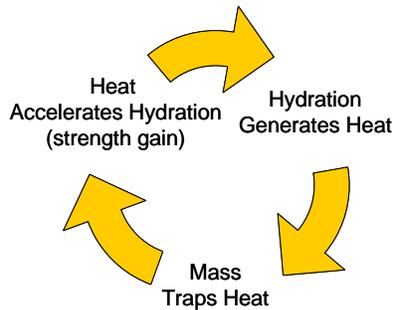


Figure 1: Concrete/Heat Curing Cycle – Elevated temperatures accelerate strength gain.

Aaron was convinced that by taking advantage of the accelerated gain in concrete strength - a result of the Houston summer heat, they could use a leaner mix design instead of the High Early mix originally planned. In this 14-floor building with 325,000 square feet, switching mix designs could save approximately \$130,000 in concrete costs alone. Furthermore, Aaron explained, they could also use a leaner mix with fly ash and earn their environmentally-conscious owner LEED certification points.

Maturity – A key factor

As illustrated in the figure above, concrete generates heat as the cement hydrates. But in this particular project, additional heat was being provided by the white-hot Texas sun. Since an increase in temperature accelerates hydration and thus the rate at which the concrete gains strength, target strengths would actually be achieved in a very short time. Using a High Early mix design would have simply been overkill. Conversely, a mix design with fly ash typically cures more slowly in cooler climates, but with the Houston heat turning up the hydration process, a lower cost and “greener” mix design could be used to achieve the strength necessary to maintain the aggressive construction schedule.

The *intelliRock* sensors strategically placed prior to each pour monitor the concrete’s temperature and calculate the effects of elevated temperature on strength gain. Tracking the data transmitted by the sensors, the *intelliRock* software converted the reported maturity data into actual strength values – which it can do for any mix design. This is how Aaron Smith at Baker Concrete successfully completed the aggressive schedule on time, below budget, and with “green” LEED points for the owner.

“The job went very well from our perspective and *intelliRock* helped us achieve our goals,” stated Baker’s Aaron Smith. “We stressed our PT beams 18 hours after placement, stripped decks about 20 hours after placement, and were able to pour a floor each week. Had we to wait for even a 2-day break, we wouldn’t have been able to achieve what we did.”

The Results

- Using a leaner mix design saved CEMEX approximately \$130,000 in material costs alone.
- Lean mix with fly ash earned valuable LEED certification points.
- Since *intelliRock* readings are available immediately, the wait time for post tension timing results was eliminated.
- Stressed PT beams in 18 hours.
- Stripped decks at 20 hours.
- Finished on time and under-budget.

“The CEMEX headquarters project should serve as the poster-child for intelliRock because everything went exactly according to plan and we kept right on schedule.”

– Aaron Smith, Senior Project Executive, Baker Concrete Construction, Inc