



## Case Study: 4<sup>th</sup> Avenue Jail Project; Phoenix, AZ



**McCarthy Building Companies, Inc. did not have to wait for seven-day lab results to strip forms and re-shores because real-time, in-place concrete strength data from IntelliRock saved man-hours and allowed McCarthy to rent less formwork and cycle it faster.**

### Project Background

McCarthy Building Companies Inc. managed construction of the \$91 million project Maricopa County's 4<sup>th</sup> Avenue Jail. The facility contains 1,360 cells, and the Central Intake facility, capable of handling 600 bookings every 12 hours.



To begin using IntelliRock, Culbertson developed a maturity calibration curve (Figure 1) for the mix used on the project by testing cylinder specimens at specific intervals. Using this curve, Culbertson was able to determine real-time, in-place concrete strength by taking readings from the IntelliRock system at will.

The job consisted of 600,000 square feet in eight levels of structural cast-in-place (CIP) elevated decks, structural CIP interior shear walls, CIP exterior shear walls, six CIP stair shafts, and four CIP elevator shafts. As these decks were cast, it was critical that McCarthy strip forms and remove re-shores as soon as possible.

The IntelliRock system provided in-place, real-time data about the deck pours, including details about the structure's temperature history (Figure 2), maturity vs. time (Figure 3) and strength vs. time (Figure 4).

### IntelliRock Real-Time Data

At the beginning of the project, McCarthy was utilizing the traditional destructive compressive testing to estimate seven-day concrete strength. "At the beginning of the project, I learned about IntelliRock from Robert Barkley, the QC guy at Hanson, our concrete supplier," said Pamela Culbertson, Project Engineer with McCarthy Building Companies, Inc. "We had run into some test result problems from the contract testing lab. He proposed that we and the structural engineer of record use the IntelliRock system instead of relying solely on the testing lab for seven-day strength results."

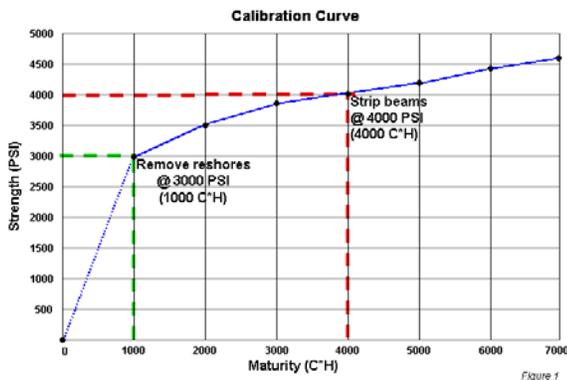


Figure 1

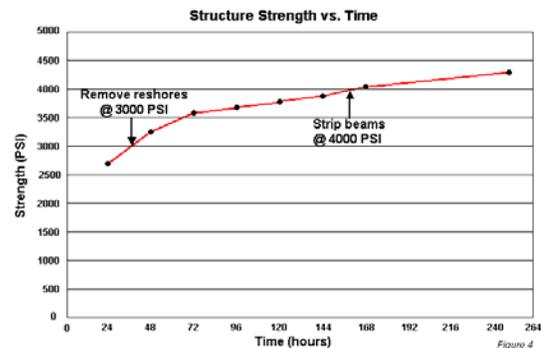


Figure 4

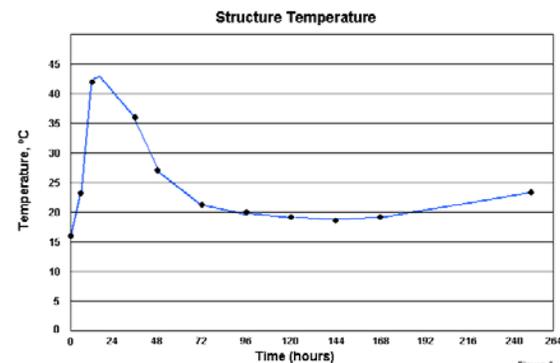
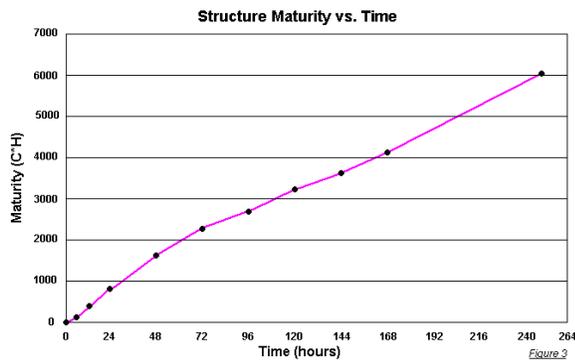


Figure 2



Project specifications allowed for stripping forms when 4,000-PSI strength was achieved. “The intelliRock system is a proactive approach to concrete placement, and it gave us more control over when we could strip our forms and remove re-shores in areas,” continued Culbertson.

“We were only getting seven-day reports from the testing lab, so the strength data from intelliRock allowed us to prove we were at design strength for re-shoring and form removal before the seven days.”

During the project pours intelliRock sensors were placed in the structures. To obtain a strength reading, Culbertson simply connected the handheld intelliRock reader to the intelliRock sensor wires protruding from the deck, took a reading, then disconnected and moved to another sensor location.

When pouring occurred, temperatures ranged from up to 100°F (37.7°C) during the summer, to a low of about 40°F (4.4°C) during the winter.

### intelliRock Advantages

The impact of intelliRock on the 4<sup>th</sup> Avenue Jail project was a savings of time and money. “Using intelliRock allows us to cycle our forms faster, by being sure we could remove re-shores and strip beams,” Culbertson added. “This allows us to rent a smaller amount of form-work and cycle it faster.”



McCarthy Project Engineer Pamela Culbertson uses intelliRock to take a strength reading at the 4<sup>th</sup> Avenue Jail project site.

### intelliRock Benefits & ROI

“Being able to measure strength in real time is a major benefit. In five months, our benefit is calculated at \$175,000” continued Culbertson. “It gave us reassurance that the concrete was at a safe strength and we weren't putting our people in danger, while at the same time allowing us to gain time on our schedule.”