

What is Concrete Maturity?

Maturity is a non-destructive approach to testing concrete that allows you to estimate the early-age compressive strength of in-place concrete in real-time. Adopting the maturity approach in your jobsite eliminates the need for field-cured cylinders for break tests, allowing you to greatly optimize your schedule. Maturity is a value that represents the progression of concrete curing. The maturity index value considers concrete temperature and curing time. As a result, mix calibration is required to implement this concept in a project. The goal of the calibration is to determine a relationship between maturity and strength for a specific mix.

Is the Maturity Method Standardized?

The maturity method has been accepted by the following governing and regulatory bodies in North America:

ASTM C1074 - Standard Practice for Estimating Concrete Strength by the Maturity Method

AASHTO T 325 - Standard Method of Test for Estimating the Strength of Concrete in Transportation Construction by Maturity Tests

ACI 318 - Building Code Requirements for Structural Concrete: 26.12 - Concrete Evaluation and Acceptance

CSA A23.1 - Concrete Materials and Methods of Concrete Construction

CSA A23.2 - Test Methods and Standard Practices for Concrete

The majority of **DOTs**

How to Use Maturity?

- Calibrate a concrete mix following the steps outlined in ASTM C1074
- Procure SmartRock™ maturity sensors, assign calibration, and install on rebar
- Pour concrete and connect to sensor wirelessly
- Read real-time strength values from SmartRock™ sensors

When to Use Maturity?

- Formwork Removal
- Post-Tensioning
- Loading Decks
- Curing Optimization
- Saw Cutting
- Paving & Patch Work
- High-Early Strength Concrete
- Mass Concrete

Benefits of Maturity?

1. Save Time

- Eliminate time waiting on early-age cylinders
- Tension cables quicker
- Strip formwork sooner
- Open roadways quicker
- Reduce need for coring
- Control project productivity

2. Save Money

- Cost to cast, collect, and test field-cured cylinders
- Reduce labor costs
- Reduce equipment rental costs
- Avoid late completion penalties
- Early completion bonus

3. Improved Accuracy

- Strength of in-situ structure vs. field-cured cylinder
- Monitor structurally critical locations
- Monitor different stages of the pour

4. Data

- Real-time strength and temperature data
- Historical strength and temperature data
- Real-time data sharing among stakeholders

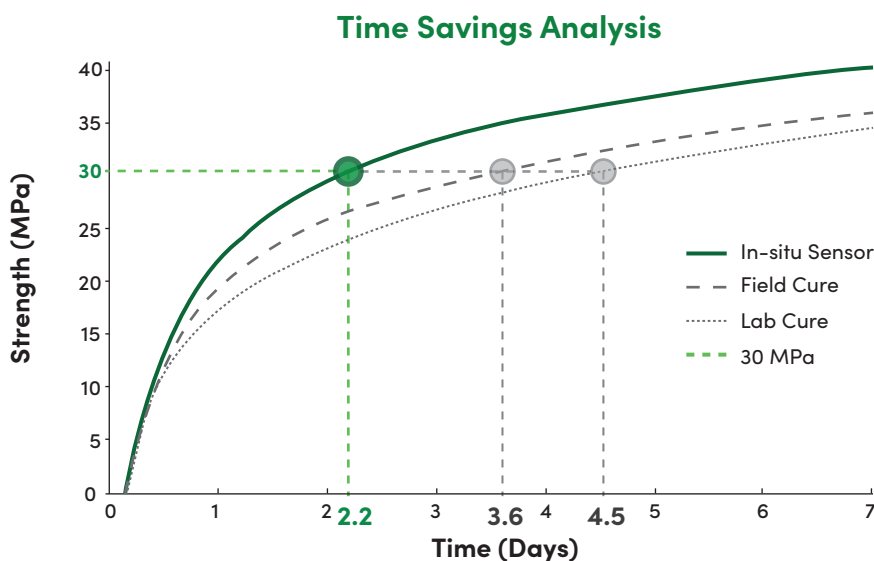


Figure 1: Time required to reach strength (30MPa) with the same concrete mix:

In-situ Sensor: 2.2 days (Average temperature 37.5 °C)

Field-cured Cylinder: 3.6 days (Average temperature 28 °C)

Lab-cured Cylinder: 4.5 Days (Average temperature 23.5 °C)