

# Strength-on-Demand Concrete

## Highway 140 Intersection Replacement



The name 4x4 Concrete originates from concrete that attains at least 400 psi (2.8 MPa) flexural strength within four hours of placement.

General contractor, W. Jaxson Baker Inc., was challenged with replacing an entire asphalt intersection with concrete within one week. The challenge was issued by CalTrans to minimize disruption to traffic flow and lane closures.

**Project:**

Intersection Replacement

**Location:**

Highway 140 and Applegate Road,  
Merced County, CA

**Owner/s:**

CalTrans, California

**Concrete Producer:**

Allied Concrete Supply, Modesto, CA

**Contractor:**

R.E. Serrano, Inc.

**General Contractor:**

W. Jaxson Baker, Inc.

**Requirements:**

High-early strength concrete

400 psi (2.8 MPa) flexural strength  
to open to traffic

**Products Used:**

MasterSet<sup>®</sup> DELVO  
extended set-controlling admixture

MasterGlenium<sup>®</sup> 3030  
high-range water-reducing admixture

MasterSet AC 534  
accelerating admixture

**Market Sector:**

Paving



## The Solution

To meet the aggressive schedule, CalTrans approved the use of Master Builders Solutions patented 4x4 Concrete system. Concrete contractor R.E. Serrano Inc., had successfully used the 4x4 Concrete system on other projects and felt that it was an appropriate solution for this challenge because of its user-friendly placement and high-early strength characteristics.

### High-Early Strength Concrete Mixture Proportions

Type III Cement	800 lb/yd <sup>3</sup> (475 kg/m <sup>3</sup> )
Water	280 lb/yd <sup>3</sup> (166 kg/m <sup>3</sup> )
w/cm	0.35
s/a	0.40

### Plastic Properties

Slump	7 in. (180 mm)
Air	Non-air-entrained

## Project Facts

- Four intersection quadrants, one replacement per day
- Beams cast and tested to ensure flexural strength
- 30 minute haul time between plant and jobsite – concrete had sufficient working time to consolidate consecutive loads
- 250 yd<sup>3</sup> (190 m<sup>3</sup>) concrete for each of four intersection quadrants
- 1,000 yd<sup>3</sup> (765 m<sup>3</sup>) concrete for entire intersection
- Average flexural strength = 420 psi (2.9 MPa) in 4 hours
- For truck clean up, 32 fl oz (945 mL) of MasterSet DELVO was used with 20 gallons (76 L) of water to stabilize hydration until the truck returned to the plant for complete washout – this procedure kept the trucks clean

## Benefits

- The 4x4 Concrete system was very user friendly and easy to place
- Exceptional high-early concrete strength permitted rapid opening to traffic and minimized lane closures
- Project was completed in only four days
- CalTrans saved over \$250,000 in traffic control costs
- 4x4 Concrete system allowed concrete to be used in lieu of asphalt

## About Master Builders Solutions

Master Builders Solutions is a leading global manufacturer of concrete admixtures, as well as other sustainable solutions for the construction industry, focussed on delivering its vision: **Inspiring people to build better**. Master Builders Solutions provides value-added technology and market-leading R&D capabilities to improve the performance

of construction materials and to enable the reduction of CO<sub>2</sub> emissions in the production of concrete. Founded in 1909, Master Builders Solutions has ca. 1600 employees operating 35 production sites globally, supporting their customers in mastering their building challenges of today – for a decarbonised future.

### Master Builders Solutions Admixtures US, LLC

23700 Chagrin Boulevard  
Beachwood, OH 44122 USA  
(800) 628-9990

[master-builders-solutions.com/en-us](http://master-builders-solutions.com/en-us)  
[admixtures@masterbuilders.com](mailto:admixtures@masterbuilders.com)

### Master Builders Solutions Canada, Inc

1800 Clark Boulevard  
Brampton, Ontario L6T 4M7 CANADA  
(289) 360-1300

® registered trademark of Master Builders Solutions in many countries of the world  
© 2023 Master Builders Solutions rev 10/23 PPR-0115, LIT #: AD3000133

