

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[®] DELVO
extended set-controlling admixture

MasterGlenium[®] 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 ³ (475 kg/m ³)
Water	280 lb/yd ³ (166 kg/m ³)
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 yd³ (190 m³) concrete for each of four intersection quadrants
- 1,000 yd³ (765 m³) 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 CO₂ 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.

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