

Strength-on-Demand Concrete

Alamo Truck Stop Weigh Scale



The Alamo truck stop weigh scale in Sparks, Nevada, is a major source of revenue for the city. An estimated five semi-trucks, weighing approximately 150,000 to 160,000 lb (68,180 - 72,730 kg) each, use the scale every hour to accurately determine their load. The scale is open 24 hours/day, 7 days/week with an estimated annual throughput of 43,800 big-rig tractor-trailers. The asphalt around the approach and exit areas of the scale ruts severely due to the constant low-speed start-and-stop truck traffic entering and exiting the scale and historically has been repaired on an annual basis.

Project:

Alamo Truck Stop

Location:

Sparks, NV

Owner/s:

Petro Oil Co.

Concrete Producer:

American Ready Mix

Concrete Contractor:

Quality Concrete Construction

Requirements:

High-early strength, durable concrete

Air-entrained concrete

Products Used:

MasterGlenium® 3030

high-range water-reducing admixture

MasterSet® DELVO

extended set-controlling admixture

MasterSet AC 534

accelerating admixture

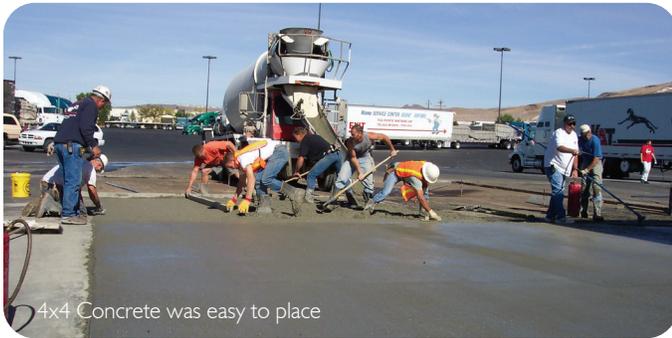
MasterAir® AE 90

air-entraining admixture

HPP Fibers

Market Sector:

Paving



The Challenge

The Petro Oil Co. was interested in a fast-track concrete replacement of the deteriorated asphalt to minimize the scale closure time and to increase the life of the scale to 10 - 15 years before repairs were needed. American Ready Mix was asked to develop a mixture that would achieve high-early strength and stand up to the deterioration caused by the heavy truck traffic loads.

The Solution

To meet the project requirements and minimize the scale closure time, American Ready Mix developed a quality, high-early compressive strength concrete mixture using Master Builders Solutions' patented 4x4 Concrete technology. The project began by milling out about 3 in. (75 mm) of asphalt with thickened edges at the approach portion of the scale. Approximately 3 in. (75 mm) of 4x4 Concrete was then easily placed over the asphalt in a whitetopping application. Shortly thereafter (about 2 hours after placement), the contractor was able to saw cut the joints of the newly repaired area. The 4x4 Concrete system achieved a flexural strength of 440 psi (3 MPa) and a compressive strength of 3,870 psi (26.7 MPa) at 8 hours after placement and, to the delight of the owner, the scale was quickly returned to service.

High-Early Strength Concrete Mixture Proportions

Cement, Type III	800 lb/yd ³ (475 kg/m ³)
Water	250 lb/yd ³ (148 kg/m ³)
w/cm	0.31
s/a	0.40

Plastic Properties

lump	7 - 8 in. (180 - 200 mm)
Air Content	8 - 10%

Project Facts and Benefits

- The 4x4 Concrete system was used in a 3 inch (75 mm) whitetopping overlay application
- Ambient temperature: 62 °F (16.7 °C) day, 32 °F (0 °C) night
- 30 yd³ (23 m³) of 4x4 Concrete was placed
- Saw cuts were placed on 4 ft (1.2 m) centers, 1 in. (25 mm) deep (1/3 the depth of overlay)
- Compressive Strength: 3,860 psi (26.6 MPa) @ 8 hours
6,260 psi (43.2 MPa) @ 41 hours
7,290 psi (50.3 MPa) @ 7 days
8,160 psi (56.3 MPa) @ 28 days
- Flexural Strength: 425 psi (2.9 MPa) @ 8 hours
730 psi (5.0 MPa) @ 41 hours
770 psi (5.3 MPa) @ 7 days
800 psi (5.5 MPa) @ 28 days
- The weigh scale was opened to traffic quickly
- The 4x4 Concrete system is expected to provide significantly longer service life compared to the asphalt
- The minimized closure time resulted in increased revenue

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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