Super-Slab® Precast Pavement System

The Fort Miller Co., Inc.

Dan E. Moellman, P.E.

Precast Concrete Pavement Slabs = Overnight Repairs

145,000 ADT

I-287, Tarrytown, NY

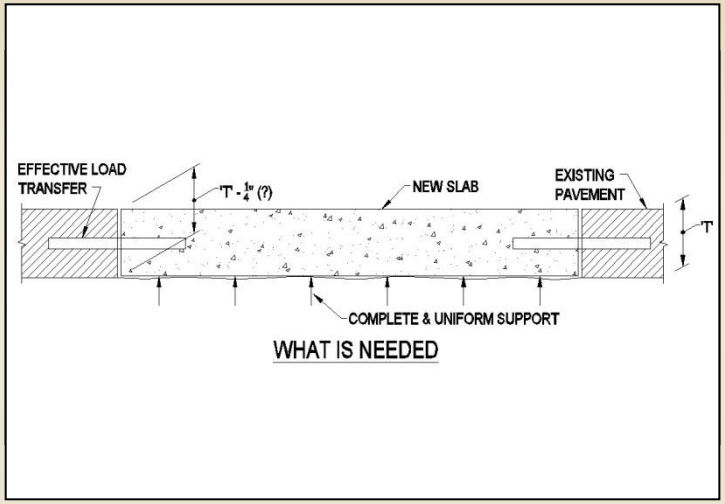
200,000 ADT

I-15, Ontario, CA

180,000 ADT

I-66, Fairfax, VA

Precast Pavement Emulates Cast in Place



Precast Equivalent

- Full Bedding Support
- Load transfer Dowels
- Slab Surface Geometry

Current Precast Systems

- **Precast Prestressed Concrete Pavement (PPCP)**
  - Pre & post tensioned (250'± assembly)
  - Developed by FHWA (non-proprietary)
- **Top-Slot Jointed Systems (Michigan Method)**
  - Jointed – slab lengths 16' ± long
  - Developed by FHWA (non-proprietary)
  - Flowable fill or urethane foam support
- **Bottom-Slot Jointed System (Super-Slab®)**
  - Jointed – slabs 6' to16'
  - Grade supported
- **Other systems are "appearing"**

Bottom-Slot Super-Slab® System (Proprietary)

- Simple slab-on-grade system
- Standard dowels and tie bars (JRCP)
- Built-in bedding grout distribution
- Precision grading equipment
- Warped and planar surfaces
- 10,000 slabs = 1,000,000 SF INSTALLED

(48 projects, 20 lane-miles completed in 9 States + ONT & QUE)
(Over 95% of all jointed precast in US)

Super-Slab®
Load Transfer Dowel System

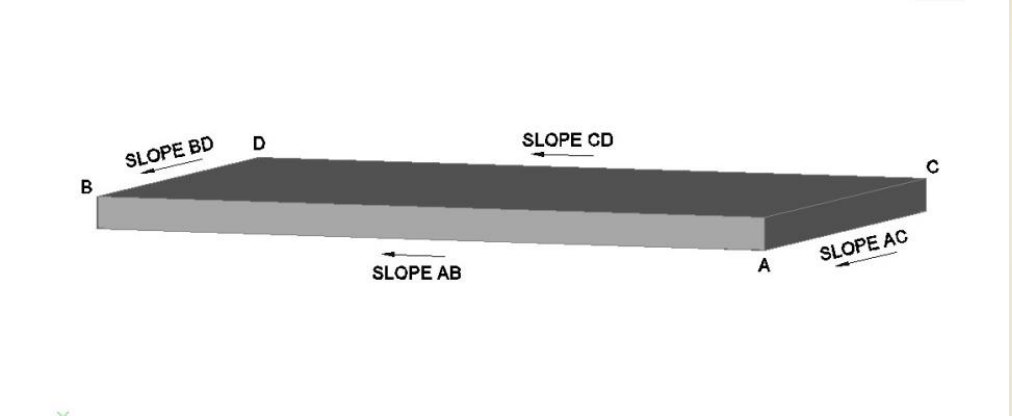
- Dowels engage slots in adjacent slab
- Pump dowel group into ports
  - Grout reaches 2500 psi in about 2 hours
- Fill slots and joint between slabs
- Dove-tail slot resists bar pop out
- Proprietary detail

Dove-tail-shaped slot

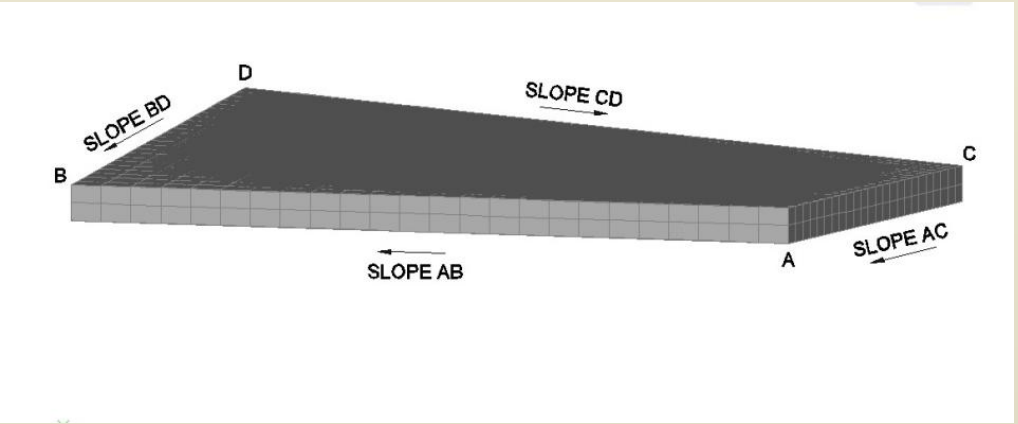
Two Types of Slabs

Slab shape depends on geometry of pavement surface

Single Plane



Warped Plane



Warped Super-Slab® panels are proprietary to The Fort Miller Co., Inc.

Intermittent Repairs (CPR)

I- 90

Albany, NY

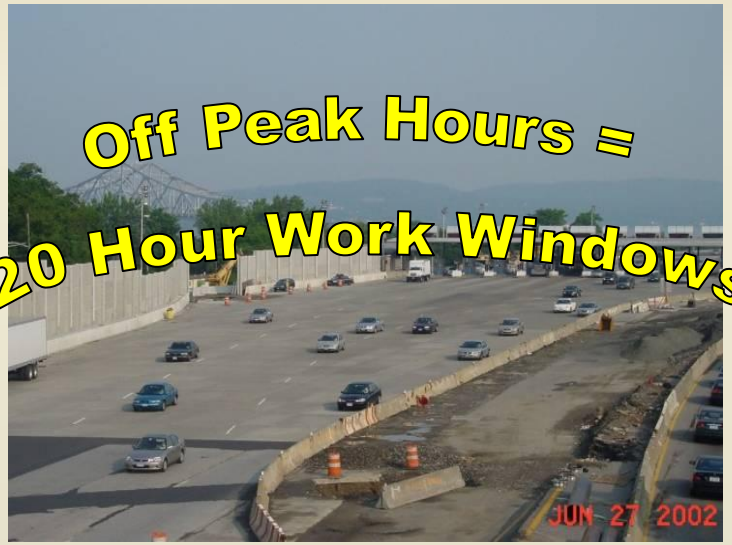
I-676 Vine St Expressway

Philadelphia, PA

I-15 Salt Lake City, Utah

I-95, New Rochelle, NY

Continuous Mainline - Tappan Zee Bridge Toll Plaza



This

(3,000 SF Per Eight Hour Shift)

(Within ± 3 mm)

In 2001 and 2002

While Maintaining

This

(135,000 Vehicles per Day)

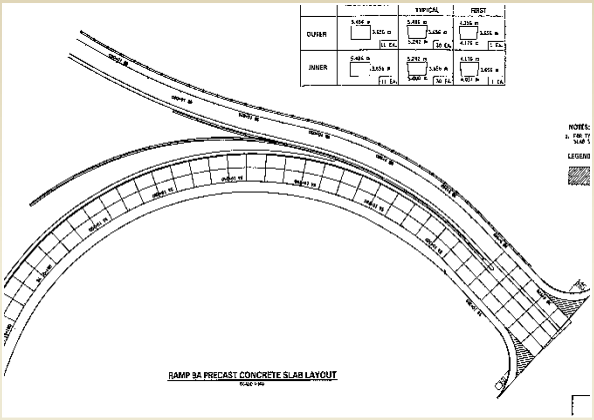
Mainline Interstate

I-15, Ontario, CA

Ramps

Chicago, Il

Brooklyn, NY



Plan View Tarrytown

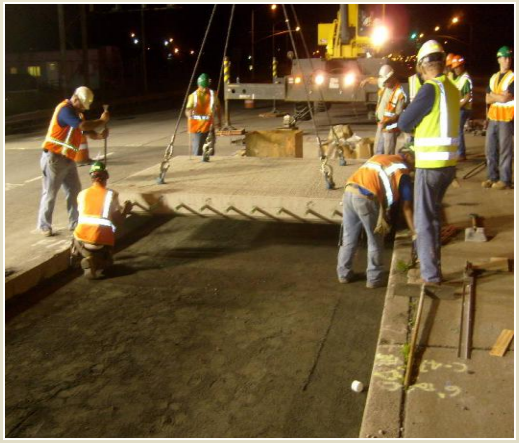
Tarrytown, NY

Intersections

Rotterdam, NY - 2006

Brooklyn, NY - 2009

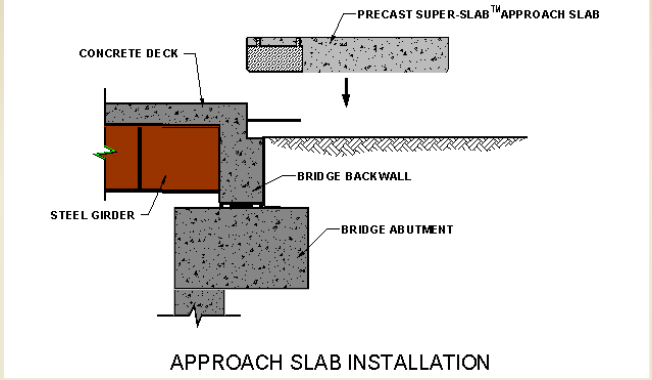
Complex Geometry



Replacing Existing Full Depth Asphalt

Bridge Approach Slabs

Binghamton, NY (2009)



Cross Section at Abutment

Existing Bridge

New Bridge

At the Site

- **Lay out slab locations and limits**
- **Cut and remove existing slabs**
  - May be a single or a multiple of single slabs
- **Install load transfer dowels and tie bars**
- **Place, grade and compact bedding material**
  - Mainline or ramps
- **Place slabs**
  - At specified locations
- **Install dowel and bedding grout**
- **Grind (if necessary) to achieve smoothness requirements**

Saw Cutting and Removal

Cuts - Full Depth
- Accurate

Slab crab bucket

Trucks - right size
- right number

Drilling for Dowels

Mark Out (accurately)

to Match Dovetail Slots

16 holes – 12 minutes

Precision Grading is the Key!

Super-Grading = Grading to 1/8th inch $\pm$, fully compacted

- **Thin layer (1/2”) fine bedding material**
- **Grade – Compact - Grade**
- **Provides “near complete” subgrade support without grout**
- **Slabs can be opened to traffic before grouting**

Continuous Grading With Hand Operated Grader H.O.G.

THREE STEPS

First Pass (1/4" high)

Compaction

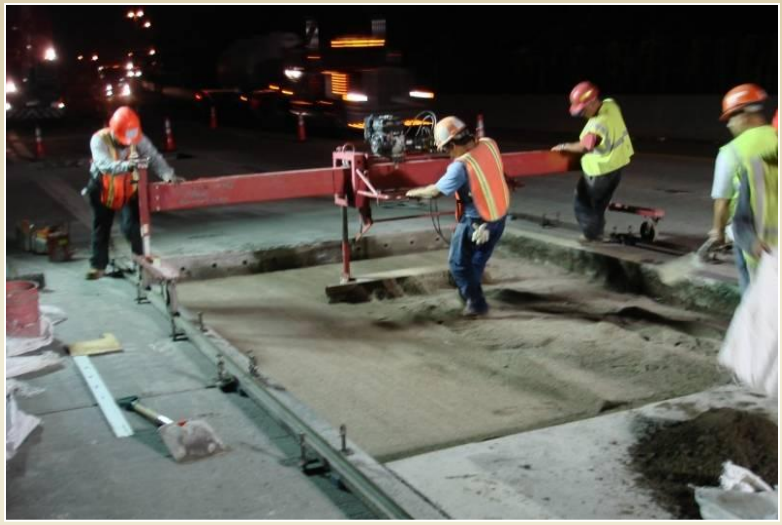
Last Pass (done)

(over 500 LF per night possible)

Grading Patches With Hand-Operated Grader (H.O.G.)

THREE STEPS

(12 minutes)



First Pass (high)

Compaction

Last Pass (done)

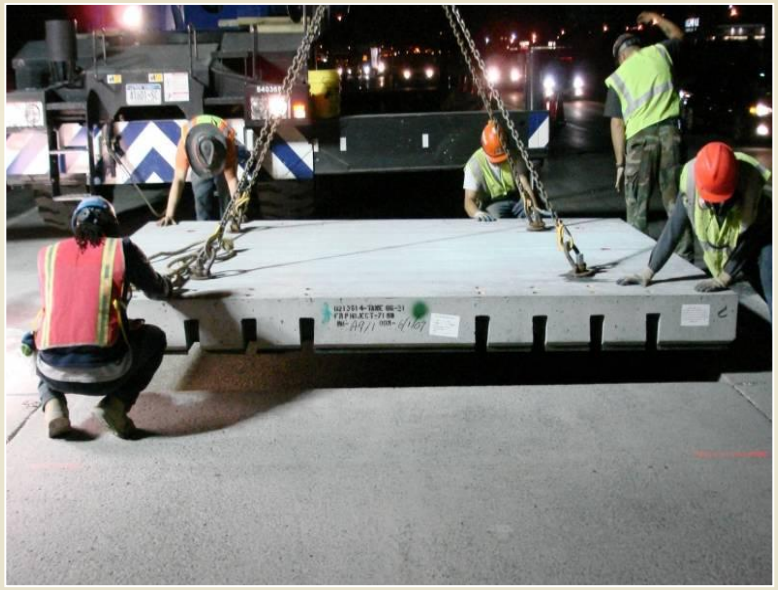
Placing Slabs – Continuous

Crane Occupies New Slabs

12’ Lane & 10’ Shoulder (min.)

Set Slab to String

Placing Slabs – Intermittent



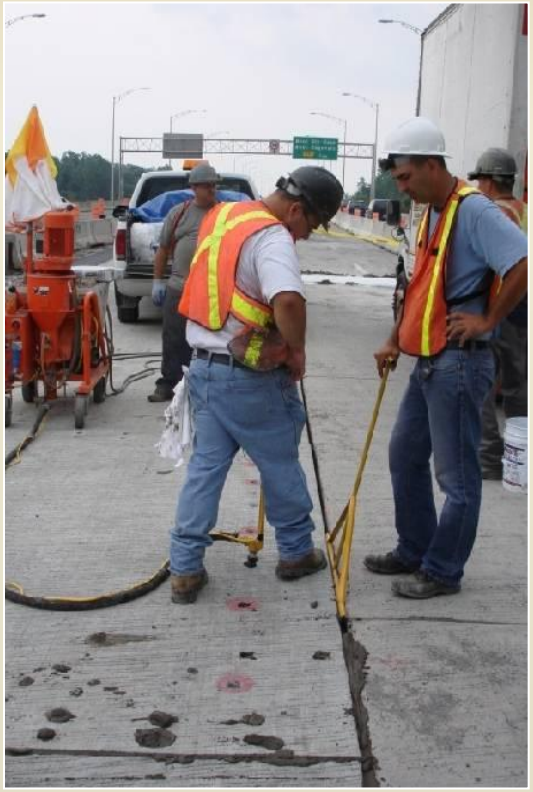
Center Slab in Hole

(Single Slab Holes)

Crane Occupies New Slab

Installing Dowel Grout

Fill Dowel Slots and Joints First



Contractor-Designed Joint Dam

Installing Bedding Grout

- Mixture of Cement, Water & Admixture
  - Flow rate of 17 - 20 seconds ASTM C939
  - Must flow into thin voids
- Reaches 600 psi ± in 12 hours
- Keep ports filled to maintain pressure

Installed Chamber by Chamber

Keys to Success

(Still More to Learn)

Good engineering

Open minds

Real partnering