

# SUPER-SLAB®\* BULLETIN No. 1

Super-Slab® is a precast concrete pavement slab system.

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## Special points of interest:

- Rapid Concrete Pavement Repairs
- FHWA's recognition of Super-Slab®
- Potential Uses of Super-Slab®
- Uses in other States

\*Super-Slab® is protected under at least one of US Patent numbers 6,607,329 B2; 6,663,315; 6,709,192 and 6,899,489 and other U.S. and foreign patents pending. Super-Slab® is a registered US Trademark owned by The Fort Miller Co., Inc.

## SUPER-SLAB® REALLY IS A FAST (AND PERMANENT) METHOD OF REPAIR

Recent Super-Slab® projects in New York State demonstrated that concrete pavement can be repaired and even entirely replaced during a series of brief eight hour (overnight) work windows—rapidly, efficiently and consistently, night after night and week after week. Some work was accomplished in weather too inclement for conventional paving operations.

During a typical eight hour night closure, existing concrete is removed (saw cutting is done during previous nights), the subgrade is precisely graded, the new slabs are installed and dowels are grouted in preparation for traffic use at the end of the closure. On some projects, slabs have been opened to traffic within minutes of placement - even before the grouting operation was complete.

The 3.6 acre Toll Plaza for the Tappan Zee Bridge in Tarrytown, NY (shown above right) is an example of how a



large area of continuous pavement can be replaced while keeping it open to critical rush hour traffic (inset) each day. The entire Plaza was replaced at the rate of 3,000 + SF per day (night) over a period of about five months. The entire Plaza was open to rush hour traffic at 6:00 AM each morning.

Intermittent (patching) repairs have been made on several projects during similar eight hour work windows, both during the day and at night.



Production rates of about 1500 SF per night were seen on the I-90 Rehabilitation Project in Albany, NY in 2004 (see Page 3) even though the repairs were isolated and spread out.

Improved production rates for both types of repairs are anticipated as the technology develops and becomes more widely used.

## SUPER-SLAB® INCLUDED IN 2004 "HIGHWAYS FOR LIFE" PRESS CONFERENCE

In April of 2004, Secretary of Transportation, Norman Mineta held a press conference in Washington, DC to introduce Highways for Life (HfL), described by FHWA as "a proposed pilot program to build highway infrastructure safer, faster, and better, and with less imposition to the driving public".

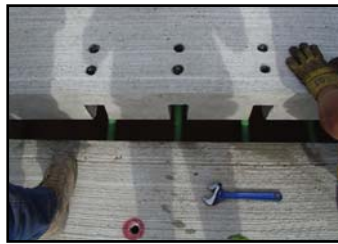
The press conference was held adjacent to the Woodrow Wilson Bridge and highlighted a number of products, materials and equipment that support advancement toward the HfL goal. Super-Slab® was part of that exhibit and the photo (right) shows Secretary Mineta observing it during the conference.



*“When the cross slope changes a warped plane slab is required”*

## SUPER-SLAB® BASICS

Super-Slab® combines the time-proven method of placing durable paving “stones” (Apian Way style) directly upon a pre-graded surface with the modern technique of structurally interlocking such “stones” together to provide a long-lasting integrated pavement surface.



Instead of stones, precast slabs are cast to exact three dimensional geometry requirements and placed directly upon a subgrade surface that has been graded to the same requirements—to an accuracy that nearly eliminates post-placement slab adjustment.

Slab interlock is achieved by casting inverted (on the bottom of the slab) dovetail slots in each slab that match and envelop conventional load transfer dowels cast in adjacent slabs. After slabs are placed, structural grout is pumped into the slots around the dowels to provide rigid

continuity between slabs as validated by falling weight deflectometer tests.

Finally, to assure complete and full slab support, a specially designed grout is pumped into a bedding grout distribution system (cast in the bottom of each slab) which directs the grout to any voids that may exist under newly placed slabs. Foam gaskets bonded to the bottom of the slabs contact the subgrade surface to retain and direct the bedding grout during installation for positive distribution to all areas of the slab.

## SUPER-SLAB® IN THREE DIMENSIONS

As long as the roadway is straight and the cross slope is constant, single plane slabs will work. Most slabs for intermittent repair (patching) and even portions of mainline pavement can be accomplished with single plane slabs. When the cross slope changes, even gradually, a warped slab (shown below) is required. For a precast pavement system to be



viable it must accommodate such changes as well as changes in horizontal and vertical alignment.

Roadway cross slope changes occur wherever horizontal alignment changes (cross slope transitions), on severe horizontal curves (shown right) and at intersections. Such three dimensional surfaces can be accommodated with precast slabs by establishing specific three dimensional values for each corner of each slab.

Fortunately, sophisticated computer programs and surveying equipment exist that make this task relatively straight forward.

Super-Slabs are cast in specially designed adjustable forms such that all sides are horizontally and vertically straight and all corners meet specific three-dimensional values. Slabs may vary in width and length as well as in cross slope to meet these values. Each slab is mark numbered and placed in a specif-



ic location on a subgrade that has been previously graded to the same three-dimensional values. The two lane 9-A Ramp in Tarrytown, NY shown in the photo above was replaced with precast Super-Slabs at a 75 m horizontal radius, a 2.79 % grade and a 5.2 % cross slope.

## VARIATIONS AND POSSIBILITIES

Previous projects have demonstrated that Super-Slab® can be used for fully continuous, intermittent (or combinations of both) types of repair - as stand-alone or adjacent to existing pavement in single or warped plane configurations.

Super-Slab® may be fabricated and used as a “patch” initially, even under bridges (above right) and later be



made continuous with other Super-Slabs newly installed adjacent to it.

It may also be used for emergency blow-up type repairs

where slabs are kept in stock and installed by highway maintenance crews. Catch basin and manhole frames may be cast in the slab or accommodated by an isolation blockout and cast in at a later date.

Super-Slab® may also be textured and colored and used as crosswalks. Finally, instruments can be cast in the slab such as those needed for toll

booth treadles (see photo below) or for weigh-in-motion stations.

Versatility makes Super-Slab® a valuable implement in the toolbox of rapid concrete pavement repair techniques.



## SUPER-SLAB® REPAIRS FASTER THAN CAST-IN-PLACE IN ALBANY, NY

After Binghamton, NY contractor, Fahs Ralston, received the contract to rehabilitate a portion of I-90 in Albany, NY in 2003, it was determined that the use of the specified rapid set concrete material to make full depth, intermittent repairs would take too long. Recognizing that every eight hour night shift exposed workers and the traveling public to extreme danger the contractor value-engineered a faster method of repair using Super-Slab®.

The actual repairs (some visible in the photo, right) were made in 2004 during one of the wettest summers on record. A total of 378 slabs (56,400 SF), were installed in just 47 night closures, about half of what was estimated if the specified repair material was used. This was 47 nights faster (and safer) than the specified method of repair.

In addition to the savings in time, the value engineering proposal cited the value high-performance precast slabs added



to the life expectancy of the repairs. Inspection at Fort Miller's precast plant insured that all slabs met exacting specifications - before they were sent to the jobsite for installation.

*“Super-Slab® repairs were made in about half the time estimated for the specified material”*

## SUPER-SLAB® USE EXPANDS

Super-Slab® has now been installed in five states and two countries totaling 4.3 lane miles of pavement. Besides the early projects in New York, New Jersey and Virginia (Dulles International Airport) Super-Slab®, has now been installed on demonstration projects in Toronto, Ontario (in Nov. 2004) and Minneapolis, MN (in June, 2005.)

In May, the California

Department of Transportation (Caltrans) installed Super-Slab® near Ontario, CA for testing purposes in preparation for a full scale Super-Slab® project on I-15 in Devore, CA to be bid in December of this year.

A demonstration project will be installed by the MTA Bridges and Tunnel Authority at their Marine Parkway Bridge Toll Plaza in September of this year. Another demonstration project

is planned in Pennsylvania this fall.

Significant Super-Slab® projects scheduled so far for 2006 include an intermittent repair project for the New York State Thruway in New Rochelle, NY, a continuous repair project on the Cross Bronx Expressway in Manhattan, NY, an intersection in Rotterdam, NY and the previously mentioned I-15 project in Devore, California.

## SUPER-SLAB® REPAIRS, “HOW LONG WILL THEY LAST?”

Super-Slab® is made from concrete that is manufactured in ideal conditions, with high quality aggregates and admixtures precisely batched at consistent water cement ratios to optimize the air void structure. The concrete is placed shortly after batching and cured under optimum conditions.

Long term durability is further assured because load transfer dowels are cast in the slabs truly square to transverse joints (not mis-aligned to

cause joint lockup). Dowel encasing structural grout is placed on the bottom of the slab protected from de-icing chemicals. Slabs are fully supported with the precisely graded subgrade (and bedding grout).

Pavement made with concrete produced in this manner and cast with these durability-enhancing features should last for a long time.

To help answer the question of long term performance under

heavy repetitive load, the California Department of Transportation (Caltrans) is currently engaging the University of California, Berkeley, in an accelerated loading test on the Super-Slab® product at a test installation near Fontana, CA. The response of the Super-Slab® units to the loading induced by the heavy vehicle simulator, shown in the photo, is continuously measured, recorded and evaluated for very long-term pavement performance.



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## About Fort Miller and Super-Slab® Development

*Fort Miller is an upstate New York precast concrete company that has been providing quality precast concrete products to the Northeast regional market for over 55 years. During the last 26 years emphasis has been placed upon developing, manufacturing and supplying transportation-related products to the heavily traveled Northeast metropolitan areas.*

*Much of Fort Miller's work during the last two decades has been in the development of new products specifically designed to meet the needs of transportation agencies that are facing the challenge of replacing an aging infrastructure without severely impacting traffic. Most notably, many of the composite bridge units we have supplied have been installed overnight, over the weekend or in similarly abbreviated time frames. The introduction of Super-Slab® in 2001 is an appropriate continuation of our effort to provide quality innovative products that can be installed in the time frame the industry demands.*

*Fort Miller's engineers and associates are committed to further advancing Super-Slab® as a product and as a method of installation to provide the transportation industry a faster way to make concrete highway repairs that last longer - pursuant to the FHWA goals in its Highways for Life program.*

## IMPLEMENTING SUPER-SLAB® TECHNOLOGY

The Fort Miller Co., Inc. provides assistance to any state or agency wishing to make rapid repairs to concrete pavement using the Super-Slab® System.

During the project development stage Fort Miller assists in determining the feasibility of utilizing Super-Slab®, and provides estimates of project costs, space and time requirements for installation and development of contract drawings and specifications. The latter includes assistance in engineering associated with three dimensional geometry.

When the project is advertised for bid, Fort Miller provides installation information and a price to all contractors bidding the project. This includes slabs delivered to the job site (sourced from a local precaster), shop drawings and engineering associ-



ated with three dimensional geometry, specialized grading equipment that will be used by the contractor and on site installation assistance to the contractor and the owner of the project.

An Installation Manual is available for pre-bid informational purposes and as a basis for training workmen and inspectors before and during slab installation. The Manual covers in detail the use of precision grading equipment (Supergrading),

slab installation and proper techniques for installing dowel and bedding grout.

A recent Super-Slab® demonstration project in Minneapolis was an example of Super-Slab® implementation in another state. The project on Trunk Highway 62 was designed and bid by Minnesota DOT. Slabs were cast by Wieser Concrete who shipped the slabs to Minneapolis based contractor PCI who installed 18 slabs in one day.