

**Summary of CP Road Map Track 7**  
**High Speed Concrete Pavement Rehabilitation and Construction**  
**(Concrete Overlays)**  
**10-10-08**

The CP Tech Center Advisory Board meeting of April 6, 2006 outlined an overall program for concrete overlays to address the need of rehabilitating aging concrete and asphalt pavements in the United States. The initial program included the development of a 30 +/- page user friendly concrete overlay guide to be completed as soon as possible. The second phase was to develop a technical assistance program for selected states throughout the country that provided expert teams to the states to help guide them through the concrete overlay selection, design and construction process. The third and final phase was to develop a 150 +/- page technical concrete overlay manual. For the rest of 2006 the CP Tech Center along with a national selected overlay committee developed the initial Guide to Concrete Overlay Solutions which was published in January 2007. A total number of prints distributed of the Guide was approximately 10,000 copies.

The CP Road Map Executive Committee concurred with the CP Tech Center Advisory Board that innovative approaches for concrete overlays could move concrete overlays into a position as one of the cornerstones for the new generation of concrete pavements. On March 27, 2007 the Executive Committee concurred with the following goals and objectives of the overlay sub-track.

**Goal** – To increase the awareness, knowledge and benefits of concrete overlay applications among state and local agencies and contractors.

**Objectives:**

1. Update the current 2007 Guide to Concrete Overlay Solutions that would include accelerated construction, work zone management, traffic staging, evaluations and items to consider in specification development.
2. Initiate a cooperative 8 state field application program in regional DOTs throughout the country who would be guided by the Center through the process of selection, design and construction of concrete overlays.
3. Develop a concrete overlay manual that would go into the details of the selection, design and construction of concrete overlays. This manual would be considered long term and needed only when the updated Guide needed to be expanded to provide additional technical detail.
4. Develop a simplified and accurate approach for concrete overlay thickness determination using current design methodology.
5. Complete research that would address the complex interaction between concrete overlay and underlining pavement structures and interlayers. This research should include development of new overlay design methods that take into account the effects of underlining pavement cracking, optimum interlayer properties, bond longevity, slab geometry effects and fatigue damage of the underlining pavement over time.

6. Complete field research that would help solve construction technique limitations for concrete overlays which would include paving machine control, locating longitudinal joints, appropriate opening strength, traffic management techniques for different lane roadways and innovative overlay materials, particularly interlayers.

**Overlay Committee Members:**

- Andy Bennett, Michigan Department of Transportation
- Jim Cable, P.E., Iowa State University
- Dan DeGraaf, Michigan Concrete Paving Association
- Jim Duit, Duit Construction Co., Inc., Oklahoma
- Todd Hanson, Iowa Department of Transportation
- Randell Riley, Illinois Chapter ACPA
- Matt Ross, Missouri/Kansas Chapter ACPA
- Jim Shea, New York State Chapter ACPA
- Gordon Smith, Iowa Concrete Paving Association
- Sam Tyson, Federal Highway Administration
- Leif Wathne, American Concrete Pavement Association
- Jim Grove, CP Tech Center
- Matt Zeller, Concrete Paving Association of Minnesota
- Jeff Uhlmeier, Washington State DOT
- Kevin Maillard, OHM Advisors
- Robert Rodden, American Concrete Paving Association
- Shannon Sweitzer, North Carolina Turnpike Authority

**Concrete Overlay Milestones:**

1. January 2007 completed initial Guide for Concrete Overlay Solutions.
2. April 2008 started 2 ½ year Concrete Overlay Field Application Program. To date five states have requested technical support as outlined in the field application program.
3. August 2008 Guide to Concrete Overlay Solutions 2<sup>nd</sup> Edition was completed and sent to printing.

**Future Emphasis for the Concrete Overlay Program:**

1. The CP Road Map Performance Based Design Track Leadership Committee concurred with the Concrete Overlay Committee for the development of a two phase program that would address overlay design issues.
  - a. Development of concrete overlay design catalogue based on existing design procedures. Proposed funding by CP Tech Center/FHWA.
  - b. Development of a new concrete overlay thickness design procedures (long-term).
2. Complete concrete overlay field research that would help solve construction technique limitations. Proposed funding by FHWA/Iowa Highway Research Board. The proposed research is listed as follows:
  - a. Reduce quantity overrun concerns with GPS mapping of the proposed project. Reduce construction survey time with GPS mapping and evaluate GPS and 3-D construction equipment control (milling machine, slipform paver and cure cart). Development of ways to establish the profile grades and machine control before or immediately after the contract letting by the highway agency so that construction is not impacted.

- b. Evaluate the use of GPS to control longitudinal joint sawing. Develop innovative ways to guide the longitudinal joint forming operation to match the underlying joint alignment.
- c. Evaluate milling by the standard practice of string line control and by GPS control. Determine the best way to establish the level of need and timing of milling for existing asphalt surface preparation.
- d. Evaluate use of innovative bond breaker materials.
- e. Determine innovative ways of handling traffic control for the construction of single lane overlays as part of a two lane or multilane overlay. Evaluate impact of haul road selection on road opening time.
- f. Investigate potential ways using both existing and new paving train components so that the length of the paving operation is minimized.
- g. Evaluate pavement strength versus opening time and completion of project time. Determine the appropriate opening strength that is required of the concrete for use by local traffic, through trucks and construction traffic, for depths of concrete of 6 inches or less.