

Pavement & Materials Partnering Committee

Work Product Scoping Document

New

Specifications for Concrete Pavements with Limited Construction Windows

February 4, 2019

Task Group

Concrete Task Group

Title

Specifications for Concrete Pavements with Limited Construction Windows

Problem Process

- Annual
- Expedited
- Emerging Initiative

Statement of Effort/Improvement

Caltrans has been at the forefront of accelerated concrete pavement construction for decades. While the Caltrans Section 40 Standard Specifications on concrete pavement have improved over the years, one important specification language related to strength requirements for cast-in-place concrete pavement with limited construction window has not been integrated into Section 40. The current Section 40 specification for conventional cast-in-place pavement includes both a minimum flexural strength requirement and a 10-day age requirement. As a result, if pavement projects require opening to traffic at any age less than 10 days, then Rapid Strength Concrete (RSC) and precast are the only concrete pavement options. Caltrans specifications for concrete pavement with RSC already allow the strength for opening pavement to traffic to be based only on a minimum flexural strength requirement - there is no minimum age requirement.

This 10-day requirement in Section 40 can result in increased traffic delays during construction and construction inefficiencies constraints due to longer lane closures. In addition, the current open-to-traffic criteria limits the flexibility of Caltrans and the paving industry in developing innovative mix designs and project staging solutions that provide cost savings and improved performance over the life of the pavement. Projects constructed in congested urban areas demonstrate the greatest need for further analysis of these requirements. Review of the 10-day “opening-to-traffic” age requirement is needed to determine if it can be reduced or eliminated for conventional cast-in-place concrete pavement.

Purpose

The goals of this project are to review existing concrete pavement specifications from other states and to develop recommendations to address the open-to-traffic strength limitation of cast-in-place concrete pavement projects with limited construction windows. Reductions in greenhouse gas (GHG) emissions are expected during the construction phase and over the service life of projects where the specification improvements are implemented. In addition, the life and constructability of concrete pavements can be improved for future urban reconstruction projects where limited construction windows are a factor.

Background

Of the 50,000 lane-miles of state highways in California, about 90 percent were constructed between 1955 and 1975 with 20-year design lives. Remarkably, many of the concrete pavement sections survived well beyond their design lives but are now in need of reconstruction. Caltrans is striving to reconstruct many of these highways with long-life concrete pavement. Growth in traffic volumes have outpaced capacity improvements making it difficult to close lanes for reconstruction. With today's greater attention to traffic delays, Caltrans requires the concrete pavement to be constructed efficiently and with minimal user disruption.

As part of the Long-Life Pavement Rehabilitation Strategies (LLPRS), Caltrans studied many unique project features for urban concrete pavement reconstruction. The use of innovative fast-setting concrete mixes and traffic modeling software to optimize work zone lane closures were a few of the many improvements that came out of this effort. Other studies have been conducted by the FHWA, FAA, ACI and other State DOT's. Some of the innovations have been implemented by Caltrans and others have not.

Caltrans continues to use a minimum age open-to-traffic specification requirement that hinders the use of long-life concrete pavement for reconstruction projects. With the dramatic volume increases forecast for this urban highway reconstruction work, it's important to review past work and move forward to implement the most beneficial improvements for future projects involving limited construction windows.

Approach

1. Street-Ready Assurance

Upon reviewing other DOT's specifications, a street-ready specification language will be prepared.

2. Performance Tracking/Management

Tasks will be simple and manageable.

3. Consistently Implemented

Implementation will take place through the Office of Concrete Pavements. The new specification language will be clearly documented and consistently applied by a lead individual from this office.

Team Members

CT/Industry	Division/Firm Name	Member Name
CT Chair	HQ Pavements	Dulce Rufino Feldman
CT	HQ Construction Standards	Debora Yost
CT	D8 Materials	Parwaz Khasraw
CT	HQ Materials Engineering and Testing Services (METS)	Patrick Lo
Industry Lead	Southwest Concrete Pavement Association (SWCPA)	Bruce Carter
Industry	Euclid	Vince Perez
Industry	G3 Quality	Marc Robert
Industry	OC405 Partners	Frank Stevenson

Objectives/Deliverables/Due Dates

Description:

1. Review specifications from at least 5 State DOTs to obtain their concrete pavement requirements regarding opening-to-traffic strength and associated minimum age if also required.
2. Develop a document summarizing the analysis of the State DOT specification review with the objective to evaluate if Caltrans needs to have both strength and 10-day age requirement to open to traffic.
3. Develop draft specification language if the review and analysis of State DOT specifications support changes to the opening-to-traffic age in Section 40.
4. Evaluate and make recommendations regarding the need of pilot projects based on findings from item 2. If pilot projects are recommended, they will be tracked and reported to the PMPC in a later phase.

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Details:

Milestones	Name - Responsible Party	Due Date (Start/Complete)
Review other DOT Specifications	Dulce Rufino Feldman and Bruce Carter	Mar 2019/May 2019
Summarize and analyze existing specifications	Debora Yost and Vince Perez	May 2019/Jul 2019
Draft specification language	Dulce Rufino Feldman and Marc Robert	Jul 2019/Aug 2019
Recommendation regarding the need of pilot projects	Dulce Rufino Feldman and Bruce Carter	Aug 2019/Sep 2019

Resources To Develop and Implement

	Caltrans Hours		Industry Hours	
	FY 18/19	FY 19/20	FY 18/19	FY 19/20
Review other DOT Specifications	160	0	120	0
Summarize and analyze existing specifications	80	40	55	25
Draft specification language	0	40	0	30
Recommendation regarding the need of pilot projects	0	15	0	15

Benefits

- Cost savings attributed to design efficiencies such as decrease in construction windows
- Reduced environmental impacts associated with congestion due to construction

Estimated Impact to Caltrans and Contractor

- Change to Section 40 (Caltrans Concrete Pavement Specification)
- Ability to be innovative when designing concrete mixes for concrete pavement projects

Impediments to Completion of Deliverables

- Unwillingness within Caltrans to approve updated specification
- Delays due to factors outside the control of the Working Group
- Unforeseen need for additional resources

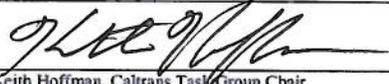
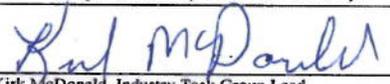
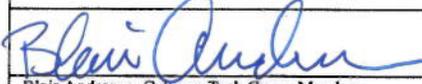
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Recommendation and Approval

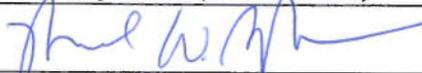
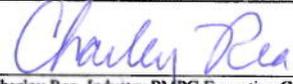
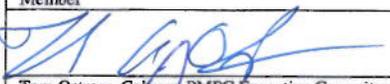
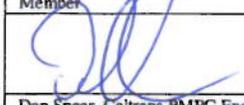
This scoping document for *Review and Update the Specifications for Concrete Pavements with Limited Construction Windows* was prepared by the *Cast In-Place Concrete Sub-Task Group* to address a priority issue with statewide significance and is within the Pavement & Materials Partnering Committee mission as described in the Pavement & Materials Partnering Committee Charter. The Subtask Group members have determined the scope, resources required and timeline for delivery of this project to attempt to ensure that the deliverables are achievable. A signature here indicates that each Task Group and PMPC Executive Committee is committed to providing the resources to support this effort within the prescribed timeframes. Furthermore, it is everyone's responsibility to ensure that the final effort/improvement will be:

- 1) Street-Ready,
- 2) Monitored and reported for performance,
- 3) Successfully implemented statewide as appropriate.

Scoping Document Recommendation and Industry Concurrence by (name and date):

Caltrans Name (Recommendation)	Date	Industry Name (Concurrence)	Date
 Keith Hoffman, Caltrans Task Group Chair	2/11/19	 Kirk McDonald, Industry Task Group Lead	2-10-19
 Kuo-Wei Lee, Caltrans Task Group Member	2/11/19	 Mark Hill, Industry Task Group Co-Member	2/11/19
 Blair Anderson, Caltrans Task Group Member	2/11/19		

Scoping Document Approval and Industry Concurrence by (name and date):

Caltrans Name (Approval)	Date	Industry Name (Concurrence)	Date
 Sergio Aceves, Caltrans PMPC Executive Committee - Chair	2/25/19	 Russ Snyder, Industry PMPC Executive Committee - Member	2/25/19
 Ray Hopkins, Caltrans PMPC Executive Committee - Member	2/25/19	 Charley Rea, Industry PMPC Executive Committee - Member	2/25/19
 Tom Ostrom, Caltrans PMPC Executive Committee - Member	2/25/19		
 Dan Speer, Caltrans PMPC Executive Committee - Member	2/25/19		

Approval Date: _____