

**Pavement & Materials Partnering Committee**  
**Work Product Short Scoping Document**  
**Concrete Pavement Specified by Fixed Value of Compressive Strength**  
**August 31, 2022**

**Task Group**

Cast In-Place Pavement Subtask Group  
Concrete Task Group

**Problem Process**

- Annual
- Expedited
- Emerging Initiative

**Title**

Concrete Pavement Specified by Fixed Value of Compressive Strength

**Statement of Effort/Improvement**

Working to improve pavement quality and reduce jobsite issues, Caltrans and the concrete pavement industry plan to investigate the use of compressive strength for specifying pavement strength. Concrete pavement design utilizes the concrete modulus of rupture (MOR) – flexural strength – as a primary design input. Since MOR is used for pavement design, Caltrans specifies MOR for accepting concrete pavement strength. Problems with MOR testing are widely understood and as a result most DOT's have moved to compressive strength for both opening strength and acceptance testing while continuing to use MOR for pavement design.

In April 2020, the standard specifications were amended to provide for a method to evaluate low flexural strength results using compressive strength as a surrogate for flexural strength. The protocol entails developing a correlation between companion flexural beams and cylinders, during mix design development and during trial slab construction. It is expected that Caltrans project data from the previous two years, along with data from current projects will provide sufficient information to be able to specify a compressive strength for opening to traffic and for final acceptance.

**Purpose**

The objectives of this project are the following: (1) review existing concrete pavement acceptance criteria from other states; (2) collect and review flexural/compressive strength correlation data from Caltrans projects; (3) develop specification language, if warranted, to specify concrete pavement strength based on compressive strength.

**Background**

Concrete pavement is currently accepted based on 42-day compressive strength correlated to the 650 psi flexural strength required at a minimum of 42 days. It is well known that there is not a direct global correlation between compressive and flexural strength values. However, since there is an excellent correlation for a specific mix design, the concrete specifications were changed.

This change was supported by the Federal Highway Administration (FHWA), as they had demonstrated strong correlation when they tested concrete pavement mixes in separate Demo Projects during recent visits with the Mobile Concrete Technology Center (MCTC) to Caltrans projects. Many States use compressive strength as a surrogate for flexural strength. As a result, our STG would like to evaluate specifying by compressive strength. There were three main benefits to have this as a top priority: compressive strength testing is much less labor intensive, specimens are easier to maintain in the proper curing environment, and compressive strength has about half of the variability of flexural strength.

While MOR works well for pavement design, the test procedure is far from ideal in the field. MOR tests are extremely sensitive to specimen preparation, handling, and curing procedures. In addition, these specimens are bulky weighing approximately 65 lbs each after demolding. As a result, most state DOT's have moved away from using MOR for opening strength and acceptance. FHWA indicates a clear trend towards the use of compressive strength on projects. Many states, based upon their own data, have determined a compressive strength that is equivalent to the flexural strength they require; while Caltrans has a protocol to establish a correlation between compressive and flexural strength during a project's concrete mix design development. After this correlation is established, compressive testing can reliably be used for accepting concrete strength.

The working group will recommend specification language changes that will specify the use of compressive strength for evaluating concrete pavements for opening to traffic and acceptance.

### **Estimated Duration**





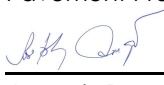
One Year.

Pavement & Materials Partnering Committee  
 Work Product Scoping Document  
*Cast In-Place Pavement Subtask Group, Concrete Task Group*  
*Concrete Pavement Specified by Fixed Value of Compressive Strength*  
 August 31, 2022



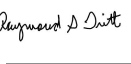



---

**Recommendation and Approval**

**Scoping Document Recommendation and Industry Concurrence by PMPC TG:**

<b>Caltrans Name (Recommendation)</b>		<b>Industry Name (Concurrence)</b>	
 <u>Keith Hoffman (Oct 10, 2022 10:30 PDT)</u>	10/10/2022	 <u>George Butorovich (Oct 10, 2022 10:21 PDT)</u>	10/10/2022
Keith Hoffman Caltrans Task Group Chair Materials and Engineering Services	Date	George Butorovich Industry Task Group Member	Date
 <u>Kuo-Wei Lee</u>	10/13/2022	 <u>Mark Hill (Oct 17, 2022 08:11 PDT)</u>	10/17/2022
Kuo-Wei Lee Caltrans Task Group Member Pavement Program	Date	Mark Hill Industry Task Group Member	Date
 <u>Joseph Dongo</u>	10/10/2022		
Joseph Dongo Caltrans Task Group Member Construction	Date		

**Scoping Document Approval and Industry Concurrence by PMPC EC:**

<b>Caltrans Name (Recommendation)</b>		<b>Industry Name (Concurrence)</b>	
 <u>Tom Pyle</u>	10/20/2022	 <u>Brandon Milar (Nov 29, 2022 10:06 PST)</u>	11/29/2022
Tom Pyle Caltrans Executive Committee Chair Pavement Program	Date	Brandon Milar Industry Executive Committee Member	Date
 <u>Raymond D. Tritt</u>	11/09/2022	 <u>Charles Rea (Oct 19, 2022 10:38 PDT)</u>	10/19/2022
Raymond Tritt Caltrans Executive Committee Member Construction	Date	Charley Rea Industry Executive Committee Member	Date
 <u>Gudmund Setberg</u>	10/19/2022		
Gudmund Setberg Caltrans Executive Committee Member Structure Design	Date		
 <u>Timothy Greutert</u>	10/27/2022		
Timothy Greutert Caltrans Executive Committee Member Materials Engineering and Testing Services	Date	Approval Date: <u>11/29/2022</u>	











# Short SD CP-CTG - Compressive Strength Acceptance

Final Audit Report

2022-11-29

Created:	2022-10-19
By:	Ian Sun Chee Fore (s139817@dot.ca.gov)
Status:	Signed
Transaction ID:	CBJCHBCAABAABAKiB_jwEIK3vCIVvSPqQagR25YmIh2ghK

## "Short SD CP-CTG - Compressive Strength Acceptance" History

-  Document created by Ian Sun Chee Fore (s139817@dot.ca.gov)  
2022-10-19 - 4:14:20 PM GMT
-  Document emailed to Tom Pyle (tom.pyle@dot.ca.gov) for signature  
2022-10-19 - 4:17:24 PM GMT
-  Document emailed to Ray Tritt (ray.tritt@dot.ca.gov) for signature  
2022-10-19 - 4:17:24 PM GMT
-  Document emailed to Gudmund Setberg (gudmund.setberg@dot.ca.gov) for signature  
2022-10-19 - 4:17:25 PM GMT
-  Document emailed to Timothy Greutert (timothy.greutert@dot.ca.gov) for signature  
2022-10-19 - 4:17:25 PM GMT
-  Document emailed to bmlar@calapa.net for signature  
2022-10-19 - 4:17:25 PM GMT
-  Document emailed to Charles Rea (crea@calcima.org) for signature  
2022-10-19 - 4:17:25 PM GMT
-  Email viewed by Charles Rea (crea@calcima.org)  
2022-10-19 - 4:18:21 PM GMT
-  Email viewed by bmlar@calapa.net  
2022-10-19 - 4:30:50 PM GMT
-  Email viewed by Gudmund Setberg (gudmund.setberg@dot.ca.gov)  
2022-10-19 - 4:46:44 PM GMT



Powered by  
Adobe  
Acrobat Sign

 Document e-signed by Gudmund Setberg (gudmund.setberg@dot.ca.gov)


Signature Date: 2022-10-19 - 4:49:35 PM GMT - Time Source: server

 Document e-signed by Charles Rea (crea@calcima.org)

Signature Date: 2022-10-19 - 5:38:06 PM GMT - Time Source: server

 Email viewed by Ray Tritt (ray.tritt@dot.ca.gov)


2022-10-19 - 5:54:36 PM GMT

 Email viewed by Timothy Greutert (timothy.greutert@dot.ca.gov)


2022-10-20 - 6:35:34 AM GMT

 Email viewed by Tom Pyle (tom.pyle@dot.ca.gov)


2022-10-20 - 2:03:25 PM GMT

 Document e-signed by Tom Pyle (tom.pyle@dot.ca.gov)


Signature Date: 2022-10-20 - 11:46:14 PM GMT - Time Source: server

 Email viewed by bmilar@calapa.net

2022-10-26 - 5:17:11 PM GMT

 Email viewed by Timothy Greutert (timothy.greutert@dot.ca.gov)

2022-10-26 - 6:26:23 PM GMT

 Email viewed by Ray Tritt (ray.tritt@dot.ca.gov)


2022-10-27 - 3:31:18 PM GMT

 Document e-signed by Timothy Greutert (timothy.greutert@dot.ca.gov)

Signature Date: 2022-10-27 - 4:21:04 PM GMT - Time Source: server

 Email viewed by Ray Tritt (ray.tritt@dot.ca.gov)


2022-11-06 - 5:35:30 AM GMT

 Email viewed by Ray Tritt (ray.tritt@dot.ca.gov)

2022-11-09 - 6:00:05 PM GMT

 Document e-signed by Ray Tritt (ray.tritt@dot.ca.gov)

Signature Date: 2022-11-09 - 6:04:28 PM GMT - Time Source: server

 Email viewed by bmilar@calapa.net

2022-11-09 - 8:01:04 PM GMT


 Email viewed by bmilar@calapa.net

2022-11-29 - 6:06:23 PM GMT


 Signer bmilar@calapa.net entered name at signing as Brandon Milar

2022-11-29 - 6:06:47 PM GMT



 Document e-signed by Brandon Milar (bmilar@calapa.net)

Signature Date: 2022-11-29 - 6:06:49 PM GMT - Time Source: server

 Agreement completed.

2022-11-29 - 6:06:49 PM GMT



Powered by  
**Adobe**  
Acrobat Sign