Rock Products Committee
SCOPING DOCUMENT
Flexural Beam Testing Requirements
July 1, 2014

Task Group

Concrete Task Group

Problem Process

☒ Annual
☐ Expedited
☐ Emerging Initiative

Title

Flexural Beam Testing Requirements in Section 40

Issue/Problem Statement

Industry is concerned that the acceptance criteria for their product is based on factors out of their control, such as ambient temperature, weather conditions, specimen fabrication, transportation and storage.

Industry believes that California Test 523 certification and accreditation for third party labs and non- Caltrans personnel has been, and continues to be, inconsistently managed and enforced throughout the State.

Background

The earliest research on California's testing method for flexural strength (later to be named California Test 523 [CT 523]) appeared in a report published in January 1967. Caltrans sought to improve upon the ASTM C78 that was already in place. The main focus of Caltrans' experimentation was to see if smaller test samples could be used and still provide accurate, reliable results. ASTM later followed Caltrans' lead and also allowed for smaller test sample sizes. At the time CT 523 was developed it was determined that this was the best method to determine the strength of in-place concrete pavement before opening the roadway to traffic.

Most other states use either AASHTO or ASTM test methods. These test methods are commonly accredited and certified by AASHTO and ACI. These test methods are supported by national organizations that keep the test methods current and up to date. New Department policy is to start moving towards national standards where national test is the same as the California Test method.

Industry feels that the ASTM C31 and ASTM C78 test methods would be better methods for determining acceptance of concrete used for pavement due to the fact that it minimizes variables in curing, fabrication and storage of test specimens that are inherent to CT 523.

CT 523 only allows rodding of test specimens because at the time it was written, rodding was the only option as field electric generators and vibratory equipment was not readily available. Industry believes that rodding is not adequate for consolidation of low-slump concrete paving mixes. The current AASHTO and ASTM test methods allows for vibration of low-slump concrete pavement specimens.

Purpose

To come to an agreement as to which of the test methods previously identified will satisfy both Caltrans and industry with regard to acceptance testing.

Identify current practices throughout the state in regards to CT 523 management and certification for all technicians performing these tests and the accreditation of Caltrans and third party testing laboratories.

Objectives/Deliverables

This objective of this activity is to provide additional clarity to the flexural strength testing requirements found in the Standard Specification.

1) Summarize current practices within Caltrans and other State DOTs (including testing, staff certification, lab certification, certification frequency, what accreditations are the labs obtaining, etc). Summary of current guidelines within Caltrans (and other State DOTs) including the IA Manual and Construction Manual.

2) Perform literature search for:
   a) Factors influencing performance of CT 523/ASTMs/Other State DOT Test methods.
   b) Any available data supporting the development or subsequent research related to CT 523 and similar ASTM test methods. (Documents pertaining to CT 523 should be located in Caltrans files and/or archived records.)
   c) Details relating to the basis for the standard specification change, specifically Section 40. Section 40 of the standard specifications went from allowing 16% variance between two specimens to16% variance from the average of two specimens.

3) Prepare decision document that analyzes possible impacts to the Department and Industry (economic, logistical, etc.) Examples: Equipment, training, manual updates, design impacts, contract administration and specification updates. Analyze impacts:
   a) If the recommendation is made to switch to ASTM.
   b) If the recommendation is made to stay with CT 523.

4) Based on the decision document, gain consensus amongst the team to provide a recommendation to the Concrete Task Group as to which method is best. If a test method cannot be recommended, recommend a path forward. If a test method can be recommended, modify the specifications accordingly.

Timeline/Resources

Deliverable	**Anticipated Completion**
Summarize current practices within Caltrans and other State DOTs (including testing, staff certification, lab certification, certification frequency, what accreditations are the labs obtaining, etc.) Summary of current guidelines within Caltrans (and other State DOTs) including the IA Manual and Construction Manual.	October 1, 2014
Summary of investigation of factors influencing performance of CT 523/ASTMs/Other State DOT Test methods.	November 3, 2014
Summary of any available data supporting the development or subsequent research related to CT 523 and similar ASTM test methods.	December 5, 2014
Explanation of details relating to the basis for the standard specification change, specifically Section 40.	December 23, 2014
Prepare decision document weighing pros and cons of making switch.	March 31, 2015
Provide written recommendation if possible. If recommendation on test method cannot be made, recommend a path forward.	June 30, 2015

Team Members

Team listed below represents that there will be 12 voting members and no more.

	CIP Pavement Subtask Group	Materials/QA Subtask Group
Caltrans Team Members:	Cornelis Hakim (Team Leader)	Keith Hoffman
	Mehdi Parvini / OE**	Jim Sagar
	Doran Glauz	Ken Darby
Industry Team Members:	Bruce Carter	Mark Hill
	George Butorvich	Marc Robert
	Tom Carter	Robert Hightower

** Represents one individual at any given time. If specifications need revising, replace Mehdi Parvini with someone from OE.

Team will be guided by Standard Project Workplan and Rock Products Charter.

Benefits

Relieves Industry's concern that the acceptance criteria for their product is based on factors out of their control, such as ambient temperature, weather conditions, specimen fabrication, transportation and storage.

If switch is made, certification and accreditation for third party labs and non-Caltrans personnel will be consistently managed and enforced throughout the State by using accepted ACI certification.

Has potential to reduce disputes on projects with regard to flexural strength testing method, therefore reducing litigation costs.

If switch is made, will eliminate the resources needed to update and maintain CT 523.

Will also know if improvements could be made to current practices within Caltrans.

Will gain knowledge on how or if the CT 523 can be improved.

Possible Impacts

If switch is made to ASTMs:

- Specifications, with the concurrence of all mandatory stakeholders, would have to be changed.
- Acceptance for opening to traffic will be determined by testing field cured samples.

Acceptance for 28 day strength (or more) will be determined by testing standard cured samples.

- Raising the specified flexural strength value to 625 psi for 28 days (standard-cured samples), 600 psi for 10 days (field-cured samples) and revise the specification that requires "pavement temperature (be kept) at not less than 40 degrees F for the initial 72 hours" to 50 degrees F in accordance with ACI 306.
- IA would need to begin certifying to ASTM instead of CT 523.
- May eliminate field laboratories.

If we stay with CT 523:

- Status quo is maintained.
- Better understanding from Industry on why CT 523 is used.

Resource Requirements

Caltrans:

Pavement:	0.25 PY
DES METS:	0.10 PY
Construction:	0.10 PY
District:	0.02 PY
OE	0.02 PY
Legal	0.02 PY

Other:

Industry:	0.50 PY
FHWA:	0.05 PY

Impediments to Completion of Deliverables

1. Lack of coordination and contribution of task group members
2. Lack of human and material resources
3. Lack of support by managers, functional units, and staff
4. Lack of staff to provide adequate training for implementation
5. New procedures may require more resources and time to complete. If this is the case, need to document conclusions in a report and propose a new Scoping Document with an updated resource estimate.

Recommendation and Approval

This scoping document for Flexural Beam Testing Requirements was prepared by the Concrete Task Group to address a priority issue that has Statewide significance and is within the Rock Products Committee mission. The Task Group Co-Chairs have determined the scope, resources required and timeline for delivery of this project to ensure that the deliverables are achievable in a timely manner.

Scoping Document Recommended for Approval by:

Dan Speer
Concrete Task Group Co-Chair

Chuck Suszko
Concrete Task Group Co-Chair

Nick Burmas
Concrete Task Group Co-Chair

Scoping Document Approved by:

Amarjeet Benipal
Caltrans RPC Co-Chair

Phil Stolarski
Caltrans RPC Co-Chair

John Stayton
Caltrans RPC Co-Chair

Approval Date: 6/23/14