

Rock Products Committee
SCOPING DOCUMENT
Shotcrete Specification Requirements
July 1, 2014

Task Group

Concrete Task Group

Title

Shotcrete Specification Requirements in Section 53

Problem Process

- Annual
- Expedited
- Emerging Initiative

Issue/Problem Statement

The 2006 and 2010 Standard Specifications (updates to section 90) have had an unforeseen impact on the quality of shotcrete that Contractors are able to provide, while still meeting the specification requirements.

Background

The current Section 53 specification and Section 90 have two different grading requirements for the 3/8" pea gravel. This has caused issues related to the interpretation of aggregate grading requirements in certain projects.

In addition, when shotcrete is designed per *Section 90-1.02* and Equations 1 and 2, there have been several issues related to the placement of the shotcrete including cracking and loss of adhesion. Higher volumes of SCMs tend to result in the lack of early adhesion which leads to tension cracks, which may or may not be discovered at time of placement. (Example of issue came up on project 04-264144). These issues are magnified when compressive strengths of 4,000 psi or higher are required.

Water demand for shotcrete mixes can be higher than what is currently allowed in Section 90. This is because shotcrete has a higher specific surface area due to the finer aggregate grading requirements. This has caused delays in obtaining an approved mix design that can be placed without creating other quality problems.

In addition, Industry has moved towards the use of automatic color dispensing systems which may deviate from the current specification. Industry would like to consider the use of these alternative systems.

Purpose

To revise Section 53 to reflect the 3/8" grading requirements found in Section 90 in order to eliminate conflicting grading requirements. There is confusion as to whether the combined

grading requirements in Section 90 apply to Section 53 for shotcrete, which include provisions that state: “The 3/8” combined grading requirements in Section 90 do not apply.”

The activity would determine the need for Equation 2 for shotcrete as written, while keeping the intent of the original specification with regard to ASR and other Department goals. This could include using alternatives currently allowed for precast and pavement mixes (or a combination of the two).

Determine the need for the requirement on maximum water allowed per section 90-1.02G(6) based on proposed above changes and standard industry practices.

Consider the use of allowing alternative coloring systems for Shotcrete in the specifications.

Objectives/Deliverables

This objective of this activity is to provide clarity to the shotcrete specifications in Section 53 of the Standard Specifications.

The following deliverables will be accomplished as part of this activity:

1. Identify team of stakeholders with equal representation from Caltrans and Industry.
2. Review shotcrete specification, best practices and field construction issues. (Some examples included)
3. Identify the Department’s parameters and performance criteria for a quality shotcrete specification and propose an alternative specification that meets the same expectations.
4. New proposed Section 53 Standard Specifications and SSPs where necessary.
5. Identify resource impacts, if any, from proposed changes.
6. Outreach with various stakeholders to communicate proposed updates prior to routing to mandatory stakeholders.

Timeline

Deliverable	Estimated Start Date
Identify team of stakeholders with equal representation from Caltrans and Industry.	1 July 2014

Deliverable	Estimated Start Date
Review shotcrete specification and field construction issues.	1 August 2014
Identify the Department's parameters and performance criteria for a quality shotcrete specification and propose an alternative specification that meets the same expectations.	1 October 2014
New proposed Specifications/SSPs where necessary.	1 January 2015
Identify resource impacts, if any, from proposed changes.	1 February 2015
Outreach with various stakeholders to communicate proposed updates prior to routing to mandatory stakeholders.	1 March 2015
Route to mandatory stakeholders for final review and approval	1 April 2015

Benefits

Provide more confidence that the final in-place product is free of coarse separations and defects.

Better clarity for mix design requirements would result in more cost effective shotcrete.

This activity would result in Industry being able to provide mixes that are consistent with the shotcrete industry's common practices, thus giving Caltrans a better product.

Resource Requirements

Unit/Organization:

- DES METS: 0.10 PY
- Construction: 0.10 PY
- DES OSC 0.10 PY
- District: 0.05 PY
- OE/SP&I 0.05 PY
- FHWA: 0.05 PY
- Legal 0.05 PY

Impediments to Completion of Deliverables

- 1- Lack of coordination and contribution of sub task group members
- 2- Lack of human and material resources
- 3- Lack of support by managers, functional units, and staff

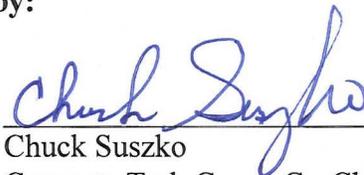
Recommendation and Approval

This scoping document for the Shotcrete Specification Requirements was prepared by 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.

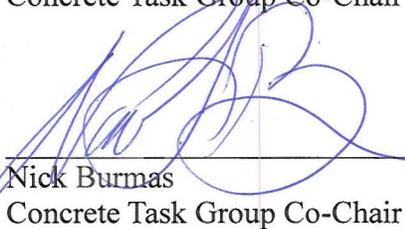
Scoping Document Recommended for Approval by:



Dan Speer
Concrete Task Group Co-Chair

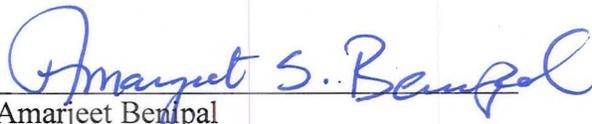


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Approval Date: 6/23/14