Rock Products Committee
SCOPING DOCUMENT
July 30, 2008

Task Group

Portland Cement Concrete Task Group (PCCTG)

The task group responsible for this project is the Precast Subcommittee, with involvement of other concrete-related task groups as needed.

Title

Developing a Section 90 Precast Concrete Specification
(PCCTG Item 1, Draft Rock Products FY2008/09 Work Plan)

Issue/Problem Statement (*What is the issue?*)

Requirements for precast concrete are scattered throughout the current Section 90, "Portland Cement Concrete," of the California Department of Transportation (Caltrans) *Standard Specifications*, creating unnecessary confusion.

Structural precast concrete producers are working under an existing quality control/quality assurance (QC/QA) program that requires performance-based specifications instead of the current prescription specifications.

The economic impact of some specifications that are written for cast-in-place concrete can result in significant cost increases for precast concrete, and in some cases, there may be very little if any value to the taxpayer.

Purpose/Timeline (*Why we need to work on this.*)

The purpose of this project is to develop a Caltrans specification and other supporting documents to separate the requirements for precast concrete from the requirements for cast-in-place concrete.

The documents will consider three levels of precast:

1. Structural (girders, piles, etc.)

2. Intermediate (mechanically stabilized earth wall panels, sound walls, large utility structures, etc.)

3. Minor concrete units (drop inlets, etc.)

It is anticipated that this specification can be developed in the 2008/09 fiscal year.

The goal is to use the new specifications to maintain a quality precast product while eliminating the confusion and inapplicable requirements in the current Section 90 specification.

Objectives/Deliverables (*What is important to be done and what is the expected outcome?*)

The main objective of this project is to create documents that will enable the complete implementation of the precast QC/QA program.

In addition to developing a specification, other supporting documents will be developed.

It is anticipated the specification could be implemented as a special provision or a subsection of Section 90, as it will be very similar in content to Section 90.

Benefits (*For example, increased life cycle or reduced costs.*)

- Confusion arising from the current specification will be eliminated.
- The necessary performance-based specifications to work with the QC/QA programs for precast fabricators will be provided.
- Overall product quality will improve with performance-based specifications.
- Lower costs will be achieved when unnecessary confusion and cast-in-place specification requirements are eliminated.
- Lower costs will result from separating the precast products into categories that more adequately reflect the needs of the type of product being produced.

Impacts (*What are the impacts to policy, specifications, construction practices, and stakeholders?*)

- Precast concrete quality will be maintained and/or improved by allowing the QC/QA process to work as it was intended.
- There is no negative impact on current cast-in-place concrete requirements.
- Confusion and time wasted during the approval and fabrication process will be reduced.

Resource Requirements (*Staff hours and expenses.*)

The Caltrans resource requirements will be determined by the Caltrans members of the precast committee. It is estimated to require approximately 24 hours per week over a six-month period for research, discussions, editing, and production of the final document.

The industry members will provide assistance as needed at no cost to Caltrans.

Impediments to Completion of Deliverables

Time needed to get input and consensus from all parties involved.

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Task Group

Portland Cement Concrete Task Group (PCCTG)

The task groups responsible are the Division of Engineering Services–Materials Engineering and Testing Services–Office of Structural Materials and Office of Rigid Pavement Materials and Structural Concrete, with active support from the Rock Products material group. Other task groups also will be involved.

Title

Developing a Self-Consolidating Concrete (SCC) Specification for Precast Concrete Members (PCCTG Item 2, Draft Rock Products FY2008/09 Work Plan)

Issue/Problem Statement (*What is the issue?*)

Precast concrete producers have been using SCC for different precast concrete projects for some time. California Department of Transportation (Caltrans) specifications, however, do not provide provisions for the use of SCC in precast prestressed concrete construction.

Purpose/Timeline (*Why we need to work on this.*)

Caltrans needs to develop specifications for SCC in collaboration with the precast concrete industry.

Objectives/Deliverables (*What is important to be done and what is the expected outcome?*)

The objective of this project is to develop SCC specifications for precast and prestressed concrete members on Caltrans projects. Caltrans needs input from the precast prestressed concrete producers for developing the final specifications.

Benefits (*For example, increased life cycle or reduced costs.*)

Projects using SCC will have improved concrete consolidation and penetration of rebar cages, reduced project schedule time (potentially faster pour rates are not really applicable to typical Caltrans precast jobs), better concrete finish, and overall cost savings due to reduced labor and equipment. SCC can result in safer working conditions for the precast producer due to fewer personnel on forms and lower noise levels.

Impacts (*What are the impacts to policy, specifications, construction practices, and stakeholders?*)

The current Caltrans precast concrete specifications need to be revised to include SCC. Caltrans needs to develop proper mix design parameters to satisfy all the requirements of SCC. Once the SCC specification is in place, designers will be able to design structures that are more intricate.

The overall construction quality and schedule should benefit (see above comments) from conventional precast and prestressed concrete structures. Precast producers may have to perform tests to confirm hardened concrete properties similar to conventional concrete, when required by project specifications.

Resource Requirements (*Staff hours and expenses.*)

It is estimated that the development of an SCC specifications and its supporting documents will require less than 250 engineering hours, plus technical support. An estimate of the time breakdown is as follows:

- Specification development: 100 hours
- Literature review: 16 hours
- Design and technical requirements: 40 hours
- Material guidelines: 30 hours
- Construction guidelines (test procedures and methods): 40 hours

Impediments to Completion of Deliverables

Caltrans resources (funds and time) need to be allocated to complete this assignment.

Industry will provide assistance as needed at no cost to Caltrans.

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Task Group

Portland Cement Concrete Task Group (PCCTG)

Title

Developing 2010 Specifications for Portland Cement Concrete (PCC) and Structural Concrete (PCCTG Item 3, Draft Rock Products FY2008/09 Work Plan)

Issue/Problem Statement (*What is the issue?*)

The California Department of Transportation (Caltrans) is in the process of converting all specifications to a plain language format. The 2010 *Standard Specifications* will be published in plain language. It is anticipated that industry will be asked to review the draft plain language specifications.

Purpose/Timeline (*Why we need to work on this.*)

This effort will need to occur over the next six or more months. It is anticipated that the deadline for submittal of the plain language specifications will be in early 2009.

Objectives/Deliverables (*What is important to be done and what is the expected outcome?*)

Review and comment on draft standard specifications and special provisions.

Benefits (*For example, increased life cycle or reduced costs.*)

Caltrans will benefit from industry's review of its specifications, as it likely that industry will identify issues that need correction or clarification. Prior to publishing the 2010 specifications, it is appropriate to allow industry, a major stakeholder, to review the specifications they will be obligated to follow.

Impacts (*What are the impacts to policy, specifications, construction practices, and stakeholders?*)

This effort will result in new 2010 specifications.

Resource Requirements (*Staff hours and expenses.*)

Review is requested of the ten standard specifications and the more than thirty special provisions managed by the Division of Engineering Services–Materials Engineering and Testing Services–Office of Rigid Pavement Materials and Structural Concrete. Assuming 40 hours per standard specification and 15 hours per special provision, this effort is expected to require 850 hours of industry participation

Impediments to Completion of Deliverables

None identified.

Combined with PCCTG-3, Developing 2010 Specifications for Portland Cement Concrete (PCC) and Structural Concrete

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Revised March 26, 2009

Task Group

Portland Cement Concrete Task Group (PCCTG)

Title

Developing a Certificate of Compliance (COC) Program for Cement
(PCCTG Item 4, Draft Rock Products FY2008/09 Work Plan)

Issue/Problem Statement (*What is the issue?*)

The current quality control/quality assurance program for determining the acceptability of cement does not meet the needs of the California Department of Transportation (Caltrans). Laboratory testing performed by Caltrans often occurs after the cement has been incorporated into projects. The process needs to be improved so that test results are available prior to cement being delivered to and placed in Caltrans projects.

Purpose/Timeline (*Why we need to work on this.*)

This effort should be given priority, as Caltrans needs to be confident that the cement being used in Caltrans projects meets all specifications.

Objectives/Deliverables (*What is important to be done and what is the expected outcome?*)

Develop a COC program for cement. It is envisioned that the COC program will incorporate a review and statistical evaluation of cement suppliers' product testing programs, historical data analyses, and routine submittals of test results.

Benefits (*For example, increased life cycle or reduced costs.*)

A COC program will provide Caltrans with confidence that the cement used in its projects meets specifications. Contractors and cement suppliers also will benefit from the COC program, as a reduction in rejected concrete, and associated project delays, should occur.

Impacts (*What are the impacts to policy, specifications, construction practices, and stakeholders?*)

A new program will be created and referenced in the specifications.

Resource Requirements (*Staff hours and expenses.*)

It is anticipated that development of the COC program will take one year and will require the participation of all cement suppliers to Caltrans. One month's time for each cement supplier is estimated. It is estimated that the lead Caltrans employee will spend 5 to 10 days per month on this effort.

Impediments to Completion of Deliverables

None identified.

Combined with PCCTG-3, Developing 2010 Specifications for Portland Cement Concrete (PCC) and Structural Concrete

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Revised March 26, 2009

Task Group

Portland Cement Concrete Task Group (PCCTG)

The task groups responsible for this project are the California Department of Transportation (Caltrans) Division of Engineering Services–Materials Engineering and Testing Services–Office of Rigid Pavement Materials and Structural Concrete and the Climate Action Team Cement Subgroup, with support from the Rock Products cementitious materials group. Other concrete-related task groups also will be involved.

Title

Developing a High-Volume Supplementary Cementitious Material (HVSCM) Concrete Specification (PCCTG Item 5, Draft Rock Products FY2008/09 Work Plan)

Issue/Problem Statement (*What is the issue?*)

The California Global Warming Solutions Act of 2006 mandates that the State reduce its greenhouse gas (GHG) emissions to 1990 levels by the year 2020. As a result, the cement and concrete industries, like all California industries, need to reduce the carbon intensity or footprint of their products. An effective way to contribute to this goal is to use supplementary cementitious materials (SCMs) as a large fraction of the cementitious material in concrete, since SCMs typically have very low carbon intensity. Caltrans and the concrete industry have experience with making and specifying concrete that has at least 50 percent of the cement replaced with SCM. The purpose of this specification is to develop provisions for special instances where this technology can be employed. Caltrans already allows for 50 to 60 percent slag be used in concrete. This specification will bring fly ash and other SCMs in alignment with current specifications.

Purpose/Timeline (*Why we need to work on this.*)

The purpose of this project is to develop a Caltrans specification and other supporting documents for the use of HVSCM concrete. These documents can be developed within the 2008/09 fiscal year. The goal is to use this provision on projects where there is time in the construction schedule, such as in structure footings or columns. Projects that cover multiple construction seasons also may be good candidates for this provision. The provision may be best employed for cast-in-place applications of concrete. Full implementation is expected by July 2010.

Objectives/Deliverables (*What is important to be done and what is the expected outcome?*)

The main objective of this project is to create documents that will enable the implementation of HVSCM concrete in Caltrans construction projects. In addition to developing a specification, other supporting documents will be developed. These supporting documents will include design guidance, material and construction guidelines for project development, and guidelines for

concrete mixture design and inspection personnel. Some of the issues to be addressed include but are not limited to:

- Constructability
- Applicability
- Availability
- SCM allowance
- Aggregate gradation

It is anticipated that the specification could be implemented as a special provision or a subsection of Section 90, "Portland Cement Concrete," of the Caltrans *Standard Specifications*, as it will be very similar in content to Section 90-10, "Minor Concrete."

Benefits (*For example, increased life cycle or reduced costs.*)

The major benefit of an HVSCM specification will be to reduce GHG emissions caused by the production and use of concrete. Other benefits include reductions in cost and waste product disposal since SCMs usually have a lower price tag than an equivalent volume of plain Portland cement and are typically byproducts of separate industrial processes.

Impacts (*What are the impacts to policy, specifications, construction practices, and stakeholders?*)

This specification may require changes to current design and construction practices. For instance, the acceptance age for concrete generally will need to change from 28 to 56 days or to possibly an even longer duration. At first, this specification will be applied to "candidate" structures. Since more time will be needed to obtain strength, the ideal candidate structure should not be affected by time, such as "formed" concrete in which early concrete strength is a secondary issue. Accordingly, this specification will be used only on specific projects and certain elements, such as footings, columns, and other formed work. It also is anticipated that the use of the proposed specification will be available for optional use by contractors, with allowances, such as adding more time to the strength-gain schedule. In addition to contractors, other affected stakeholders will be cement, concrete, and SCM suppliers.

Resource Requirements (*Staff hours and expenses.*)

It is estimated that an HVSCM specification and its supporting documents will require less than 700 engineering hours, plus support and technical/technician assistance. An estimate of the time breakdown is given as follows:

- Specification development: 200 hours
- Overall literature review: 40 hours
- Design guidelines: 150 hours

Combined with PCCTG-3, Developing 2010 Specifications for Portland Cement Concrete (PCC) and Structural Concrete

- Material guidelines: 150 hours
- Construction guidelines: 150 hours

Impediments to Completion of Deliverables

Funding and staffing are the major impediments. It is expected that a major portion of the work will be performed by consultant labor under a current engineering contract or by staff in the Consultation and Investigation Branch of the Office of Rigid Pavement Materials and Structural Concrete. Funds and time must be allocated to accomplish the work. In order for Caltrans staff to work on the project, it must be designated a high priority by management.