



1-31 CONSTRUCTABILITY REVIEWS FOR STRUCTURES PROJECTS

Introduction

Departmental policy requires a formal Constructability Review (CR) for all major projects on the California State Highway System. This requirement aims to improve overall constructability and reduce contract change orders, claims and traffic delays.

The following guidelines have been developed for the Division of Engineering Services (DES) based upon the constructability processes already developed statewide. These guidelines are intended to clearly define the constructability review process for all structures through the project development stages.

Policy Statement

All structures on the California State Highway System will receive a formal CR, as an important part of the project's overall Quality Management Plan.

Members of the DES Project Delivery Team will participate in the District CR in accordance with the policies and practices already in place in each District.

DES will incorporate additional constructability review checkpoints into the development of Structures PS&E in accordance with these guidelines.

Discussion

While these guidelines cover CR specifically, other reviews and practices already in place shall be continued. Constructability Reviews are intended to supplement, not replace, the use of the Project Development Team (PDT) meetings and other reviews that provide communication among functional units. These guidelines will allow constructability feedback to be incorporated into all projects without impacting their timely delivery. In addition to improved communication between functional units, lessons learned become a by-product of the CR process, which can then be applied to future projects.

In order to better serve the communities in which projects are constructed, construction issues that may cause adverse impacts shall be identified and addressed. Examples of adverse impacts include escalating costs, disruptions to neighborhoods and businesses and time delays.



The Best Management Practice is for all DES PDT members to take an active role in the quality of the final product. The time spent in performing the CR should be considered an integral part of the project development process, and if employed properly, should not impact the project delivery schedule.

The goal of the CR process is to ensure DES Structures projects have addressed all constructability issues. This will fulfill the department's obligation of the "Implied Warranty" of every contract that states to all bidders that the project can be constructed as designed.

District Constructability Reviews

The formal CR Process is an iterative, multidisciplinary review at defined stages of the project development process. The number of constructability reviews is based on the project's complexity.

Details of the formal CR Process are outlined in the Project Development Procedures Manual, Chapter 8, Section 6:

<http://dot.ca.gov/hq/oppd/pdpm/chap-pdf/chapt08.pdf>

Structure Constructability Reviews

Members of the DES Project Delivery Team will participate in the District CR in accordance with the policies and practices already in place in each District.

Since the District CR Stages do not directly coincide with structures project development milestones, DES will incorporate additional CR checkpoints into the development of Structures PS&E in accordance with the Structures Constructability Review Checkpoints Table.

Level 1:

- Large, complex roadway/facility improvements
- Complex interchange construction or modifications
- Large structure projects with complex or high cost features
- Large rehabilitation projects which include major replacements of structures or other features



Level 2:

- Less complex roadway/facility projects
- Less complex structure or interchange projects
- Most rehabilitation projects which include structure rehabilitation, minor widening or safety improvements

Level 3:

- Capital Preventative Maintenance projects (CAPM) or Minor B projects that include structural features, such as barrier upgrades, deck rehabilitation, joint seal replacement, approach slabs and similar projects.

Structures Constructability Review Checkpoints						
Review Stage	Level 1	Level 2	Level 3	Project Phase	WBS Code	WBS Description
Advance Planning Studies	X	X	X	K or 0	150.15.30 or 160.10.85	Structures Advance Planning Study (APS)
General Plans	X	X		1	240.75	Draft General Plans
Unchecked Details	X			1	240.85	Draft Structure Plans
Draft Structures PS&E	X	X	X	1	250.50	Project Review

The Structure Design Task Manager (TM) shall be responsible for determining the appropriate level of review and for setting target dates for each review stage on a project specific basis.

The Structure Design TM shall also be responsible for coordinating project reviews with the Districts and within DES.

Refer to Attachment 1 for the detailed process for the each of these checkpoints.



Functional Reviewers

The Structure Design TM shall identify the appropriate functional offices on a project specific basis. Each functional office shall provide the names of the specific functional reviewers to be included on the DES Project Delivery Team.

In general, functional reviewers will include the following:

- Structure Design – Structure Project Engineer
- Structure Construction – Field Representative
- Structure Office Engineer – Specification Engineer and/or Project Estimator
- Geotechnical Services – Geotechnical Designer
- Structures Hydraulics – Hydraulics Designer
- Structures Maintenance – Area Bridge Maintenance Engineer
- District – District Project Engineer

The responsibilities of the functional reviewers are as follows:

- Serve as the project focal point from their respective functional area for questions/ comments for the District CR. Attend District CR meetings as required.
- Serve as the project focal point from their respective functional area for providing input during the development of the structures work packages.
- Attend Project Field Review.
- Attend Type Selection meeting.
- Attend Project Review Meeting.
- Review documents and provide feedback for the applicable review stages for structures projects.
- Incorporate recommendations into their respective functional deliverables (i.e. Hydraulic Report, Foundation Reports, Special Provisions) during Project Review.
- Concur that all applicable constructability comments have been properly incorporated into the final Structures PS&E.

A separate worksheet has been developed called Task Manager CR Tool, which can be utilized to track the status of each functional reviewer.



Process for Structures Constructability Review Checkpoints

Functional reviewers are to be consulted for input in the development of each work package. Careful planning on the part of the Project Engineer will allow incorporation of comments into each deliverable without adding time to the overall project development schedule. Comments received after the completion of the milestone will be incorporated into the next milestone. The Design TM is responsible for establishing the schedule for reviews and field site visits and communicating the schedule to the affected participants.

Refer to Attachment 1 for a detailed description of the review process.

Field Reviews

In addition to the Structures Constructability Review Checkpoints Table, a field review prior to Type Selection is required for all Level 1 Projects. A field review on a Level 2 Project may also be warranted.

The Structure Design TM will request a field review from the Structure Construction Area Senior, who will then be responsible for coordinating the field review.

DES Constructability Review Feedback Form

Functional reviewers are to utilize the DES CR Feedback Form for making comments (See the following website: <http://onramp.dot.ca.gov/hq/oscnnet/downloadsCRForm&Checklists.htm>). The Structure Project Engineer shall respond back to the reviewer on each of the comments provided and maintain an ongoing project file of CR comments and responses. CR comments may result in significant effects on the cost, scope, and schedule of a project. If this is the case, the issue must be documented and then discussed with the appropriate level on the ladder of escalation to ensure a solution is achieved as soon as possible.

Significant changes to the project scope trigger the need for the Design TM to complete a Change Communication Document (CCD). Comments that raise serious concerns on the constructability of a project should trigger a face-to-face meeting between the design unit and the reviewer. It is important thorough reviews are conducted in the earlier phases of project development when significant changes are more easily managed.

Upon final Structures PS&E, the project engineer shall forward the CR Feedback Form and any applicable CR Check Lists to the RE pending file.



Constructability Review Check Lists

Checklists have been developed to assist in performing a CR for a structures project. The checklists are separate attachments to this guideline document, and are provided to focus attention on key issues. There are separate checklists for bridges, foundations, walls, and culverts.

Feedback During Construction

During construction, the field representative shall contact the Structures Project Engineer to discuss any structures related Contract Change Orders. This feedback process is intended to reduce repeatable construction problems. During construction, the Project Engineer is encouraged to visit the jobsite with the Structure Representative as well as on a final walk-through.

Close out Meetings

Many districts have integrated a close out meeting to review lessons learned. If the District does not initiate a close out meeting, the OSC Senior is to discuss conducting a close out meeting with the design TM. In order to improve communication back to design on issues encountered during the construction phase, OSC field staff will provide any pertinent feedback to design at the close out of a project. Senior level staff should be involved in close out meetings to be able to assess feedback and look for means to integrate into future projects. Issues discussed at the closeout meeting with broader implications for future projects, should be raised to an Office Chief level for further review.

(original signed by Kevin J. Thompson)

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