

**ACEC / Caltrans Division of Engineering Services
Structures Liaison Committee
MEETING MINUTES**

DATE: April 28th, 2011

TIME: 10:00 AM – 12:00 PM

MAIN LOCATION: California Department of Transportation
Division of Engineering Services
1801 30th Street, Room 102 (Farmers Market 1 Building, 1st Floor)
Sacramento, CA 95816

ALTERNATE LOCATION (Video Teleconference): District 12 Office, Room C1-165
3337 Michelson Drive, Irvine

MEETING MINUTES: John Woelfel, PE

I. Call to Order

- A. Self Introductions
- B. Changes to Agenda: None.

II. Status/Reports on Technical Topics

- A. Technical Questions from Last Meeting:
 - Caltrans Responses to Technical Questions (see handout)
 - Status of Caltrans Pre-Approved MSE Wall List
 1. Barton Newton provided status update regarding Caltrans Pre-Approved MSE Wall List.
 2. Barton reported that much work remains ongoing within Caltrans in conducting reviews of submittals, adding that this significant workload is distributed among limited staff resources.
 3. Barton projected that unless added resources are dedicated to this effort, the time required to complete reviews and approvals of all the vendors could be up to one year.
 4. Barton suggested that an option could be to extend the deadline for requiring LRFD design for MSE walls until the reviews are completed. It was discussed that it's unlikely that FHWA would refuse to pay for MSE wall systems that are not conforming to LRFD requirements. No objections were voiced to this scenario. Barton added that Caltrans is currently working on

related Wall Standard Drawings that will be included with the new 2010 Standard Plan and XS sheets.

5. Lam Nguyen suggested that another option might be for volunteer services from the consultant community to assist Caltrans in evaluating the LRFD submittals.

B. Caltrans In-House Software:

- Caltrans Updated In-House Software List was circulated (see handout)
- CT-Flex (Mike Keever)

1. Mike Keever reported that CT-Flex has been developed for application of designing flexible walls such as tiebacks, soldier piles and MSE walls. The software is being further refined for LRFD and to include rigid, gravity retaining walls. Mike reported that currently Caltrans is working with Legal on copyright concerns, while AECOM is engaged with software validation and Beta Testing is currently in progress.

2. It was discussed that Legal has concluded that Caltrans cannot make their software generally available for use by Consultants, as it has been determined that such an approach would represent a “gift of public funds.” Statement was made that calculations submitted using any software are acceptable, provided that code requirements are satisfied by the software.

C. SDC 1.6 Technical Questions (Open Forum)

1. Majid Sarraf presented two technical questions on SDC Version 1.6:

1) SCD 7.8.2 Transverse abutment response based on 50% of adjacent bent stiffness appears not to be realistic and there is concern that bent displacement demands and abutment pile capacities may be distorted.

2) SCD 7.8.4 Interaction of superstructure and bearing pad at abutments is not considered which leads to underestimates the total force transfer to abutment pile system.

2. Tom Walker presented an SDC technical question on the “alpha” factor used for abutment shear key force capacity in SDC 7.8.4. The range for this factor is 0.5 – 1.0 and background or guidelines for choosing an appropriate value are not included.

Interest was also discussed in seeing a commentary developed for SDC, and development of a guide spec format.

Action Items:

- **Majid to email Tom his technical questions**
- **Tom to compile the questions and forward to Sudhakar Vatti**

- **Sudhakar to obtain responses to the questions**

D. District Approvals of Bridge Site Data Submittal Package

Tom stated that District requirements for approval of BSDS packages are becoming increasingly onerous and that it would be helpful if more discretion were given to OSFP Liaison Engineers to determine the required contents of the BSDS submittal. Lam reported that DES is looking at the issue.

E. Design-Build Submittals

Lam reported that Caltrans is in the process of establishing procedures for Design-Build project submittals. As this project delivery method is increasingly common and as lessons are learned on each project, the need exists for general protocols to be established. Barton asked if the Committee could present a list of D-B related questions to help identify areas where changes will be beneficial.

Action Item:

- **Tom to solicit D-B questions from ACEC members**

III. Updates

A. DES Updates

1. Jim Davis distributed handouts that detail DES capabilities and points of contacts, defining recent staffing updates and the current DES Organization. (see handout)

2. Barton announced that several new Memo to Designers would be coming out including: MTD 5-12, 5-14, 15-14, 20-2, 20-12, 3-1 and 3-7. Barton suggested that recurring agenda items be added for "Memo to Designers", "Technical Research" and "Independent Quality Assurance".

Action Item:

- **Tom and Lam to incorporate the suggested new agenda items as needed for future Committee meetings**

B. ACEC Updates

1. Invoicing on Caltrans contracts. Lam reported that he and Mark Ashley remain in the process of soliciting feedback from current contracts, adding that there is no report of major disconnects or problem areas.

2. Technical Workshops

- a. Concrete Technology Seminars: Tom reported for Jim Frost that the San Diego seminar was a success. The Sacramento seminar will take place on May 9th.

- b. Plain Language Specifications, it was discussed that the 2010 Standards would soon be published online. Hard copies are not expected to be available until December 2011. Caltrans in-house training for the new "Plain Language" format will also be gearing up and possible workshops could be discussed once the in-house training is established.

3. Annual Report Update: Lam stated that final review comments were sent to Mark Ashley and the report could be finalized and submitted.

Action Items:

- **Mark to finalize the Annual Report and email to Lam**

C. Project Development Oversight/Updates/Contracting Opportunities

1. Lam reported that Caltrans' new D59 CI contracts will experience more streamlined Monthly Project Reporting requirements, adding that negotiations on these new contracts has been progressing on schedule. Lam added that there are no current Design Contract opportunities. While there will be two new Geotechnical contracts, both of these are currently delayed.

IV. 2011 Meeting Schedule

Remaining 2011 Meeting Schedule

- July 28th, 2011
- October 27th, 2011

Attendees:

CALTRANS NAME	EMAIL
Sudhakar Vatti, Caltrans	Sudhakar.Vatti@dot.ca.gov
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Steve Tayanipour, Huitt Zollars	stayanipour@huitt-zollars.com

Following are DES/Caltrans responses to the technical questions raised during the ACEC/DES Liaison Committee meeting held on Jan 28, 2011: (Responses in blue)

A. Longitudinal and Vertical Restrainers

1) For new bridge design, if we meet the seat width requirements of SDC 7.2.5 Hinges, are longitudinal hinge restrainers required (SDC 7.2.6 Hinge Restrainers)?

As per SDC 7.2.6, a restrainer unit shall be placed in each alternating cell at all hinges (minimum of 2.). No reduction in seat width allowed due to restrainer participation.

2) For new bridge design, when are vertical restrainers required?

Vertical restrainers are not required. We discourage the use of vertical restrainers.

B. Shrinkage Models (CIB FIB 90, 4th ed LRFD, and ACI)

1) Do any of these shrinkage models compare well with the concrete mixes we can expect in CA?

On several specific projects, concrete testing during construction showed that actual shrinkage was twice that of what CEB-FIP90 model predicted. More research needs to be done to know how California mixes in general compare with the various shrinkage models. A research proposal is currently being put together.

2) If not, should we require contractors to add Shrinkage Reducing Agents (SRA) to meet the design shrinkage strain? CT jobs that used SRA - Devil's Slide Bridge, Angels Crest, and Oakland Eastbound I-580 Conn Repair.

On past projects with structures sensitive to shrinkage, language was put into the special provisions to limit the shrinkage strain to certain values. SRA was not required, but was allowed to be used at the option of the contractor.

C. Shrinkage (SH) Load (see attachment for MTD 7-10)

1) Should we design (columns, superstructure, etc.) with the values given in Attachment 2 of MTD 7-10? Please note that for Concrete (Conventional) the shortening is basically zero. Also, doesn't the value for Concrete (Post Tensioning) include elastic shortening? These values do not compare well with the CIB FIB 90, ACI, or LRFD models.

MTD-7-10 covers the Joints and Bearings only and currently being revised. This is an issue currently being looked into to provide uniform direction as to which shortening values should be used. The CTBridge group is working on a function that can show forces from creep and shrinkage effects which should be ready in about 1 year. Post tension design already includes losses due to creep and shrinkage, so it need not be added again in superstructure post tension design. The factors used in MTD 7-10 are 50% of the total long term shortening assuming that half of the long term shortening remains at the time of joint seal installation.

2) Should we design (columns, superstructure, etc.) with the CIB FIB, ACI or LRFD shrinkage models?

Segmentally constructed structures need to use the CEB or ACI creep/shrinkage models because of the needed predictions for each construction stage. These projects need project-specific design criteria.

D. Long Term Camber (Spliced Precast Girder and Precast Girder) - Time Dependent Camber (see attachment for Pitkins Curve Br)

1) Who should be responsible for the calculating the haunch during construction - Structures Rep or Contractor?

Contractor is responsible for the calculating the haunch.

2) Should the designer put enough information on the plans to calculate the long term camber?

It is not recommended the designer show this information on plans. During the design stage designers doesn't know the factors that would influence camber like mix design, and aggregate source.

3) If we put the camber on the plans with our construction assumptions, what happens if our assumptions are not correct? What should each party be responsible for? Shouldn't this be covered in the specs?

Caltrans specifications state the Contractor is responsible for camber calculations.

4) Should the designer put the camber on the plans but note it as "For Information Only" and have the contractor hire a PE to help set the camber as approved by the engineer? This would be similar to Segmental Bridge construction.

Deflections due to deck load and rail shown on the plans to help the contractor set up the CIP deck screed. Deflection data due to post-tensioning shall be added in the RE pending file for spliced precast girder bridges.

1) SDC 7.7.1.7 Use of "T" Headed Stirrups and Bars in Footings

1) Are CT design sections designing foundations to meet this section of the code? We have not seen a CT bridge that uses "T" headed stirrups in footings.

"T" heads in footing stirrups are relatively new practice. It is an improvement to the 90-degree hook. Its use has been delayed because the "Design Details" package showing this detail has not been published yet. This detail is shown in the SDC 1.6.

2) SDC 7.7.1 Footing Design (see attachment for SDC page 7-36)

1) In EQs 7.31b and 7.31c, does M_p of the pile imply that we are allowing the pile to form a plastic hinge?

SDC equations, 7.31b and 7.31c are under section 7.7.1.1, which covers the pile foundations in competent soil. The piles will not form plastic hinges in this soil. The moment in the pile is unknown unless lateral analysis performed. Lateral analysis is not required in competent soils. The worst case analysis is the case of assumed M_p in the piles

2) If we are designing the piles to be elastic for column M_o and V_o why would we apply M_p of the pile?

We do not have the moment values in the pile but it cannot be larger than M_p . If you want a better value then you need to do the lateral analysis, which is not recommended.

3) CADD

1) When will Standard Drawings be updated to Font 3 to reflect Bridge CADD requirements? We've been utilizing Caltrans Standard Drawings (e.g., MSE walls) but have been getting CADD comments to update the standard drawings to utilize Font 3 (currently Font 2).

The Department will be releasing updated Standard Plans as part of the 2010 Construction Standards project (late March 2010). The 2010 Standard Plans will be updated to the latest Departmental requirements for Microstation (v8). It should be noted that the plans will be posted in a vector format, .DGN and a static format, .PDF. The Department will no longer be posting Standard Plans in .DWG (Autocadd).

Likewise, SP&I will be releasing updated Bridge Standard Detail Sheets (XS), about the same time as the Department's release of the 2010 Standard Plans. The XS Sheets will also reflect the latest requirements for microstation and will be posted in .DGN and .PDF formats.

4) Rebar Lap Splices (see Attachment for Lap Splice Lengths)

In some situations, Standard Specification 52-1.08A lap splice lengths are less than required by the new LRFD code. However, it should also be noted that when taking a deeper look into this it quickly becomes apparent the LRFD code requirements have not changed on these splice lengths - once you adjust for the switch from pounds per square inch to kips per square inch units the formulas and requirements are essentially the same. The following are also noted.

- As concrete strength decreases the problem gets worse.
- Looking further into the code, many situations require even longer splices. One would be top bars per LRFD code 5.11.2.1.2. So, even though the attached shows only a few inches of differences for two of the three highlighted noncompliance situations that would change significantly for top bars in normal strength concrete.

Show longer splices on the plans where appropriate or write something into the specials that would apply to all bars in all concrete?

Standard Specs cover only standard Class "B" splice requirements (ie 50% staggered and no modification factors for 12" concrete below, epoxy, etc). If longer splice lengths are required than specified in the Standard Specs they should be shown on the plans. Reference Bridge Design Details 13-16.

CT In-house Software

Sudhakar,

Please see the attached Bridge Design Software List which ACEC requested.

Thanks,

Sincerely,

Paul Chung, PE, MS, ME,

Office of Earthquake Engineering

The major programs used in Structure Design are as follows and you may share this info:

V Bent

CT Bridge

MathCAD

Leap Bridge

Leap Consplice

RM 2000

MDX

PS Beam

SAP

G Stable 7

Group 7.0

L Pile plus 5.0

Yours,

Dan

Dan Heathcote, Sr Br Engr

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The Division of Engineering Services - Providing solutions for California's transportation needs



DES Chief
Robert Pieplow

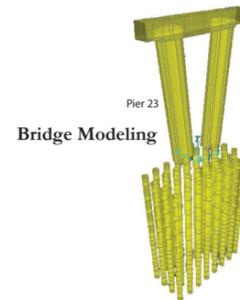
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Office Engineer assists DES transportation partners with the advertising and obtaining bids, and timely award of approximately 650 major construction contracts worth \$2 billion delivered annually by Caltrans. Office Engineer also administers the Best Bids Contract Quality Management Program and publishes construction contract standard plans and specifications to facilitate project delivery and improve mobility across California.

Structure Design is the structure project delivery subdivision in DES. Structure Design delivers plans, specifications, and estimates for structures including bridges, buildings, earth retaining structures, and pumping plants. Additionally, Structure Design provides technical construction support, advance planning studies, photogrammetric services, and preliminary investigation services.

Program/Project and Resource Management (PPRM) manages the DES Capital Outlay Support and Non-Capital Programs. This includes developing project workplans, allocating resources, and monitoring programs resource utilization. PPRM also provides Architectural & Engineering contract management and structural technical oversight services for both on and off State highway system projects.

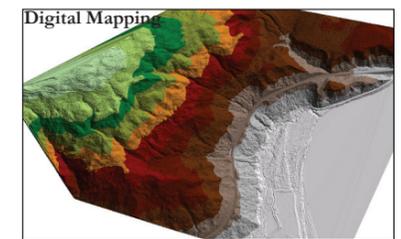


Structure Construction provides construction engineering, contract administration, and independent quality assurance for highway bridges and related structures on the State highway system. Structure Construction also develops and maintains technical guidance for the construction of highway structures.

Structure Policy and Innovation, under the leadership of the State Bridge Engineer, is responsible for the development of technical policies, standards, and guidance material used by DES and consultant engineers in the design of bridges and structures; development and implementation of the latest structure-related design and innovation methods through research and national engagement with industry and external stakeholders; promotes and supports the continued development of a highly skilled technical workforce; provides special analysis, including earthquake engineering; and hydraulic studies for structure projects.

Administration provides essential support services to all staff in DES in the areas of budgeting, contract management support, human resources, workforce development, building operations, safety, business services, and technical publications and graphics services.

The majority of DES' engineering staff has 10-15 years of practical experience in the transportation field, with technical knowledge that is unmatched in the industry. California's diverse geography and topography make it one of the most unique regions in the world for building transportation infrastructure. This combination of a challenging environment and unrivaled experience in design and construction of transportation structures has established DES as a leader in the industry for nearly a century. It is DES' goal to fully collaborate with our transportation partners to meet the expectations of the public by delivering innovative, effective solutions to meet California's transportation challenges.



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 DEPARTMENT OF TRANSPORTATION

Division of Engineering Services



The Division of Engineering Services (DES) is the lead project delivery organization for the design, construction, and oversight of bridge and other transportation structures for the California Department of Transportation (Caltrans). DES is a comprehensive, multidisciplinary engineering organization committed to providing our clients with quality products and services in a timely manner.

DES has designed, advertised, and administered construction for thousands of transportation projects throughout California. From major suspension bridges to freeway sign structures, DES collaborates with our transportation partners to meet the expectations and needs of the public by delivering effective solutions for today's increasingly complex transportation projects.

This brochure and accompanying inserts are meant to provide a brief overview of DES' core business functions. For additional information, please visit the DES website at <http://www.dot.ca.gov/hq/esc/>.



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