

California

State DOT Representative Report Questions

National Concrete Consortium

San Antonio, Texas

April 2, 2009

Theme: Ride Quality for Bridges

Please provide your state DOT's perspective regarding the following theme questions. Each NCC state DOT representative will be asked to present their responses to the group during the State Report forum on Thursday morning April 2, 2009.

1. What features of a bridge deck and approach do you consider to have the most impact on ride quality?

The smoothness requirements set forth in the Caltrans Standard Specification 51-1.17 and which are tested for conformance with the requirements of California Test 547, <http://www.dot.ca.gov/hq/esc/ctms/index.html>

2. How does your state measure ride quality for bridge decks?
 - a. IRI? [See # 12](#)
 - b. Straight edge? (Yes)
 - c. Other? (Profilograph)
 - d. Specifications? [Caltrans Standard Specification 51-1.17](#)

3. What smoothness thresholds does your DOT require for bridge decks?

The surface shall have a profile trace with no high points in excess of 0.25 inch, and the surfaces within the traveled way shall have a profile count of 13 or less in any 100 foot section. In addition, the roadway surfaces shall not vary more than 0.02-foot from the lower edge of a 12-foot long straightedge placed transversely to traffic.

4. How are transitions near localized features (drainage basins, joints) treated in efforts to ensure acceptable ride quality?

The smoothness requirements set forth in the Caltrans Standard Specification 51-1.17 are required for the surfaces of the bridges, approach slabs, and the adjacent 50 feet of approach pavement.

5. What corrective actions are required for substandard bridge deck/approach ride quality?

Surfaces which fail to conform to the above smoothness tolerances shall be ground until the tolerances are met.

6. Does your state initiate a penalty/incentive structure for bridge ride quality?

There is no penalty/incentive structure for bridge ride quality in place. The contractor must meet the contract requirements.

7. Does your state consider ride quality as a scoping item for bridge rehabilitation?

Yes, ride quality is a determining factor in scoping bridge rehabilitation projects. We would normally NOT initiate a project solely on ride quality alone however. A typical case is the AC pavement on a bridge deck is distressed. This may be due to the underlying concrete being in a poor condition. In this case, a project would be developed to repair the concrete bridge deck and also provide a good riding surface for the entire bridge.

8. Does your state require sequencing (casting positive moment regions prior to negative moment regions) of deck pours during placement of bridge deck concrete for continuously designed decks?

The majority of our bridges are cast-in-place concrete box girders post-tensioned and conventionally reinforced cast on falsework until they can support themselves.

For steel structures, the following guidance material is in place during the design of steel structures.

Caltrans Memos to Designers Manual MTD 16-4:

The sequence of concrete deck placing should be shown on the plans to minimize the following:

1. Tension in previously placed concrete.
2. Variations from the assumptions that all deck concrete is placed at once.

The responsibility is up to the designer to use good engineering judgment and knowledge to minimize the deck crack.

9. What method and type of texture does your state apply to your bridge deck surface?

The typical texture on California Bridges is transverse tine. Caltrans does not specify a texture type just that the friction and smoothness requirements are met. Contractors have used various methods to place texture on the roadway. Burlap drags, astro-turf, coiled pieces of pvc pipe.

In areas where the bridges are susceptible to frost they may receive a "tined" finish.

10. How does your state handle transitions/approaches from pavement on to the bridge deck (approach length, profile, joints)?

Caltrans Memos to Designers Manual 5-3: The structure approach provides a smooth transition between the highway pavement and bridge superstructure and, as appropriate, consists of some or all of the following:

1. Reinforced concrete approach slab attached to the structure
2. Positive sub-grade drainage system behind the abutment.
3. Superior compaction in the fills approaching the structure.

The standard approach slab length is 30 feet.

<http://www.dot.ca.gov/hq/esc/techpubs/manual/bridgemanuals/bridge-memo-to-designer/bmd.html#sec5>

11. Does your state maintain a database for bridge ride quality?

No

12. How does your state report its network ride quality for pavements and bridges to the Highway Performance Monitoring System (HPMS) database (network report excludes or includes bridges with pavements)?

IRI is measured on the structures but it is not included in the HPMS. Next year, Caltrans will have to include the structures in order to comply with the newer federal requirements.

Here is some metadata on IRI measurement. This is only for on-system (state) routes.

- Type of vehicle used to collect IRI - Inertial road profiler
- Inclusion of structures - Structures are measured but not reported to HPMS.
- Inclusion of railroad crossings - Railroad crossings are measured and are included because they cannot be reliably identified for exclusion.
- Measurement of wheel path - Both wheel paths are measured and calculated separately; the average of the two is reported to HPMS.
- Measurement lane - Lane measured is identified in the system; outside right lane is reported to HPMS.
- IRI simulation - IRI simulation is quarter-car.