Chapter 6: Deck Plates

Table of Contents

6-1 Introduction

Temporary deck plates in accordance with *Contract Specifications* Section 48-4, *Temporary Structures – Temporary Decking*, provide the means of temporary decking for bridge joint or deck reconstruction. Deck plates may be considered as an option if bridge reconstruction activities are unable to be completed before the bridge is to be opened to traffic. The design of deck plates typically consists of the use of metal plates mechanically anchored to the existing deck or approach slab, while tapering the plate edges to the traveling surface for a smooth transition. Note that tapering of the plates may not be required if the plates are recessed, as illustrated in Figure 6-1.

Deck plates may be a Caltrans-designed system, as shown in the contract documents, or a contractor-designed system when not shown in the contract documents.

Figure 6-1. Recessed Deck Plates Installed for Deck Joint Replacement Sacramento River BOH, Bryte Bend (Br. NO. 22-0026). Route: 80

6-2 Contractual Requirements

The *Contract Specifications* Section 48-4, *Temporary Structures – Temporary Decking,* requires the Contractor to submit to the Engineer for authorization, temporary decking shop drawings and calculations. The shop drawings must be sealed and signed by an engineer who is registered as a civil engineer in the State.

6-3 Design Considerations

If temporary decking is not shown, the temporary decking design must:

1. Comply with the unfactored permit loads, braking force, and HL93 loads, except lane load, from the current *AASHTO LRFD Bridge Design Specifications with California Amendments*.
2. Not exceed the allowable stresses or design loads specified in *Contract Specifications* Section 48-2.02B(3), *Temporary Structures – Falsework – Materials – Design Criteria – Stresses, Loadings, and Deflections*.
3. Have live load deflection not exceeding 1/300 of the temporary decking span length for the design load.
4. Provide for temporary decking with a uniform surface and a coefficient of friction of at least 0.35 when measured under California Test 342, *Method of Test for Surface Skid Resistance with the California Portable Skid Test*.
5. Provide for temporary decking that is mechanically connected to the existing structure and adjacent approaches. If a steel plate spans a joint, the mechanical connection must accommodate at least 50 percent of the movement range shown for that joint.
6. Not overstress, induce permanent forces into, or produce cracking in the existing structure.

If there is an elevation difference of more than 1/2 inch between the temporary decking and the adjacent deck, install temporary tapers up to and away from the temporary decking. Construct tapers under *Contract Specifications* Section 7-1.03, *Legal Relations and Responsibility to the Public – Public Convenience.* If the temporary decking does not extend the entire width of the roadway, taper the sides of the temporary decking at a 12:1 (horizontal: vertical) ratio. Material for temporary tapers must comply with *Contract Specifications* Section 60-3.02B(2), *Existing Structures – Structure Rehabilitation – Bridge Deck Repair or Preparation – Materials – Rapid Setting Concrete*, or Section 60-3.04B(2), *Deck Overlays – Polyester Concrete Overlays – Materials*. Cure temporary tapers at least 3 hours before allowing traffic on the temporary decking.

6-4 Caltrans-Designed Deck Plates

Caltrans-designed temporary deck plates are shown in the contract documents. Refer to the project plan sheets and the special provisions for unique requirements.

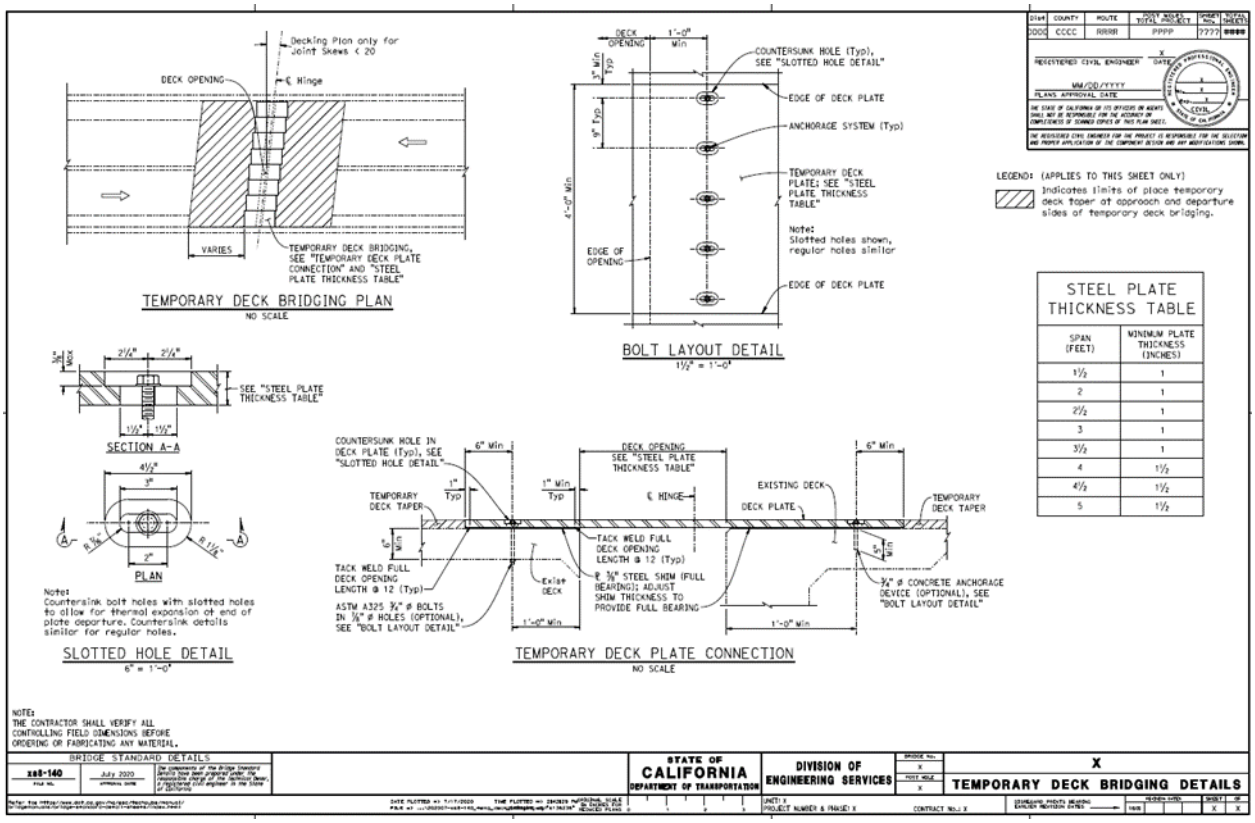

Figure 6-2. Contract Plan Temporary Deck Plate Details

Restrictions on Use of Standard Drawings:

The maximum longitudinal clear span is 5 feet. Spans greater than 5 feet may require a special design to control the deflection. The required plate thickness may create a bump greater than what District Traffic Engineering will allow. The maximum joint skew for Temporary Deck Bridging XS Sheet is 20 degrees. Greater skews create grade problems with the temporary taper and plate stagger. To solve this, the plates are placed parallel to the joint. The exterior plates are cut in a triangle, which requires special detailing.

6-5 Contractor-Designed Deck Plates

The Contractor is responsible for the design of the temporary deck plates if the contract documents do not include Caltrans deck plate drawings.

Contractor-designed deck plates must be submitted to the Engineer for review and authorization under *Contract Specifications* Section 48-4.01C, *Temporary Structures – Temporary Decking – Submittals.* The Contractor is required to submit shop drawings and calculations for temporary decking, which must be sealed and signed by an engineer who is registered as a civil engineer in the State.

Refer to the aforementioned specifications for specific requirements for storage location of equipment and materials, construction sequence and schedule, cure time for concrete, and removal details for the temporary decking.

For temporary decking which is not shown in the plans, shop drawings, and calculations must also include:

1. Design calculations, including the description, location, and value of all loads.
2. Details of the connection between the temporary decking and the existing or new structure, including range of movement.

A certificate of compliance for temporary decking materials must be submitted.

6-6 Installation, Maintenance, and Removal

The Contractor is expected to inspect the installed temporary deck plates daily while in service, where damage may occur due to wear and tear. Components of inspection include the taper, metal plate, and anchorage system.

Some common maintenance repairs include:

1. Any loose hardware of the anchorage system shall be securely tightened.
2. Verify all hardware is in place per plan; the Contractor should have additional hardware on-hand if needed.
3. Any visible vibration on plates with loading is required to be securely tightened with an impact and shims checked for full bearing.
4. Shims may need to be replaced if plate does not maintain appropriate height.
5. Missing or damaged shims require replacement; the Contractor must have additional shims on hand to add/replace as needed.
6. Patch any damage to the taper if cracking or spalling occurs.

7. Replace any missing foam between plate and taper as needed.

Installation and maintenance checklists are useful tools to ensure deck plates are installed and maintained properly. See Figure 6-3 and Figure 6-4 below for examples of deck plate installation and daily inspection checklists.

Discuss the use of these checklists at the preconstruction conference.

As outlined in *Contract Specifications* Section 48-4.03, *Temporary Structures – Temporary Decking – Construction*, verify that the Contractor promptly removes the temporary decking when no longer needed, the holes are patched, and the existing structure is left in the condition required.

Temporary Deck Plates Installation Checklist

Date: _____

Location: _____

Inspector: _____

- ☐ Steel plate thickness matches shop drawings
- ☐ Plates sit flush on deck (full bearing)
- ☐ Plates centered correctly (even spacing of demolition limits)
- ☐ Shims/crush strips under plates positioned correctly
- ☐ High spots ground to provide full bearing (no rocking)
- ☐ Slotted and fixed bolt holes oriented correctly, to allow for thermal expansion
- ☐ Plates installed per installation plan
- ☐ Shims in between the plates placed correctly
- ☐ Anchor holes drilled using the correct diameter drill bit
- ☐ Anchor holes drilled to the correct depth
- ☐ Anchor holes cleaned per manufacturer instructions
- ☐ Anchors embedded to the minimum depth specified in shop drawings
- ☐ Anchors installed per manufacturer's instructions
- ☐ Anchors match what is specified in the shop drawings
- ☐ Rapid strength or polyester concrete tapers installed per authorized shop drawings
- ☐ Foam strips are placed per authorized shop drawings

Figure 6-3. Example Deck Plate Installation Checklist

Date: _____
Plates installed: _____
Location (Joint#/Bent #) _____
Inspector: _____

Temporary Deck Plates Daily Inspection Protocol

On a daily basis, each taper, roadway plate, and anchorage system installed will be inspected for the following:

1. Check if hardware is loose - securely tighten as needed
2. Verify replacement nuts and washers are available onsite
3. Check for visible movement of anchors - replace as required
4. Check for excessive vibration of plates - tighten anchors as needed
5. Verify shims maintaining appropriate height – replace if flattened
6. Verify shims are oriented correctly – replace as needed
7. Check for cracking or spalling in tapers – patch damaged tapers
8. Verify foam in place between plate and taper – replace as needed

Figure 6-4. Example Deck Plate Daily Inspection Checklist