Rock Products Committee
SCOPING DOCUMENT
Temporary Transverse Joint Tapers
February 5, 2015

Task Groups

Concrete Task Group

Asphalt Task Group

Pavement Preservation Task Group

Problem Process

☐ Annual

☒ Expedited

☐ Emerging Initiative

Title

Temporary Transverse Joint Tapers

Issue/Problem Statement

Construction project activities, including overlays and cold planing, produce temporary vertical offsets of varying heights for transverse joints (perpendicular to vehicular traffic) on the travelled way. Prior to opening the travelled way to traffic, the vertical offsets must be mitigated to ensure the public does not experience discomfort or damage to goods being transported when travelling through the construction zone. Presently there may be multiple methods specified to address the transverse joint vertical offsets produced by construction activities. One of these methods is the construction of temporary tapers to specified slopes with specified materials. The Department has experienced varying levels of workmanship on these temporary tapers, as well as inconsistencies in maintenance of these temporary facilities once in place. In some instances, the Department has received complaints from the public regarding these temporary taper areas. The Department would like to minimize discomfort to the travelling public or damage to goods being transported through its construction zones and help ensure temporary tapers are constructed and maintained in a consistent manner throughout the state.

Background

Districts 2 and 3 have fielded multiple complaints from the public travelling through construction zones at areas where temporary tapers have been used at transverse joints to address vertical offsets created by overlays or cold planing activities. At the request of district directors from these areas, opportunities for improving current practices were investigated.

These investigations started with a literature search of other state DOTs temporary taper slopes and comparison to the slope often specified by the Department (30H:1V). These comparisons showed that many other states are using temporary tapers with “gentler” slopes, including some specifying slopes of 200H:1V or flatter.

Next investigations were done to model the expected vertical acceleration that would be experienced as a vehicle traversed a temporary taper. The CHP’s human vehicle environmental simulation software was used for assessing vertical acceleration. This modeling included multiple temporary taper configurations with different slopes and vertical offsets as well as

different configurations of vehicles (sedan, truck and trailer, etc.) and speed of travel. Based on published data on discomfort levels due to vertical acceleration, a 6.0 g vertical acceleration level was examined. Using temporary tapers constructed with various configurations and accelerometer instrumentation on vehicles travelling at multiple approach speeds, the accuracy of the modeling was demonstrated.

A nonstandard special provision was prepared (as attached) and inserted in nearly 60 pilot projects in the North Region over two construction seasons. The evaluation of the first set of pilot projects included feedback from the resident engineers on quality of workmanship and judgments on ride acceptability. The second set of pilot projects included videos of public vehicles traversing the temporary tapers along with configurations of the constructed temporary taper slopes.

The nonstandard special provision (7-1.03, “Public Convenience”) requires that transverse joint height differentials greater than 0.04-foot construct a temporary taper in conformance with the following table where slopes are shown as horizontal to vertical:

Height differential	Slope	
	Taper use of 14 days or less	Taper use of more than 14 days
Greater than 0.10 foot	100:1 or flatter	200:1 or flatter
0.04 to 0.10 foot	70:1 or flatter	70:1 or flatter

In addition, the material and equipment requirements for the temporary taper construction are specified and the requirement that existing surfaces must be ground to accommodate a minimum taper thickness of 0.10-foot when the temporary taper will be in place for more than 14 days or the HMA material (e.g. rubberized, polymer modified or open graded) is unsuitable for raking to maximum 0.02-foot thickness at the conform. There are also finished surface requirements specified to assess workmanship quality and a provision to use alternative material and methods if authorized.

As a temporary feature, the contractor is responsible for maintaining the temporary taper through its use and performing the removal and disposal of the taper when no longer needed. Payment for this work is included in the associated items of work (e.g. HMA, polyester overlay, cold planing, etc.).

Based on pilot project use and recommendations from construction staff, the following changes to the specification have been proposed for use in the final standard specification:

1. Update specification for use with section 39 requirements
2. Use a minimum slope ratio of 100:1 in lieu of the 70:1 if polyester overlay is placed.

Purpose

Ensure temporary tapers are constructed and maintained in a consistent manner across the State and that temporary tapers not create an unreasonable level of discomfort to the travelling public or damage to goods being transported.

Objectives/Deliverables

Development specification uniform requirements for temporary tapers and provide notice to industry sub groups who will be affected by this change on new construction projects containing the new specification requirements.

Timeline

Task/Deliverable	Targeted Completion Date
Share specification with industry task groups	9-15-15
Upon completion of 2015 Standards moratorium, submit specification change as a revised standard specification	2-15-16
Incorporate revised standard specification in newly advertised projects	4-15-16
Develop and issue a CPD to announce the new specification requirements concerning temporary tapers	5-15-16

Benefits

Standardize temporary taper requirements across various construction activities. Help minimize discomfort to travelling public and damage to goods being transported through construction zones. Reduce public complaints regarding temporary tapers on the travelled way. Provide bidder's a more uniform bid environment.

Impacts

Anticipate slight increase in costs to construct the temporary tapers to the revised standards.

Stakeholders include:
Districts
Division of Maintenance
Division of Construction
DES-OE
Construction Industry

Resource Requirements

Caltrans:

Pavement:	0.01 PY
DES METS:	0.01 PY
Construction:	0.05 PY
District:	0.01 PY
Office Engineer:	0.01 PY

Impediments to Completion of Deliverables

Factors that could impede and jeopardize the effective completion of the deliverables include lack of support by managers, functional units, and staff.

Recommendation and Approval

This scoping document was prepared by the Concrete, Asphalt and Pavement Preservation Task Groups to address a priority issue that has statewide significance and is within the Rock Products Committee mission. The Task Group Co-Chairs have determined the scope, resources required and timeline for delivery of this project to ensure that the deliverables are achievable in a timely manner.

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