

DEPARTMENT OF TRANSPORTATION

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*Serious drought.
Help save water!*

July 18, 2016

Ms. Diane Boyer-Vine
Legislative Counsel
State Capitol, Room 3021
Sacramento, CA 95814

Mr. Daniel Alvarez
Secretary of the Senate
State Capitol, Room 3044
Sacramento, CA 95814

Mr. E. Dotson Wilson
Chief Clerk of the Assembly
State Capitol, Room 3196
Sacramento, CA 95814

Dear Ms. Boyer-Vine and Messrs. Alvarez and Wilson:

I am pleased to transmit the California Department of Transportation's "Specifications for the Use of Reclaimed Asphalt Pavement: A Status Report," as required by Public Resources Code section 42704.

Distribution to the California State Legislature has been made pursuant to Government Code section 9795. This report can be found at <www.dot.ca.gov/reports-legislature.htm>.

Sincerely,

A handwritten signature in blue ink, appearing to read "Malcolm Dougherty".

MALCOLM DOUGHERTY
Director

Enclosure

Specifications for the Use of Reclaimed Asphalt Pavement: A Status Report



**Report to the Legislature
Prepared in Accordance With
Public Resources Code Section 42704**

July 2016

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Contents

Executive Summary iv

Background 1

 Statutory Reference & Purpose 1

 Program Background 1

Status of Progress Since 2011 1

Conclusion 3

Appendix. Statutory Reporting Reference 4

Executive Summary

Public Resources Code section 42704 states that on or before January 1, 2014, the California Department of Transportation (Caltrans) may, with input from the Caltrans/Industry Rock Products Committee, establish specifications for the use of reclaimed asphalt pavement (RAP) of up to 40 percent for hot mix asphalt (HMA) mixes. Furthermore, the code requires that on or before March 1, 2016, Caltrans shall submit a report to the Legislature on its progress, since the year 2011, toward the development and implementation of the specifications for RAP. This is a one-time report.

Caltrans has been working with the asphalt industry through the Rock Products Committee to develop specifications that would allow the use of RAP as a replacement for up to 40 percent of HMA. In 2009 Caltrans began allowing the use of up to 15 percent RAP in HMA by aggregate weight, then in 2013 increased it to 25 percent by aggregate weight and also allowed maximum binder replacement of 25 percent for the surface course (upper 0.2 foot of HMA, exclusive of the open-graded friction course) and 40 percent for lower courses.

On October 20, 2014, the Federal Highway Administration (FHWA) issued a memorandum indicating that an increasing number of state highway agencies were reporting premature cracking in relatively new asphalt pavements as the result of using a high content of recycled asphalt binder from RAP and/or recycled asphalt shingles (RAS). The asphalt industry also expressed concerns about the use of current RAP specifications and associated cracking in pavements. Caltrans is currently working with the asphalt industry to address this issue. A project scoping document, was approved by the Rock Products Committee on January 28, 2016, to evaluate premature pavement cracking associated with the use of RAP and/or RAS in HMA and to determine necessary modifications to the current specifications to address the cracking issue.

Background

Statutory Reference & Purpose

Public Resources Code section 42704(c)(1): “On or before March 1, 2016, the Department of Transportation shall submit a report to the Legislature in compliance with Section 9795 of the Government Code on its progress, since the year 2011, toward the development and implementation of the specifications for reclaimed asphalt pavement, as specified in subdivision (a).” This is a one-time report.

Program Background

One of Caltrans’ core principles is sustainability, which is reflected in Caltrans’ mission and goals. Caltrans supports and encourages the use of recycled material in its pavements. Use of RAP in HMA is one of the ways to support sustainability. Use of RAP could help reduce the cost of HMA, save energy, and decrease greenhouse gas emissions.

Caltrans has allowed the use of RAP in HMA for several years. Starting in 2009, Caltrans allowed contractors to substitute RAP aggregate as part of the virgin aggregate in HMA in a quantity not exceeding 15 percent of the aggregate blend by weight.

Status of Progress Since 2011

On September 7, 2012, Governor Brown signed Assembly Bill 812 (Ma, Chapter 230, Statutes of 2012), which added section 42704 to the Public Resources Code. Section 42704(a) states, “On or before January 1, 2014, the Department of Transportation may, with input from the Caltrans/Industry Rock Products Committee, establish specifications for the use of reclaimed asphalt pavement (RAP) of up to 40 percent for hot mix asphalt mixes.”

Previously, Caltrans contacted the FHWA to solicit national experience on the use of RAP. On June 28, 2011, Caltrans hosted a meeting with the FHWA RAP expert panel to share knowledge and experience on the use of high amounts of RAP in HMA. This meeting was attended by Caltrans and asphalt industry members.

Through the process established by the Rock Products Committee, a project scoping document to develop specifications that would allow the use of higher amounts of RAP in HMA was approved in July 2012. Prior specifications based the RAP content limit by aggregate weight. Controlling the performance of high RAP content in HMA requires careful control on how much binder is replaced. This led Caltrans to transition the basis of the RAP usage limit from aggregate weight to binder replacement. This transition was to be achieved in two phases. In the first phase, Caltrans would increase allowable RAP usage from 15 percent to 25 percent for surface courses and 40 percent for subsurface courses based on both aggregate weight and binder replacement percentage. Based on the result from the first phase, Caltrans would consider fully switching to a limit based solely on binder replacement percentage in the second phase.

The first phase was completed through a subtask group consisting of Caltrans and asphalt industry members created under the Asphalt Task Group of the Rock Products Committee. The subtask group developed specifications to allow increases in the amounts of RAP used in the HMA. On February 22, 2013, Caltrans adopted these specifications as Revised Standard Specifications (RAP RSS). The RAP RSS allowed the use of RAP at a substitution rate not exceeding 25 percent of the aggregate blend by weight. The RSS also allowed a maximum asphalt binder replacement rate of 25 percent for surface courses (upper 0.2 foot of HMA, exclusive of the open-graded friction course) and 40 percent for subsurface courses. This completed the first phase of the project.

The subtask group continued to work on the second phase, which was to fully switch to a RAP percentage limit based solely on binder replacement. The advantage of binder replacement over aggregate blend by weight is that binder from other recyclable material sources (such as RAS) can also be incorporated. It also allows higher amount of RAP to be used when lower amount of recyclable binder is found in the RAP. This would allow a maximum asphalt binder replacement rate of 25 percent for surface courses (upper 0.2 foot of HMA, exclusive of the open-graded friction course) and 40 percent for subsurface courses.

During the fall of 2014, a final draft of Non-Standard Special Provisions based on binder replacement (RAP/RAS NSSP) was developed to incorporate the change proposed under the second phase. The RAP/RAS NSSP allows the use of RAS in addition to RAP as sources of binder replacement.

However, on October 20, 2014, the FHWA issued a memorandum noting an increasing number of state highway agencies (not including Caltrans) were reporting premature cracking in relatively new asphalt pavements as a result of using a high content of recycled asphalt binder from RAP and/or RAS. The FHWA considers anything over 15 percent binder replacement as high content of recycled asphalt binder. The FHWA memo impacts the RAP RSS and RAP/RAS NSSP, which allow the incorporation of high amount of recyclable asphalt. Members of the asphalt industry also expressed concerns about current RAP specifications and associated premature cracking in pavements noticed in other states.

Caltrans is working with the asphalt industry to address the issue of premature cracking noticed in other states in asphalt pavements containing a high content of recycled asphalt binder. The Rock Products Committee approved a project scoping document on January 28, 2016, to address this issue. A subtask group has been created to work on this project. This subtask group will be reevaluating and revising the RAP RSS and the draft RAP/RAS NSSP. The subtask group is scheduled to develop revisions to the RAP RSS and RAP/RAS NSSP by October 2016. In the meantime, to encourage continued use of RAP and/or RAS in HMA, Caltrans instituted a stop-gap measure by developing a Blending Chart NSSP. The Blending Chart NSSP specifies a more robust mix design procedure using binder blending charts to address the premature cracking issue. The use of blending charts would enable the contractor to more accurately determine the quality of the binder in the HMA which would be a blend of recyclable binder and virgin binder. This Blending Chart NSSP will be used with the RAP RSS and RAP/RAS NSSP until the subtask group develops more comprehensive revised specifications.

Conclusion

Caltrans will continue to work with the asphalt industry through the Rock Products Committee process to develop specifications that will allow the use of a sustainable amount of RAP and RAS in HMA without negatively affecting product performance.

Appendix. Statutory Reporting Reference

PUBLIC RESOURCES CODE—PRC

DIVISION 30. WASTE MANAGEMENT [40000–49620]

(Division 30 added by Stats. 1989, Ch. 1096, Sec. 2.)

PART 3. STATE PROGRAMS [42000–42999]

(Part 3 added by Stats. 1989, Ch. 1096, Sec. 2.)

CHAPTER 14. Paving Materials [42700–42705]

(Chapter 14 added by Stats. 1990, Ch. 35, Sec. 22.)

ARTICLE 1. Recycled Materials [42700–42704.5]

(Article 1 heading added by Stats. 1995, Ch. 605, Sec. 2.)

42704.

- (a) On or before January 1, 2014, the Department of Transportation may, with input from the Caltrans/Industry Rock Products Committee, establish specifications for the use of reclaimed asphalt pavement (RAP) of up to 40 percent for hot mix asphalt mixes.
- (b) Subdivision (a) does not limit the authority of the Department of Transportation to establish specifications for the use of reclaimed asphalt pavement in amounts greater than 40 percent for hot mix asphalt mixes.
- (c) (1) On or before March 1, 2016, the Department of Transportation shall submit a report to the Legislature in compliance with Section 9795 of the Government Code on its progress, since the year 2011, toward the development and implementation of the specifications for reclaimed asphalt pavement, as specified in subdivision (a).

(2) This subdivision shall become inoperative on March 1, 2020, pursuant to Section 10231.5 of the Government Code.

(Added by Stats. 2012, Ch. 230, Sec. 1. Effective January 1, 2013.)