

# AB 2953: Analysis and Recommendations



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# AB 2953 Excerpts

*SECTION 1. Section 42704.6 is added to the Public Resources line 2 Code, to read:*

*42704.6 (a) To the extent feasible and cost effective, the department and a local agency that has jurisdiction over a street or highway shall use advanced technologies and material recycling techniques that reduce the cost of maintaining and rehabilitating streets and highways and that exhibit reduced levels of greenhouse gas emissions through material choice and construction method.*

*(b) Beginning January 1, 2024, a local agency that has over a street or highway shall, to the extent feasible and cost effective, apply standard specifications that allow for the use of recycled materials in streets and highways.*

*(c) Beginning January 1, 2024, and until January 1, 2027, the standard specifications described in subdivision (b) shall allow recycled materials at or above the level allowed in the department's [Caltrans] standard specifications that went into effect on October 22, 2018, line 12 for all of the following:*

*(1) Recycled base and subbase materials as set forth in Sections 25-1.02 and 26-1.02 of the department's standard specifications.*

*(2) Reclaimed asphalt pavement and other materials in asphalt as set forth in Section 39-2.02B of the department's standard specifications.*

*(3) Reclaimed aggregate, fly ash, returned plastic concrete, and other materials in concrete as set forth in Sections 90-1.02, 90-2.02, and 90-9 of the department's standard specifications.*

# Recycled Base and Subbase Materials: 2023 Caltrans vs. 2021 Greenbook

- *25-1.02B Class I, II, and III Aggregate Subbase* is comparable to *200-2.6, Select Subbase*
  - SS has a slightly higher Sand Equivalent requirement (20 vs. 18).
  - SS does not list reclaimed processed LCB or CTB as a component material.
- *26-1.02B Class 2 Aggregate Base* is comparable to *200-2.4, Crushed Miscellaneous Base*
  - CMB has the same R-Value requirement, 78, but a much higher minimum SE, 35 vs. 22.
  - CMB allows up to 3% brick.
  - CMB limits gravel particles retained on the No. 4 sieve to 15% or less
  - CMB does not list reclaimed processed LCB or CTB as a component material.

# Recycled Base and Subbase Materials: 2023 Caltrans vs. 2021 Greenbook

- *26-1.03B Class 3 Aggregate Base* is comparable to *200-2.5, Processed Miscellaneous Base*
  - PMB has a much higher R-Value requirement (60 vs. 50)
  - PMB has a slightly higher SE requirement (20 vs. 18)
  - PMB allows crushed porcelain and up to 3% brick
  - PMB limits gravel particles retained on the No. 4 sieve to 75% or less
  - PMB does not list reclaimed processed LCB or CTB as a component material.
- ***Recommendations:***
  - Specify CMB or PMB
  - Include a Special Provision adding reclaimed processed LCB or CTB as allowable component materials

# Reclaimed Aggregate ... and Other Materials in Concrete

## 2023 Caltrans vs. 2021 Greenbook

- *Section 90* vs. *Subsection 201-1*
- *201-1 in the 2024 Edition* has been completely re-written and is consistent with *Caltrans Section 90*. No Special Provisions needed.
- *2021 and earlier Editions* contain some, but not all, of the provisions needed to satisfy AB 2953. Special Provisions needed.
  - Special Provisions will be difficult and time consuming to prepare.
  - A general statement of intent to comply with AB 2953 may be simpler.
  - Alternate Class (Table 201-1) mixes may be more commonly submitted.
  - For assistance, contact Nathan Forrest, P.E., Technical Director, California Nevada Cement Association, [Nathan.Forrest@cncement.org](mailto:Nathan.Forrest@cncement.org), (520) 235-0480

# Reclaimed Asphalt Pavement and Other Materials in Asphalt:

- **Caltrans, Section 39:** Based on the Superpave Mix Design Method
- **Greenbook, Subsection 203-6:** Based on the Hveem Mix Design Method
- **Note:** *Mix design methods and corresponding requirements are not interchangeable.*
- The following focuses on Caltrans provisions that, for Greenbook users, either must be included as Special Provisions to satisfy AB 2853, or are other related provisions recommended for inclusion as Special Provisions.

# Introduction to RAP: Current and Future Practice

- RAP replaces virgin binder and aggregate in the mix
- Reasons to use RAP in a mix:
  - Contractor: reduces cost of virgin binder
  - Owner:
    - Can reduce bid cost of mix
    - Can be used to engineer properties of the mix
    - Can reduce environmental impacts
- RAP stiffens the blended binder in the mix
  - This can be engineered by reducing the PG grade of the virgin binder and/or adding rejuvenating agent
  - Stiffening:
    - Reduces rutting
    - Increases fatigue and age-related cracking in thin (<3 inches) new asphalt on the surface
    - Decreases fatigue cracking in layer below the surface if new asphalt >3 inches thick

# Introduction to RAP: Current and Future Practice

- 2018 Caltrans Standard Specifications practice:
  - If 15% or less RAP by mass: no adjustments
  - If 15 to 25% RAP by mass: reduce virgin binder grade by step-down, ex PG 64-16 with 11% RAP, PG 58-22 with 22% RAP
- UCPRC/Caltrans research underway indicates that:
  - Can engineer properties of mixes using PG grade, RAP, RAS and rejuvenating agent for any application: thin surface, thick or very thick overlay or new pavement
  - Need performance related laboratory tests to measure the resulting properties
- Caltrans is looking to move to higher quantities of RAP in HMA, including HMA-PM and RHMA, if engineering can be made to work
- Adjustments in PG binder specification are also being investigated to consider the blended binder, not just the virgin binder



# Reclaimed Asphalt Pavement and Other Materials in Asphalt:

## 39-2.02B(2) Type A Hot Mix Asphalt Mix Design

For Type A HMA mixtures using RAP, *the maximum allowed binder replacement* is 25.0 percent in the upper 0.2 foot exclusive of OGFC and 40.0 percent below. The binder replacement is calculated as a percentage of the approved JMF target asphalt binder content. **203-6.3.1**

For RAP substitution of *15 percent or less*, the grade of the virgin binder must be the *specified grade of asphalt binder* for ~~Type A HMA~~. **203-6.2.1**

For RAP substitution *greater than 15 percent and not exceeding 25 percent*, the grade of the virgin binder must be the specified grade of asphalt binder for ~~Type A HMA~~ with the *upper and lower temperature classification reduced by 6 degrees C*. ~~Hamburg wheel track requirements are based on the grade of asphalt binder specified for Type A HMA.~~ **203-6.2.1**

- *Note: the provisions above are recommended for inclusion as Special Provisions, but not required to satisfy AB 2953.*

# Reclaimed Asphalt Pavement and Other Materials in Asphalt:

## 39-2.02B(5) Reclaimed Asphalt Pavement

You may substitute RAP for part of the virgin aggregate in a quantity up to 25 percent of the aggregate blend.

**203-6.2.5.1**

- *Note: inclusion of the above as a Special Provision is required to satisfy AB 2953.*

If RAP is from multiple sources, blend the RAP thoroughly and completely before fractionating. **203-6.2.5.3**

For RAP substitution *greater than 15 percent* of the aggregate blend, *fractionate* RAP stockpiles into 2 sizes, a coarse fraction RAP retained on 3/8-inch sieve and a fine fraction RAP passing 3/8-inch sieve. **203-6.2.5.3**

For RAP substitution of *15 percent* of the aggregate blend *or less*, *fractionation is not required*. The RAP fractionation must comply with the requirements shown in the following table: [include table] **203-6.2.5.3**

- *Note: the provisions above are recommended for inclusion as Special Provisions, but not required to satisfy AB 2953.*

# Reclaimed Asphalt Pavement and Other Materials in Asphalt:

## 39-2.02B(5) Reclaimed Asphalt Pavement

You may use the coarse fractionated stockpile, the fine fractionated stockpile, or a combination of the coarse and fine fractionated stockpiles. **203-6.2.5.3**

Isolate the processed RAP stockpiles from other materials. Store processed RAP in conical or longitudinal stockpiles. Processed RAP must not be agglomerated or be allowed to congeal in large stockpiles. **203-6.2.5.2**

- *Note: the above are recommended for inclusion as Special Provisions, but not required to satisfy AB 2953.*

# Reclaimed Asphalt Pavement and Other Materials in Asphalt:

## 39-2.02B(11) Type A Hot Mix Asphalt Production

If RAP is used, the asphalt plant must automatically adjust the virgin asphalt binder to account for RAP percentage and RAP binder. **203-6.7.1**

During production, you may adjust hot- or cold-feed proportion controls for virgin aggregate and RAP. For RAP substitution of 15 percent or less, RAP must be within  $\pm 3$  of RAP percentage shown in your Contractor Job Mix Formula Proposal form without exceeding 15 percent. For RAP substitution of greater than 15 percent, RAP must be within  $\pm 3$  of RAP percentage shown in your Contractor Job Mix Formula Proposal form without exceeding 25 percent. **203-6.7.1**

- *Note: the above are recommended for inclusion as Special Provisions, but not required to satisfy AB 2953.*

# Reclaimed Asphalt Pavement and Other Materials in Asphalt:

- ***Recommendations:***

- If using the 2024 Greenbook, review 203-6 for inclusion of required and recommended provisions. Prepare and include Special Provisions for missing provisions.
- If using the 2021 or earlier Greenbook: Prepare and include Special Provisions. See Sample Special Provisions developed for the City of San Diego.
- Review Job Mix Formula submittals:
  - Analyze for compliance with limitation on virgin binder replacement. See sample analysis.
- Perform on-site (“plant”) inspection and quality assurance testing during production