



## Pavement Smoothness Categories

2011 Number 3, Page 1 of 4

Date: February 18, 2011 [Revised 5/8/2014,  
2/22/2016] **Revised January 12, 2017**

## ASSIGNING PAVEMENT SMOOTHNESS CATEGORIES

This design bulletin provides guidance to designers for assigning pavement smoothness categories for hot mix asphalt and Portland cement concrete pavements.

### FOR HOT MIX ASPHALT PAVEMENTS:

#### MRI Category I

1. Use on Urban Reconstruction with or without curb and gutter;
2. Use on construction of one layer over an intermediate treatment [Removal of Asphalt Mat (Planing), Cold Bituminous Pavement (Recycle), Heating and Remixing, Heating and Repaving, Full Depth Reclamation, leveling course with a thickness of 1.5 inches or less, or other intermediate treatment];
3. May use on overlays meeting case No. 2 above, with curb and gutter when a shoulder separates driving lanes from the curb and gutter. A minimal amount of utility boxes, intersections and grade changes are allowed. Insert a general note stating that the new asphalt driving lanes do not have to match curb and gutter.
4. May use on overlays meeting case No. 2 above, with curb and gutter when pavement smoothness is very important (Example: Speed limit higher than 39 mph). A minimal amount of utility boxes, intersections and grade changes are allowed. Insert a plan note stating that the new asphalt driving lanes do not have to match curb and gutter.

#### MRI Category II

1. Use on new construction with or without curb and gutter;
2. Use on construction of more than one layer;
3. May use on overlays meeting case No. 2 above, with curb and gutter when a shoulder separates driving lanes from the curb and gutter. A minimal amount of utility boxes, intersections and grade changes are allowed. Insert a general note stating that the new asphalt driving lanes do not have to match curb and gutter grades.
4. May use on overlays meeting case No. 2 above, with curb and gutter when pavement smoothness is very important (Example: Speed limit higher than 39 mph). A minimal amount of utility boxes, intersections and grade changes are allowed. Insert a plan note stating that the new asphalt driving lanes do not have to match curb and gutter.

#### MRI Category III

1. Only one layer of pavement is being placed without an intermediate treatment.
2. Only one layer of pavement is being placed over Heating and Scarifying.
3. Heating and Repaving without an overlay.



# DESIGN BULLETIN

Division of Project Support  
Project Development Branch  
Standards and Specifications Unit

## Pavement Smoothness Categories

2011 Number 3, Page 2 of 4

Date: February 18, 2011 [Revised 5/8/2014,  
2/22/2016] **Revised January 12, 2017**

4. May be used in urban overlays with curb and gutter when a shoulder separates driving lanes from the curb and gutter. A minimal amount of utility boxes, intersections and grade changes are allowed. A note needs to be placed in the plans stating that the new asphalt driving lanes will not have to match curb and gutter grades.
5. May be used in urban overlays with curb and gutter when pavement smoothness is very important (Example: Speed limit higher than 39 mph). A minimal amount of utility boxes, intersections and grade changes are allowed. A note needs to be placed in the plans stating that the new asphalt driving lanes will not have to match curb and gutter.

**MRI Category IV** is applied to the following asphalt pavement construction:

1. Cold Recycling without an overlay.
2. Thin overlays (1.5 inches or less) of HMA or SMA without an intermediate treatment.
3. Heating and Scarifying without an overlay.
4. Heating and Remixing without an overlay.
5. Urban rehabilitation treatments when smoothness is affected by matching existing curb and gutter and/or numerous intersections and/or utility boxes. This is not for reconstruction in urban areas.

Category IV has no incentive and is tested according to subsection 105.07 (f). A force account for pavement smoothness is not needed if the project is only MRI Category IV.

### No pavement smoothness category

1. Chip seals
2. Slurry seal
3. Cape seal
4. Micro Surfacing

Chip seals are not tested at all for smoothness.

### FOR PORTLAND CEMENT CONCRETE PAVEMENTS:

**MRI Category I** is for construction that will be affected by curb & gutter, numerous intersections/access points, or utility boxes, and for urban construction, has a speed limit greater than 40 mph.

**MRI Category II** is for express ways, interstates and any other PCCP that is not affected by curb & gutter, and utility boxes.



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# DESIGN BULLETIN

Division of Project Support  
Project Development Branch  
Standards and Specifications Unit

## Pavement Smoothness Categories

2011 Number 3, Page 3 of 4

Date: February 18, 2011 [Revised 5/8/2014,  
2/22/2016] Revised January 12, 2017

**MRI Category III** is for urban construction that will be affected by curb & gutter, numerous intersections/access points, or utility boxes, and has a speed limit of 40 mph or less.

Short sections (sections less than 25 ft) of PCCP panel replacement will not be subject to incentive/disincentive payment, but will be evaluated by straightedge. Insert the following note in the general notes:

PCCP Panel Replacement shall not be subject to Incentive/Disincentive payments but shall be subject to evaluation of roughness by straightedge in accordance with sub-section 105.08 (a) 2.

### FOR ALL PAVEMENTS:

Place the pavement smoothness category assignment in the General Notes. MRI Category II is the default smoothness category in the specification if a smoothness category is not listed in the plans.

Do not assign Urban or Rural to any smoothness category.

Do not assign percent improvement. These smoothness categories are no longer in existence.

When appropriate, divide the project into different sections with different pavement smoothness categories instead of using the easier pavement smoothness category for the whole project

If the designer intends for shoulders to be future driving lanes, add a note to the General Notes stating whether these future driving lanes are subject to smoothness requirements.

The Designer will assign the pavement smoothness categories. When assigning smoothness categories, please contact Staff Materials' Concrete & Physical Properties Unit (303-398-6542 or 303-398-6549) if you are unsure of what category to use. Or when in doubt, assign MRI Category II. MRI Category II is the toughest specification to meet, so if the plans should have been MRI category I or III, a change while under contract can be made with no cost to CDOT.

The Designer will set up a planned force account for pavement smoothness based on the maximum incentive possible for the project.

The Designer will estimate the required number of Flagging Hours, Traffic Control Supervision, Traffic Control Devices, and Uniformed Traffic Control necessary to implement the



**COLORADO**  
Department of  
Transportation

# DESIGN BULLETIN

Division of Project Support  
Project Development Branch  
Standards and Specifications Unit

## Pavement Smoothness Categories

2011 Number 3, Page 4 of 4

Date: February 18, 2011 [Revised 5/8/2014,  
2/22/2016] **Revised January 12, 2017**

Department's Quality Assurance portion of this specification. The designer will include these quantities in the quantities table to be bid.

Traffic control for smoothness testing can include but is not limited to:

- Closing a lane of traffic while testing
- Stopping traffic temporarily to set & retrieve triggering devices (cones or reflective tape)
- Flaggers to hold traffic at intersections and on-ramps
- UTC to allow the profiler to test through a signalized intersection without slowing or stopping.

The following examples can be used to assist in assigning smoothness categories:

Example 1: A HMA project has a 6-lane divided highway with a mill and fill treatment with curb and gutter on each side along with a number of manholes and utility boxes. However, the project's middle lane is relatively free from any obstructions. This project would have MRI Category IV assigned to the two outside lanes in each direction and MRI Category I in the middle lanes.

Example 2: A HMA project has a very short lead-in to an intersection. Because the majority of the pavement would be excluded it could be a good idea to assign this project as Category IV.

Example 3: A HMA project has a short lead-in section to a bridge. Because the majority of the pavement would be excluded, it could be a good idea to assign this project as Category IV.

Example 4: A project has a roundabout in it. The roundabout is considered a turning lane and is excluded from Incentive Payment.

[Deleted paragraph from previous revision addressing incentive/disincentive payments and localized roughness.]

Example 5: A project is a total of 3-miles. Two miles of the project have no curb and gutter. One mile of the project has curb and gutter and a large number of manholes. This project should receive two different smoothness categories for the two sections of the project.

### **References:**

Design Bulletins can be found on the CDOT intranet at:

[https://www.codot.gov/business/designsupport/bulletins\\_manuals/design-bulletins](https://www.codot.gov/business/designsupport/bulletins_manuals/design-bulletins)