

### 3.60 SMOOTHNESS

#### 3.61 TESTING

*Pavement Smoothness* evaluation requirements are included in [Specifications 2316](#) and [2317](#). Pavement smoothness requirements for Primary and Interstate projects are included in [Specification 2317](#). [Specification 2316](#) should apply to all other projects when [Specification 2317](#) does not apply. In addition to the exclusions noted in the specifications, side road and entrance fillet quantities and HMA dropoff fillet quantities should be excluded from testing and incentive/disincentive calculations. Milling of existing HMA to remove deteriorated material, as opposed to milling specifically to remove ruts, shall also be considered as correction of the surface profile in reference to this specification.

[Specification 2428](#) includes smoothness specifications for bridge decks and bridge deck overlays. It discusses the requirements of smoothness criteria for bridge decks, new approaches, bridge deck overlays, and overlayed approaches and when evaluation is excluded. Required profilograph testing is run at each wheel path for the full length of the bridge regardless of construction headers, except for expansion joints not adjusted.

Any pavement and bridge deck areas carrying traffic, but excluded from profilogram index calculation, must be checked for high points and low points with deviations in excess of 0.5 inches (12.7 mm) in a length of 25 feet (7.6 m). All bumps exceeding 0.5 inches (12.7 mm) in these excluded areas are to be corrected. In addition, all dips exceeding 0.5 inches (12.7 mm) in pavement surfaces are to be corrected. Dips in bridge decks, deck overlays, bridge approaches, and approach overlays are to be corrected when required by the Engineer. A price adjustment of \$900 will be assessed for each dip that is not corrected.

When reviewing profile information submitted by a contractor, one of the first things to check is the profilograph/profiler instrument settings. Proper instrument settings, along with further information on smoothness testing can be found in [Materials I.M. 341](#).

#### 3.62 EVALUATION

##### **Pavement Smoothness**

If two or more lanes are placed in a single pass with a full width paver, smoothness results of adjoining lanes should be evaluated separately and independently so that each lane has its own profilograph trace.

When the contractor is not responsible for the adjacent surface, the 16 feet (5 m) at the ends of sections will not be evaluated for profile index. These areas will be evaluated for high points and low points with deviations in excess of 0.5 inches (12.7 mm) in a length of 25 feet (7.6 m). Bumps and dips will be evaluated by the Engineer, and correction of bumps and dips determined to be under the control of the contractor will be corrected at no additional cost. Correction of bumps and dips determined to be beyond the control of the contractor will be paid as extra work per [Article 1109.03, B](#). The entire section should be included in computations for incentives and price reductions.

##### **Bridge Deck Smoothness**

Profilograph tests in both wheel paths will be averaged and an individual profile index calculated for each traffic lane segment of bridge decks and bridge deck overlays.

When the contractor is not responsible for the adjacent surface, the 16 feet (5 m) at the ends of sections will not be evaluated for profile index. In addition, the 16 feet (5 m) at ends of expansion joints not adjusted should not be included in testing or evaluation. These areas will be evaluated for high points and low points with deviations in excess of 0.5 inches (12.7 mm) in a length of 25 feet (7.6 m). Bumps and dips will be evaluated by the Engineer, and correction of bumps and dips determined to be under the control of the contractor will be corrected at no additional cost. Correction of bumps and dips determined to be beyond the control of the contractor will be paid as extra work per [Article 1109.03, B](#). The entire section should be included in computations for incentives and price reductions.

Profilograph tests for bridge approach sections or overlay of bridge approach sections are tested at the center of each traffic lane. These areas shall be corrected for smoothness and will not be used in the computation for incentive or price reduction of bridge decks or bridge deck overlays.

### **3.63 BUMP CORRECTION**

Exact location of 13 mm (1/2 inch) bumps requiring correction has proven difficult particularly on resurfacing projects. Referencing by station location, string line, and rolling straight-edge often lacks the precision necessary for identification of exact bump locations. Locate bumps on the pavement surface during initial profilograph testing or have a profilograph available during correction to locate bumps and monitor correction results.