

(Use on rural asphaltic mainline paving projects that have 10,000 tons or greater of asphaltic pavement constructed in 2 layers or more on a stable, graded, and shaped foundation and with a design speed of 45 mph or greater. Profiling new asphaltic pavements is now incidental to the Asphaltic Concrete Pavement bid items.) 405-001

## **Profiling Asphaltic Concrete Pavement; Profile Index Incentive, Asphaltic Concrete Pavement, Item 40729**

### **A Description**

- (1) This special provision describes profiling new asphaltic pavements with a computerized profiler.

### **B (Vacant)**

### **C Construction**

#### **C.1 General**

- (1) In addition to straightedging as specified in 405.3.13, profile the final surface of the mainline pavement. The department defines mainline pavement as all pavement longer than 250 feet (80m) except shoulders, parking lanes, ramps, tapers, acceleration and deceleration lanes, bridge decks, bridge deck approach slabs, the new pavement within 50 feet (15m) of bridge deck approach slabs, and the new pavement within 50 feet (15m) of existing pavement.
- (2) Furnish a calibrated profiler on the project when paving the final mainline surface. Notify the engineer before calibrating the profiler. If the engineer requests, arrange to have the engineer observe the profiler calibration and operation.
- (3) Have a profilograph operator, certified under the department's highway technician certification program (HTCP), collect and document the required profile data using the methods taught in the HTCP profilograph course.

#### **C.2 Equipment**

- (1) Furnish a 25 foot (7.6 m) wheelbase computerized California type profilograph capable of reducing the pavement profile. The equipment must also be capable of printing a scaled profile trace with the following information:
  - 1. Pavement stationing.
  - 2. Individual scallop heights.
  - 3. Must-grind locations.
- (2) If the department approves, the contractor may use a lightweight profiler capable of emulating the specified profilograph output. The department may require data demonstrating the lightweight profiler's ability to produce ride numbers comparable to a profilograph.

#### **C.3 Testing**

##### **C.3.1 Run and Reduction Parameters**

- (1) Before starting data collection, enter the appropriate pavement stationing information and the following reduction parameters:
  - Reduction length..... 528 feet (160 m)

Blanking band.....	0 inches (0 mm)
Digital third-order Butterworth low pass filter .....	2 feet (610 mm) <sup>[1]</sup>
High pass filter.....	off <sup>[2]</sup>
Must-grind height.....	0.40 inches (10mm)
Must-grind length.....	25 feet (7.6m)
Dip locator .....	off
Bump locator.....	on
Scallop rounding .....	0.01 inches (1mm)

<sup>[1]</sup> If using a James Cox & Associates profilograph, provide version 3.01 software or newer with the low pass filter set to 2 for both US standard and SI metric measurement.

<sup>[2]</sup> If using a lightweight profiler, provide analysis software with a high pass filter set to the value the manufacturer recommends to best reproduce the trace from a California type profilograph.

### C.3.2 Contractor Testing

- (1) Operate a California type profilograph at no more than 3 miles per hour (5km/h). Operate a lightweight profiler within the manufacturer's recommended speed tolerance.
- (2) Within one business day after paving the final surface, measure the longitudinal profile of each wheel track of each lane of mainline pavement as follows:
  1. For pavements 12 foot (3.6m) wide or less, parallel to each edge of the pavement and 3 feet (1m) from the edge.
  2. For pavements wider than 12 feet (3.6m), in the wheel tracks described as follows:
    - 2.1 Parallel to each edge of the traveled way and 3 feet (1m) from the edge.
    - 2.2 Parallel to the location of each planned longitudinal joint and 3 feet (1m) on each side of the joint.
- (3) Measure the profiles of each standard, partial, or extended segment. All segments are nominally one lane wide consisting of 2 wheel tracks and distinguished by length as follows:
  1. Standard segments are 528 feet (160m) long.
  2. Partial segments are less than 528 feet (160m) long.
  3. Extended segments are longer than 528 feet (160m).
- (4) Treat partial segments longer than 250 feet (80m) as independent segments. Combine 250 foot (80m) or shorter partial segments with contiguously placed pavement to form a partial segment longer than 250 feet (80m) or an extended segment. The contractor may avoid end-of-run partial segments by including them with contiguous pavement placed later.

### C.3.3 Department Verification Testing

- (1) The department may periodically conduct independent verification tests to validate the contractor's results. The department and contractor will jointly investigate any discrepancies as soon as it is practical. The investigation may include additional testing, inspecting and calibrating

equipment, and reviewing testing procedures of both parties. Both the department and the contractor will document all work performed in resolving a discrepancy.

### **C.3.4 Documenting Profile Runs**

- (1) Calculate the average profile index for each standard, partial, or extended segment. The average profile index is the average of both individual wheel track profile indices, in inches per mile (mm/km), taken in a single lane for each segment.
- (2) Within one business day after completing a companion pair of profile runs, submit a computer printed profile trace for each wheel track of each segment showing pavement stationing, scallop heights, and must-grind locations. The print-out must also indicate the run and reduction parameter settings, specified in C.3.1, used for each run. Within that same one business day also complete and submit a printable electronic copy, either by e-mail or on a disk, of the department's profile summary excel spreadsheet tabulating the resulting average profile indices for each standard, partial, or extended segment.

## **C.4 Corrective Actions**

### **C.4.1 General**

- (1) Correct the ride as the engineer directs. Do not use diamond grinding except where the engineer directs for must-grind removal. Place a light emulsified asphalt fog seal on diamond ground areas. Provide suitable traffic control to protect fog sealed areas until cured.

### **C.4.2 Corrective Actions for Must-Grinds**

- (1) Review each individual wheel track profile trace for must-grinds, high points deviating more than 0.4 inches (10 mm) in 25 feet (7.6 m). As the engineer directs, correct must-grind areas to minimize their impact on the ride. Reprofile the corrected area to verify the must-grind removal and determine a new average profile index for the affected segments.

### **C.4.3 Corrective Actions for Excessive Profile Index**

- (1) If an individual wheel track profile index exceeds 45 in/mile (710 mm/km) before corrective work, evaluate the paving operation and equipment, and make needed adjustments. If the contractor takes no corrective action, the engineer may suspend paving. Test the subsequent pavement profile as soon as it is practical after paving resumes.
- (2) If either the initial average profile index or average profile index after must-grind correction exceeds 45 inches/mile (710 mm/km) for a segment, the engineer may require the contractor to correct that segment. Correct the segment final surface to a profile index of 20 inches/mile (315 mm/km) or less using whichever of the following methods the engineer directs:
  1. Remove and replace the full width of the surface layer excluding the paved shoulder.
  2. Overlay the full width of the surface layer including the paved shoulder.
- (5) Reprofile corrected segments to verify that the profile index is 20 in/mile (315 mm/km) or less and there are no must-grinds. Segments failing these criteria after correction are subject to the engineer's right to adjust pay for non-conforming work under 105.3.

**D Measurement**

- (1) The department will measure Profile Index Incentive, Asphaltic Concrete Pavement by the dollar, adjusted as determined in E.2 for the acceptably completed Asphaltic Concrete Pavement bid items.

**E Payment**

**E.1 Payment for Profiling**

- (1) Costs for furnishing and operating the profiler; documenting profile results; and correcting the final pavement surface are incidental to the Asphaltic Concrete Pavement bid items.

**E.2 Pay Adjustment**

- (1) The department will adjust pay under the following bid item:

ITEM NUMBER	DESCRIPTION	UNIT
40729	Profile Index Incentive, Asphaltic Concrete Pavement	Dollars

- (2) Incentive payment is not limited, either up or down, to the bid amount the schedule of items shows.
- (3) The department will adjust pay for each standard, partial, or extended segment based on the initial average profile index for that segment. The initial average profile index is calculated before either must-grind corrections or segment final surface corrections.
- (4) The department will adjust pay for 528 foot (160 m) long standard segments nominally one lane wide as follows:

INITIAL PROFILE INDEX in inches/mile (mm/km)	PAY ADJUSTMENT per standard segment
< 10.0 (158)	+ \$250
? 10.0 (158) to < 20.0 (316)	\$0
? 20.0 (316)	- \$400

- (5) The department will prorate the pay adjustment for partial or extended segments based on their length.

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