

740 QMP Ride

740.1 Description

740.1.1 General

740.1 Revise final riding profile location information.

- (1) This section describes profiling with a non-contact profiler, locating areas of localized roughness, and determining the International Roughness Index (IRI) for each wheel path.
- (2) Profile **final riding** surfaces greater than 1500 feet in continuous length, **that are full width, and typically carry moving vehicles. Include the following when they meet the criteria:**
 - Auxiliary lanes.
 - System interchanges that carry traffic from one freeway to another via ramps or connectors.
 - Entrance ramps, exit ramps, and turn lanes.
 - Mainline pavement on county, state, or U.S. highway crossroads reconstructed under the contract.
- (3) **Include bridges and bridge approaches in profile runs but exclude them from segment IRI calculations. Also exclude the following from segment IRI calculations:**
 - Roundabouts and pavements within 150 feet of the points of curvature of roundabout intersections.
 - Pavements within 25 feet of railroad crossings.
 - Pavements within 25 feet of bridges or bridge approaches not constructed under the contract.
- (4) The engineer may direct straightedging under [415.3.10](#) or [450.3.2.9](#) for pavement excluded from localized roughness under [740.3.4.2](#)(1), for bridges, for roundabouts, and for pavements within 150 feet of the points of curvature of roundabout intersections.

740.1.2 Quality Control Program

740.1.2.1 Quality Control Plan

- (1) Conform to [701.1.2.2](#), except omit items 3, 4, 5, and 9; and include the following:
 1. The methods and timing used for monitoring and testing ride quality throughout the placement process/**work**. Also indicate the approximate timing of acceptance testing in relation to **the work**.
 2. The segment locations of each profile run used for acceptance testing.
 3. A traffic control plan.

740.1.2.2 Personnel

- (1) Have an HTCP-certified profiler operate the equipment, collect the required data, and analyze the results using the methods taught in the HTCP profiling course. Ensure that an HTCP-certified profiler supervises data entry into MRS software.

740.1.2.3 Equipment

- (1) Furnish a profile-measuring device capable of measuring IRI from the list of department-approved profilers on the [APL](#).
- (2) Unless the engineer and contractor mutually agree otherwise, arrange to have a calibrated profiler available when paving the final riding surface.
- (3) Verify profiler equipment calibration daily using test methods the profiler manufacturer recommends. Notify the engineer before verifying the calibration. If the engineer requests, arrange to have the engineer observe the calibration verification and profiler operation. Maintain records of calibration verification activities; provide those records to the engineer upon request.

740.1.2.4 Documentation

- (1) After profiling, compute the segment IRI for each segment and analyze areas of localized roughness using the ProVAL software available for download at:
<http://www.atwoodsystems.com/>
- (2) Prepare the ProVAL ride quality module reports showing the segment IRI for each segment and areas of localized roughness exceeding 200 in/mile on pavements that are not continuously diamond-ground or designated for continuous diamond grinding. Generate the ride quality module reports in ProVAL using the following parameters:

	FIXED INTERVAL (segment IRI)	CONTINUOUS (localized roughness)
BASE-LENGTH	500 feet	25 feet
THRESHOLD	140 in/mile	200 in/mile

- (3) Field-locate the areas of localized roughness before the engineer's assessment for corrective action. Document the reasons for areas excluded.

- (4) Within five business days after completing profile acceptance runs, unless the engineer and contractor mutually agree to a different timeline, upload the electronic ProVAL project file containing the .pdf files for each profiler acceptance run and ride quality module reports, as PDF files, using MRS software available at:

<http://www.atwoodsystems.com/>

- (5) Notify the engineer when MRS submittal is complete and profiler acceptance run data and ride quality module reports are uploaded into MRS.

740.2 (Vacant)

740.3 Testing

740.3.1 General

- (1) Enter the equipment-specific department-approved filter settings and parameters given in the approved profilers list at:

<https://wisconsindot.gov/Documents/doing-bus/eng-consultants/cnslt-rsrces/tools/qmp/profilers.pdf>

740.3.2 Contractor QC Testing

740.3.2 Revise to clarify profile run marking information and ramp and turn lane information.

- (1) Operate profilers within the manufacturer's recommended speed tolerances. Perform profile runs in the direction of travel. Measure the longitudinal profile of each wheel track of each lane. The wheel tracks are 6.0 feet apart and centered in the travel lane.
- (2) Coordinate with the engineer at least 24 hours before making profile runs for acceptance, unless the engineer approves otherwise. The department may require profiling to accommodate staged construction or if corrective action is required.
- (3) **Mark** the beginning and ending points for each profile run on the pavement; **ensure markings remain for a minimum of 10 business days after reporting profile data.** Measure the profiles of each standard and partial segment. Define primary segments starting at a project terminus and running contiguously along the mainline to the other project terminus. Define segments one wheel path wide and distinguished by length as follows:
1. Standard segments are 500 feet long.
 2. Partial segments are less than 500 feet long.
- (4) Treat partial segments as independent segments. Document profile runs conforming to [740.1.2.4](#); categorize segments as follows:

Segments with a posted speed limit of 55 mph or greater:

- HMA I Asphalt pavement with multiple opportunities to achieve a smooth ride. The following operations if performed under the contract are considered as opportunities:
- A layer of HMA
 - A leveling or wedging layer of HMA
 - Diamond grinding or partial depth milling of the underlying pavement surface.
- HMA II Asphalt pavement with a single opportunity to achieve a smooth ride.
- HMA III Asphalt pavement segments containing any portion of a bridge, bridge approach, railroad crossing, or intersection. An intersection is the area within the points of curvature of the intersection radii.
- PCC II Concrete pavement.
- PCC III Concrete pavement segments containing any portion of a bridge, bridge approach, railroad crossing, intersection, or gap. An intersection is the area within the points of curvature of the intersection radii.
- RCDG V Rural concrete pavement surfaces the contract designates for continuous diamond grinding.

Segments with any portion having a posted speed limit less than 55 mph:

- HMA IV Asphalt pavement including intersections, bridges, approaches, and railroad crossings, **entrance ramps, exit ramps, and turn lanes.**
- PCC IV Concrete pavement including gaps, intersections, bridges, approaches, and railroad crossings, **entrance ramps, exit ramps, and turn lanes.**
- UCDG V Urban concrete pavement surfaces the contract designates for continuous diamond grinding.
- (5) Notify the engineer when the profiling data has been submitted.

740.3.3 Department QV Testing

- (1) The department reserves the right to conduct QV testing to validate the quality of the product on any segment at any time. The department will notify the contractor before testing so the contractor can observe the QV testing.
- (2) After completing QV profile runs, the department will review the profiling data with the contractor directly on-site and will identify any areas of immediate concern. The department will analyze the data and provide the test results to the contractor within 10 business days of testing, unless the contractor and engineer mutually agree otherwise.
- (3) The engineer and contractor will jointly investigate any testing discrepancies. If the contractor does not respond to an engineer request to resolve a testing discrepancy, the engineer may suspend production until action is taken.

740.3.4 Corrective Action

740.3.4.1 General

- (1) Recommend corrective action to the engineer.
- (2) Before directing corrective action, the engineer will assess whether a repair will help or hurt the long-term performance. Correct the ride as the engineer directs in writing.

740.3.4.2 Corrective Action for Localized Roughness

- (1) The engineer will assess each wheel path for areas of localized roughness within 5 business days of being notified that ProVAL reports are uploaded. For each area that exceeds 200 in/mile, the engineer will do one of the following:
 1. Direct the contractor to correct the area to minimize the effect on the ride.
 2. Leave the area of localized roughness in place with no pay reduction.
 3. Assess a pay reduction for each area in each wheel path as follows:
 - Length \leq 25 feet: (localized roughness in/mile - 200) dollars/foot or \$250 whichever is least
 - Length $>$ 25 feet: (localized roughness in/mile - 200) dollars/foot or 10 dollars/foot whichever is leastThe department will not reduce pay for localized roughness within HMA IV and PCC IV segments.

- (2) Re-profile corrected areas to verify that the localized roughness is less than 140 in/mile. Upload a revised ProVAL ride quality module report for corrected areas into MRS software.

740.3.4.3 Corrective Action for Excessive Segment IRI

- (1) If an individual segment IRI exceeds 140 in/mile for HMA I, HMA II, and PCC II pavements after correction for localized roughness, the engineer may require the contractor to correct that segment's final surface as follows:
 - HMA I: Correct to an IRI of 60 in/mile using whichever of the following methods the engineer approves:
 - Mill and replace the full lane width of the riding surface excluding the paved shoulder.
 - Diamond grinding, conforming to [420.3.2](#) through [420.3.4](#) except space grooves 0.06 - 0.09 inches apart, or fine-tooth milling the full lane width of the riding surface including adjustment of the paved shoulders.
 - HMA II: Correct to an IRI of 85 in/mile using whichever of the following methods the engineer approves:
 - Mill and replace the full lane width of the riding surface excluding the paved shoulder.
 - Diamond grinding, conforming to [420.3.2](#) through [420.3.4](#) except space grooves 0.06 - 0.09 inches apart, or fine-tooth milling of the full lane width of the riding surface including adjustment of the paved shoulders.
 - PCC II: Correct to an IRI of 85 in/mile using whichever of the following methods the engineer approves:
 - Diamond grinding, conforming to [420.3.1](#) through [420.3.4](#), of the full lane width of the riding surface including adjustment of the paved shoulders.
 - Remove and replace the full lane width of the riding surface.

- (2) Re-profile corrected segments to verify that the final segment IRI meets the above correction limits and there are no areas of localized roughness. Upload a revised ProVAL ride quality module report for the corrected areas into MRS software. Segments failing these criteria after correction are nonconforming work under [105.3](#).

740.3.4.4 Corrective Grinding for Continuous Diamond Ground Work

- (1) Do not apply localized roughness criteria to surfaces designated for continuous diamond grinding under [420](#) or the transitions to existing work not ground under the contract. Instead ensure that the finished ground surface does not include longitudinal surface deviations exceeding 0.3-inch in 25 feet as determined using ProVal's straightedge simulation analysis.

- (2) Exclude low areas due to subsidence or other localized causes from the requirements of [740.3.4.4\(3\)](#). The engineer will review each low area and may direct the contractor to perform corrective grinding to reduce the final segment IRI for that segment.
- (3) If an individual segment IRI exceeds 65 in/mile for RCDG V or 115 in/mile for UCDG V, perform corrective grinding on that segment. Re-profile corrected segments to verify the final segment IRI. Ensure that each segment has a segment IRI after corrective grinding as follows:
 - Segments with a before-grinding IRI less than or equal to 200 in/mile, provide a final segment IRI that does not exceed 65 in/mile for RCDG V or 115 in/mile for UCDG V.
 - Segments with a before-grinding IRI greater than 200 in/mile, provide a final segment IRI as follows:
 - Do not exceed 35 percent of the before-grinding IRI for RCDG V.
 - Do not exceed 115 in/mile or 35 percent of the before-grinding IRI, whichever is greater, for UCDG V.
- (4) Submit a revised ProVAL smoothness assurance report after corrective grinding for corrected segments to validate the final segment IRI.
- (5) If after performing corrective grinding, a segment contains a bump exceeding 0.3 inch in 25 feet or has a final segment IRI greater than specified, that segment is nonconforming work under [105.3](#).

740.4 Measurement

- (1) The department will measure Incentive IRI Ride by the dollar, calculated as specified in [740.5.2](#).

740.5 Payment

740.5.1 General

- (1) Costs for furnishing and operating the profiler, documenting profile results, and correcting the final surface are incidental to the contract. The department will pay separately for engineer-directed corrective action performed within areas excluded under item 3 of [740.3.4.2\(1\)](#) as extra work.

740.5.2 Pay Adjustment

- (1) The department will pay incentive for ride as follows:

<u>ITEM NUMBER</u>	<u>DESCRIPTION</u>	<u>UNIT</u>
740.0440	Incentive IRI Ride	DOL

- (2) Incentive payment may be more or less than the amount the schedule of items shows.
- (3) The department will administer disincentives for ride under the Disincentive IRI Ride administrative item.
- (4) The department will not assess disincentives on HMA III or PCC III segments. Incentive pay for HMA III and PCC III segments will be based on the category of the adjoining segments.
- (5) The department will adjust pay as follows:
 - For work placed under the contract: Based on the initial segment IRI for that segment. If corrective action for excessive segment IRI is required, the department will base disincentives on the segment IRI after correction is performed according to [740.3.4.3](#).
 - For continuous diamond grinding of existing concrete: Based on the final segment IRI as specified in [420.3.5](#).
- (6) The department will adjust pay for 500-foot long standard segments nominally one wheel path wide using equation "ride 2.01" as follows:

For HMA I Pavement:	Initial IRI (in/mile)	Pay Adjustment (dollars/500 feet)
	< 30	250
	>= 30 to < 35	1750 - (50 x IRI)
	>= 35 to < 60	0
	>= 60 to < 75	1000 - (50/3 x IRI) ^[1]
	>= 75	-250 ^[1]
For HMA II and PCC II Pavement:	Initial IRI (in/mile)	Pay Adjustment (dollars/500 feet)
	< 50	250
	>= 50 to < 55	2750 - (50 x IRI)
	>= 55 to < 85	0
	>= 85 to < 100	(4250/3) - (50/3 x IRI) ^[1]
	>= 100	-250 ^[1]

^[1] The department will not assess a ride disincentive for HMA pavement placed in cold weather because of a department-caused delay as specified in [450.5.2\(3\)](#).

For HMA IV and PCC IV Pavement:	Initial IRI (in/mile)	Pay Adjustment (dollars/500 feet)
	< 35	250
	>= 35 to < 45	$1125 - (25 \times \text{IRI})$
	>= 45	0
For RCDG V Pavement:	Final IRI (in/mile)	Pay Adjustment (dollars/500 feet)
	< 45	125
	>= 45 to < 55	$687.5 - (12.5 \times \text{IRI})$
	>= 55	0
For UCDG V Pavement:	Final IRI (in/mile)	Pay Adjustment (dollars/500 feet)
	< 50	125
	>= 50 to < 75	$375 - (5 \times \text{IRI})$
	>= 75	0

(7) The department will prorate the pay adjustment for non-standard segments based on their length.