

DIAMOND GRINDING AND SURFACE TESTING BRIDGE SECTIONS

Effective: December 6, 2004

Revised: March 29, 2017

Description. This work shall consist of diamond grinding and surface testing bridge sections.

A bridge section shall consist of the bridge deck plus the bridge approach pavement and connector pavement on each side of the bridge.

Equipment. Equipment shall be according to the following.

- (a) Diamond Grinder. The diamond grinder shall be a self-propelled planing machine specifically designed for diamond saw grinding. It shall be capable of accurately establishing the profile grade and controlling the grinding cross slope. It shall also have an effective means for removing excess material and slurry from the surface and for preventing dust from escaping into the air. The removal of slurry shall be continuous throughout the grinding operation. The slurry shall be disposed of according to Article 202.03.

The grinding head shall be a minimum of 4 ft. (1.2 m) wide and the diamond saw blades shall be gang mounted on the grinding head at a rate of 50 to 60 blades / ft. (164 to 197 blades/m).

- (b) Surface Testing Equipment. Required surface testing and analysis equipment and their jobsite transportation shall be provided by the Contractor. The Profile Testing Device shall be according to Article 1101.10(b) except the trace analysis shall be based on traces from bridge sections.

CONSTRUCTION REQUIREMENTS

General. After all components have been properly cured, the bridge section shall be ground over its entire length and over a width that extends to within 2 ft. (600 mm) of the curbs or parapets. Grinding shall be done separately before any saw cut grooving, and no concurrent combination of the two operations will be permitted. Whenever possible, each subsequent longitudinal grinding pass shall progress down the cross slope from high to low. The maximum thickness removed shall be 1/4 inch (6 mm); however, when the bridge deck thickness noted on the plans can be maintained, as a minimum, additional removal thickness may be permitted.

The grinding process shall produce a pavement surface that is true in grade and uniform in appearance with longitudinal line-type texture. The line-type texture shall contain corrugations parallel to the outside pavement edge and present a narrow ridge corduroy type appearance. The peaks of the ridges shall be 1/8-inch +/- 1/16-inch (3 mm +/- 1.5 mm) higher than the bottom of the grinding with evenly spaced ridges.

It shall be the contractor's responsibility to select the actual number of blades per foot (meter) to be used to provide the proper surface finish for the aggregate type and concrete present on the project within the limits specified above.

The vertical difference between longitudinal passes shall be 1/8 inch (3 mm) maximum. The grinding at the ends of the bridge section shall be diminished uniformly at a rate of 1:240 over the connector pavements.

Grinding shall be continuous through all joints. All expansion joints and bridge components under the joints shall be protected from damage or contact with the grinding slurry.

Surface Testing. The diamond ground bridge section shall be surface tested in the presence of the Engineer prior to opening to traffic.

A copy of the approval letter and recorded settings from the Profile Equipment Verification (PEV) Program shall be submitted to the Engineer prior to testing.

All objects and debris shall be removed from the bridge section surface prior to testing. During surface testing, joint openings may be temporarily filled with material approved by the Engineer.

Profiles shall be taken in the wheel paths of each lane, 3 ft. (1 m) from, and parallel to, the planned lane lines. A guide shall be used to maintain the required distance.

The profile trace shall have stationing indicated every 500 ft. (150 m) at a minimum. Both ends of the profile trace shall be labeled with the following information: contract number, beginning and ending stationing, which direction is up on the trace, which direction the data was taken, and the device operator name(s). The top portion of the Profile Report for Bridge Deck Smoothness (Attachment 1) shall be completed and the form secured around the trace roll.

Trace Reduction and Bump Locating Procedure. All traces shall be reduced. Traces produced by a mechanical recorder shall be reduced using an electronic scanner and computer software. This software shall calculate the profile index in inch/mile (mm/km) and indicate any bumps in excess of 0.30 inch (8 mm) with a line intersecting the profile on the printout. Computerized recorders shall provide the same information.

The average profile index and locations with deviations exceeding the 0.30 inch (8 mm) limit shall be recorded on the Profile Report for Bridge Deck Smoothness.

All traces and reports shall be provided to the Engineer within two working days of completing the testing. Traces from either a computerized profile testing device or analysis software used with a manual profile testing device shall display the settings used for the data reduction. The Engineer will compare these settings with the approved settings from the PEV Program. If the settings do not match, the results will be rejected and the section shall be retested/reanalyzed with the appropriate settings.

Corrective Actions. Within the bridge section, all deviations in excess of 0.30 inch (8 mm) in a length of 25 ft. (8 m) or less shall be corrected regardless of the profile index value. Correction of deviations shall not result in the deck thickness being less than the minimum.

Any lane within a bridge section having an average profile index greater than 25.0 inch/mile (400 mm/km), including bumps, shall be corrected to reduce the profile index to 25.0 inch/mile (400 mm/km) or less. Profile corrections shall not result in the deck thickness being less than the minimum.

Where corrective work is performed, the bridge section shall be retested to verify that corrections have produced a profile index of 25.0 inch/mile (400 mm/km) or less for each lane. The Contractor shall furnish the profile tracing(s) and the completed form(s) to the Engineer within two working days after any corrections are made.

Corrective actions shall be performed at no additional cost to the department.

The Engineer may perform profile testing on the surface at any time for monitoring and comparison purposes.

Method of Measurement. This work will be measured for payment in place and the area computed in square yards (square meters) of diamond grinding performed.

Basis of Payment. This work will be paid for at the contract unit price per square yard (square meter) for DIAMOND GRINDING (BRIDGE SECTION).

Instructions for Completing Profile Report for Bridge Deck Smoothness

This form shall be prepared and submitted, along with the profile trace, to the Engineer.

Type of Report:

Initial - Testing of bridge section prior to any corrective action.

Intermediate - After some corrective action has been completed.

Final - After all corrective action has been completed.

Other Information:

Structure Number - Numerical identification of the bridge.

Traffic Direction - NB, SB, EB and WB depending on the traffic flow of the numbered route.

Lane Description - DL (driving lane), CL (center lane), or PL (passing Lane).

Operator - Printed name of the Contractor personnel operating the profiler.

Engineer - Printed name of Department representative witnessing data collection.

Bump locations are listed by station for each track (wheel path).

Please send completed copies to:

DOT.BR.Smoothness.Testing@illinois.gov



Type of Report:

Initial Intermediate Final

Route: _____
 Contract No. _____
 County _____
 Posted Speed _____
 No. of Lanes Ground _____

Structure Number _____
 Date Tested _____
 Contractor _____
 Operator _____
 Engineer _____



Lane Descr.	Bridge Section Length ft (m)	Track 1 Measured Roughness in. (mm)	Track 1 Profile Index in./mi. (mm/km)	Track 2 Measured Roughness in. (mm)	Track 2 Profile Index in./mi. (mm/km)	Average Profile Index in./mi. (mm/km)
			0.00		0.00	0.00
			0.00		0.00	0.00
			0.00		0.00	0.00
			0.00		0.00	0.00
			0.00		0.00	0.00
			0.00		0.00	0.00
			0.00		0.00	0.00
			0.00		0.00	0.00
			0.00		0.00	0.00
			0.00		0.00	0.00
			0.00		0.00	0.00
			0.00		0.00	0.00
			0.00		0.00	0.00
			0.00		0.00	0.00
			0.00		0.00	0.00
			0.00		0.00	0.00
			0.00		0.00	0.00
			0.00		0.00	0.00
			0.00		0.00	0.00
			0.00		0.00	0.00
			0.00		0.00	0.00

Bump Locations:

Track 1: _____

Track 2: _____

Certified By _____

Organization _____

Title _____

EXAMPLE



Profile Report for Bridge Deck Smoothness

Type of Report:

Initial Intermediate Final

Route: I-155
 Contract No. 72856
 County Logan
 Posted Speed 70
 No. of Lanes Ground 2

Structure Number 054-0073
 Date Tested 3/29/2017
 Contractor John Doe Construction
 Operator John Doe Jr.
 Engineer Mike Smith

Lane Descr.	Bridge Section Length ft. (m)	Track 1 Measured Roughness in. (mm)	Track 1 Profile Index in./mi. (mm/km)	Track 2 Measured Roughness in. (mm)	Track 2 Profile Index in./mi. (mm/km)	Average Profile Index in./mi. (mm/km)
NBDL	663	3.2	25.48	3	23.89	24.69
NBPL	663	2.5	19.91	3.6	28.67	24.29
			0.00		0.00	0.00
			0.00		0.00	0.00
			0.00		0.00	0.00
			0.00		0.00	0.00
			0.00		0.00	0.00
			0.00		0.00	0.00
			0.00		0.00	0.00
			0.00		0.00	0.00
			0.00		0.00	0.00
			0.00		0.00	0.00
			0.00		0.00	0.00
			0.00		0.00	0.00
			0.00		0.00	0.00
			0.00		0.00	0.00
			0.00		0.00	0.00
			0.00		0.00	0.00
			0.00		0.00	0.00

Bump Locations:

Track 1: Station 1893+53.5 and Station 1897+65.7

Track 2: None

Certified By David Jones

Organization John Doe Construction

Title Chief Profiler Operator