



BUREAU OF MATERIALS

MATERIALS

PROCEDURES

MP NUMBER: 28-12
Supersedes MP 28-08

EFFECTIVE DATE: May 1, 2012

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BRIDGE DECK RIDE QUALITY ACCEPTANCE TESTING USING WALKING PROFILER

PURPOSE and SCOPE:

This MP is to establish a standard procedure for calibration and testing of bridge deck ride quality using a walking profiler device. The walking profiler is a precise tandem wheeled device which collects electronic distance measurement (EDM) and inclinometer data to measure the profile of paved surfaces. In 2010, NJDOT purchased 4 SurPRO profiler devices, manufactured by International Cybernetics (ICC) for the purpose of replacing the antiquated Rolling Straight Edge (RSE) as the acceptance test equipment for bridge decks. The RSE has already been replaced as the device for measuring ride quality of pavements.

NJDOT specifications for surface tolerance are based on a maximum deviation of 1/8" in 10 ft. At the time of this writing, existing projects bid under the 2007 and earlier Standard Specifications provide for acceptance testing using the RSE. In order to implement the upgrade of equipment, NJDOT has directed that change orders be written for existing projects to change the test equipment (but not the tolerance). The same change will be included in the Special Provisions for future projects (See BDC11S-03).

This MP also covers the analysis of the collected profile data, using ProVAL software, and reporting of results. Whether the project was bid under the old RSE language or under the profiler language in the BDC, both the surface tolerance and the measurement of profile data are the same. However, the distinction of whether the project was bid under the RSE or profiler language does affect the analysis, in that a slightly more lenient tolerance is applied for projects bid under the RSE language. This is because the increased accuracy of the analyzed profile may result in more defects being detected.

REFERENCES:

2007 Standard Specifications and project Special Provisions, Addenda (Sec. 507.03.02 (N)
Construction Procedures Handbook (CPH) Section No. VI – F2...
BDC No. BDC11S-03
SurPRO user's guide (Appendix to MP-28-12)
SurPRO Utility
ProVal User's Guide

INSTRUCTIONS:

I. Scheduling

- A. The Resident Engineer will request testing of bridge decks and approaches as described in CPH, Subsection VI-F2.
- B. Determine all areas to be tested and advise the Resident Engineer. Refer to the plans and Special Provisions to determine lanes to be tested, lot limits, and whether approach slabs need to be tested (Special Provisions 507.03.07). Under the 2007 Standard Specifications, bridge deck lots are defined as the travel lanes from joint assembly to joint assembly (507.03.02 N). Construction joints do not affect lot limits. Testing will generally have to be coordinated with curing and other construction operations on the deck.
- C. Equipment used will be the walking profiler manufactured by International Cybernetics (ICC).

II. Preparation for testing.

- A. The profiler should be fully charged prior to use.
- B. Safety, sweeping and wheelpath layout should be provided by the contractor.

III. Testing.

- A. It is recommended that operators of the SurPRO walking profiler be trained in its use and use of ProVal software. Refer to the instructions
- B. It is necessary to take complete field notes of test locations and times. It will be necessary to match up the location of each wheelpath tested to its respective file name when data is processed and reports are created.
- C. Warmup and Calibration: Unpack, assemble, and warm up the profiler for 15 minutes. Perform a closed loop calibration according to the instructions.
- D. Perform wheelpath runs according to recommendations in the guide. Be sure to walk the device smoothly at or below the maximum speed of 1.2 MPH.
- E. After each run, Press “Stop”, followed by “Save.” Allow sufficient time after each command for the unit to process the data and scroll through its display. The display will indicate the filename as an 8 digit alphanumeric with the 1st 4 digits being the date and the last 4 being the time of completion of the run. Record this filename along with the location of the test. Press clear (“CLR”) before starting the next run.
- F. Perform a minimum of one run per wheelpath in the direction of travel. Repeat runs are recommended, if practical, to improve confidence in the accuracy of data.

IV. Data Transfer

- A. After completing the testing, connect the profiler using a serial cable to the computer where it will be analyzed. Use the Surpro Utility software (installed from the flash drive included with the profiler). Using the Send command on the profiler and the Receive command in the Surpro utility, download data to PC. (The Surpro saves profile data in multiple formats – only the .ERD files are needed. Others may be discarded.)

- B. Locate the ERD files on the PC. Surpro utility default folder is C:/ProgramFiles/ICC/WinReport. Move the .ERD data files to a project folder. If files are renamed, file names should retain the date and time in the default filename.
- C. Return the profiler to its storage location, set it on its stand, and connect the battery charger.

Analyze Data

- A. Download ProVAL software (free download from www.roadprofile.com, need Windows Service Pack 3 to install.)
- B. Analyze Data for each wheelpath using ProVal Rolling Straightedge analysis feature. As inputs, use 10 ft for the straightedge length. Use a 5/32" (0.156") deviation threshold if the project was bid under the RSE spec. For projects bid under profiler spec use 1/8" (0.125"). Use butterworth low pass filter.
- C. Export analyzed data to Excel for calculations (Report Menu). ProVal will generate a 2 page spreadsheet using the Export command. In Excel, use the "exceeded thresholds" page to calculate the length of the defects from the start and stop distance. (Defect Length = Stop distance minus Start distance) Total each wheelpath, divide by the length tested and convert to percent to obtain Percent Defective. Calculate the lot Percent Defective based on all included wheelpaths. Format as a percent to the nearest 0.1%.
- D. Calculate the Reduction Per Lot (Percent) for each lot using table 507.03.02-2.

Report

Compile report in Excel of all lots tested. Include:

- A summary page including a breakdown of the lots tested, the percent defective (to the nearest 0.1%), and the Pay Reduction as provided in Table 507.03.02-2, if applicable.
- Tabulations of defects (Exceeded thresholds pages)
- Graphs of elevation profile and deviation profile may also be included as optional additional information pages. These can be copied from ProVAL and pasted into Excel.

Alternately, the The .PDF option (Report menu) may be used for the tabulation of defects (this includes a deviation profile graph) and included with the summary page. .

Distribution of Report

RE, field manager, team leader.