



Republic of the Philippines  
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS  
**OFFICE OF THE SECRETARY**  
Manila

097.13 DPH

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DEPARTMENT ORDER )

No. **48** )  
Series of 2019 )

SUBJECT:

**GUIDELINES ON THE USE OF  
INERTIAL PROFILER (IP) FOR  
INSPECTION AND ACCEPTANCE  
OF PAVEMENT ON NATIONAL  
PRIMARY ROADS**

To provide guidance to all concerned on the requirement for acceptance of pavement on National Primary Roads, to include measurements using inertial profiler, the following guidelines are hereby prescribed:

1.0 During Pre-Construction Stage the Implementing Office shall:

- 1.1 Ensure that inertial profiling and/or compliance to IRI value requirements of proposed pavements is a stated requirement in the contract.
- 1.2 Indicate in the plan which sections of new pavement that would be subject to the inertial profiler requirements and which sections that would be subject to straightedge testing requirements.
- 1.3 Inform bidders of pavement smoothness requirements, including submittals, during pre-bid conference.

2.0 Procedure for Inertial Profiling Surveys shall meet the requirements of Department Order No. 21, series of 2019 including the following:

2.1 Type and Location of Profile Management

IRI is calculated based on the average IRI values from left and right wheelpaths. The survey team must mark the beginning and end locations of the project. The measurement shall be in the direction of traffic.

2.2 Profile Measurement Equipment and Testing Parameters

The Department will be using an inertial profiler (IP) to determine the IRI value of the road project. Cooperation in the scheduling of testing is necessary in order that it can be performed efficiently on all projects.

Engineers from the Bureau of Quality and Safety (BQS) who have undergone training shall be the one to perform the testing.

## 2.3 Calibration

Immediately prior to the IP surveys for pavement acceptance, the inertial profiler calibration and verification testing must be performed. Turn on electronic equipment prior to testing to allow electric components to stabilize. Adequate time should be allowed for all electronic components to warm up before calibration and measurement starts. The calibration and verification testing is to be performed with the Project Engineer's presence before inertial profiling begins. Refer to Manufacturer's Operations Manual for complete procedure. Included in this testing are the following:

- 2.3.1 *Distance Calibration* – Profiling system distance calibration shall be performed daily prior to collection of any surface data. Prior to performing a distance calibration on the profiling vehicle, first use a measuring wheel or tape measure to carefully mark the control section to be used as the calibration segment. Choose a surface that will allow consistent, straight tracking of the profiling system vehicle across the calibration test section. Section length should be at least 100 meters long.
- 2.3.2 *Laser Height Verification* – Laser height verification shall be performed prior to mobilization for collection of any surface data.
- 2.3.3 *Bounce Test* – Bounce test shall be conducted daily prior to collection of any surface data. This test is performed with the profiler stationary on a flat surface; an updown rocking motion is induced in the vehicle while the resulting profile is recorded.
- 2.3.4 *Accelerometer Static Calibration* – Accelerometer Static Calibration shall be performed at 90-day intervals or if the profiling system has developed signs of irregular profile data or output of profile traces with irregular attributes. Use extreme caution in performing the static calibration procedure to assure that the Manufacturer's instructions for the routine are followed exactly. Failure to properly perform the static calibration procedure will alter the normal configuration of the system and may require that updated configuration settings be supplied by manufacturer, which will disable the system from accurate or reliable performance until the erroneous configuration condition is corrected.
- 2.3.5 Any other manufacturer's recommended daily tests.

## 2.4 Repeatability Test

Prior to data collection, a test segment with a length of 500 meters will be selected at site for the repeatability test. The repeatability test shall be witnessed by the authorized representative of the contractor and/or the Project Engineer. Five profile runs will be made on the test segment for repeatability test. The profile runs for repeatability are acceptable if the average IRI of the two wheelpaths satisfy the following criteria:

- 2.4.1 The IRI values of each of the five (5) runs are within 1% of the mean IRI of the selected runs.
- 2.4.2 The standard deviations of IRI of the selected runs are within 2% of the mean IRI.

## 2.5 Measurement

Three (3) runs per lane per site should be conducted for acceptance measurement. The IRI value for the lane shall be the average IRI of the two wheelpaths for the three (3) runs combined.

The IRI value of each section shall be calculated and reported in units of m/km and shall be rounded to two digits to the right of the decimal.

The Contractor shall ensure that project staffs are available to assist Department's inertial profiler smoothness testing personnel with station limits of inertial profiling and excluded areas.

The Contractor shall thoroughly sweep the roadway surface and then shall obtain the Project Engineer's approval before beginning any profile operation.

2.6 Pavements Smoothness Measurement Exclusions – Areas exempt from inertial profiler requirements must be measured using straightedge testing by the contractor in accordance to the procedure in Item 311 and 307 of the DPWH Standard Specifications for Highways, Bridges and Airports, Volume II and meet specified requirements. The contractor is required to submit areas requiring smoothness correction in conformance with the specifications. The following areas shall be excluded from pavement smoothness measurements with the use of inertial profiler:

- 2.6.1 Within a block or 4.5m from the transverse joint separating the pavement from an existing pavement not constructed under the same project.
- 2.6.2 Bridge decks and approach slabs not included in the contract.
- 2.6.3 Portions of pavement with rumble strips.
- 2.6.4 Intersections and roundabouts.
- 2.6.5 At grade railroad crossings.



- 2.6.6 One concrete block on either side of manholes, water supply castings, etc.
- 2.6.7 Paved shoulders less than 3.05m wide.
- 2.6.8 Miscellaneous areas such as approach to medians and gore areas, turnouts, etc.
- 2.6.9 Travel lanes less than 300 m in length including ramps, turn lanes, and acceleration and deceleration lanes.
- 2.6.10 Reblocking works done at intermittent sections.

## 2.7 Corrective Work

- 2.7.1 If corrective work is required, the Contractor shall submit a written corrective work proposal to the Project Engineer, which shall include the locations that will be requiring corrective work. The contractor shall not commence corrective work until methods and procedures have been approved in writing by the Project Engineer. The Contractor shall notify the Project Engineer prior to the commencement of the corrective work.
- 2.7.2 Pavement cross slope shall be maintained throughout the corrected areas
- 2.7.3 If permanent pavement markings are damaged or destroyed during corrective works, they shall be replaced at no cost to the Department.
- 2.7.4 Joint sealant that has been damaged during corrective works as determined by the Project Engineer shall be repaired and replaced at the cost of the contractor.

This Order shall take effect immediately.

  
**MARK A. VILLAR**  
Secretary

15.1 MGM/EKS/MAV

Department of Public Works and Highways  
Office of the Secretary



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