

# Understanding Proposal Note 555 Surface Smoothness for Bridges & Approaches



*January 2014*



# Proposal Note 555

Holistic approach to evaluating smoothness across and through the bridge using a metric grounded in Ride Quality

- Pavement to approach slab to deck to approach slab and back to pavement inclusive of all transitions / interfaces
- 25' of pavement on either side of deck and approach slabs encompass the “bridge encounter”
- “new” surface all the way through the encounter

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- A straightedge does not “see” roughness the way a vehicle suspension does



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## Existing Specifications

- 511.19 (511.16- 2013 C&MS) and 526.05 Roadway Finish- referred 451.12 (451.13-2013 C&MS)
- 451.12(451.13) Surface Smoothness.
  - “ test the pavement surface for smoothness using a 10-foot (3 m) rolling straightedge . Provide a two or four-wheeled device 10 feet (3 m) in length with an indicator wheel at the center which detects high and low areas in the pavement surface.”

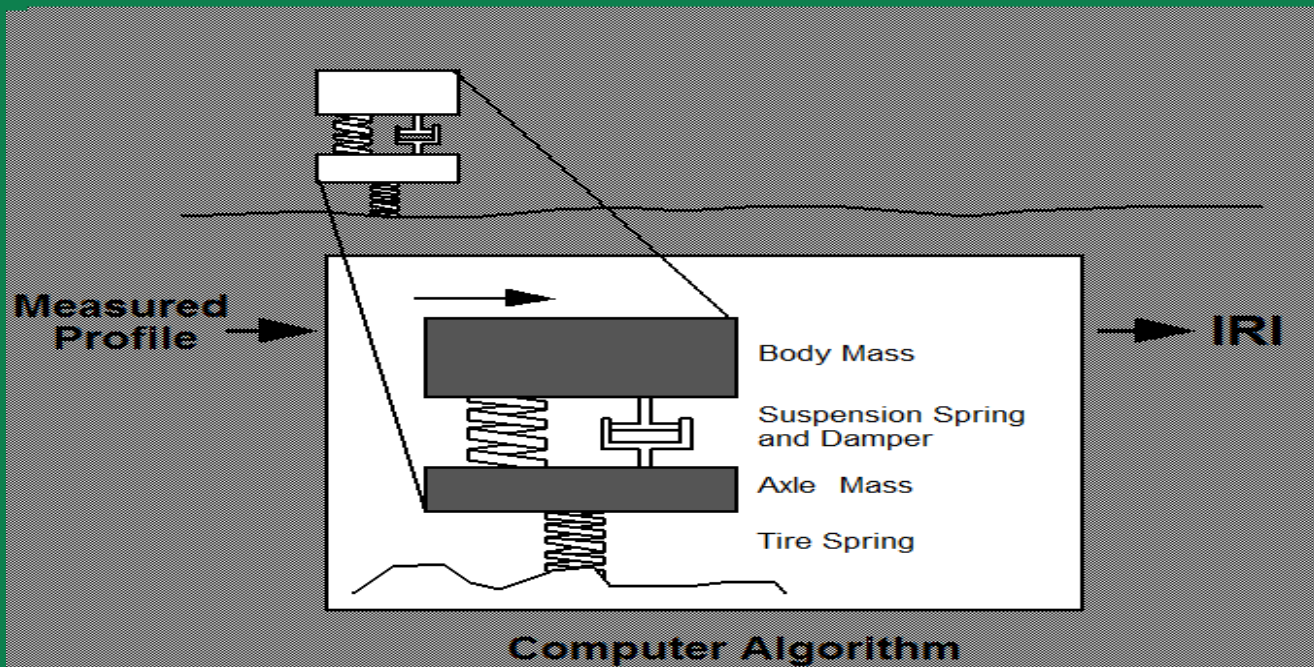
“Ensure pavement surface variations do not exceed 1/8 inch in a 10-foot (3 mm in a 3 m) length of pavement.”

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- International Roughness Index (IRI) is a composite model of vehicle suspensions
- Using profiles to simulate vehicle response (What the public “feels”)

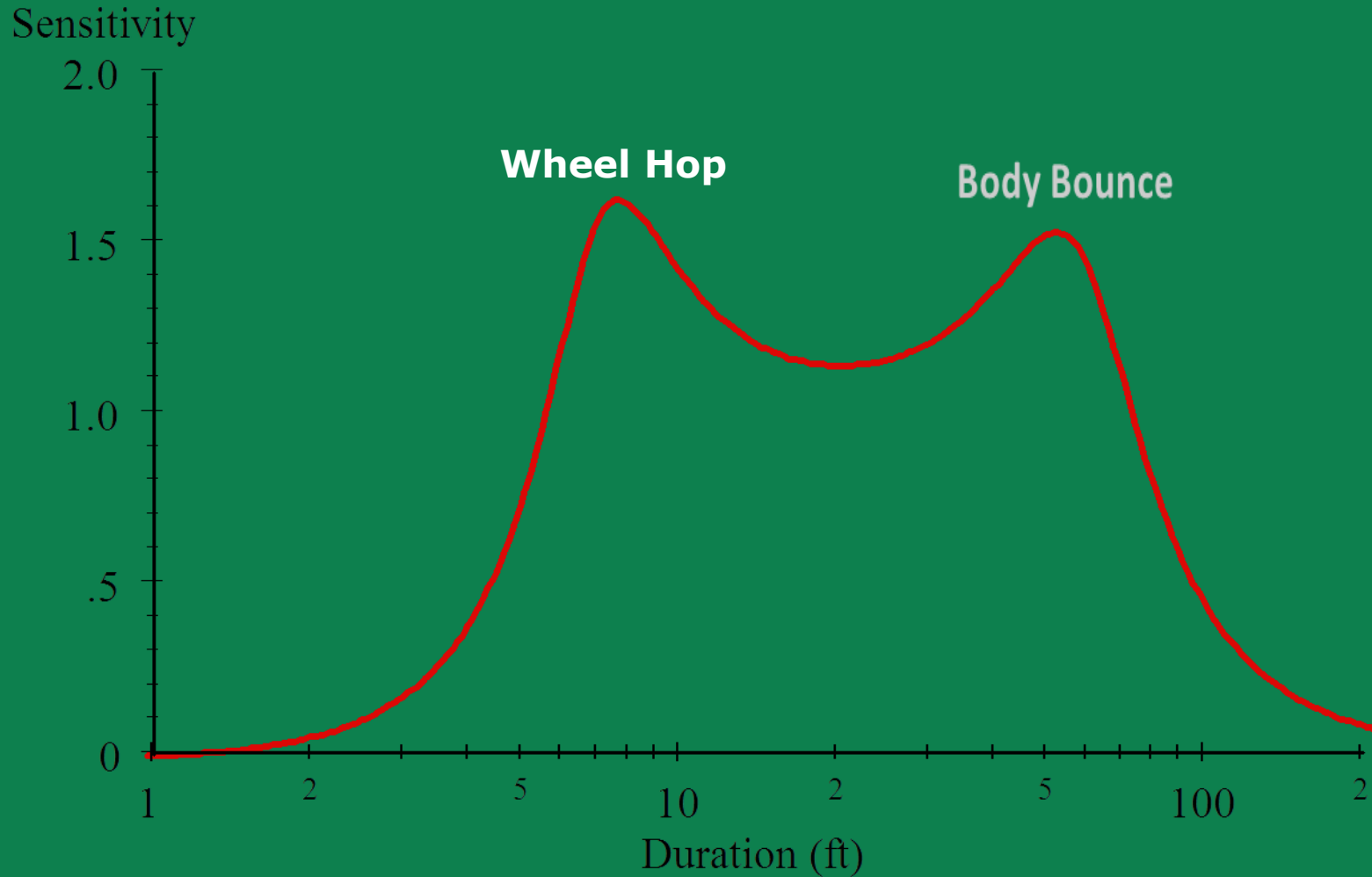


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## IRI Sensitivity



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## “ONE SIZE FITS ALL”

- All designs: integral, semi-integral, jointed; steel, concrete, suspension, cable stayed, etc.
- All sizes: big/long/wide bridges to small/short/2 lane bridges
- All speeds: Fast (interstates) to slow (urban and/or local roads)



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- No pay adjustments positive or negative
- Overall Roughness limit
- Localized roughness limit  
(1/8" in 10' straightedge goes away)
- Corrective action require if roughness limits are exceeded



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## Overall Roughness Criteria

- Each lane of encounter must be built to an IRI of 130 inches/mile or less
- MRI (Mean IRI) average IRI of both wheel paths in the given lane
- If not, then must be corrected to an IRI of 100 inches/mile or less
- Overall criteria waived if bridge encounter is less than 265 feet in length

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## Localized Roughness Criteria

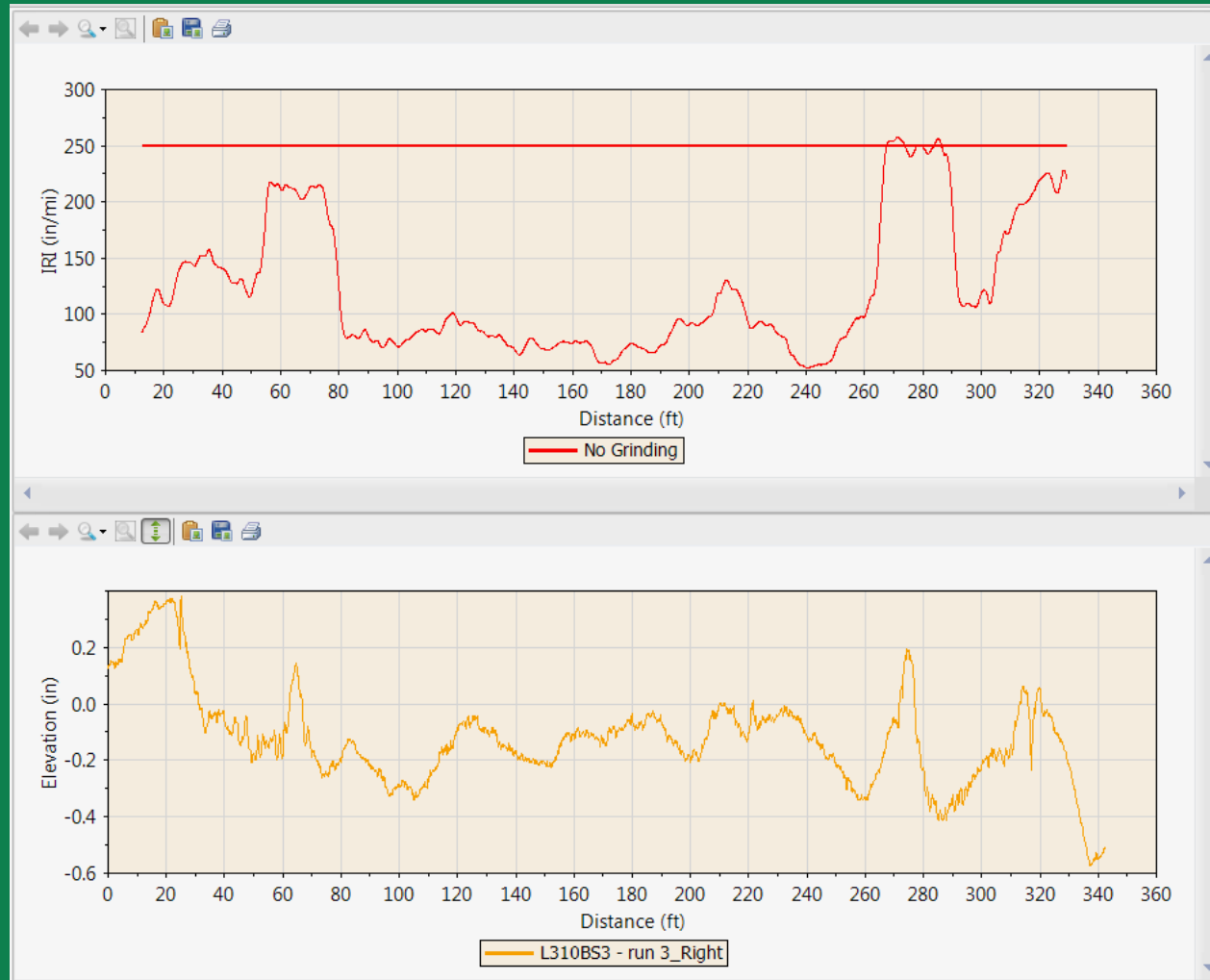
- Each wheel path of each lane must not exceed an IRI of 250 inches/mile on a continuous 25 foot base length through the encounter
  - If not, then must be corrected to an IRI below 250 inches per mile in 25'
  - Limit is increased to 350 inches/mile anywhere the sliding 25' base length includes steel armor

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## Localized Roughness Criteria



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## Acceptance Testing

- Must use certified equipment and operator
- Must notify ODOT project engineer 24 hours in advance of testing



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## Acceptance Testing

- If corrective action is required, a corrective action plan must be submitted to and approved by the ODOT project engineer
- Re-testing after any corrective action work is completed



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## Corrective Action

- If possible, correct smoothness prior to establishing longitudinal grooves
  - Use ProVAL to help determine corrective action plan
  - Will diamond grinding with a particular grinder likely fix the problem?
  - Grinding alone may not fix the problem, slab jacking or additional pavement material may be required

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## Corrective Action

- If possible, correct smoothness prior to establishing longitudinal grooves



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