



# RESEARCH PROJECT CAPSULE [ 17-2P ]

October 2016

TECHNOLOGY TRANSFER PROGRAM

## Implementation of a Localized Roughness Specification for Use on Louisiana Bridges

### JUST THE FACTS:

**Start Date:**

August 1, 2016

**Duration:**

12 months

**End Date:**

July 31, 2017

**Funding:**

TT-Fed/TT-Reg

**Principal Investigator:**

Mark Martinez, P.E.

Pavement Research Engineer

Louisiana Transportation Research Center

**Administrative Contact:**

Tyson Rupnow, Ph.D., P.E.

Associate Director, Research

225-767-9124

**Technical Contact:**

Zhongjie "Doc" Zhang, Ph.D., P.E.

Pavement & Geotech

Research Administrator

225-767-9162

Louisiana Transportation  
Research Center  
4101 Gourrier Ave  
Baton Rouge, LA 70808

Sponsored jointly by the Louisiana  
Department of Transportation and  
Development and Louisiana State  
University

### POINTS OF INTEREST:

Problem Addressed / Objective of  
Research / Methodology Used  
Implementation Potential

### PROBLEM

The Louisiana Transportation Research Center has worked closely with the Bridge Design section of the Louisiana Department of Transportation and Development (DOTD) to develop a workable specification for standard and localized roughness of bridges.

The draft specification has two components: standard assessment of the overall International Roughness Index (IRI) of a bridge and localized assessment of individual bumps, faults, and slope changes.

DOTD has extensive experience with standard IRI measures of pavement roughness, but this experience is not directly transferable to bridges. DOTD also has experience with localized roughness, but that experience has never been applied to project acceptance.

### OBJECTIVE

This project is an attempt to use the draft specification on pilot projects to assess the specification's strengths and weaknesses and to refine the specification as needed. The objectives of the research are to decrease roughness on Louisiana bridges and to assess benefits and costs associated with doing so.

### METHODOLOGY

Bridge construction projects where the draft specification can be tested will be selected for this research. The group of selected bridges shall exhibit variations in overall length, traffic volume, design characteristics, or potential future distress types. Enough bridges within each category will be sampled so that a valid statistical analysis can be performed.

The roughness of the selected bridges will be measured with a high-speed inertial profiler (HSIP) soon after construction completion and the collected profiles will be analyzed in terms of standard and localized roughness. Statistical distribution curves for each of the bridge categories will be developed and the upper 95th percentile for each category will be determined.

[WWW.LTRC.LSU.EDU](http://WWW.LTRC.LSU.EDU)

The draft specification thresholds will be adjusted to match the 95th percentile roughness for each category. If a single threshold is not sufficient to cover all of the categories, then the specification will be broken down by category. A tabular summary of findings and a recommended specification revision will be prepared.

## IMPLEMENTATION POTENTIAL

For construction quality assurance, DOTD is committed to implementing a bridge smoothness specification based on IRI utilizing the HSIP. Most states have only recently begun to experiment with an IRI-based specification for bridges utilizing HSIP. Specification thresholds have not yet been thoroughly vetted. This research is a critical step to ensure fairness and effectiveness of a DOTD specification.

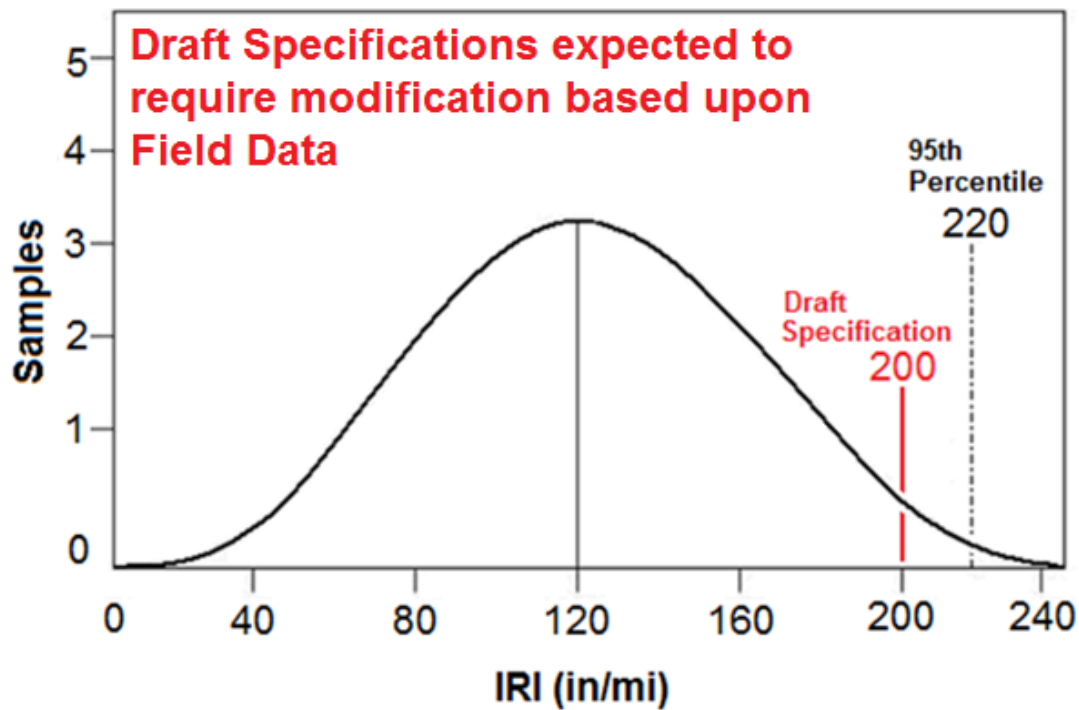


Figure 1  
Draft specifications