



COLLEGE CURRICULUM: COLLECTING VEHICLE DATA WITH SMARTPHONES

The field collection of vehicle dynamic response is a topic not usually found in undergraduate programs, and not all that common in graduate-level electives. Yet, these crucial vehicle acceleration/deceleration values have a fundamental impact on the design of roadways. Most civil engineering students study vehicle operating dynamics from the textbook and thus do not fully appreciate how these accelerations/decelerations “feel” to the driver, the ultimate consumers of their engineering designs.

Two civil engineering professors at the Oregon Institute of Technology (Oregon Tech) undertook a project to incorporate more “real-world” data collection and analysis into transportation courses. This project supports coursework development at both the undergraduate and graduate level by the creation of field laboratory modules related to vehicle operating dynamics with the use of smartphone/iPod technology.

A total of four instructional modules were developed; one each at the undergraduate level and graduate level for both lateral acceleration and longitudinal deceleration. The modules teach students how to collect data, how to determine the recommended advisory speeds for horizontal curves, and how to calculate and evaluate the recommended stopping sight distance. Graduate students were instrumental in the development and troubleshooting of each module.

The instructional modules developed through the support of this grant build on the success of two previous NITC research and education grants at Oregon Tech. This project transferred the knowledge and expertise of the research team monitoring the health of transportation structures using smartphone/iPod technology to one of eight graduate courses restructured as part of a larger curriculum development grant.

This project developed a series of laboratory/field exercises where students collect and process vehicle acceleration/deceleration readings and evaluate the results in comparison to values used in city, county, state and federal roadway design manuals.

PROJECT TITLE
Instructional Modules for Obtaining Vehicle Dynamics Data with Smartphone Sensors (#2017-1073)

INVESTIGATORS
[Lead] Roger Lindgren, Ph.D., Oregon Institute of Technology

LEARN MORE
Download the report and related materials:
<http://nitc.trec.pdx.edu/research/project/1073>

This study was funded by the National Institute for Transportation and Communities (NITC). NITC is one of five U.S. Department of Transportation national university transportation centers. Housed at Portland State University, NITC is a program of the Transportation Research and Education Center (TREC). This Portland State-led research partnership includes the University of Oregon, Oregon Institute of Technology, University of Utah and new partners University of Arizona and University of Texas at Arlington.