



UNIVERSITY TRANSPORTATION CENTER

RESEARCH BRIEF

Measuring, Managing, and Reducing Pavement Macrotexture and Roughness to Improve Cyclists' Safety and Ride Quality

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Background

According to recent research studies, travel behavior of young adults has started to significantly change within the last decade and non-motorized means of transportation have started to be used more often. To promote bicycle use, City of Portland has pursued a “built it and they will come” strategy by constructing more bikeways and improving the condition of the existing ones. This strategy paid off well and bicycle commute trips in Portland doubled from 1990 to 2000. This outcome clearly shows that increasing the size of the bikeway network, improving the condition of bikeways, increasing ride quality and safety can create a significant increase in the use of bicycles for commuting and recreational purposes. Improved bikeway network is also expected to promote bicycle tourism in urban and rural areas.

Surface texture and roughness of bikeways directly affect the bicyclists' ride quality. Texture and/or roughness requirements for bike paths and shoulders need to be established to improve cyclists' comfort. Effective post-construction treatments to improve ride quality should also be determined. Improved bikeway surfaces and ride quality can potentially increase bicycle use for commuting and recreational purposes in the Pacific Northwest. Reduced texture and roughness on bikeways can also reduce bicycle damage and increase cyclists' safety.

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Research Project

This research would have three objectives: i) determine the impact of pavement-related factors on cyclists' ride quality; ii) identify routes with lower ride quality; and iii) provide suggestions and guidelines to improve user comfort. The research tasks are:

- 1) Identification of routes with high and low ride quality: Bike trips with cyclists will be organized in Benton County.
- 2) Identification of factors affecting bicycle ride quality: Macrotexture (by sand patch test), International Roughness Index (by Surpro and/or inertial profiler), and bicycle vibration (by a three-axis accelerometer installed on different types of bicycles) data for the sections identified in Task 1 will be collected.
- 3) Surveys of bicycle ride quality: Bicycle rides on the selected routes will be scheduled with several cyclists in the region.
- 4) Data analysis: By conducting statistical analysis using the data collected in Tasks 2 and 3, the correlations between macrotexture, roughness, and vibrations and cyclists' perception of ride quality will be determined. Based on the results of statistical analysis, texture and roughness thresholds to achieve acceptable and high cyclist comfort levels will be determined.

ABOUT THE AUTHORS

The research team consisted of Erdem Coleri of Oregon State University.

ABOUT THE FUNDERS

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EXPECTED DATE OF COMPLETION

March 2022

FOR MORE INFORMATION

<https://depts.washington.edu/pactrans/research/projects/measuring-managing-and-reducing-pavement-macrotexture-and-roughness-to-improve-cyclists-safety-and-ride-quality/>