INTRODUCTION

How does a street stack up? The Highway Capacity Manual contains the only national standard for measuring street performance for bicycling. Its bicycle level-of-service (BLOS) model gives a grade, A through F, to segments of streets and intersections.

But many practitioners don’t understand how BLOS works. We break open the black box, showing what variables are included and excluded and how sensitive the BLOS calculations are to them.

METHODS

We summarize the variables included in the BLOS model and the units of analysis in tables and graphics. We conduct a sensitivity analysis using plausible hypothetical cases to show what really drives BLOS. We inventory important variables that BLOS does not consider, drawing on the state of bicycle planning practice. Finally, we decipher the origins of BLOS and describe the data sets used to create the model.

ORIGINS

Some may be surprised at the age and relatively small sample sizes of the data that underlie BLOS. Two studies conducted in 1997 and 2003, both in Florida, with 150 and 60 participants respectively, form the basis for the model. As such, BLOS does not cover post-2005 designs such as cycle tracks, colored bicycle lanes, sharrows, and bicycle boxes.

WHAT DETERMINES BICYCLE LOS?

At an intersection: the width of the street being crossed and the bicyclists’ operating space (wide outside lane, shoulder, or bike lane). High traffic volumes also influence the score.

On a link: depending on their values, all three can heavily influence the score: 1) vehicle volumes (esp. heavy vehicles) 2) vehicle speeds, and 3) bicyclists’ operating space.

On a segment: a function of intersection BLOS and link BLOS, with a large constant that makes it very difficult to achieve a grade above C.

On a facility: a length-weighted sum of segment BLOS scores.

POLICY IMPLICATIONS

By enabling broader scrutiny of the BLOS model, we hope to target resources towards the most crucial improvements. We suggest three major changes:

1. Help agencies model changes to vehicle volumes and speeds; scores greatly depend on predicting these accurately
2. Make the model sensitive to the variety of street treatments that now exist in the U.S. and the range of variables that are currently known to affect bicyclist safety and comfort
3. Simplify the functional form of the model for improved usability and transparency

UNITS

Components of Link BLOS can be positive or negative, with wide lanes and bike lanes counteracting poor pavement and high speeds and traffic volumes.

Traffic speed degrades Link BLOS, but the relationship is logarithmic; the effect decreases as speeds increase.

SENSITIVITY EXAMPLES

Units of analysis used to assign a grade to a section of street; numerical ranges to convert scores to grades. Lower numbers are better scores.

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