Bicyclist Comfort Level and Lateral Positions of Motor Vehicles and Bicycles

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NEXTRANS Intern
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Summary

• Bicyclist Comfort Level
• Lateral Position
• Why?
• How?
• Results
• What now?
Bicycle Comfort Level

- 2 models developed for predicting comfort on roadways given geometric and operational characteristics
- Bicycle Level of Service (BLOS) developed using real time feedback from cyclists
- Bicycle Compatibility Index (BCI) developed using feedback from cyclists watching video footage
- Both use similar input variables
### Lateral Position

1997 HARKEY / STEWART

<table>
<thead>
<tr>
<th>Facility Type</th>
<th>Bike to Curb</th>
<th>Facility Type</th>
<th>Bike to Car</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wide Curb</td>
<td>1.4 ft</td>
<td>Wide Curb</td>
<td>6.4 ft</td>
</tr>
<tr>
<td>Bicycle Lane</td>
<td>2.6 ft</td>
<td>Bicycle Lane</td>
<td>6.2 ft</td>
</tr>
<tr>
<td>Paved Shoulder</td>
<td>2.6 ft</td>
<td>Paved Shoulder</td>
<td>5.9 ft</td>
</tr>
</tbody>
</table>
Why?

- Measurable indicator of comfort level to compare with model
- Improve existing models (BCI, BLOS)
- Better spending decisions with increasing ped and bike funds
- Policy-making
Federal Pedestrian and Bicycle Funding, 1992–2009

(FHWA The National Bicycling and Walking Study: 15 Year Status Report)
Survey Creation
PHOTOGRAPHY
Survey Creation

PHOTOGRAPHY

Masking tape marks 1 ft. intervals
Passenger side rear tire marks car position
Survey Creation

PHOTOGRAPHY

Photos taken at 1 ft intervals
Rear bike tire marks bike position
## Survey Creation

<table>
<thead>
<tr>
<th></th>
<th>9 ft car to curb</th>
<th>8 ft car to curb</th>
<th>7 ft car to curb</th>
<th>6 ft car to curb</th>
<th>5 ft car to curb</th>
<th>4 ft car to curb</th>
<th>3 ft car to curb</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 ft bike to curb</td>
<td>9-1</td>
<td>8-1</td>
<td>7-1</td>
<td>6-1</td>
<td>5-1</td>
<td>4-1</td>
<td>3-1</td>
</tr>
<tr>
<td>2 ft bike to curb</td>
<td>9-2</td>
<td>8-2</td>
<td>7-2</td>
<td>6-2</td>
<td>5-2</td>
<td>4-2</td>
<td></td>
</tr>
<tr>
<td>3 ft bike to curb</td>
<td>9-3</td>
<td>8-3</td>
<td>7-3</td>
<td>6-3</td>
<td>5-3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 ft bike to curb</td>
<td>9-4</td>
<td>8-4</td>
<td>7-4</td>
<td>6-4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 ft bike to curb</td>
<td>9-5</td>
<td>8-5</td>
<td>7-5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 ft bike to curb</td>
<td>9-6</td>
<td>8-6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7 ft bike to curb</td>
<td>9-7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Survey Creation
QUESTION LAYOUT

• Photos are grouped by car to curb distance and presented in increasing order of bike to curb distance

• Picture frames and horizontal lines are the same color for each car to curb group
Survey Creation

DEMOGRAPHICS

• 4 questions related to demographics: Age, Gender, Weekly Miles, Zip Code

• 2 free response questions: Other Factors, Comments/Suggestions

• All demographic and free response questions are optional
IRB Approval

DEFINITIONS

• IRB approval is required for human subject research conducted by UIUC faculty, staff, student, or visiting researchers (including interns)

• “Under the federal regulations, human subjects are defined as: living individual(s) about whom an investigator conducting research obtains: (1) data through intervention or interaction with the individual; or (2) identifiable private information.” (http://irb.illinois.edu)
Data Collection

• Distributed to:
  • 4 Champaign-Urbana bicycle-related email lists
  • 1 bicycle-related Facebook group
• Survey participants responded online by following a link to the informed consent and continuing to the survey
Results

Gender of Respondents

- Female: 35 responses
- Male: 58 responses
Results

AGE

Age of Respondents

<table>
<thead>
<tr>
<th>Age Range</th>
<th>Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>18 - 22</td>
<td>5</td>
</tr>
<tr>
<td>23 - 28</td>
<td>26</td>
</tr>
<tr>
<td>29 - 35</td>
<td>13</td>
</tr>
<tr>
<td>36 - 45</td>
<td>19</td>
</tr>
<tr>
<td>45 - 60</td>
<td>30</td>
</tr>
<tr>
<td>greater than 60</td>
<td>0</td>
</tr>
</tbody>
</table>
Results

WEEKLY RIDING

Weekly Riding of Respondents

<table>
<thead>
<tr>
<th>Miles Per Week</th>
<th>Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>less than 10</td>
<td>12</td>
</tr>
<tr>
<td>11 - 30</td>
<td>28</td>
</tr>
<tr>
<td>31 - 60</td>
<td>24</td>
</tr>
<tr>
<td>61 - 100</td>
<td>20</td>
</tr>
<tr>
<td>more than 100</td>
<td>9</td>
</tr>
</tbody>
</table>
Results
ALL RESPONDENTS
## Results

### GENDER

<table>
<thead>
<tr>
<th>Gender</th>
<th>Female</th>
<th>Male</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average CL</td>
<td>3.28</td>
<td>3.31</td>
</tr>
</tbody>
</table>
## Results

### WEEKLY RIDING

<table>
<thead>
<tr>
<th>Miles</th>
<th>less than 10</th>
<th>11 - 30</th>
<th>31 - 60</th>
<th>61 - 100</th>
<th>more than 100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average</td>
<td>3.21</td>
<td>3.37</td>
<td>3.38</td>
<td>3.18</td>
<td>3.23</td>
</tr>
</tbody>
</table>

**Average Comfort Level by Weekly Miles**

The chart shows the average comfort level by weekly miles, with color-coded bars for different mileage ranges.
Results

AGE

<table>
<thead>
<tr>
<th>Age</th>
<th>18 - 22</th>
<th>23 - 28</th>
<th>29 - 35</th>
<th>36 - 45</th>
<th>45 - 60</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average CL</td>
<td>3.41</td>
<td>3.3</td>
<td>3.28</td>
<td>3.37</td>
<td>3.24</td>
</tr>
</tbody>
</table>
Results

CAR TO CURB

Car to Curb Comfort Level

Bike to Curb Comfort Level

Bike to Car Comfort Level
Results

CAR TO CURB

CL is highest at Bike to Curb 3ft when car is far from curb
Results

BIKE TO CAR

CL is highest at Bike to Curb 3ft until Bike to Car is 2ft
Results

At same Bike to Car distance, CL is often lower when more total lateral distance is available to cyclist.
Further Research/Analysis

- Survey responses will be accepted until July 30; more in depth analysis will occur after the submission period
- Determine relationship between car to curb, bike to curb, and bike to car
- More data collection considering various roadway characteristics
Thank You!

- NEXTRANS
- Advisor: Professor Benekohal
- Graduate Mentors: Hani Ramezani, Juan Medina