Operational and Safety Impacts for Bicyclists Using Roadways with On-Street Parking

Research performed for
- The Texas Department of Transportation

By
- Center for Transportation Research,
  - The University of Texas
Operational and Safety Impacts for Bicyclists Using Roadways with On-Street Parking

- Maria Burke (PC)
- Paul Douglas
- Paul Moon
- Carol Nixon
- Teri Kaplan (PD)
- Charles Gaskin
- Robert Musselman
- Darcie Schipuil
- Kenneth Zigrang

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City of Chicago Bicycle Design Guide’s Standard Road Striping for a Bike Lane on 44’ Wide Street

Note: This example should not be construed as a TxDOT recommended or approved design for roadways with bicycle facilities and on-street parking.
Examples of (a) bike-in-house marking and (b) bike-and-chevron marking
Operational Field Studies

- Twenty-five Sites
  - Austin: 9
  - Houston: 8
  - San Antonio: 8
- Paid Bicycle Riders
  - 29 males, 10 females,
    - ages 19 to 64.
- Video data capture
A passing event with a motorist, bicyclist and parked motor vehicle (passing event)
Only a bicyclist passing a parked motor vehicle (non-passing event)
Only a motorist passing a parked vehicle (non-passing event)
Only the bicyclist 40 ft in front of the parked motor vehicle (non-passing event)
A passing event with a motorist and bicyclist 40 ft in front of the parked motor vehicle (passing event)
Passing motor vehicle avoids confrontation with bicyclist ("yes" or "no" recorded)
Bicyclist avoids confrontation with motorist ("yes" or "no" recorded)
Operating space of a cyclist

3.4 ft
2.5 ft
1.25 ft
1.7 ft
Bike Lane vs. Wide Outside Lane

Bike Lane vs. Wide Outside Lane

Parkfield North
Motor Vehicle ENC: 41%

Cincinnati
Motor Vehicle ENC: 0%

Distance (ft)
Bicycle Lane vs. Parking in an Outside Lane

**Georgian**
Motor Vehicle ENC: 29%

**Alamo**
Motor Vehicle ENC: 24%
Wide Outside Lane vs. Parking in a Bike Lane

Guadalupe
Motor Vehicle ENC: 53%

Timber Path
Motor Vehicle ENC: 42%
Bike Lane vs. Bike Lane and Buffer

Bike Lane vs. Bike Lane and Buffer (Same Total Lane Width)

- **Parkfield North**
  - Motor Vehicle ENC: 16%
  - LPB: Blue Line
  - LPM: Red Line

- **San Jacinto**
  - Motor Vehicle ENC: 33%
  - LPB: Blue Line
  - LPM: Red Line

**Distance (ft)**

0  1  2  3  4  5  6  7  8  9  10  11  12  13  14  15  16  17  18  19  20

**Door Zone**

**Bicycle Lane**

**Bicycle Lane Buffer**

**Motor Vehicle Lane**

**CL**

VCTR
Bike Lane with Varying Total Roadway Width

Bike Lane- Changing Total Roadway Width

Georgian
Motor Vehicle ENC: 57%

30th Street
Motor Vehicle ENC: 18%
Wide Outside Lane with Varying Roadway Width

Wide Outside Lane with Varying Total Lane Width

Meadow Glen
ENC: 59%
6.5 to 9.3: 1.2 to 1

Cincinnati
ENC: 64%
6.4 to 9.3: 0.9

PMV Door Zone

Distance (ft)

Motor Vehicle Lane

Wide Outside Lane

LPB
LPM
1) Motorist and cyclist behavior is significantly different in the presence of on-street parking.

2) Operationally, marked bicycle lanes are superior to wide outside lanes (without marking).

3) Total roadway width is critical to safety and operations for both cyclists and motorists.

4) Where parking is allowed, a bicycle lane with a buffer space is the only way to ensure that cyclists are removed from the door zone of parked vehicles.
5) The new information has been incorporated into a revised edition of the *Texas Guide for Planned and Retrofit Bike Facilities* and associated Excel Workbook.
Distribution of Commute Distance for Commuter Bicyclists

<table>
<thead>
<tr>
<th>Distance Range</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 miles or less</td>
<td>22%</td>
</tr>
<tr>
<td>2.01 to 5 miles</td>
<td>30%</td>
</tr>
<tr>
<td>5.01 to 7 miles</td>
<td>10%</td>
</tr>
<tr>
<td>7.01 to 10 miles</td>
<td>16%</td>
</tr>
<tr>
<td>10.01 to 15 miles</td>
<td>14%</td>
</tr>
<tr>
<td>15.01 to 25 miles</td>
<td>7%</td>
</tr>
<tr>
<td>More than 25 miles</td>
<td>1%</td>
</tr>
</tbody>
</table>
Work Start Time Distribution of Commuter Bicyclists

- Before 6 AM: 1%
- Between 7 - 7:59 AM: 5%
- Between 8 - 8:59 AM: 15%
- Between 9 - 9:59 AM: 38%
- Between 10 - 10:59 AM: 27%
- Beyond 11 AM: 14%
Work End Time Distribution of Commuter Bicyclists

Before 3 PM - 21%
Between 3 - 3:59 PM - 5%
Between 4 - 4:59 PM - 13%
Between 5 - 5:59 PM - 33%
Between 6 - 6:59 PM - 16%
Between 7 - 7:59 PM - 6%
Beyond 8 PM - 6%
Age Distribution of Respondents

- Greater than 65 years: 2%
- 18 - 24 years: 9%
- 25 - 34 years: 23%
- 35 - 44 years: 30%
- 45 - 64 years: 36%
Distribution of Highest Level Education

- High school or lower: 4%
- Associate Degree/Some college: 21%
- Bachelors Degree: 42%
- Graduate Degree or higher: 33%
Residential Location of Survey Respondents

- Austin: 49%
- San Antonio: 12%
- Houston: 17%
- Dallas-Fort Worth-Arlington: 6%
- Others: 16%
Distribution of Auto Ownership

- 0%: 2%
- 1: 25%
- 2: 50%
- 3: 17%
- 4 or more: 6%
Distribution of Bicycle Ownership

- 12%
- 20%
- 68%
- 0%
- 10%
- 20%
- 30%
- 40%
- 50%
- 60%
- 70%
- 80%

1 2 3 or more
Distribution of Household Size

- 1 person: 19%
- 2 people: 40%
- 3 people: 18%
- 4 or more: 23%
Distribution of Number of Children in Bicyclists' Households

- 71% have 0 children
- 13% have 1 child
- 12% have 2 children
- 4% have 3 or more children