MEMPHIS MPO BICYCLE AND PEDESTRIAN COUNTER PROGRAM

CONDUCTING BIKE AND PEDESTRIANS COUNTS, TO PLAN FOR THEM

TDOT MPO CONFERENCE

June 7, 2017
Memphis, TN
How We Got Started?

- 2014 - Mid-South Household Travel Survey
  Bicycle-Pedestrian Data Collection
  Survey - 1,172 completed
  Counts - Conducted at 40 locations across the region

Survey Question: Factors that would encourage you to bike more:

Better maintenance of bicycle routes 7.0%
More nearby locations to bicycle to (shopping, entertainment, daycare, etc.) 9.6%
More off-street paths 14.1%
Transit service improvements (e.g., more routes or more frequent buses) 1.4%
Safer ways to cross freeways, major intersections, rivers (on bridges), etc. 6.1%
More protected bicycle lanes with buffers 14.4%
Bicycle safety classes or other safety education 0.9%
Enhanced surroundings of bicycle routes such as more separation from road; better lighting; more signs; maps of bicycle routes; or better scenery 3.8%
Wider shoulders or outside lanes on roadways 2.8%
Better connectivity, including linkages between bicycle routes and no abrupt endings to bikeways 3.5%
More dedicated bicycle lanes 7.2%
Educating the driving public about driving safely around bicyclists 5.3%
Installing showers/lockers at work 1.5%
Reduced motor vehicle speeds or volumes 0.7%
More or improved bicycle parking at key destinations 1.2%
Stronger enforcement of motor vehicle violations 2.9%
More support for bicycling from people that I associate with 0.6%
Access to bicycles, such as with a bicycle sharing program 1.0%
High gas or parking prices 1.2%
None - I don’t enjoy bicycling 3.2%
None - My health prevents me from bicycling 1.2%
None - I almost always need my car (for my job, carrying passengers, or other tasks) 5.3%
Count Locations:
Across the Region: 40

Broad Range of Locations:
Existing Facilities
Current TIP Projects
Corridors in BPP
Multiple Jurisdictions
Mix Land Use Types
Bike/Ped Traffic

Collection Summary:
Time of Year: April
Weather improved for outdoor activity

Time of Day: 12 Hour Period: 7 am - 7 pm
FHWA Pilot Program

2015 - 1 of 10 MPO's selected Bicycle/Pedestrian Automated Count Pilot Program
No Formal Bicycle and Pedestrian Count Program in Place
$20,000 Grant from FHWA to Purchase Counters ($5,000 local match)
Range of Technology For Pedestrians

1. Video Detection: Camera Detection
   Video Technology installed at an intersection
   Configure zones to detect between different sized objects and
   avoids zones were pedestrian are unlikely to be
   Data retrieved manually or uploaded automatically via Wi-Fi

2. Passive Infrared Counters
   Detect changes in energy (i.e. temperature, heat)
   Multi-Purpose systems that can be used pedestrians or
   bicyclists (cannot distinguish between people using the two
   modes)

8 out of 10 MPOs for
Pilot Program selected
the passive infrared
counter

Eco-Counters or TRAFx
Manufacturers

Video Detection

GRIDS

Video Detection
Passive Infrared

TAKING PEDESTRIAN COUNTS

- Detect pedestrians and cyclists by infrared radiation heated pattern
- Passive infrared sensor placed on one side of the facility
- Widely used and tested
- The devices are deployed horizontally (causes challenges with groups of pedestrians)

Advantages
- Movable and easy to install
- Can be used with a bicycle only count technology
- Battery Powered
- May store data onsite or wirelessly

Drawbacks
- Cannot be used in mixed vehicle locations
- Are prone to error due to changes in background (sun reflection)
Passive Infrared Counters

Configure:
Prior to Installation (Docking Station)
Install:
Mount on Light Pole, Tree, etc.
Position Direction across Sidewalk
Collect/Analyze:
Data though Software Program (TRAFx)

TRAFx Software

HOURS OF THE DAY  DAYS OF THE WEEK
Bicycle Counter Technology
Range of Technology For Bicyclists

1. Micro-Radar Sensors
   - Pavement embedded bicycle counters for bicycle lanes
   - Detects bicycle through the disruption of an electromagnetic field
   - Flexibility to be portable or permanently installed
   - Loops are capable of distinguishing bicyclists from vehicles
   - Data is retrieved on-site or at a remote, centralized location

2. Pneumatic Tubes
   - Two rubber tubes stretched across the right-of-way
   - Pulses of air pass through to a detector which detects the vehicle axle and classifies the type
   - Captures direction

1 MPO selected Microradar sensors and 8 MPOs selected Pneumatic tubes

JAMAR Technologies, Eco-Counters, and Senys Networks
Pneumatic Counters

- Two rubber tubes are stretched across the ROW and record when bicycles pass
- Bicycle or other vehicles pass over the tubes, pulses of air pass through to a detector which deducts the vehicles axle spacing

Advantages:
- More familiar technology, portable, easy to install

Drawbacks:
Wear and tear, periodic field visits (check tape), tape or tubing will deteriorate under high bicycle or vehicular traffic; on-site data downloading.

Best Installation:
- Paved Surface and above freezing weather

Count Duration:
- One day to several months
PNEUMATIC COUNTERS

- CONFIGURE:
  - Set-up Prior to Installation

- INSTALL:
  - Tubes (40-60' length), 2' Apart
  - Chain, Locks, Tape
  - Mid-Week Check

- COLLECT/ANALYZE DATA
Test Period
(Infrared & Pneumatic Counters)
### Selection of Locations

<table>
<thead>
<tr>
<th>Location #</th>
<th>Location</th>
<th>Pedestrian Count</th>
<th>Bicycle Count</th>
<th>Jurisdiction</th>
<th>Count Combined</th>
<th>Ranking</th>
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<td>26</td>
<td>SF Greenline/Multins Station Rd</td>
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<td>72</td>
<td>Memphis</td>
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<td>27</td>
<td>Humphreys Blvd/Shady Grove Rd</td>
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<td>52</td>
<td>6</td>
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<td>34</td>
<td>11</td>
<td>Millington</td>
<td>45</td>
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<td>34</td>
<td>Main St/GE Patterson Ave</td>
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<td>23</td>
<td>Memphis</td>
<td>557</td>
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<tr>
<td>35</td>
<td>Riverside Dr/ South of Beale St</td>
<td>770</td>
<td>37</td>
<td>Memphis</td>
<td>807</td>
<td>3 (previou)</td>
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<td>36</td>
<td>Main St/Adams Ave</td>
<td>2280</td>
<td>87</td>
<td>Memphis</td>
<td>2367</td>
<td>1 (City Hall)</td>
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<td>37</td>
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<td>169</td>
<td>27</td>
<td>Memphis</td>
<td>196</td>
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<td><strong>Total</strong></td>
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<td>9005</td>
<td>1124</td>
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<td>10129</td>
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<td><strong>Average</strong></td>
<td></td>
<td>225.1</td>
<td>28.1</td>
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</tbody>
</table>

**Ranking Sheet to determine high traffic counter locations**

**Proposed Counter Locations**
Selection of Locations

Counters Placed in Three Locations for One Week Testing Period

**DETERMINING COUNTER TEST LOCATIONS:**
Considered a number of factors:
- Facility type, volume, location, adjacent land uses
- Input from local stakeholders:
  - Memphis MPO Active Transportation Committee (ATAC)

Same Time of Year as Counts Done in 2014 (compare data)
Test Location: Main & Adams
HOURS OF THE DAY

Infrared Counter

12:00 PM

Hourly Averages

Hours of the Day
DAYS OF THE WEEK

Infrared Counter

<table>
<thead>
<tr>
<th>Days of the Week</th>
<th>Daily Averages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mon</td>
<td>975</td>
</tr>
<tr>
<td>Tue</td>
<td>825</td>
</tr>
<tr>
<td>Wed</td>
<td>725</td>
</tr>
<tr>
<td>Thu</td>
<td>1,300</td>
</tr>
<tr>
<td>Fri</td>
<td>875</td>
</tr>
<tr>
<td>Sat</td>
<td>425</td>
</tr>
<tr>
<td>Sun</td>
<td>575</td>
</tr>
</tbody>
</table>
Summary for Pedestrians
Main Street and Adams Avenue

Avg. Daily Traffic: 785

- Busiest Day of the Week: Thursday (1,243 Counts)
- Slowest Day of the Week: Saturday
- Busiest Time of Day: 12:00 PM
- Daily Average: 785
- Min: 441 (Saturday)
- Max: 1,243 (Thursday)
BICYCLE COUNTS
Main Street and Adams Avenue

Busiest Day of the Week: Thursday
Slowest Day of the Week: Wednesday
Busiest Time of Day: 11:00 AM
Summary of Data
Three Count Locations
# Summary of Data (2017 Counts)

<table>
<thead>
<tr>
<th>Locations</th>
<th>Main/Adams</th>
<th>Dunlap/ Jefferson</th>
<th>Humphreys/ Shady Grove</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pedestrian</td>
<td></td>
<td>Pedestrian</td>
<td>Pedestrian</td>
</tr>
<tr>
<td>Bicycles</td>
<td>158</td>
<td>1408</td>
<td>218</td>
</tr>
<tr>
<td><strong>Total Counts</strong></td>
<td>5,496</td>
<td>653</td>
<td>177</td>
</tr>
<tr>
<td>Busiest Day</td>
<td>Thursday</td>
<td>Wednesday</td>
<td>Sunday</td>
</tr>
<tr>
<td>Slowest Day of the Week</td>
<td>Saturday</td>
<td>Saturday</td>
<td>Saturday</td>
</tr>
<tr>
<td>Busiest Time of Day</td>
<td>12:00 PM</td>
<td>9:00 AM</td>
<td>9:00 AM</td>
</tr>
<tr>
<td></td>
<td>11:00 AM</td>
<td>12:00 PM</td>
<td>12:00 PM</td>
</tr>
</tbody>
</table>
Comparison of Counts
## Comparison of Counts (2014/2017)

| Count Type    | Main/Adams |  | Dunlap/Jefferson |  | Humphreys/Shady Grove |  |
|---------------|------------|--------------------------|--------------------------|--------------------------|--------------------------|
| Pedestrian    | 1132       | 583          | 188        | 108        | 34         | 25         |
| Bicycle       | 23         | 9            | 3          | 138        | 11         | 11         |

### 2014 and 2017 Count Comparison

- **Pedestrian**
  - Main/Adams: 1132
  - Dunlap/Jefferson: 188
  - Humphreys/Shady Grove: 34

- **Bicycle**
  - Main/Adams: 23
  - Dunlap/Jefferson: 3
  - Humphreys/Shady Grove: 11

**Note:** Compared 2014 count to 2017 count on the same day of week and same 12-hour period.
Lessons Learned
Scheduling
- Allow Sufficient Time and Resources (Before and After Count)
- May Need to Validate Count (Manual)

Safety
- Work in Pairs,
- Contact Law Enforcement at Busy Intersections

Working with Local Jurisdictions
- Partnerships conducting counts across the region

Organization and Documentation
- Mapping direction and location of counters
- Counter numbering system
Future Efforts

MPO Ongoing Count Program
- Member Agencies Check-Out Equipment for Use in Their Area
- MPO Serve as Repository for Count Information
- Assist with Future Bicycle and Pedestrian Planning Efforts

Federal Initiatives for Collecting Count Data
- Traffic Monitoring Analysis System
- Working on Collecting Non-Motorized Counts

Video Detection
- Potential Capability to Collect Bicycle and Pedestrian Counts at Intersections

Signal Software:
- **SmartCyle** - Differentiate Cars & Bikes
- **PedTrax** - Count Bikes/Peds Crosswalks
- **VantageLive!** - Convert Raw Data, New Software: May 2017
QUESTIONs?

- Background
- Bicycle and Pedestrian Plan
- How We Got Started

- FHWA Pilot Program
- Pedestrian Counters
- Bicycle Counters
- Test Period

- Summary of Data
- Comparison of Counts
- Lessons Learned
- Future Efforts
CONTACT US

125 N. Main Street, Suite 450

K: +1 901 576-7218
Z: +1 901 576-7216

kate.horton@memphistn.gov
zylavian.watley@memphistn.gov

www.memphismipo.org