Nonmotorized Volume Data Collection

State of the practice and Ohio efforts

Ohio Transportation Engineers Conference
October 3, 2018

Joe Fish
How many miles do bicyclists travel each year in Ohio?

How many miles do people walk each year in Ohio?
Agenda

- Why count bicyclists and pedestrians?
- Nonmotorized counting 101
- Ongoing efforts in Ohio
- Emerging trends
- Developing an Ohio count program
Why count bicyclists and pedestrians?

- Document use
- Monitor trends at individual locations
- Estimate statewide bicycle or pedestrian miles traveled
- Develop bicycle or pedestrian crash rates
- Prioritize locations for investments
- Calibrate other datasets such as MPO models or Strava data
- It’s required by law (?)
How agencies in Ohio would be most likely to use pedestrian or bicycle volume data

- To help obtain grants or funding: 193
- Tracking changes in bike/ped travel volume over time: 175
- Support economic development: 173
- Project prioritization: 170
- Safety analyses; developing risk/exposure rates: 167
- Understanding potential health benefits from...: 160
- Before/after studies: 160
- Improving maintenance & operations: 157
- Establishing performance metrics: 153
- Social equity: 147
- Developing model inputs; projecting AADNT: 135

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Example: Delaware Valley Regional Planning Commission (Philadelphia, PA)

- Part of DVRPC’s traffic monitoring group
- Counts conducted on 3-year rotating basis

Source: DVRPC. https://www.dvrpc.org/webmaps/pedbikecounts/
Example: Alameda County, CA pedestrian risk analysis

- Two intersections with same number of crashes, but very different crash risk per crossing

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Mission Boulevard</td>
<td>Torrance Avenue</td>
<td>1,169</td>
<td>60,796</td>
<td>607,964</td>
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<td>Davis Street</td>
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<td>196,410</td>
<td>1,964,102</td>
<td>1</td>
<td>5.09</td>
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<tr>
<td>International</td>
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<td>12,303</td>
<td>639,752</td>
<td>6,397,522</td>
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<td>4.69</td>
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<td>Solano Avenue</td>
<td>Masonic Avenue</td>
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<td>1,154,559</td>
<td>11,545,589</td>
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<td>1.73</td>
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<tr>
<td>Broadway</td>
<td>12th Street</td>
<td>112,896</td>
<td>5,870,590</td>
<td>58,705,888</td>
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<td>0.85</td>
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Ohio law

“The department of transportation, in order to assist in statewide strategic transportation planning, shall develop metrics that allow the comparison of data across transportation modes and that also incorporate the full spectrum of state strategic transportation goals, including motorist, bicyclist, and pedestrian counts…”

Source: Ohio Revised Code. Section 5501.08. http://codes.ohio.gov/orc/5501.08v1
National trends

- NCHRP 797: Guidebook on Pedestrian and Bicycle Volume Data Collection
- FHWA Traffic Monitoring Guide, chapter 4
- Travel Monitoring Analysis System (TMAS)
- State DOTs
  - Colorado: started count program in 2009; recently studied relationship between counts and Strava data
  - Minnesota: partnerships with University of Minnesota
  - Washington: research to develop bicycle miles traveled estimates
Nonmotorized counting 101

- Elements of a nonmotorized count program
  - Continuous counters
  - Short-duration counters
  - Factor groups
  - Data management
  - Sharing
  - Analysis and reporting

Technologies

- Manual data collection (bike/pedestrian)
- Infrared (bike/pedestrian)
- Pneumatic tubes (bike)
- Inductive loops (bike)
- Piezoelectric strips (bike)
- Piezoelectric pads (pedestrian)
- Video (bike/pedestrian)
Emerging nonmotorized volume data collection trends and challenges

- Crowdsourced data
  - Can provides age and gender info
  - Covers entire network
  - Colorado DOT study found Strava users represent between 3 and 30 percent of total use

- Integration of motorized and nonmotorized data collection

- Scooters

Source: Colorado DOT Strava Metro Analysis Summary.
Developing a nonmotorized volume data collection program in Ohio

Problem:
- Data collection not coordinated statewide; no central data repository
- No data collection standards
- Data not being used to the fullest extent for decisionmaking
- Data collection gaps due to ad hoc nature of initial program efforts

Solution:
- Document and understand existing efforts
- Develop program goals and performance measures
- Identify and implement a more strategic approach
Developing a nonmotorized volume data collection program in Ohio

**Nonmotorized Monitoring Program Evolution**

<table>
<thead>
<tr>
<th>Stage 1: Experimentation</th>
<th>Stage 2: Basic Program</th>
<th>Stage 3: Systematic Program</th>
<th>Stage 4: Fully Institutionalized</th>
</tr>
</thead>
<tbody>
<tr>
<td>• One location or series of location</td>
<td>• Basic reporting</td>
<td>• Consistent analysis &amp; reporting</td>
<td>• Routine, widespread data collection</td>
</tr>
<tr>
<td>• Trial and Error</td>
<td>• Benchmarking and basic analysis</td>
<td>• Data quality procedures in place</td>
<td>• Bicycle and/or pedestrian miles traveled estimates</td>
</tr>
<tr>
<td>• No clear program in place</td>
<td>• Part of staff duties</td>
<td>• Clear maintenance and expansion strategy</td>
<td>• No U.S. agencies at this stage.</td>
</tr>
<tr>
<td>• Most DOTs in this stage</td>
<td>• 5-10 DOTs in this stage</td>
<td>• Some DOTs on cusp of this stage.</td>
<td></td>
</tr>
</tbody>
</table>
Nonmotorized counting in Ohio

- Many agencies doing manual counts across the state
- Variety of agencies doing automated short-duration and permanent counts
  - Metroparks/MPO partnerships
  - Focus on infrared counts on off-street facilities
- Innovative projects combining motor vehicle and nonmotorized counts using video (NOACA)
Why some agencies currently do not collect nonmotorized volume data

- Inadequate staff time: 75
- Equipment and/or maintenance costs: 49
- Unsure on best methods: 38
- Benefits are unclear: 30
- Lack of understanding of available counting technologies: 27
- Other: 26
- No interest: 10
<table>
<thead>
<tr>
<th>Service</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Program funding</td>
<td>67%</td>
</tr>
<tr>
<td>Access to a repository for collected data</td>
<td>63%</td>
</tr>
<tr>
<td>Support for developing reports and analyzing pedestrian and bicycle trends</td>
<td>57%</td>
</tr>
<tr>
<td>Access to loaner equipment to collect data</td>
<td>54%</td>
</tr>
<tr>
<td>Training on data collection technologies</td>
<td>53%</td>
</tr>
<tr>
<td>Training on data management and count analysis</td>
<td>49%</td>
</tr>
<tr>
<td>Other</td>
<td>11%</td>
</tr>
</tbody>
</table>
Goals

- Establish a routine nonmotorized count data collection program
- Establish and implement a process for data to be consistently uploaded to a centralized database maintained by ODOT
- Develop analytical methods and processes for reporting performance measures
- Share data with stakeholders
- Institutionalize and build capacity for nonmotorized monitoring within ODOT and across Ohio
Program structure

- Roles & responsibilities for ODOT and local partners
- Data collection, management, and analysis workflow
- Performance measures
Next steps

- Develop educational materials for local agencies
- Consolidate existing count data into ODOT database (MS2)
- Outline next steps for statewide data collection and program implementation
Questions?

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