Cyclists’ speed – field observation and measurements

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Background

Note that each single cycle accident can have several causes.

Seriously injured person: >1% medical impairment

Aim

The aim of this study is to enhance the understanding of cyclists’ speeds.

Limitation: Only pedestrian and cycle paths
Material and method

Data from existing measurements: 17 sites (3 Municipalities)  
10 from Stockholm, 6 from Linköping and 1 from Eskilstuna  
Problems! Mostly collect flows. Speed aggregated by hour.

New measurements: 5 sites (2 the same as the existing)  
1 in Stockholm, 4 in Linköping  
Individual level, 1-10 days

Observation study: same sites as the new measurements  
2-4 occasions, ~1 hour
Average speed

Blue bars = Stockholm
Gren bars = Linköping
Orange bar = Eskilstuna
High pedestrian flow - lower speed

<table>
<thead>
<tr>
<th>Site</th>
<th>n</th>
<th>Bicyclists</th>
<th>Pedestrians</th>
<th>Other road users</th>
<th>Average speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site 12, n = 1,503</td>
<td>90%</td>
<td>10%</td>
<td>0%</td>
<td>19.7 km/h</td>
<td></td>
</tr>
<tr>
<td>Site 13, n = 1,439</td>
<td>94%</td>
<td>5%</td>
<td>2%</td>
<td>21.6 km/h</td>
<td></td>
</tr>
<tr>
<td>Site 14, n = 577</td>
<td>69%</td>
<td>30%</td>
<td>1%</td>
<td>17.8 km/h</td>
<td></td>
</tr>
<tr>
<td>Site 15, n = 629</td>
<td>91%</td>
<td>9%</td>
<td>0%</td>
<td>19.3 km/h</td>
<td></td>
</tr>
</tbody>
</table>
More racers /pedelecs - higher speed

<table>
<thead>
<tr>
<th>Site</th>
<th>Classic</th>
<th>Trekking</th>
<th>MTB</th>
<th>Racer</th>
<th>Pedelec</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site 12</td>
<td>73%</td>
<td></td>
<td></td>
<td>20%</td>
<td>3%</td>
<td>29%</td>
</tr>
<tr>
<td>Site 13</td>
<td>52%</td>
<td></td>
<td></td>
<td>26%</td>
<td>4%</td>
<td>4%</td>
</tr>
<tr>
<td>Site 14</td>
<td>75%</td>
<td></td>
<td></td>
<td>13%</td>
<td>5%</td>
<td>12%</td>
</tr>
<tr>
<td>Site 15</td>
<td>69%</td>
<td></td>
<td></td>
<td>22%</td>
<td>3%</td>
<td>2%</td>
</tr>
</tbody>
</table>

Average speed

- Site 12, n = 1,350: 19.7 km/h
- Site 13, n = 988: 21.6 km/h
- Site 14, n = 540: 17.8 km/h
- Site 15, n = 572: 19.3 km/h
Boxplot
Site 12 – sloping path

Gradient: 7%
Width: 3.1 m
AADT: 2,800
Site 13 – commuter route

Width: 2.9 m
AADT: 1,100
Site 14 – near city center

Width: 2.5 m (6.6 m)  
AADT: 3,400
Conclusions

• Cyclists' average speed varied between 16 - 25 km/h at the 19 sites.
• The variation depended on location and road user composition:
  • Lower average speeds: uphill slopes, close to crossings or were the pedestrian flow was high,
  • Higher average speeds: downhill slopes and commuter paths.
• Connection between average speed and the width of the distribution – the higher the average speed, the greater the speed distribution.
The connection to traffic safety?

How speed data can contribute:

• It is important to consider downhill/uphill, width and separation (including directions) when designing bicycle paths,
• we observed that the speed was relatively high at certain sites where both pedestrians and cyclists had to share space,
• what will happen with the number of cyclist who use pedelecs? If increasing, will it give higher speeds? (In Sweden the Government currently refund 25% of a purchased pedelec).
How to move on?

This study is a first step in trying to describe the distribution of cyclists' speeds.
The next step, which would require more data, is to relate the outcome of accidents to the speed distribution, and to investigate how high speeds affect the accident outcomes.

But how? Suggestions?

And also, further evaluation of measurement equipment is needed!
Thank you for your attention!

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