How to prevent slow pedestrians to get locked between barriers?
The Netherlands:

- Small, flat.
- High population density.
- Fine-grained road network.
- 3400 km railway network.
- Natural level crossings.
- High traffic density.
- High train intensity.

17 million inhabitants
20 million bicycles
26 trains/hours @LX
The Netherlands:

- Almost 2400 level crossings
  - 1900 on passenger lines (max 140 km/h)
  - 500 on low speed harbour & industrial lines

- 2017: 28 accidents, 5 fatalities
Some physical measures:

- Closing level crossings (>1200 in 40 years).
- Active crossings with barriers (>90% on public crossings).
  - Ambition: 100% in 2023.
- Short closure times.
  - ETCS will further improve this.
- Separated lanes for pedestrians and cyclists.
  - Full barriers on both sides of the tracks.

**Our improvements seem to be more than can be clarified by the physical measures since 1990.**

**The missing link could be education campaigns!**
The Dutch standard: automatic protected level crossing with half barriers.
<table>
<thead>
<tr>
<th>Period</th>
<th>&lt;20</th>
<th>20</th>
<th>30</th>
<th>40</th>
<th>50</th>
<th>60</th>
<th>70</th>
<th>80+</th>
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<td>53</td>
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<td>2008-2017</td>
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<td>47</td>
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<td>19</td>
<td>27</td>
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<td>417</td>
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<tr>
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<td>965</td>
<td>670</td>
<td>504</td>
<td>404</td>
<td>252</td>
<td>191</td>
<td>87</td>
<td>3769</td>
<td>4176</td>
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The best results for younger people, increasing percentage for older people.

Measures to discourage dangerous behaviour may introduce a new problem for all decent people.
The problem:

The full barriers discourage bad behaviour. For a crossing over 2 tracks after minimal 23 seconds the train arrives, which is sufficient for slower people. The full barriers will be closed after 17 seconds which may be a problem.

The longer the crossing distance the larger the problem.

- Complaints
- Panic
- Accidents

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<tbody>
<tr>
<td>accidents</td>
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<td>3</td>
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<td>fatalities</td>
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Video’s:
The idea:

• An additional green light which says that the level crossing will not be activated for some time.

• No obligation, no resemblance with general traffic signs.
Presentation Brenda Struve