Optimizing Large Vehicle Fleets for Urban Environments

Alexander Epstein, PhD and Jonah Chiarenza, AICP
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Report Contents

• Overview of Optimizing Large Vehicles best practices
  • Context
  • Vision Zero Large Vehicle Safety Working Group
  • Best practices: a toolkit
  • Implementation: experimenting and phasing in
Heavy Trucks & Buses Pose Unique Safety Risks

- Heavy trucks and buses are disproportionately represented in fatal crashes in the United States, despite being driven by professionals.
  - 4% of registered vehicles
  - 7% of VRU fatalities (468 in 2016)

- Even in low-speed settings, large vehicles pose particular risks to people outside the vehicle such as pedestrians and cyclists.

- Drivers of heavy vehicles involved in crashes with vulnerable road users (VRUs) often report not realizing that they had struck someone.
Opportunities for Safety Gains

• Publically owned, leased, contracted, or permitted truck fleets present an opportunity to improve safety for VRUs through:
  • Retrofits
  • Procurements
  • Future contracts
  • Supply-demand virtuous cycle

• Selecting appropriately sized and configured heavy vehicles for urban driving can help reduce VRU fatalities and injuries, in part by increasing opportunities for geometric street safety improvements.

Small investment, potentially large payoff
Brief review of final best practices
Brief review of best practices

- Vehicle safety technologies, models, and (at the time!) latest availability of pedestrian automatic emergency braking systems and direct vision
  - Box, pumper, and ladder truck deep dives
Downsizing: quick walkthrough

- Improve drivers’ situational awareness, comfort, confidence
- Improve operational and ingress/egress safety
- Leverage existing budget & procurement cycles

<table>
<thead>
<tr>
<th>A change in vehicle dimension...</th>
<th>...can mean a reduction in street/environment dimension.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wheelbase</td>
<td>Turn radius</td>
</tr>
<tr>
<td>Wheelcut</td>
<td>Turn radius</td>
</tr>
<tr>
<td>Steering axle configuration</td>
<td>Turn radius</td>
</tr>
<tr>
<td>Width</td>
<td>Lane width</td>
</tr>
<tr>
<td>Driver seat height</td>
<td>Blind spots</td>
</tr>
</tbody>
</table>
## Downsizing best practices: Fire

<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>Turn radius</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>41 ft</td>
<td>24 ft</td>
<td>29 ft</td>
<td>28 ft</td>
<td>1,500 gal/minute</td>
<td>1,500 gal/minute</td>
<td>1,500 gal/minute</td>
</tr>
<tr>
<td>Wheelbase</td>
<td>260 in.</td>
<td>190 in.</td>
<td>155 in. tractor; 305-341 in. trailer</td>
<td>201 in.</td>
<td>201 in.</td>
<td>169 in.</td>
<td>129 in.</td>
</tr>
<tr>
<td>Overall length</td>
<td>574 in.</td>
<td>393 in.</td>
<td>604-720 in.</td>
<td>504 in.</td>
<td>304 in.</td>
<td>334 in.</td>
<td>266 in.</td>
</tr>
<tr>
<td>Ladder height</td>
<td>95 ft</td>
<td>105 ft</td>
<td>100 ft</td>
<td>138 ft</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ladder reach</td>
<td>87 ft</td>
<td>91 ft</td>
<td>91 ft</td>
<td>82 ft</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Visualized ladder radi</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ground line</td>
<td>87 ft reach</td>
<td>91 ft reach</td>
<td>91 ft reach</td>
<td>82 ft reach</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Same pumping capacity, smaller turning radius*
Downsizing best practices: Straight Truck

<table>
<thead>
<tr>
<th></th>
<th>Rigid</th>
<th>Rear Steer</th>
<th>Conventional</th>
<th>Cab-over</th>
</tr>
</thead>
<tbody>
<tr>
<td>Axles</td>
<td>3-axle</td>
<td>2-axle</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max cargo body length</td>
<td>30 ft</td>
<td>25 ft</td>
<td>24 ft</td>
<td>28 ft</td>
</tr>
<tr>
<td>Overall length</td>
<td>454 in.</td>
<td>Not available</td>
<td>463 in.</td>
<td>414 in.</td>
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<tr>
<td>GVWR</td>
<td>52,000 lbs</td>
<td>52,000 lbs</td>
<td>33,000 lbs</td>
<td>33,000 lbs</td>
</tr>
<tr>
<td>Turn radius</td>
<td>40 ft</td>
<td>33 ft</td>
<td>44 ft</td>
<td>30 ft</td>
</tr>
</tbody>
</table>

Same GVWR, smaller turning radius

Same GVWR, longer cargo body, smaller turning radius
Blind Spot Comparison

71% visibility

57% visibility
Launching the Safe Fleet Transition Plan
Technology and Process Best Practices

Margo Devene and Alexander K Epstein, Ph.D.

June 2017
DOT-VTTC-DGAD-07-01

Prepared for:
Department of Citywide Administrative Services
City of New York

Safe Fleet Transition Plan
Update 2018 - 2019
Best Practice Technologies and Processes

Alexander K Epstein, Ph.D. and Rebecca Giannes

November 2018
DOT-VTTC-DGAD-10-01

Prepared for:
Department of Citywide Administrative Services
City of New York
London: Changing perceptions

‘I feel much more confident driving in the higher vision cab. I don’t want to go back to a standard tipper’

‘You just need to sit in one of the old cabs then get in the new one to realise how important this change is’

“I’d say just give it a go, it’s opened my eyes. I didn’t see how it could be improved before”

‘As a truck driver, it pains me to say this, but it’s actually pretty good’
Recap and next steps

Rightsized large vehicles can maintain or increase capability and help make a positive impact

- Decrease emergency vehicle response time and access limitations
- Increase large vehicle access across city
- Improve roadway and operator safety through reduced collisions and ingress/egress injuries

- Try before you buy
- Consider quick wins and be systematic when going “all in”
- Talk to other cities
- Check out these resources →
Thank you

Alexander Epstein, Ph.D.
(617) 494-2539
alexander.epstein@dot.gov

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