

VRU Analysis

Jessica Powell



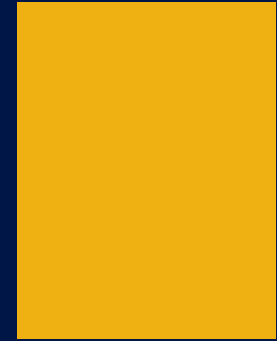
U.S. Department of Transportation
Federal Motor Carrier Safety Administration

Federal Motor Carrier Safety Administration

2023

ANALYSIS,
RESEARCH, &
TECHNOLOGY
FORUM

VIRTUAL EVENT



VRU Project Background

Vulnerable Road User (VRU) fatalities are becoming an increasing portion of the commercial motor vehicle crash problem.

- The National Highway Transportation Safety Administration (NHTSA) estimates a 58% increase in the number of non-occupants killed in large truck crashes between 2014-2020.



National Center for Statistics and Analysis, "Large trucks: 2020 data (Traffic Safety Facts, DOT HS 813 286)," National Highway Traffic Safety Administration, Washington, DC, 2022, April.

Overall Process and Methods: Two Levels

1. Literature Review

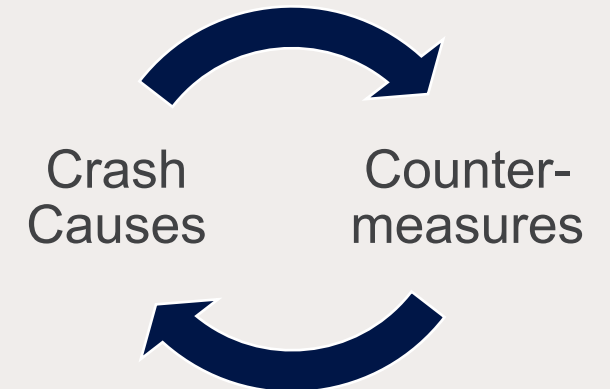
- Repository & Open Science Access Portal (rosap)



2. Database Analysis

- Fatality Analysis Reporting System (FARS)
- Motor Carrier Management Information System (MCMIS)
- Consolidated State Crash (CSC) database

3. Mapping



Level 1: Most Prevalent and Risky Crash Types

Level 2: Likely Causes and Countermeasures Specific to a Given Crash Type

Level 1: Intersection crashes are prevalent

More than 50% of the combined total of fatal and injury crashes occur at or near intersections



Level 2: Intersections

Level 2: Likely Causes and Countermeasures Specific to a Given Crash Type

Step 1



Putative Causal Factors

- Form hypothesis about one cause of VRU crash type from literature review

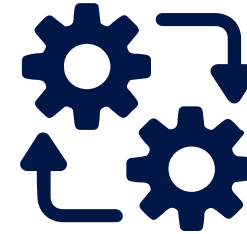
Step 2



Micro-Analysis

- Are data consistent with hypothesis?

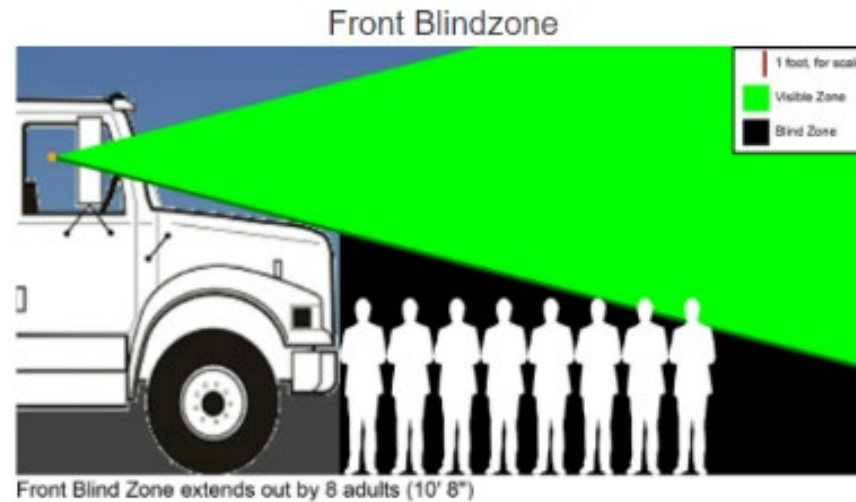
Step 3



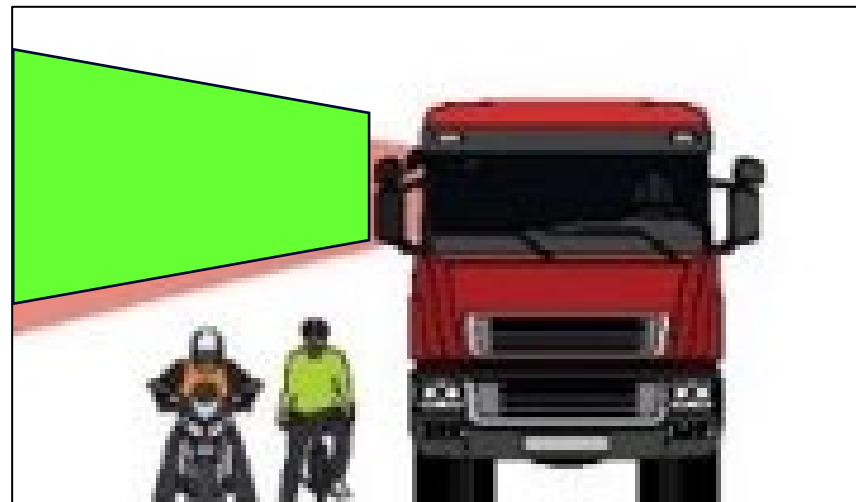
Countermeasures

- Identify potential countermeasures to apply to help reduce VRU crashes

Putative Causal Factors: Obstructions to Vision



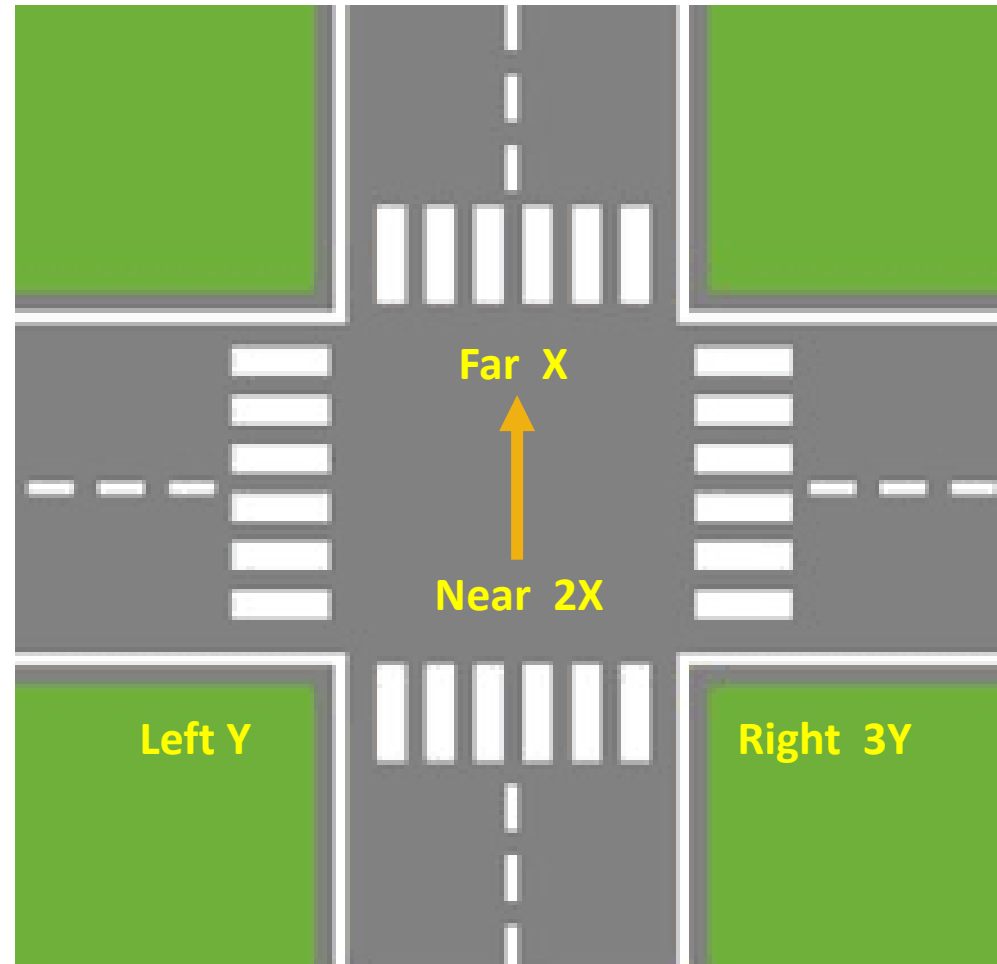
Low forward visibility – more nearside crashes



Low passenger side visibility – more nearside crashes on the right

Analysis: Obstructions to Vision

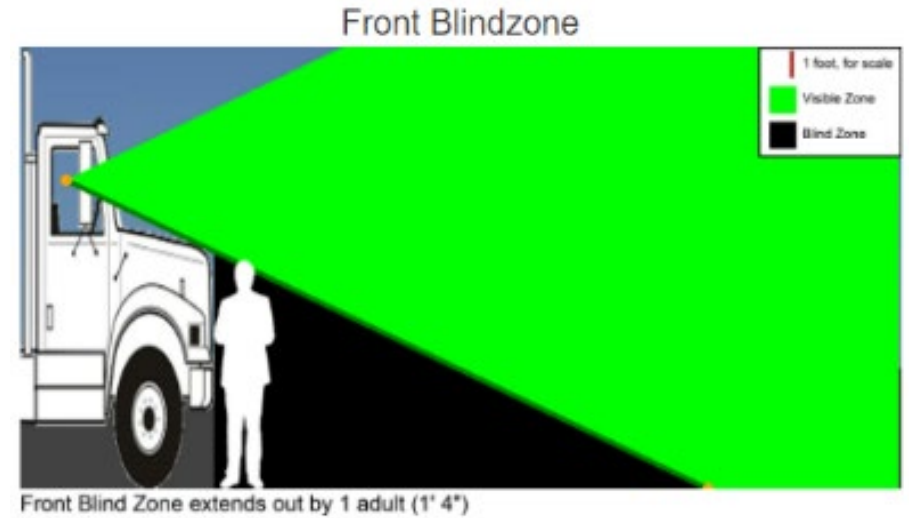
- Motorist maneuver (straight)
- Pedestrian maneuvers (right, left)
- Intersection side (near or far)



Countermeasures: High Vision Cab, Bird's Eye View Camera

Blind zones can be dramatically reduced through alternative cab designs and ADAS systems

Direct vision cab



Bird's eye view camera system



Conclusion



Contact Information

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