

An alternative estimate of the lives that could be saved by a side underride guard standard

2nd ACUP meeting

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IIHS trailer underride research



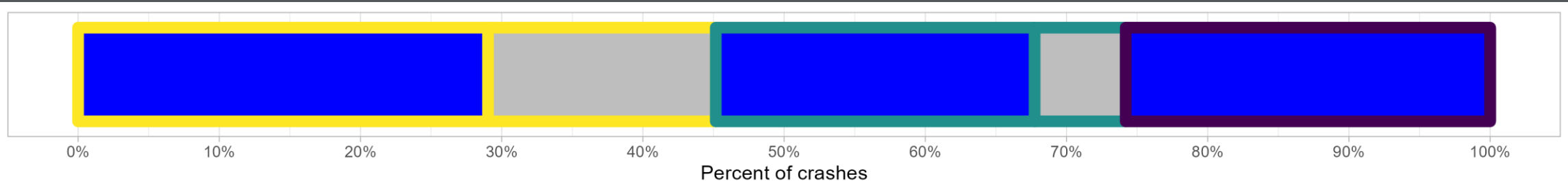
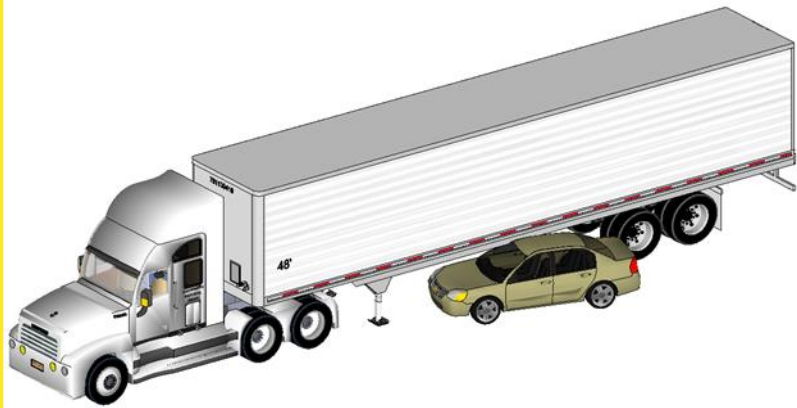
- ▶ IIHS conducted its first underride crash tests in 1976
- ▶ Since 2017 **TOUGHGUARD** award has encouraged trailer manufacturers to voluntarily improve rear underride guards



- ▶ IIHS has published multiple studies of real-world trailer underride crashes, both rear and side

2012 IIHS side underride study

- ▶ Analyzed 206 truck/trailer side impacts in NHTSA's Large Truck Crash Causation Study
- ▶ LTCCS contains detailed on-scene photographic documentation and measurements
- ▶ In 78% of cases with serious/fatal injury, side underride guards could have reduced injury severity; varying effectiveness by crash configuration



Crash configuration ■ Parallel ■ Perpendicular ■ Opposite SUG benefit ■ No ■ Yes

NHTSA's side underride guard cost benefit analysis

- ▶ NHTSA estimated 17 lives per year would be saved by SUG standard; costs would be 6-9 times benefits
- ▶ IIHS comment on NHTSA's CBA pointed out several limitations:
 - Ignored crashes involving 3+ vehicles
 - Ignored many impact types (e.g. side-to-side)
 - Ignored benefits to other road users (e.g. pedestrians, cyclists, motorcyclists)
 - Assumed trailer crashes had no underride unless police report indicated otherwise (53%)
 - Assumed no benefit of guards at 41+ mph
 - Used posted speed limits to estimate crash severity; ignored crash angles, braking

Effects of limitations

NHTSA cost benefit analysis

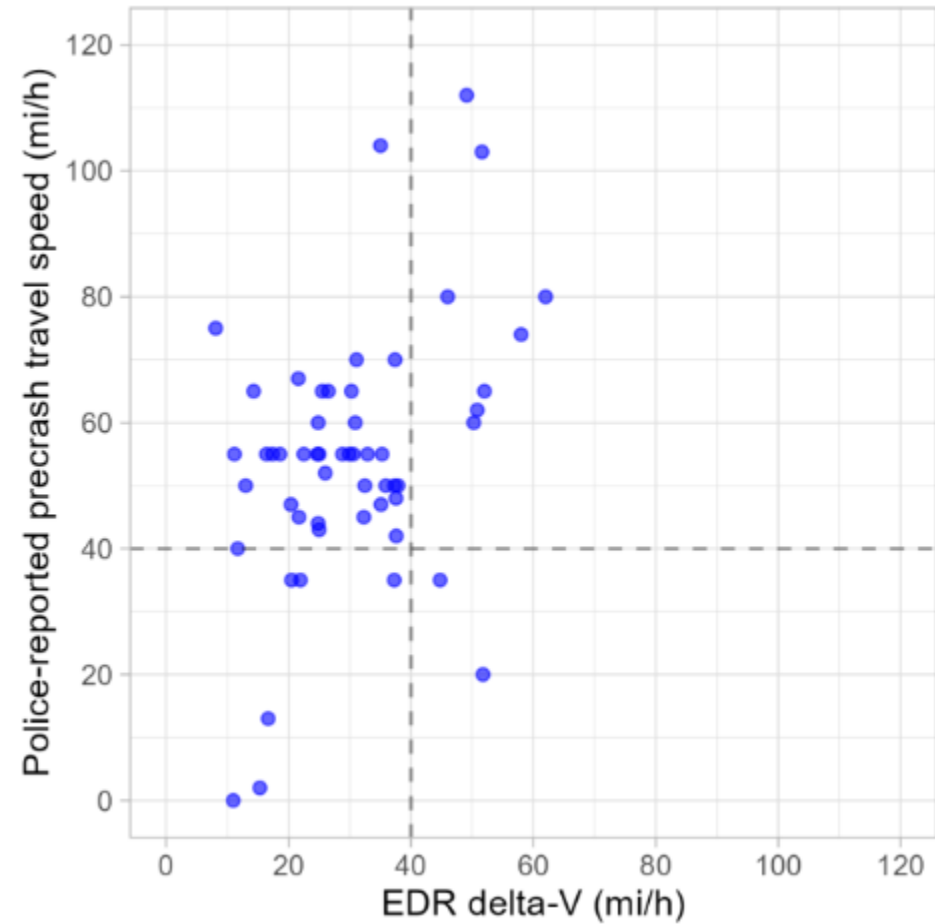
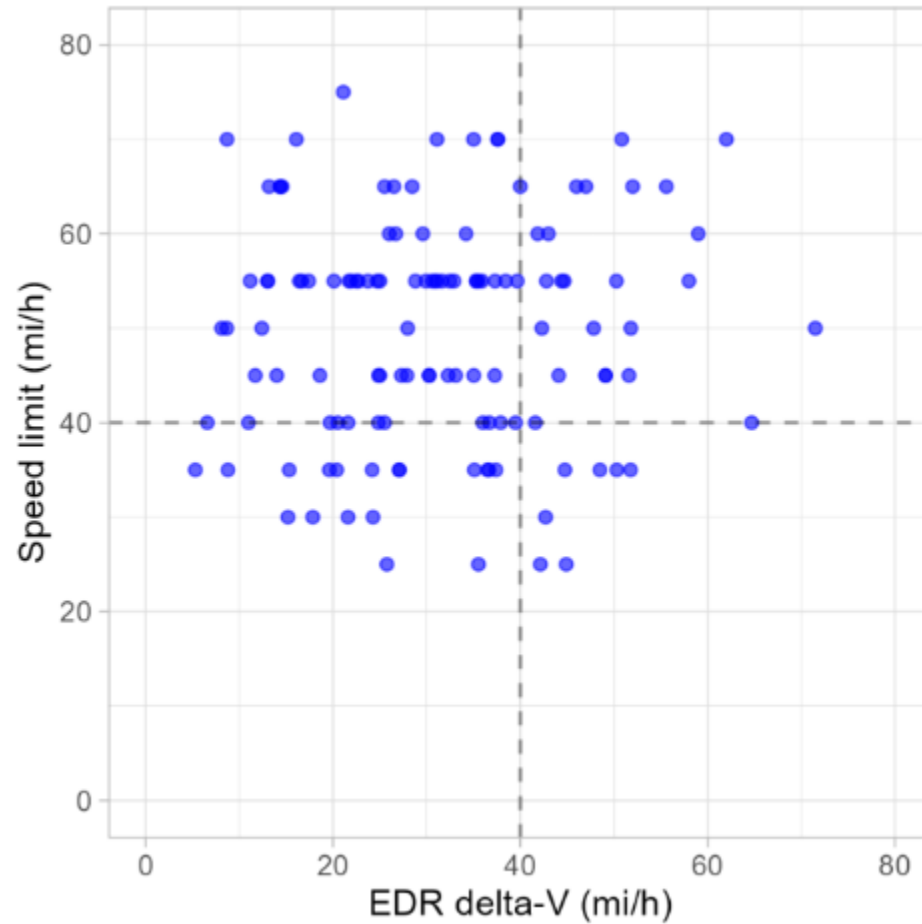
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IIHS findings

- ▶ Excludes two-thirds of relevant fatalities
- ▶ 53 pedestrians & bicyclists, 52 motorcyclists killed annually in trailer side crashes
- ▶ Photographs show 69-89% underride rate
- ▶ NHTSA has not tested any SUG designs to demonstrate a failure speed
- ▶ EDR (“black box”) data show 63% of fatal crashes involve forward velocity change <40 mph; unrelated to speed limit

EDR delta-V for FARS crashes

Speed limit and police-reported precrash speeds are poor indicators of crash severity



IIHS lives saved estimate

- ▶ 549 average annual passenger vehicle occupant fatalities in crashes involving side of tractor trailer
- ▶ 159-217 of these could be addressed by SUGs, based on LTCCS data
- ▶ This is 9-13 times NHTSA's estimate of 17 lives saved per year
- ▶ Some crashes may be too severe for SUG effectiveness, but EDR data indicate this would be minority (exact number would depend on SUG requirements in a regulation)
- ▶ Still doesn't include 105 annual pedestrian, bicyclist, motorcyclist fatalities
- ▶ In total, we estimate a SUG rule would save at least 10 times the lives estimated by NHTSA, making it "cost effective" per DOT's \$12.5 million value of a statistical life



The IIHS comment on NHTSA's ANPRM can be found here:
<https://www.regulations.gov/comment/NHTSA-2023-0012-0092>

