



Insurance Institute for Highway Safety
Highway Loss Data Institute

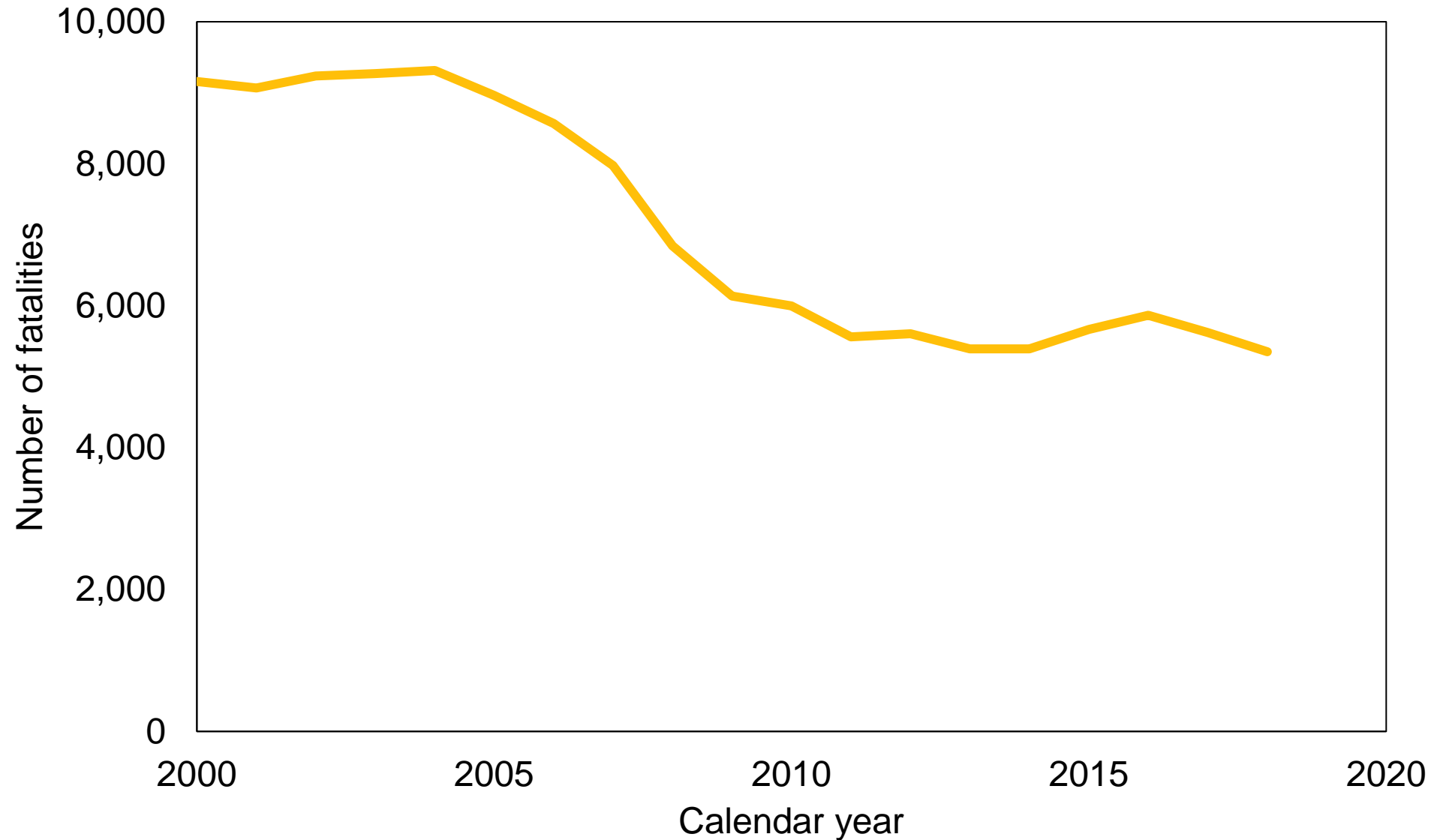
Update on IIHS Side Impact 2.0 Test

2021 SAE Government Industry Meeting

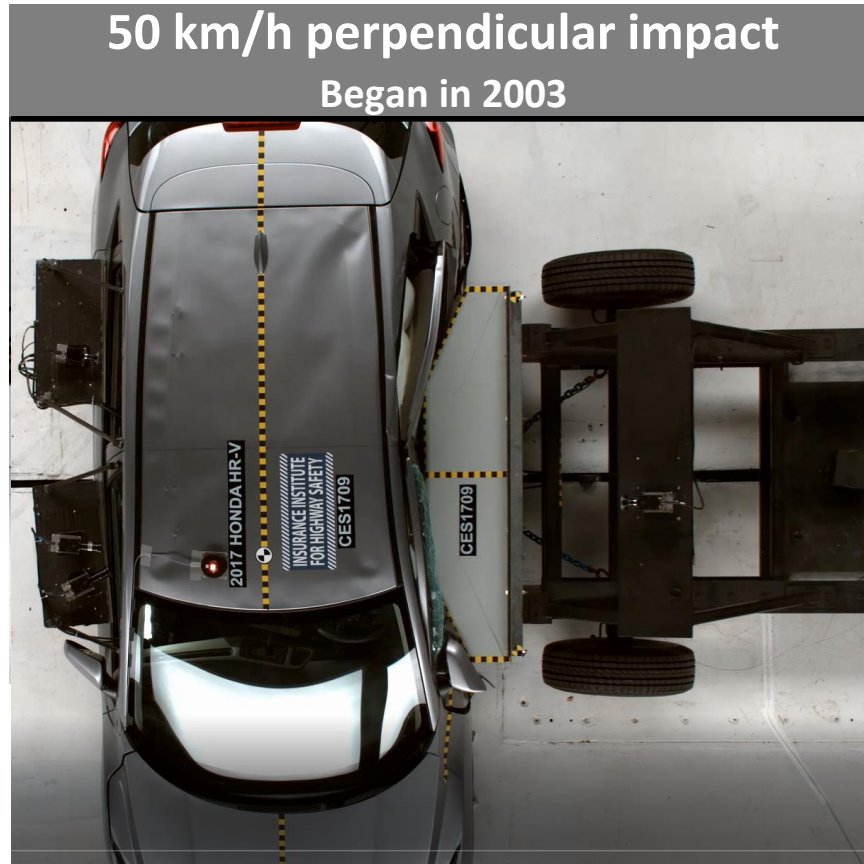
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[iihs.org](https://www.iihs.org)

Side crash fatalities in the United States



Original IIHS side impact crashworthiness test



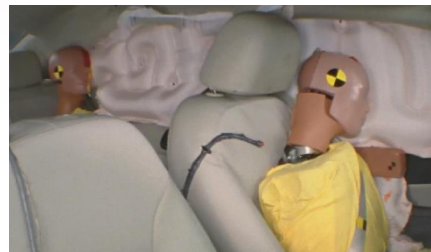
Vehicle Ratings

Good

Acceptable

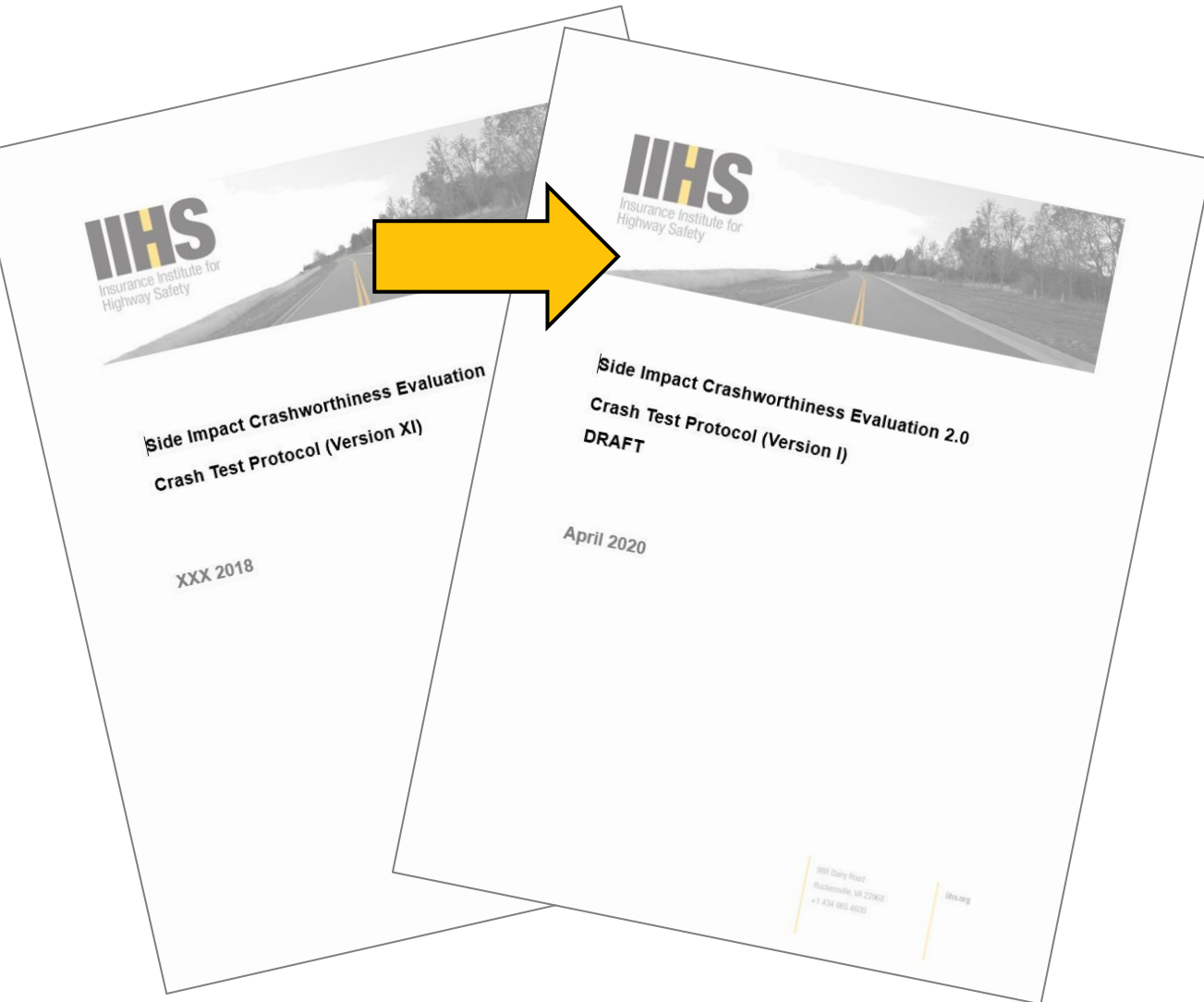
Marginal

Poor



Vehicle ratings based on dummy injury measures, restraints/dummy kinematics and structural performance

Changes from original side impact to side impact 2.0 test



Same

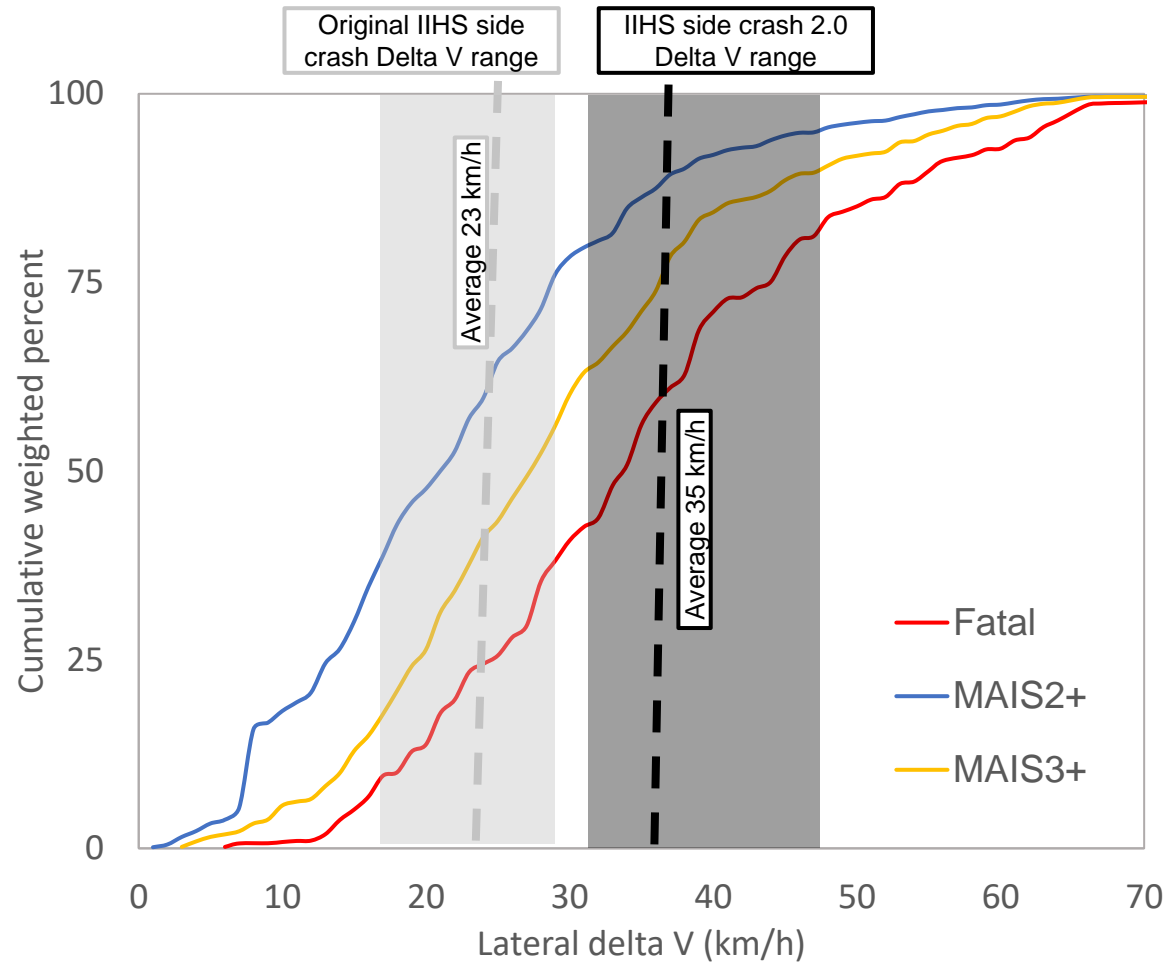
- ▶ Crash configuration
- ▶ Dummies
- ▶ Components to measure/rate

Different

- ▶ Test speed
- ▶ Barrier cart/trolley structure and weight
- ▶ Aluminum honeycomb barrier face
- ▶ Component and overall ratings

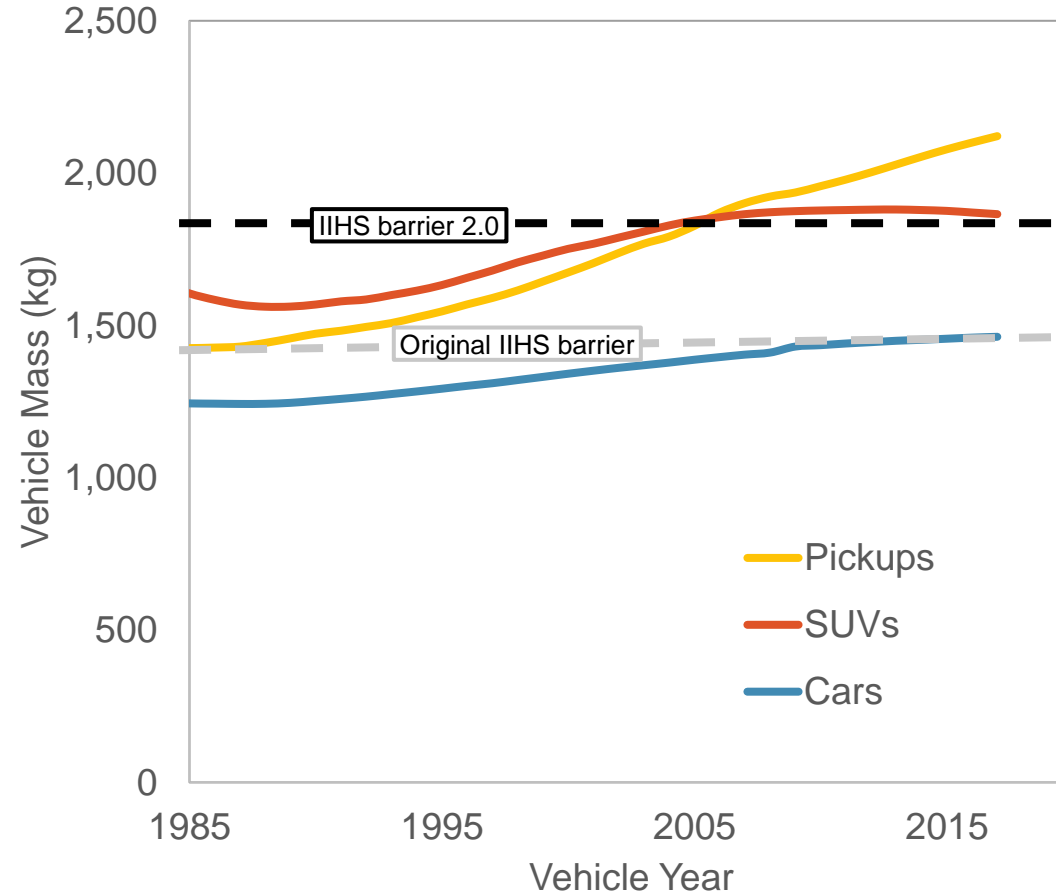
Side Impact 2.0 test conditions

Increase MDB striking speed from 50 km/h to 60 km/h

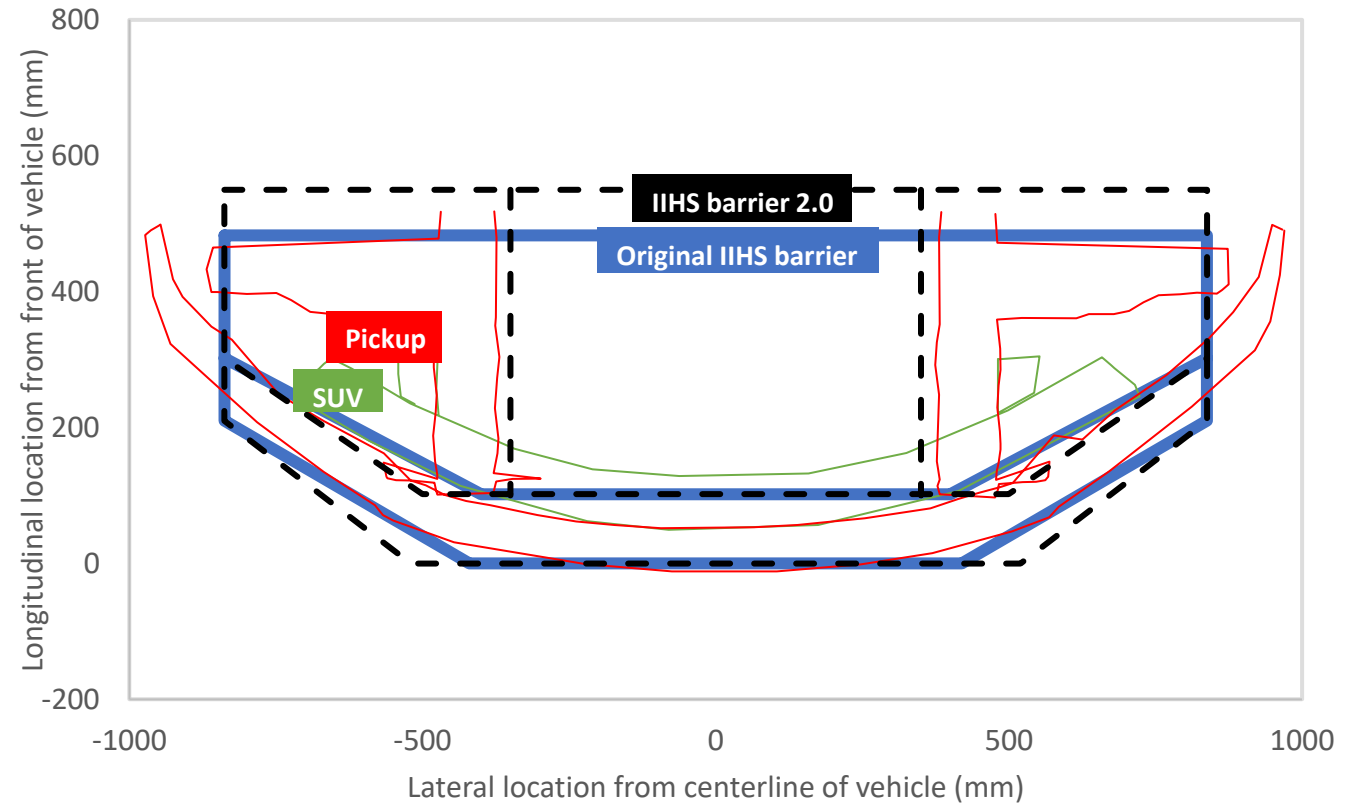
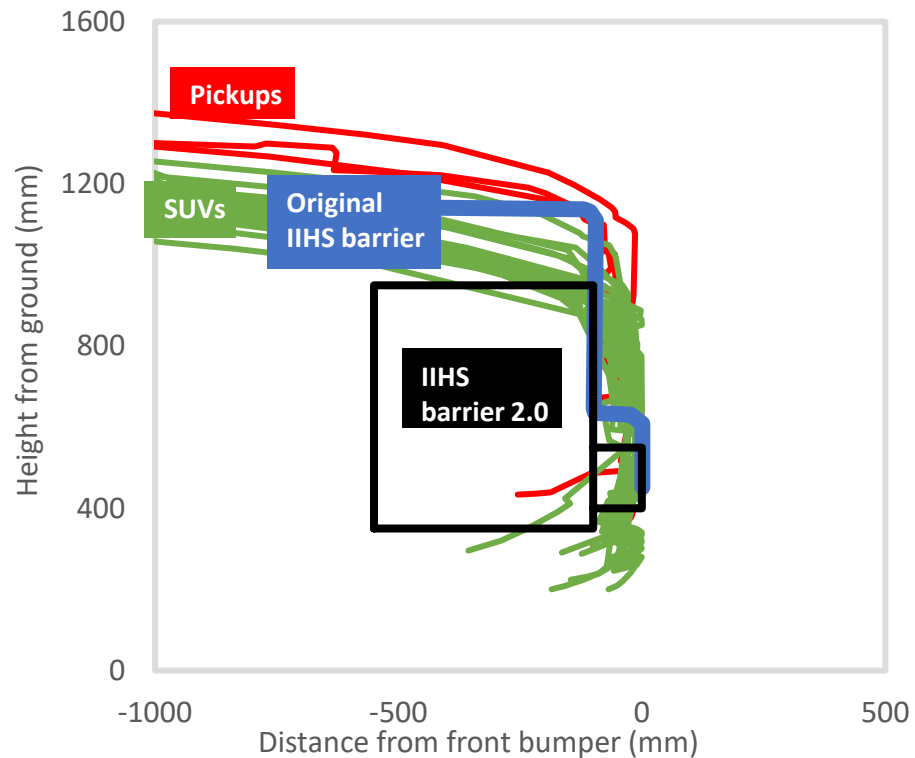


Side Impact 2.0 test conditions

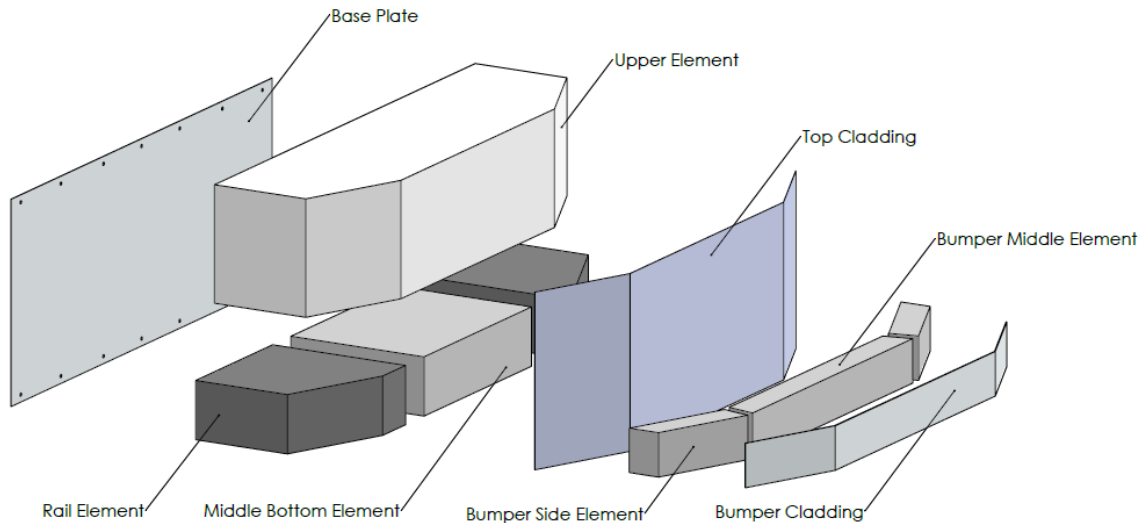
Increase MDB mass from 1,500 kg to 1,900 kg



Barrier honeycomb shape modified to reflect current SUVs and pickup geometry



IIHS Side Impact 2.0 honeycomb barrier



Changes from original barrier to barrier 2.0

- ▶ Lower overall height of deformable element
- ▶ Lower mounting of barrier (decrease ground clearance)
- ▶ Larger barrier thickness to reduce bottoming of deformable element
- ▶ Wider flat front face to match vehicle structures
- ▶ Reduced height of bumper beam element to match current vehicles
- ▶ Changes to honeycomb stiffness to reflect vehicle characteristics
- ▶ Converting all dimensions to “metric-friendly” values (ie 103 mm to 100 mm)

Five vehicles tested with IIHS barrier 2.0 configuration

Validated IIHS barrier 2.0 as representative of striking SUVs in a 60 km/h test

Kia Forte



Honda Civic



Honda Accord



Toyota Camry



VW Atlas



IIHS side impact cart properties

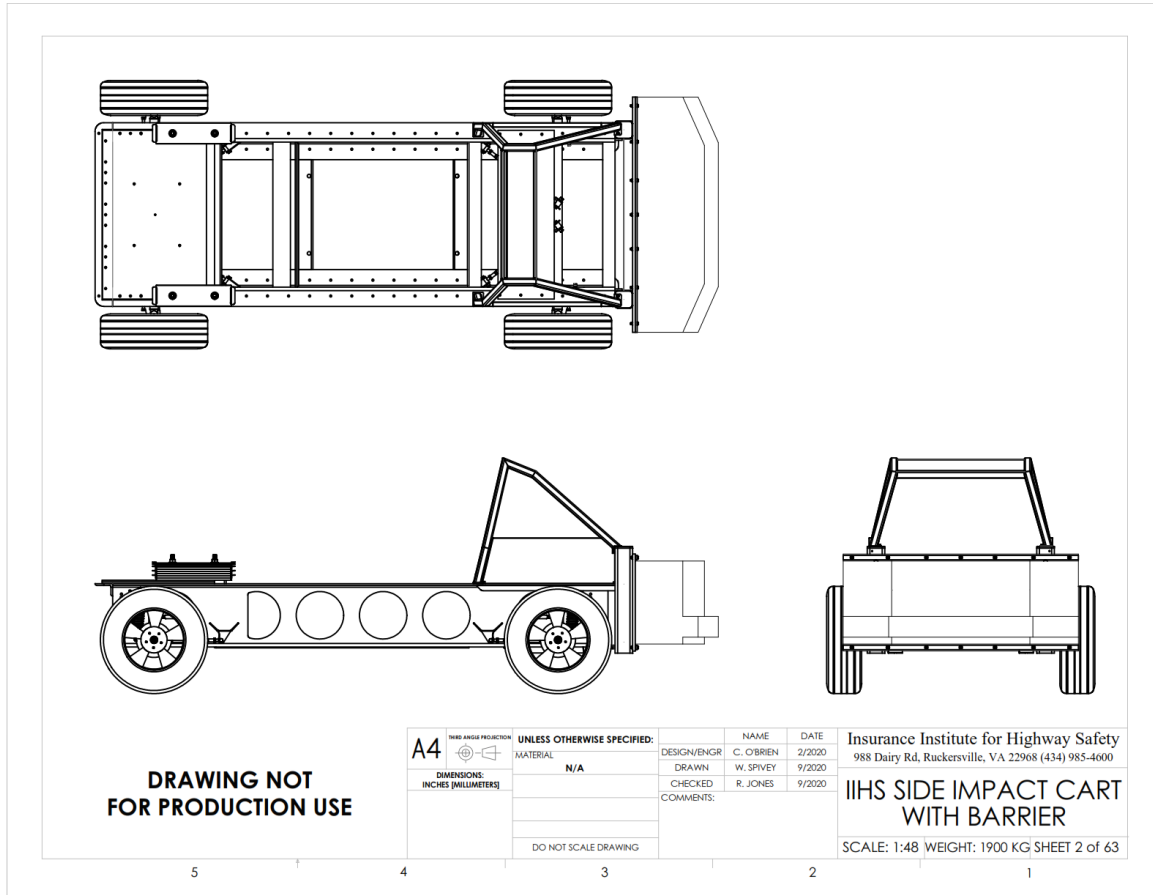
IIHS side impact cart

- ▶ 1,900 kg
- ▶ Wheelbase: 2,926 mm
- ▶ Overall Length: 4,505 mm
- ▶ Width: 1,327 mm
- ▶ Wheel size: 245/70R17
- ▶ Includes suspension

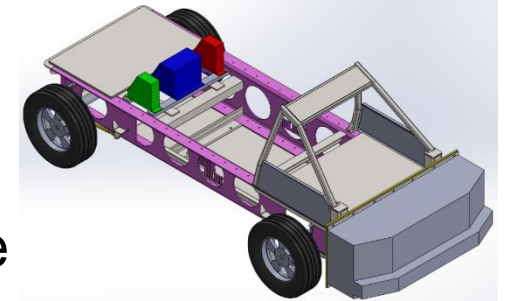


	X	Y	Z
Center of Gravity	1,236 mm	0 mm	651 mm
Moment of Inertia	581 kg-m ²	3,688 kg-m ²	4,049 kg-m ²

Side impact cart drawing package

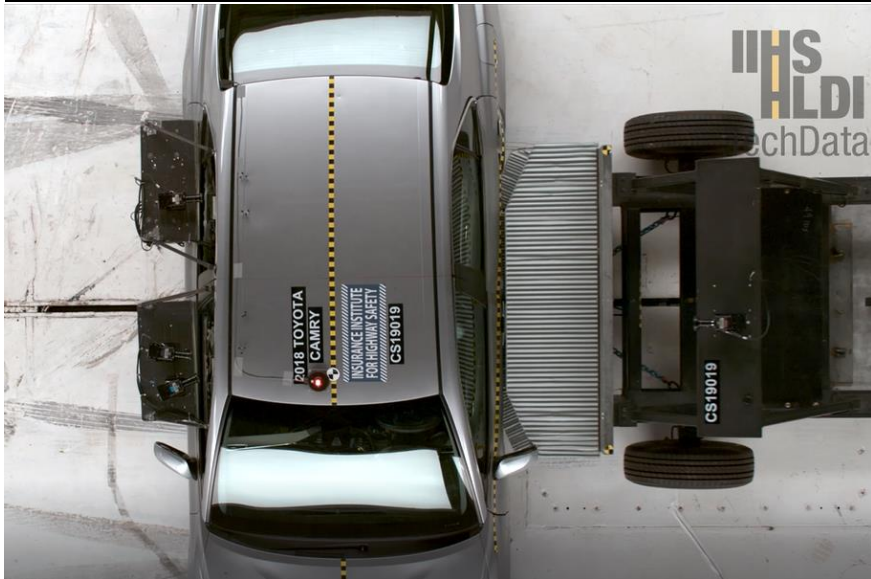


- ▶ Solid Model of cart
- ▶ Technical drawing package
- ▶ Detailed parts list
- ▶ Available on website:
<https://www.iihs.org/ratings/about-our-tests/test-protocols-and-technical-information>



IIHS side impact crashworthiness test 2.0

60 km/h perpendicular impact



1,900 kg cart w/suspension
MDB 2.0 barrier face



Vehicle Ratings

- G**ood
- A**cceptable
- M**arginal
- P**oor



Vehicle ratings based on dummy injury measures, restraints/dummy kinematics and structural performance

Inaugural Test Program

Small SUVs

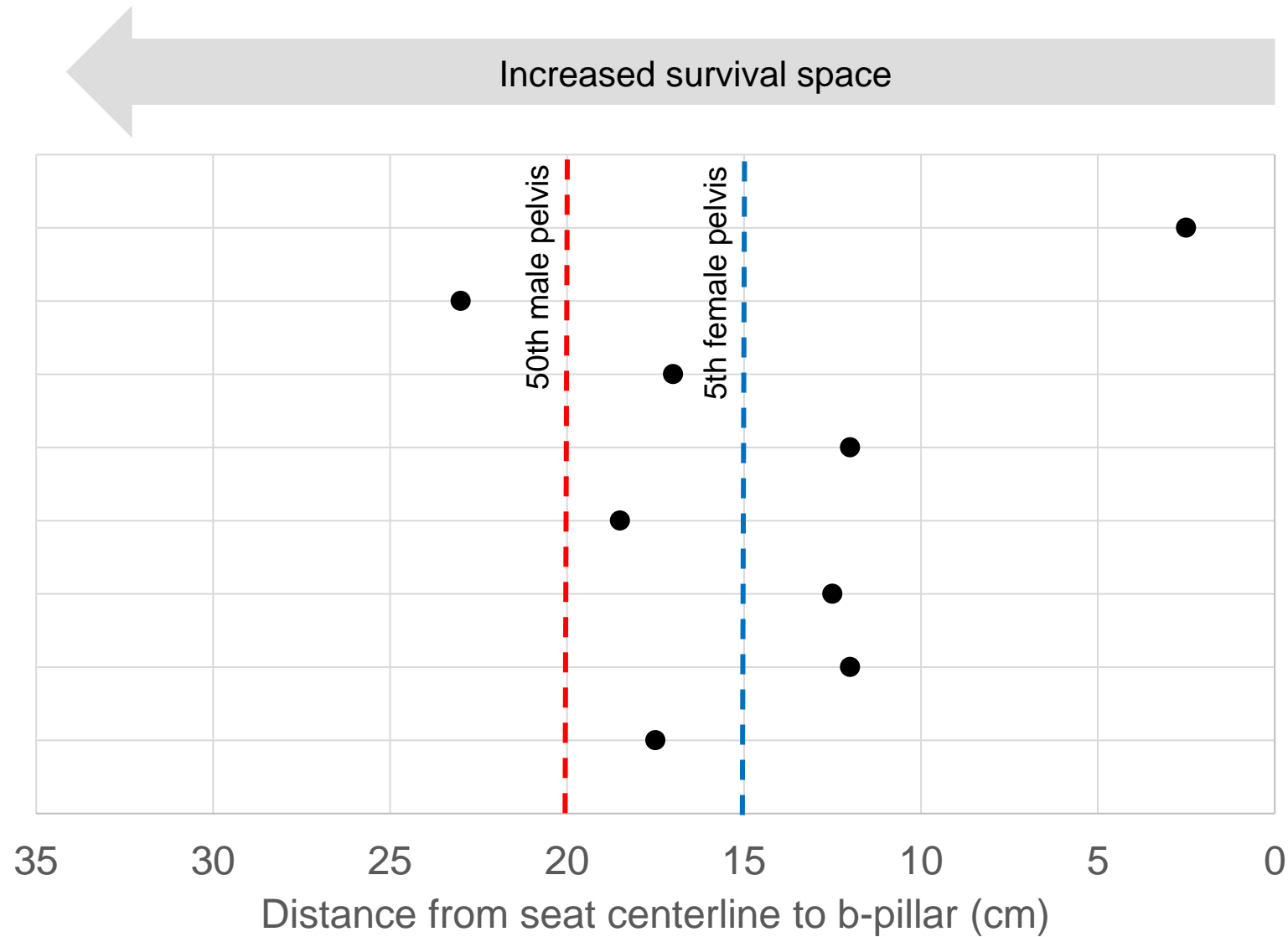
Audi Q3
Hyundai Tucson
Buick Encore
Mitsubishi Eclipse Cross
Toyota RAV-4
Volvo XC40
Mazda CX-5
Nissan Rogue
Ford Escape
Subaru Forester
Honda CR-V
Chevrolet Equinox
Jeep Compass
Honda HR-V
Jeep Renegade

8 tests conducted in 2020
Testing to be completed by March 2021



Range of structural performance

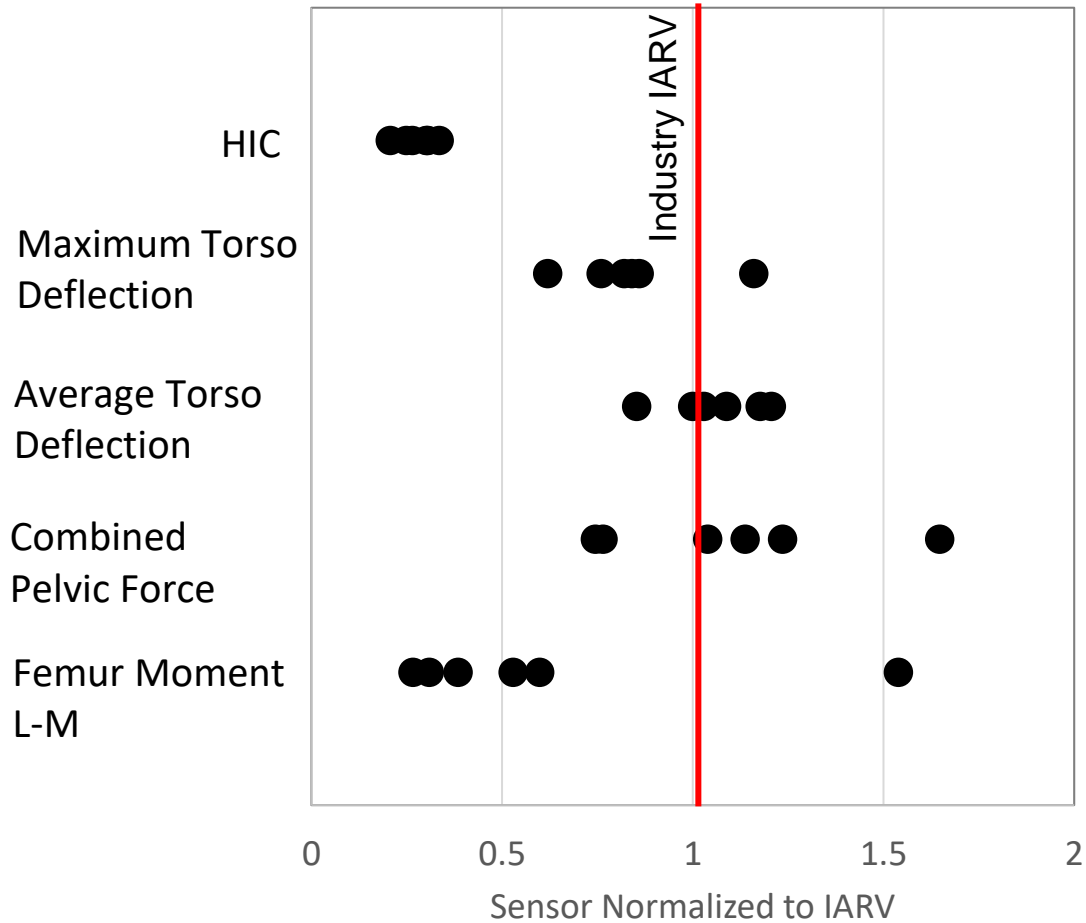
Small SUVs



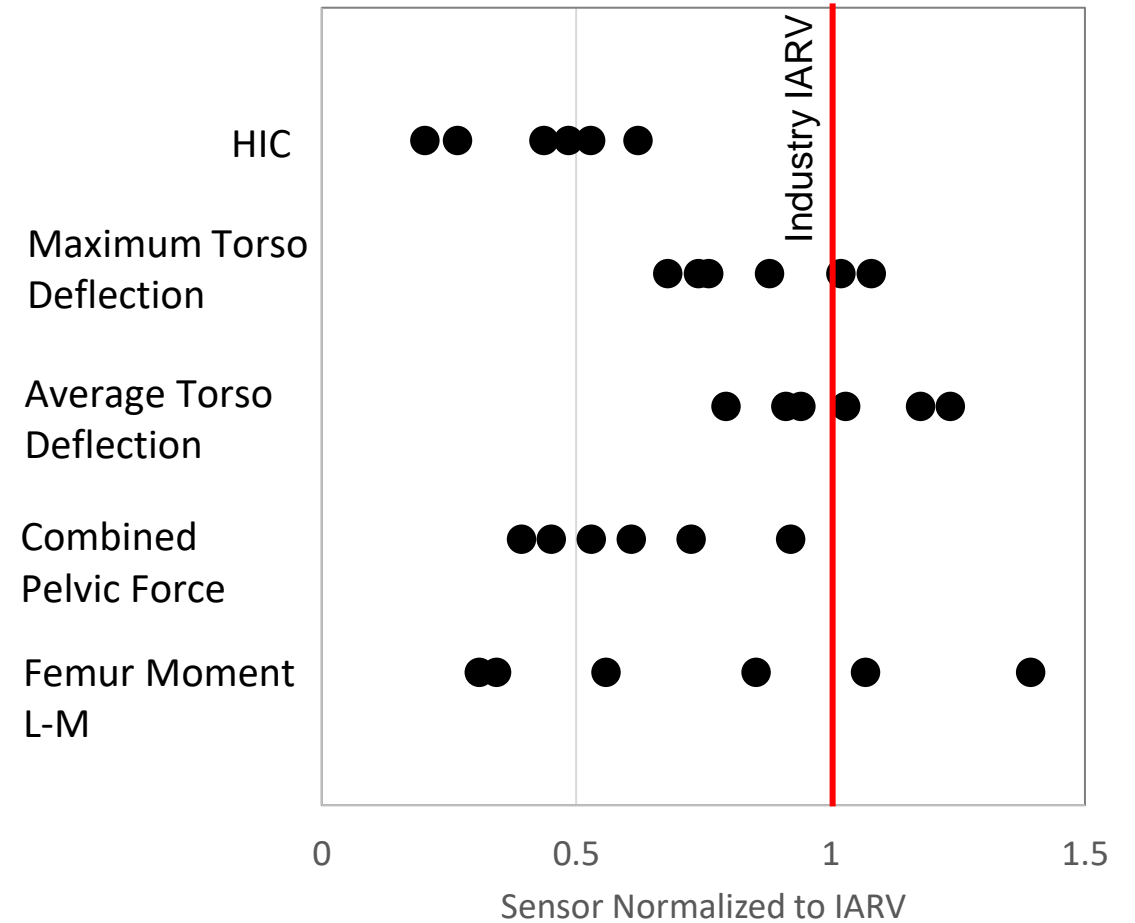
Range of peak dummy sensor measures

Selected sensors

Driver Dummy



Passenger Dummy



Timeline/Next Steps

Test protocol and barrier specifications available on website

- ▶ Q1 2021 – Completion of pilot program testing (small SUV segment)
- ▶ Q2 - 2021 – Ratings protocol following pilot program
- ▶ Side impact 2.0 to be included in TSP 2023

All updated documents can be found:

<https://www.iihs.org/ratings/about-our-tests/test-protocols-and-technical-information>

<https://www.iihs.org/ratings/about-our-tests/test-protocols-and-technical-information/crashworthiness-research-programs>



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