

G r e a t D e s i g n s i n

STEEL



The 2017 Honda Ridgeline

Steve Behm

Principal Underbody Design Engineer

2017 Honda Ridgeline Body Development Leader

Honda R&D Americas, Inc.



2017 Ridgeline



Great Designs In Steel
May 17, 2017

Ridgeline History

RIDGELINE

1st Generation: 2006 – 2014

Unibody pickup Truck

Best handling, ride & fuel economy
Innovative package, bed & tailgate



250,000 units in operation
175,000 original owners



ACCOLADES



2005 Best of What's New



2006 Grand Award



Editor's Choice

CAR AND DRIVER

"#1 Pickup"



All Star
Top 10 for 2007



Automotive Excellence
Functionality

PASSIONATE CUSTOMERS



2006, 2007, 2008
APEAL Winner

Customer Usage

RIDGELINE



Customer & Dealer Feedback

RIDGELINE

Pros

WEST	CENTRAL	MIDWEST	SOUTHEAST	NORTHEAST
• Car-like driving dynamics • Safety • Interior • Unibody construction • In-bed Trunk • High trim levels (leather, leather + navi) • Medium size luxury truck • "Home Depot" truck	• Dynamics • High trim levels • In-bed trunk • Safety • Garagability	• Driving dynamics • High quality feel, solid • In-bed trunk • Garagability • High trim levels (leather, leather + navi) • Commanding feeling	• Dynamics • In-bed Trunk • Garagability	• Dynamics • Trunk • Tailgate
+ Driving Dynamics		+ Trunk & Tailgate		+ Cabin Space

Cons

• Styling does not look like a truck • 2W (insurance, price point, FE) • Perception of a truck • Reach over height (bed sides) • Sport (only wheel & tire) • 6' bed	• Styling • More towing capacity • FE too low	• Bed scratching even light bed loading • Limited cover (expensive) • (+ 3 mpg) • Updated features • Selection is key, don't have product • 6' bed	• Styling is odd • FE does not match Honda or limited towing • Bed cover • Want lower price entry point	• Technology is old • Wheels & tires need to improve
- Styling		- Fuel Economy		- Technology

Personal

Attractive & Modern



- **Emotionally appealing:**
 - Easily recognized as a TRUCK
- **Up-to-date:**
 - Easy to Use, Tech Features, HMI

Prepared

Capable & Versatile



- **Prepared for the bulkiest of Cargo:**
 - Right Sized Bed, best utility for wide and long modules & easy loading
- **Capable**
 - 1500 lb. payload, 5000 lb. towing & off-road capability
- **Most versatile interior:**
 - 5 adult comfort plus large module capability in rear seat area

Confident

Comfortable & Secure



- **Freedom to Explore:**
 - Fun to drive, comfortable for long trips, improved driving range, class leading FE
- **Freedom to tell stories:**
 - Quiet comfortable cabin
- **Peace of mind:**
 - Most secure storage, DQR, Top Safety+
- **Makes financial sense:**
 - Great VALUE and feature content

Everyday Life Is an Adventure...

Commuting, Work

"I need a truck to navigate the urban environment, look cool, feel safe, and get outstanding fuel economy."



Home Projects

"I need a truck that can haul a lot of cargo and not worry about it."



Weekend Escapes

"I need a truck that can take me anywhere I want and bring my family and toys."



I Need a Truck to Guide Me!

LIFE'S ADVENTURE GUIDE

The background of the advertisement is a collage of four lifestyle images. The top-left image shows a city street at night with lights reflecting on the pavement. The top-right image shows two men in an office; one is standing and looking at a laptop, and the other is sitting and talking on a mobile phone. The bottom-left image shows a dark-colored pickup truck loaded with large bags, likely for construction or landscaping. The bottom-right image shows a white pickup truck with a motorcycle in its bed, parked in a wooded area.

Personal
Cool, Tough & Athletic

Commuting/work

"I need a truck to navigate
the urban jungle, look cool, feel safe,
and get outstanding fuel economy"

Prepared
Capable & Versatile

Home Project

"I need a truck that can haul a lot of
cargo and not worry about it"

Confident
Comfortable & Secure

Weekend Escape

"I need a truck that can take me anywhere
I want and bring my family and toys."

Body – Core Concepts

RIDGELINE

Pros

Innovative Package

+ Driving Dynamics

+ Trunk & Tailgate

+ Cabin Space

Unibody Construction

**Updated Platform,
Materials, Joining**

Cons

- Styling

- Fuel Economy

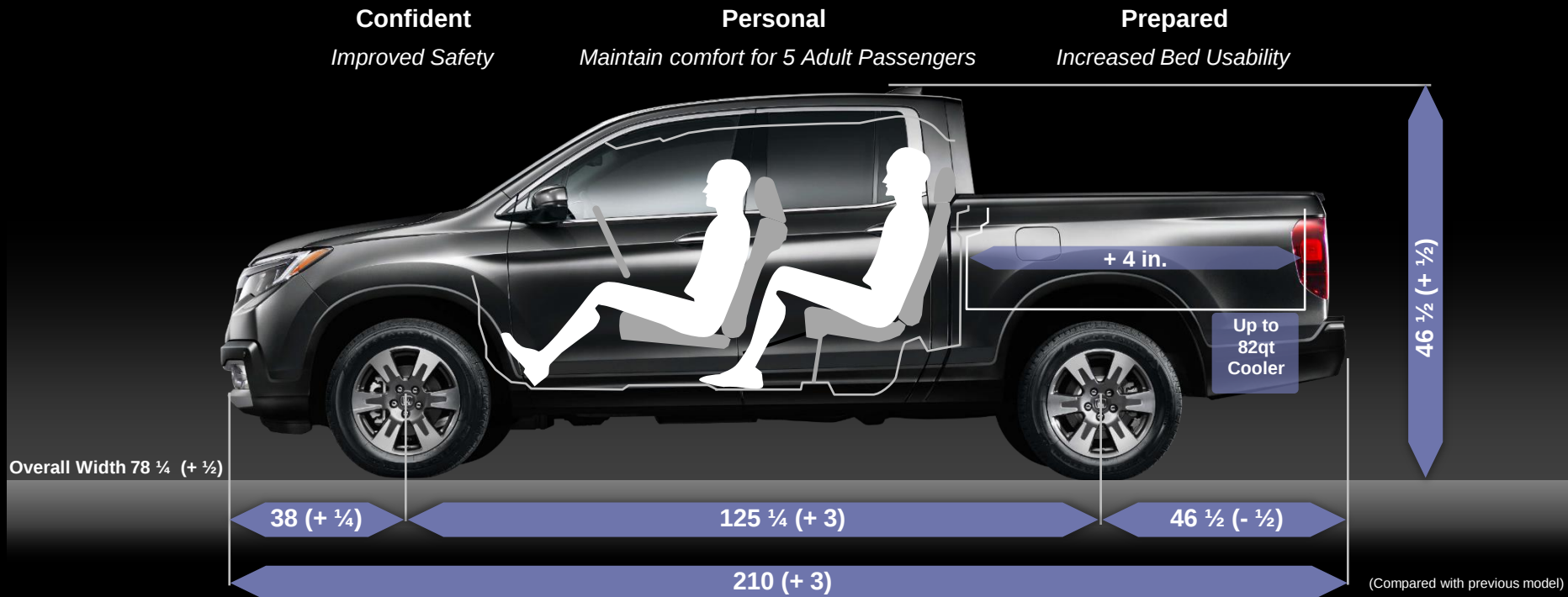
- Technology

Truck-like Proportions

Package : Flexible, Adaptable & Spacious

RIDGELINE

Provides more usability and maintains passenger comfort while keeping a small footprint



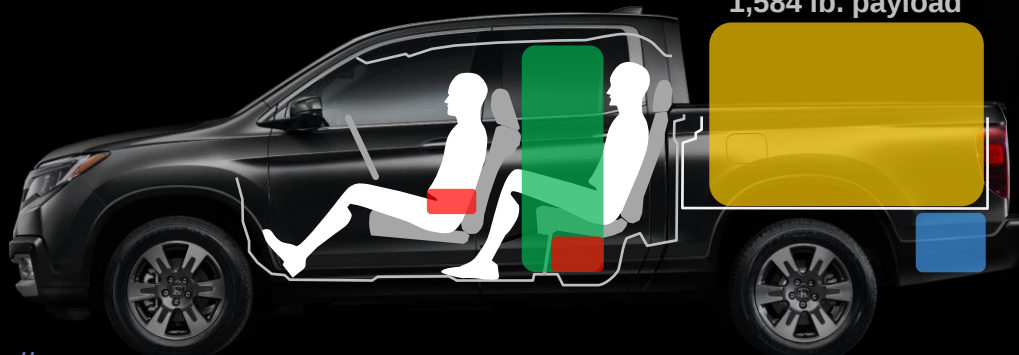
Package : Cargo Flexibility

RIDGELINE

- 1 Passenger space
- 2 Accessible storage
- 3 Secure interior zone
- 4 Truck bed
- 5 Secure in-bed storage



1,584 lb. payload



	New Ridgeline	Comp A	Comp C	Comp B
Bicycle	✓ Wheel On	Wheel Removed	Wheel Removed	Wheel Removed
Golf Bag (Hidden)	✓	×	×	×
TV & Golf Bag	✓	×	×	×



Styling : Exterior Design Highlights

RIDGELINE

Modern Aerodynamic Profile

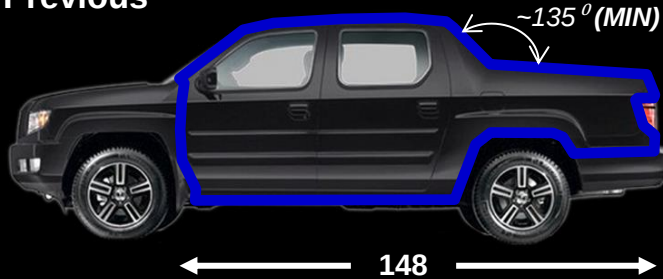


Traditional Truck Profile

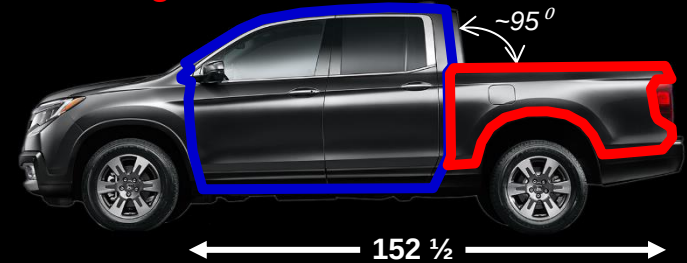


Side panel construction accommodates longer wheelbase

Previous



New Ridgeline Side Panel + 4 ¾ in. from previous



Rear Fender Advantages

- **Styling Flexibility**
Avoids formability constraints at C-pillar/bed corner
Enables clearly defined cab/bed styling cues
- **Weld Access**
Allows for structural truss construction
- **Insurance/Repair**
Bolt-on rear fender can be replaced after light collision damage
- **Stamping Efficiency**
Side panel blank efficiency & scrap rate improvement

Previous



Traditional Panel

New Ridgeline



Integrated Truss

Styling : Factory Impact

RIDGELINE

Honda manufacturing's flexible production strategy leverages commonality between products & processes.

Challenge

Rear fender construction requires two new processes

- Rear Fender Sub-Assembly
- Rear Fender Install to the Whitebody

Solution

■ Lean

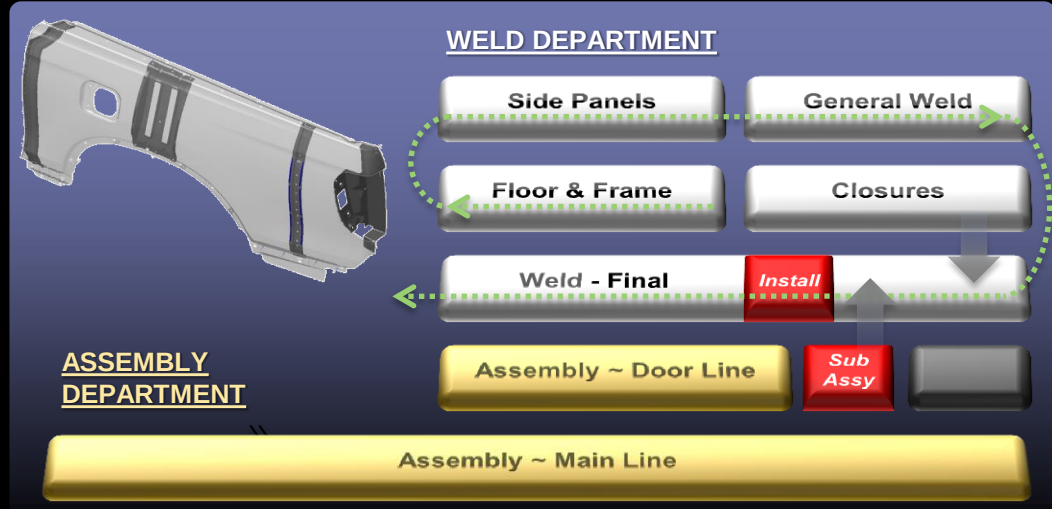
- Developed production equipment with small footprint enabling it to be located near point of installation

■ Agile

- Sub-Assy during other model production
- Install during Ridgeline production
- Adjustable to production volume

■ Flexible

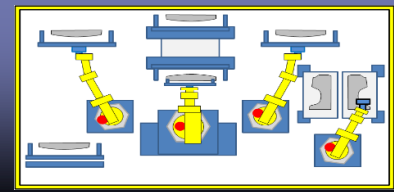
- Sub-Assy cell is currently new for Ridgeline
- Adaptable to other processes/assemblies future new model consideration



Rr Fender Install

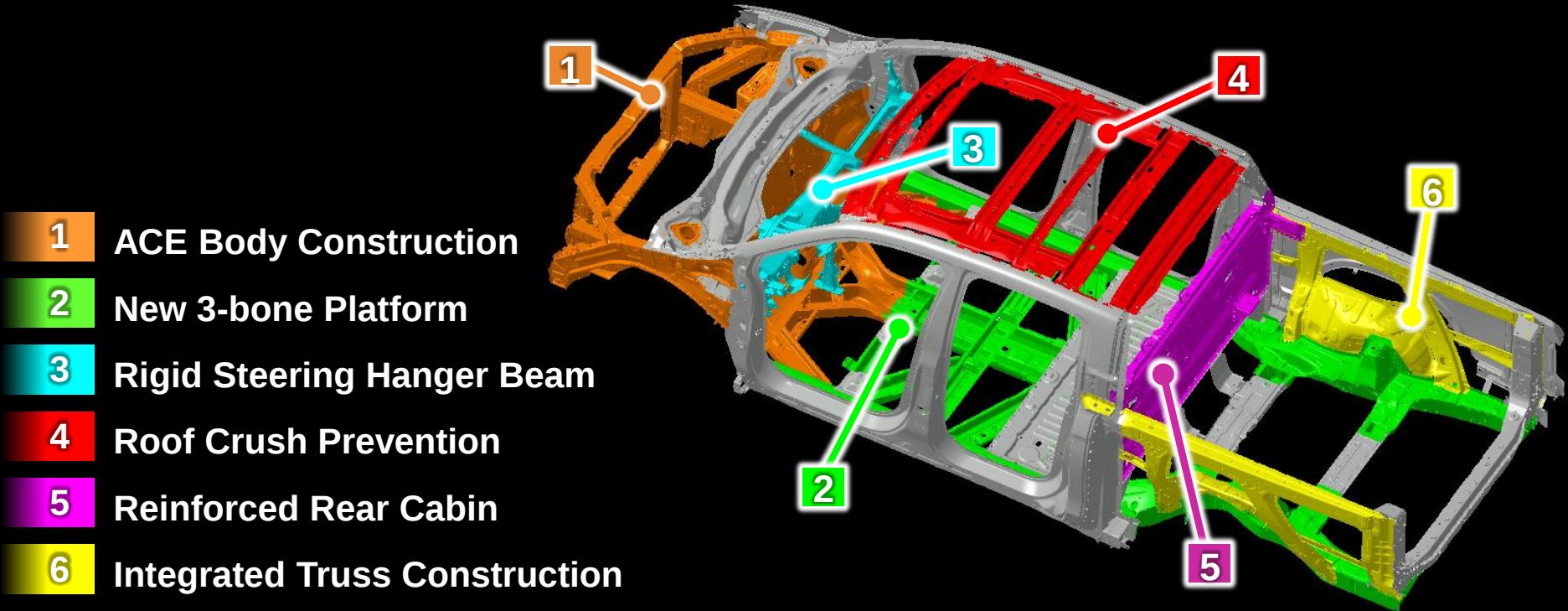


Rr Fender Sub Assy



Body Structure : Key Construction

RIDGELINE



Body Structure : Platform Commonality

RIDGELINE

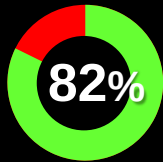
'14 MDX

3rd Generation Light Truck Platform

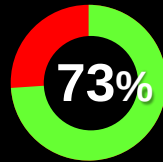
'16 Pilot

'17 Ridgeline

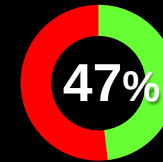
'18 Odyssey



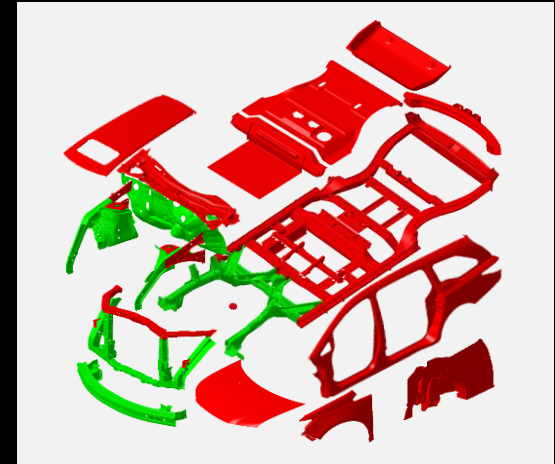
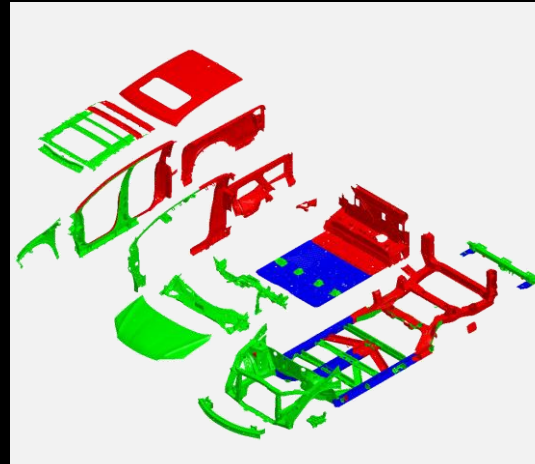
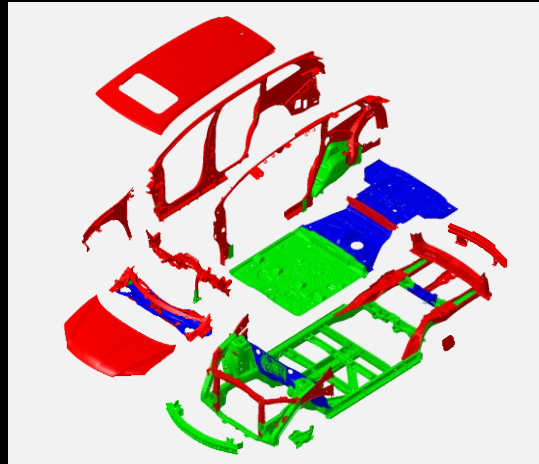
A = MDX Common
A' = MDX Modified
B = Pilot Exclusive



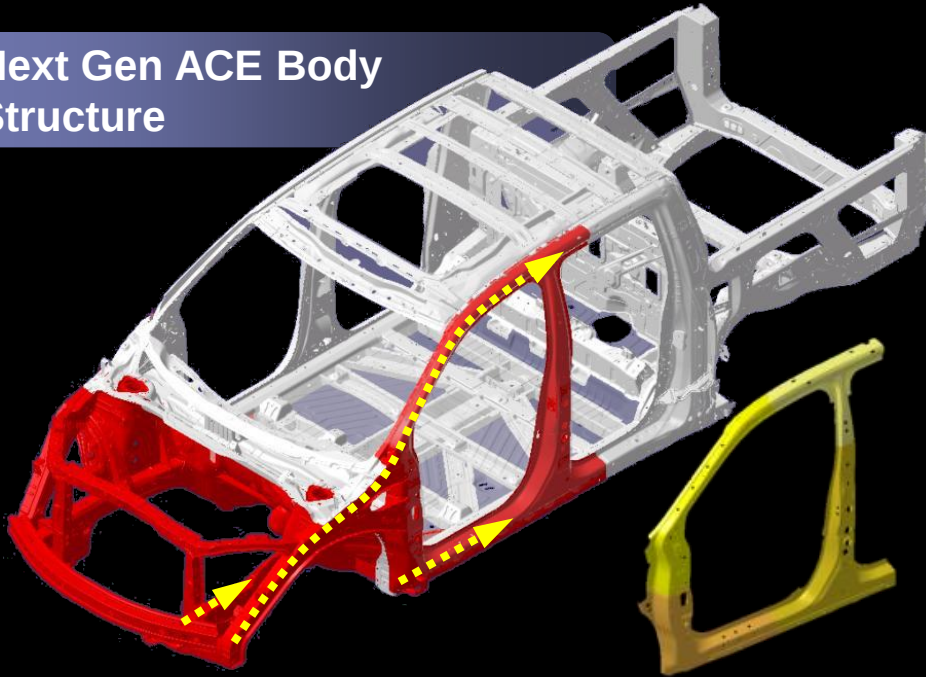
A = Pilot Common
A' = Pilot Modified
B = Ridgeline Exclusive



A = Pilot Common
A' = Pilot Modified
B = Odyssey Exclusive



Next Gen ACE Body Structure



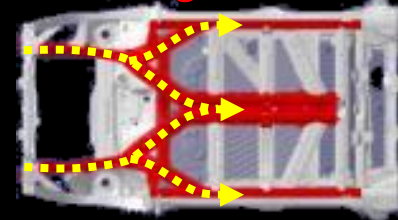
Hot Stamp Steel Door Ring
with Tailor-Welded B-Pillar

More Efficient 3-Bone Platform Construction

Previous "4-bone"



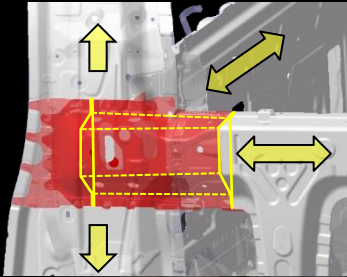
New Ridgeline "3-bone"



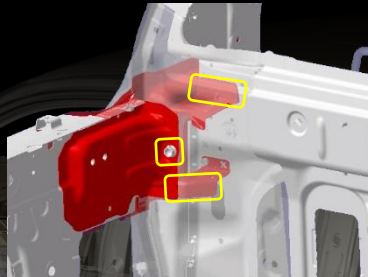
Body Structure : Truck-Specific Construction

RIDGELINE

C-pillar Critical Unibody Joint

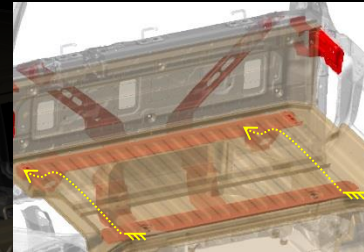


Bed rail section continuously integrated into C-pillar section

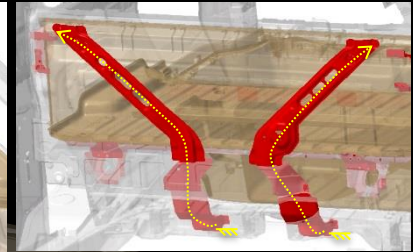


Spot welding + structural adhesive + mechanical fastener

Rear Cabin Cargo Retention Structure

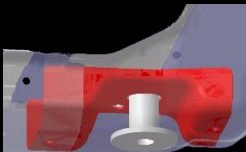


Rear cabin structure includes load paths to manage input from bed cargo intrusion test mode



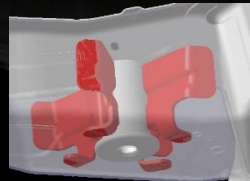
Rear Sub-Frame Mounts

Previous



Collar support bracket

New Ridgeline



Collar + butterfly braces
(+45% mount stiffness)

One-Piece Rear C/Mbr Comp

Previous



C/mbr in floor frame comp
D-plr in side panel outer comp

New Ridgeline

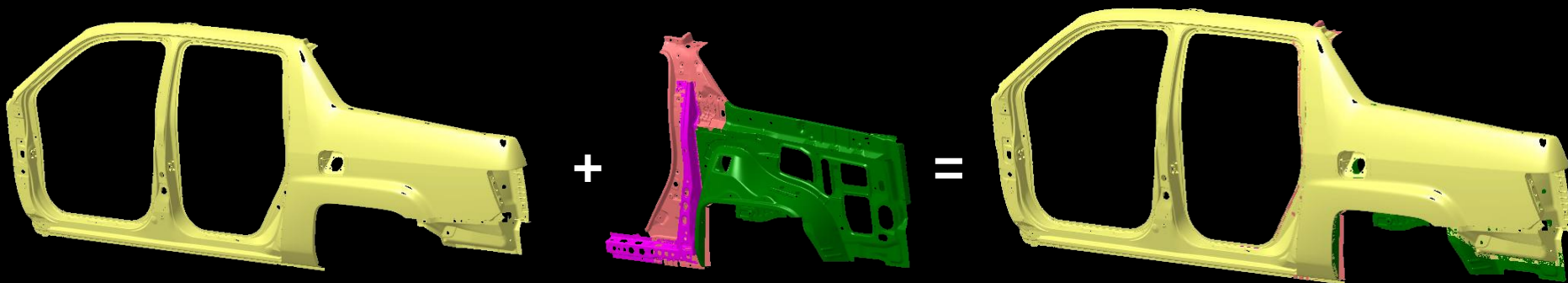


One-piece rr c/mbr → Improved accuracy for t/gate fit/fuction

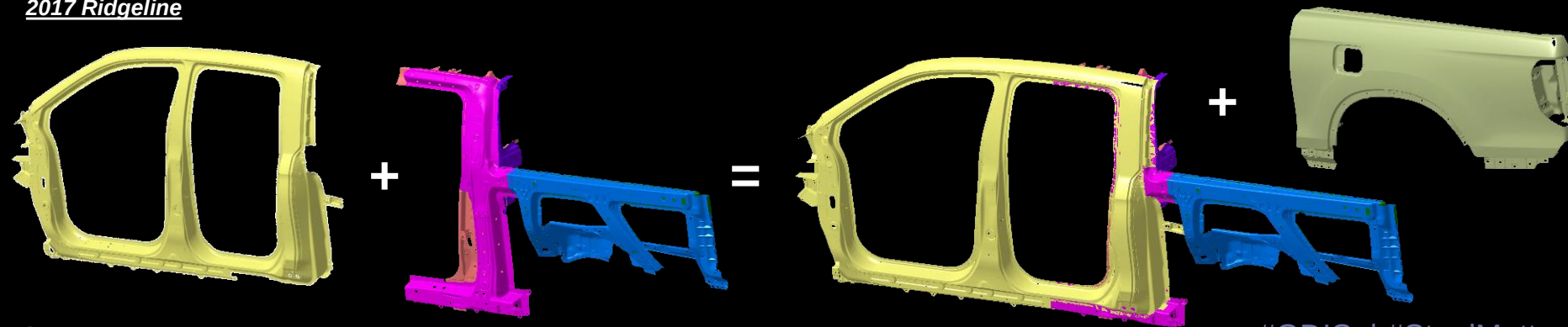
Body Structure : Truck-Specific Construction

RIDGELINE

2014 Ridgeline



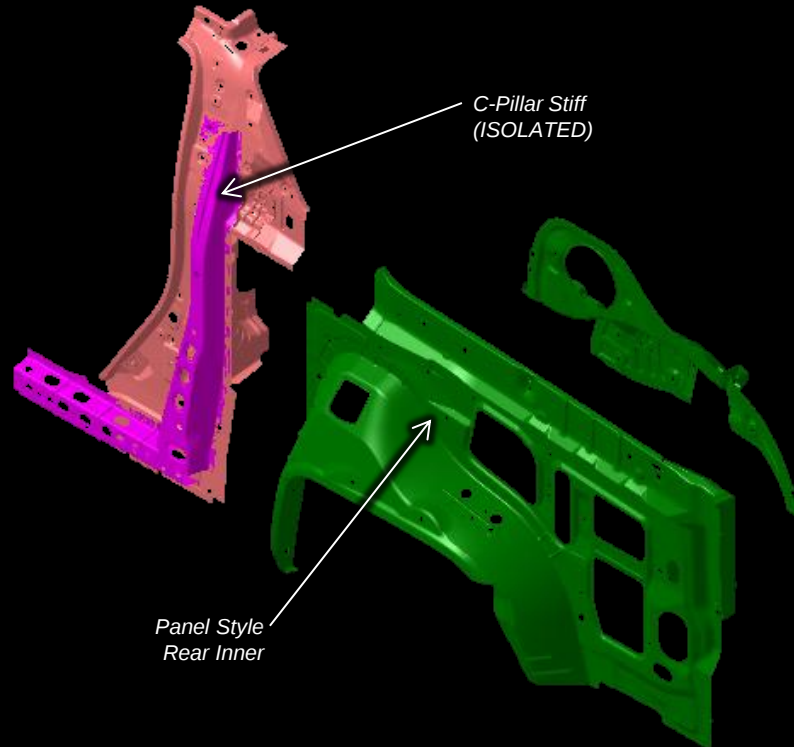
2017 Ridgeline



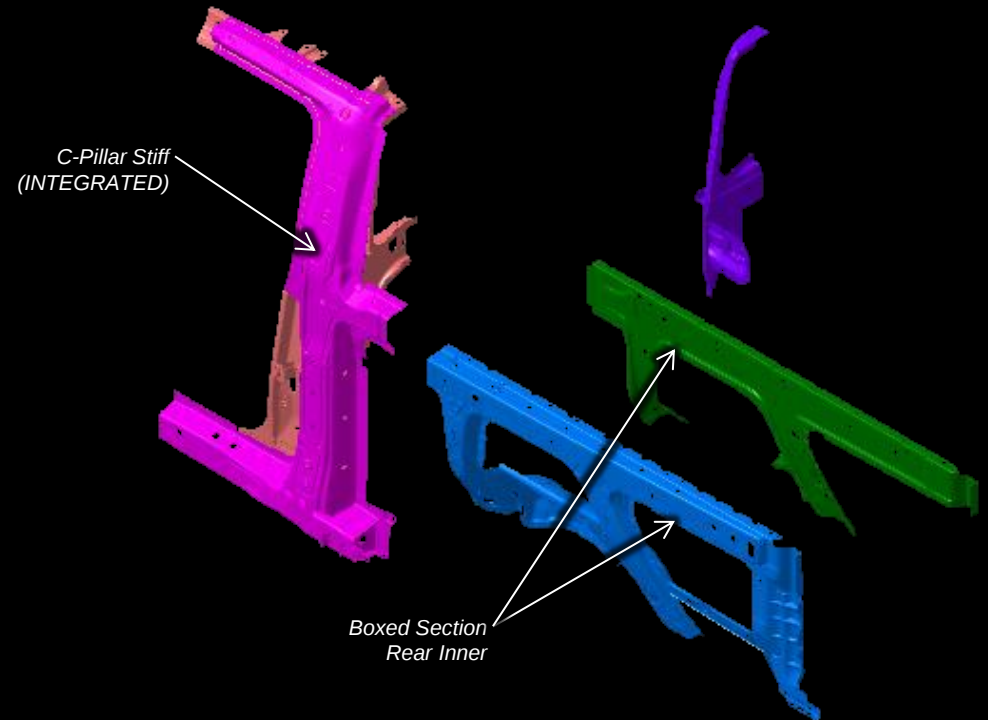
Body Structure : Truck-Specific Construction

RIDGELINE

2014 Ridgeline



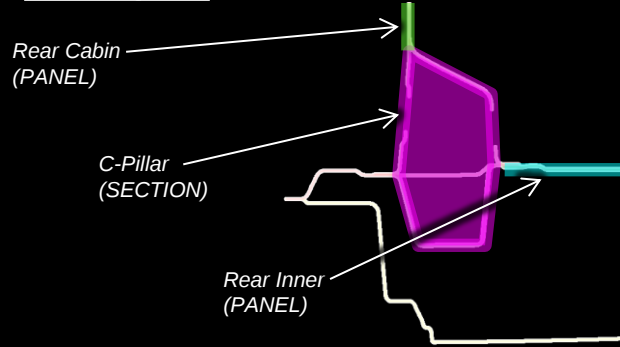
2017 Ridgeline



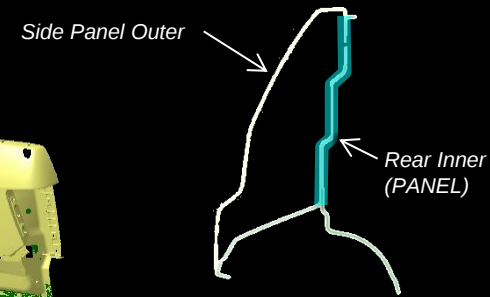
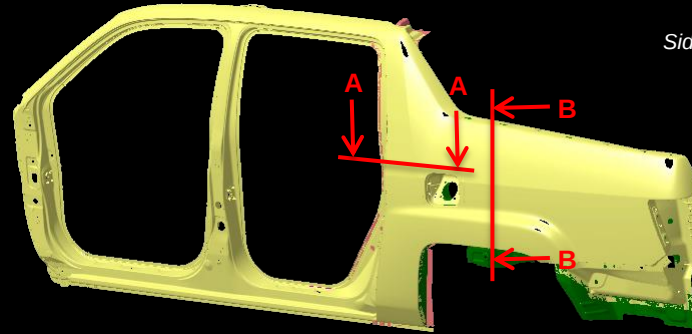
Body Structure : Truck-Specific Construction

RIDGELINE

2014 Ridgeline

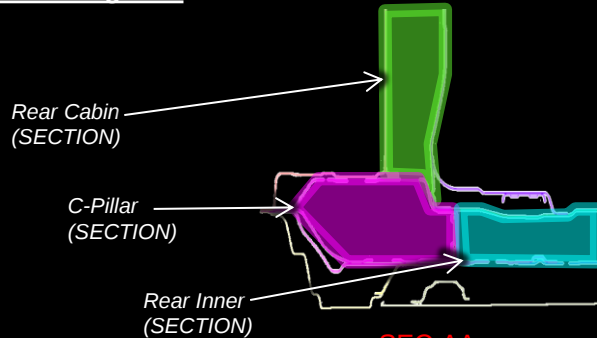


SEC AA

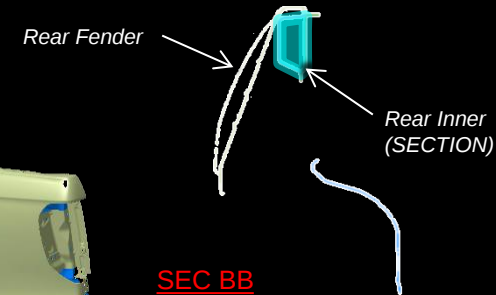
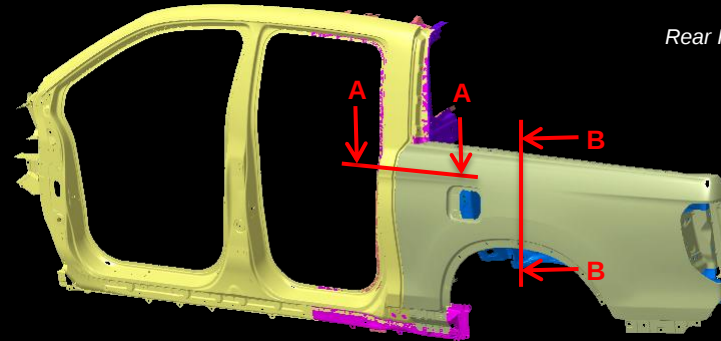


SEC BB

2017 Ridgeline

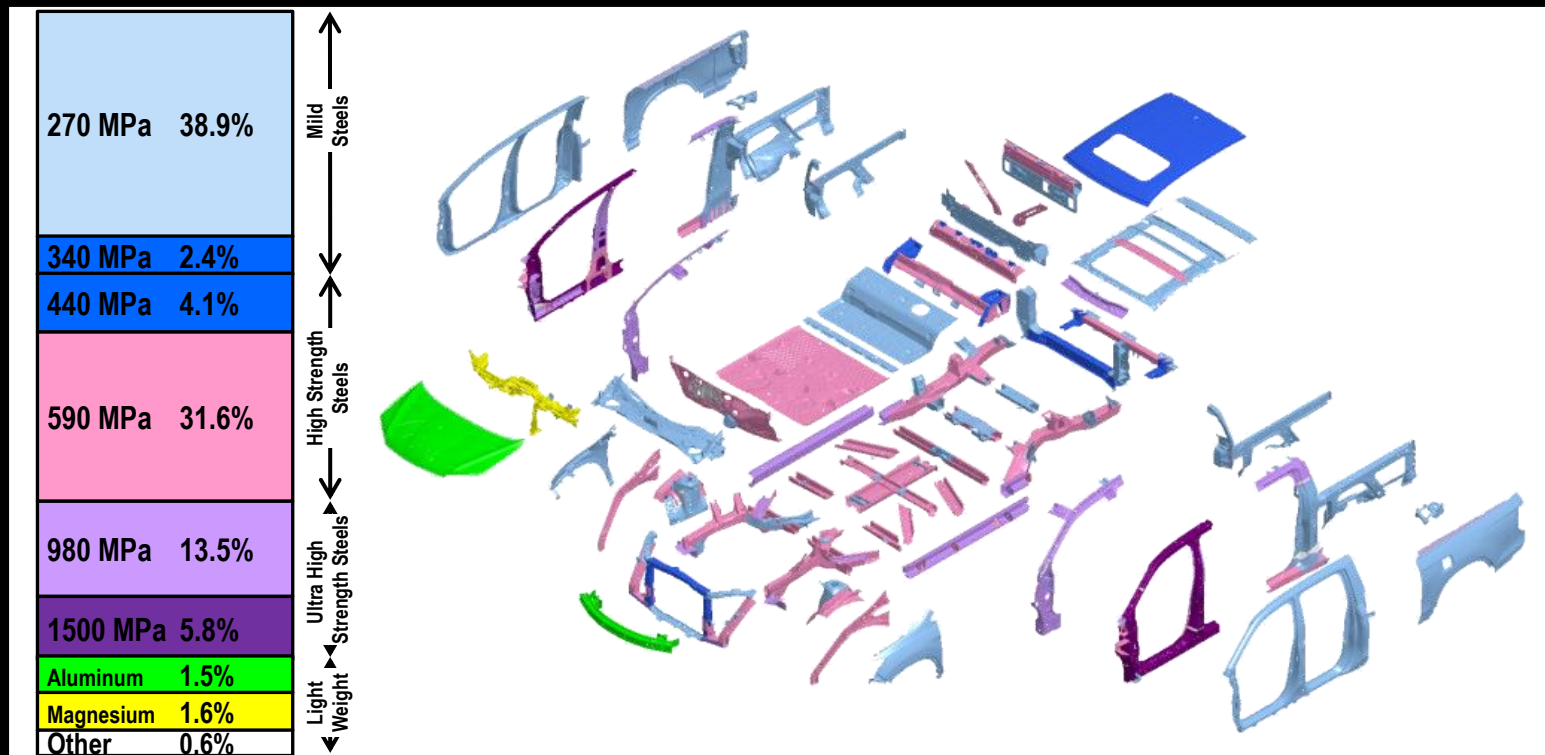


SEC AA



SEC BB

55.0% High Strength & Ultra High Strength Steel



Body Structure : Weight

RIDGELINE

CBU

2,080 kg



2014 Ridgeline

-62kg

2,018 kg



2017 Ridgeline

Inertia Weight Rank Down

- ☐ Increased Wheelbase
- ☐ SOT Protection
- ☐ Increased Stiffness
- ☐ Increased Bed Size

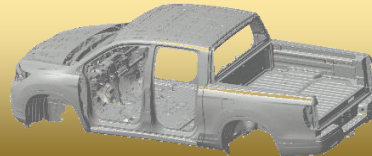
Body

609 kg



-16kg

593 kg



Body Structure : Light-Weighting

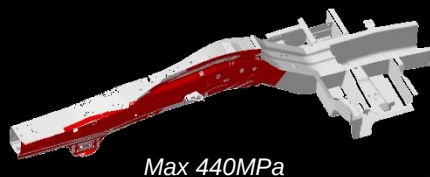
RIDGELINE

Aluminum Hood



-10.1kg

High Strength Steel Front Side Frame



Max 440MPa

-7.4kg

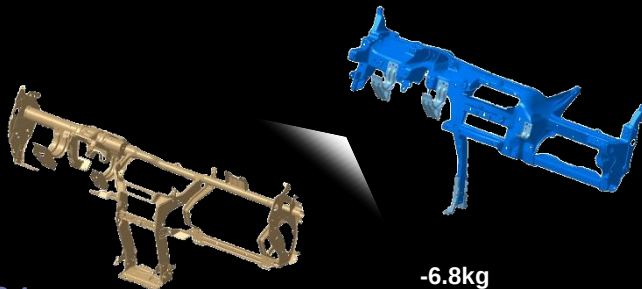


Max 980MPa

Hot Stamp Door Ring



Cast Magnesium IP Frame

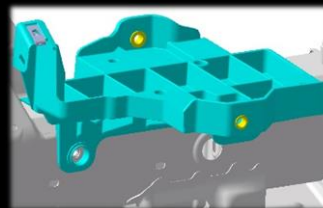


-6.8kg

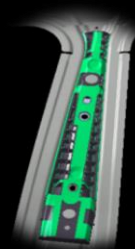
Composite Battery Base



-0.6kg



Composite B-Plr Stiff

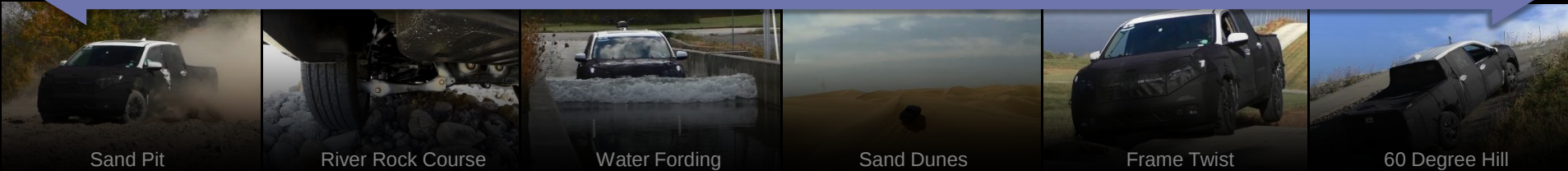


Performance : Concept

RIDGELINE

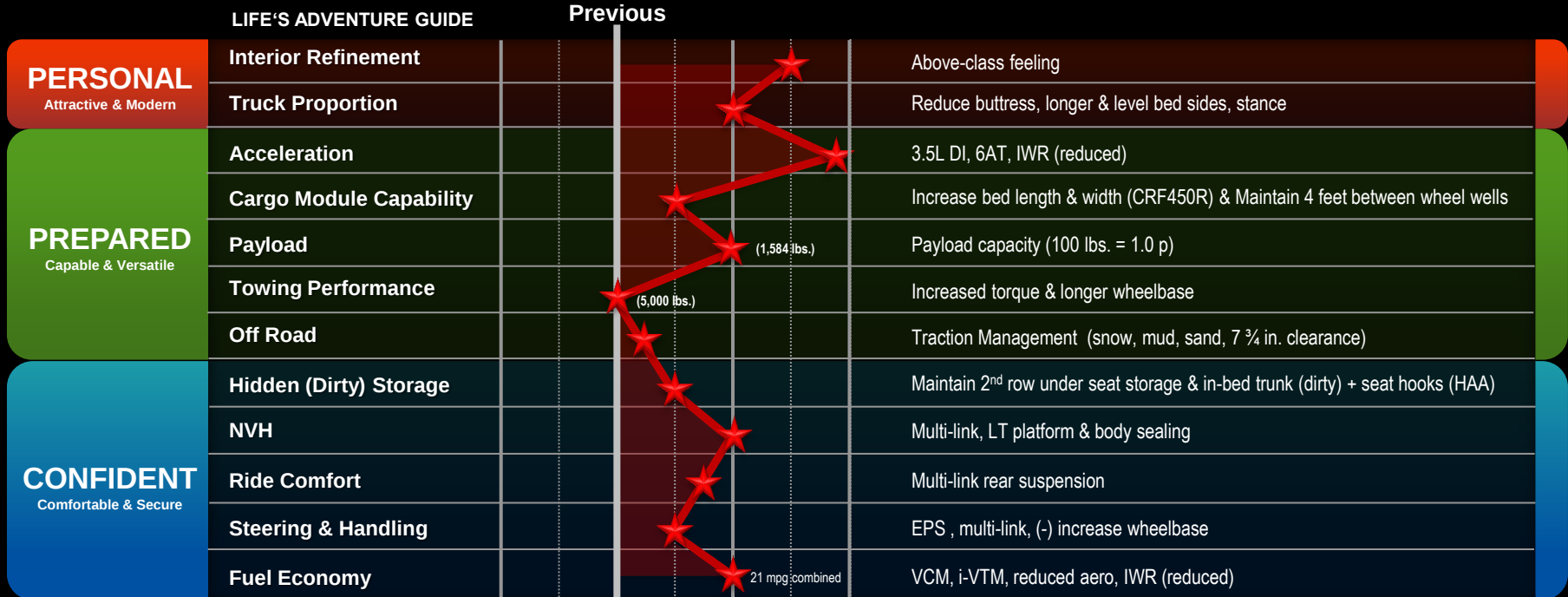


Comfortable, Confident & Powerful Dynamic Performance in All Conditions

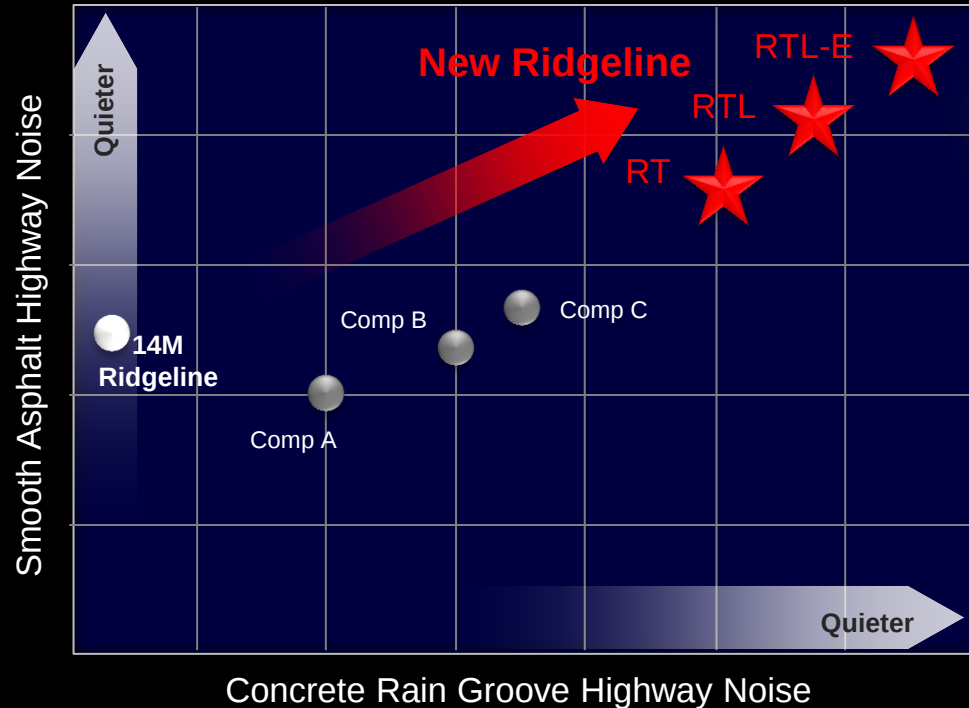


- Better ride comfort
- Better traction
- Better stability on and off the road
- Independent suspension
- Best active AWD in the market
- Stronger, lighter body

All targets met or exceeded Very competitive product with clear customer advantages



Best in class on-road cabin isolation



Rear Sub-Frame Mounts



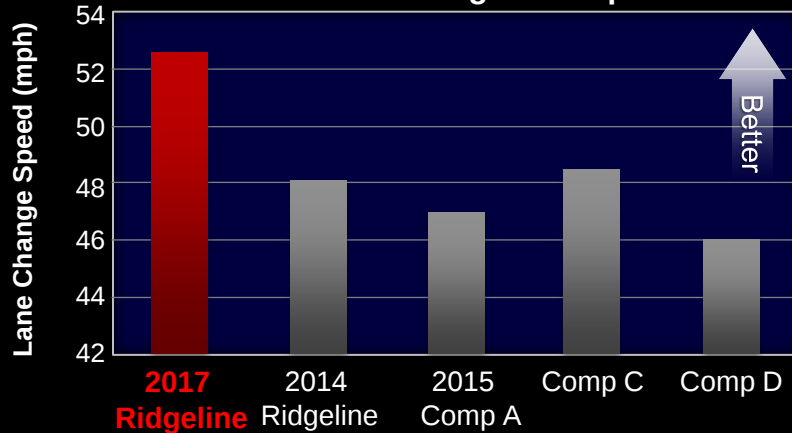
Collar + butterfly braces
(+45% mount stiffness)

Helps to isolate
road load input
from the chassis
into the body

Precise Body Control → Top Class Performance

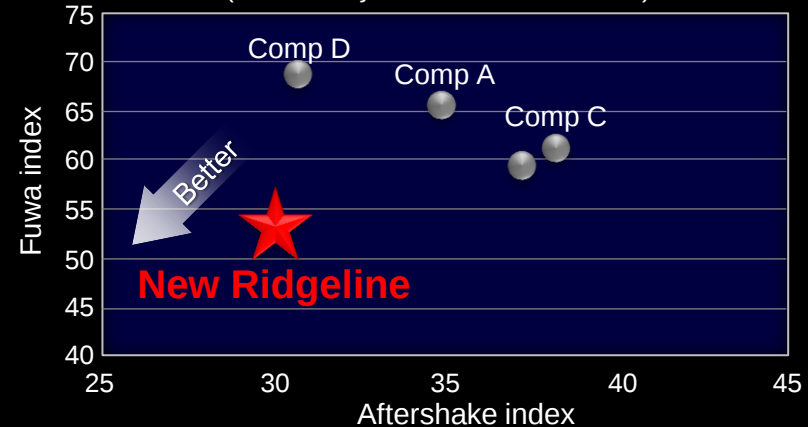


Double Lane Change Max Speed



Ride Test

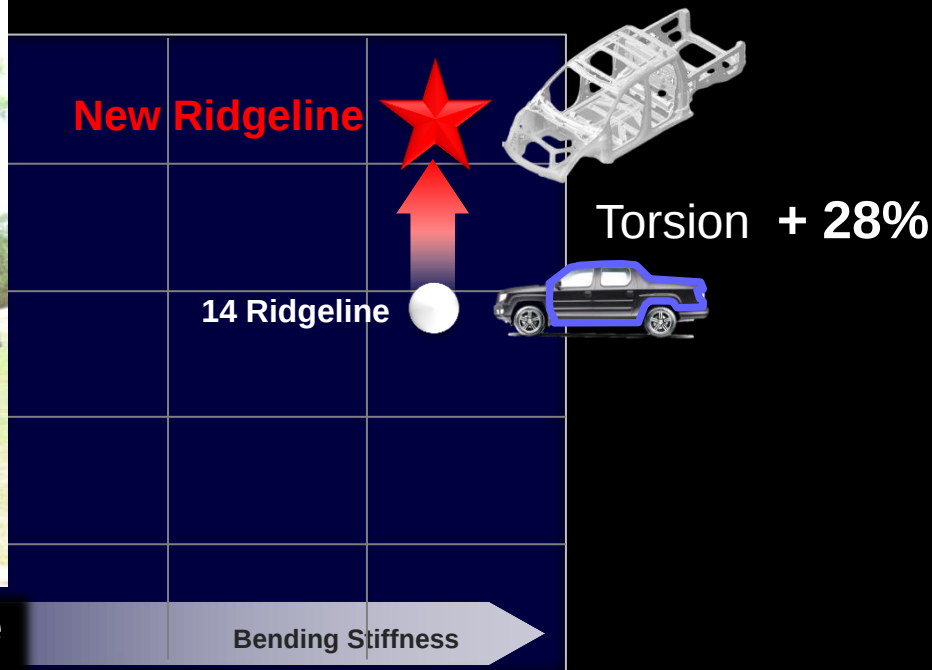
(Gross Body Control vs. Aftershake)



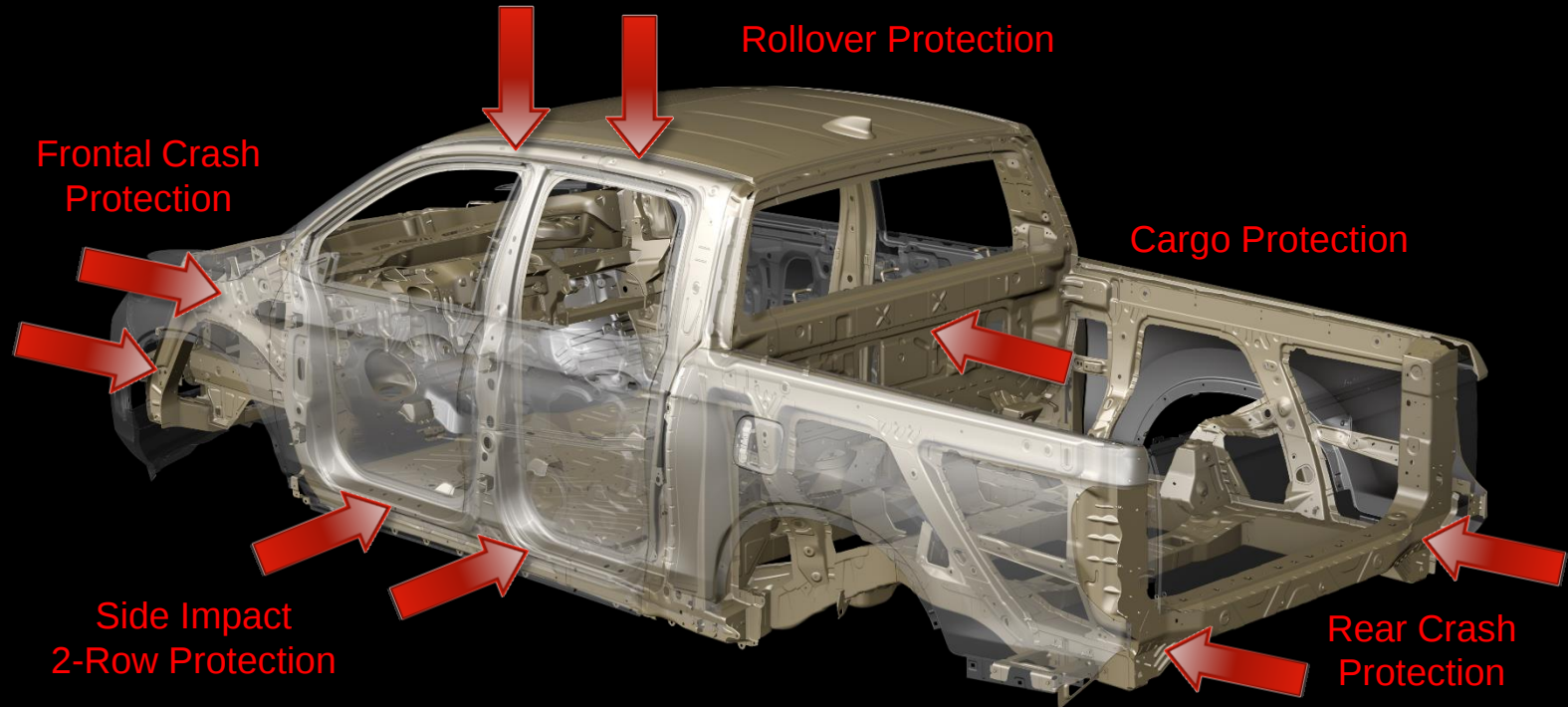
Unibody construction offers superior ride comfort, handling & confidence



**Doors and tailgate still open/close
during severe frame twist mode**

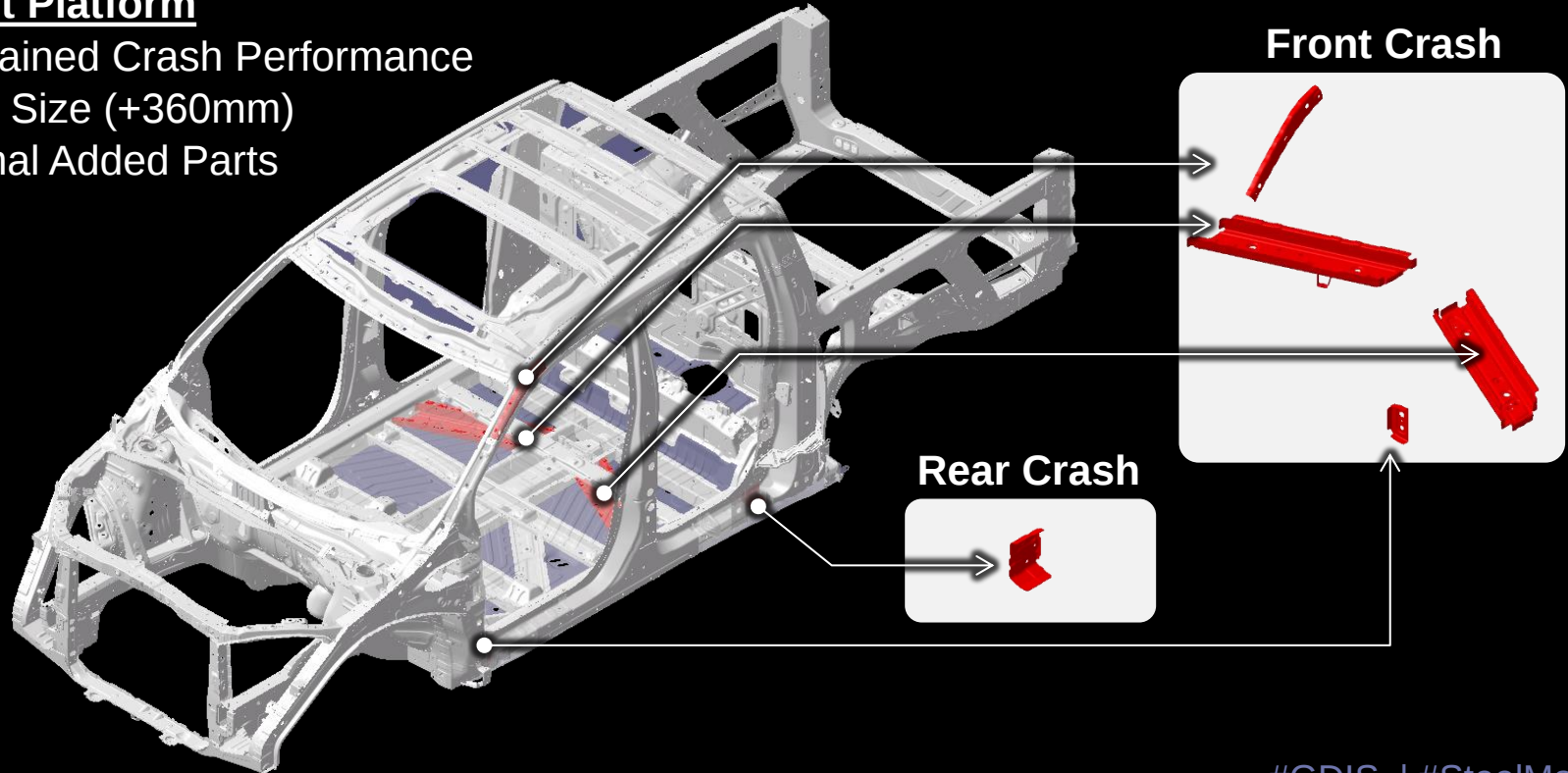


Maximize Passive Safety Through Body Design



Robust Platform

- Maintained Crash Performance
- Truck Size (+360mm)
- Minimal Added Parts



Performance : Small Overlap Test

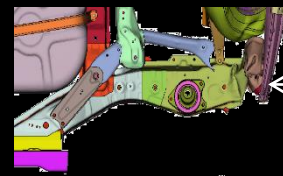
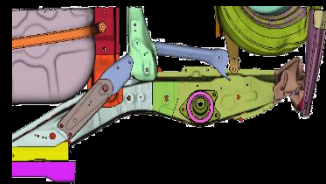
RIDGELINE



Performance : Rear Crash

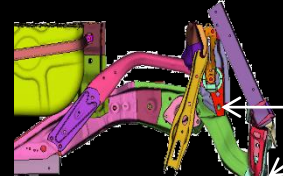
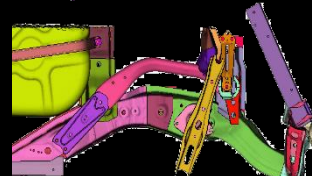
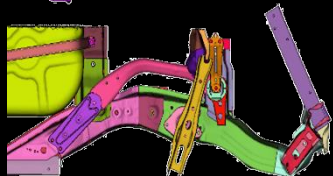
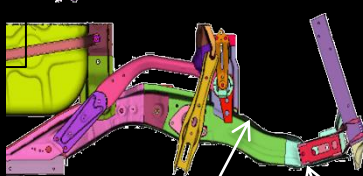
RIDGELINE

Platform



Axial
Crush
Mode

Ridgeline

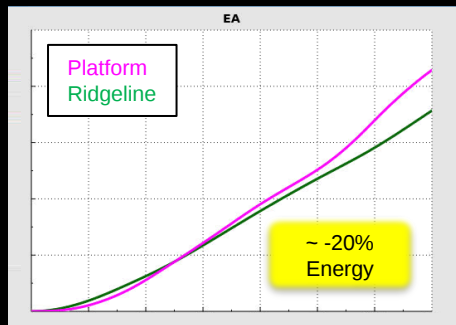
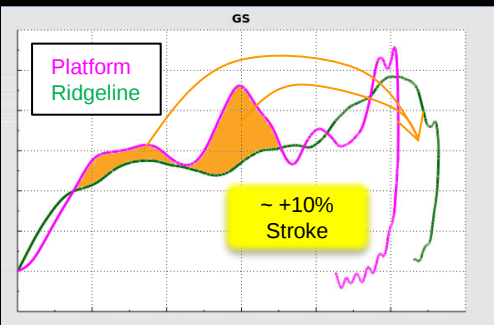


Bend
Bend
Mode

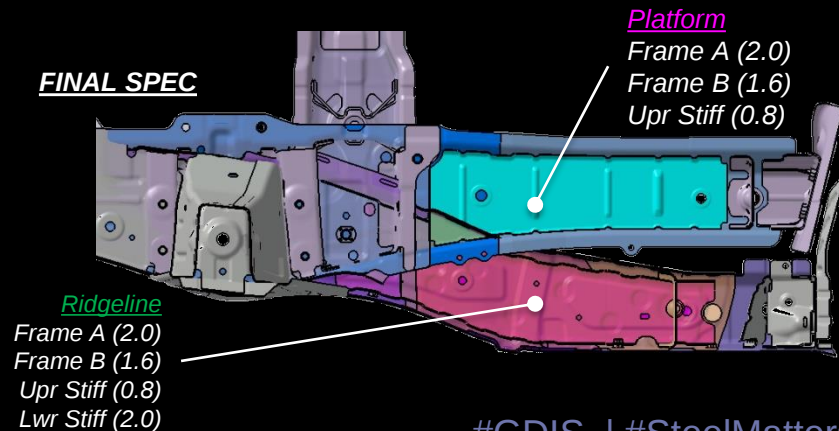
In-Bed Trunk Packaging

Standard Trailer Hitch

BASELINE SPEC PERFORMANCE



FINAL SPEC



Industry-Leading Safety Ratings

NHTSA



National
Highway
Traffic
Safety
Administration

Frontal crash



Side crash



Rollover



Overall Rating



IIHS

INSURANCE INSTITUTE
FOR HIGHWAY SAFETY

Insurance
Institute for
Highway
Safety

Front Crash Prevention

Frontal Collision

Side Collision

Rear/Head

Roof Strength

Small Overlap

Superior

Good

Good

Good

Good

Good

TOP SAFETY PICK+





The All-New 2017 Honda Ridgeline



Great Designs In Steel
May 17, 2017