Hot Stamp Rear Frame Optimization

Target 20% Weight-down

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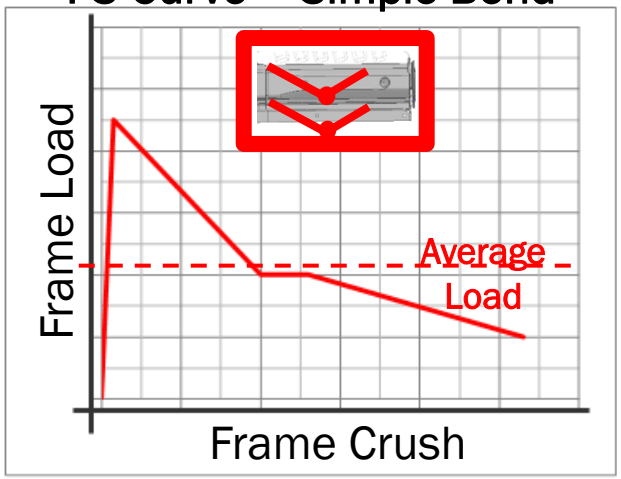
HONDA

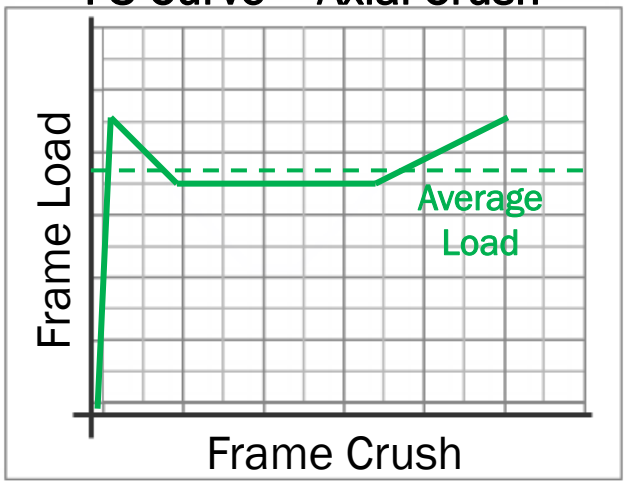
Honda R&D Americas

Rear Frame Crash Mode Concept

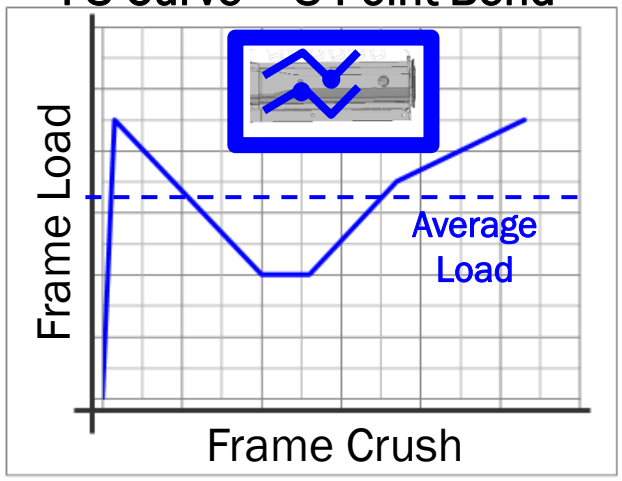
FS Curve – Simple Bend



FS Curve – Axial Crush



FS Curve – 3 Point Bend



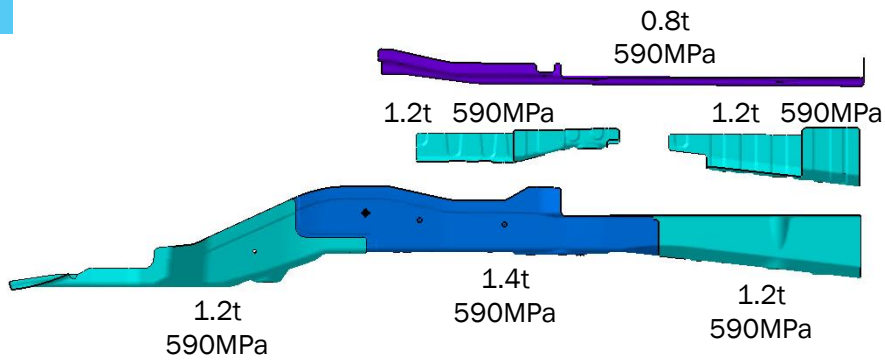
	Simple	Axial	3pt
Stability	Good	**Better**	**Best**
Efficiency	Good	**Better**	**Best**
Repeatability	Good	**Better**	**Best**
Complexity	Better	**Good**	**Best**

Rear Frame Design Concept

Reduce rear frame comp mass & complexity while maintaining crush mode & performance

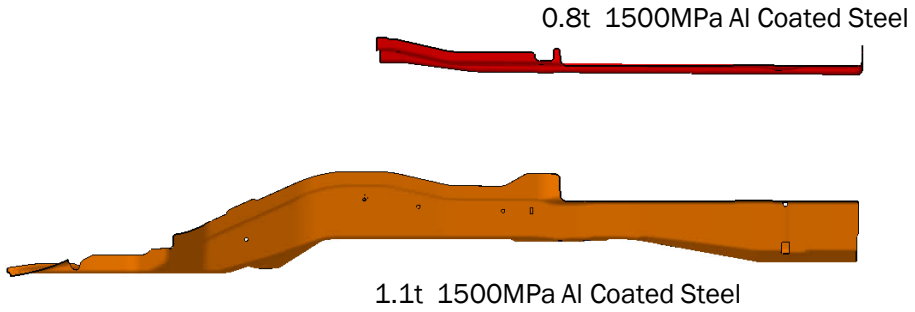
Cold Stamped Solution

- Multiple piece rear frame for forming
- Patches required for mode control
- High spot weld count increases piece cost and weld line investment



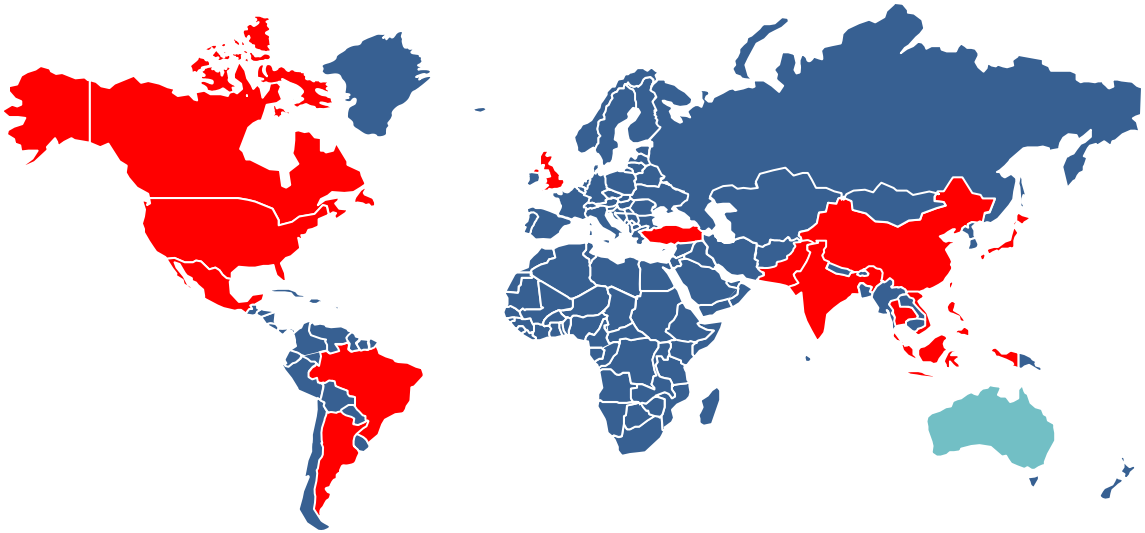
Hot Stamped Solution

- Single piece rear frame stamping
- Patches not required for mode control or energy absorption
- Minimal spot weld count reduces piece cost and weld line investment

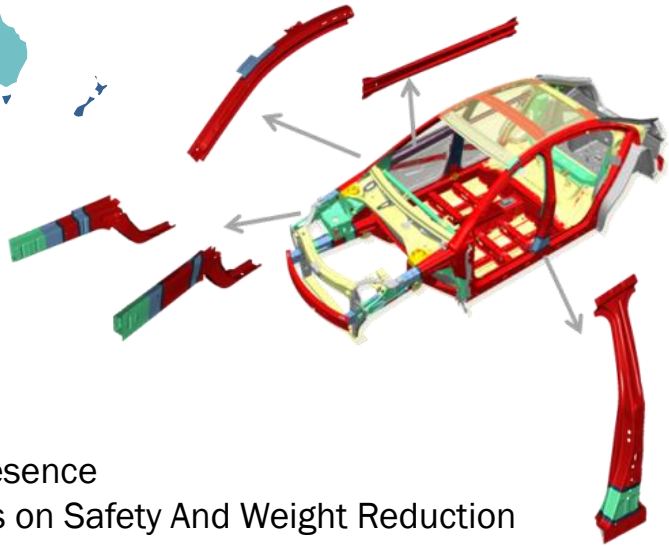


Honda & Gestamp Partnership

Honda

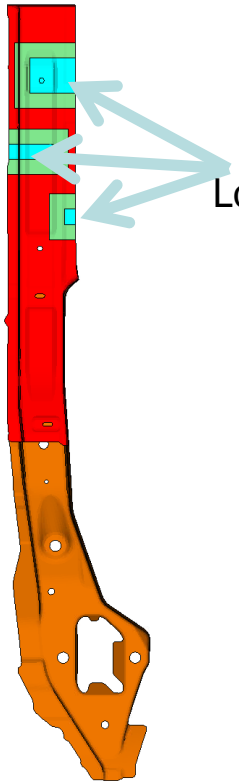


Gestamp

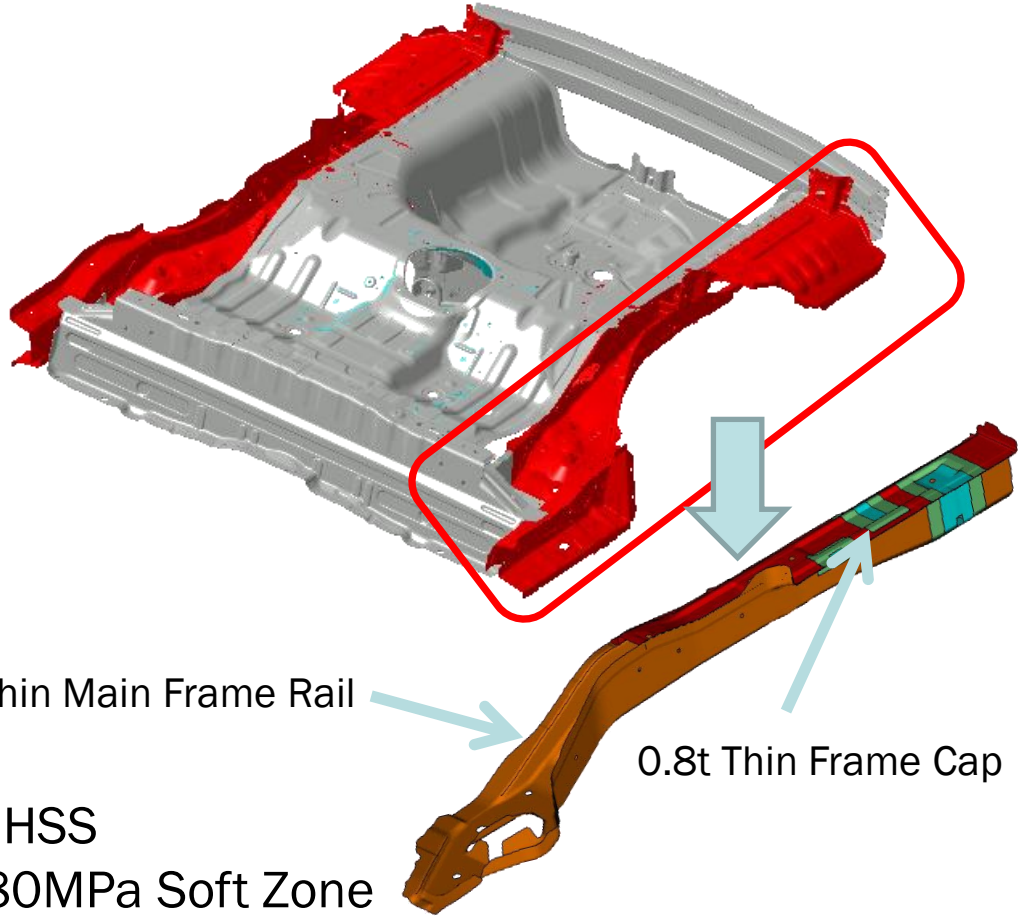


- Global Presence
- BIW Focus on Safety And Weight Reduction
- R&D and Advanced Engineering
- Hot Stamping with Tailored Properties (Soft Zone)

Hot Stamp Rear Frame Design Realization



780MPa Tensile Strength
Localized Crush Initiation Zones



1.1t Thin Main Frame Rail

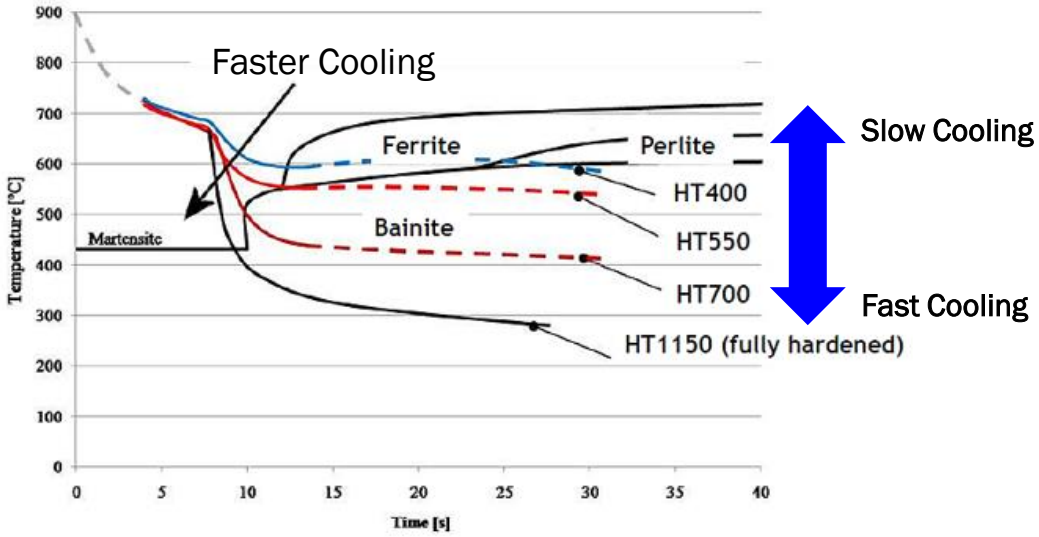
0.8t Thin Frame Cap

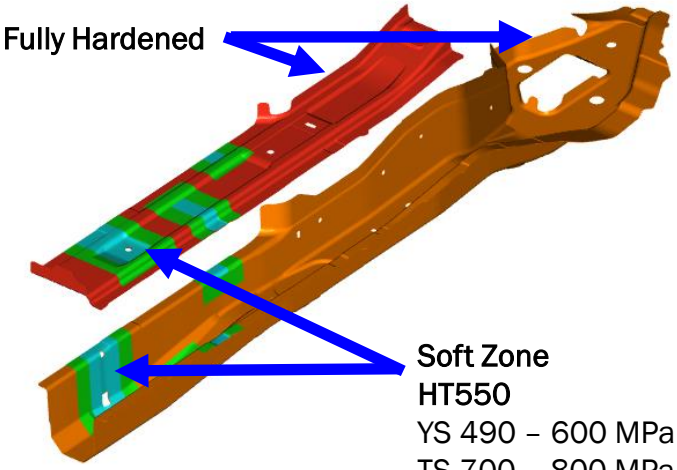
- Reduce Mass → Application of Thin HSS
- Maintain Crush Mode → Develop 780MPa Soft Zone
- Reduce Complexity → Develop Soft Zone Through Cross-section

20 % Weight Reduction Compared to Previous Model

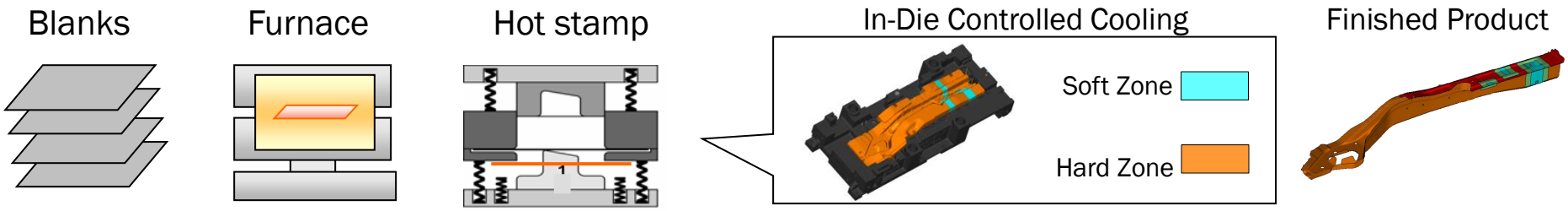
Tailored Properties Manufacturing

- In-die process to produce Soft Zone sections with Tailored Properties
- Smallest areas of application within the part becomes possible
- Design freedom to place Soft Zone features almost anywhere on the part



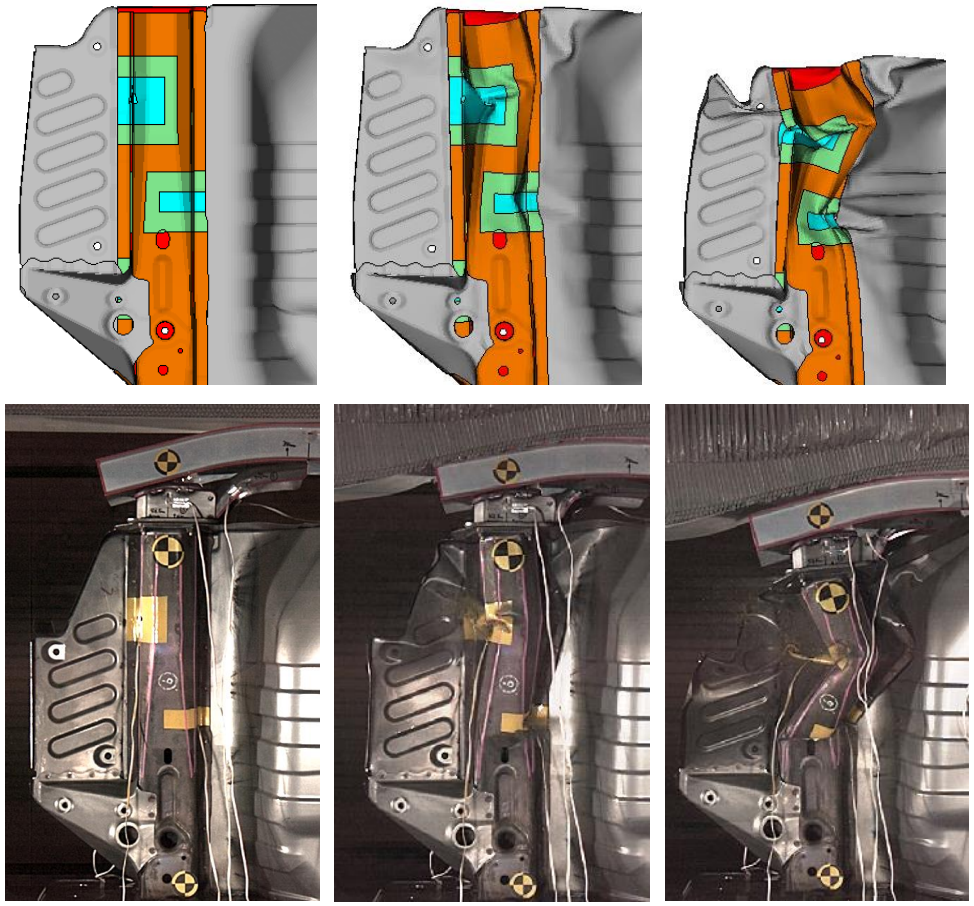


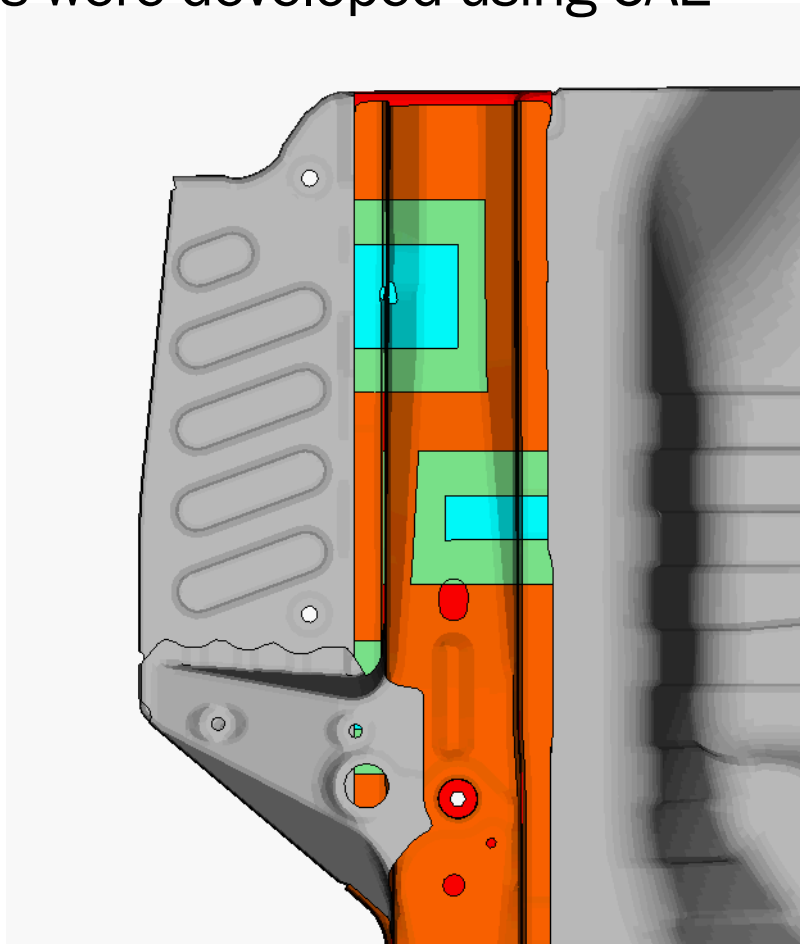
Manufacturing Process



Rear Frame Crash Mode Realization

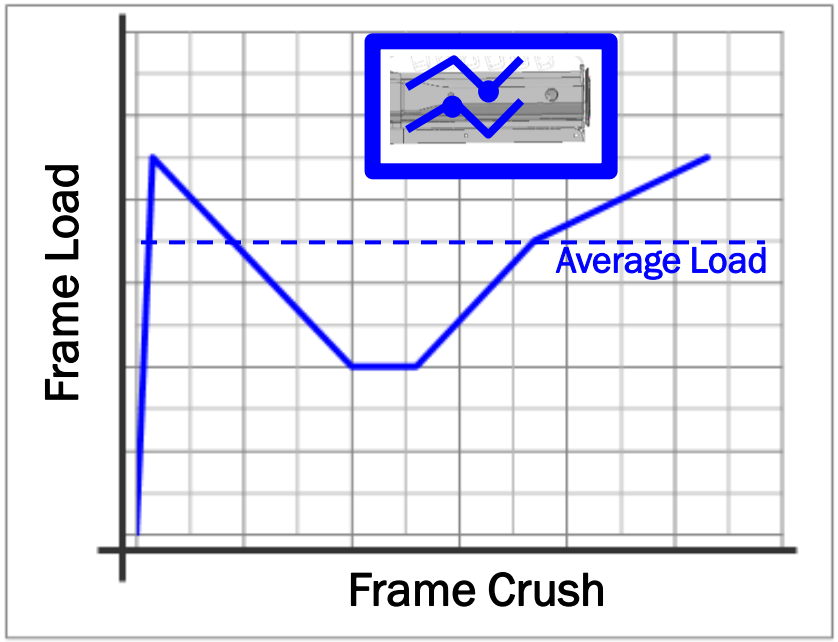
- Tempered soft zones were utilized to achieve desired crush mode
- Location, size, and properties of soft zones were developed using CAE



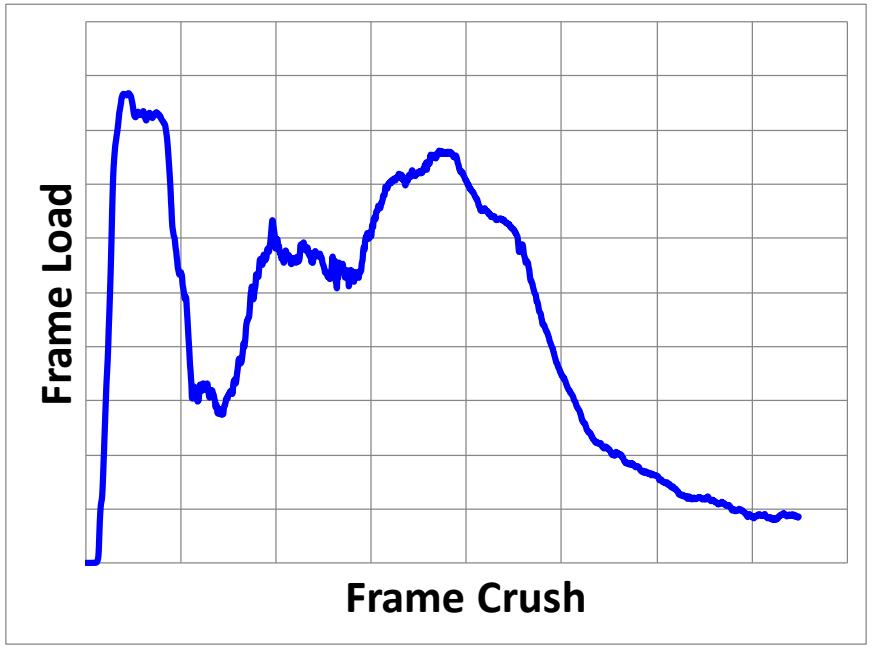


Rear Frame Crash Mode Realization

FS Curve (Concept) – 3 Point Bend



FS Curve (Actual) – 3 Point Bend



Stable 3pt Bending Is Achieved Through Use of Soft Zone Technology

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