Holden Cruze
Body Structure

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GM Holden

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Automotive steel grades

1. Low strength
   - mild steel & interstitial-free (IF) steel, used for skin panels, small brackets
2. Medium strength
   - bake hardening, used for door skins
3. Conventional high strength
   - HSLA / High Strength Low Alloy, used for structural members
4. Advanced high strength
   - dual phase (DP), used for rockers, cross-members
5. Ultra high strength
   - hot stamped / press-hardened, used for floor reinforcements

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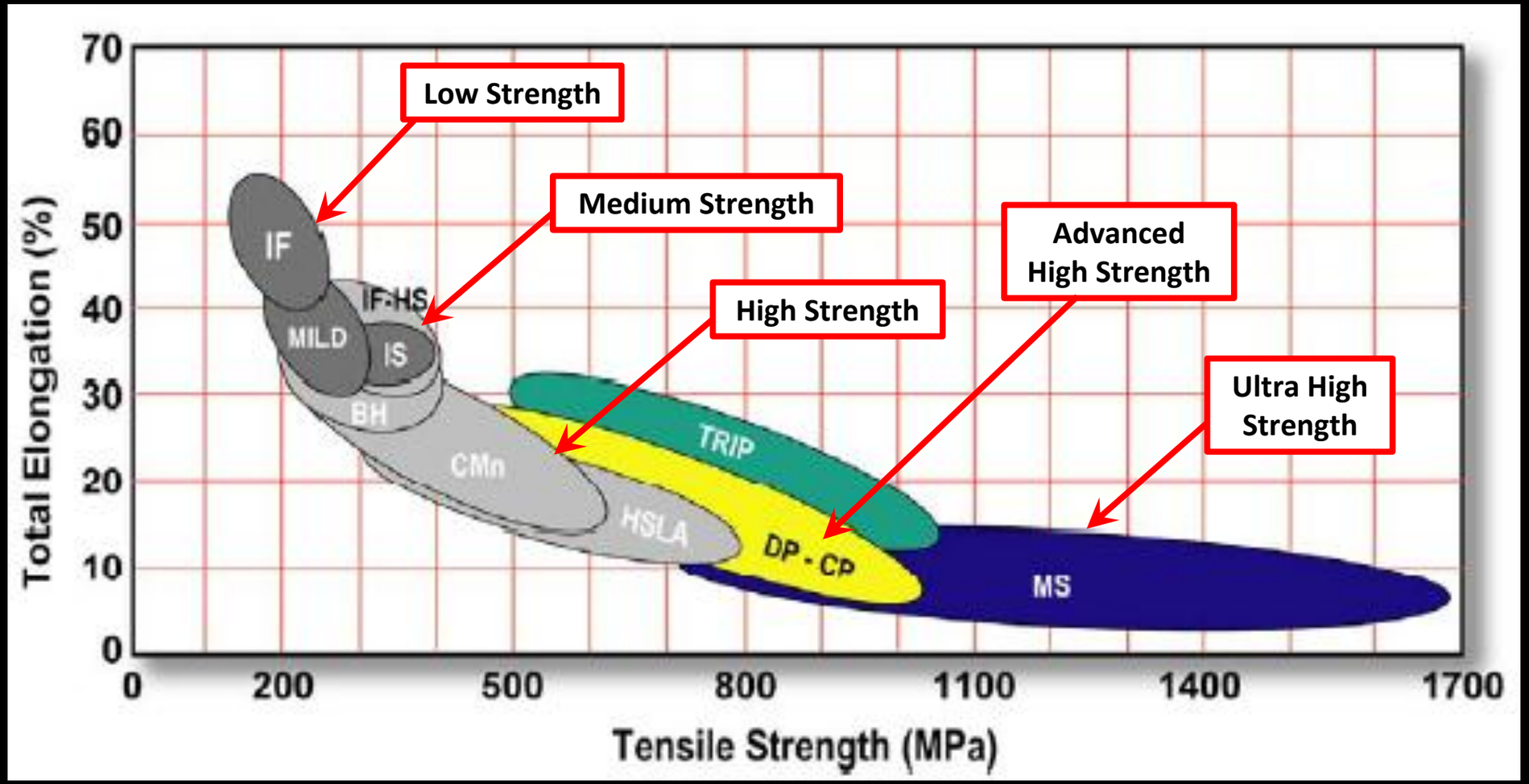
Automotive steel properties



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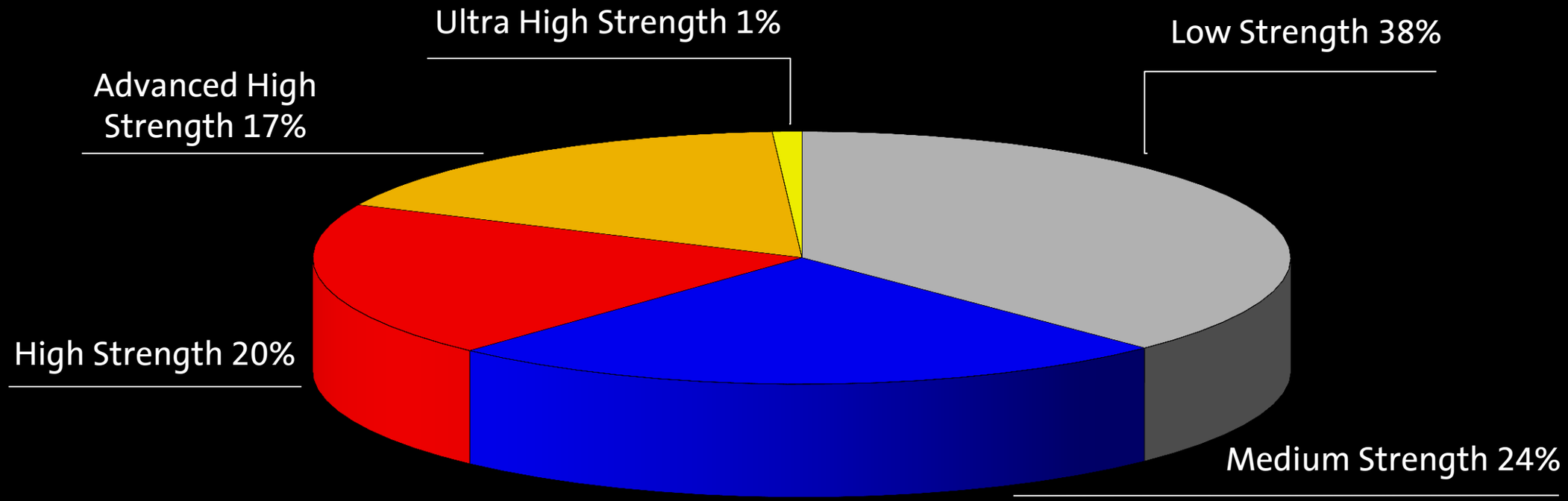
Automotive steels – mechanical properties

Grade	Yield Strength (MPa)	Tensile Strength (MPa)	Elongation (%)
Low Strength	140-180	270-330	40
Medium Strength	180-300	300 min	32
High Strength	340-400	400 min	22
Advanced High Strength	550-700	980 min	10
Ultra High Strength	950-1100	1200 min	8

Cruze Steel Usage



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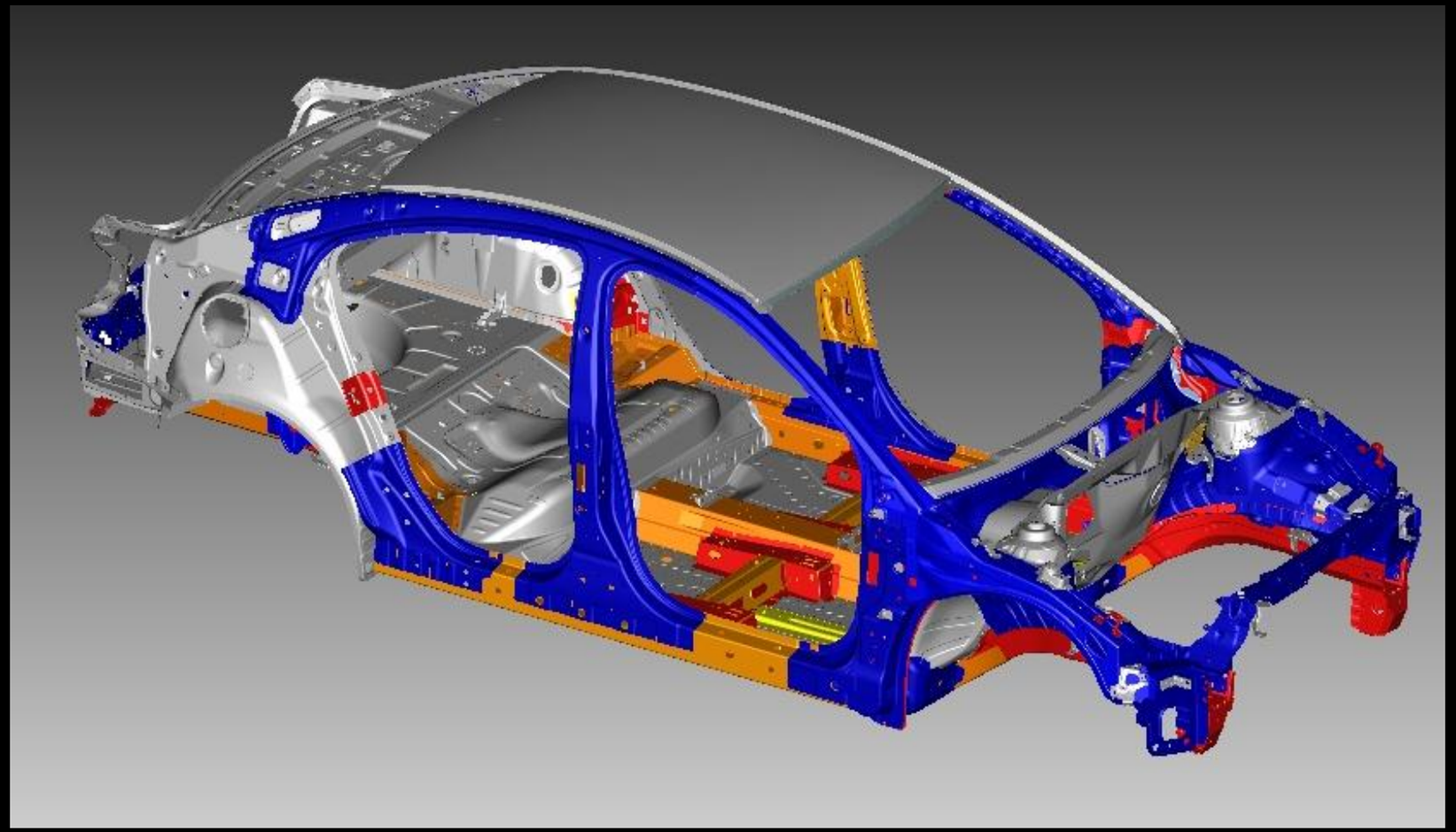
Steel Usage

- Low Strength
- Medium Strength
- High Strength
- Advanced High Strength
- Ultra High Strength



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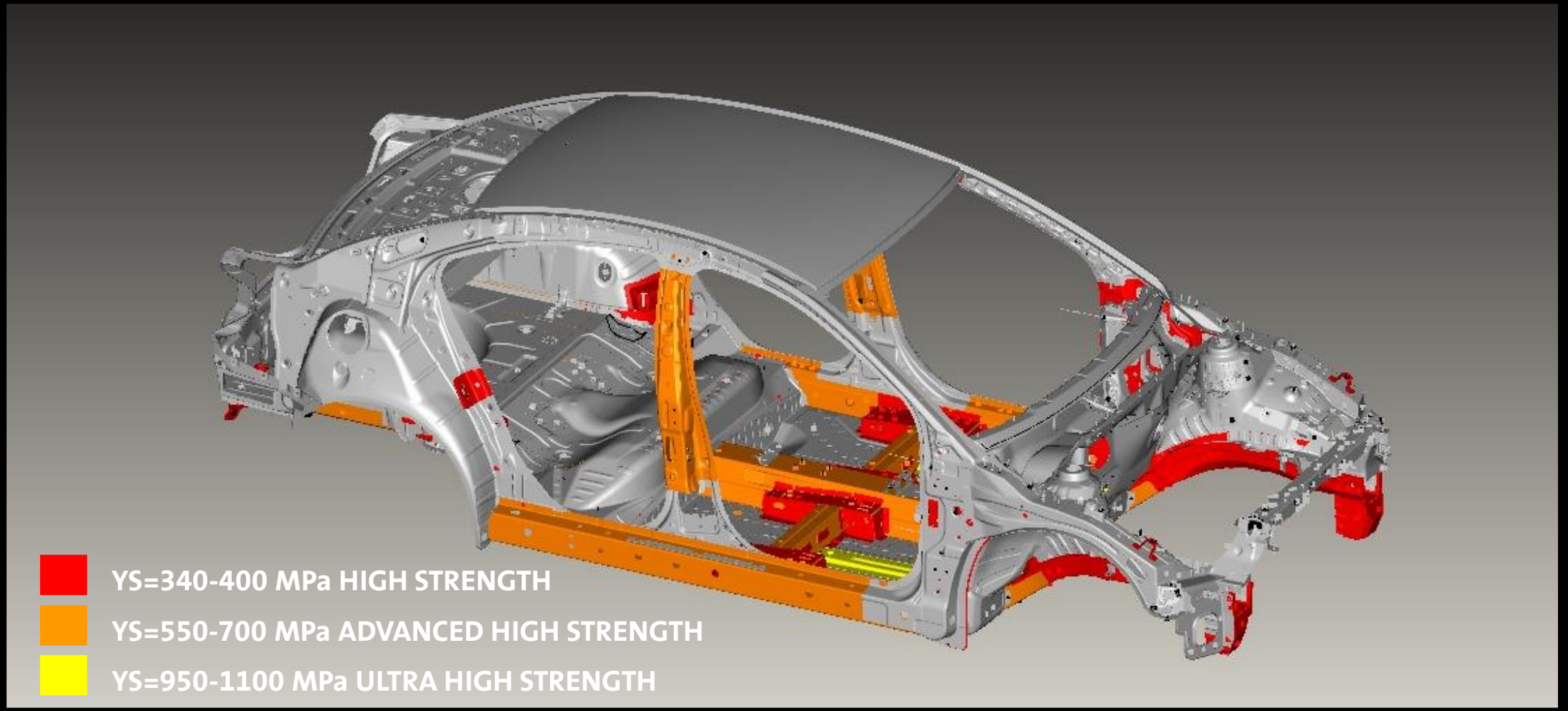
High Strength Steel Usage



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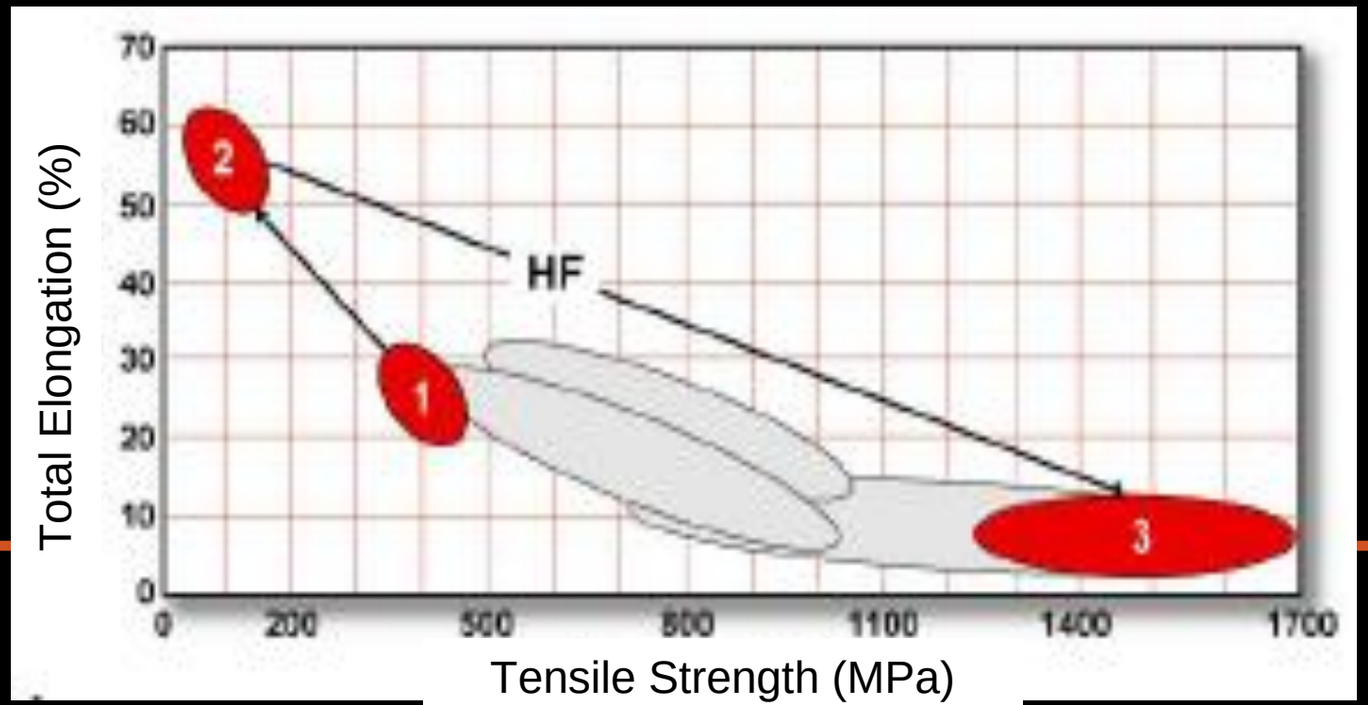
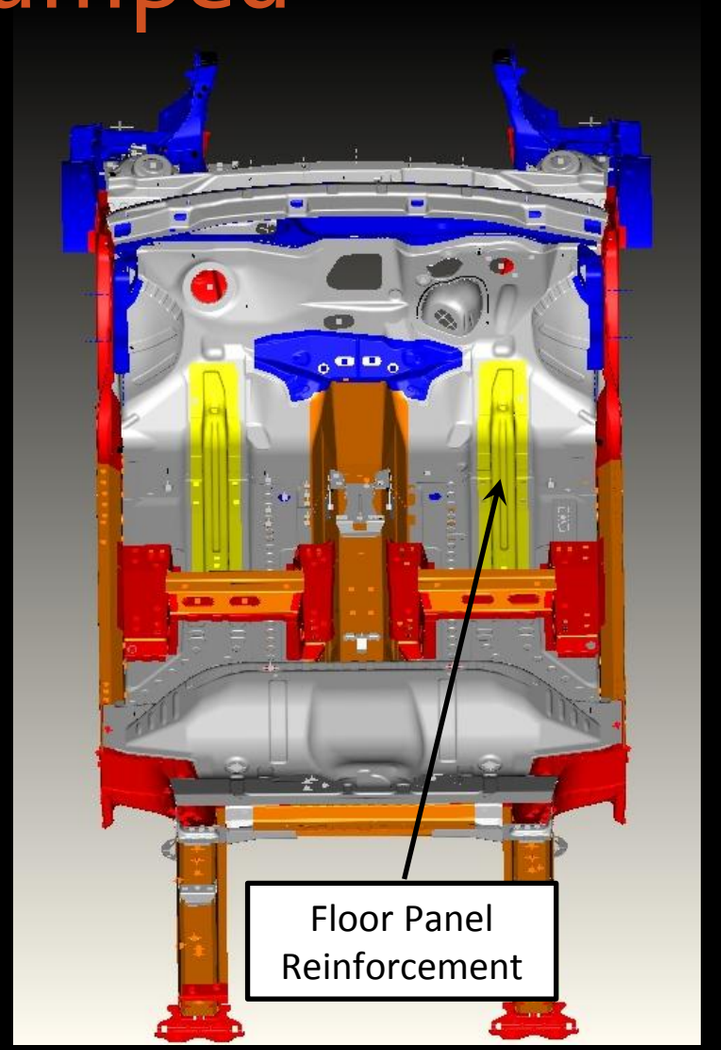
Steel Usage – Press Hardened / Hot Stamped

- Ultra high strength steel
- YS = 950MPa, TS = 1200MPa
- Blank is heated above 900˚C, stamped, quenched
- Enables complex geometry, little springback





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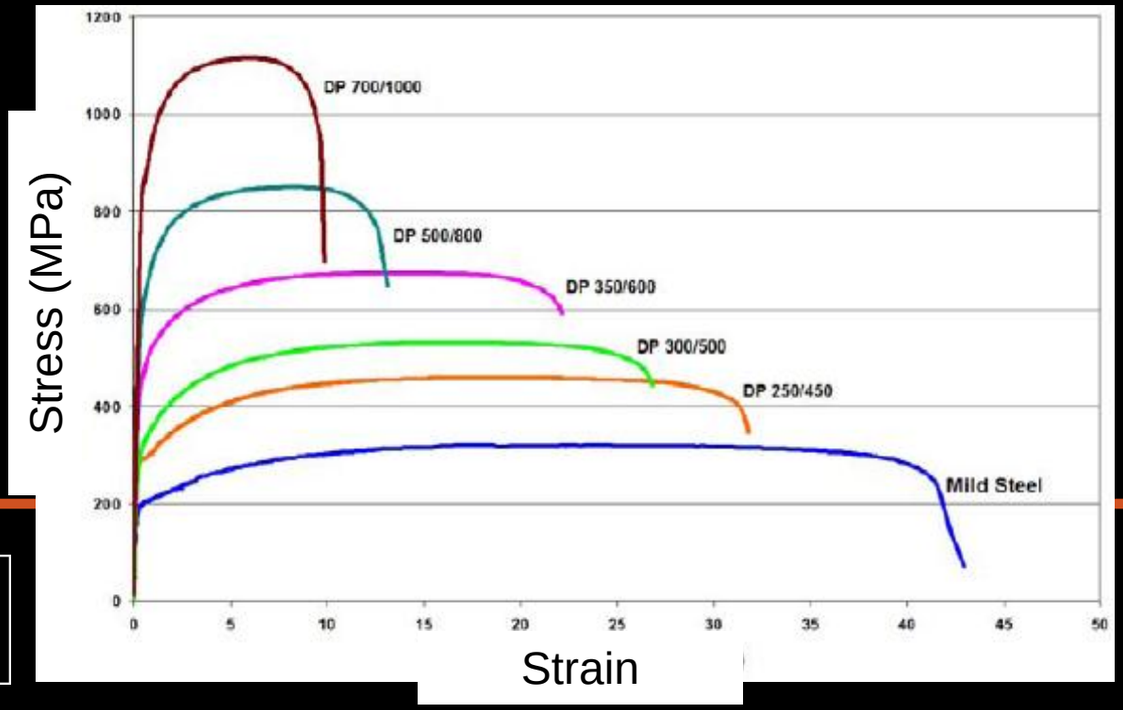
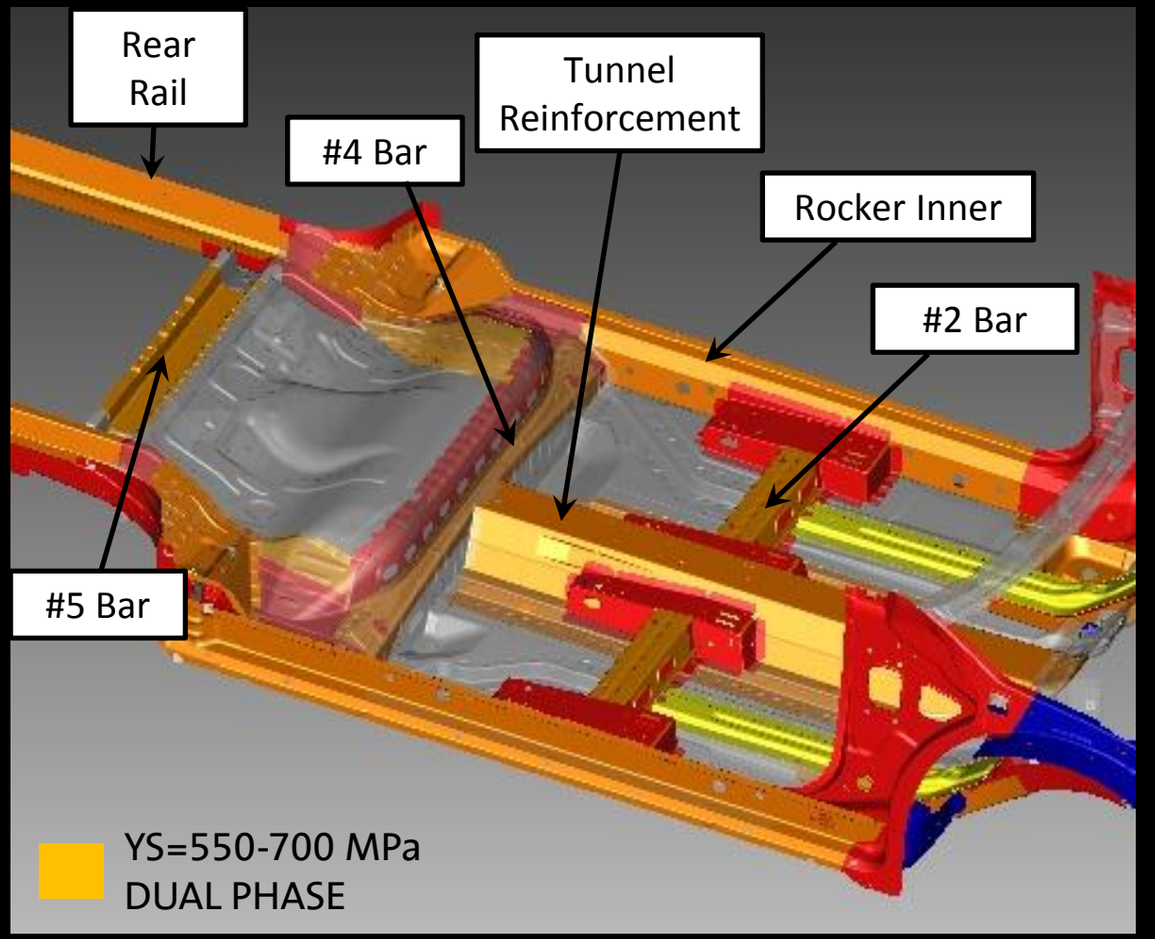
Steel Usage – Dual Phase (Underbody)

- Advanced high strength steel
- Rocker Inner, #4 Bar, #2 Bar, Rear Rail
- YS = 650MPa, TS = 980MPa
- Folding, bending, simple stampings





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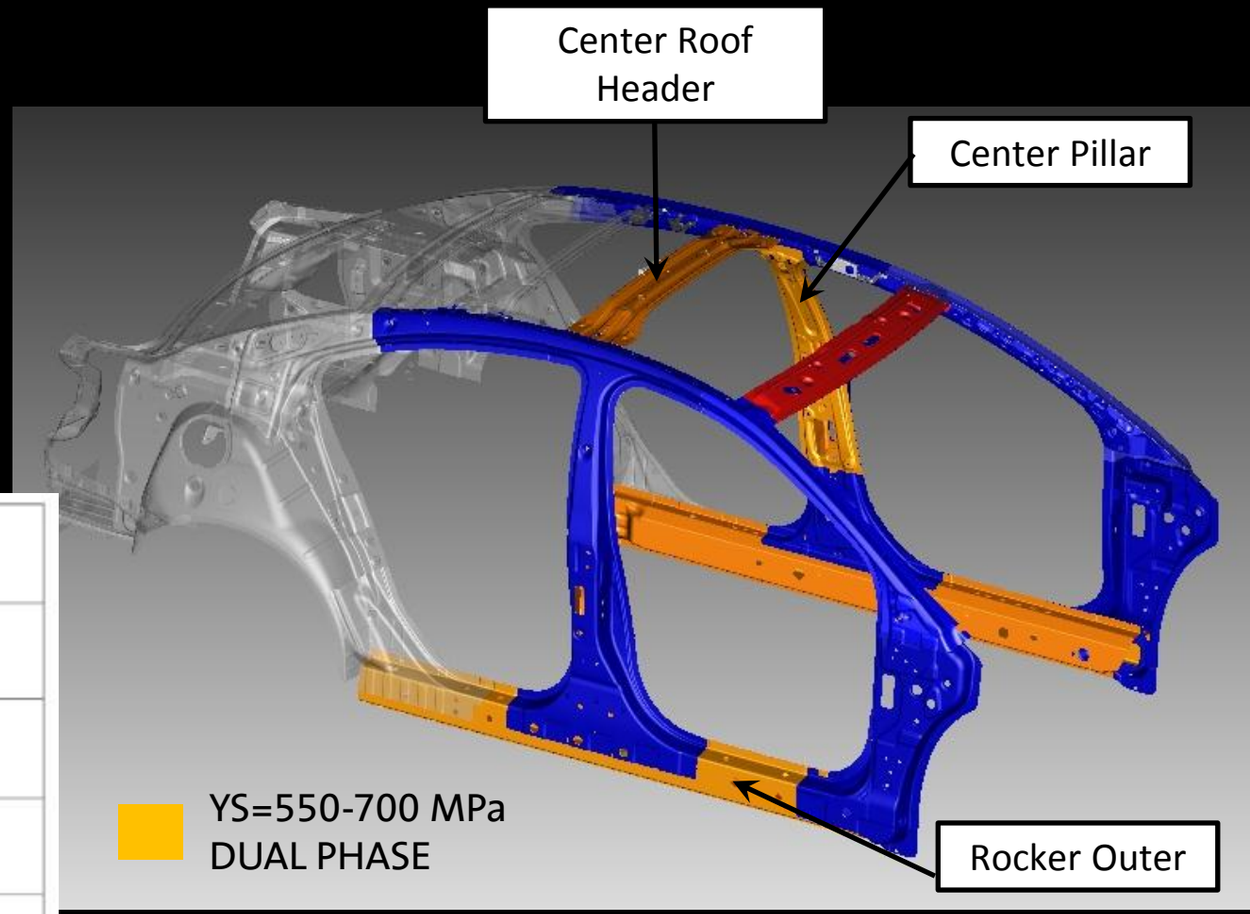
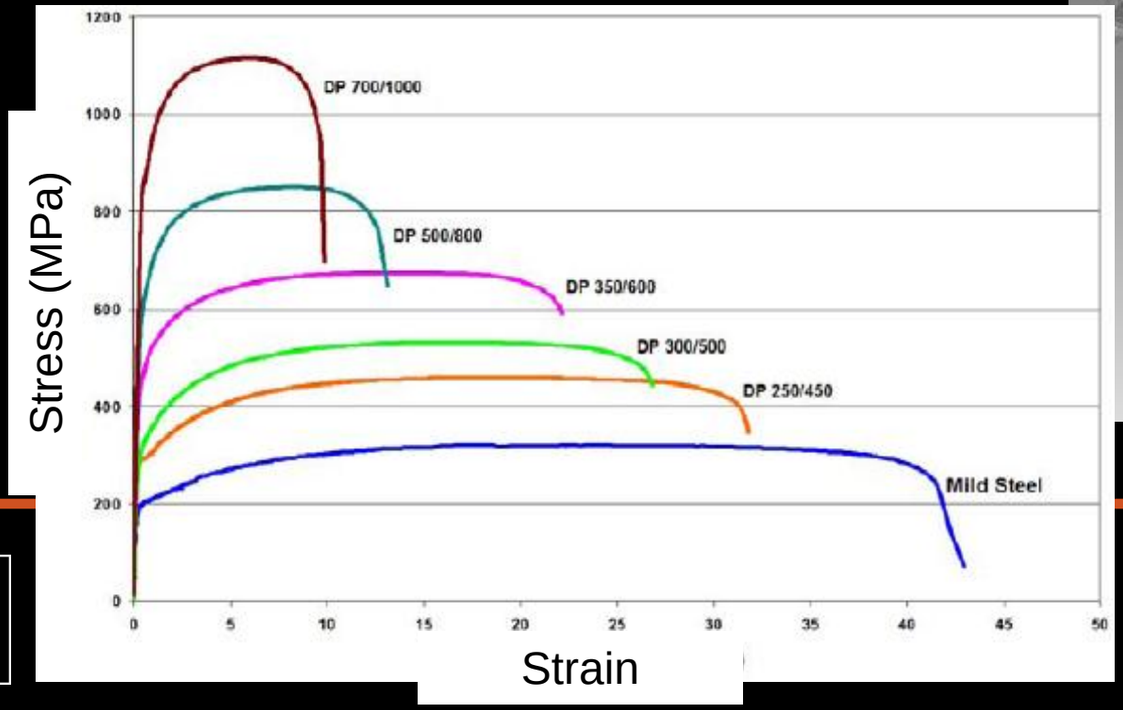
Steel Usage – Dual Phase (Uppers)

- Advanced high strength steel
- Centre Pillar, Roof Header, Rocker
- YS = 650MPa, TS = 980MPa
- Folding, bending, simple stampings





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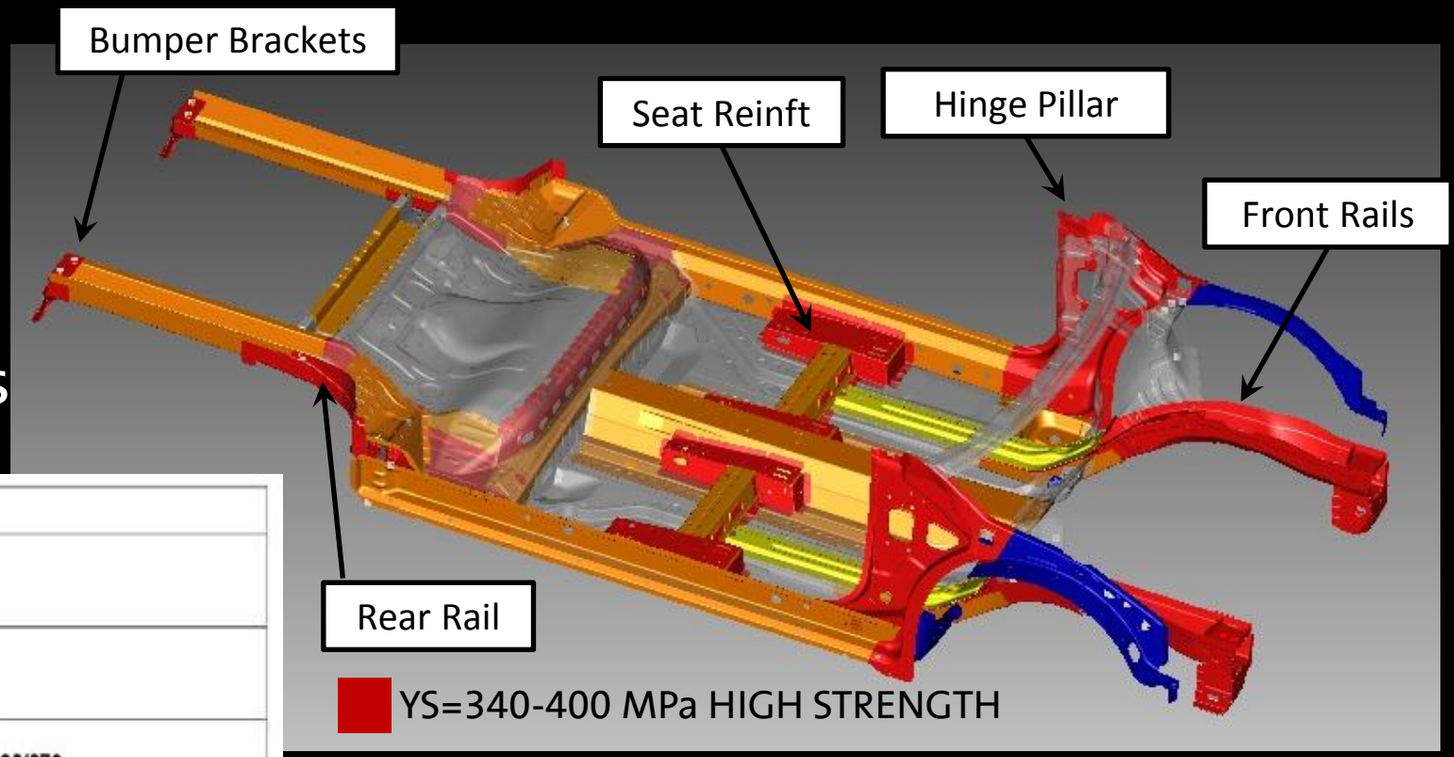
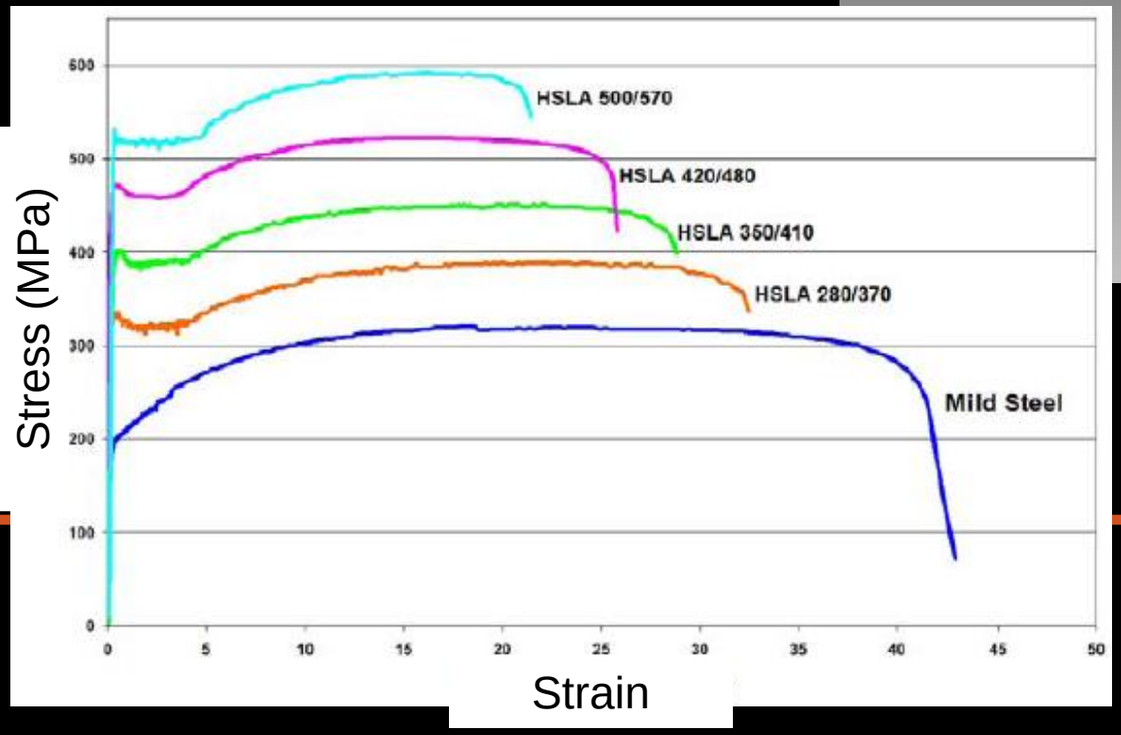
Steel Usage – HSLA (Underbody)

- Many underbody panels
- Yield strength = 340-400MPa
- Tensile strength > 400MPa
- Conventional stamping process





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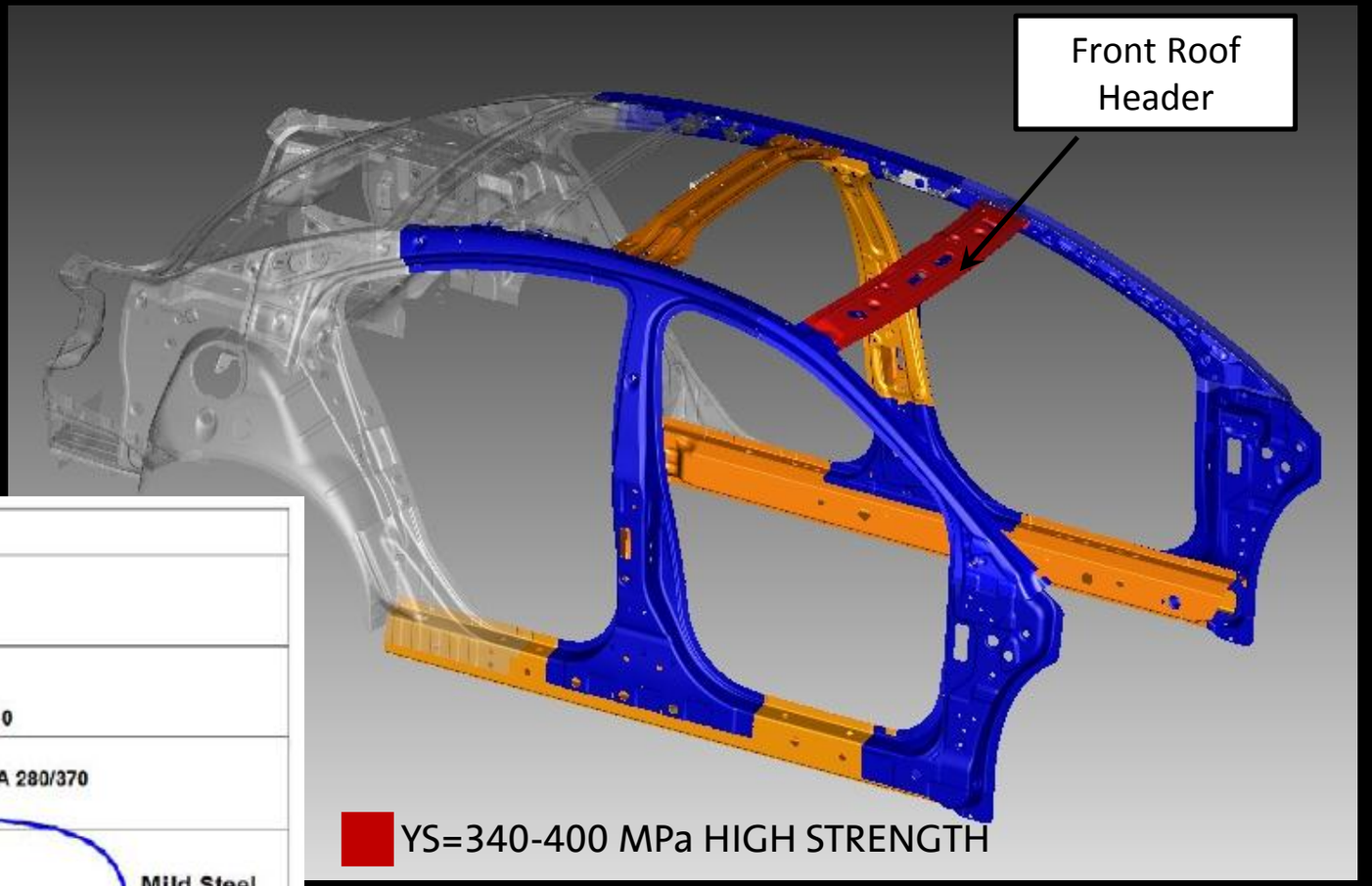
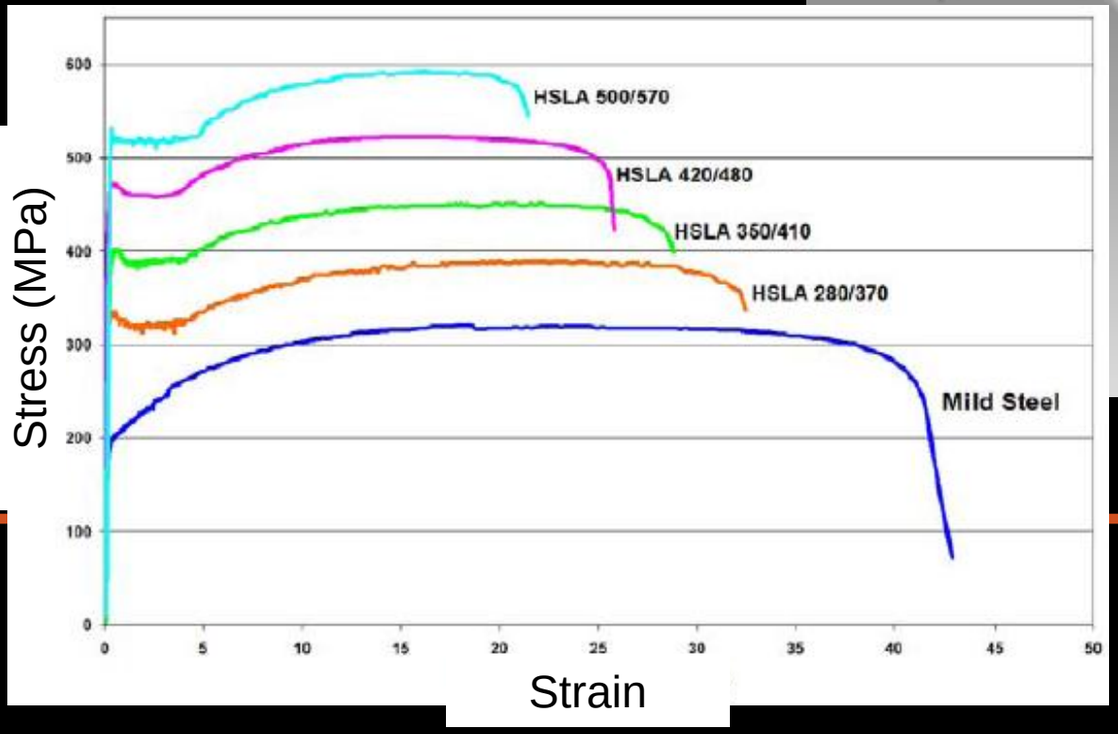
Steel Usage – HSLA

- Upper structure panels
- Yield strength = 340-400MPa
- Tensile strength > 400MPa
- Stamping process





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