
NA Automotive Steel Content Market Study Final Report Executive Summary

June 6th 2018

This Report Has Been Prepared Solely For :



- Steel continues to account for the majority material share of the average North American light vehicles curb weight in 2018 for body, bumpers and closure applications. Although this trend is expected to continue for the vehicle of the future, the adoption of alternative lightweight materials including aluminum for selected components is evident.
- The 2015 AHSS use in North American produced light vehicles is 279 pounds and expected to grow significantly to 570 pounds by 2025.
- In 2018, flat rolled steel accounts for 70%+ of all closures, 55% of all hoods, 50% of all bumpers and together with iron, 65% of the suspension control arms.
- As domestic OEMs, Ford, FCA and General Motors, have increased their utilization of AHSS in its vehicles between 2013 and 2018, while BMW and Honda are the AHSS/UHSS leaders for non-domestic OEMs.
 - The Silverado for 2019 will include higher strength steels for the frame and BIW, increasing the share of AHSS and UHSS by ~5%
 - The redesigned Honda Civic added applications for UHSS accounting for ~26% of the BIW, replacing some mild and AHSS applications
- The steel industry has made monumental strides in developing new advanced grades of steel and making them commercially available.
 - The continued preference and use of steel within the typical Body In White structures has limited the growth of alternative materials

Advanced high-strength steel continues its growth trajectory

- AHSS continues its growth trajectory with approximately 258 pounds per vehicle in 2018, surpassing our estimates in 2013 by ~4 pounds per vehicle.
- The 2018 North American light vehicle is estimated to have an average of ~1,480 pounds of flat rolled steel compared to ~1,615 pounds in 2013; similar to the reduction in average vehicle curb weight.
 - Variation in estimates between 2013 and 2018 may be attributed to the mix difference of production vehicles in 2013 vs. 2018 (greater share of SUV and PUP) as well as the vehicle launch cadence
- The 2018 average light vehicle content of flat rolled steel versus the 2013 flat rolled content per vehicle for body structures, closures, door beams, bumper beams, suspensions, sub-frames and wheels in pounds per vehicle has changed as follows:

2010 vs. 2013 Average Net Change in Steel Content by Grade in Pounds / Vehicle

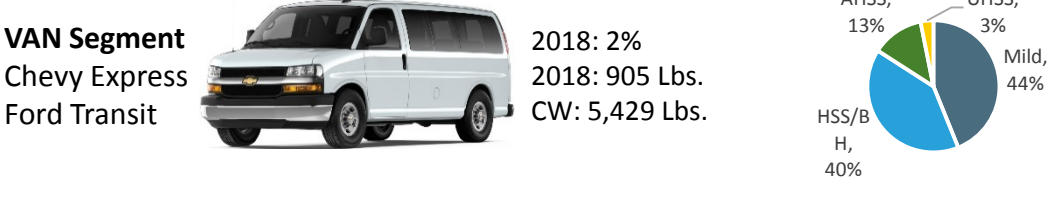
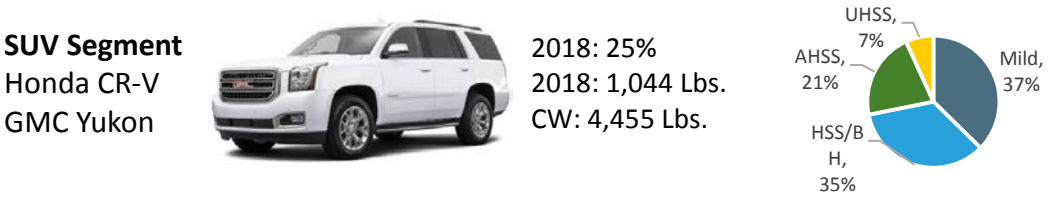
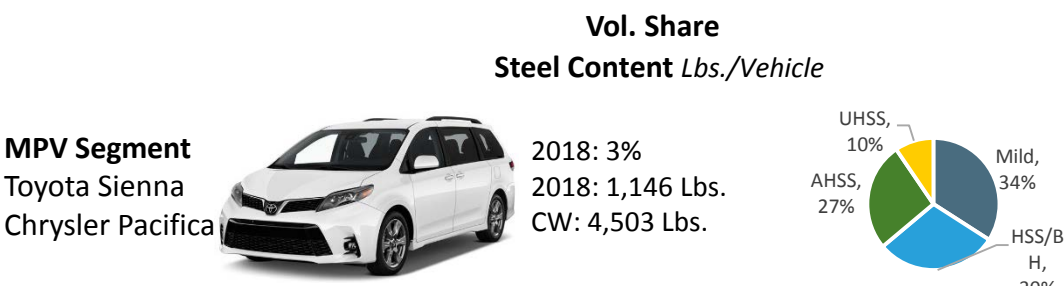
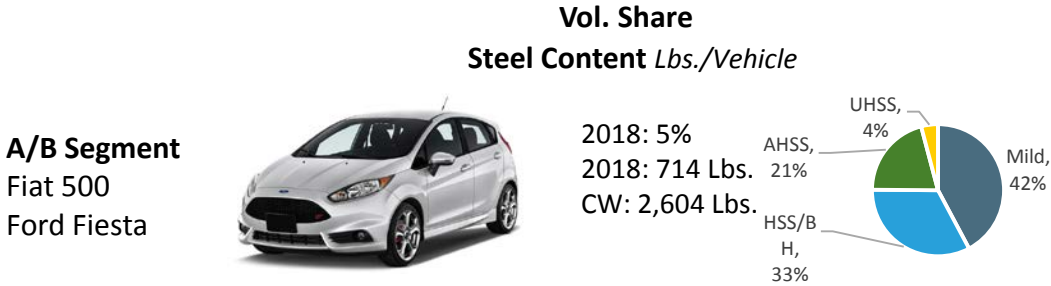
Mild Steel	BH & HSS	AHSS (DP)	UHSS
▼ 110.3	▲ 63.2	▲ 15.7	▲ 16.1

2013 vs. 2018 Average Net Change in Steel Content by Grade in Pounds / Vehicle

Mild Steel	HSS	BH	AHSS (DP)	UHSS/GEN3
▼ 153.9	▼ 36.0	▼ 70.0	▲ 70.0	▲ 19.9

Source: Ducker Assumptions; based on OEM and aluminum sheet producers

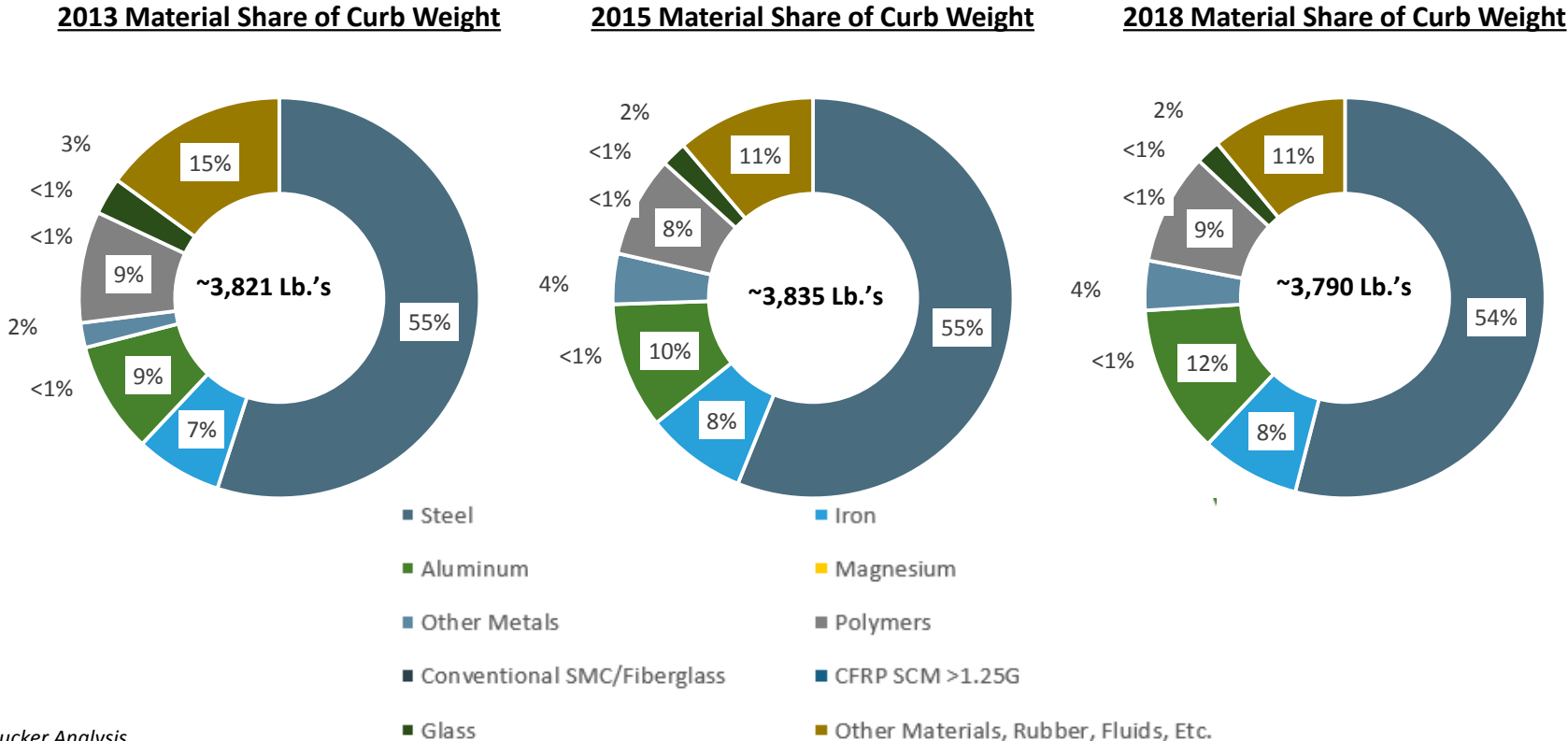
Share of steel grades is similar across vehicle class segments, with a slight increase in AHSS and UHSS on larger vehicles.



Source: LMC Production Forecast 4Q2017

Steel remains the primary material of choice for automotive materials.

- Ferrous materials in its various forms make-up nearly 62% of the materials mix in the average 2018 light vehicle.
- When comparing material content from 2013 to 2018, the steel overall percentage remains consistent at approximately 54%.
 - Aluminum content takes some share away from iron content (blocks, knuckles, control arms etc.)
 - AHSS content replaces mild steel, and in some instances replaces HSS in applications where part geometry and formability can be addressed with advanced grades of steel



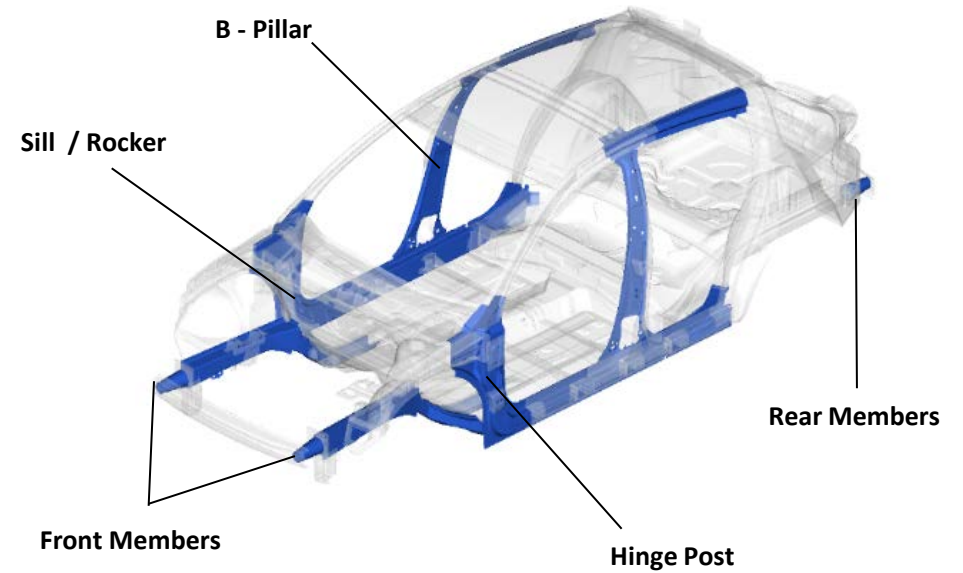
Source: American Chemistry Council & Ducker Analysis

3rd Gen AHSS have a dual pathway of automotive utilization, the first and more near term would take advantage of 3rd Gen AHSS's higher strength and elongation to replace heavier HSS and HSLA applications.

3rd Gen AHSS Applications Replacing HSS & HSLA

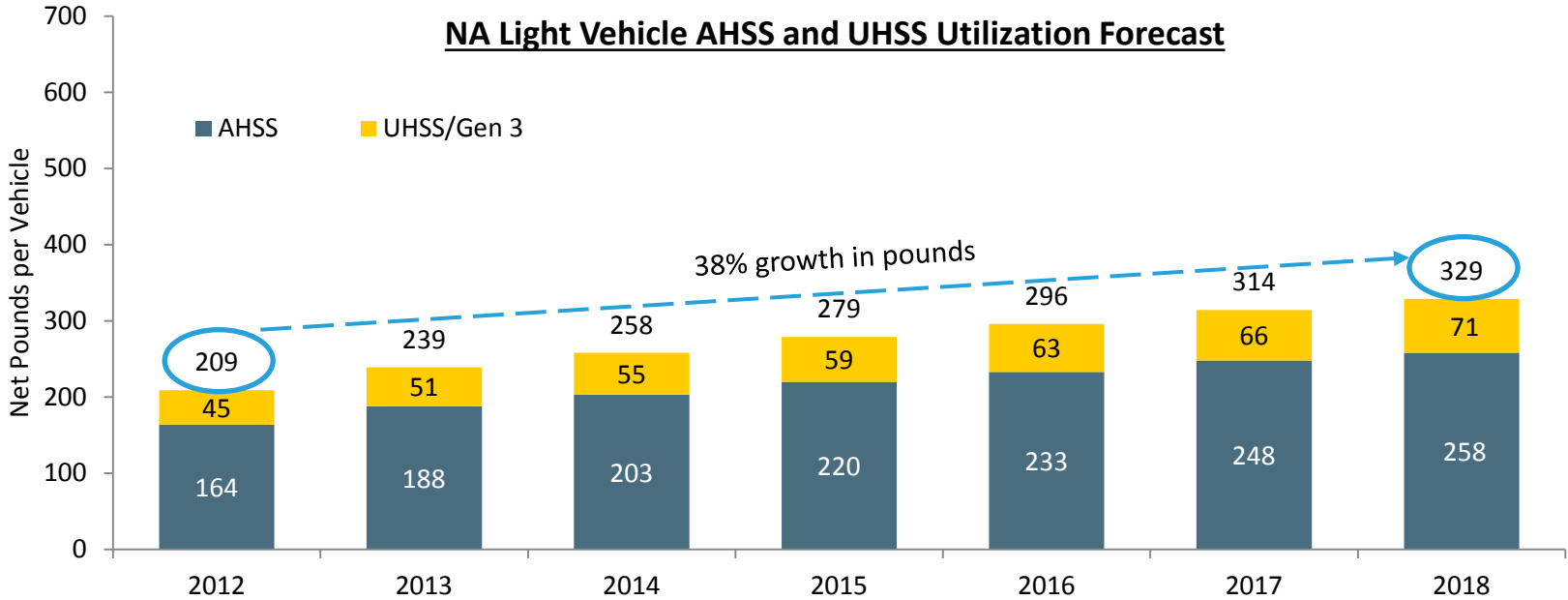


3rd Gen AHSS Applications Augmenting PHS/AHSS



The 2018 AHSS and UHSS use in North American produced light vehicles is 329 pounds per vehicle, a significant increase from 2013, translating to an additional 90 pounds or a 38% growth from 2013.

- Between 2012 and 2018, there has been a net increase of AHSS/UHSS grades of steel of ~120 pounds per vehicle. This translates to an annual average growth of 20 pounds per year.
 - As OEMs continue to monitor EPA goals and consumer preferences, vehicle launch dates and the expected increase of new vehicles in 2019, translate to further AHSS/UHSS growth in 2019 and beyond
- AHSS/UHSS have proven mass savings capabilities as compared to mild and HSS/HSLA. This along with the higher strengths for occupant safety remain the key fundamental drivers.
 - Depending on the OEM, and the vehicle class there are mass and cost tradeoffs that values AHSS/UHSS over other competing materials

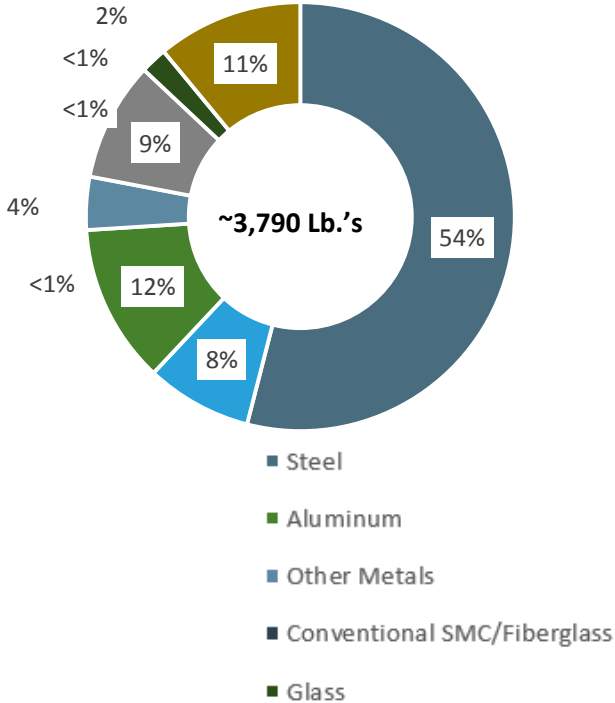


*Excludes ~2% used for service / crash parts
Numbers may be +/- 1-2% due to rounding error and estimation*

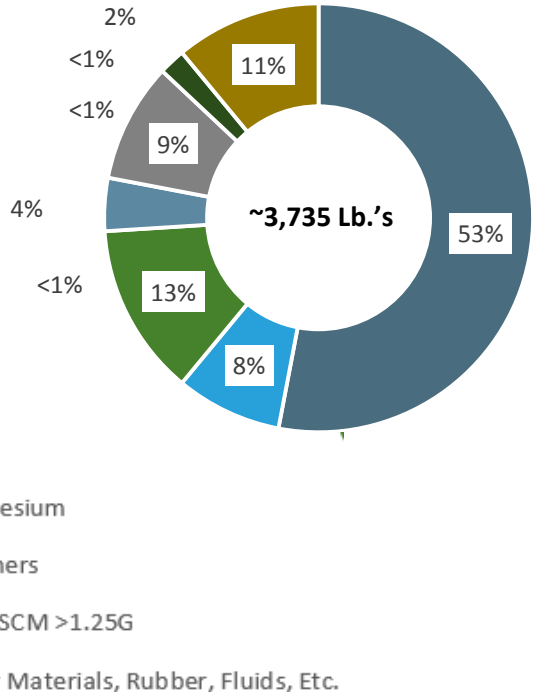
Steel remains the primary share of automotive materials into 2020.

- Aluminum will continue to gain share of curb weight, increasing by ~30 pounds per vehicle by 2020.
- Advanced grades of steel will continue to hinder further growth of all competing materials.

2018 Material Share of Curb Weight



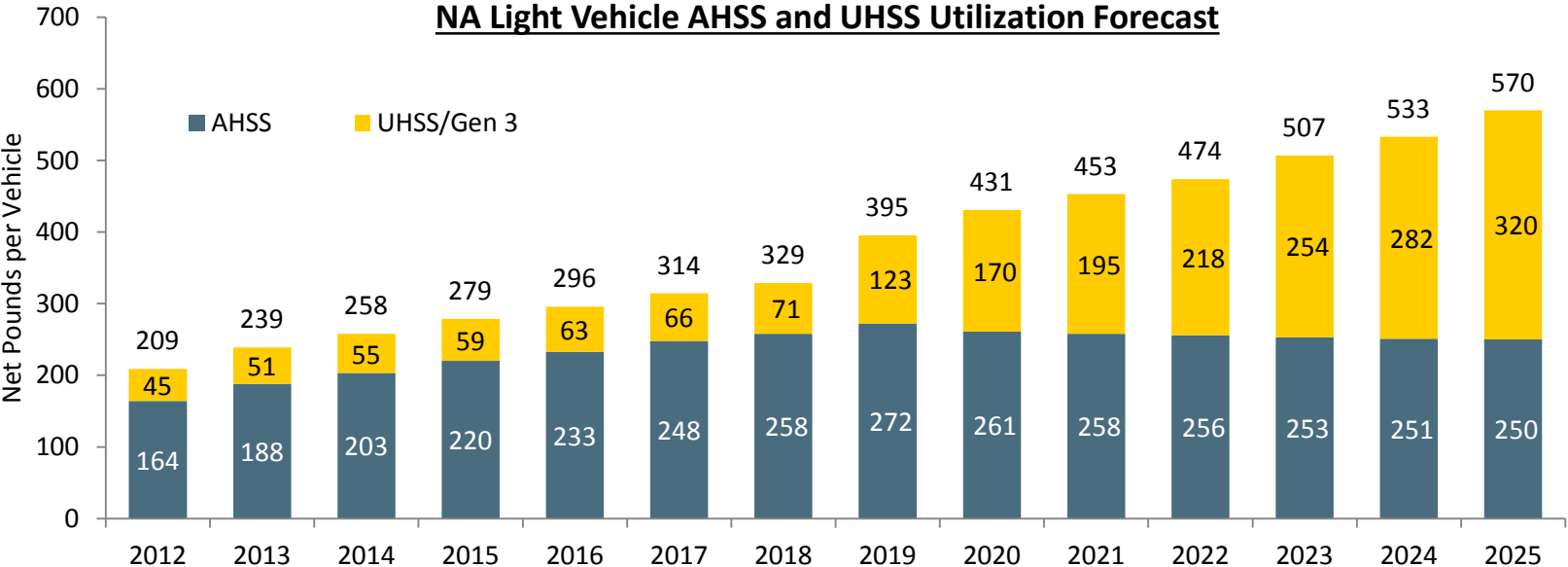
2020 Material Share of Curb Weight



Source: American Chemistry Council & Ducker Analysis

The 2015 AHSS use in North American produced light vehicles is 279 pounds and expected to grow significantly to 570 pounds by 2025.

- Adoption rates and estimates vary by OEM; however, beyond 2020, AHSS pounds per vehicle will decline, while UHSS continues to grow.
- Growth of advanced grades of steel has increased since the 2013 report, where 2019 was 351 pounds, and 2025 was 483 pounds.
- From 2019 to 2025, there will be a net increase of AHSS/UHSS grades of steel of ~175 pounds per vehicle. This translates to an annual average growth of 30 pounds per year.
 - The time period between 2019 and 2025 will demonstrate accelerated growth for UHSS and will be driven by the OEMs desire to meet global vehicle standards, the expected EPA goals, the number of new vehicle platform launches as well a general increase in vehicle production
- AHSS/UHSS have proven mass savings capabilities as compared to mild and HSS/HSLA. This along with the higher strengths for occupant safety remain the key fundamental drivers.
 - Depending on the OEM, and the vehicle class there are mass and cost tradeoffs that values AHSS/UHSS over other competing materials



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THANK YOU.

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www.ducker.com | info@ducker.com



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