

Implementation of Aluminum in High Volume Car Body Design & Manufacturing

GALM, August 20, 2015



Constellium: Three Business Units



Aerospace and Transportation

- € 1.197 billion in revenues
- #1 worldwide for aerospace plates
- #1 in the USA for large coils
- #2 worldwide in general engineering plates



Packaging and Automotive Rolled Products

- € 2.573* billion in revenues
- #1 worldwide in closure stock
- #2 in Europe for can body stock and #3 in North America
- Major player in auto body sheet: #4 worldwide



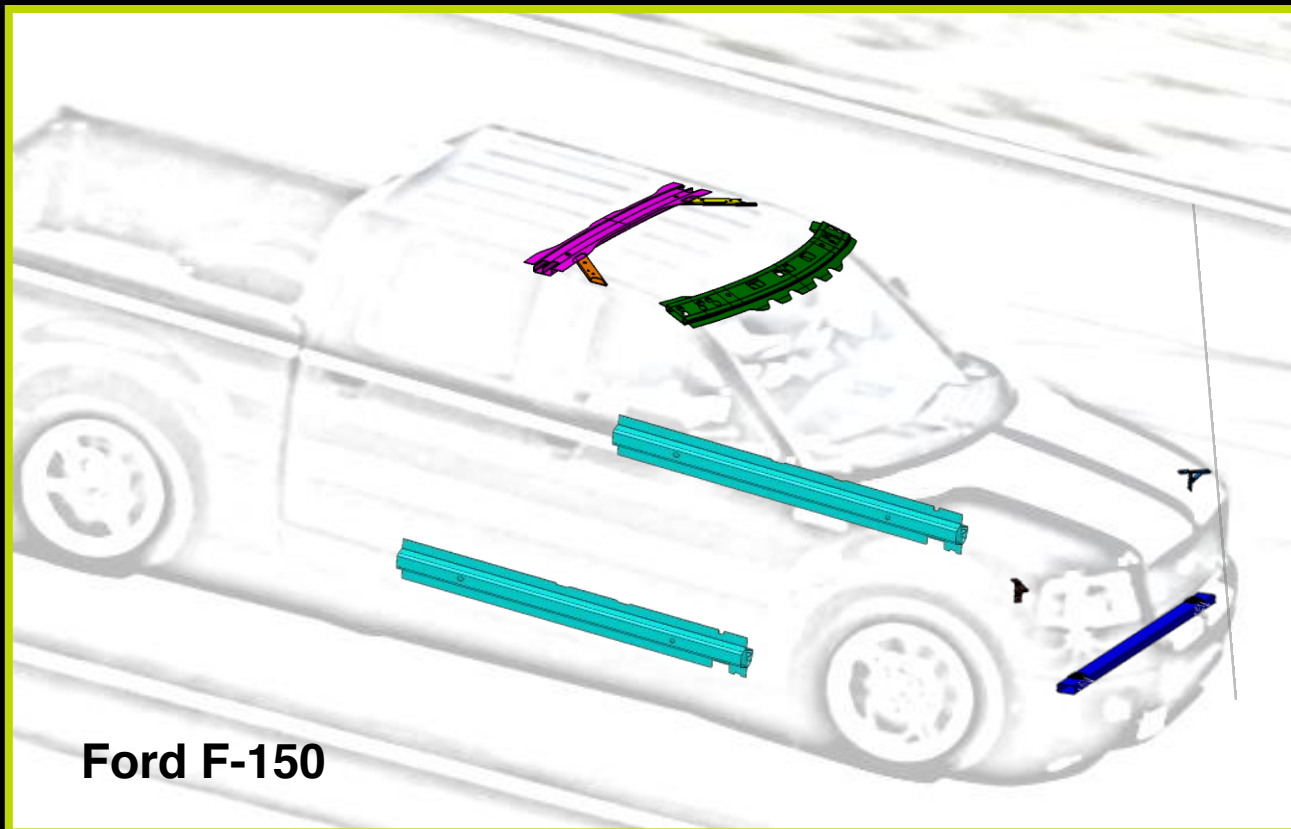
Automotive Structures and Industry

- € 921 million in revenues
- #1 in Europe for large profiles
- #1 in Europe for hard alloy extrusions
- #2 worldwide in crash management systems

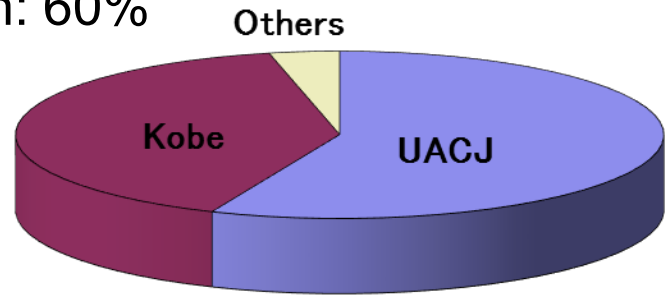
* The combined unaudited pro forma revenue information for the year ended December 31, 2014 presented above gives effect to the acquisition of Wise as if it had occurred on January 1, 2014. This information is presented for information purposes only and does not purport to represent what Constellium actual revenues would have been had the acquisition occurred on the date indicated, nor is it necessarily indicative of future results.

Constellium Automotive Structures

- Full range of alloys and processes to accommodate the OEM needs
- Major supplier of BiW structural parts in Europe and largest in North America



UACJ market share in Japan: 60%



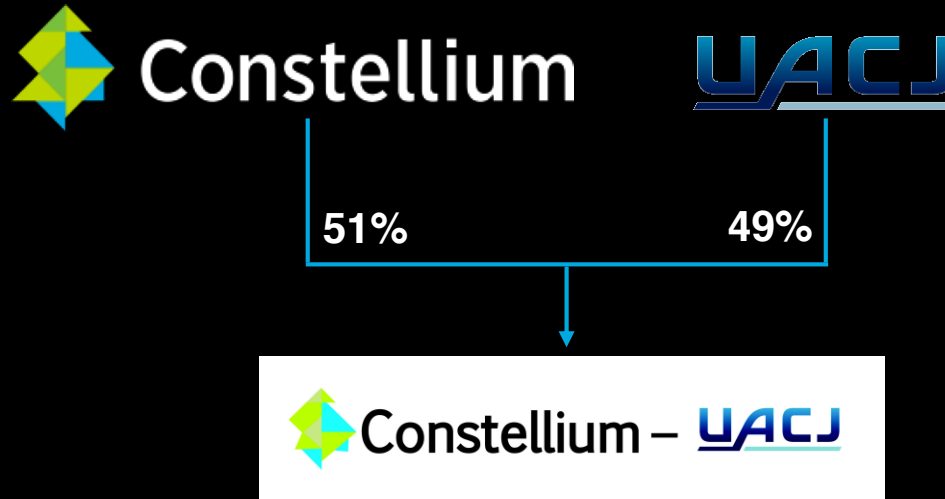
Customers: Toyota, Nissan, Honda, Mitsubishi, Subaru, Mazda

Applications: Skins, Panels, Reinforcements, Door Panels, etc.

Main Models:



Response to the US BiW sheet demand: Constellium – UACJ Joint Venture



■ Combined customer portfolio

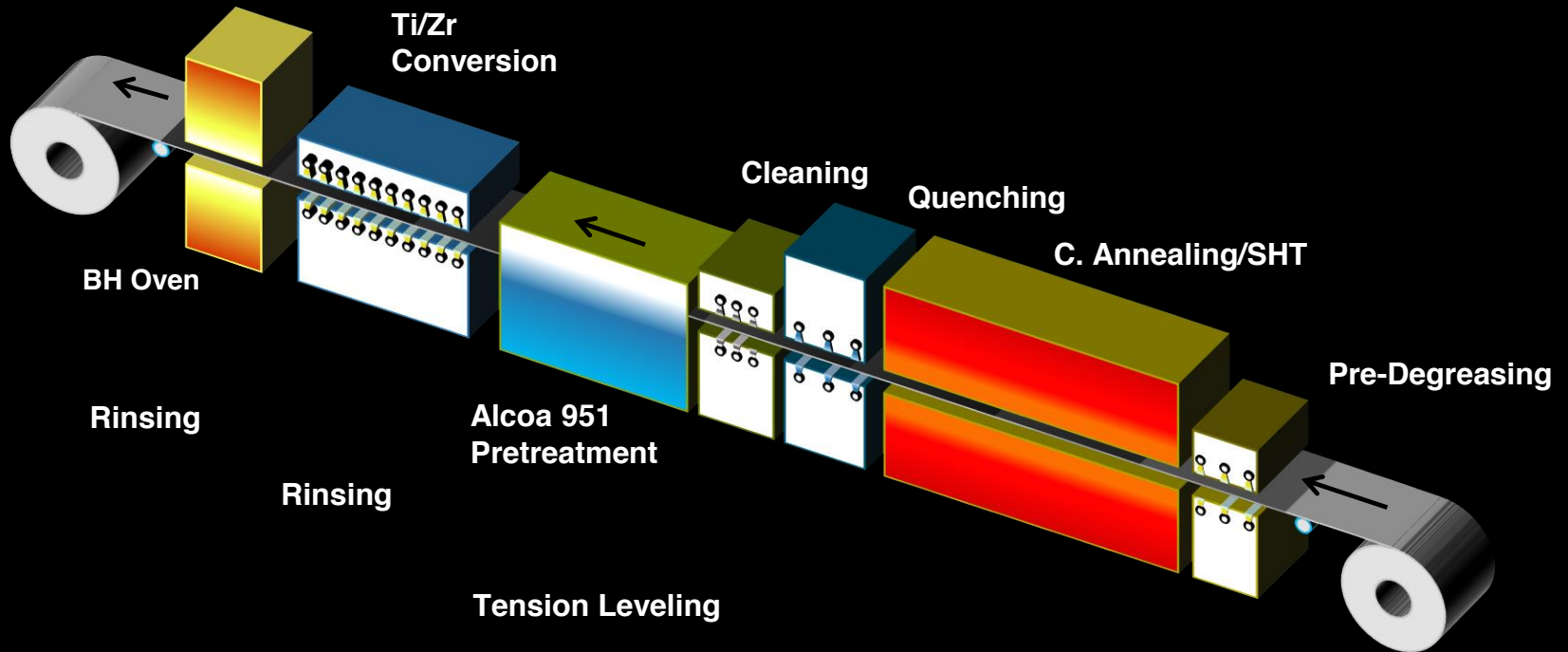


New Constellium-UACJ plant in Bowling Green, KY

- Devoted to aluminum automotive body sheet
- 240,000 square feet
- Full portfolio of 5XXX and 6XXX alloys
- In-line pretreatment and lubrication
- Maximum width: 2200mm
- Maximum gauge: 3.2mm
- Separate coil completion line



Continuous Annealing Line with Pre-Treatment





Key development driver: No compromises

STYLE



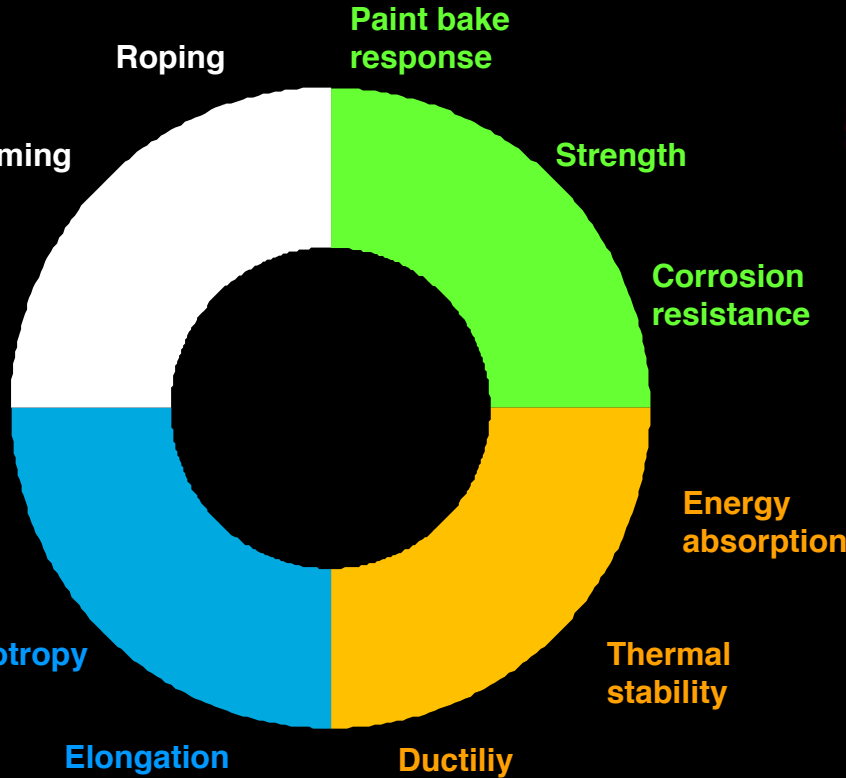
LIGHTWEIGHTING



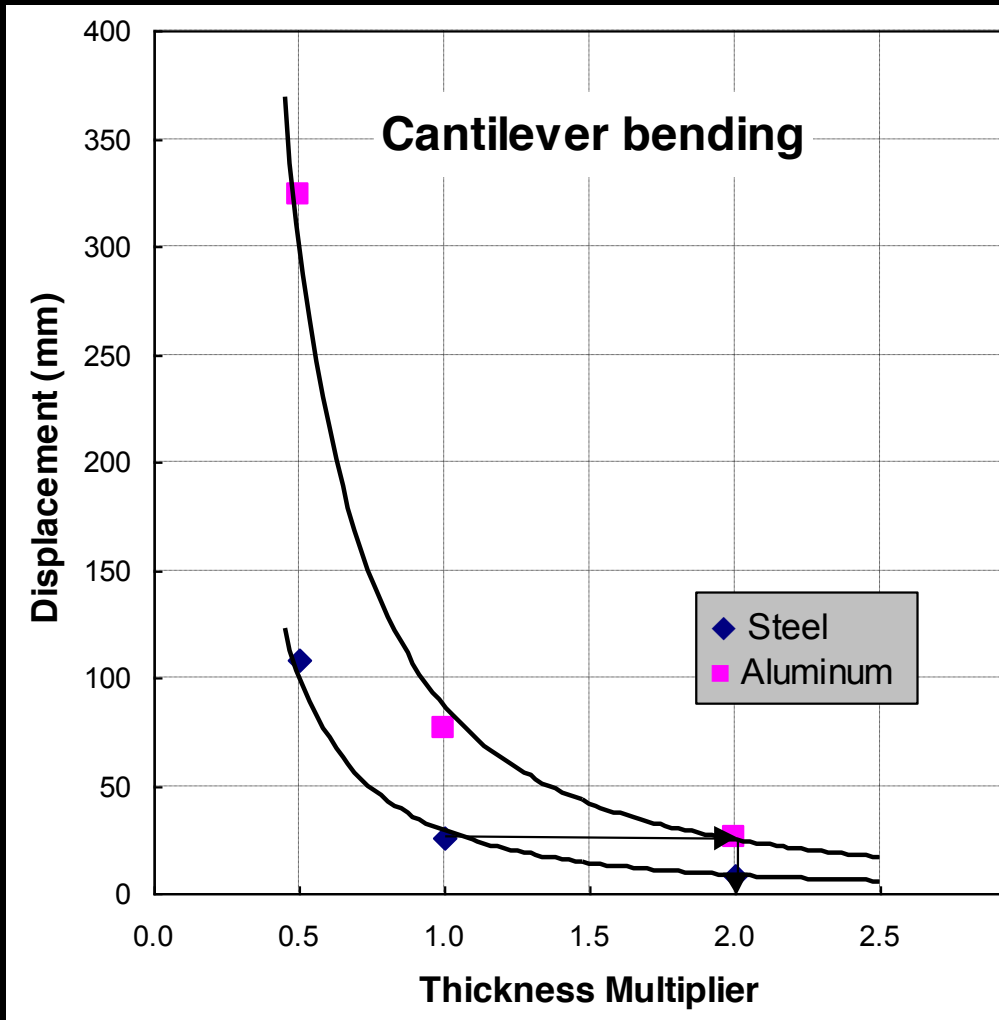
DESIGN



SAFETY



Design for weight savings: Stiffness



- Stiffness dominated BIW
- Combination of membrane and through-thickness bending
- Increase through-thickness bending component
 - ▶ Strategic placement of reinforcements
 - ▶ Limit buckling modes

Sheet or extrusions for BIW structures?

	Extruded components	Sheet components
Open/Closed sections	<ul style="list-style-type: none">■ Easy to implement closed sections	<ul style="list-style-type: none">■ Open. Close sections need assembly
Section type	<ul style="list-style-type: none">■ Complex, multiple chambers■ Constant along part	<ul style="list-style-type: none">■ Multi-piece sections necessary■ Variable along part
Component thickness	<ul style="list-style-type: none">■ Variable	<ul style="list-style-type: none">■ Constant
Features & fasteners	<ul style="list-style-type: none">■ Cost adder	<ul style="list-style-type: none">■ Easy to implement
Cycle time	<ul style="list-style-type: none">■ 2-6 spm	<ul style="list-style-type: none">■ 5-20 spm

Sheet and extruded components are complementary, allowing the optimization of the performance/cost equation

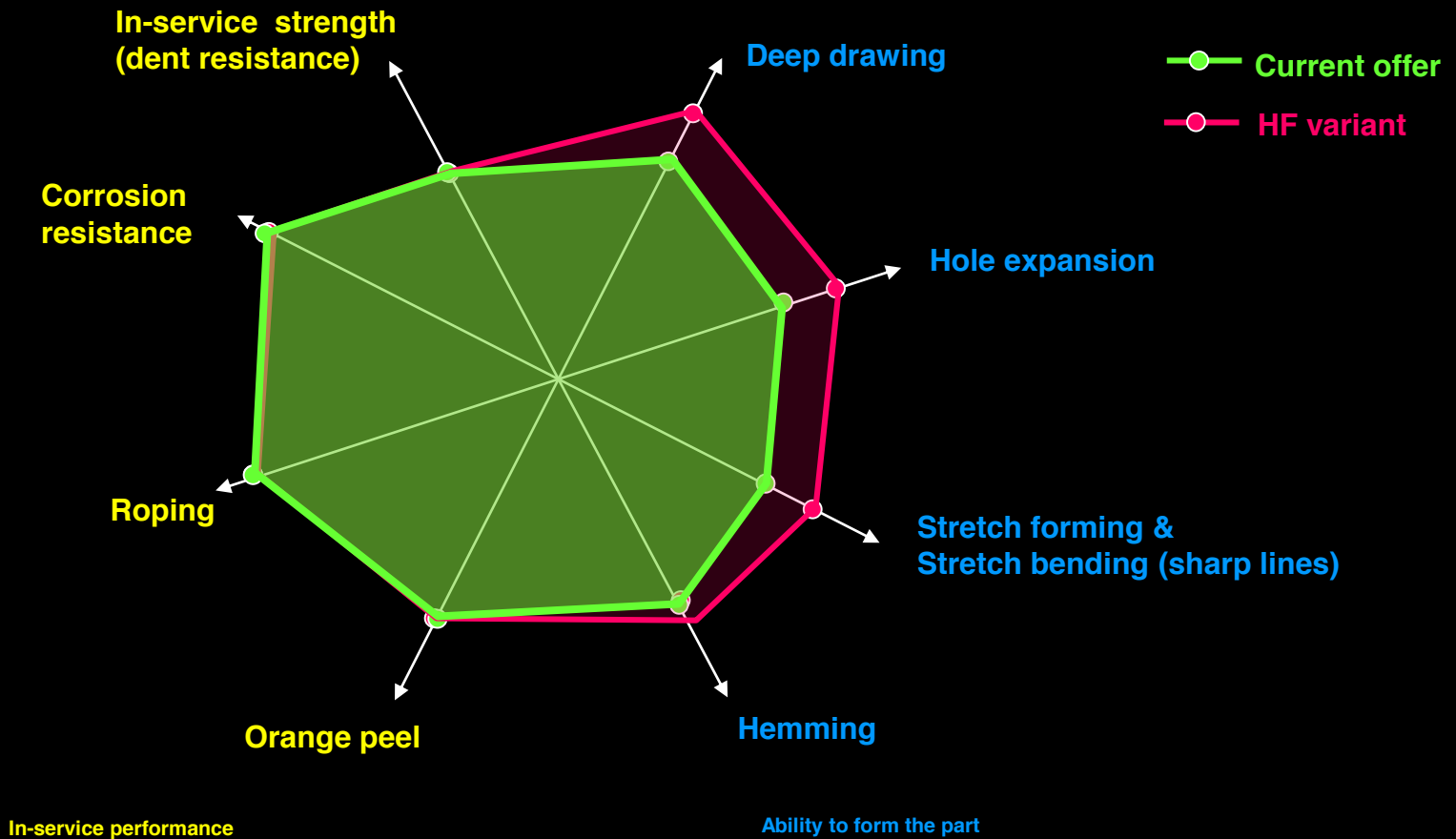
Formability: Current designs require sharp lines

- Request from OEMs: skin alloys that allow very sharp character-lines
- Combination of high work hardening @ high strains, coupled with bendability



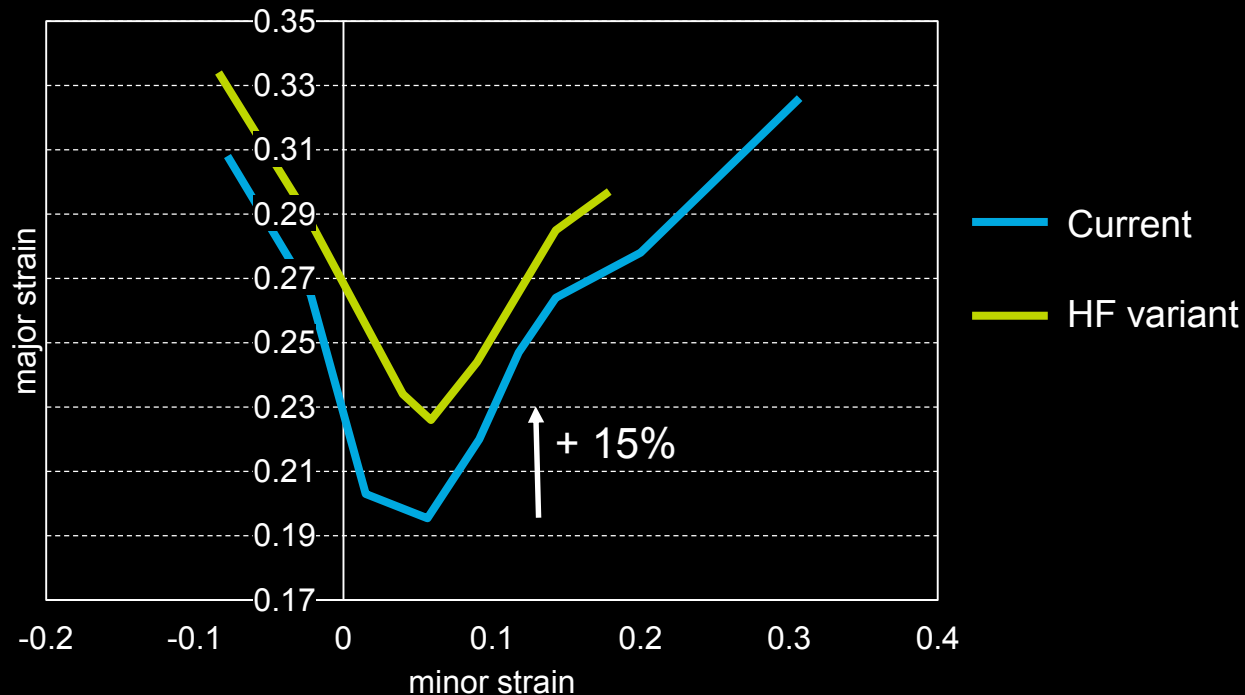
Outer skin alloys requirements

Constellium-UACJ development strategy for exterior BIW:
Stretching boundaries w/o sacrificing established design envelope



Highly formable skin alloys for complex outer panels

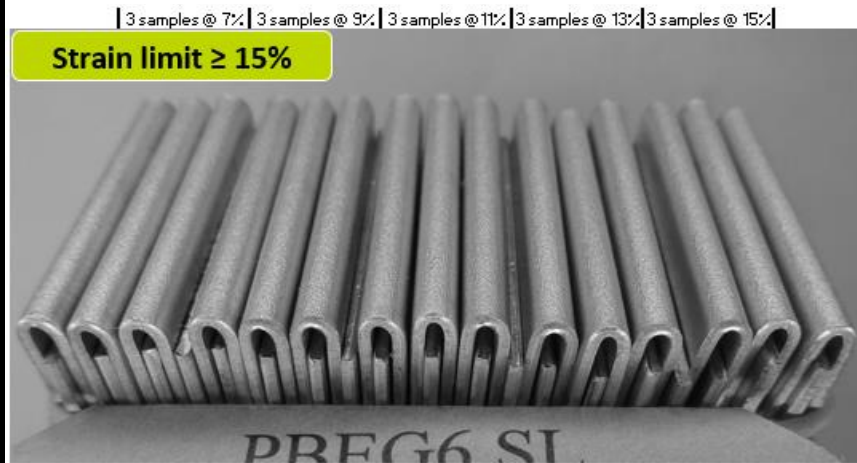
- All the formability criteria improved in reference with the incumbent Surfalex®
- → Forming limit curve is improved, particularly in plane strain, which helps form sharper character lines



Bendability meeting highest OEM requirements

Prestrain // RD

Prestrain // TD





Summary

- Sheet and extruded components will continue to share the car design space in BIW construction.
- Constellium and UACJ, established sheet suppliers in EU and Japan, are expanding in the NA market.
- Greenfield SHT facility in Bowling Green, KY, will start production in 2016, supplied by Constellium and UACJ mills.
- Shared technological advancements focus on extending the range of designs that can be achieved with high production methods.

Thank you for your attention!

Please visit Constellium-UACJ at booth #23.