

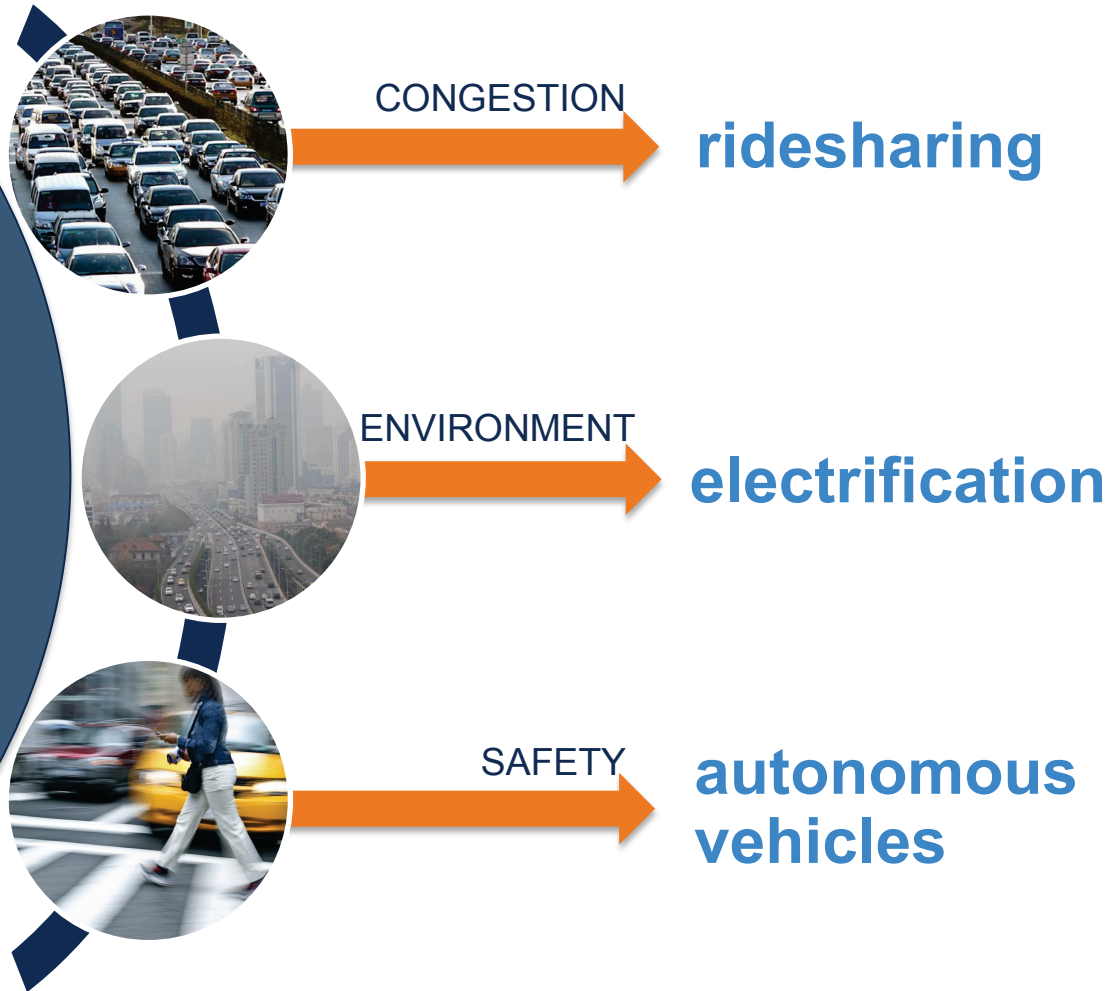
A Suppliers Perspective to Growth

Society of Automotive Analysts

THE NEW MOBILITY WORLD



Urbanization



Urbanization trends are driving changes in governmental regulations, consumer behavior and the automotive industry

Lightweighting will play a critical role in expediting and maximizing these trends



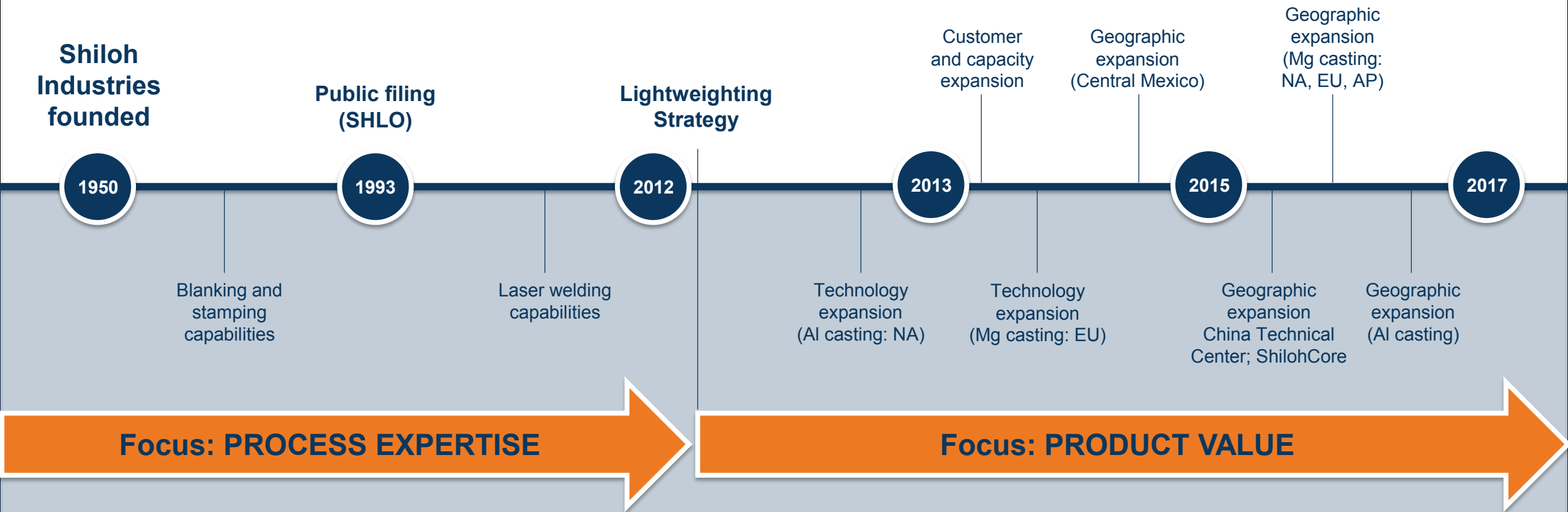
The Shiloh Value Proposition

- ✓ Reduce weight
- ✓ Reduce complexity
- ✓ Reduce emissions
- ✓ Reduce overall cost
- ✓ Reduce fuel consumption



Safe. Silent. Strong. Sustainable.

TRANSFORMATION OF CAPABILITIES



Increased scale, geographic diversity and focus on product and solution-based value proposition

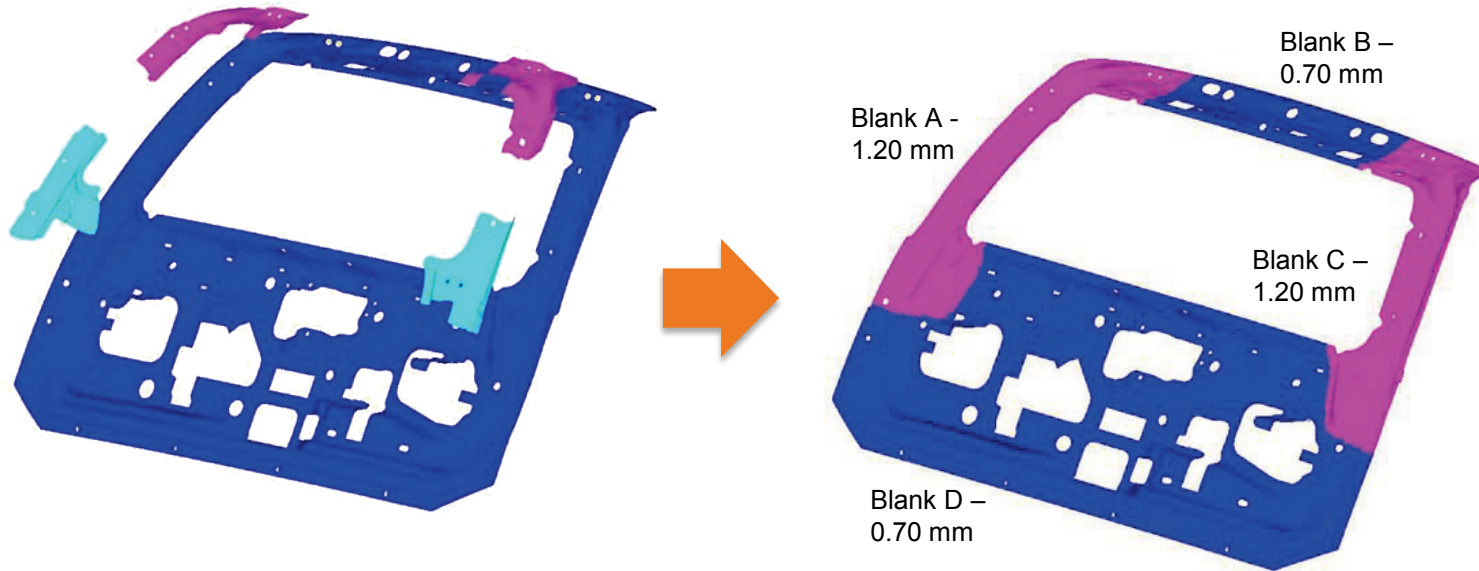
THE BEGINNING

Advanced Integration



Liftgate Inner and Reinforcements

4-Pc Curvilinear LWB Liftgate Inner



- Eliminates 4 parts
- Steel savings of 5.45 kg
- Vehicle mass savings of 0.90 kg
- Variable Step Technology can be used for sealing issues



PRODUCT FOCUS

Body & Interior Structures

Alternative solutions for OEM design needs



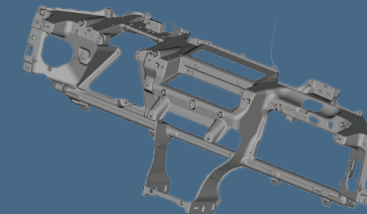
Steel Solutions:
Strong and affordable



Hybrid Solutions:
Customizable for
any requirement



Magnesium Solutions:
Ultra lightweight and
high performance





PRODUCT FOCUS

Chassis Systems

Engineered to
add strength and
reduce weight
were needed

Frame Rails:

Multi-material and multi-thickness



Shock Towers:

Optimized multi-material solution



Engine Cradles:

Multi-material, high-strength cross members



Rear Rails:

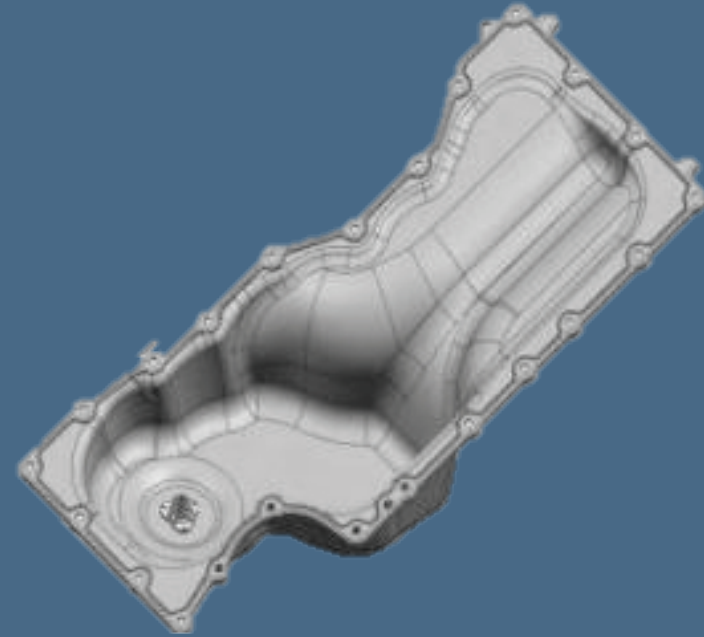
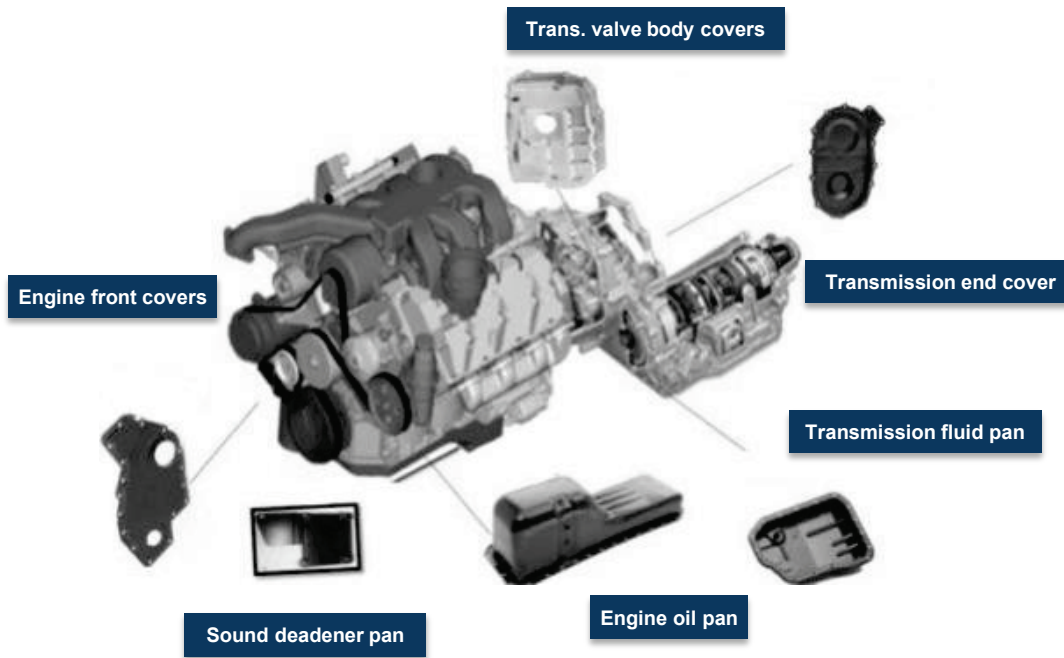
Lightweight, stiff and strong



PRODUCT FOCUS

Propulsion Systems

Technology-led designs to reduce NVH without adding weight



**Proprietary ShilohCore™
on a Crankcase
Reservoir System:**

lightweight; reduced noise and vibration; corrosion resistant



NOISE-REDUCING TECHNOLOGIES

Advanced Materials - ShilohCore™ Dash Panel



- Maintains NVH performance for “Life of Vehicle”
- Reduced manufacturing floor space requirements
- Enabled use of UHSS frame rail while maintaining NVH damping
- ShilohCore applied to vertical surfaces not accessible to LASD robots
- Dash panel stamped with damping patch already in place on the blank
- Slots and welds required for formability of the patch



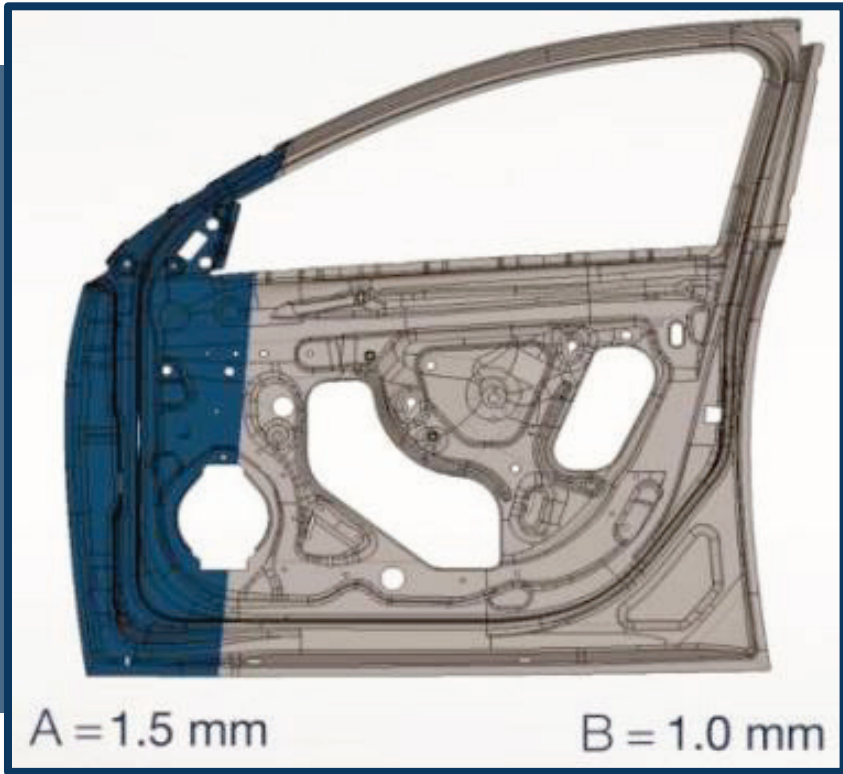
Reduced total system cost

Reduced weight by 2kg

Reduced NVH by 2dB

NEXT GENERATION TECHNOLOGIES

Advanced Processes - Aluminum Laser Welding



Reduce weight
and optimize
material without
compromising
performance and
formability

Aluminum monolithic door inners
versus Shiloh's aluminum laser
welded door inners

- 20% reduction in weight
per vehicle
- 25% cost savings

THE FUTURE

It's a Mixed Material World



The future of lightweighting will require more and more multi-material product solutions

We continue to develop core knowledge and expertise:

Materials

- Alloy steels: mild, HSS/AHSS, next generation, stainless
- Aluminum alloys
- Magnesium alloys
- NVH materials

Multi-material joining

- Adhesives
- Mechanical Joining
- Welding: Laser, MIG/TIG, Spot

Welding



Flow Screws

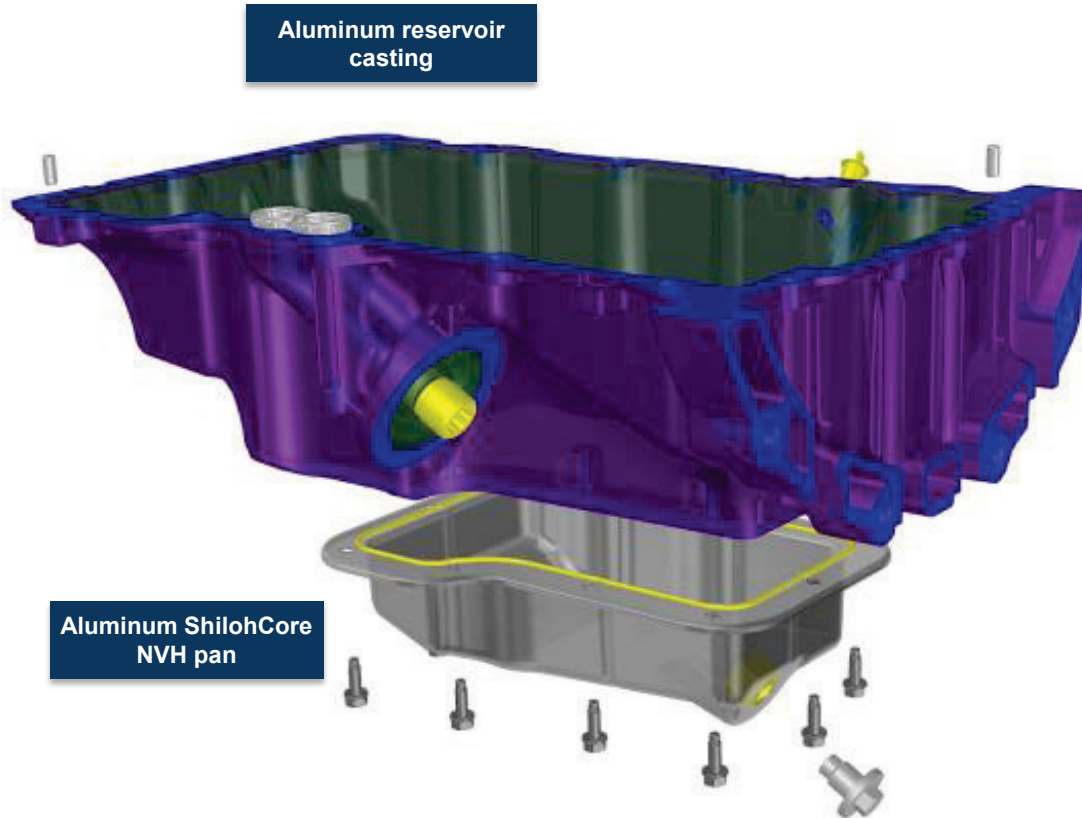


Riveting



MIXED MATERIAL SOLUTIONS

Crankcase reservoir system



ALUMINUM RESERVOIR

- Integral mounting features
- Fluid passages and integrated connection points
- Weight savings of ~30%

LAMINATE ALUMINUM PAN (ShilohCore™)

- Reduced engine noise
- Reduced transmitted structural noise
- Improved crack resistance with low clearance
- Reduced weight by optimizing structure and material selection

ASSEMBLED SOLUTION

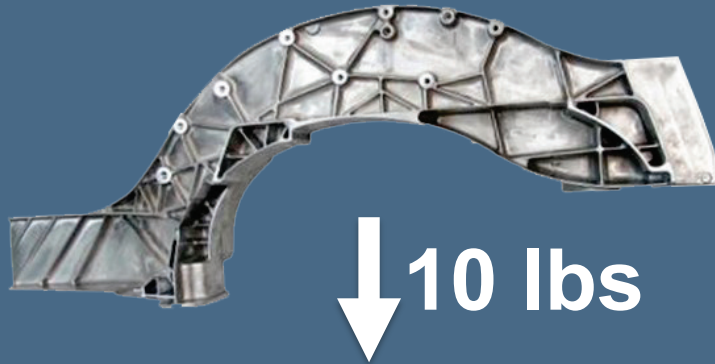
- 18 components assembled and shipped
- Reduction in customer bill of materials
- Ease of attachment for OEM

THE CRITICAL LINK

Upfront Development



Redesigned existing aluminum system;
making aluminum lighter...



The key to
maximizing
lightweighting is
through **up-front**
collaboration with
our customers



↓ **24 lbs**

Estimated total cost of aluminum
housing less than cast iron design with
nearly 50% weight reduction

OUR IMPACT



At Shiloh, we believe in:

***creating innovative solutions
for sustainable mobility and
a safer, healthier environment***





THANK YOU

For more information visit
shiloh.com or contact us at
marketing@shiloh.com