CASE STUDY

Driving Innovation: How Local Reinforcements Are Shaping the Future of Vehicle Safety

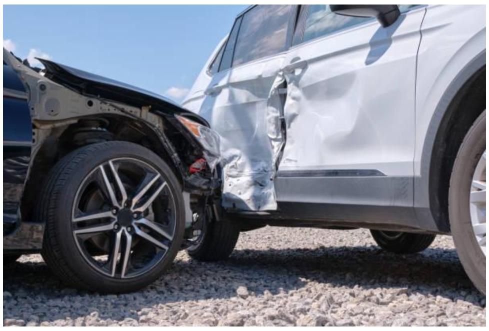
In 2011, California US. A women fell asleep while driving her 2011 Honda Insight on a mountain road in California and crashed head-on into a tree. The car was severely damaged, but modern crumple zone engineering helped absorb the impact. She escaped with only an airbag burn and was able to climb back to the road on her own.

CUSTOMER PROFILE

The customer is a globally recognized automotive manufacturer with a diverse range of well-known brands. Operating in over 130 markets, the company maintains a robust presence in both traditional and electric vehicle segments. With a strong focus on innovation, sustainability, and customer satisfaction, it continues to lead the transformation toward clean, connected, and efficient transportation.

CHALLENGE

The automotive sector is undergoing rapid transformation driven by the need for greater energy efficiency and electrification. Stricter regulations and fierce market competition demand innovative and cost-effective engineering solutions. However, balancing performance, sustainability, and affordability remains a persistent challenge.



A key focus is reducing vehicle weight and simplifying supply chains. Major opportunities exist in redesigning structural components such as the car body, chassis, and crumple zones, areas that traditionally require complex assemblies of 10 to 50 parts per subassembly.

What is needed is a flexible and hybrid manufacturing approach that enables local reinforcement on simplified components for improving crash performance and reducing weight, without adding manufacturing complexity or cost.

SOLUTION

ValCUN's metal additive manufacturing technology enables the direct deposition of reinforcement structures onto thin-walled aluminum components. Even relatively simple designs can significantly enhance crash resistance and energy absorption.

In the available production window of just four minutes, two to three robotic ValCUN printheads can lay down 10 to 100 meters of reinforcement, depending on design complexity and resolution. This process meets customer throughput and cost requirements.

Unlike traditional welding or Directed Energy Deposition (DED) systems, ValCUN's low-heat-input approach prevents deformation and cracking of the base component—maintaining structural integrity and ensuring high mechanical performance of the final part.

SCALABILITY

For this application with a serial production of typically 100k cars, this flexible and hybrid manufacturing method combines reduction potential of weight and bill of material of 30%.

The projected economic impact is significant: from €1 million in savings by 2029 in premium vehicle lines, scaling up to €1 billion in savings by 2035 as the technology is adopted across mass-market platforms (6 million+ vehicles).