DESIGN OPPORTUNITIES

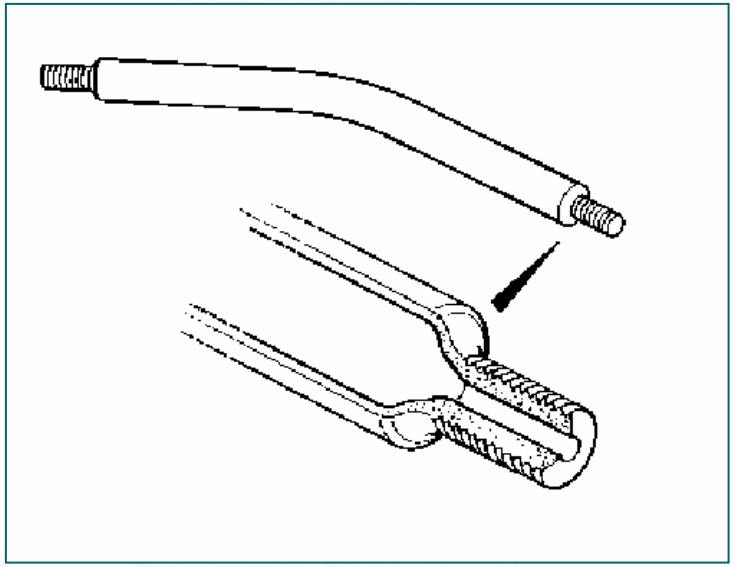
- **AN EXTENSIVE STUDY WAS CONDUCTED TO IDENTIFY THE POTENTIAL FOR:**
  - **COST EFFECTIVENESS**
  - **MASS REDUCTION WITH STEEL**
- **OPPORTUNITIES IDENTIFIED ARE ILUSTRATED ON THE FOLLOWING PAGES:**

An exercise was conducted to identify the potential for optimised, light weight steel-based solutions.

The engineering team supported by the Consortium developed ideas based on the application of both near-reach and far-reach steel materials and manufacturing technologies.
Numerous design ideas were generated, encompassing both system structural elements and component parts. These designs included ideas similar to some of the following examples.

DESIGN OPPORTUNITIES

LONGITUDINAL LINK



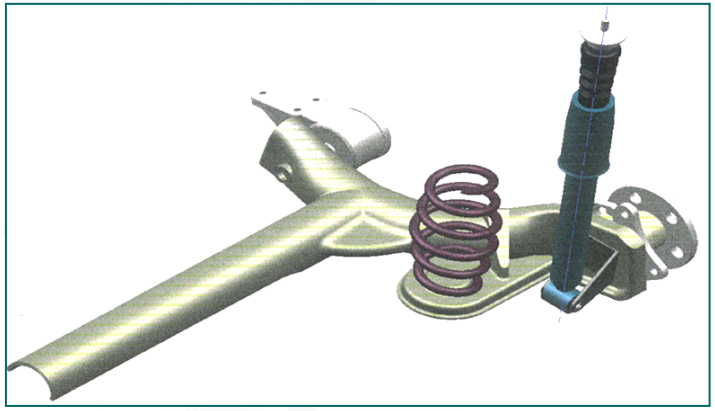
- BENCHMARK MASS 2.10 Kg
- ESTIMATED MASS 0.76 Kg
- POTENTIAL 64 % MASS REDUCTION

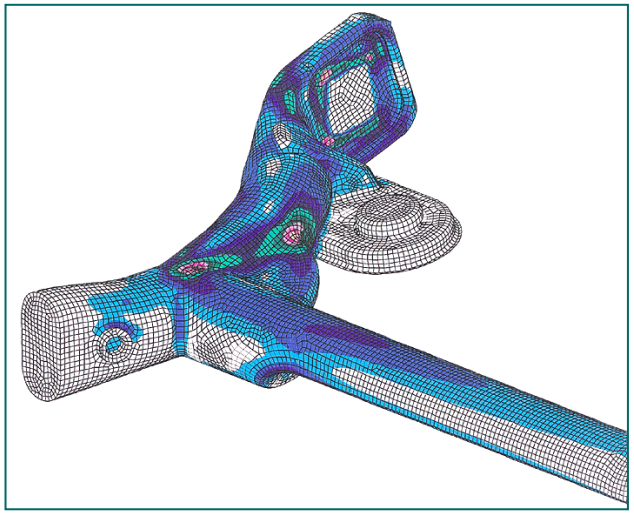
>> HYDROFORMED AND ROTARY SWAGED TUBE

ULTRALIGHT STEEL AUTO SUSPENSION

DESIGN OPPORTUNITIES

TWISTBEAM





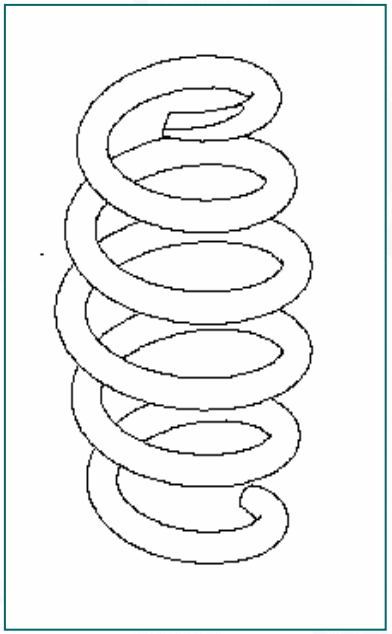
- **BENCHMARK MASS 26.20 Kg**
- **ESTIMATED MASS 19.65 Kg**
- **POTENTIAL 25 % MASS REDUCTION** (of Twistbeam structure)

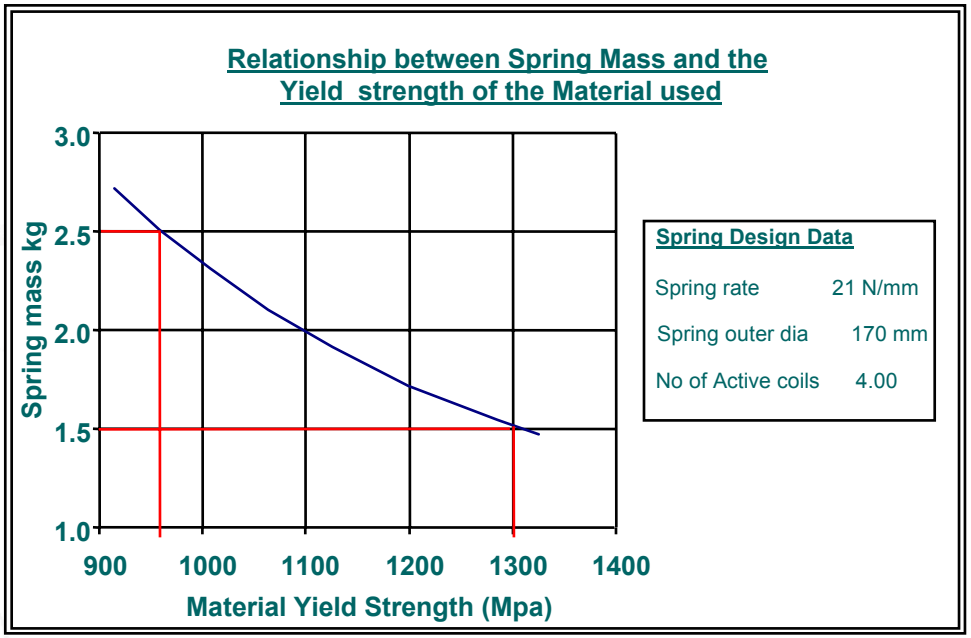
The geometry and package of the benchmark vehicle were used to create as a basis for this study. The proposed solution uses hydoformed trailing arms which interfaces by laser welding to a roll formed transverse beam made from a tailor welded blank. The study has highlighted possible mass savings of up to 25%.

ULTRALIGHT STEEL AUTO SUSPENSION

DESIGN OPPORTUNITIES

COIL SPRING





>>HIGH STRENGTH SPRING STEEL

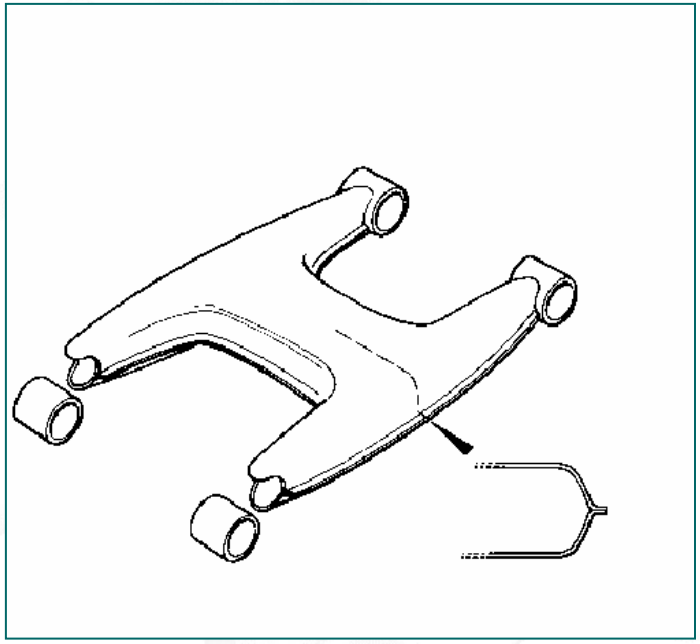
>>HIGH STRENGTH STEEL = LIGHTER SPRING

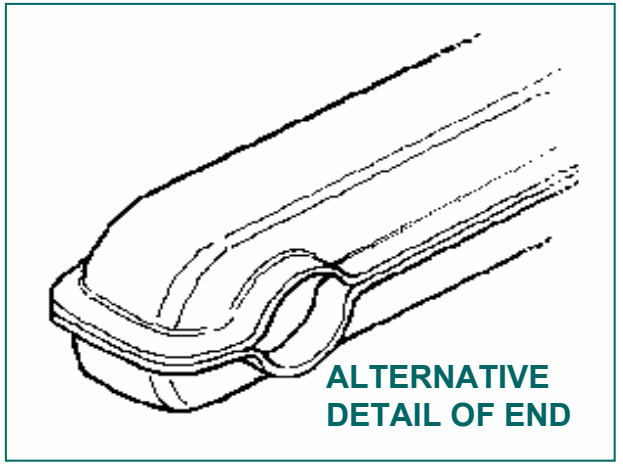
- **BENCHMARK MASS 2.50 Kg (960 MPa)**
- **ESTIMATED MASS 1.50 Kg (1300 MPa)**
- **POTENTIAL 40 % MASS REDUCTION**

ULTRALIGHT STEEL AUTO SUSPENSION

DESIGN OPPORTUNITIES

LOWER CONTROL ARM





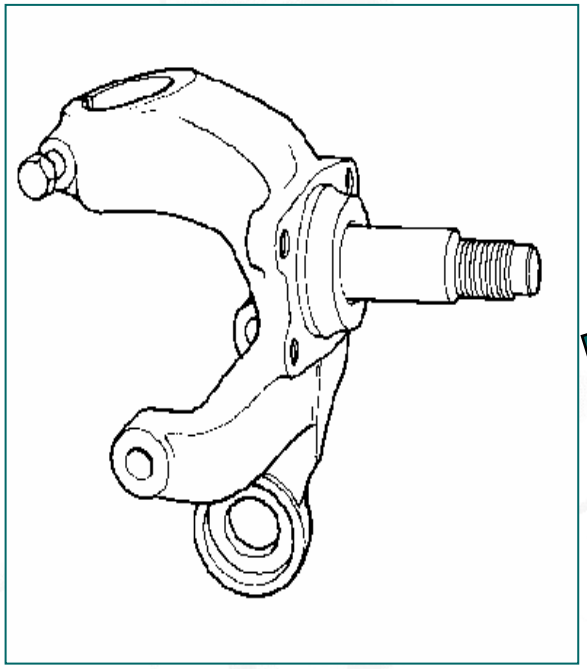
- BENCHMARK MASS (Al) 2.9 Kg
- ESTIMATED MASS (Fe) 2.9 Kg
- Equal mass to Aluminium part

>>HIGH STRENGTH STEEL, PILLOW HYDROFORMED

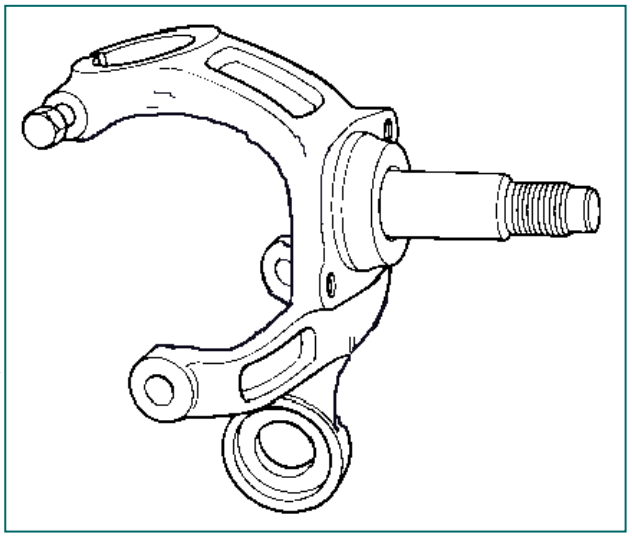
ULTRALIGHT STEEL AUTO SUSPENSION

DESIGN OPPORTUNITES

HUB CARRIER



>>CASTING



>>HIGH STRENGTH STEEL FORGING

- BENCHMARK MASS 3.40 Kg, Casting
- TARGET MASS 2.90 Kg, Optimised Forging
- POTENTIAL 15 % MASS REDUCTION

CONCLUSION

- A COMPREHENSIVE BENCHMARK STUDY WAS UNDERTAKEN.
- MANY OPPORTUNITIES FOR COST EFFECTIVE MASS REDUCTION THROUGH STEEL BASED TECHNOLOGIES WERE IDENTIFIED.
- AGGRESSIVE TARGETS HAVE BEEN SET FOR THE NEXT PHASE: