

ULSAS PHASE ONE

Significant Mass Reduction With No Cost Penalty

BENCHMARKING & CREATIVE IDEAS

The ULSAS programme provided an opportunity for the Steel Industry to take a pro-active role in the development of light weight steel-based solutions for automotive suspension components and to demonstrate the full range of steel materials and processing technologies.

In recognition of the technical diversity and impact upon vehicle layout and character, the ULSAS programme has focused exclusively upon rear suspension systems. The programme was structured in phases. The ULSAS Phase One programme was initiated with the aim of identifying opportunities for significant mass savings with no cost penalty. The first step of Phase One consisted of benchmarking and concept design ideas. The second step looked at a range of concept proposals for suspension systems across a variety of vehicle classes or sizes.

BENCHMARKING OVERVIEW

10 MONTH PROGRAMME, WORLD MARKET FOCUS:

- **COMPREHENSIVE BENCHMARK STUDY
VEHICLES PROCURED AND ASSESSED**
 - SUBJECTIVE - TESTED ON ROAD & TRACK IN USA AND UK
 - OBJECTIVE - STATE OF THE ART EVALUATION
 - QUANTITATIVE - WEIGHT, COST AND MANUFACTURING STUDIES
- **IDENTIFICATION OF POTENTIAL FOR LIGHTWEIGHT STEEL
SOLUTIONS
GENERATION OF INITIAL CONCEPTS
SETTING OF PROGRAMME TARGETS**

The Benchmarking and Initial Concept Design work was undertaken by Lotus Engineering over a period of ten months. Studies to establish the current status of rear suspension system design and manufacturing techniques formed a significant aspect of the initial part of the programme. This primarily consisted of a comprehensive benchmark study in which vehicles were procured and then assessed in several manners;

Subjective Tests - vehicles tested on roads & tracks in USA and UK.

Objective Tests - state of the art evaluation and detailed design review.

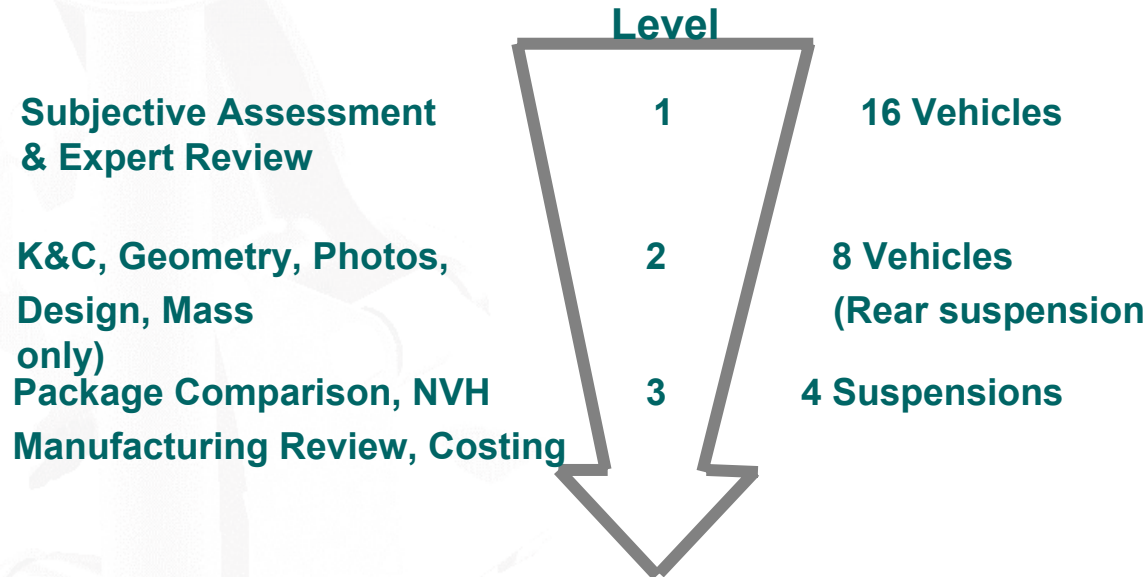
Quantitative Tests - weight, cost and manufacturing studies.

Aligned to these studies a holistic review of suspension system requirements was undertaken from which the opportunities for the application of steel technologies were identified.

BENCHMARK STUDY WORKSCOPE



- **WORLD MARKET REVIEWED AND SHORTLISTED**



Firstly, a comprehensive list was compiled of volume production vehicles available to the consumer during 1997. The benchmarking process filtered the vehicles through a series of investigations to evaluate designs against a range of suspension system performance criteria.

From the original list, sixteen significant vehicles were shortlisted and procured for subjective evaluation. By application of the knowledge gathered during the subjective appraisals, eight vehicles were selected for a further stage of evaluation.

From here on, the focus was directed towards REAR SUSPENSION TYPES, within complementary vehicle classes, and markets - as distinct from specific benchmark VEHICLES.