

ANTHONY STEVENS

JAGUAR/DAIMLER XJC CONVERTIBLE.

In converting the XJC coupe into a convertible model the most important concern is to replace the strength lost by removing the roof. This presents itself in two major forms:- 1. the beam strength of the car, which is the strength to resist breaking its back, and 2. the torsional strength, being literally the strength to resist twisting from front to back.

Before the initial prototype XJC convertible was built a study was undertaken of the Jaguar E-type convertible model, which uses many of the same parts and as such is very similar in all its dynamic loadings. From this study it was possible to decide the metal sections required in the sill areas, being the areas which contribute most to both beam and torsional strength.

It was decided to test the torsional strength of the XJC in its standard closed coupe form, and this was done by mounting the car on a full rig, with the front suspension mounting points fixed rigidly to the rig and a beam mounted to the rear suspension mounting points. This beam extended sideways out from the car such that weights could be added and the deflection measured against the fixed front points. The convertible conversion was then carried out and the converted car mounted on the torsional test rig in exactly the same way as before the conversion. The result was that the Avon-Stevens conversion produced a torsionally stronger car than the original XJC coupe. This was born out in road use by kerbing, which produced less distortion at the door shut for the conversion than for the original.

The beam strength is easy to calculate whereas the torsional strength is not, so the sills were strengthened to give equal beam strength to the original.

Although the converted XJC convertible was therefore stronger in all important aspects than the original closed roof car its natural frequency had been changed. This is a problem faced by all convertible car designers, that the natural frequency of an open car is much lower than a closed car, and that this frequency comes closer to the frequency experienced in many road surfaces. The result of this therefore is that the XJC convertible, like all open cars is more subject to shake from road surfaces. This can be damped-out to some extent and the larger the bulk of the car the less it is likely to be noticed by its occupants. Much effort was put into the development of the Avon-Stevens convertible to minimise shake of all forms and this work was highly successful, resulting in a car as smooth to drive and ride in as any the equivalent Rolls Royce and Aston Martin models.

Anthony STEVENS. B.Sc(Eng)., M.I.Mech.E.,
C.Eng., M.C.S.D.

15th. February 1991.



Managing Director,
Stevens & Company,
Consultants in Managing Design,
Prospect House, 58 Leam Terrace,
Leamington Spa, CV31 1BQ, England.