Design Improvement of Components and Structures.

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ABSTRACT

In recent years, various methods of optimisation have been developed, based on the finite-element methods of structural analysis. Some of these methods have been implemented in commercial computer programs such as Nastran, Optistruct, Tosca, and so on.

Some of these programs are part of a larger suite of programs, however, and not conveniently usable as an external program from the suite. This is a serious drawback for a small company like ADVEA, when projects involve not only the solution of given problems, but often also the transfer of the complete solution process to the customer. For example, MSC Nastran SOL 200 requires MSC Patran to be used efficiently; Altair Optistruct requires Altair HyperMesh to be used.

The design improvement program ReSHAPE has been developed to be completely independent from any pre- and post-processor, so that it can be used with any one of them. It was therefore an easy task to couple ReSHAPE with ANSA to efficiently and effectively solve design improvement problems, as required by customers.

The paper demonstrates the process of design improvement on selected problems. The first problem is the weight reduction of a car component by changing its shape, the second one demonstrates retuning a car component for noise reduction, and finally, the last two examples show the application of ANSA and ReSHAPE in a non-engineering field; firstly in the design of harmonic bells, and secondly the redesign of the tone arm and chassis of the Caliburn Turntable for improvement of analogue reproduction of music.

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