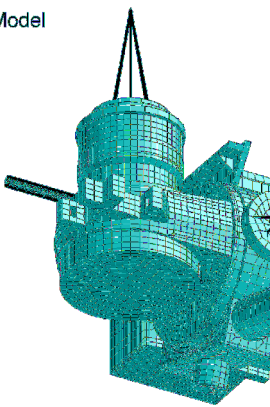


OPTICAL SYSTEM

The aim of the current project was to find the actual limitations of the optical system and to determine necessary design changes of some components of the system in order to meet the proposed new acceleration levels.

FE Model



CAE Simulation & Solutions

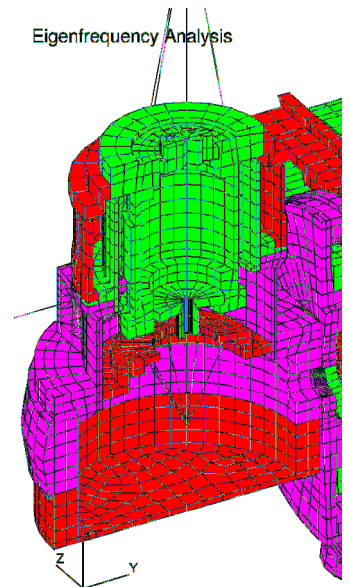
The goal of the design changes was to

- Increase the accelerations by a factor of 3
- Reduce the weight by 1/3

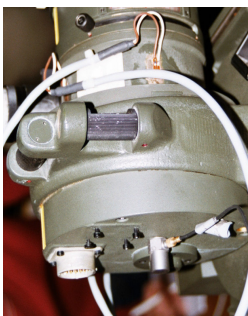
To achieve this goal a combined strategy of using analytical calculations and finite element models (picture left) was used to investigate the overall behaviour of the system as well as to ensure the safety of several bolted connections.

A combination of stiffness increase due to changes in the cross-section areas in combination with material substitutions using modern light-weight materials with high strength opened the way to achieve this challenging goals. The usage of different materials is depicted on the right hand side (different colours indicate different materials).

Eigenfrequency Analysis



CAE Simulation & Solutions



Measurements of the actual accelerations and strains on the optical system using a shaker test verified the calculations and yielded insight into the damping characteristics of the system.

The conclusion is that the critical areas of the system have been identified and design changes, especially of the cant housing, were proposed and evaluated. A conclusive test on the modified system verified the design changes. The proposed goals of increasing the accelerations by a factor of 3 and reducing the weight by 33% could be achieved successfully.