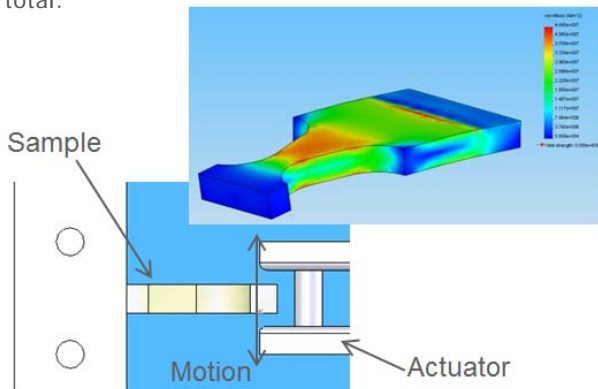




Determining Accelerated Environmental Fatigue Behavior

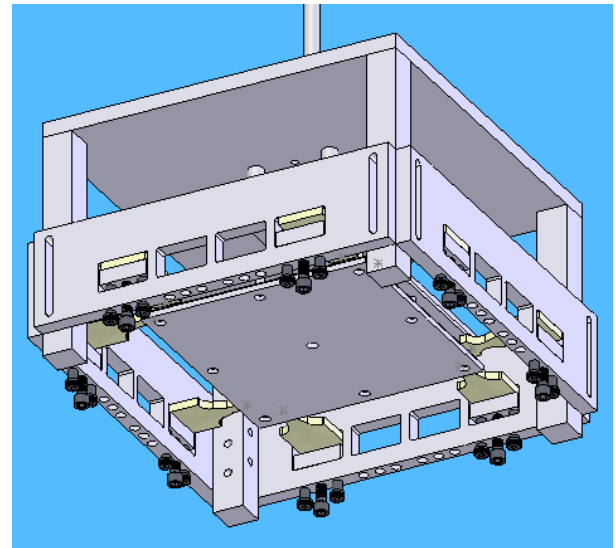
Summary

Plastics are ubiquitous in engineering and in many cases have replaced metals. However, plastics can suffer substantially from environmentally induced cracking where the environment in combination with fatigue loading induces catastrophic failure. As plastics are used more often in all kinds of industries, delayed cracking in polymers has become the number one cause of in-service product failure, accounting for as much as 70% of the total.



Description

CPG has taken the concept of fatigue loading and developed a system designed to fatigue specimens in an accelerated aging environment. The environmental stress cracking (ESC) test applies a cyclic stress on multiple standard specimens under elevated temperatures. The sample's geometry is such that the stress caused by the bending motion of the actuator is focused in one specific area, which is then analyzed for cracks and excessive oxidation to determine the resistance to environmentally induced surface failures. Plastics are particularly prone to this problem because of the interaction of the environment with the polymer surface. Currently there is no standard approach to determine the performance of polymers and plastics in this aggressive and frequently encountered deformation mode.



Specifications

- Oscillating amplitude from $\pm 5\text{mm}$ up to $\pm 25\text{mm}$
- Capacity to hold and test up to 16 samples at once
 - Includes control specimens
- Ability to test for any number of cycles
 - Specified for in excess of 1 million
- Temperature range $10\text{ }^\circ\text{C}$ above ambient to $300\text{ }^\circ\text{C}$
 - Utilizes conventional convection ovens
- Standard frequency range 0.1 Hz up to 10 Hz

Markets

Quality control

Research and development

Biomedical materials

Engineering polymers