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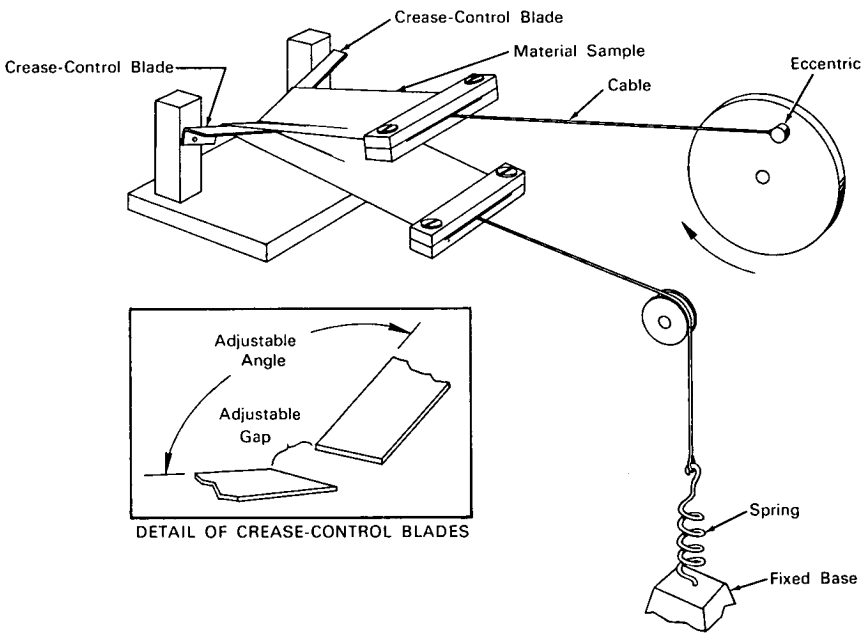
NASA TECH BRIEF

This NASA Tech Brief is issued by the Technology Utilization Division to acquaint industry with the technical content of an innovation derived from the space program.

Machine Tests Crease Durability of Sheet Materials



DETAIL OF CREASE-CONTROL BLADES

The problem: Testing the durability of sheet materials subjected to repeated creasing. A machine was particularly required for the testing of fluorocarbon polymers used as expulsion bladders for liquid propellants. Commercially available testing machines were found to be incapable of producing the type of creasing experienced by such bladders.

The solution: A machine that subjects a sample of sheet material to repeated cycles of creasing and uncreasing in a manner simulating the forces experienced by an expulsion bladder.

How it's done: The midsection of the material is folded over the crease-control blades and one end is clamped to a cable attached to a motor-driven eccentric. The other end of the material is clamped to a cable which is secured to a spring or other tensioning device such as a weight. The material is pulled and creased as the eccentric rotates away from the material during one half of the cycle and relaxes during the second half of the cycle. The stresses applied to the material in the areas adjacent to the crease-control blades during each cycle of the machine repeatedly crease the material as indicated in the illustration. The durability of the material to creasing is measured by the number of cycles required to produce failure as indicated by the appearance of pinholes or tears in the crease areas. In order to provide for different modes

(continued overleaf)

of operation, the machine can be adjusted to vary the angle and gap between the crease-control blades, the cycling rate, and the amount of tension on the spring.

Notes:

1. Testing of material samples can be made automatic by the addition of a cycle counter and sensors (e.g., photocells, radioactive devices) to indicate the formation of pinholes or tears and actuate an automatic shutoff device when failure occurs.
2. Inquiries concerning this innovation may be directed to:

   Technology Utilization Officer
   Jet Propulsion Laboratory
   4800 Oak Grove Drive
   Pasadena, California, 91103
   Reference: B64-10178

Patent status: NASA encourages commercial use of this innovation. No patent action is contemplated.

Source: Howard B. Stanford and Larry K. Jones (JPL-604)