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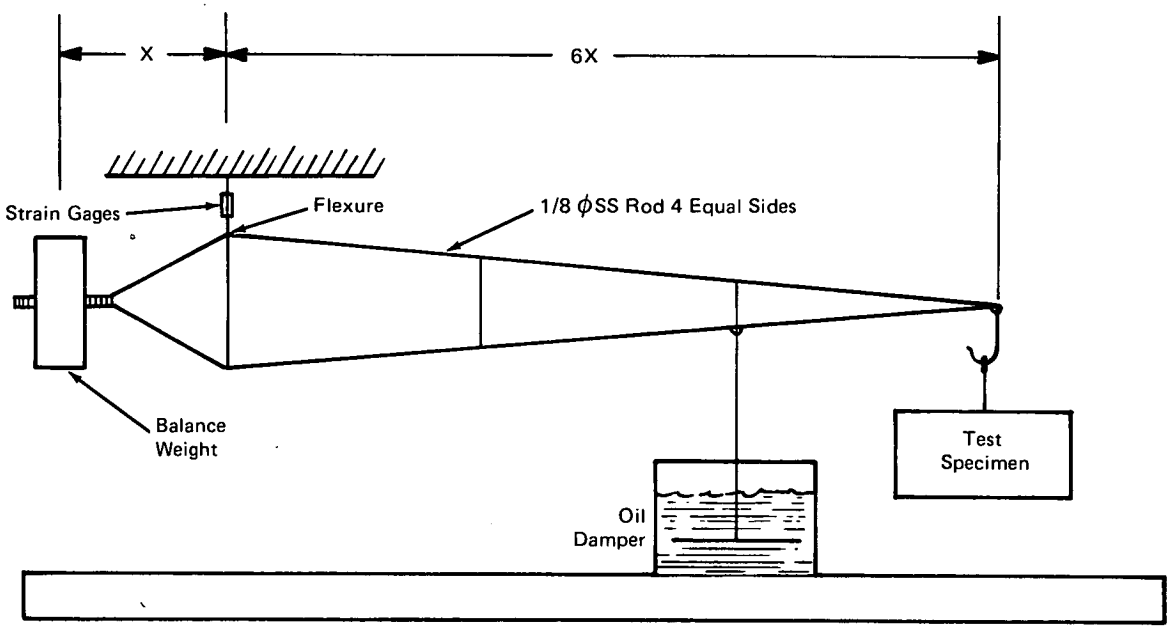
NASA TECH BRIEF

Marshall Space Flight Center

Remote Weighing Device



The problem:

Present electrobalances can determine a fraction of a milligram change in specimens weighing several hundred grams. In general, these balances will handle only specimens up to approximately 200-g and of limited physical size.

The solution:

A remote-weighing device has been designed and developed that is capable of measuring a weight change of 3 mg of a 500-g specimen. Because of its sensitivity, the instrument has been used for a moisture diffusion test. In general, the instrument can be used for any testing where small weight changes in large samples are required; both positive and negative changes can be measured.

How it's done:

The device, as shown in the figure, is constructed with a stainless steel flexure that supports a beam on one end and to which the specimen is attached on the opposite end. The flexure has four strain gages that measure bending stress and cancel tension and compression stresses. The beam is attached to the flexure so that the distance from the point of attachment to the specimen is six times the distance from the attach point to the balancing weight. Any change in the specimen weight is then multiplied by a factor of six and creates a bending stress in the flexure that is measured by the strain gage. This ratio can be varied to obtain greater resolutions or to measure heavier specimens. As the specimen holder is not part of the device, it can be custom designed to satisfy corrosion, contamination, and support features of the specimen.

(continued overleaf)

The device is compact and can accept specimens of greater physical size or total weight than electrobalances presently on the market. Possible fields of study in which the instrument might be used include corrosion studies, biological weight gains or losses, nuclear experiments, evaporation rates, and weight changes in hazardous environments.

Notes:

1. Information concerning this innovation may be of interest to research or testing laboratories and instrument manufacturers.
2. Requests for further information may be directed to:
   Technology Utilization Officer
   Marshall Space Flight Center
   Code A&TS-TU
   Huntsville, Alabama 35812
   Reference: B72-10325

Patent status:

No patent action is contemplated by NASA.

Source: J. P. Valinsky of
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