Micro-Measurements

Strain Gages and Instrumentation

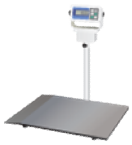
VISHAY PRECISION GROUP

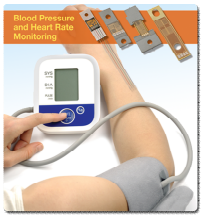
Since 1962, Micro-Measurements has been a leading supplier of:

Bondable and weldable foil strain gages available in thousands of possible pattern designs and combinations of grid alloys, backing materials, resistances, and options for measurement of surface strain for experimental stress analysis.

Accessories for bonding sensors.

Sensors for residual stress, high temperature, shear, concrete embedment, pressure, crack propagation and displacement, weighing, medical measurement systems



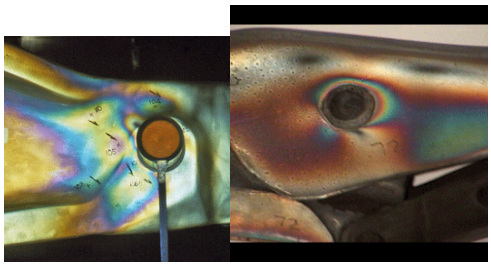


http://www.vishaypg.com/micro-measurements/stress-analysis-strain-gages/

Instruments: A complete range instruments engineered specifically for strain gages including Strain Indicators, Digital Data Systems, Signal Conditioning Amplifiers, and Special-Purpose Equipment.

http://www.vishaypg.com/micro-measurements/instruments/

PhotoStress® Analysis System: Optical measurement and analysis of stresses/strains in test parts and structures.



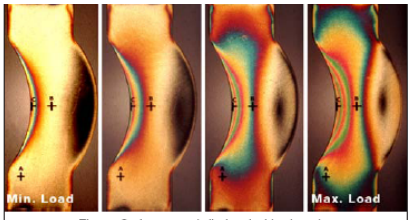


Figure 8. Incrementally loaded test part

Introduction to Photoelasticity

- Many experimental methods can be used to determine the distribution of stresses and strains in machine components and structures. Probably the most common method involves resistance **strain gages** that are easy to install and provide precise results under a wide variety of operating conditions. Unfortunately, strain gages provide data only at the points where they have been mounted and little is learned about other regions on the surface of the component. As a consequence, there has been a continuing interest in full field experimental stress analysis methods that provide data on stresses over relatively large areas of component surface.
- The method of birefringent coating, also called the method of photoelastic coatings (or **reflection photoelasticity** in this case) extends the classical procedures of model photoelasticity to the measurement of surface strains in opaque two and three dimensional models made of any material. The coating is a thin layer of birefringent material (usually a polymer) that is bonded integrally to the flat or curved surfaces of the prototype being analyzed for stress. When the prototype is loaded, the surface strains are transmitted to the coating, reproducing the prototype strain field in the coating. To provide light reflection at the interface, the coating is bonded in place with reflective cement. When viewed through a white light**reflection polariscope**, the strained coating exhibits black isoclinic and colored isochromatic fringes. Full field isochromatic isoclinic patterns are directly and instantly visible and can be photographed, processed and analyzed by using a **digital compensator** to determine the fringe order value with advanced **PSCalc® computer software** to translate the data into stress and strain levels.
- The **photoelastic coating** method has many advantages compared to other methods of experimental stress analysis. It provides point by point or full field quantitative data, enabling the investigator to determine the complete distribution of surface strains and their directions, and directly highlighting severely strained areas.

http://www.vishaypg.com/micro-measurements/photo-stress-plus/