FOIL STRAIN GAGES

Foil gages are fabricated from constantan or nickel-chromium alloy sheet material that is reduced to 0.0025 to 0.0005 mm in thickness. This foil is then laminated to a backing material and coated with photo resist. Using a multiple-image negative of a gage, the composite gage pattern is transferred to the photoresist on the foil using photolithographic techniques.

After developing and chemical etching processes, the gages are completely defined and can be isolated for lead-wire attachment, encapsulation, and establishing the gage factor for the batch of gages. The gage factor for foil gages is also defined by Eq. 5.7.

Figure 5.9 shows a gage pattern of a two-element 90° rosette.23 The axis of the gage on the right is aligned with the principal axis. The gage on the left is automatically aligned to measure the transverse strain due to Poisson’s ratio.

The gage length is an important parameter in gage selection, as it is the effective length, excluding the end loops, over which the transduction takes place. The grid width together with the gage length determines the area of the strain field.

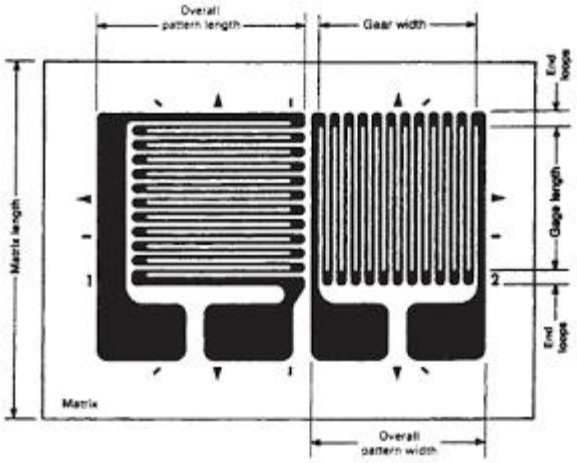

Fig 5.9 A two-element 90° rosette-type foil gage.

For example, when measuring strains in a reinforced-concrete beam in the presence of aggregate and cement-sand mix, one is interested in the average strain, and for this reason long-gage-length gages should be used. Transverse sensitivity is exhibited by foil gages owing to a strain field normal to the principal axial field. Since the grid lines of a foil gage are wide, the transverse strain couple through the backing into the grid, and this causes a change in the resistance of the grid.

Source: http://mediatoget.blogspot.in/2012/05/foil-strain-gages.html