APPENDIX - I

METHOD OF WORKING OUT POISSON'S RATIO FOR JOINT ELEMENT

Data : Normal displacement dv = -0.0080 cm
Shear displacement du = 0.129 cm
Height of sample = 2.5 cm

$\therefore$ Normal strain $= \varepsilon_{yy} = \frac{dv}{2.5} = \frac{-0.008}{2.5} = -0.0032$

Shear strain $= \gamma_{xy} = \tan^{-1} \frac{du}{2.5} = 0.052$

Shear strain $= \varepsilon_{xy} = \frac{\gamma_{xy}}{2} = \frac{0.052}{2} = 0.026$

Principal strains

$$\varepsilon_1 = \frac{\varepsilon_{yy}}{2} + \sqrt{\left(\frac{\varepsilon_{yy}}{2}\right)^2 + (\varepsilon_{xy})^2}$$

$$= \frac{-0.0032}{2} + \sqrt{\left(\frac{-0.0032}{2}\right)^2 + (0.026)^2}$$

$$= -0.0016 + 0.0260$$

$$= 0.0244$$

Similarly, $\varepsilon_3 = \frac{\varepsilon_{yy}}{2} - \sqrt{\left(\frac{\varepsilon_{yy}}{2}\right)^2 + (\varepsilon_{xy})^2}$

$$= -0.0016 - 0.0260$$

$$= -0.0276$$

Poisson's ratio $\nu = \frac{-\varepsilon_3}{\varepsilon_1} = \frac{0.0276}{0.0244} = 1.13$