

## ABSTRACT

Two dimensional finite element modelling of underground structures at shallow depth has been used to obtain the surface response to incident SH waves. Although some visco-elastic modelling is done the major part of the work considers perfectly elastic media. Vertically incident SH, obliquely incident SH and the SH source on the surface have been examined.

Power spectral ratios were studied to determine the effect on the surface seismograms of the position, shape, depth, size and material composition of the underground anomaly. A number of relationships between the surface response and the anomaly has been identified.

These relationships have been used in developing an approach to the solution of the inverse problem: given the seismic motion of the ground surface, determine the physical properties of the underground structure.