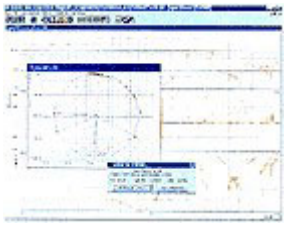
Modal analysis is increasingly becoming regarded as an essential pre-requisite to many environmental data gathering trials that we undertake. It is a process where the dynamic response of structures can be characterised in terms of resonance frequencies, damping and mode shape.

Detailed knowledge of this information is invaluable when attempting to interpret a structural response measured in a particular dynamic environment. The analysis enables forcing frequencies and response frequencies to be distinguished, which is important when compiling vibration test spectra from measured data.

Modal analysis involves the excitation of the structure either in a continuous way using shakers or by application of transients, eg: by striking the structure with a hammer. Each method has its own particular advantages in different situations. In either case, the input force is measured precisely using a force transducer and the structural response is measured using accelerometers. It is the relationship between the applied force and associated responses that is the key to modal analysis and these relationships are computed as functions of frequency in terms of magnitude, phase and coherence.



The required structural parameters are extracted from these measured data by a process of curve fitting theoretical responses of single or multiple degrees of freedom systems.

Over recent years Cranfield Aerospace have conducted many modal analyses of structures ranging from a Harrier GR7 aircraft to small airborne reconnaissance pods.

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