



SINT
Technology

Experimental Modal Analysis

Experimental Modal Analysis (EMA)

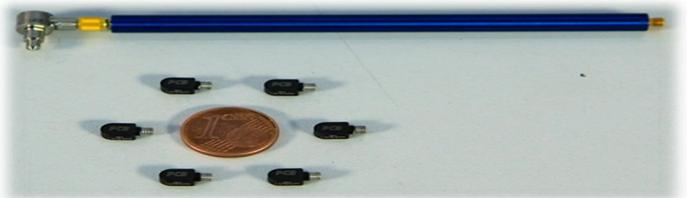
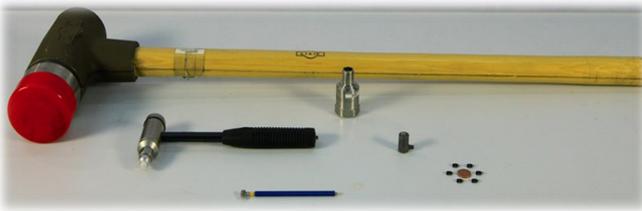
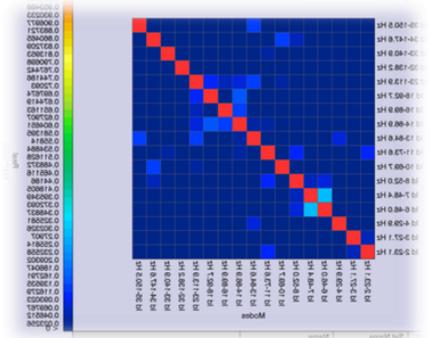
Experimental Modal Analysis (EMA) is an effective instrument for describing, understanding and modelling the dynamic behaviour of a structure.

It can be carried out both to determine the natural frequencies and mode shapes of a structure and to verify accuracy and calibrate a finite element model (FE).

Also, the EMA can be used in order to make a troubleshooting vibration problems

An example of the analysis techniques that SINT Technology can use are:

- Impulse excitation (instrumented hammer)
- Controlled excitation (shaker)
- Operational Modal Analysis (OMA)
- Operational Deflection Shape (ODS)

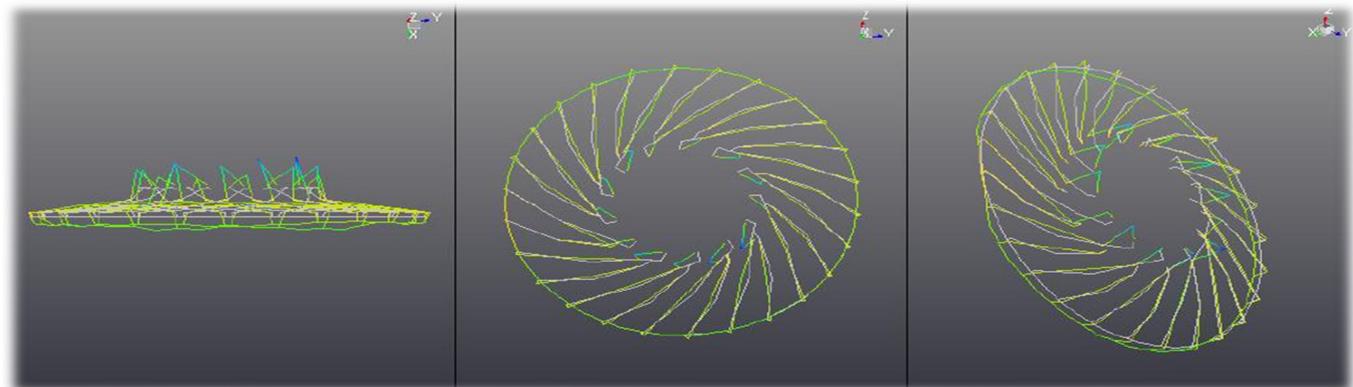
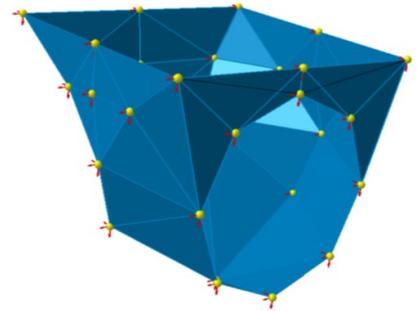


Skills:

- professionalism guaranteed by highly skilled engineering technicians
- dynamism and flexibility
- availability to perform testing on the customer's plant in all parts of the world
- detailed reporting in accordance with the customer's requirements and the main international technical standards

Operating areas:

- OIL & GAS
- Energy
- Rail
- Automotive
- Aviation
- Paper
- Steel
- Civil



Operational modal analysis (OMA)

Operational Modal Analysis (OMA) has lately been a more and more common tool in structural dynamics. The benefits compared to Experimental Modal Analysis (EMA) are that one does not need any artificial excitation and that the structure does not have to be at rest, which is a requirement of EMA. So far, OMA has won terrain for modal analysis of large structures such as buildings and bridges, and for vehicles such as helicopters and ships

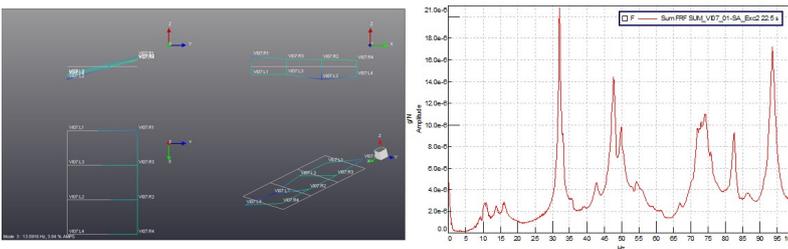


SINT Technology can determine the main modal parameters:

- Natural frequencies
- Mode shapes
- Damping

The validation of the modes was done using the following:

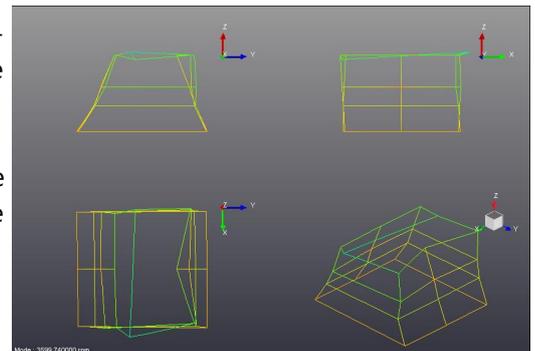
- Modal Assurance Criterion (MAC)
- Complexity tools
- Modal Phase Collinearity (MPC)
- Mean Phase Deviation (MPD)
- Phase scatter



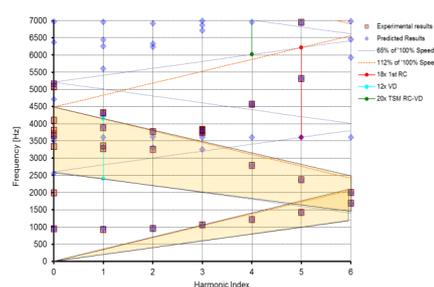
Operational deflection shape (ODS)

In the vibration analysis, the ODS is a technique that permit the visualisation of the vibration deflection shapes of the machine or of the structure as influenced by its own operating forces.

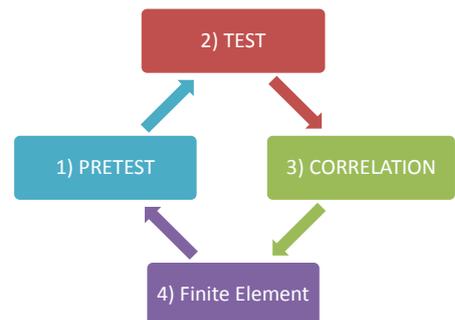
This type of the test is very useful when it's not easy to shut-down the machine (i.e. turbomachinery, compressors, pumps) or it's not possible excite the structure (i.e. big structures like bridges, palaces, etc...)



PRE-TEST and CORRELATION



Thanks to the best specialized softwares, SINT can carry out the **PRE-TEST** analysis (in order to chose the best set-up measurement) and the **CORRELATION** analysis (for the comparison of the Finite element model with the experimental model).



Standards

Field of application	Description	Standard Code
Modal Analysis	Vibration and shock - Experimental determination of mechanical mobility - Part 2: Measurements using single-point translation excitation with an at-	ISO 7626-2
	Vibration and shock - Experimental determination of mechanical mobility - Part 5: Measurements using impact excitation with an exciter which is not	ISO 7626-5



SINT Technology

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Recognitions

SINT Technology's test laboratory is accredited to standard ISO/IEC 17025:2005 by the Italian accreditation body **ACCREDIA** with **certificate no. 0910**



LAB N° 0910

Certification of conformity to the requirements of standard

UNI EN ISO 9001



ISO 9001 = OHSAS 18001