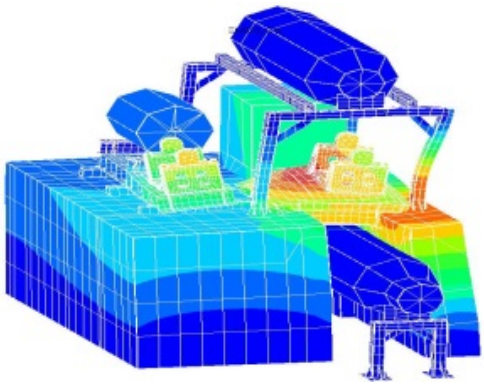
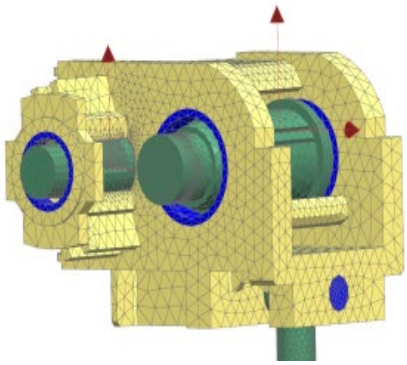
DYNAE

# Dynamic structure analysis

## Your requirements

- Anticipating the vibratory behaviour of an equipment
- Sizing the frame or the foundations of a machine
- Validating piping supports
- Correcting a resonance problem
- Assistance in designing mechanical devices





## The solutions

- Simulation by means of finite element
- Taking into account the sources of excitations
- Mechanical and pulsatory excitations
- Experimental modal analysis
- Calculating the bending and twisting of shafts

- **An approach based on experience in the field**
  - Knowledge of the pitfalls to be avoided
  - An experimental database to refer to
  - Comparing the measurements/calculations results

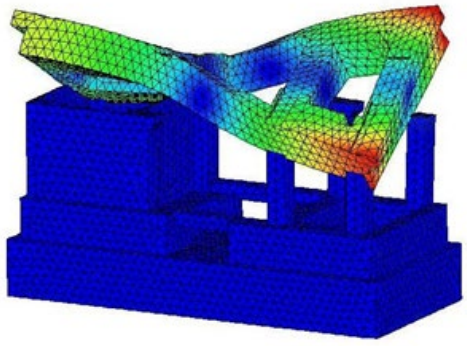
- **A pragmatic and efficient methodology**
  - A personalized procedure for the problem involved
  - A survery sized to the context
  - Validation with the customer step by step
  - Control of deadlines

- **High performances means for measurements and surveysants**
  - Engineers specialising in structure analysis
  - Specific measuring tools
  - Command of experimental modal analysis
  - Calculation software using Finite Element Method
  - Knowledge of norms and standards

- **Concrete results**
  - Clear and realistic recommendations
  - Proposal of several possible solutions
  - Calculation of the expected gains
  - Acceptance test on site for final validation

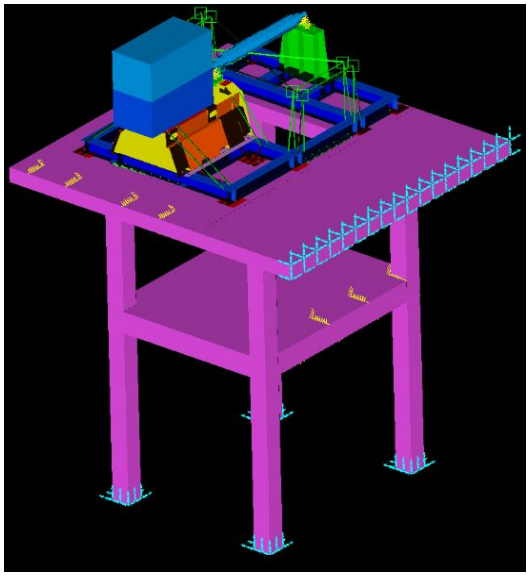
## What is a dynamic structure analysis?

A dynamic survey consists in characterising the way a structure reacts dynamic stress: alternating, transitory or random forces, or indeed vibrations.



## Why perform a dynamic structure analysis?

- To avoid vibratory problems when starting up a new installation: resonance of the chassis, the civil works or the piping for example.
- To anticipate the dynamic behaviour of a machine in terms of vibrations and alternating stress.
- To correct a problem of vibrations or breakage on an existing installation.
- To predict and anticipate the vibratory consequences of an increase in production capacity.
- To anticipate the vibratory impact on the neighbourhood, or calculate adapted insulation studs.



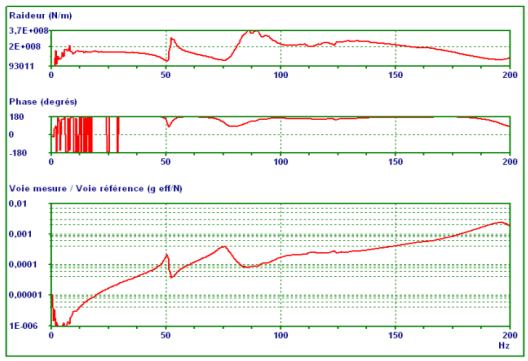
## How are the measurements performed ?

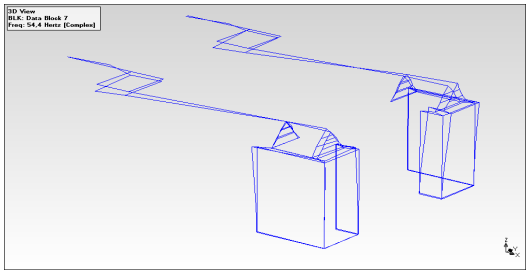
- The transfer functions are measured by exciting the structure using an impact hammer equipped with a force sensor, and by measuring the vibratory response with a triaxial accelerometer.
- This makes it possible to characterise the associated natural and deformed frequencies; the modal damping is also deducted from these measurements.
- In case of coupled modes, the aim of the modal analysis is to recalculate the characteristic of each of the modes to decouple them.
- The comparison between the natural mode and operational deformed shape makes it possible to determine between a resonance and a forced response and to adapt the corrective solutions.

## What are the calculations performed ?

Modelling using finite elements makes it possible, using the drawings of the installation :

- To calculate the natural modes of the initial installation (with repositioning on the measurements).
- To simulate the impact on the natural modes of the various modifications to the structure.
- To calculate the expected vibrations and dynamic loads by calculating response to an excitation.

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