

> Why and when?

- New equipment
- Revamping
- Unit shutdown
- Alarms or malfunctions
- Piping and static equipment vibration
- Deterioration of refractories

> The results

- Dynamic calculation of shaft line and structure
- Machine and structure acceptance test
- Assessment of critical equipment
- Diagnosis of the fault and recommendations
- Source and structure analysis
- Monitoring of furnaces and boilers



> Dynamic calculation of the layout of new equipment

The aim is to make sure that there will not be any vibration problems when a new or modified facility is started up: the critical frequencies of shafts as well as the natural frequencies of the structure (frame, base ...) have to be far away from excitation frequencies. The amplification factor when critical frequencies pass has to meet API requirements.

> Acceptance of the facilities

At the time of commissioning or after a general service, not only the absence of mechanical or electromechanical faults is checked, but also the absence of any structure fault leading to resonance problems. The compliance with the API requirements and engineering guides is also validated.

> The diagnosis of faults on rotating machines

In the event of an alarm caused by high vibration or a malfunction, the aim of the vibratory diagnosis is to identify the cause of the fault, assess how serious it is and recommend corrective action. The measuring programme is adapted to the problem each time.

> Diagnosis of static equipment and piping

Vibration of ducts, cracks... can be the result of abnormal mechanical or pulsatory excitation, or a problem with the supports of the tank or the piping. It is therefore necessary to identify the source of excitation on the one hand and determine if it has to be eliminated or act on the response of the structure.

> The check-up on critical equipment

The vibratory and electrical check-up before/after a general service makes it possible to target the maintenance actions and to take delivery of the machine after repairs have been carried out. The electrical analysis is complementary to the vibratory analysis and makes it possible to decide on the presence of an electromagnetic fault or a fault leading to torque fluctuations.

> Monitoring furnaces and cooling units by means of infrared thermography

The proper operation of the refractories and thermal insulation materials is very important to schedule works during the plant shutdowns. Regular monitoring will make it possible to have genuine indicators about their state and therefore plan the maintenance operations without any surprises at the time of the opening.



DYNAE

- > Vibratory analysis
- > Electrical analysis
- > Infrared thermography
- > Instrumentation and sensors
- > Software
- > Training

Head Office

Parc technologique Nord
 29 rue Condorcet
 38090 VILLEFONTAINE - France
 Tel. : +33 (0)4 74 99 07 10
 E-mail : contact@dynae.com

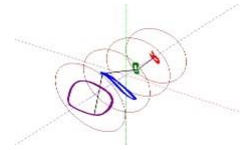
Branches :

Centre-IDF-Nord, Est, Sud-Ouest, Sud-Est,
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SOME REFERENCES IN THE FIELD OF PETROCHEMICALS & CHEMICALS

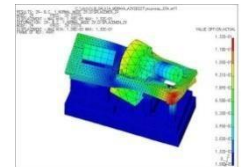
> Dynamic calculation

TOTAL La Mède	Dynamic study of the turbine-generator set's table
NAPHTACHIMIE	Layout calculation of a lobe blower
NAPHTACHIMIE	Pulsatory and vibratory study on a reciprocating compressor
LYONDELL BASELL	Calculation of a shock absorber for the supports of a tank
PETROINEOS	Dynamic study of the torch lines



> Acceptance tests for equipment

LAVERA UTILITES	Recording the start-up of the turbine-generator set after works
JACOBS	Acceptance of the piping on a gas storage facility
STORENGY	Acceptance of the reciprocating compressors and the suction & discharge lines
LYONDELL BASELL	Assessment of 3,500 bar vibratory hyper-compressor



> Diagnosis of rotating machines

TOTAL UPSTREAM	Analysis of the critical frequencies of turbine-generators
DRESSER RAND	Vibratory diagnosis of a reciprocating make-up compressor
EXXON MOBIL	Electrical expert survey of 3 compressor motors
EXXON MOBIL	Dynamic expert survey of ethylene extruder
CIE PETRO. BERRE	Diagnosis of PP and PE extruder
BASF	Vibratory assessment of the equipment
PETROINEOS	Diagnosis of centrifugal compressor
HUTCHINSON	Vibratory analysis of a mixer



> Vibratory diagnosis of piping and static equipment

TOTAL La Mède	Vibratory diagnosis of the new distillation furnace
GDF	Vibratory diagnosis of a regulating station
TOTAL Donges	Vibratory diagnosis of a HF unit's piping
KEM ONE	Vibratory diagnosis of an agitator
ESSO Fos	Vibratory diagnosis of the distillation furnace



> Refractory monitoring by means of infrared Thermography

TOTAL Donge	Monitoring furnaces and refrigerant apparatus
TOTAL Carling	Diagnosis of furnaces
RHODIA	Monitoring rotating furnaces
TOTAL Angola	Detecting hot spots on off-shore platforms
SONARA Cameroon	Analysis of electrical substations and refractories
TOTAL Gabon	Looking for corrosion on desalination pipes

