



# ACCENTO

ACÚSTICA Y  
VIBRACIONES



INGENIERÍA ACÚSTICA, DISEÑO, FABRICACIÓN E INSTALACIÓN DE SISTEMAS PARA EL CONTROL DE RUIDO, VIBRACIONES Y CHOQUES  
SOUND ENGINEERING, DESIGN, MANUFACTURE AND INSTALLATION OF DEVICES FOR THE CONTROL OF NOISE, VIBRATIONS AND SHOCKS

## THE COMPANY

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**ACCENTO ACÚSTICA Y VIBRACIONES, S.L.**, with 100% Spanish capital, with offices in London and international presence with distributors in many countries.

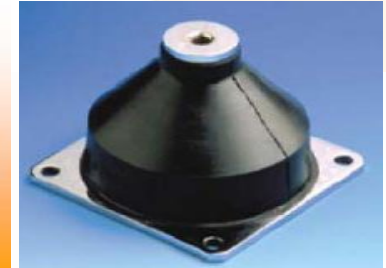
**Human capital** consists of engineers and highly qualified technicians with extensive experience of over 20 years.

▪ The main areas of action are the following:

- **Vibrations, seismic and shocks.** Engineering and manufacture of dampers.
- **Vibration and shock dynamic testing.** *Laboratory with shaker.*
- **Vibration and shock measurement.** Noise maps and acoustical prediction.
- **Acoustic.** Manufacture of silencers, refurbishment and engineering, ventilation.
- **High performance thermal insulation.** *High temperature and cryogenics.*
- **Aeronautical structures.** Racks Arinc, custom, etc...
- **FEM Calculation, structures, thermal and fluid-dynamic.**
- **Design and manufacture of viewers panels and NVG.**

## VIBRATIONS, EARTHQUAKES AND SHOCKS

**Accento** designs and manufactures dampers and compensators. Make vibration measurements, vibration and shock dynamic testing. Performs technical reports and seeks engineering solutions to solve problems.

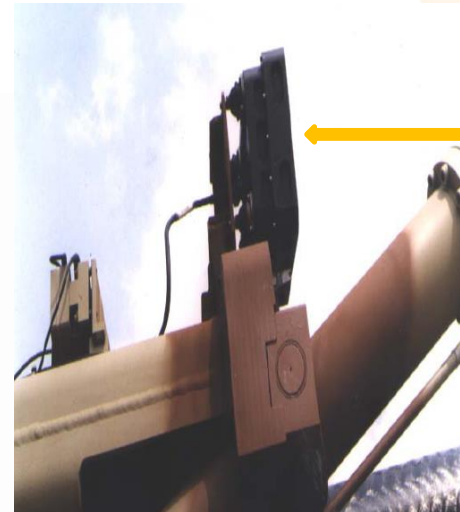


## VIBRATIONS AND SHOCKS

**Accento** is a specialist in the study of vibrations and shocks of aviation, marine and rail industry as well as in general industry fields.

**Accento** works with both military and civilian industry.

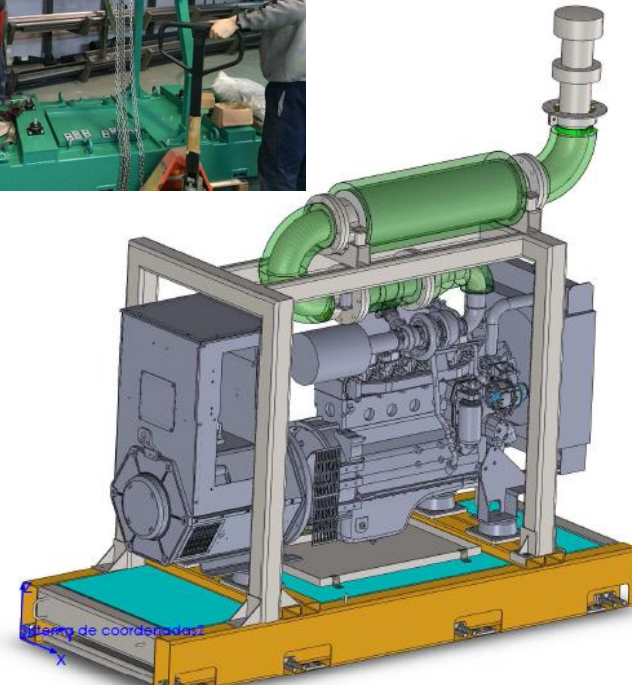
Standards applicable for customers are such MIL-STD, STANAG, ISO, etc...



## VIBRATIONS AND SHOCKS

**Accento** works in vibration and shock insulation for many civilian and military applications, by finding an optimal solution for any circumstance or location.

- Vibration isolation on the floors of Crystal Tower building (Madrid).
- Engineering and suspension of the recording studio in El Corte Inglés.
- Suspension of electronic warfare equipment from the Australian Navy made by SAINSEL.
- Suspension of electronic equipment on board AVE-Talgo (Mecca and Kazajistan Project).
- Suspension and study dilatations of exhaust lines for CAF diesel trains.
- Study and manufacture of GPS equipment on board buses, isolation of hard disks, for INDRA-PROYNTEC.



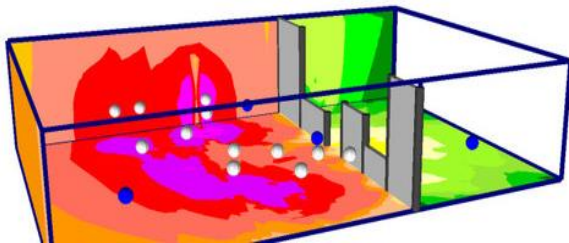
## INDUSTRIAL ACOUSTIC



## INDUSTRIAL ACOUSTIC

### WORKING ENVIRONMENT

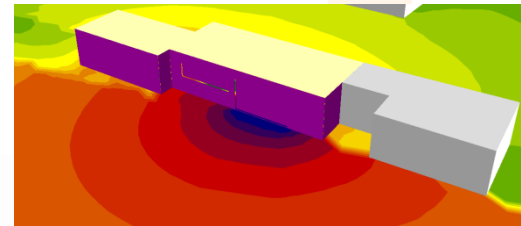
- **High noise levels**  
Risk for the physical integrity of workers



- **RD 286/2006**  
On protection of the safety and health of workers from the risks associated with exposure to noise.

### ENVIRONMENTAL IMPACT

- **Outside environment**  
Presence of noise or vibrations which implies discomfort, risk or damage to persons or adverse effects on the environment.



- **European directive 2002/49/CE**
- **37/2003 Noise Law**
- **RD 1513/2005**  
Assessment and management of environmental noise
- **RD 1367/2007**  
*Noise zoning, quality objectives and acoustic emissions*

## INDUSTRIAL ACOUSTIC



**Sound  
PLAN**

**Cadna A<sup>®</sup>**

### INDUSTRIAL NOISE MAPS

#### GOALS

(Art.15 Ley 37/2003 del Ruido)

- Evaluate overall exposure to environmental noise in a specific area due to the existence of different noise sources and elaborate overall prediction of such a zone.
- Make overall predictions for such area.



## METHODOLOGY FOR INDUSTRIAL NOISE MAPS

3D MODEL



CHARACTERISING NOISE SOURCES



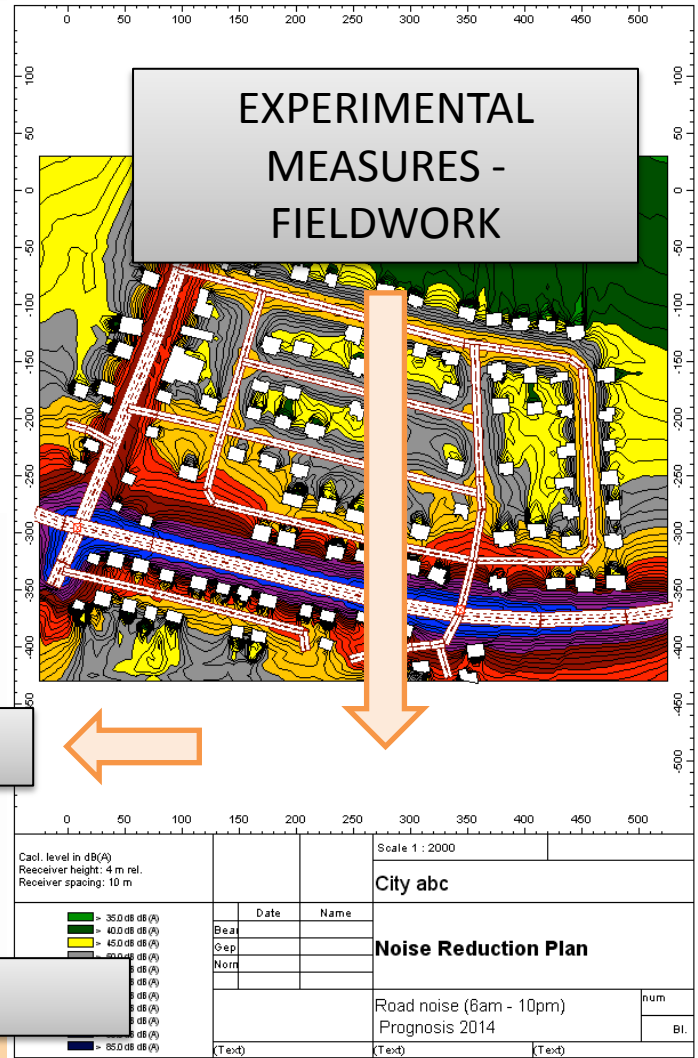
PREDICTIVE MODEL



VALIDATION



NOISE MAP



## METHODOLOGY FOR INDUSTRIAL NOISE MAPS

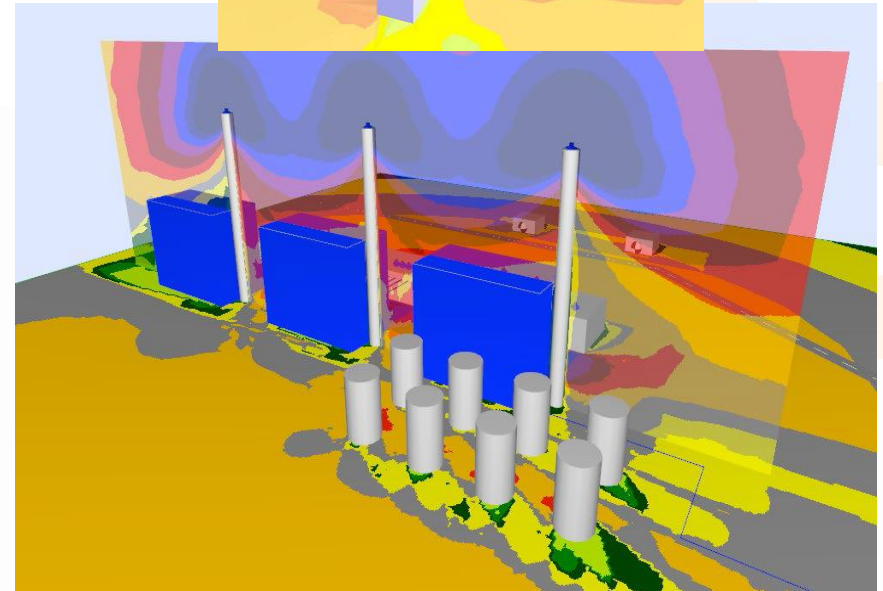
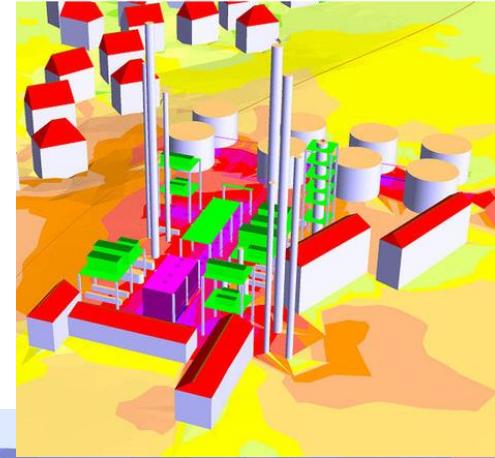
### WORKING METHODOLOGY

STARTING POSITION  
INITIAL NOISE MAP

STICKING POINT LOCATION

DESIGN AND IMPLEMENTATION OF  
SOLUTIONS

EVALUATE SOLUTIONS  
NOISE MAP FOR EVALUATION



## INDUSTRIAL ACOUSTIC

### ACOUSTIC SOLUTIONS - ACCENTO

ACC- SE EXHAUST SILENCERS



ACC- CAB ACOUSTIC CABINS



ACC- SP RECTANGULAR SILENCERS



ACC- DR ACOUSTIC WINDOWS



## INDUSTRIAL ACOUSTIC

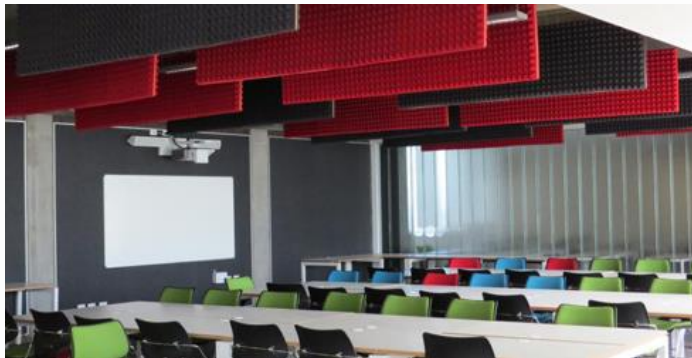
ACC- MA THERMO-ACOUSTIC BLANKETS



ACC- AP ACOUSTIC SCREENS



ACC- BFS ABSORBENT MATERIALS

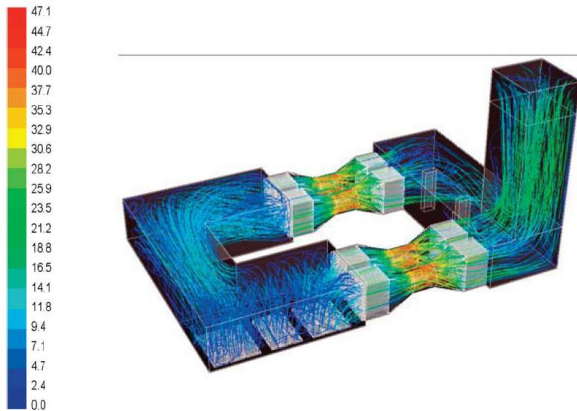
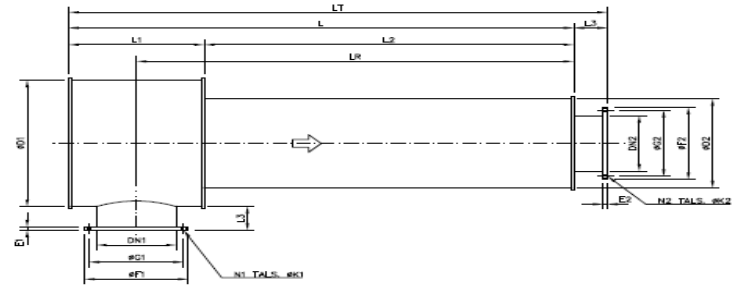
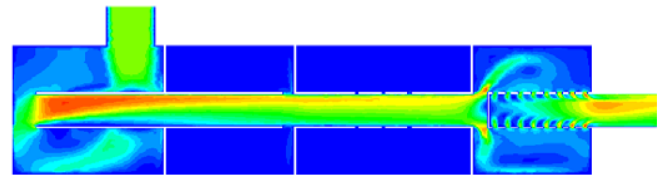
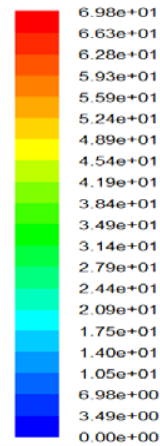
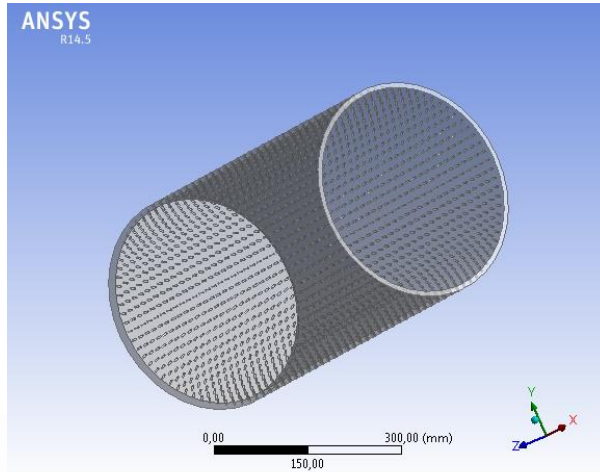


ACC-3500 BENCH



# INDUSTRIAL ACOUSTIC

## Finite Element Noise Simulation and Fluid-Dynamic calculation



### CFD Analysis

*Computational Fluid Dynamics*

ANSYS 14.5 (Fluent)

### Finite Elements Noise Simulation

SYSNOISE 5.6, VIRTUAL LAB

## INDUSTRIAL ACOUSTIC

### ACOUSTIC CONDITIONING AND SOUND EQUIPMENT

## EASE, ODEÓN

### SOUND REINFORCEMENT

SPL Direct, SPL Total

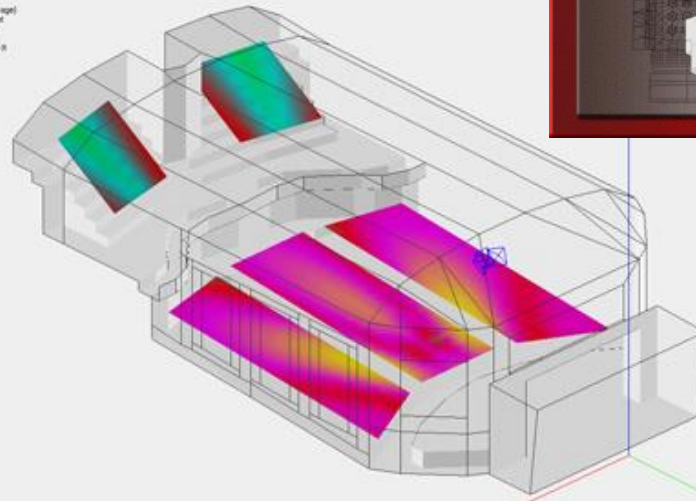
TR

C80, C50

Intelligibility

(ALCons, RASTI, STI)

Ver: 29 / Hor: 44  
Luph: 51.5.02  
Project: 040402  
Map: Direct SPL  
Freq: 1000 Hz  
(Third Octave Average)  
Energy: 0.01 - 0.01  
(Third Octave)  
Shooting: Call: No  
Resolution: 3.000

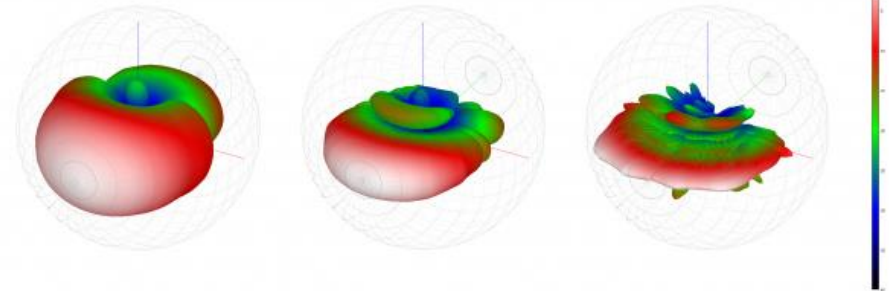


### PUBLIC ADDRESS SYSTEMS

Intelligibility

(ALCons, RASTI, STI)

100V Lines (High Impedance)



## THERMAL AND ACOUSTIC INSULATION

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**Accento** designs and manufactures blankets for thermal and acoustic insulation. These blankets are designed for industrial applications (insulation of boilers, high temperature joints, sealed of furnaces, etc ..) and for fireproof applications (interior coating of ships and aircraft, engine rooms and equipment, pipe insulation , fire doors, etc ...)



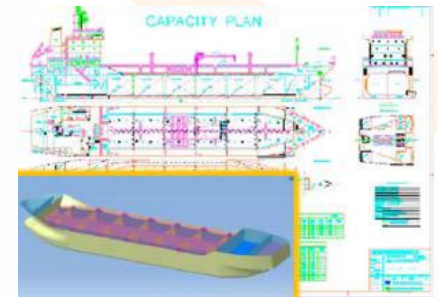
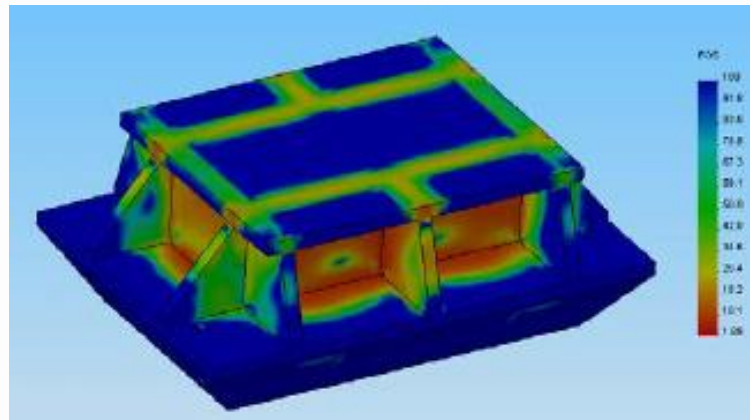
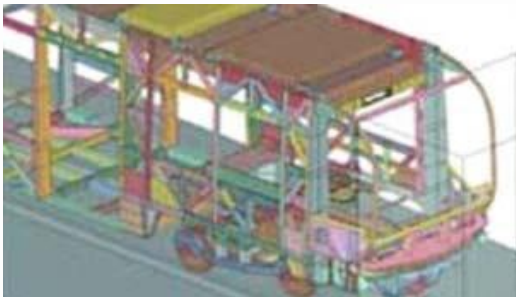
## FINITE ELEMENT CALCULATION, STRUCTURES, THERMAL AND FLUID-DYNAMIC

**Accento** carry out studies in the field of engineering simulation:

Fluid-dynamic studies and aerodynamic loads calculation.

Structural validation studies, Modal, Random, sources of vibration, isolation and fatigue. CAD.

Acoustic studies with numerical simulation, SYSNOISE, etc. Thermal analysis, CFD analysis: compressible, biphasic fluids, combustion ...





## FINITE ELEMENT CALCULATION, STRUCTURES, THERMAL AND FLUID-DYNAMIC

Mechanical Simulation. FEM.

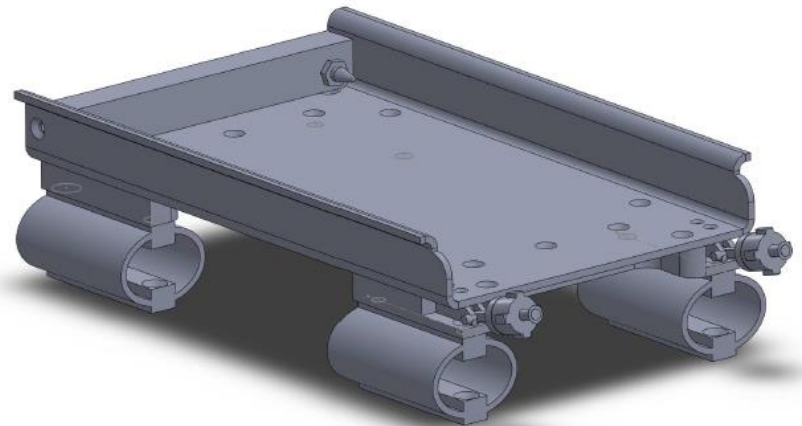
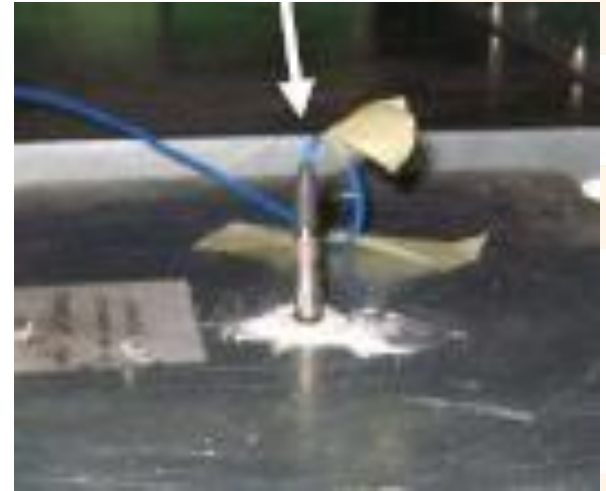
- Capacities of simulation programs :

### CAD:

- Development of 3D models from drawings.
- Design and development of pieces.
- Design improvements including manufacturing restrictions.
- Making any type of drawings.

### MESH AND PREPARATION OF MODELS :

- Mid-surfaces meshing.
- Voluminous solid meshing.
- Complex meshing.



## FINITE ELEMENT CALCULATION, STRUCTURES, THERMAL AND FLUID-DYNAMIC

Mechanical Simulation. FEM.

### STATIC ANALYSIS

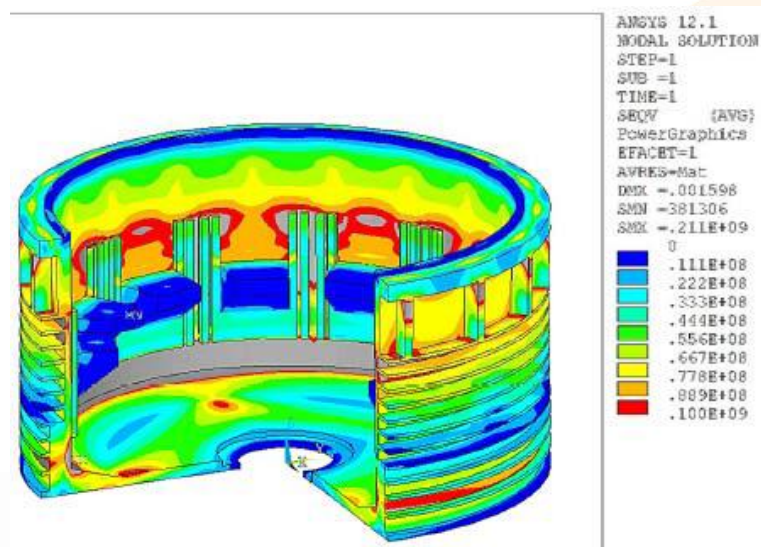
- Structure validation.
- Proposal on improving.
- Complete systems study.

### DYNAMIC ANALYSIS

- Modal response.
- Random response.
- Investigation of vibration sources in structures.

### RAPID APPLICATION-DYNAMIC ANALYSIS

- Impacts on metals and plastics, any material.



## FINITE ELEMENT CALCULATION, STRUCTURES, THERMAL AND FLUID-DYNAMIC

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Mechanical Simulation. FEM.

### FATIGUE

- Estimate the useful life of mechanical components.
- Frequency response under random load (PSD).
- Study of thermomechanical cycles.

### WORKS FOR HIHG TECHNOLOGY

- Thermal analysis for CERN tunnel.
- Thermomechanical study of decay-window for neutrino beam.

### AERONAUTICAL

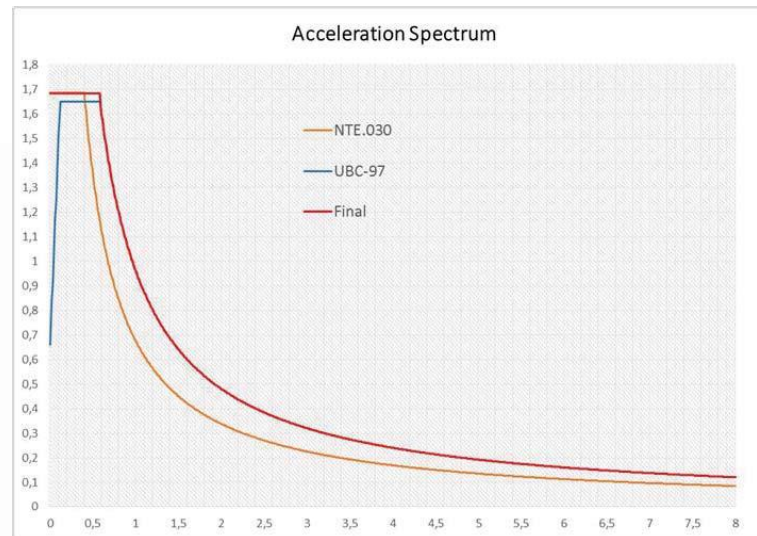
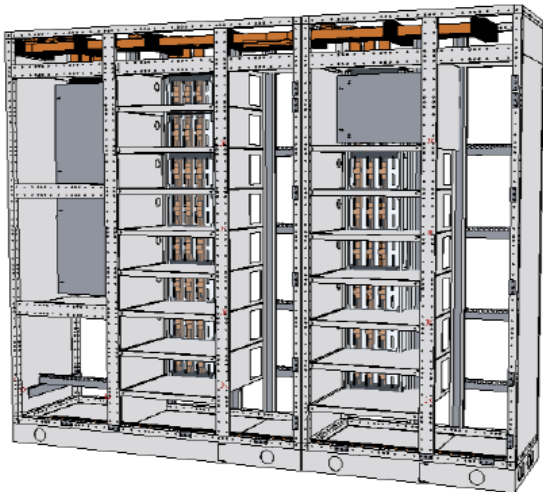
- Composite wing design and calculation of fluid-structure interaction.
- Thermal analysis of a furnace under gamma radiation.

## FINITE ELEMENT CALCULATION, SEISMIC STUDIES, DAMPERS FOR EARTHQUAKES

### FEM SIMULATION

Using the ANSYS calculation tool we perform seismic simulation of any region that affects structures.

Development of custom dampers or standard dampers to isolate EARTHQUAKES.



# CÁLCULO POR ELEMENTOS FINITOS, ESTRUCTURAS, CALCULOS SISMICOS

Applications and calculations examples:

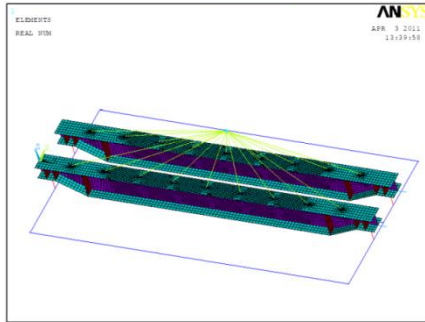
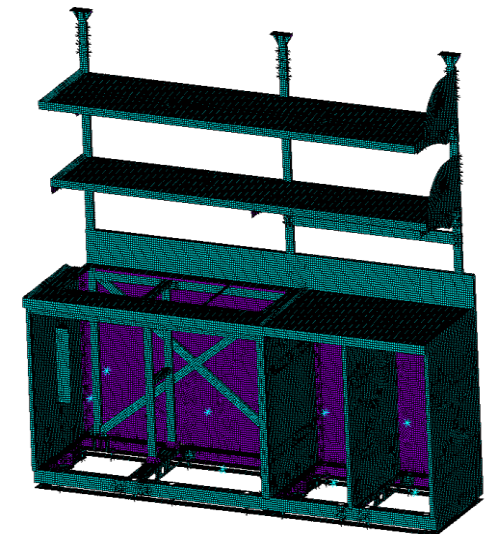
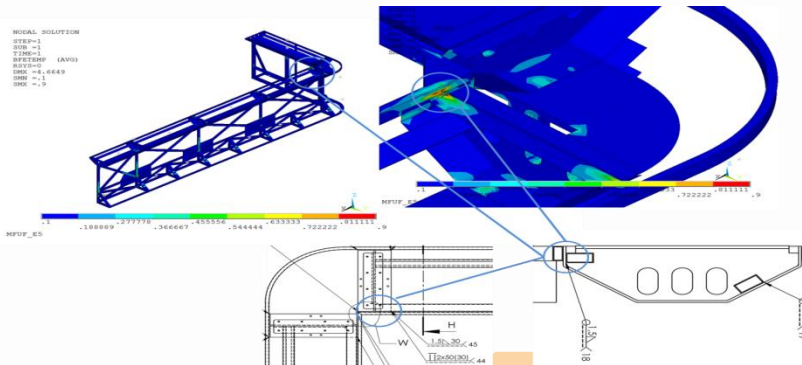
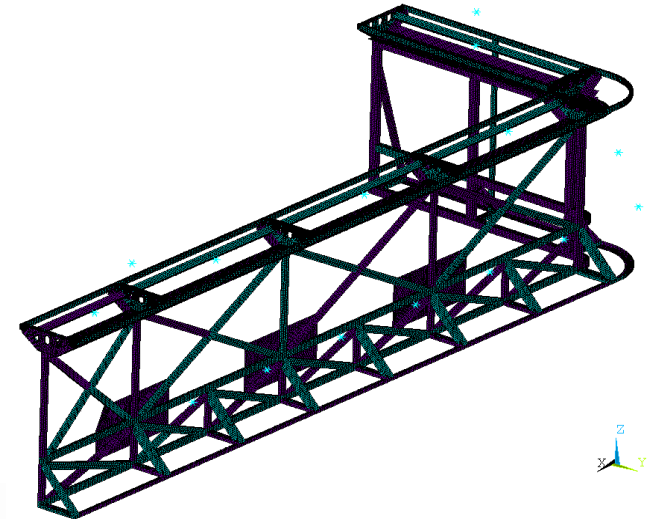
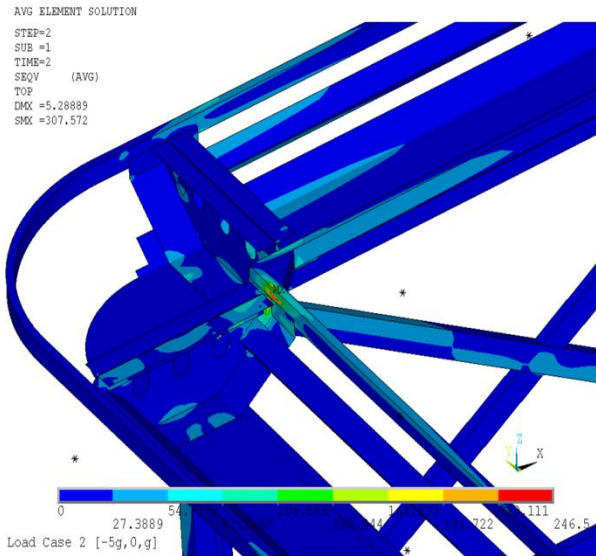
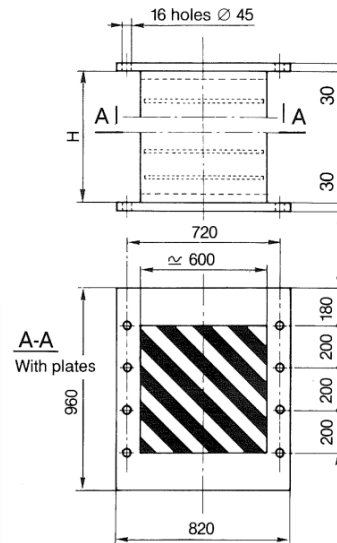
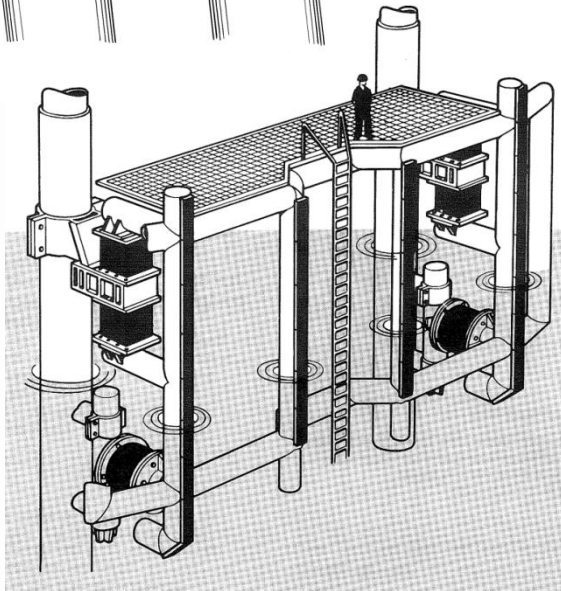
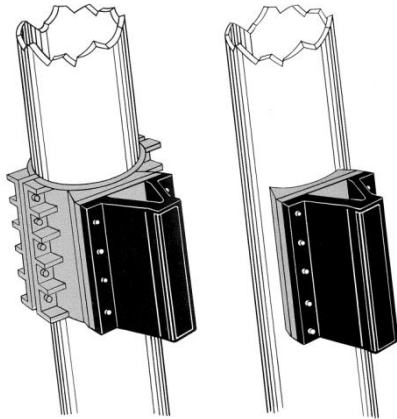


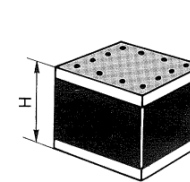
Figura 3.1: Geometría y malla del conjunto. Modelo de elementos finitos.



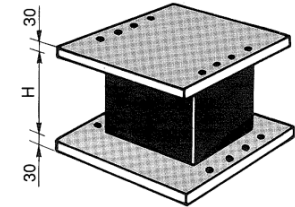
## RUBBER PARTS. OFFSHORE.



without fixing plates



with fixing plates



Type	SF-2	SF-3	SF-4	SF-5
H	265 ± 2	390 ± 3	515 ± 4	640 ± 5
Weight (kg)*	260	325	410	475
Energy (tm)	4,4	6,6	8,8	11,0
Reaction (t)	36	36	36	36
Deflection (m)	0,245	0,370	0,495	0,620

\* without fixing plates

## QUALITY CERTIFICATE

ACCENTO ACÚSTICA Y VIBRACIONES, S.L  
has a quality system applicable to:

“DESIGN, MANUFACTURING,  
COMMERCIALIZATION AND INSTALLATION  
OF ELEMENTS FOR ACOUSTIC ISOLATION,  
VIBRATIONS AND SHOCKS”,

certified by the auditing firm Bureau  
Veritas, in accordance with the following  
standards:

- ISO 9001:2008 - ES035204



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standards:

- ISO 14001:2004 - ES035206





## REFERENCES

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### MARINE SECTOR

- **ASTILLEROS ARMON, .S.A**  
Supply of exhaust silencers for propulsion and emergency engine.
- **NAVANTIA**  
Supply of Wire Rope Damper for electronic equipment.
- **ASTILLEROS GOLDAN**  
Calculation, design and supply of vibration-suppressing components for the exhaust system.
- **FINANZAUTO/CATERPILLAR**  
Supply of exhaust silencers and high temperature thermal blankets.

### RAIL SECTOR

- **CAF, S.A.**  
Supply of metal compensators and metal dampers in the exhaust system.
- **PATENTES TALGO**  
Design and calculation of special electronic equipment dampers for MECCA and KAZAJISTAN project.
- **FINANZAUTO/CATERPILLAR**  
Design and manufacture of exhaust pipe assembly, compensators, dampers and thermal-acoustic blankets.

## REFERENCES

### METROPOLITAN RAIL SECTOR

- **MADRID UNDERGROUND.**
  - Supply and installation of acoustic conditioning in ventilation shafts for Lines 2, 3, 4, 6 and Metrosur.
  - Isolation level study of the rails front of vibration transmission to the foundation. Sound level in adjacent buildings.
- **VALENCIA UNDERGROUND.**  
Supply and installation of acoustic conditioning in ventilation shafts for Lines 1 and 2.
- **ZITRÓN, S.A. ARGEL UNDERGROUND.**  
Supply and installation of acoustic conditioning in ventilation shafts for Line 1.
- **COBRA, S.A.**  
Electrical Substation in Madrid Underground tunnel ventilation.

### INDUSTRIAL SECTOR

- **AQUALIA. GRUPO FCC.**  
Supply of acoustic elements for the ventilation system of the plant New Cairo WWTP. Egypt.
- **ISOLUX CORSAN.**  
Acoustic Treatment of technical buildings in Tomelloso WWTP.
- **DEGREMONT.**  
Acoustic treatment of technical buildings in IDA Barcelona.
- **FLOWSERVE SPAIN.**  
Acoustic-thermal treatment for high pressure pumps.
- **FOSTER WHEELER.**  
Suspension for vibration and Seismic in turbine-condenser group.
- **ACCIONA.**  
Supply of acoustic elements for the ventilation system and Dampers for vibration. Thermal Power Plant in Baja California.
- **UTE-EDAR OURENSE.**  
Supply Rectangular Silencers for WWTP Ourense.

# THANKS FOR YOUR ATTENTION



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