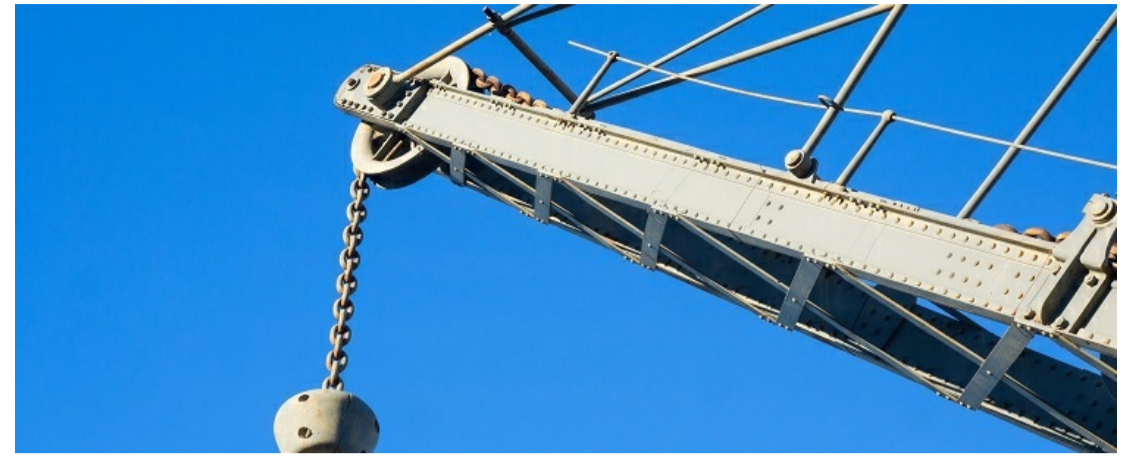


DESIGN OF ROBUST ASSEMBLIES

80% of mechanical failures are linked to assembly problems.

Cetim offers a global approach to the controlled design of assemblies, supporting you in the optimum choice of assembly technology and its correct dimensioning to speed up the marketing of more reliable, more efficient and more competitive products.



Your expectations

80% of mechanical failures are linked to assembly problems.

How can we speed up the time-to-market for more reliable, higher-performance and more competitive products?

Our solutions

Cetim offers a global approach to the controlled design of multi-material assemblies, by assisting you in the optimum choice of assembly technology and its right sizing.

Intervening on two of the decisive links in the product value chain ('*design and simulation*' on the one hand and '*testing and validation*' on the other), Cetim offers you customized support:

- **Study, qualification of the need and functional analysis** : *Data collection - fatigue strength requirements, loading Measurements, stress profiles - statistical and probabilistic data analysis, exchanges between project teams/customer and Cetim, co-elaboration of a design programme and validation of your assembly --> drafting of specifications for strategic decision.*
- **Design study and sizing**: *Following assistance in choosing the technology and based on the business rules, we carry out the digital sizing study - calculation/simulation, determination of fatigue performance (Sustainability)-->Preparation of a validation test program according to the specifications and expected performance.*
- **Characterisation and testing** : *according to the specifications validated in stage 2, we propose the appropriate test resources, design and build the necessary test benches and carry out the material and assembly test campaigns - static, dynamic, fatigue, vibration fatigue tests, particularly in an H2 environment, etc. -->Test and measurement report summarises the results obtained.*
- **Correlations and final validation of the assembly**: *we correlate the results of the calculations and tests, carry out a reliability analysis, validate the conformity of the product with the expected performance, and design the associated assembly ranges. Based on the results of this final stage, we propose ways of improving fatigue life -->At the end of this final stage, the performance of your assembly is validated, and we provide you with a final report on the entire study.*

The in-depth analysis of each stage in the design and validation of your assembly, combined with the precise definition of the expected performance criteria and their validation by digital simulation and testing, guarantees a result that complies with the specifications validated together within a controlled timeframe and investment.

Cetim's expertise in multi-materials, assembly techniques, simulation and testing of all types, managed by a single Cetim project manager, brings decisive added value to your designs.

Our experts also support your skills development and those of your employees through nearly [50 Cetim Academy® training courses](#).

ZOOM ON HYDROGEN

[HyMEET](#), our technological platform dedicated to H₂, provides mechanical engineering with resources and skills needed to master low-carbon hydrogen production, distribution, storage and utilization technologies. HyMEET combines an ambitious R&D program with a €25 million investment in resources dedicated to characterization and validation tests (up to 1000 bar and in a range of temperatures from deep cryogenics to high temperatures) as well as consulting and training.

Its activities are dedicated to:

Characterizing the behavior of materials in contact with hydrogen

Development of specific test methods

Characterization of specific mechanical equipment and systems in severe hydrogen environments.

Our equipment enables:

Mechanical characterization of materials using fatigue machines in a high-pressure hydrogen environment

Control of sealing systems and plant containment, with test benches developed to study gas diffusion phenomena, resistance to rapid decompression and sealing performance under severe conditions

The study of the ageing of test specimens in high-pressure autoclaves

Tests under cryogenic conditions for the use of hydrogen in liquid form, with several cryostats fed by a helium-hydrogen liquefier

Multiphysics tests with pressure, temperature and cycling.

Manufacture of thermoplastic composite parts (tanks, tubes) by in-situ deposition and consolidation (in real time, with no further steps required) using our HySPIDE TP robotized cell.

Your benefits

An offer covering the entire value chain and adapted to your constraints thanks to a tailored support

Cetim is a Carnot Institute



Question and Answer Service
sqr@cetim.fr www.cetim.fr

