04/09/2025

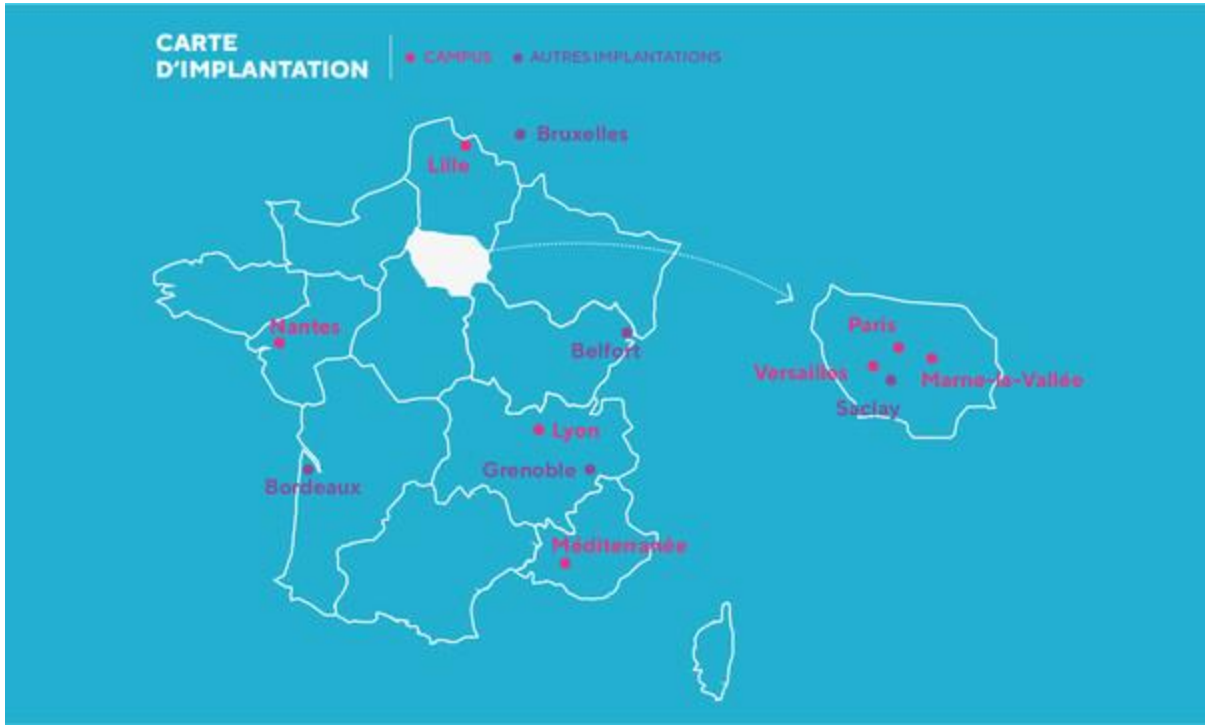
Lamine Dieng

# University Gustave Eiffel test Facilities

Université Gustave Eiffel

# Uni-Eiffel / Campus Nantes / SMC Lab



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# Laboratory missions

Research and Development

Standardisation and professional associations

Publications, conferences, technical doctrines...

- Improve knowledge of metallic elements, cables, structural bonding and composites used in civil engineering applications (bridges, nuclear enclosures, dams, **offshore/EMR structures**),

- Supporting public policies/public contracting authorities in the **management of civil engineering structures** and the deployment of **new MRE structures** (infrastructure management, adaptation of structures and climate change mitigation)

- Help train the next generation in these issues,

- Contributing to the dissemination of knowledge

Certification

Expertise

Internships, doctorates, teaching

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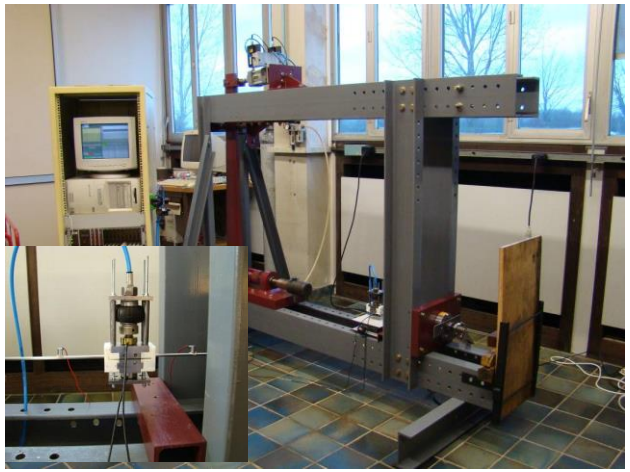
- 5 tensile test Rigs, including 3 fatigue machines (100, 250, 300, 600, 2500 kN)
- 5 mechanical test benches (up to 5,000 KN)
- 1 fretting-fatigue bench (50 kN)
- Several creep/relaxation frames

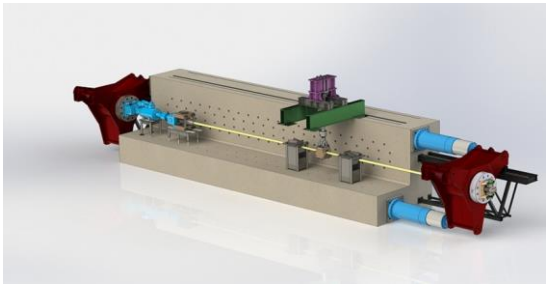
**2500 KN fatigue press**



**Fretting-fatigue machine**

- Major equipment: Cable fatigue bench (static force up to 24,000 KN + dynamic jacks)
- 200 m traction bench

THeoREm
Test facilities for Hydrodynamics and Marine Renewable Energy



**Cable Fatigue Bench**

**200 m mechanical test bench**

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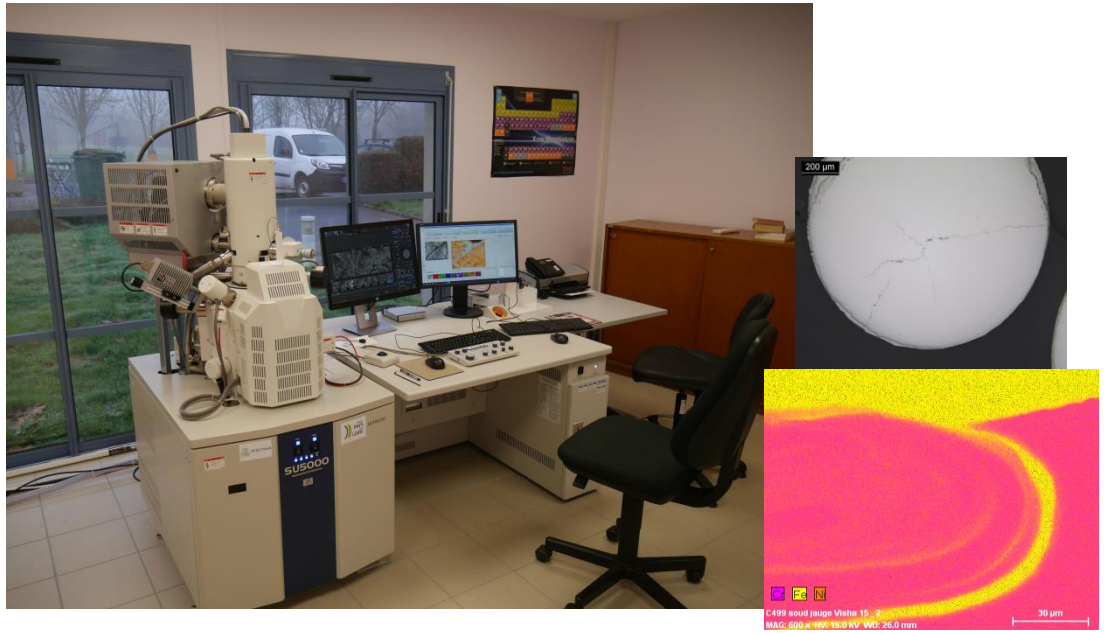
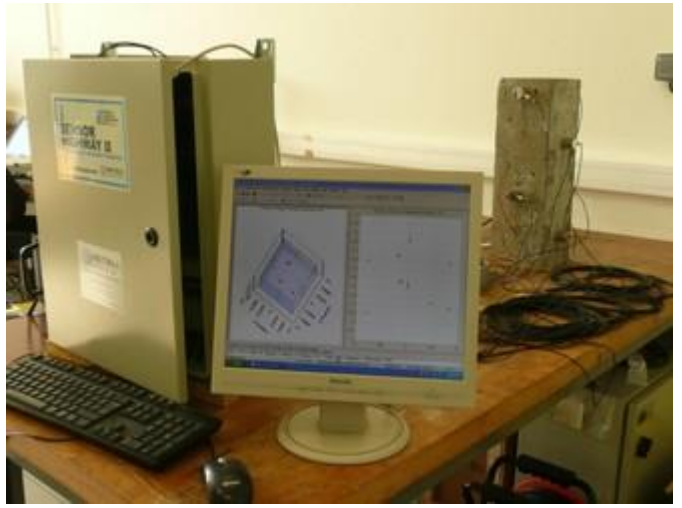
- Metallurgical analyses: Preparation room + optical microscopes, SEM/EDS
- Hydrogen measurement
- 3D geometric characterisation
- Hardness / micro-hardness measurement systems




**Scanning Electron Microscope**

- ND monitoring / auscultation techniques: multichannel acoustic emission (X 4), Acousto-ultrasound and US (X2),
- Instrumentation and vibration analysis equipment,
- Single-channel and multi-channel electrochemistry (X5)
- Systems for measuring and acquiring displacements, deformations, forces and temperatures
- Image correlation measurements



**Acoustic emission measurement chain**

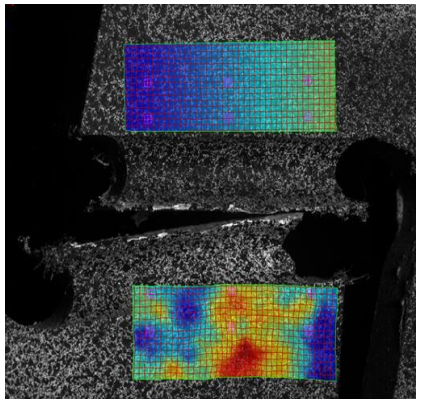


**Image correlation measurements**

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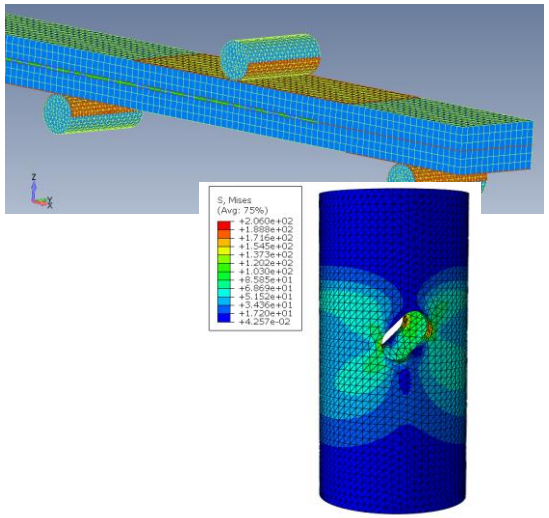
- Set of environmental chambers: 2 salt spray chambers, a hygrothermal stability chamber and a hygrothermal cycling chamber
- Ageing frame under stress (corrosion, alkaline environment, etc.)

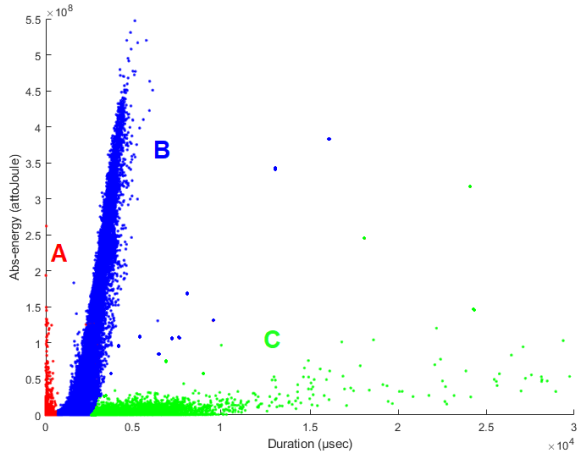
- Finite element Modelling software (Abaqus, Msc Marc et Mentat, etc.)
- Data processing tools (Matlab, etc.)
- CAD (SolidWorks, etc.)

**Salt fog chamber**

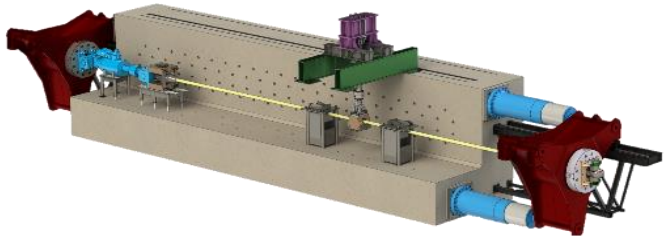
**Stressed ageing frames**

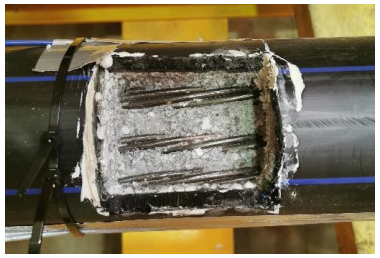


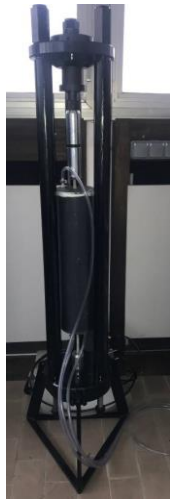
**Finite element models**

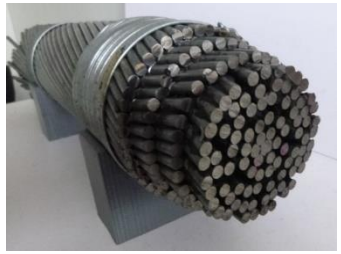



**Tools for processing and classifying acoustic events**









**Theme 1: Behaviour and durability of MRE and energy cables**

Monamoor (GEF), Seasnake (OceanERANet), Dynamo (GEF), Seanake+ (Cet), SmartMooring (Cet)

**MENFAT project**

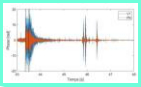
**Topic 2: Reinforcement and cables for civil engineering structures**

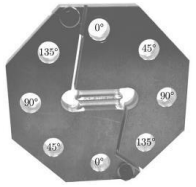
BA and BP certification, thesis N. Delaplanque (ANDRA), GT AFGC, re-anchoring test (SANEF) *+ expert reports*

***Certification***

**Theme 5: Auscultation, instrumentation and diagnosis of existing structures**

Thesis C. Sarr, Auscultation of end caps using acousto-US, Cable acoustic instrument (CCI Seine Estuaire), CAHPREEX (Connected bridges), *+ expert reports*



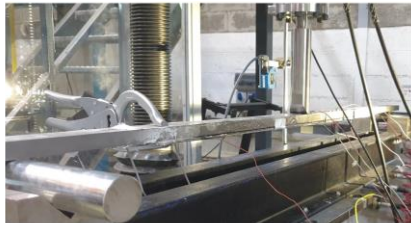


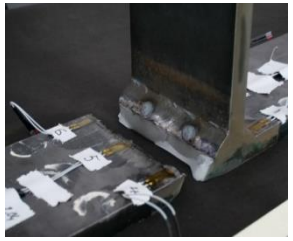
**Theme 3: Behaviour and durability of metal structures and their assembly**

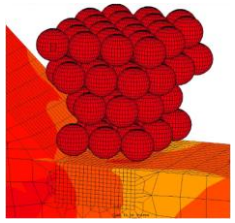
Thesis H. Franz (AREP), completion ass. Soudés (SONATS), thesis J.M. Morel (RTE), *+ expert reports*

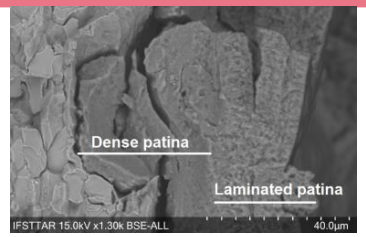
**Theme 4: Structural bonding and composite materials for civil engineering applications**

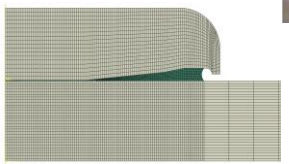
Thesis Q. Sourisseau and post-doc (SBO-Bureau Veritas), thesis A. Fawaz, thesis M. Loiseau (DGA/ColdPad), Recityplast project *+ expert appraisals*









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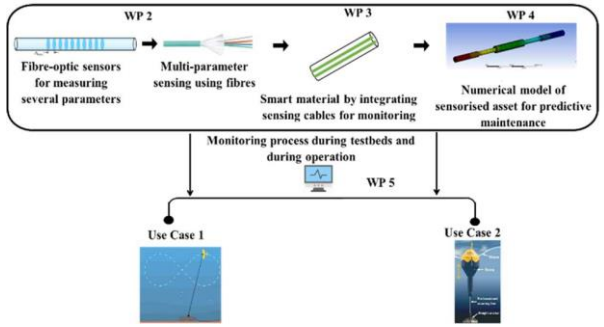
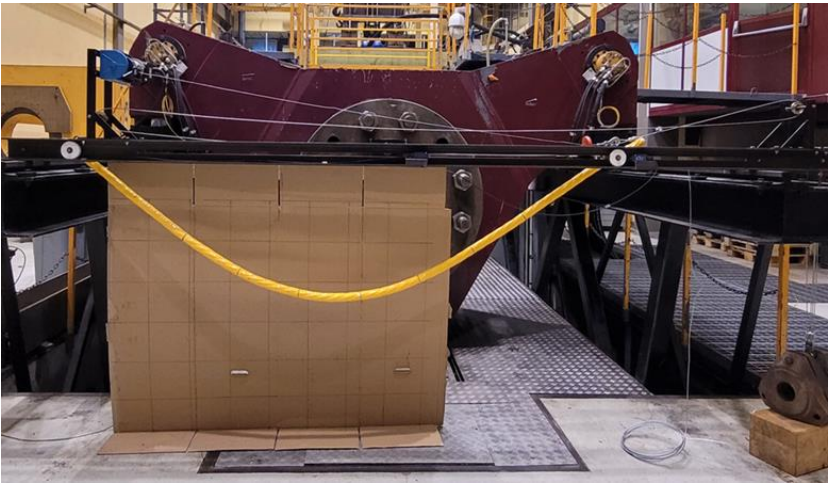
# Succes on Cet - projects

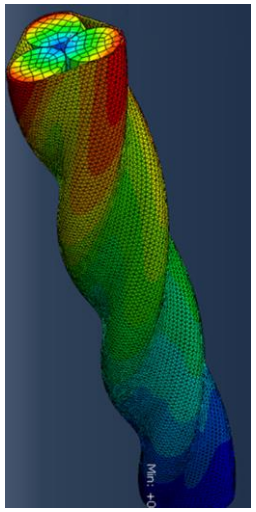
- **SEASNAKE Project** : Characterization and Dynamic Behavior of Conductor Cables


- **SMARTMOORING Project : Sensor-equipped mooring components for marine energy systems**




- Seasnake + Project : **Industrial upscale of surface protection system & fibre optic-based condition monitoring for the SEASNAKE MVC (Medium Voltage Cables)**





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# Main partners

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**SMC Laboratory**
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