



PRESS INFORMATION JULY 2020

## EDYCEM AND CENTRALE NANTES RENEW THEIR RESEARCH CHAIR TO DEVELOP SUSTAINABLE CONCRETE



EDYCEM - CENTRALE NANTES Research Chair – photo by Charles MARION

### EDYCEM

EDYCEM has 33 concrete plants, most of which are NF BPE certified, based in the West of France, making it a truly local player. The business has the necessary resources to offer innovative products developed in its R&D laboratory for both professional and private users. [www.edycem-bpe.fr](http://www.edycem-bpe.fr)

### CENTRALE NANTES

Founded in 1919, Centrale Nantes is a French engineering school. Its undergraduate, Master and PhD programmes are based on the latest scientific and technological developments. At Centrale Nantes, research and training are organised into three key areas for growth and innovation: manufacturing, energy transition and healthcare. [www.ec-nantes.fr](http://www.ec-nantes.fr)

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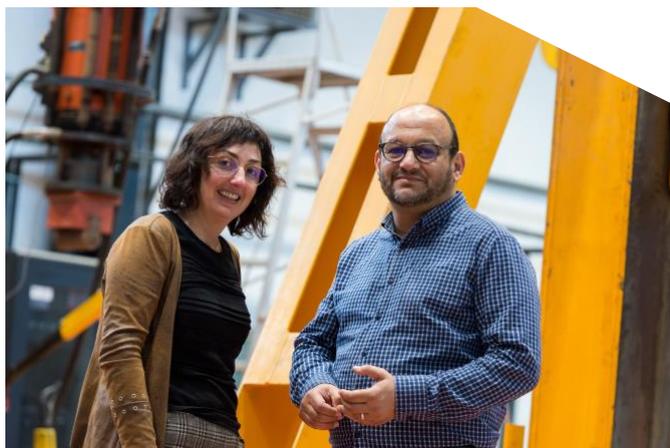
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## FIELD OPERATIONS AT THE HEART OF R&D

The forward-looking cooperation between EDYCEM and CENTRALE NANTES has grown steadily since 2001 when they began working together to innovate and expand the range of products and services for the concrete industry. In 2015, their Research Chair I on "Innovative concrete for new applications", which aimed to strengthen R&D, yielded innovations such as the first SMARTCEM® connected concrete and the eco-responsible EDY'ECO concept. Building on these twenty years of collaboration, the two parties launched Research Chair II at the end of 2019, on "Sustainable Concrete", for a period of five years. EDYCEM is the only mid-size French company to date to have signed a research chair with a CNRS laboratory of international repute.

The programme for this €3 million Research Chair II **confirms EDYCEM's commitment to innovation in the field of societal issues**. The work is focused on materials capable of **meeting the challenges of the city of tomorrow, in particular by reducing the impact of new buildings on the environment and accounting for all emissions over its life cycle, starting from the point of construction**.



Estelle Breillat, Quality and Development Director, EDYCEM  
Prof Ahmed Loukili, Research Chair  
Photo by Charles MARION

The topics to be addressed are **in line with previous work** to create concrete and construction processes that contribute to meeting environmental challenges. Each material is studied in depth using **advanced experimental and numerical techniques**, leading to the continuous improvement of products and the development of innovation such as the patented TECHNILISS® structural insulating concrete.

Innovation at EDYCEM is fueled by societal issues and the concrete expectations of its customers. For the first time, **two companies from the west of France and the ATILH Association** (Association Technique de l'Industrie des Liants hydrauliques) **have been included in the programme. Their industrial vision will enhance the academic contributions:**

- CHARIER, a family-owned public works company with expertise in aggregate extraction, road works, earthworks, deconstruction and civil engineering etc.,
- ATILH, represented by several professional organizations and members of La Filière Béton,
- ROTURIER SAS, specialised in hydraulic civil engineering (water treatment plants, engineering structures, bridges, etc.) and structural work (industrial buildings, functional structures and civil engineering (wind power, methanization, engineering structures).

## SHAPING TOMORROW'S CITIES

The Research Chair II comprises three new PhD theses that will focus on **sustainable development issues and climate challenges**:

- **Low-carbon concrete**: the behaviour and performance of concrete are analysed with the new cements that will be integrated into the NF EN197-1 standard. For example, CEM II / C- M with clinker content ranging from 50% to 64%. This thesis will contribute to anticipating future regulations by understanding the structured and deferred biological behaviour of the material.

For this work, EDYCEM will be calling on ATILH, one of whose objectives is to participate in reducing the carbon footprint of cement. Its remit, related to environmental issues, standards and cement quality, make it a leading partner in the development of concrete with a low carbon footprint.

- **Optimizing the formulation of permeable road paving**: This line of research has a dual objective. The first is to **limit urban heat islands**, which are a source of health risks for the population, by designing materials derived from deconstruction that have evapotranspiration properties.

The second application is set in a context of sustained rainfall over short periods that can lead to localized flooding and serious material damage and human casualties. This phenomenon is due to the high impermeability of road paving. The aim of the research is to propose concrete paving formulations that are sufficiently permeable and sustainable to allow **runoff water to evacuate rapidly**.

- **The durability of concrete in water treatment plants**: Chemically aggressive environments can lead to rapid structural deterioration if the concrete was not specifically designed for this use. This deterioration varies according to the process and the composition of the treated water. How to balance workability, durability and the structural behaviour of concrete in hydraulic structures? This thesis aims to reproduce these environments in order to study concrete formulations. A performance-based approach will be implemented to ensure durable structures.



Work session  
EDYCEM - CENTRALE NANTES Research Chair  
Photo by Charles MARION

As with the Research Chair I, it is intended that the results of the work be **published in specialized international scientific journals or at conferences in France, and abroad**. A guarantee of recognition of the quality and reliability of the approach.



## ILLUSTRATING THE SYNERGIES BETWEEN RESEARCH, INDUSTRY AND FIELD OPERATIONS

True to its local values, EDYCEM chose to involve customers and historical partners, such as the company ROTURIER SAS in this Research Chair II. This family-owned company, founded in 1955 and based in Pouzauges (Vendée), specialises in hydraulic civil engineering (water treatment plants, engineering structures, bridges, etc.) and structural work (tertiary and industrial buildings, etc.), i.e., large-scale projects requiring large quantities of waterproof, durable concrete that is resistant in the most aggressive environments.

It is within the framework of the thesis on "Durability of concrete for water treatment plants: assessment of the aggressiveness of the environment and performance approach" that ROTURIER SAS contributes its **vision of the field, needs awareness, and site methodology**.

The company is involved at two levels:

- **during the upstream phase of assimilation of problems encountered in the field:** hosting the scientific team to understand how and why a specific type of concrete is used for a specific type of structure. This technical stage provides an understanding of concrete application, site management, formwork rotation and user feedback. This work also provides site personnel with information on the concrete's chemistry.
- **in testing new formulations.** The concrete formulations created will be used on test sites to check their resistance and their reactions in aggressive environments to guarantee optimum durability.

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*"This Research Chair is a concrete way of increasing cooperation and promoting the long-term future of our businesses. As a company, we are set first of all to gain valuable knowledge. Expertise in concrete is a major technical and financial challenge. The environmental and health consequences of a leaking water treatment plant, for example, are just unthinkable. The structures on which we work require material with a lifespan of up to 50 years. The innovation that will result from this thesis will benefit everyone, from the project owner to the end user."*

*Julien CAILLAUD,  
Operations Director  
ROTURIER SAS.*

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