



# L2MGC

## CIVIL ENGINEERING MECHANICS AND MATERIALS LABORATORY

Laboratoire de Mécanique et Matériaux du Génie Civil

EA 4114

19 teacher-researchers

26 doctoral students

L2MGC has been developing its activities in the field of civil engineering, focusing on issues relating to the optimisation of materials and the behaviour of structures. The approaches used combine experimental studies with modelling work, ranging from the microstructural to the macrostructural scale, and cover both physico-chemical and mechanical aspects as well as thermo-hydro-mechanical coupling issues.



### KEYWORDS SCIENCE

- Rheology, tribology, and formulation
- Mechanics of materials and structures
- Heterogeneous media, porous materials
- Transfers, couplings, and scale effects

### KEYWORDS APPLICATIONS

- Construction, buildings, and public works
- Sustainable development, protection of natural resources and waste recovery
- Safety of structures and infrastructures



### APPLICATIONS AND INDUSTRIAL SECTORS

- Low carbon concrete, alkali activated binders, recycled aggregate concrete, lightweight concrete, textile mortar composites
- Recovery of construction waste and excavated soil
- Preservation of built heritage, durability, auscultation, diagnosis, repair
- Behaviour of materials at high temperatures, fire resistance, post-fire behaviour, thermal performance
- Phase change materials (PCM)
- Environmental performance of recycled and other materials in the circular economy
- 3D printing, etc.

### KNOW-HOW · SKILLS · EXPERTISE · SPECIFIC FEATURES

- Rheology: Mixing and rheological behaviour, pumping and transporting cementitious materials, application processes (spraying, injection, extrusion, bonding, printing)
- Mechanics of materials and structures: phenomenological approach to the mechanical and fracture behaviour of low environmental impact materials, rehabilitation of structures using composites with a reduced environmental footprint, reinforcement-concrete bond
- Durability and auscultation: performance based approach to concrete, evolution of the microstructure of concrete exposed to environmental stress, assessment of the degradation of reinforced concrete structures using non-destructive methods
- Thermo-hydro-chemical couplings and mechanics of materials

### EQUIPMENT

- Development of cementitious materials: Concrete batching plant 250L capacity, concrete mixers 80L capacity x2, mortar mixers 5L, shock table, vibrating table, sieving machine
- Preparation and conservation: Cold chamber -20°C/+20°C, carbonation chamber, Weiss WT450 climatic chambers, 250L ovens
- Thermal, structural, microstructural, and chemical characterisation: ATG/ATD 1500°C, bending bench 250kN, hot wire conductivity meter FP2C, Hot Disk TPS 1500 conductivity meter + furnace 4L 1000°C, chloride ion diffusion, ambient dilatometer - 1200°C, furnace 1m<sup>3</sup> 600°C, furnace 1m<sup>3</sup> 900°C, scanning electron microscope, gas permeability, 250kN hydraulic traction press, 30kN electromechanical press, 400kN electromechanical press, 1250kN hydraulic press, 3000kN hydraulic press, 4x4x16 hydraulic flexion-compression press, rheometer, System 7000 scanner, D4 Scanner, 50kN electromechanical traction

### INDUSTRIAL PARTNERSHIPS · SPIN-OFFS

- 5 to 10 industrial collaborations per year  
 CEMEX, UNPG, ROCAMAT, LRMH, SOLETANCHE, etc.

