



Master's degree internship

Topic: Fire resistance of raw earth walls: from bricks to wall structures

Internship Proposition:

The Laboratory of Engineering Sciences Applied to Mechanics and Electrical Engineering (SIAME) at the University of Pau and Pays de l'Adour (UPPA) is offering a master's internship on the high-temperature and fire behaviour of raw-earth walls. The project will begin with small-scale tests on earth bricks, followed by medium-scale wall tests.

Context and objective of the internship:

Earth materials have gained attention as sustainable solutions to environmental and economic challenges in construction. Primarily composed of soil and water, these materials have been used in long-lasting structures for centuries. However, challenges related to fire performance must be addressed before their widespread adoption in modern construction, where safety is essential.

The proposed internship will investigate the fire behavior and high-temperature performance of raw earth bricks (at small and medium wall scale size). Mechanical properties will be tested after slow heating (2°C/min) to evaluate their residual properties. Thermal properties will be evaluated. Rapid heating tests (ISO 834-1 fire) will also be conducted to assess fire behavior. Prior to high-temperature testing, the effects of surrounding conditions, including water content and mechanical loading, will be considered, as both are expected to have a significant impact on fire behavior.

This research will be conducted at the University of Pau and Pays de l'Adour (UPPA) in collaboration with French partners, as part of the ADEME (The French Agency for Ecological Transition). Experiments will take place in the SIAME laboratory, using earth bricks from different sources to assess how soil type influences fire performance and the potential of these materials for modern construction.

The main objectives of the study are therefore:

- Investigate the fire behavior of earth-based materials: compressed earth bricks and molded earth bricks.
- Analyze high-temperature response of raw earth bricks during fire testing.
- Evaluate high-temperature mechanical and thermal properties.

Program of the internship:

Task 1: Literature review

- Technical and technological state of the art
- Scientific state of the art

Task 2: Soil characterization (geotechnical tests)

Task 3: Preparation of samples

Task 4: Characterization of earth bricks at high temperature

- Conduct fire tests on earth bricks considering the synergistic effect of moisture content and external loading.
- Determine the residual thermo-mechanical properties of earth bricks.



Task 5: Master internship report writing

Contract:

Starting date: February 2026.

Place: Université de Pau et des Pays de l'Adour (UPPA), SIAME Lab, 55 Rue Mirambeau, 64600 Anglet, France.

The supervision will be made by Hélène Carré and Hussein Moussa during the internship period.

Remuneration: 650 €/month net salary (possible slight variation depending on the number of days in the month – 4.35 €/h).

Contact details:

To apply, please send a CV and a motivation letter before **03 December 2025** to:

- Hélène Carré : helene.carre@univ-pau.fr
- Hussein Moussa: hussein.moussa@univ-pau.fr

Selected candidates will be interviewed (online) between the 08 and 12 of December 2025.