




## Earthen construction, a question of permanence

Jeanne Marie Gentilleau<sup>1</sup>, Rachel Guerrero<sup>2</sup>, Aymone Nicolas<sup>3</sup>, Sophie Popot<sup>4</sup>

<sup>1</sup> TERA, Valence, France, [jeanmar@proton.me](mailto:jeanmar@proton.me), ; <sup>2</sup> ARESO, Toulouse, France, [rachel.guerrero@ecozimut.com](mailto:rachel.guerrero@ecozimut.com), ; <sup>3</sup> Mine de talents, Alès, France, [aymone.nicolas@orange.fr](mailto:aymone.nicolas@orange.fr), ; <sup>4</sup> ARPE Normandie, Caen, France, [sophie.popot@lesjours.org](mailto:sophie.popot@lesjours.org)

**Topic: T4.4. Reinterpretation of traditional techniques for their application in contemporary architecture**

How to cite: Jeanne Marie, Gentilleau; Rachel, Guerrero; Aymone, Nicolas and Sophie, Popot (2025). Earth construction, a question of permanence. In proceedings book: *HERITAGE 2025 | International Conference on Earthen & Vernacular Heritage: Restoration, Rehabilitation & Urban Regeneration*. September 10<sup>th</sup> – 12<sup>th</sup>, 2025, Valencia (Spain). [https://doi.org/10.4995/HERITAGE2025.2025.\\*\\*\\*\\*](https://doi.org/10.4995/HERITAGE2025.2025.****)

### Abstract

*The “Confédération de la Construction en Terre Crue” is a French non-profit association, representative of the different categories of players involved in earthen construction. In 2020, the Confédération published the “Guide des bonnes pratiques de la construction en terre crue” (Collectif-CONF terre 2020), the first step “normative” text for earthen construction, and nowadays conducts research through workshops and a variety of actions. Its initial research work highlights the obstacles to the development of this practice, whether regulatory, normative or related to the skill levels of professionals in the sector. For the HERITAGE 2025 conference, and the 4.4th topic, the “Confédération” is presenting three of its most recent works in order to share and cross-fertilize, with other European researchers, the advancement in our research and actions in favor of permanent earthen construction, from yesterday, today and tomorrow:*

- *the Projet National Terre, PN Terre, a nationwide research project aimed at removing the main obstacles to the deployment of earthen construction on a larger scale,*
- *the prefiguration of a participatory guarantee system, PGS, for earthen builders and actors, a participative, non-commercial system based on peer assessment for the recognition of skilled workers,*
- *ongoing efforts to have the know-how of those involved in earthen construction recognized as part of humanity's intangible cultural heritage, in France at first and then internationally.*

**Keywords:** *common-good, craftsmanship, earthen building, norm and standardization, participatory guarantee system PGS, UNESCO intangible cultural heritage ICH*

### 1. Introduction

In France, ten structures and associations of earthen construction professionals, on a national or regional scale, have joined forces since 2018 to form the “Confédération de la Construction en Terre Crue” (<https://conf-terrecrue.org/>). This non-profit organization aims to:

- federate and represent earthen construction professionals,
- promote and defend earthen construction,
- support and contribute to earthen construction research activities.

This Confederation operates on a collegial basis. Actions are carried out in workshops, that are open to every member of the organisations forming the Confederation. Among other things, the Confederation's work focuses on enabling vernacular earthen construction techniques to be more easily used in new construction and heritage maintenance. In other words, the fields of study do not stop at materials, workmanship or know-how of the past, but are part of a continuum, as a present-day necessity: “How to settle on Earth” (Friedman, 1976) is a permanent question.

The Confederation was founded in response to a tendency to “standardize” earthen construction. In France, many of the particularities of earthen construction and vernacular building in general are “outside the norm” of the current framework of the construction sector. This situation makes them extremely difficult to use (Calame 1987) outside the framework of renovations on old buildings dating from before 1948. Nevertheless, the Confederation's normative approach does not go in the direction of conventional standardization of construction products. The Confederation is committed to the recognition of these practices, which transform a diversity of raw materials into building materials while preserving vernacular construction skills, the common good, and environmental and social resources through know-how. It is committed to ensuring that these specific features are recognized as standards adapted to contemporary challenges.

A first step towards this “standardization” was taken with the publication in 2020 of a reference text recognized by the entire profession: the “Guide des bonnes pratiques de la construction en terre crue”. The aim of this text was to transpose from the spoken word to the written word the habits and needs of the French earth construction system taken as a whole, old and

new (Popot 2018). This Guide is now recognized as a first step reference by the construction sector i.e., by builders, designers and the insurance system.

This article will develop three of the Confederation's actions on the subject of contemporary transposition to the written of vernacular building cultures.

- Firstly, we present the *Projet National Terre* (PN*Terre*), a research program supported by the French government, which takes place in a university setting, integrating practitioners in broad participatory research.
- The Confederation is also considering a Participatory Guarantee System (PGS) that would guarantee the right relationship between the quality of workmanship, the transmission of know-how and all the activities induced by the act of building, while ensuring the preservation of resources.
- In the third part, attention is drawn to the desire to have the skills and know-how of earth building, as described in the *Guide des Bonnes Pratiques*, listed as an Intangible Cultural Heritage by UNESCO.

## 2. The “*Projet National Terre*”

In France, “National Research Projects” are programs designed to promote collaborative applied research projects and full-scale experimentation aimed at increasing knowledge and improving practices, tools and methods in the French civil engineering economic sector. Financially supported by the French Ministry of Ecological Transition<sup>1</sup>, these projects bring together public and private research laboratories, design and construction companies, architecture schools and heritage institutions,

---

<sup>1</sup>Ministère de la Transition écologique, de l'Énergie, du Climat et de la Prévention des risques

such as the National FastCarb Project (PN Fast Carb, 2020) on low-carbon concretes. In other words, the results of these projects are reflected in the publication of collections of recommendations and methodological guides, which are intended to contribute to the updating of technical guidelines and standards.

Initiated in 2017 by a group of earth construction researchers and practitioners, the Projet National Terre was built around one ambition: to make earth a major contributor to the ecological transition of the construction sector in France by drawing scientific lessons from built heritage in order to apply them to contemporary construction. Today, it brings together over 100 members.

The first step was to draw up a charter or set of rules (PNTerre 2017) that reflects the desire to stay as close as possible to vernacular construction and to pay attention to the social, environmental and economic impacts of future constructions. The studies focus exclusively on earth, used with no added binders. The research projects financed or accredited under the PNTerre program promote on-site building skills (with few or no industrial processes), low-carbon projects that promote the reversibility of construction, and products whose composition is known and free of rights.

The second step in 2019 was to carry out a literature review on all the topics covered (earth building socio-culture, environmental impacts, mechanical and hygrothermal properties, fire safety, worksite testing), and to draw up a research program covering the needs to be met for the sector in the short and longer term, as well as the means envisaged to meet them (PNTerre, 2019).

Projects in progress over the next two or three years include: structural characterization of load-bearing cob structures based on examples

from Brittany's heritage (Fig.1); dimensioning of rammed earth structures in Auvergne-Rhône-Alpes; fire behavior of earth walls; sociological study of heritage renovation sites to gain a better understanding of the transmission of know-how.

The expected scientific and technical results include changing regulations, so that multi-storey buildings in load-bearing adobe or brick partitions in social housing are made possible again. While we await the technical results of the research, we have noticed another result of this project: the opening of dialogue and cooperation between university researchers carrying out laboratory research on earth samples, and the craftsmen and women working on site, far from the academic world. For example, during the construction of a new elementary school in Mordelles, Brittany, applied research was carried out on an in situ seismic risk test, on acoustics between classrooms, as well as on the interactions between the different participants: town council, the architects, the engineers and the masons.

### **3. Recognizing skilled workers, an ongoing need**

In this section, we return to the need to recognize craftsmen in the field of vernacular construction: how Participatory Guarantee Systems (PGS), as defined by the IFOAM<sup>2</sup>, are a means to this end. We will then present the basic principles of the PGS being developed by the Earth Confederation.

#### **3.1. Context**

Earthen construction belongs to the realm of vernacular architecture, and relies on the mastery of a wide range of skills. "Maintaining and looking after our built heritage means knowing how to do things and being able to pass them on. The absence of this maintenance leads

---

<sup>2</sup>IFOAM, International Federation of Organic Agriculture Movements

to the loss of this built heritage”. (Chevallier, 1991).

One of the Confederation's aims is to promote and defend earthen construction. Preserving heritage also means learning from the past to improve practices and meet the building needs of today and tomorrow. Achieving this objective implies maintaining know-how, passing it on and improving it (Chevallier, 1991).

Finding competent professionals is a recurring need for project owners concerned about preserving their heritage and the quality of the construction work. They need to find and contact these professionals. Directories of professionals who possess this know-how have always been used (Calame, 1988). In 2003, the “Maisons Paysannes de France” association published a national survey and census of professionals chosen in the field of rural built heritage, by theme, which included professionals in earthen construction.

At present, there are many different attempts to distinguish professionals. To navigate this, the “Confédération de l'Artisanat et des Petites Entreprises du Bâtiment” or “CAPEB” has published a summary of all the guarantees, acronyms, designations, certifications, etc. that exist in France (CAPEB Grand Paris 2019). Among these qualifiers, we are seeing a new concept emerging in building environmental quality, based on a participative guarantee system or PGS (DRIEAT IDF 2021 p.35).

### **3.2. Peer-certified labels or participatory guarantee systems: PGS**

The PGS concept was theorized and put into practice within IFOAM as early as 2008 (May 2019), “Participatory Guarantee Systems (PGS) are quality assurance systems with a local focus. They certify producers by relying on the active participation of stakeholders and are based on trust, social networks and knowledge exchange” (IFOAM - Organics International, 2008).

Earthen construction, a question of permanence  
PLEASE, DO NOT EDIT OR DELETE THESE LINES  
PLEASE, DO NOT EDIT OR DELETE THESE LINES

It is a certification system that provides a guarantee of continuous improvement by those who practice this profession for their mutual benefit, while preserving the resources or common goods of Humanity. It is an open, horizontal and transparent process. This model of governance is based on the theory of the commons and its applications (Ostrom, 1999).

Participatory guarantee systems (PGS), labels or endorsements certified by peers, are increasingly visible in the field of food and fair trade. The French association “Nature & Progrès” was a forerunner of what would later become the organic farming movement, drafting its first specifications in 1972. Other sectors of activity have also adopted this model of governance, such as intellectual data in research, or free software in information technology. From the outset, these PGSs aroused the curiosity of intellectuals, self-builders and craftsmen in favor of vernacular construction, though without ever achieving the equivalent success or recognition of the “BIO” (organic food) certification.

In the building sector, a PGS was launched in 2009. When the BDM (Bâtiment Durable Méditerranéen) approach became operational. It includes a self-assessment framework covering environmental, social and economic aspects, as well as a human and technical support system for all those involved in the project, and a final validation of the performance level achieved by the building by an inter-professional commission (Buick 2012). This system is now being rolled out in other regions: Bâtiments Durables Occitanie (BDO), Bâtiments Durables Franciliens (BDF)EKOPOLIS in Île de France.

In contrast to the IFOAM's definition of PGS, BDM and its successors have chosen to certify buildings, not the construction professionals involved. Buildings are assessed in their entirety, in terms of their environmental impact over their complete life cycle.

These labels or participatory certifications are difficult to compare, as they do not relate to the same objects.

### 3.3. The project for a peer-certified label for earth constructors

Following the publication of the “Guide des bonnes pratiques de la construction en terre crue” in 2018-2020, a forward-looking workshop was formed within the Confederation on the subject of participatory guarantee systems (PGS).

In the light of the COMPAIRS<sup>3</sup> studies from 2020 to 2023 and the analysis of pre-existing PGSs in the building sector, the Confederation workshop has been able to define its own project. Initially, it intends to address the need for skill recognition and knowledge transmission.

We can see that a double shift needs to take place. One that comes from an understanding of the materials, their characteristics and the results achieved (based on research carried out at “Projet National Terre”), and the other from participative certification, an organization that certifies that the company or individual is capable of achieving on site the results achieved in the laboratory.

This participatory certification or peer-certified label project has several goals:

- structure the profession, allowing a better knowledge of the profession from within and without,
- improve, disseminate and transmit practices and know-how, through initial and continuing training and all forms of knowledge dissemination ;
- revise and update the standard-setting reference text: “Guide de bonnes pratiques de la construction en terre crue”

(Confédération de la Construction en Terre Crue, 2020) ;

- gain the confidence of all those involved in the building industry, particularly technical control and insurance companies, in earthen construction.

## 4. Earthen construction know-how, Intangible Heritage of Humanity

In France, as in many other countries around the world, building with earth involves a wide range of skills, from the selection and preparation of local earth to its use in built structures.

Despite the evolution of laying techniques and the mechanization of some tools, these skills are characterized by a high degree of permanence, requiring many years of practice to master.

According to UNESCO, “intangible cultural heritage means the practices, representations, expressions, knowledge and skills... that communities... recognized by communities ... as part of their cultural heritage ... transmitted from generation to generation ... constantly recreated by communities and groups according to their environment, their interaction with nature and their history, and providing them with a sense of identity and continuity, thus helping to promote respect for cultural diversity and human creativity” (UNESCO 2003).

Throughout France, both in the metropolitan and overseas regions, the cultural community of earthen construction, which has existed for centuries, has all but disappeared. It is no longer precisely defined as “passing on a heritage from generation to generation, providing a sense of identity and continuity”. However, know-how has not disappeared, even though it has declined since the Second World War, partly due to the death of many craftsmen on the battlefields, and

<sup>3</sup><https://certification-participative.org/le-projet-compairs/>

partly due to the industrialization of construction. Over the last forty years, and particularly over the last ten, they have been revived and updated by professionals and local residents who practice earthen construction and contribute to studying, highlighting and improving recognition of this know-how. Today, building with earth is more than just the act of making structures with a clay-based material. It's also a state of mind specific to a community of craftsmen and practitioners who have made a name for themselves in the construction industry.

The “Confédération de la Construction en Terre Crue”'s application for earthen construction to be listed as an intangible cultural heritage site under the UNESCO Convention is based on this community of practitioners.

The aim is to make an inventory of the specific skills involved in earth building, understand their vitality and how they are passed on, identify the threats and risks they face, and identify the ways in which they can be safeguarded and enhanced, either currently or in the future.

#### **4.1. Inventory of skills**

Knowing the skills and know-how of our craftsmen and craftswomen requires a thorough understanding of the heritage they have built up. Inventories have already been carried out in the regions, some by government departments, others by the regions themselves (Midi-Quercy; Nord-Pas de Calais); surveys carried out as part of university theses and dissertations (Bassin Lyonnais, Isère, Bresse, Ain, Champagne, Rennes, etc.); the inventory launched by the Gustave Eiffel University in Nantes on the sustainability of earthen construction techniques (Brittany, Pays de la Loire, Champagne, Limagne, Occitanie). There is also a national inventory project, as well as three inventories of contemporary earthen architecture. Further studies are planned to cover the entire country.

Earthen construction, a question of permanence  
PLEASE, DO NOT EDIT OR DELETE THESE LINES  
PLEASE, DO NOT EDIT OR DELETE THESE LINES

#### **4.2. Methods of learning and transmission**

Earthen construction practices are based on specific knowledge and know-how different to those usually required to design and build with standardized and industrialized materials. They are transmitted in different ways: on-site in a company; in continuing education; in participatory construction sites or educational construction sites. Transmission is based on teaching traditional techniques, based on the observation of heritage for inspiration, even when the goal is to find new ways of doing things.

#### **4.3. Threats and risks**

Among the threats and risks weighing on the know-how linked to earthen heritage, the loss of culture in the broad sense, among the general public on the one hand, and among the inhabitants of earth houses on the other, as well as the loss of contact with the earth material, lead to disqualifying representations, and to a lack of skill transmission.

The invisibility of the material "earth" is due to the diffusion of social representations which, in France as in many other countries (this is one of the "discourses" of colonization), equate earth with the material of the poor - and dirty - or with obsolete knowledge. ... The bad reputation of the material is conveyed by conventional building professionals and residents who suffer and cause damage, due to a lack of knowledge of the properties of the material ... to the point of making it lose its thermal and plastic assets, thus giving it the status of "bad" material." (Pecquet & Pruvost, 2019). This lack of knowledge leads to inappropriate rehabilitation and renovation practices by residents and professionals with the use of inadequate materials and techniques; but also incorrect practices in new construction. In addition to this lack of knowledge of built heritage and the lessons that could be learned from it, there are other factors such as the trend towards standardization of traditional know-how

on the model of industrial materials through the growing demand for reference texts to justify the performance of these techniques; installation and insurability difficulties for craftsmen due to regulatory constraints. But also urbanization which causes the disappearance of village communities which participated in the collective maintenance of earth structures.

### 4.3. Safeguard measures

Safeguarding measures consist of regulatory actions aimed at the building profession. They also aim to give visibility to this know-how and to the earthen built heritage, so that building professionals, but also the population, can re-appropriate this heritage. They are of several types:

#### 4.4.1. Reference texts

These texts are written by professionals in earthen construction and published: Treatise on earthen construction; Guide to good practices; Professional rules for renderings on earth supports; Standard on earth bricks; Glossary and lexicon of earthen construction.

#### 4.4.2. Training actions

A collaboration with national training authorities; the drafting of professional references at European level and dissemination in existing national references; different programs in architecture and engineering schools; regional introductory projects for the restoration of earth buildings, open to all.

#### 4.4.3. Actions for main public

Many expositions, conferences and regional festivals are accessible to the general public.

#### 4.4.4. Public recognition

The French State has been funding actions to structure the sector since 2012. Many projects are supported by the Regions and local authorities. In 2020 a national professional diploma for earth masons was created. Earth as

a geo-sourced material was reintroduced into the curriculum of the C.A.P. (Professional Aptitude Certificate) for masonry. A new C.A.P. was introduced for half-timbered construction. All these initiatives are bearing fruit. However, they are still insufficient for earth building to become a common construction technique again. All the risks and the difficulty of safeguarding and promoting this know-how encourage us to request its registration as Intangible Cultural Heritage with UNESCO, because the urgency is great, given the disregard in which earthen construction heritage finds itself today. Since this type of construction is practiced in all latitudes, it could be defined as a universal example of the interaction of human with nature, a universal art of building with local, organic and geo-sourced materials. We hope that this Conference will be an opportunity to create links with other countries, which could undertake the same approach, first with their government, to then join in a common recognition by UNESCO of this vernacular heritage in earth.

## 5. Conclusion

The challenges of heritage preservation and in particular the transition between vernacular architecture and contemporary construction can be addressed by different types of organization: States at different national, regional and local levels, but also educational organizations (Universities) or cultural dissemination organizations (Museums). These issues can also be supported by private entities defending quite divergent goals. In this contribution we have tried to show the values and actions supported by a federation of regional and national associations representing, for the most part, artisanal companies in earthen construction. What emerges is a renewal and an interpretation of traditional techniques for their application in contemporary architecture, not from a formal and nostalgic point of view, but on the contrary in the sense of a living heritage anchored in

building skills and knowledge, trust between

## References



Figure 1: Bauges Porteuses - Projet National Terre

- Buick, R. & Rimbaud, A. (2012). Etude sur le secteur et les filières de production des matériaux ... Nomadéis pour le Ministère de l'Ecologie, du Développement Durable et de l'Energie, DGALN / PUCA, 101p.  
<https://www.urbanisme-puca.gouv.fr/IMG/pdf/Nomadéis>
- Calame, F. (1987). Peau de bois, peau de pierre, Terrain [Online], 9 | 1987, Online since 19 July 2007,  
<http://journals.openedition.org/terrain/3188>
- Calame, F. (1988). L'entretien du patrimoine bâti : pour un diagnostic des savoir-faire, in, Terrain [Online], 11 | 1988, Online since 18 July 2007,  
<http://journals.openedition.org/terrain/3322>
- CAPEB Grand Paris (2019). Tableau des signes de reconnaissance de la qualité dans le bâtiment, <https://www.apeb-grandparis.fr/wp-content/uploads/2019/09/Tableau-Qualifs-2019.pdf>
- Confédération de la Construction en Terre Crue (2020), Guide des bonnes pratiques de la construction en terre crue, 2020.  
<https://conf-terrecrue.org/textes-de-reference/>
- Chevallier, D. (1991). Des savoirs efficaces, Terrain [Online], 16 | 1991, Online since 06 July 2007.  
<http://journals.openedition.org/terrain/2992>
- May C. (2019). Le guide des SPG : Comment développer et gérer les systèmes participatifs de garantie pour l'agriculture biologique, IFOAM, 2019.  
<https://www.fao.org/family-farming/detail/fr/c/1264864/>
- Pecquet, L. & Pruvost G. (2019), PN Terre, Etude de montage, 2019, 170 p., <https://projet-national-terre.univ-gustave-eiffel.fr/>
- UNESCO (2003), Convention pour la sauvegarde du patrimoine culturel immatériel, 2003,  
<https://ich.unesco.org/fr/convention#art2>