

7. CONCLUSION

In order to begin the long job of building acceptance for earthen structures in Africa, it will be necessary to address standards and regulation issues. This means both writing and adopting guides and norms for earthen building, but also redrafting norms written for materials like cement, norms that have mysteriously come to apply to all other materials. This is a process that takes time. It is a process which is not well understood and which is changing fast in the African context. Regional agreements mean single-country codes can now be harmonized by many countries, and enjoy immediate force in law. When the standards are generated in the region rather than parachuted in from elsewhere, there may be particular interest and willingness to uptake. This process has been largely unfunded and a labor of dedication, but it is critical that through pressure from

those working in this field, its significance should be better understood by funders, and that the current emphasis on research is strategically shifted to standards dissemination until that goal is reached. Because earthen building is still proscribed in towns and cities, and millions still have no choice but to live in shacks from found materials because standardized materials like cement are completely unaffordable, and because professionals in the built environment are not educated to see earthen construction as acceptable or viable, it is imperative that the legal tools are put in place to allow millions, the dignity to legally procure decent, affordable, environmentally sound and sustainable earthen schools, clinics, commercial buildings and homes for the first time.

Notes

(1) COMESA: Common Market for Eastern and Southern Africa.
(2) SADC: Southern African Development Community.
(3) SADCSTAN: Southern African Development Community Cooperation through Standardisation.

References

Bakker, K.A. (2009). Challenges of African City Development. UNESCO workshop on the application of the concept of the Historic Urban Landscape in the African context, 30 Nov-3 Dec 2009. Zanzibar, United Republic of Tanzania: UNESCO.

Keable, R. (2010). How Construction Standards Can Reduce Carbon Emissions: An African Case Study. In Carbon and Climate Law Review. Vol.4, Issue 4, pp. 357-363.

Keable, R. (2011). Guides, Codes and Standards for Rammed Earth Structures, an African Case Study. In TERRA 2008, 10th International Conference on the Study and Conservation of Earthen Architectural Heritage, Bamako, Mali, 1-5 Feb 2008. Los Angeles, USA: Getty Conservation institute, pp.361-364.

Ogbu, L. (2009). A Search for Specificity: Learning from Africa. In African Perspectives 2009 - The African City Centre: [Re]sourced, International Conference, 22-28 Sep 2009. Pretoria, South Africa: University of Pretoria.

Standards Association of Zimbabwe (2001). Zimbabwe Standard Code of Practice for Rammed Earth Structures, Zimbabwe Standard No. 724:2001.

Walker, P., Keable, R., Martin, J., & Maniatidis, V. (2005). Rammed earth: design and construction guidelines. Bracknell, UK: BRE Bookshop.

Yahya, S., Agevi, E., Lowe, L., Mugova, A., Musandu-Nyamayaro, O., & Schilderman, Th. (2001), Double Standards, Single Purpose: Reforming Housing Regulations to Reduce poverty. London, UK: ITDG Publishing, Practical Action Publications.

PROTERRA IBERIAN-AMERICAN NETWORK: HISTORY, INVENTORY AND PERSPECTIVES

Marco Antônio Penido de Rezende, Célia Neves, Luis Fernando Guerrero

Theme 9: Education, Training and Outreach
Keywords: Network, Iberian-American, technological development, technology transfer

Abstract

The PROTERRA Iberian-American Network is a collaborative organization established in order to investigate, preserve and disseminate earthen architecture and its construction technology. It brings together over 100 professionals from 21 countries of the region in various research areas, such as teaching, design, construction, training and dissemination. The Network has published nine printed books, 20 CD-ROM and other electronic publications, and has promoted more than 60 courses and workshops, and over 30 conferences and seminars, among which 12 Iberian-American Seminars of Architecture and Earthen Construction (SIACOT) were accomplished under its direct auspices. Currently, the Network has a significant role in research and dissemination of earthen architecture and construction throughout the Iberian-American region, both from the point of view of conservation, as well as construction technology, and new architecture. The origins of this organization began in October 2001, as an Iberian-American research project, supported by CYTED (Ciencia y Tecnologia para el Desarrollo), which led to interesting and unusual contributions to the discipline, particularly those that resulted in the creation of the Network at the end of the Proterra project, in February 2006. Since then, without any formal funding, the Network continues developing various activities from the initiative of its members, and has even increased the number of courses and seminars in relation to previous years, when working within a funded rese arch project. The dynamism and interesting past of the Network led to the development of a study conducted in 2010 at the University of Oregon, USA. This paper presents part of the results of that study, which discusses the different activities accomplished by the Network, and incorporates also the oral history and actions of one of its members, as well as the first and the second Coordinators of the Network.

1. INTRODUCTION

Sustainable development and cyber space are perhaps the two most obvious features of the 21st century. Both are used by the PROTERRA Iberian-American Network, created to promote and raise awareness about earthen architecture and its construction, especially within the countries of the region. It started in 2001 with just seven members as a temporary four-year program. Known as the Research Project, it rapidly expanded with the association of other professionals involved in the subject. At the end of the project, the challenge of continuity was assumed by the Network, based mainly on common interest and volunteer work of its members. The story of PROTERRA, documented through papers authored by its Coordinators (Neves, 2006; Neves, 2010; Neves and Guerrero, 2010), as well as reports and newsletters, motivated the development of a post-doctoral level study, which sought to synthesize and analyze the activities carried out over time since the initial Research Project to its current networking activity.

2. PROTERRA IBERIAN-AMERICAN NETWORK

The current PROTERRA Network was named after the project that instigated it in the scope of the XIV Subprogram of Social Housing-HABYTED of the Science and Technology Program for Development-CYTED (www.cytcd.org). The project Proterra began in October 2001 and was concluded in February 2006. As an “international and multilateral technical cooperation project” (Neves, 2006), it sought the transfer of scientific and technological results of earthen architecture and its construction to productive sectors and social policies of Iberian-American countries. According to Neves and Guerrero (2009), its main forms of action included:

- Information and specialized distribution of the technology of earthen architecture and its construction;
- Exchange of information and experiences;
- Technical support to applied research projects;
- Capacity building and technology transfer at different levels;

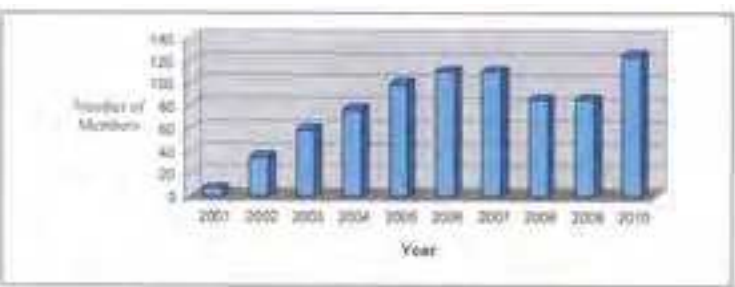


Table 1. Evolution of PROTERRA Network membership (1) (credits: Rezende, 2011)

- Databases and several publications;
- Advisory and consulting services.

With the imminent completion of the project, at its last meeting held in Monsaraz, Portugal, in October 2005, it was decided to create the Network despite the lack of financial support from the CYTED Program, or any other agent of international funding. It was possible to continue various activities because there was already an international team of professionals interested in promoting the improvement and dissemination of the technology of earthen architecture and its construction.

To this end, regulations were established defining the nature and objectives of the Network, its thematic areas, operational structure, conditions for its management and association. According to its statutes, it is defined as “an international network of integration and technical and scientific cooperation in the Iberian-American field, which operates in the development of earthen architecture and its construction” (Neves, 2006).

Any discussion and agreements on the regulations for creating the Network were accomplished over the Internet, taking advantage of the listserv created in October 2003, and adopted as the official form of communication and development for many of the Network’s activities. Proterra Project refers to the period during the sponsorship by CYTED (from 2001 to 2006), and PROTERRA Iberian-American Network refers to the next stage (from 2006 to present).

3. PROTERRA TEAM

From its outset, PROTERRA sought to add new members for specific aims, especially those of gathering active professionals in different and geographically distant areas, able to promote the development and technological transfer. This created a discussion environment of knowledge sharing, as a way to identify opportunities for the development of joint activities.

Although the object of PROTERRA was aimed at the use of earth in contemporary construction, since its launch, PROTERRA also integrated activities and professionals dedicated to the preservation of heritage, in order to understand the strong connection between the knowledge produced for the restoration of buildings and the actual construction of housing. The technological basis developed in this field has



Fig.1 PROTERRA Project activity in Colombia: Construtiera 2006 (credits: Luis Fernando Guerrero)

been essential for rescuing and maintaining the tradition and the memory of this constructive knowledge. Moreover, the research conducted and the solutions put forward for heritage restoration have also provided effective solutions for construction systems currently in use.

This trait began to distinguish PROTERRA from other similar projects, which are usually closed groups to facilitate and coordinate the various works to be executed. But in this project, membership was closed to interested persons, regardless of their academic level and training profile. The project had criteria for admission of members established by its supporter CYTED with four categories of members that differed by location (country), experience and performance. These included effective members, collaborators, observers and ‘friendly-institutions’ representatives. Currently, the Network no longer uses these categories, except the reference to friendly-institution, which relates with associated institutions.

The operational experts within the field of study were enrolled as full members; specialists with little or no action within the field of study, but with activities related to earthen architecture and construction, as well as experts from a broad Iberian-America were enrolled as collaborating members. University undergraduate and graduate students were included as observer members. The friendly institution category was created to integrate institutions that did not always have specific action on the issue, whether or not of Iberian-American origin, but which supported, participated and followed the project. Each institution could designate up to three representatives as members of PROTERRA. All members enjoyed the same rights, notwithstanding their group, with the exception of financial support for the implementation of project activities, and the participation at Assemblies, which were privileges restrict to active members.

Table 1 presents the evolution of PROTERRA’s team, whose number of members was gradually increased from the beginning of the project, ranging from 80 to 120 since the establishment of the Network in 2006.

PROTERRA’s team always maintained its unusual nature due to good participation from academics, researchers and other professionals dedicated to design and execution of the work, and activities relating to technology transfer. Neves (2006) argues that at the end of the project in February 2006, PROTERRA had more than 100 participants from 18 Iberian-American countries with the following profile: 42% have their main professional activity at universities; 16% at research institutions; 18% at NGOs, and 24% in architecture offices and other public or private enterprises primarily focused on social housing construction programs.

The reduction of the number of members observed in the year 2008 is due to the assessment by the coordination of integrating just the members that were more active responding back to the activities of PROTERRA. By 2010, the PROTERRA team expanded with the entry of other interested colleagues. In several meetings the ‘ideal’ size for a smooth functioning of the PROTERRA Iberian-American Network was discussed. The consensus points to a number of around 100 members. In parallel, PROTERRA has always stimulated the creation of national or thematic networks, which associate with it and with each other, allowing the expansion of the number of people united by a common goal, in addition to facilitating the discussion of specific problems of a regional nature, and to disseminate and to exchange experiences in the international arena.

It is important to refer that Proterra project (2001-2006) was coordinated by Célia Neves, from Brazil, who also launched and coordinated the PROTERRA network from 2006 to 2008. The second coordinator was Luis Fernando Guerrero Baca, from Mexico (2008-2011). The third coordinator was Mariana Correia, from Portugal (2011-2014) (5).

4. ACTIVITIES OF PROTERRA NETWORK

Table 2 summarizes the main activities developed by PROTERRA since its beginning.

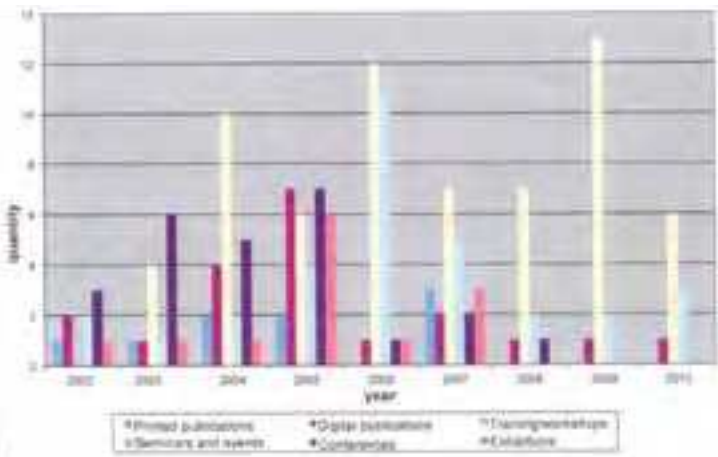


Table 2. Main activities developed by the PROTERRA Network (2) (credits: Rezende, 2011)

While a research project, the activities were scheduled at an annual meeting according to the working capacity of the team and following the basic guidelines of its supporter, CYTED. The activities were recorded in annual reports submitted to CYTED and CNPq (3), the Brazilian participant of the CYTED body. As a network, PROTERRA plans its activities in an annual meeting, or through collective electronic mailing to the listserv. Implementation, however, depends on the funding obtained by its members for various financial institutions. The activities are duly registered in the newsletter published quarterly.

Regarding the survey presented in Table 2, the activities were organized into six categories with some adjustments, such as demonstration projects and other activities in support of earthen building. These were accounted for in the category of ‘training and workshops’. Other activities, such as companies, institutions and governments agencies, were not accounted for, as well as meetings and work directed towards standardizing earthen buildings in different countries, protection against earthquakes and other natural phenomena, development of collective research that led to the glossary of technical terms for earthen architecture and an inter-laboratory program.

Regulations for the use of earthen materials were always one of the essential activities of PROTERRA. After its inception, PROTERRA published recommendations for the development of technical building standards with mixed techniques (4) of earthen construction (Hays and Matuk, 2003). In 2005, with the support of PROTERRA, the Autonomous University of Tamaulipas organized the 1st International Congress-Workshop for Standardization of Earthen Architecture to show the progress in knowledge and activities established for the development of “earthen standards” (Congreso, 2005). Other actions had occurred, and are still occurring, in order to create the scientific basis for these regulations. In 2007, PROTERRA launched an international inter-laboratory program aimed at standardizing laboratory tests related to soil characterization and the qualification of products used in various construction systems. At the end of 2008, the inter-laboratory study was completed to test the compressive strength of adobe (Neves and Faria, 2008).

From the results obtained, a PROTERRA procedure is being proposed for testing the compressive strength of adobe. In addition, it also seeks to advance in the inter-laboratory program, by establishing the procedure for testing small adobe walls, in order to evaluate the behavior of adobe masonry and to test procedures for CEB (compressed earth block).

A focus of great interest to countries located in the mountain ranges of the Andes and Mexico corresponds to the behavior of earthen constructions during earthquakes. PROTERRA always sought to contribute to the identification of technical solutions to prevent disasters resulting from this natural phenomenon. It supported the implementation of SismoAdobe2005, organized by the Pontifical Catholic University of Peru in 2005, which brought together 359 people from 26 countries, presenting research and construction solutions adopted in certain regions that can be utilized in other regions mainly for the benefit of low-



Fig.2 Workshop at the 11th SIACOT in Tampico, Mexico, Sept. 2011
Fig.3 Workshop at the 14th SIACOT in San Salvador, El Salvador, Nov. 2014
(credits: Luis Fernando Guerrero)

income communities, which are generally the most affected by these events.

At one of the first meetings of the project, the difficulty of communication between the countries of Spanish and Portuguese languages, each with of its own technical terms, was identified. As a result, a decision was made to organize a database of common technical terms in various Iberian-American countries with the possibility of being expanded in the future to other languages. PROTERRA members documented and recorded regional technical terms of the past and present; Gallaecia Higher Education School [ESG-Escola Superior Gallaecia] from Portugal edited the information, generating the Specific Terminology of Earthen Architecture and Construction (available at: www.redproterra.org). The ESG also launched and managed PROTERRA website, since 2007.

Another activity that was not specifically identified, but was adapted above all others, was the transfer of technology. Since its inception, PROTERRA valued actions corresponding to these types of activities. In its general assembly in 2004, transfer knowledge was codified through the identification of training activities and dissemination, and looking for more efficient ways to transfer knowledge (Correia and Neves, 2008).

By analyzing Table 2, it is possible to see that 2005, although almost the last year of the project, was one of the most active. It is evident that the following years were also quite productive, albeit with fewer types of activities and the prevalence of training and workshops. These events have a practical nature and the participants learned the basics of earthen construction or restoration. Typically, PROTERRA conducts workshops in conjunction with SIACOT, occasionally with different audiences: graduate students and people from communities participate with much enthusiasm.

Further analysis of Table 2 shows that a reasonable number of exhibitions occurred between 2002 and 2007. In order to disseminate to universities the research being conducted, as well as the work of Iberian-American professionals, members of PROTERRA prepared illustrated panels presenting their work with short explanatory texts. These were recorded on a CD, and printed in several countries. At each exhibition, panels depicting local experiences were added, usually prepared by people who were not members of PROTERRA, thus enriching the heritage of each country. As these traveling exhibitions were easy to transport

and assemble, this method of diffusion proved extremely effective and reached a wide audience.

Publications are one of the priorities of PROTERRA. After completing the project, due to printing costs, digital publications were preferred, distributed on CD or placed on websites. Papers presented at conferences and other academic events were released on CD and, whenever possible, also printed. In order to have an adequate bibliography of training activities, Proterra Project published in 2005 Soil Selection and Control Methods for Earthen Construction-Field Practices, which was the result of work involving five specialists members of PROTERRA (Neves, Faria, Rotandaro, Cevallos, and Hoffmann, 2009a). In 2009, this document was revised and also published in Spanish (Neves, Faria, Rotandaro, Cevallos, and Hoffmann, 2009b). In 2011, PROTERRA published Earthen Building Techniques in Portuguese and Spanish (Neves and Faria, 2011a, 2011b), and PROTERRA Workshops. Instructions for the Organization in Spanish (Neves and Faria, 2011c), for the purpose of collaborating on the practical activities of capacity-building events. These documents are all available at www.redproterra.org.

The conferences recorded in Table 2, which correspond to the events promoted by PROTERRA, were excellent opportunities for dissemination, and occurred mostly during the period between 2002 and 2007. Currently, PROTERRA has participated more effectively in events, not only with presentations at conferences, but as an organization capable of conveying the state of the art of earthen architecture and construction in Iberian-America. In October 2010, PROTERRA was invited to form a panel at the annual meeting of the Association for Preservation Technology International (APTI) in Denver, United States.

The performance of the Network relative to the project showed a significant increase in activities, training and workshops, 2009 being an exemplary year with 13 events. Other activities that have also increased are the hosting of conferences and events. In this case, a high concentration of events occurred in the years 2006 and 2007.

Editorial activities, especially printed ones, had a significant reduction. With the completion of the project, there were no more resources for the publication and distribution of printed materials. However, PROTERRA understands that there is a lack of publications on this topic in the Iberian-American region, and that efforts should be concentrated to develop more publications, especially digital ones, as they are easier to finance and distribute.

Exhibition activities were also quite small. Despite its relevance for the dissemination of earthen architecture and construction, exhibitions were not defined as a priority, and since 2008 even less so, although one may occur on occasion.

All things considered, with the completion of the project, there was an increase in training activities, workshops and events, which has been very positive contribution to a greater diffusion of earthen architecture in Iberian-America. However, there was a reduction in the number of publications and exhibitions. Although lack of funding may partly justify the reduced number of printed publications, it appears to partly be a result of the management of

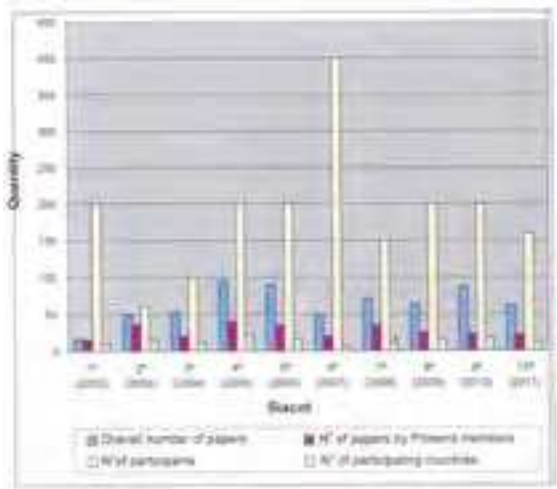


Table 3. Number of participants, papers and countries at the SIACOT seminars (credits: Rezende, 2011)

the Network itself. It is important to clarify, as noted by Camarinha-Mattos (2004) and Dorogovtset (2010), that when the Network's management is identified as the probable cause, shortcomings in coordination are not being pointed out, a characteristic attitude and action of all members involved.

5. IBERIAN-AMERICAN SEMINAR OF EARTHEN ARCHITECTURE AND CONSTRUCTION – SIACOT

The first event to occur focused on the possibility of developing a community oriented activity in the region, bringing together its members in the first annual meeting in Salvador, Brazil in September 2002. The 25 Proterra project members from 11 countries that were present had much to contribute to the dissemination of earthen architecture and construction within the community, as well as to non-specialists. Thus began SIACOT, an event created with the aim of promoting interaction between academia and the production sector, including professionals from the most diverse areas of activity and society in general, to show the state of the art of earthen architecture and its construction in Iberian-American countries. The number of participants, of countries represented and papers published, edited by Neves (2006 and 2010) and Rezende (2008), are summarized in Table 2 (5).

In the period of the Proterra project, the SIACOT was associated with the annual general meeting, whose expenses were funded by CYTED, the program sponsor. However, due to the strategy adopted to increase the number of members of Proterra, there were not enough financial resources to fully assume the travel expenses of all, to participate in the assembly and, consequently, in the corresponding SIACOT. The procedures adopted were to encourage Proterra members to find their own institutional financial aid, and to request various contributions from the organizing institutions to serve the largest number of members possible.

The criteria for granting financial support to the coordinator's staff members was defined in a clear and transparent way. Without the financial resources of specific sponsors, each member had to

find their own support, and whenever possible, the organizing institutions facilitate the participation of the Proterra members in the SIACOT, by assuming some of their expenses.

Table 3 indicates a sharp increase in the number of papers, averaging 50 to 80 items per event, as well as an increase of authors, who are not members of PROTERRA, demonstrating the success of the events as a place for disseminating achievements and research, especially in Iberian-American countries. Thus, SIACOT, by virtue of the large number of papers published annually, has become an important portal for dissemination of earthen architecture and it construction.

In addition to presentations of academic papers, other parallel hands-on activities occur during SIACOT, particularly workshops. These activities also contribute to dissemination and training, creating a healthy environment of awareness, knowledge and other information sharing among participants, and facilitating the development of joint projects, as well as friendships.

6. CONCLUSIONS

According to Neves and Guerrero (2010), the activities of the Proterra project remain an axis of strategic development for the medium- and long-term work of the PROTERRA Iberian-American Network, which can be grouped into four lines of action, developed either individually or collectively.

The first concerns the issue of research, whose knowledge generation is produced by the Network members from different fields. This ranges from earth characterization, development and performance of building systems, structural analysis, environmental impact studies, relationship between architecture and health, history and construction archeology, studies and conservation of heritage structures, among many others. The results are presented at different events, and publications are disseminated at national and international levels. However, SIACOT, which is held annually, is the ideal place for this purpose. The *raison d'être* of this international event is precisely the presentation and collective discussion of research progress and experiences in different fields of knowledge of earthen architecture and its construction.

The second line of action refers to formal education. Although examples of earthen construction can be found on five continents, paradoxically, universities are unequipped for this branch of science. The evolution of related disciplines occurs in a disjointed manner. Currently, the PROTERRA Iberian-American Network looks to integrate institutional actions like those of the Chaire UNESCO Architectures de Terre, among others, aiming at collaborating within the structure of teaching/learning suitable for the discipline of earthen architecture and construction among the universities operating in this area.

Another activity that receives much attention within the Network is the training of human resources through practical workshops. Self-builders participate in these, including people in general, community members, students, professionals and teachers, among others. This process is very effective because it facilitates the transmission and assimilation of construction techniques, either



Fig.4 Workshop on painting with natural colors, at the 15°SIACOT in Cuenca, Ecuador, Nov.2015 (credits: Luis Fernando Guerrero)

through the experience acquired by direct contact with the materials and tools during practice, or as a collective work, in addition to the technical assistance offered by instructors.

The plans developed for this line of action showed the need to systematize procedures to facilitate the organization of workshops and to ensure the pedagogical aspects of this form of capacity building, regardless of the local agent or organizer of the event. Therefore, there is an effort towards developing PROTERRA documents for trainers and workshop organizers, as well as attendees. Thus, pertinent procedures to different types of workshops can be created, establishing methods for planning and the corresponding activities in order to avoid unpredictable circumstances.

Notes

- (1) There is no record of the number of members in the years 2007 and 2009; therefore, in these years, in Table 1, is repeat the number of the previous year.
- (2) In Table 2, 2002 corresponds to the period between October 2001 and September 2002; 2003 corresponds to the period between October 2002 and December 2003; and other years are for the period from January to December of each year.
- (3) CNPq - National Council for Scientific and Technological Development.
- (4) Mixed techniques correspond to the building systems in which a material is used as a supporting element, usually wood, and earth as filler. It has several names, such as bahareque, quinchá, pau a pique, and taipa de mão, among others.
- (5) Note added during the proceedings publication: The forth mandate is coordinated by Hugo Pereira, from Chile (2014-2017) with the support of a Coordination Council composed by the three previous coordinators.
- (6) Other relevant data from SIACOT is a follows:

SIACOT	Date	Place	Organization
1°	September 2002	Salvador, Brazil	Polytechnic School of the Federal University of Bahia, State University of Feira de Santana and Center for Research and Development
2°	September 2003	Madrid, Spain	Higher Technical School of Madrid. Research Center for Traditional Architecture
3°	September 2004	San Miguel de Tucumán, Argentina	Faculty of Architecture and Urban Planning of the National University of Tucuman; Regional Research Center of Earthen Architecture
4°	October 2005	Monsaraz, Portugal	Escola Superior Gallaecia, Foundation Convent of Orada, Centre of the Earth Association
5°	June 2006	Mendoza, Argentina	Environmental Institute of Social and Human Sciences; Regional Research Center of Earthen Architecture
6°	September 2007	Tampico, Mexico	Autonomous University of Tamaulipas
7°	November 2008	São Luís, Brazil	State University of Maranhão; TerraBrasil Network
8°	June 2009	San Miguel de Tucumán, Argentina	Faculty of Architecture and Urban Planning of the National University of Tucuman; Regional Research Center of Earthen Architecture
9°	February 2010	Coimbra, Portugal	Archaeological Studies Centers of Coimbra and Porto; University of Coimbra, Escola Superior Gallaecia, Centre of the Earth Association
10°	November 2010	Montevideo, Uruguay	Regional North Faculty of Architecture of Salto

References

Carminha-Matos, L. (2004). Collaborative networks: a new scientific discipline. *Journal of Intelligent Manufacturing*. Vol. 16, No. 4-5.

Congreso-Taller Internacional para la Normalización de la Arquitectura de Tierra. (2005). *Memorias*. Tampico, Mexico: Unidad Académica de Arquitectura, Diseño y Urbanismo. Universidad Autónoma de Tamaulipas.

Correia, M. & Neves, C. (2011). Knowledge Transfer and Networking on Earth Architecture. In *Terra 2008 Proceedings: 10th International Conference on the Study and Conservation of Earthen Architecture*, 1-5 February 2008, Bamako, Mali. Los Angeles, USA: Getty Conservation Institute, pp.372-377. Available at http://www.redproterra.org/images/stories/pubs_sobre_proterra/11_terra2008_mali_2008.pdf

Dorogovtsev, S. (2010). *Lectures on Complex Networks*. Oxford, UK: Oxford University Press.

Hays, A., & Matuk, S. (2003). Recomendaciones para la elaboración de normas técnicas de edificación con técnicas mixtas de construcción con tierra. In *Técnicas Mistas de Construcción con Tierra* (pp. 121-350). Salvador, Brazil: Proyecto XIV.6 Proterra/CYTED.

Neves, C. (2006). Cinco anos de arquitetura e construção com terra e Proterra em Ibero-América. *TERRABRASIL 2006*. Ouro Preto, Brazil: UFMG; PUC MINAS; PROTERRA. 1 CD-ROM. Available at: http://www.redproterra.org/images/stories/pubs_sobre_proterra/7_terrabrasil_brasil_2006.pdf

Neves, C. (2010). 10 SIACOTs, 9 anos de dinamismo da Rede Ibero-Americana PROTERRA. XI SIACOT – Seminário Ibero Americano de Arquitetura e Construção com Terra. *Anais*. Montevideo, Uruguay: Proterra/Universidad de la República. Available at http://www.redproterra.org/images/stories/pubs_sobre_proterra/14_x_siacot_uruguay_2010.pdf

Neves, C., & Faria, O.B. (2008). Programa interlaboratorial PROTERRA. Ensaio de adobe. *TerraBrasil 2008: II Congresso Arquitetura e Construção com Terra no Brasil/ VIII Seminário Ibero-americano de Construção com Terra*. São Luís, Brazil: UEMA/PROTERRA/TerraBrasil,

Neves, C., & Faria, O. (Eds.) (2011a). *Técnicas de construção com terra*. Bauru, Brazil: FEB-UNESP / PROTERRA. Available at http://redproterra.org/images/stories/pub_pdf/tecnicas_de_construcao_com_terra.pdf

Neves, C., & Faria, O. (Eds.) (2011b). *Técnicas de construcción con tierra*. Bauru, Brazil: FEB-UNESP / PROTERRA. Available at http://redproterra.org/images/stories/pub_pdf/tecnicas_de_construccion_con_tierra.pdf

Neves, C., & Faria, O. (Eds.) (2011c). *Talleres Proterra – Instructivo para la organización*. Bauru, Brazil: FEB-UNESP / PROTERRA. Available at http://redproterra.org/images/stories/pub_pdf/talleres_proterra_maio_2012.pdf

Neves, C., & Faria, O., Rotandaro, R., Cevallos, P., & Hoffmann, M. (2009a). Seleção de solos e métodos de controle na construção com terra – práticas de campo. Rede Ibero-americana PROTERRA. Available at http://redproterra.org/images/stories/pub_pdf/Selecao_de_solos_10.pdf

Neves, C., Faria, O., Rotandaro, R., Cevallos, P., & Hoffmann, M. (2009b). Selección de suelos y métodos de control en la construcción con tierra – prácticas de campo. Rede Ibero-americana PROTERRA Available at http://redproterra.org/images/stories/pub_pdf/selecao_de_solos_09.pdf

Neves, C., & Guerrero Baca, L.F. (2009). Avanços e desafios da Rede Ibero-Americana PROTERRA. 6° ATP/9° SIACOT. *Actas*. Coimbra, Portugal: CEAUCP/ESG/Proterra. Available at http://www.redproterra.org/images/stories/pubs_sobre_proterra/12_6atp-9siacot_portugal_2009.pdf

Rezende, M.A.P. (2008). Reflexões sobre a rede ibero-americana PROTERRA. VII SIACOT – Seminário Ibero Americano de Arquitetura e Construção com Terra. *Anais*. São Luís, Brazil: Proterra/Rede TerraBrasil/Universidade Estadual Maranhão.

Rezende, M.A.P. (2011). Relatório técnico-científico de pós-doutorado no exterior – PDE. Processo No. 201221/2009-8. Technical report submitted to CNPq. The report is not published.