ICOMOS CIAV

International Committee on Vernacular Architecture

International Council on Monuments and Sites

CIAV NEWSLETTER

QUARTERLY PUBLICATION

Volume 50
February 2022

Bamboo-Structure-in-Bali © inhabitat.com
Cover photo: Venice in Flood © Conde Naster Traveler

ICOMOS-CIAV
International Committee of Vernacular Architecture
International Council on Monuments and Sites

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EDITORIAL

Hossam Mahdy
President of CIAV
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Dear colleagues and friends,

Warm greetings from CIAV Bureau and from myself.

A whole year has passed and the pandemic is still looming over our heads and preventing us from undertaking many of our activities. I do hope that 2022 will be kinder to us all and to the whole world.

While we wish to see the pandemic behind us, there is another great threat to all humanity that will not go away unless we act with due diligence and on time: Climate change. This is in the heart of CIAV's mission. On the one hand the vernacular built heritage is highly threatened by climate change. On the other hand many lessons and examples of the wisdom and common sense that are required to address climate change could be found in the vernacular built heritage in different localities around the world.

The whole world followed with hope and fear for two weeks the UN Climate Change Conference of the Parties 2021 in Glasgow (COP26) with the title "Uniting the world to tackle climate change". The ICOMOS Advisory Committee 2021 Scientific Conference took place online as one of the parallel events of COP26 with the theme "Living Heritage and Climate Change". CIAV was strongly present at the conference with a Knowledge Café with the theme "Living Vernacular Built Heritage and Climate Change". The event was very vibrant with about seventy participants and very important interventions and discussions.

Ivan Enev, CIAV Secretary General took minutes of the discussion and will share them with all CIAV Membership. Suheyla Koc accepted to act as the coordinator for CIAV next steps on the topic which could lead to forming a working group but also could lead to other possible actions and initiatives.

I would like to suggest to organize a webinar in February 2022 to brainstorm ideas for future steps to ensure that climate change will be in the heart of CIAV activities.

I do hope that the pandemic will permit us to meet in person in September 2022 in Valencia. As you know the scientific conference of CIAV for this year will be joining Heritage 2022 (International Conference on Vernacular Heritage, Culture, People and Sustainability) in Valencia from 15 to 17 September. CIAV annual meeting will be held then. ICICH (the International Scientific Committee on Intangible Heritage) will also join CIAV in contributing to Heritage 2022 and I hope that we could hold a joint meeting of the two committees' members to discuss possible future collaboration on common interests.

I wish you all the bests for the season and the new year 2022.

Yours,
Hossam Mahdy
CIAV President

EDITORIAL

Hossam Mahdy
Presidente CIAV
hossammahdy1960@yahoo.co.uk

Estimados colegas y amigos,

Saludos afectuosos del Buró CIAV y de mí mismo.

Ha pasado un año entero y la pandemia sigue cerniéndose sobre nuestras cabezas impidiéndonos llevar a cabo muchas de nuestras actividades. Espero que 2022 sea más amable con todos nosotros y con el mundo entero.

Si bien deseamos dejar atrás la pandemia, existe otra gran amenaza para toda la humanidad que no desaparecerá a menos que actuemos con la debida diligencia y a tiempo: el cambio climático. Esto está en el corazón de la misión de CIAV. Por un lado, el patrimonio construido vernáculo está muy amenazado por el cambio climático. Por otro lado, se pueden encontrar muchas lecciones y ejemplos de la sabiduría y el sentido común que se requieren para abordar el cambio climático en el patrimonio construido vernáculo en diferentes localidades del mundo.

El mundo entero siguió con esperanza y miedo durante dos semanas la Conferencia de las Partes sobre el Cambio Climático de la ONU 2021 en Glasgow (COP26) con el título "Uniendo al mundo para abordar el cambio climático". La Conferencia Científica del Comité Asesor de ICOMOS 2021 se llevó a cabo en línea como uno de los eventos paralelos de la COP26 con el tema "Patrimonio vivo y cambio climático". CIAV estuvo fuertemente presente en la conferencia con un Café del Conocimiento con el tema "Patrimonio Construido Vernáculo Vivo y Cambio Climático". El evento fue muy vibrante con cerca de setenta participantes e intervenciones y debates muy importantes.

Ivan Enev, Secretario General de la CIAV, tomó las actas de la discusión y las compartirá con todos los miembros de la CIAV. Suheyla Koc aceptó actuar como coordinadora de los próximos pasos de la CIAV sobre el tema, lo que podría conducir a la formación de un grupo de trabajo, pero también podría conducir a otras posibles acciones e iniciativas.Me gustaría sugerir organizar un seminario web en febrero de 2022 para intercambiar ideas sobre los pasos futuros para garantizar que el cambio climático esté en el centro de las actividades del CIAV.

Espero que la pandemia nos permita encontrarnos personalmente en septiembre de 2022 en Valencia. Como sabéis a la jornada científica del CIAV de este año se sumará Heritage 2022 (International Conference on Vernacular Heritage, Culture, People and Sustainability) en Valencia del 15 al 17 de septiembre. Entonces se llevará a cabo la reunión anual de CIAV. ICICH (Comité Científico Internacional sobre Patrimonio Inmaterial) también se unirá a CIAV para contribuir a Heritage 2022 y espero que podamos celebrar una reunión conjunta de los miembros de los dos comités para discutir una posible colaboración futura sobre intereses comunes.

Les deseo todo lo mejor para la temporada y el nuevo año 2022.

Saludos cordiales
Hossam Mahdy
Presidente CIAV

COP 26: the 2021 United Nations Climate Change Conference

Time: 31 October-13 November,2021 Place: Glasgow, UK

Around the world storms, floods and wildfires are intensifying. Air pollution sadly affects the health of tens of millions of people and unpredictable weather causes untold damage to homes and livelihoods. But while the impacts of climate change are devastating, advances in tackling it are leading to cleaner air, creating good jobs, restoring nature and unleashing economic growth.

Climate Change Is The Greatest Risk Facing Us All. Despite the opportunities, we are not acting fast enough. To avert this crisis, countries need to join forces urgently.

Under the Paris Agreement, countries committed to developing national plans quantifying how much they would reduce their emissions - known as Nationally Determined Contributions, or 'NDCs'. All agreed that follow-ups would occur every five years and plans would be updated to reflect each country's highest possible ambition at that time.

From 31 October to 13 November 2021, The UK hosted the 26th UN Climate Change Conference of the Parties (COP26) in Glasgow. Around 120 leaders came together, launching two weeks of global negotiations to help determine whether humanity can drive forward the urgent action needed to avoid catastrophic climate change.

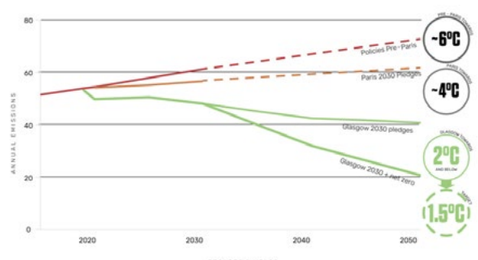
Addressing leaders at the first major global gathering since the COVID-19 pandemic, COP President Alok Sharma stated:"The science is clear that the window of time we have to keep the goal of 1.5℃ alive , and to avoid the worst effects of climate change, is closing fast. But with political will and commitment, we can, and must, deliver an outcome in Glasgow the world can be proud of."

After thirteen days of intense negotiations, COP26 concluded with every Party - almost 200 countries – agreeing to the Glasgow Climate Pact. This global agreement will accelerate action on climate change this decade, and finally completes the Paris Rulebook.

The aim of the UK COP26 Presidency was to maintain the hope of limiting the rise in global temperature to 1.5 ℃ , and the Glasgow Climate Pact does just that. Combined with increased ambition and action from countries, 1.5 ℃ remains in sight, but it will only be achieved if every country delivers on what they pledged.

The UK Presidency has given significantly more focus to championing real world sectoral action than ever before. For the first time, COP agreed to a position on phasing down unabated coal power. The Glasgow Climate Pact is the climax of two years of fervent diplomacy and raising ambition. The Presidency's work focused on delivering the Glasgow Climate Pact and driving action across the globe on the following 4 goals:

1. Mitigation: Secured near-global net zero, NDCs from 153 countries and future strengthening of mitigation measures : At the start of the Presidency, around 30% of world GDP was covered by Net Zero commitments; it is now over 90%. 153 countries put forth new 2030 emissions targets (NDCs). The Glasgow Climate Pact accelerates the drumbeat and puts in place the underpinning rules and systems. In Glasgow, countries finalized the Paris Rulebook and agreed to come back in 2022 with new strengthened commitments and a new UN climate programme on mitigation ambition, and they finalised the Paris Rulebook. To deliver on these stretching targets, the Presidency has driven commitments to move away from coal power, halt and reverse forest loss, reduce methane emissions, and speed up the transition to electric vehicles.



If countries keep their promises, with agreement to revisit 2030 commitments, the 1.5 degree goal is still alive © UNEP Emissions Gap Report

Coal Power Plant in Nottingham, UK. Source: E3G

2. Adaptation and Loss and Damage: Boosted efforts to deal with climate impacts : 80 countries are now covered by either Adaptation Communications or National Adaptation Plans to increase preparedness to climate risks, with 45 submitted over the last year. The Glasgow Sharm el-Sheikh Work Programme on the Global Goal on Adaptation was agreed upon, which will drive adaptation action. This is the first time an adaptation specific financing goal has ever been agreed on globally. Nations have announced new partnerships to improve access to finance, including for Indigenous Peoples. A new Glasgow Dialogue on Loss and Damage funding arrangements was created. The Santiago Network on Loss and Damage was brought to life through clear functions and funding.

3. Finance: Mobilized billions and trillions: Developed countries made progress towards delivering the $100 billion climate finance goal and will reach it by 2023 at the latest. 34 countries and 5 public finance institutions will discontinue international support for the unabated fossil fuel energy sector in 2022. Private financial institutions and central banks are moving to realign trillions towards global net zero. In Glasgow, countries agreed on the way forward for the new post-2025 climate finance goal. Developed countries committed significantly increased funding to vital funds such as the Least Developed Countries Fund.

4. Collaboration: Countries worked together to deliver The Glasgow Breakthroughs,which will accelerate collaboration between governments, businesses and civil society to deliver on climate goals faster. Collaborative councils and dialogues in energy, electric vehicles, shipping and agricultural commodities will help deliver on commitments. At COP26, the Paris Rulebook was finalized - including the 'enhanced transparency framework' , a new mechanism and standards for international carbon markets, and common timeframes for emissions reductions targets.

To know more: https://ukcop26.org/

2021 HeritAP Webinar on "Conserving the Hearts of Asia: Rural Heritage"

Time: 18-19 November, 2021 Place: Online

On 18-19 November, the World Heritage Institute of Training and Research for the Asia and the Pacific Region under the auspices of UNESCO (WHITRAP Shanghai) organized the 2021 Heritage Asia and the Pacific (HeritAP) annual meeting on "Conserving the Hearts of Asia: Rural Heritage".

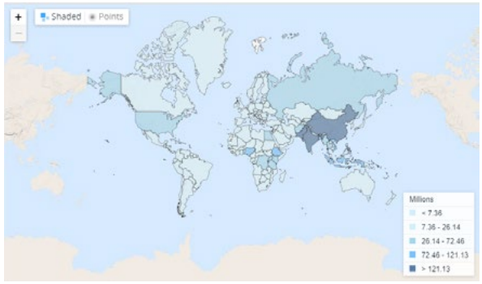
Heritage practitioners across the world especially those from the Asia-Pacific region gathered together and shared their practices and experiences of rural revitalization. JING Feng, Chief of Asia and the Pacific Unit at the UNESCO World Heritage Centre, and Webber NDORO, Director-General at the ICCROM, delivered the opening addresses. 6 regional representatives from UNESCO, IUCN, the Chinese Academy of Sciences (CAS), WHITRAP Shanghai, the International Committee of Vernacular Architecture (ICOMOS-CIAV), and the ICOMOS/IFLA International Scientific Committee on Cultural Landscapes (ISCCL), presented keynote speeches. Fourteen presentations were delivered by the national representatives from China, Thailand, Japan, Vietnam, South Korea, Pakistan, India, Iran, and Malaysia.

Given the significant role of rural vitalization within the globalization process, it is essential for the international community to participate in discussions and reflections on the contexts, functions, and prospects of the rural vitalization.

The webinar focused on 3 themes:

- Recognition of rural heritage, understanding relevant conventions and programmes and explore building synergies;
- Community empowerment and multiple stakeholders' involvement;
- Linking metropolis and rural areas.

In the webinar, members of HeritAP summarized the key characteristics of rural heritage, looked into the way that current international



Rural population (Source: World Bank Data in 2020)

conventions and programs directly or indirectly contribute to rural heritage conservation, and finally shared experiences of rural heritage conservation based on case studies. These case studies reflect the four key issues that have been encountered throughout the practices: the building of synergies among the current conventions and programs; community empowerment and multiple stakeholder involvement; integrated development of industries and the balance among the social, economic, and ecological aspects; and the linkage of metropolis with rural areas.

This webinar was concluded with a proposed outlook for what WHITRAP can do in the future. HeritAP will continue to focus on rural heritage especially the four key issues in the following years. With the vision to conserve rural heritage, WHITRAP Shanghai has established five missions: to improve the quality of agricultural development through advanced technology; to promote green, resilient, and people-centred development of rural areas; to enhance rural culture and its revitaliztion; to respect traditional knowledge and provide assistance to the communities; to establish a harmonious urban and rural relationship.

During the webinar, experts agreed that although the current conventions, programs and tools don't directly deal with rural heritage, they provide leading experience for rural heritage conservation. In FAO's program on GIAHS introduced by Professor MIN Qingwen, 40 of 62 agricultural heritage systems designated so far are in Asia and the Pacific region. For instance , the Hani Rice Terraces, its "Forest-Village-Terrace-River" landscape and the water system to survive the severe drought in 2009-2010 demonstrates the resilience of traditional ecological landscapes and thus the superior value of rural heritage.

Community's role is quite important in the conservation. Hatthaya SIRIPHATTHANAKUN, specialist in Cultural Heritage Conservation in SEAMEO Regional Centre for Archaeology and Fine Arts, introduces a participatory learning approach to engaging with the local community. The 'One Tambon, One Product (OTOP)' programme is a national economy-driven policy in Thailand targeted at rural areas to develop a sale product that is unique and reflecting cultural identity of each village. The participatory learning methodology is to gather the educators, heritage professionals, community developers, landscape architects, product designers, social media experts, university students and most importantly, villagers together in the workshops.

For future activities, the webinar has given three suggestions. First, while facilitating the standardization of rural heritage, we need to consider the diverse contexts of the Asia-Pacific region and try to be inclusive as much as possible. Second, the documentation needs to be done timely and properly due to the unavoidable impact caused by the conservation and management practices . Third, it is important to strengthen the collaboration and implement the training at all levels (international, national, regional, local administrations, site managers and local communities), among which the benefit of local communities is the final goal.

If you want to see more cases, please go to the following website:

http://www.whitr-ap.org/

Group photo of webinar © WHITRAP Shanghai

Grant Information of Endangered Wooden Architecture Programme(EWAP)

Introduction of EWAP

The Endangered Wooden Architecture Programme (EWAP) is a grant-giving programme that offers small and large grants for the documentation of endangered wooden architecture. The programme is hosted by Oxford Brookes University and delivered in collaboration with CyArk. EWAP was established in 2021 with funding from Arcadia, a charitable fund of Lisbet Rausing and Peter Baldwin.

Throughout history, wood has been an important building material all around the world. Today, extensive and rapid global deforestation, combined with competition from industrially manufactured materials threatens the continuity and survival of many wooden buildings and the carpentry traditions and ways of life associated with them.There is an urgent need to document the endangered wooden architectural heritage before much of it disappears due to the combined forces of globalisation, deforestation and material transience.

EWAP supports projects that focus on documenting wooden architecture that is endangered because of neglect, conflict or environmental circumstances. These records will be maintained for the long-term within an open-access digital repository. The programme also aims to develop research capacity, foster new collaborations and initiatives, and raise awareness and appreciation of the value and significance of wooden architecture around the world.

Grant Information

EWAP will favour projects in parts of the world where documentation has been less developed and funding support is more difficult to obtain. Thus, projects in Western Europe and North America will not be funded at this time.

The programme will also support the documentation of bamboo, palm, reed or grass traditions if a strong case for their at risk status can be made. These grants are not for conservation or restoration work.

- **Small grants** can last up to one year with a maximum award of £25,000.

- **Large grants** can last up to two years with a maximum award of £150,000. A large part of this grant is intended to cover equipment for 3D documentation.

Applications

The grant application process comprises two stages:

- an Expression of Interest (EOI)

- a Full Application.

EOI's provide an outline of the proposed project and make a case for the endangered status of the structure(s). Projects that meet the criteria for EWAP funding are then invited to submit a Full Application, which provides a detailed description of the project methodology and a breakdown of the budget. Full Applications are reviewed by expert peer reviewers and subsequently ranked by the EWAP Advisory Panel.

Applications must be submitted online via Google forms. This year's application is closed, please look forward to 2022!

One grant cycle is issued per year:

- The EWAP grant round opened on 11 October 2021.

- Expressions of Interest were submitted online by 22 November 2021.

- Applicants were notified in December 2021 as to whether they qualify to apply for the Full Application.

- Full Applications must be received by 21 February 2022.

- Notification of results will be issued by the end of June 2022.

If you have any questions please contact ewap@brookes.ac.uk

Peer Reviews Wanted

EWAP is also recruiting peer reviewers to evaluate grant applications. The first peer review round is scheduled for March 2022, with annual cycles. Peer reviewers will receive £75 for their time and effort for each review

EWAP is interested in peer reviewers from various disciplinary and professional backgrounds who have established expertise in traditional wooden architecture, including its construction and cultural production (in a specific geographic region).

If you want to apply to be a peer reviewer, please go to the following website:

https://www.brookes.ac.uk/research/units/tde/projects/endangered-wooden-architecture-programme/

or contact Professor Marcel Vellinga

Phone No. 01865 483978

Email : mvellinga@brookes.ac.uk

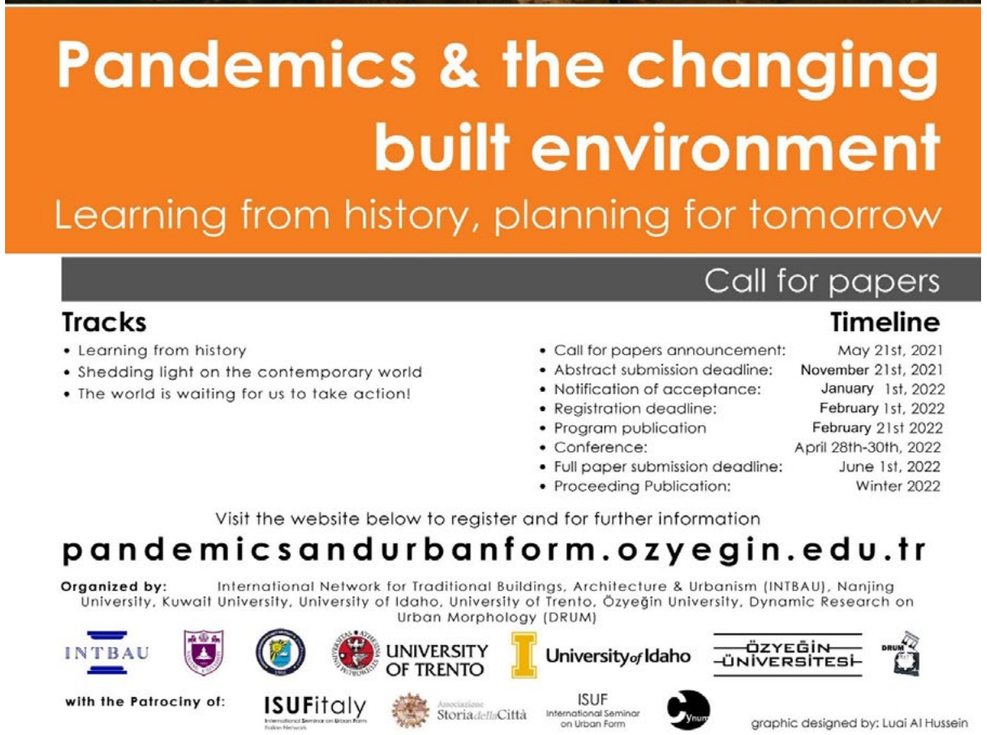
House building in Indonesia © Marcel Vellinga

Rulong Bridege: China's oldest woven-arch timber bridge constructed during the Ming dynasty in 1625 and renovated between 1821 and 1859 during the Qing dynasty. © Ronald G. Knapp, 2019.

First International Blended Conference on Pandemics and Urban Form , PUF 2022

Theme: Pandemics & the Changing Built Environment

Time: 28-30 April, 2022 Place: Istanbul, Turkey



2020 was an extraordinary year for all countries around the world. The pandemic continues to spread with no end in sight, confirming that the world is dramatically changing. The scholars in the field of the built environment are increasingly discussing the relationship between survival and urban form, two concepts once closely linked. In addition to this, the pandemic has brought us other questions: how can people interact with nature; how should we regulate social behaviours, and should we use science and technologies to improve the built environment?

We have experienced unprecedented changes in our social behaviours since the COVID-19 pandemic. These changes, permanent or temporary, have altered our citiesfrom those we lived in pre-pandemic. This new society includes completely different retail patterns, a reduced use of public transportation, an increased and multipurpose use of residential spaces, the exploration of online activities, and a reduced use of public spaces, such as offices, stadiums, museums, theatres, schools and universities, streets, parks and public squares.

We believe that in the long or medium term, the new social pattern will be followed by substantial changes in the built environment and we should understand these changes to plan and design for the future, to mitigate the diffusion of new airborne diseases, and to meet new social demands.

Conference track 1: Learning from history

- Historical plagues and urban transformations
- Pandemics, territorial cycles and morphological periods
- The Justinian plague and the collapse of classical cities
- The black plague and the Renaissance
- The Spanish flu and the modernist manifesto

Conference track 2: Shedding light on the contemporary world

- The impact of the pandemics on the physical space
- Changes in social behaviours and in the built environment
- Smart working and new office spaces
- Public health policies and their effects on the built environment
- Virtual spaces/communications and the effects on real spaces
- Climate change, pollution and waste treatment
- Online education

Conference track 3: The world is waiting for us to take action

- The impact of the built environment on public health
- Design and future solutions for public health
- Technologies, design and smart cities
- Architectural responses to COVID-19
- Hospital design and COVID-19
- Pandemics and open spaces, roads and parks
- New housing and building types
- Planning for health in the built environment
- From global metropolis to sustainable small towns
- Public transportation: airports, subways, train and hyperloop stations and bus terminals

Keynote Speakers

Andrés Duany, FAIA,CNU

Ashraf M. Salama, Universtiy of Strathclyde

Bin Zhao, Tsinghua University

Maurizio Carta, University of Palermo

Nadia Charalambous, University of Cyprus

Peter Larkham, Birmingham City University

Tolga Ünlü, Çukurova University

Vítor Oliveira, University of Porto

Organisers

INTBAU, Nanjing University, University of Trento, Özyegin University, University of Idaho, Kuwait University

Proceedings

Proceedings will be published after the conference in a volume with ISBN code, with SCOPUS indexing.

Contact info

E-mail: pandemicsandurbanform@gmail.com

Website: https://pandemicsandurbanform.ozyegin.edu.tr/

Call for Articles and Podcasts for the 50th Anniversary of WHC

The World Heritage represents the most exceptional expressions of our humanity and treasures of our planet. Through the 1972 Convention concerning the Protection of the World Cultural and Natural Heritage, countries around the world vowed to safeguard the places of outstanding universal value through local, national, regional and international actions.

In 2022, the World Heritage Convention celebrates its 50th anniversary. The 1,154 natural and cultural heritage sites in over 160 countries are the testament to the universal appreciation and achievement of this groundbreaking legal framework, which was ignited by a joint call between Egypt and Sudan to save monuments under threat by a newly developed dam.

This landmark year comes at a watershed moment for conservation. The effects of climate change have been tangibly felt by sites around the world, while the increasing volume of tourism has put environmental and social pressure on the properties and surrounding communities alike. The COVID-19 pandemic has revealed the vulnerability of the heritage ecosystem in the face of sudden onset crisis, as demonstrated by the closure of 89% of World Heritage sites.

In this context, UNESCO will launch a year-long programme to galvanize profound reflections on the future of heritage titled "The Next 50: World Heritage as a source of resilience, humanity and innovation." Events, campaigns, and initiatives will provide a space of conversation and exploration on the role of the World Heritage Convention as well as non-listed heritage in the face of global challenges. Prominent thinkers and luminaries from diverse fields including science and social and human sciences will be invited to imagine the World Heritage Convention at its 100th anniversary.

Objective

Throughout the anniversary year, UNESCO will launch various mechanisms conducive to new ideas, knowledge and research around inscribed and non-inscribed heritage sites and its ecosystem.

Converging the Organization's leadership in heritage and The Conversation's reach and media expertise, this partnership provides a global platform for scientists and experts whose work have made a significant contribution to the protection of natural and cultural heritage over the years, while inviting the larger research community to join the global reflection.

Qualifications and Criteria

- Only researchers with a current and verifiable affiliation with a research institute may participate in the Call.
- The application and articles should be in French or English. Podcast should be in French.
- The article/podcast must demonstrate expertise and relevance through novel scientific information (e.g. recently published in peer-reviewed articles or related to ongoing research projects), field research (e.g. World Heritage and heritage sites) and/or relevant examples.
- No corporate or review articles are accepted (e.g. conference review).
- The article/podcast must be innovation- and solution-oriented, and highlight inspiring initiatives when possible.
- At least one of the key themes must be addressed (see below).
- Diversity must be promoted through researchers' backgrounds and/or regional coverage of the article. UNESCO particularly encourages submissions from Africa and Small Island Developing States] and by early career scientists.

Key Themes

- Concrete and innovative ways to safeguard heritage in the face of climate change
- Models of sustainable tourism that benefit sites and surrounding communities
- Reconciliation of conservation and urban/rural development
- Contribution as well as threats of new technologies to the protection and promotion of heritage in the next 50 years
- Application of lessons learned during the COVID-19 pandemic to future conservation efforts
- The role of cultural and natural heritage to meet the increasing environmental and social challenges of our times

Submission Guideline

UNESCO will only consider applications containing all requested elements as below:

1) Proposed title of the article/podcast; 2) Short summary of the proposed article/podcast (200 words); 3) CV; 4) References; 5)Valid contact details of the affiliate organization of their research.

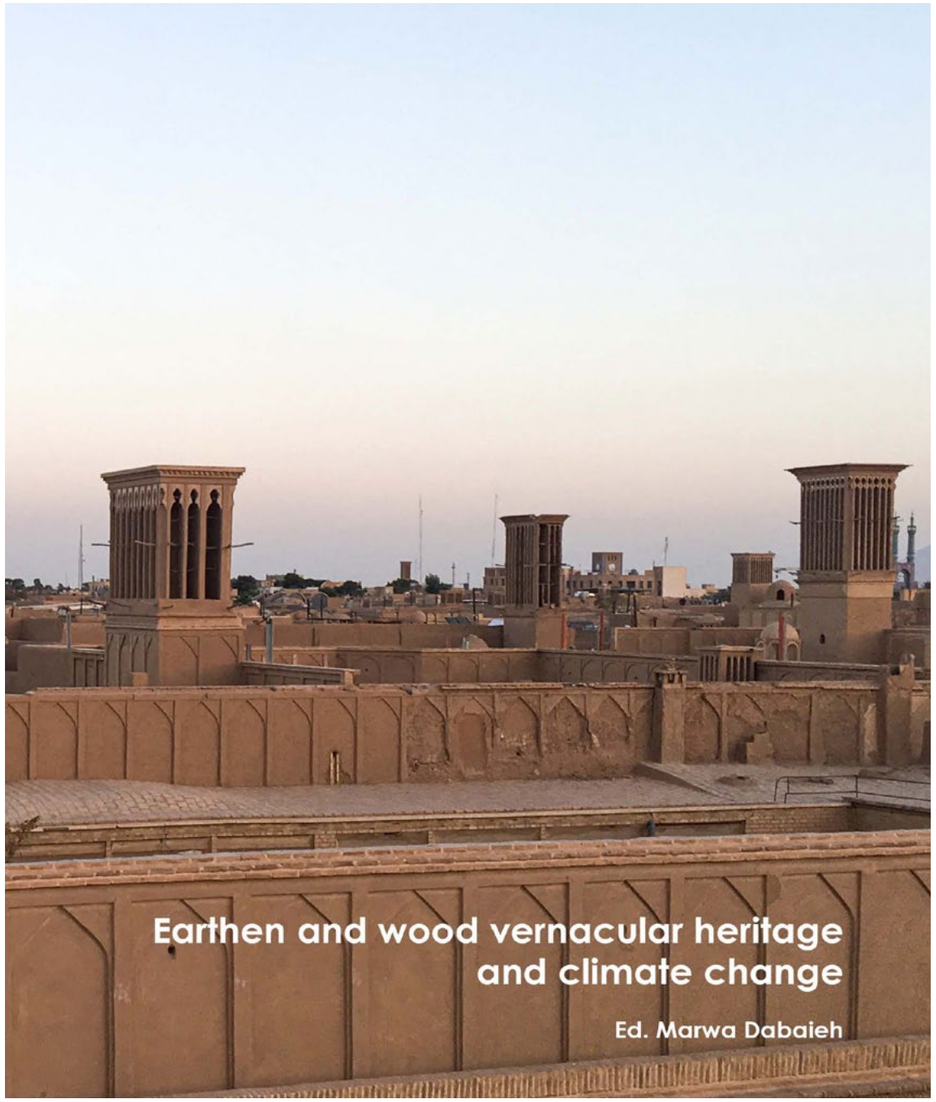
The complete application package shall be submitted to **30 January 2022 at 23:59 (Paris hour) through an online form.**

Complete the application online!

Rock Islands Southern Lagoon, Palau © Shutterstock.com

Recommended Book/Publication

Earthen and wood vernacular heritage and Climate change

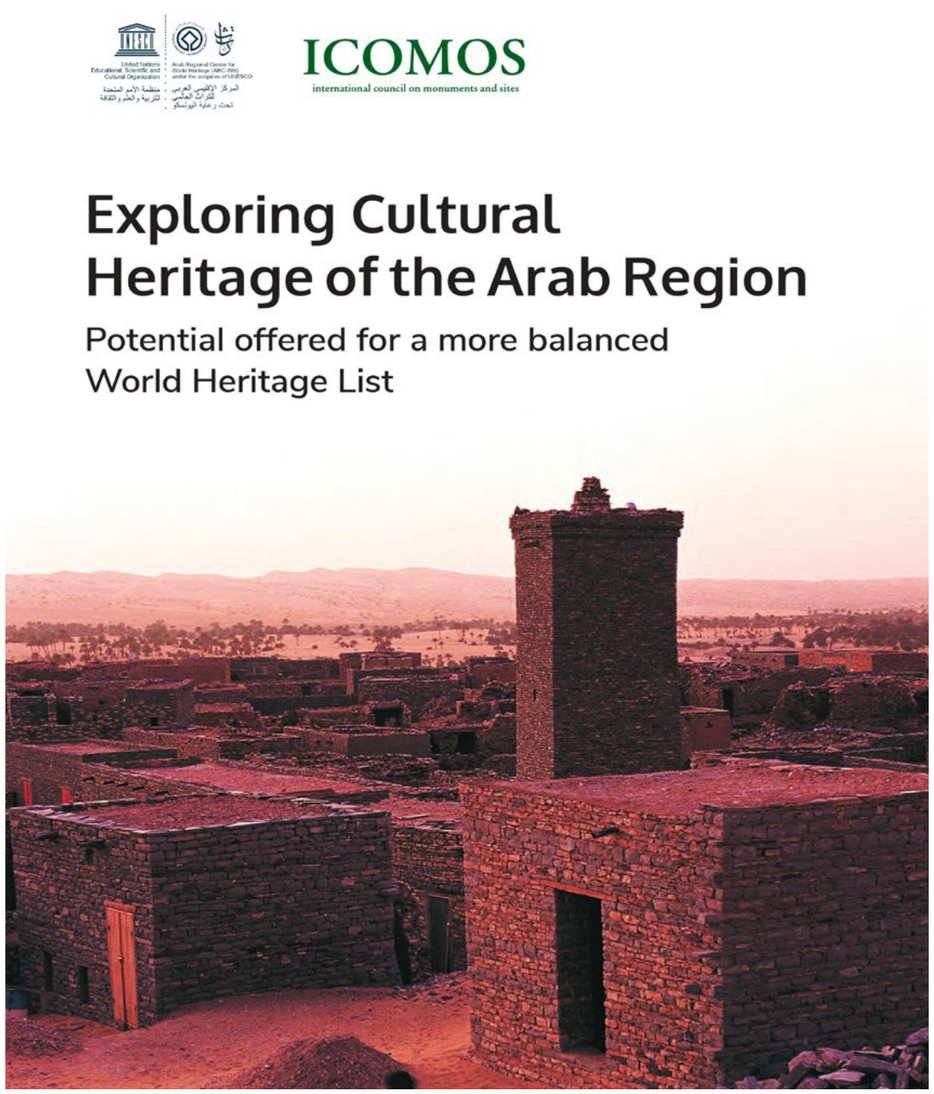


Language: English
Editors: Dabaieh Marwa
Published by: Lund University
ISBN: 978-91-7267-447-9
Download:
http://mau.diva-portal.org/smash/get/diva2:1596799/FULLTEXT01.pdf

The proceedings of the 4 ISCs International Conference on Earthen and wood vernacular heritage and climate change in Lund, Sweden. The papers cover the following themes: Vulnerability of VA(Vernacular Architecture) to climate change; Effects of energy regulations on VA; Natural materials and building conservation; Education in sustainable development for VA; VA in post Covid-19 world.

Recommended Book/Publication

Exploring Cultural Heritage of the Arab Region

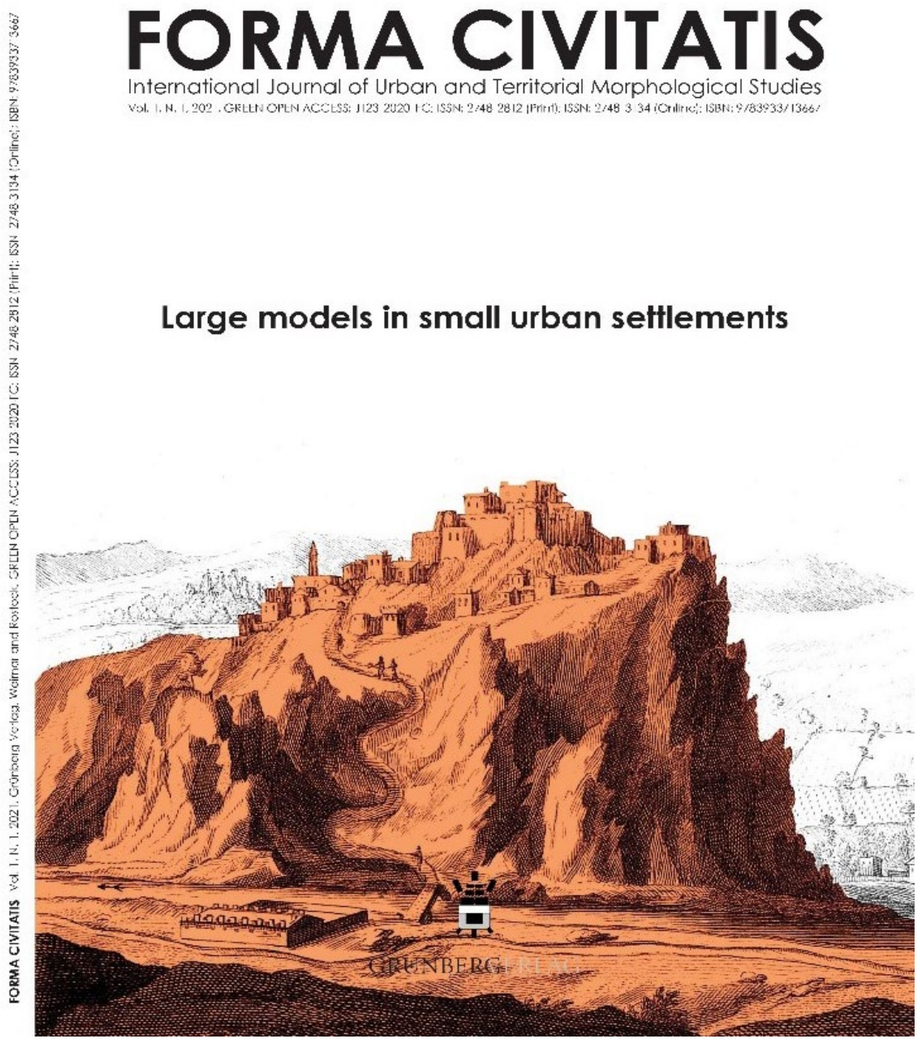


Language: English
Key words: world heritage; arab countries, cultural heritage
Published by: ICOMOS
Download: https://openarchive.icomos.org/id/eprint/2525/1/ARC-WH%20ICOMOS_Exploring-Cultural-Heritage-of-the-Arab-Region.v2.pdf

The aim of joint ARC-WH- ICOMOS project is to reflect on the inadequate balance happening on the World Heritage List within cultural sites, and analyse some of the challenges facing the Arab countries. This study provides a preliminary assessment of the promising themes and typologies that could be considered by the Arab States Parties as a basis to expand the understanding of cultural heritage.

Recommended Book/Publication

FORMA CIVITATIS: International journal of urban and territorial morphological studies(IJUTMS)



Language: English

Double Blind Peer Review/Open Access

Publisher: Grünberg Verlag, Weimar and Rostock

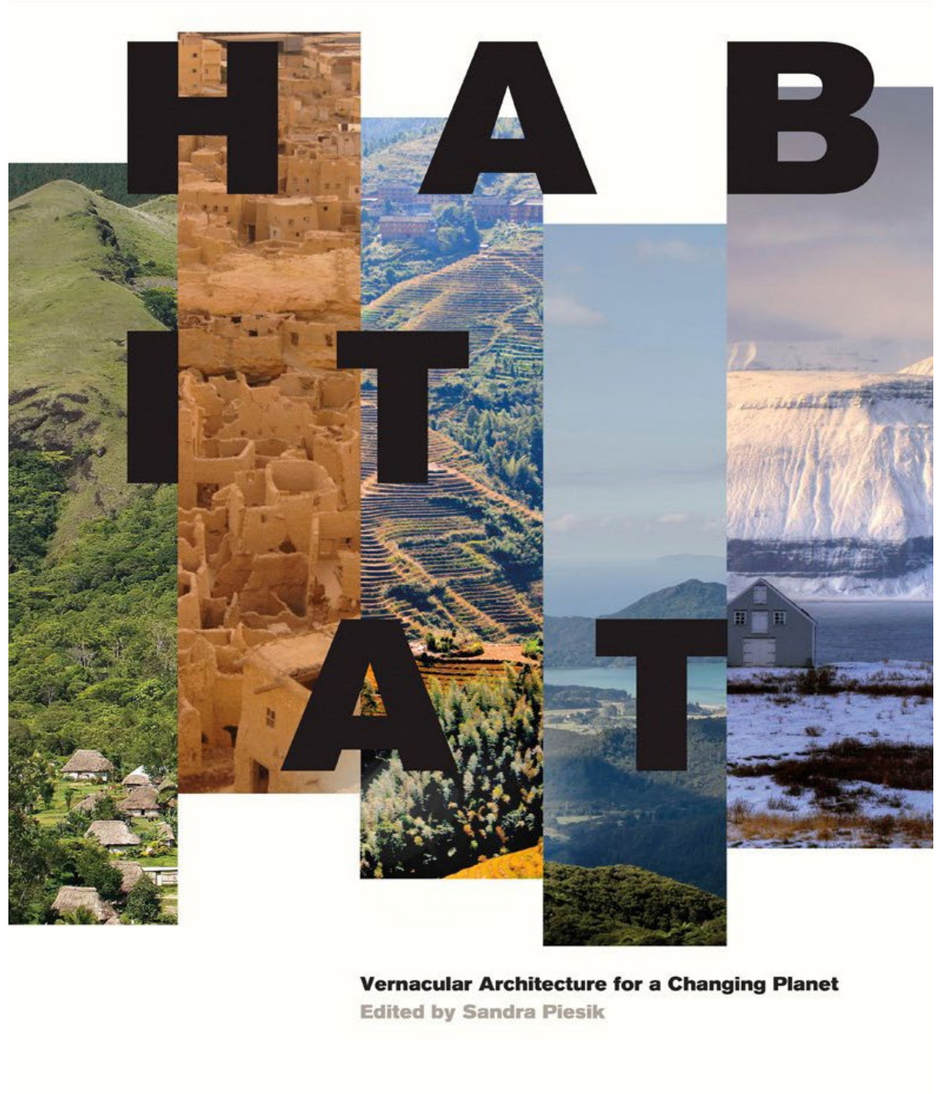
ISSN 2748-2812 **/ISBN** 9783933713667

Download: http://www.formacivitatis.com/index.php/journal/issue/current

Forma Civitatis aims to publish yearly scientific research in English, characterized by the application of innovative and experimental methods. The covered themes range from urban morphology, the history of architecture, , the theory of form to survey or architectural design and restoration, and include the studies in the discipline of archaeology.

Recommended Book/Publication

Habitat: Vernacular Architecture for a Changing Planet



Language: English

Author: Sandra Piesik

Published by: Harry N. Abrams

Purchase:

https://www.amazon.com/Habitat-Vernacular-Architecture-Changing-Planet/dp/1419728806

The core of Habitat is arranged by climate zone, from desert to tropical, temperate to arctic. Within each section, buildings are presented regionally, showing how local climatic conditions and vegetation affect the evolution of building styles.Habitat offers real-world insights into sustainable buildings and stresses the importance of preserving disappearing craftsmanship and local knowledge.

Planning For Climate Change In Indigenous Coastal Settlements: Chendani Koliwada in Thane, India

Priyanka Panjwani

Priyanka Panjwani

Conservation Architect

Co-ordinator, ICOMOS India
NSC Risk Preparedness

Associate member of ICOMOS
ISC ES CC

priyanka.d.panjwani@gmail.com

She has ten years of experience as a consultant and a scholar in architecture and regeneration projects in India. Her research interests include climate resilience and industrial heritage.

1. Introduction

Thane city is located on the western part of India and adjoins Mumbai city in the north eastern part of the Salsette island (Fig.1). Since 2nd century BC, Thane had a strong geo-political presence as a marine trade centre in the Konkan region. Thane has interacted with the Western empires as well as Indian rulers over several dynasties. Its prime navigational route is through the Thane creek, which is one of Asia's longest creeks.

With a coastline of about 112 kms, Thane creek comprises of low tidal flats, tidal marshes, salt pans, grasslands, tidal inlets and has a high density of mangrove cover. It is an Important Coastal and Marine Biodiversity Area (ICMBA) and more than 40 fishing villages dot the Thane creek on its two coasts. These coastal villages or koliwadas are indigenous to the city and are primarily inhabited by the kolis (fishing community) and the agris (rice cultivators and salt producers; or traders). The kolis have their own distinct rituals and traditions, which are in sync with tidal patterns.

Today, Thane is one of the most populated cities in India, with a gross density of about 14361 per km^2. It is an industrially advanced urban district in the state of Maharashtra faster than Mumbai.

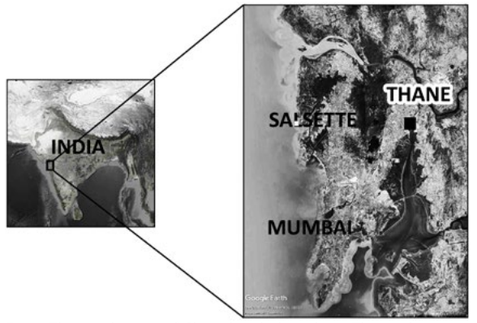


Fig 1. The study area of Chendani koliwada © The author

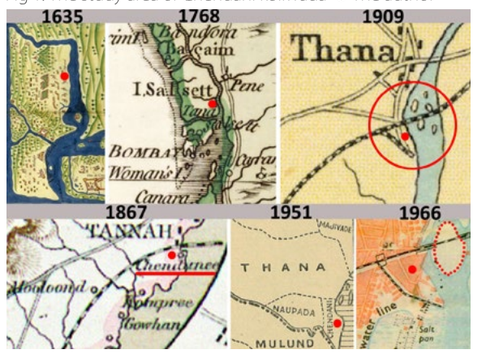


Fig 2. Analysis of the geographical topography of the site through archival maps © The author

1.1 Climate Change Risks

Thane lies in the tropical climatic zone and experiences high humidity, along with harsh summers and heavy monsoons. The annual temperature ranges from 22°C to 36 °C ; the average annual rainfall is 2000-2500 mm; and humidity is between 61-86 %.

Historically, Thane has experienced strong winds and cyclonic activities and climate change is likely to further intensify them. Globally, sea levels are projected to rise above 1 metre in the next decade. The low-lying topography of the creek with high intensity rainfall makes Thane's coastal settlements susceptible to flooding and coastal erosion.

Due to rapid urbanization, increased construction, quarrying, pollution and reclamation, degradation of vegetative cover is rampant in Thane city. These human activities severely influence the regional climate and landscape. This is evident as per the historical maps(Fig. 2) which indicate that siltation in Thane creek has increased over time and it is said to be perpetrated by household and industrial effluent pollution. Such events greatly impact indigenous livelihoods, natural ecosystems and consequently threaten cultural identity.

Lakes have been the traditional water source for the city and are deeply embedded in its culture. Thane is often referred to as the 'City of Lakes'; at one point there were 65 lakes in Thane, and the count has dwindled to 35 today. The lakes of Thane are rain fed, making them unfit for drinking purposes but useful during emergencies. Due to scarcity of water, several wells were dug up in coastal settlements, which over time gravely affected the ground water levels.

Thane draws in a large migrant population in search of employment and 17 % of its total population lives in slums. This puts an additional strain on the existing infrastructure. Furthermore, poverty, rise in overall temperature levels and unhygienic living conditions have led to a surge in the risk of disease spread in these informal settlements.

1.2 Context of the Study Area

The coastal settlement analysed in this paper is the Chendani koliwada which is situated on the narrow part of the creek (next to the silt island), close to Thane city. The residents of this koliwada are 'Son' kolis (golden kolis) - they were fishermen, businessmen, traders and merchants, owing to the strategic importance of the Chendani bunder (port) in the transportation of salt.

In 1853, the first Indian passenger train started from Victoria Terminus in Mumbai (now CSMT) and ended in Thane, near Chendani koliwada. In 1854, the railway bridge across Thane creek divided the koliwada into two parts, creating a social diaspora among the natives. Today, the physical reminders of this indigenous settlement are found in the 300-year-old vernacular

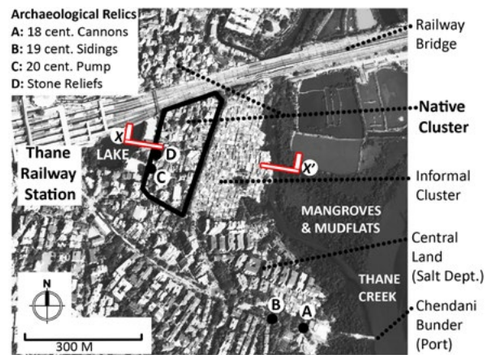


Fig 3. Layout of the Chendani koliwada clusters © The author

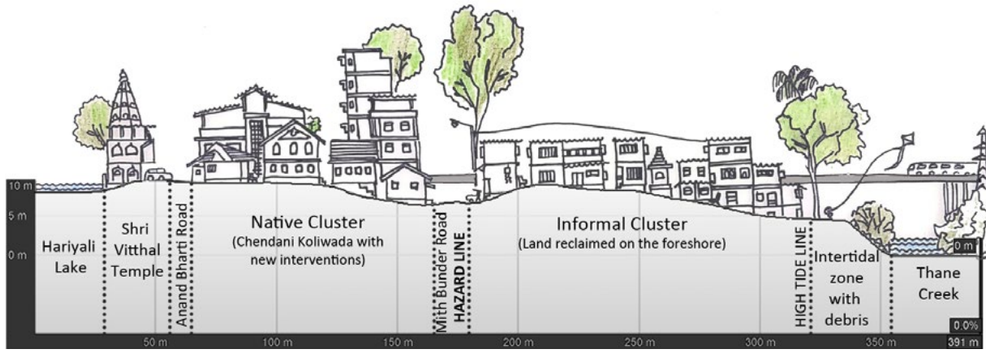


Fig 4. Sectional Elevation through the native and the informal cluster at Chendani koliwada © The author

structures and artefacts of archaeological significance discovered in the vicinity.

To the west of the koliwada lies Hariyali Lake, which was 6 acres in size in 1882, but has reduced to about 2 acres today. To the east of the native settlement across Mith bunder (salt port) road, the koliwada extends as an informal slum settlement, built 50-60 years ago, next to Thane creek (Fig.3, Fig.4). Between the slums and the port, part of the land is owned by the Central Government, consisting of heterogenous building typologies - including high rise affordable housing, chawls (dense tenements) and vernacular houses.

The kolis of Chendani koliwada pray to the waters even today, but they no longer fish in the nearby creek due to excessive siltation, pollution and diminishing marine ecology.

2. Architecture and Climate Change

The Chendani koliwada was formed organically and is high in density, with vernacular structures lining narrow internal walkways of 2-2.5 m. width. A visual survey reveals that a major portion of the original fabric has been rebuilt and new buildings have replaced the old ones in same sized plots (Fig. 5). The taller apartment buildings include ground floor (G) stilt areas for parking, and have been constructed using modern materials such as concrete. There is no setback on either side of the native cluster touching the vehicular roads (Fig. 4).

Next to Thane creek, an informal settlement sits on an encroached foreshore land, which was perhaps once used for beaching fishing boats, making nets, repairing boats, storing salt and fish, drying fish etc. It now consists of compact, low plinth, one room tenements, each of about 9 m^2. area. These houses are made using cheap material that is readily available and can be assembled together quickly. Because this unplanned settlement grew incrementally, it lacks legitimate infrastructure and services such as open spaces. Hence, it is often prone to getting waterlogged during the monsoons.

The once quaint coastal village of Chendani retains some of its charm even today due to the distinctive characteristics of its domestic vernacular architecture. These houses resemble those along the coastal belt of the Konkan region in Western India and are modestly designed for the local community.

2.1 Vernacular Houses

The vernacular houses in the native cluster are indigenous residential buildings, with a large footprint of about 90 m^2. floor area. They are generally ground storied load bearing structures, with a square or a rectangular plinth built using random rubble stone masonry with mud mortar, and the superstructure includes wooden elements. A porch or a veranda defines the entry to the house through which a central living area is reached (Fig. 6). A straight staircase

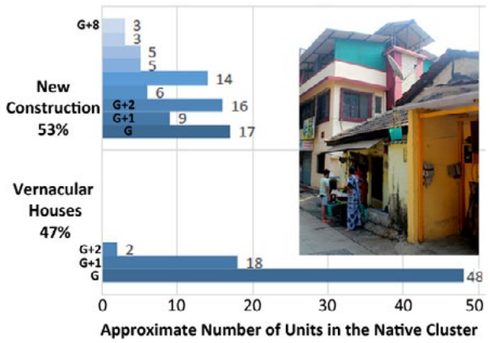


Fig 5. Understanding the architectural form in the native cluster of Chendani koliwada © The author

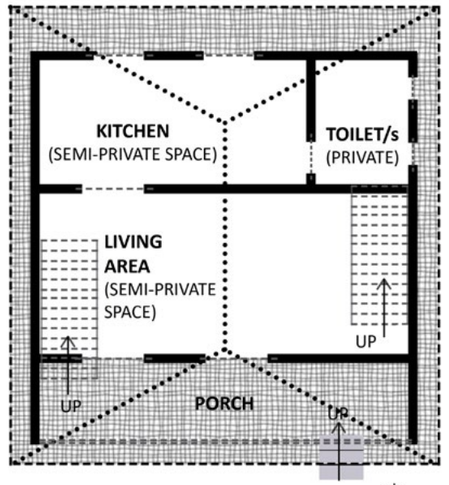


Fig 6. Plan of a vernacular house in the native cluster of Chendani koliwada © The author

Fig. 7 Architectural Elements that impart aesthetic and cultural significance to Vernacular Houses in Chendani koliwada © The author

made of timber, leading to the upper attic floor is usually placed in the hall and/or the porch. The next set of accompanying rooms are utility spaces, including kitchen, bathroom and toilet. The structural system in majority of the houses comprises of wooden beams and joists, supported by load bearing walls. Most houses have windows and doors with segmental arched lintels, carved wooden frames and wood panelled shutters. Street side windows are small in size and meshed for privacy. The interiors are adorned with wall niches and local stone flooring. Every house has identifiable features such as decorative stucco work, carved timber brackets, decorative railings in cast iron and timber, timber sloping roofs with decorative fascia board and Mangalore clay tiles. These elements attribute an indisputable aesthetic appeal and an old-world charm to these houses (Fig. 7).

2.2 Climate Adaptability

The native houses in Chendani have 'inherent sustainable features' (ISFs) that make them adaptable to climate change. The houses were built with varying plinths to follow the contours of the land, which allowed the surface water to drain into the creek, naturally without obstruction. The internal spaces of native houses have a larger volume than the modern homes. Their thick walls act as insulators and keep the interior spaces cooler than the exterior. Most of the structures are oriented on the East-West axis and the location of their openings allows better wind movement and cross ventilation, thereby enhancing comfort and healthy living conditions.

The porch or verandas serve as spaces for shade and natural cooling, and they are lined with eaves and green planters. Colours on the porch and the windows brighten up the cluster. The porch acts as a buffer between the public and the private areas in the absence of a compound wall. They aid social cohesion and co-operative living by becoming areas of interaction within the neighbourhood. The timber door and window shutters do not overheat the space like glazed facades do in newer buildings. The pitched roofs of the houses have curved vent tiles to allow natural light and ventilation. They have deep overhangs to provide shade and to protect the walls from heavy rainfall.

The vernacular houses in Chendani koliwada were built using local materials, skills and finances within the community's natural environment. Hence, they are the least carbon intensive among the other typologies that exist surrounding it today.

2.3 Climate Risks

Climate change and extreme weather are recognized as serious threats to cultural heritage. The vernacular houses in Chendani koliwada are made up of highly combustible materials such as timber, and have multiple electrical cables running around it. Most of the traditional homes rely on LPG cylinders for cooking purposes and have no fire precaution or prevention system

installed on site. The narrow internal lanes make the cluster vulnerable in times of rising temperature levels and fire emergencies, as large fire trucks cannot pass through them easily.

The vehicular road between the native and the informal cluster has been surveyed as a 'hazard line' in the draft Coastal Zone Map of Mumbai City and Mumbai Suburban, 2019. The internal lanes within the native cluster have been concretized and raised. This is a cause for urban heat island effect; and flooding inside the houses due to lowered plinth levels.

Due to growing needs and irregular maintenance, several native structures have undergone additions and alterations using carbon intensive materials such as steel and concrete (Fig. 8). With the introduction of new materials, the original strength of traditional materials has diminished and so has its ability to withstand natural calamities, such as earthquakes. To cope with financial and societal stresses, many homes have undergone demolition to build taller buildings, which again is highly carbon intensive. Also, a disturbing trend of building cheaper informal homes in spaces between vernacular houses is seen within the native cluster (Fig. 9). This will not only increase the density of the built fabric and reduce open spaces, but also damage the overall character of the cluster.

3. Archaeology and Climate Change

Archaeology gives identity to the culture of the people in multi-layered urban contexts. In the last five years, several archaeological artefacts

Fig. 8 Unsympathetic additions and alterations in the native cluster of Chendani koliwada © The author

Fig. 9 Present reality of urban transformation- informal structure quickly constructed between two vernacular houses in the native cluster of Chendani koliwada. © The author

have been discovered near Chendani koliwada, which make the coastal village both unique, as well as vulnerable to threats (Fig. 3, 10).

Undated sculptural stone reliefs in the native cluster are religiously venerated and somewhat protected at the corner of the internal lanes. 18th century cannons found in 2016 near the Chendani port are secured on a high plinth in situ. They are kept exposed to the weather in the high tide zone and await scientific conservation and safer storage solutions. The 19th century industrial railway sidings discovered near the port during new road works in 2019, lie on the road side in a deteriorated condition. Lastly, what appears to be a 20th century water pump from Ohio (USA), is fixed on an internal road, without any hint of a well nearby. In the absence of informative signages, their 'sense of place' is lost and these artefacts remain disconnected from the larger society.

4. Discussion

In addition to the existing climate change risks, the coastal communities in India have to grapple with several regulations that need to be sensitised to their culture and needs.

The vernacular houses in Chendani koliwada of Thane do not have any legal reservation as a

Fig 10. Archaeological artefacts in and around the native cluster of Chendani koliwada © The author

historic precinct, or documentation detailed by any heritage regulatory body in the region. The Gaothan Expansion Scheme of 1986 supports the development of coastal villages but it is inefficient without accurate mapping and demarcation of these villages. The Proposed Land Use Map, in the Draft Mumbai Metropolitan Regional Plan 2016-36, indicates the reclaimed area where the informal cluster stands today as an 'urbanisable zone' (Fig. 11). In addition to this, the 2019 amendments to the Coastal Regulation Zone Notification have revised legal protection to koliwadas and extended support to redevelopment of coastal villages. India has initiated climate change action policies at the state level, but they are inadequate at this stage. The plan prepared for Maharashtra (Thane) does not include historic built environment or strategies for its climate resilience. Hence, there is an urgent need for special development control regulations for indigenous coastal settlements.

Coping with severe change is possible through local participation and empathetic policies. In 2020, artists in Chendani koliwada initiated an archival research project, documenting local food recipes and music through citizen workshops. Recognizing cultural practices and associated stories help strengthen local bonds, which can be supported further through promotion and funding by the appropriate government authorities.

5. Conclusion

The traditional houses of Chendani koliwada have been integrated in the narrative of the coastal koli community for several generations. The strength of this type of vernacular architecture lies in its cultural and contextual relevance, which makes it adaptable to risks due to climate change.

To encourage responsible alterations and rebuilding, it is crucial to build local capacity to understand relationships between climate and life cycle emissions of the built fabric, revive long lost traditional building skills, boost further archaeological research and incentivize sustainable preservation of the native houses. Lessons learnt from vernacular knowledge in Chendani koliwada will play an important role in the formation of a comprehensive model for sustainable coastal settlements, and will also go a long way in planning to make them resilient to climate change.

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Fig. 11 Debris at the edge of the cluster near the Thane creek, a leisure zone for the younger generation.© The author

Stone Architecture: Maukallajta the forgotten city

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1. INTRODUCTION

This document performs a comparative analysis of the architecture and construction techniques used in the houses located in the colonial city of Maukallajta in the Muñecas province of the Department of La Paz, Bolivia, of the architecture and the construction method worked in stone and earth mortar, and of the housing constructions of the Mollo culture (Iskanwaya citadel), with the purpose of obtaining evidence on the spatial and constructive memory of this culture applied in the colonial houses of this mining town that today is in ruins.

2. THE MOLLO CULTURE

The so-called Mollo Culture is directly linked to the Tiwanaku . After the fall of the Tiwanaku, migrations took place towards the mesothermic valleys of the Department of La Paz. Ximena Medinacelli identifies, with respect to the migrations to this region, the continuity of agriculture and other productive activities which allowed accelerated urban development and maintained a tradition of stone construction. (Medinacelli, 2014)

This spatial and constructive memory is preserved through time, as Meyers indicates when stating that the Mollos would be an intermediary between the Tiwanakotas and the Incas. This can be seen in the analysis of the inherited style and development of Mollo ceramics, similar to that of the Tiwanaku, which has made it possible to identify Mollo urban centers as possible Tiwanakota colonies. (Meyers, 2002)

Buysse-Cassgne suggests that after the fall of the Tiwanaku civilization, the communities split into various cultures and ethnic groups. Once such group is the Kallawaya, a culture associated with the Mollos, a people that extended from the western shore of Lake Titicaca to the mesothermic valleys. (Casagne, 1987)

The region encompassed by the culture corresponds to the high valleys of the Department of La Paz. Most of the settlements were located in the valleys that emerge from the eastern Cordillera Real, with endless ecosystems and natural landscapes of great diversity.

These ecosystems allowed economic and urban development in the region and the development of citadels and fortresses built in stone, with a domain of the territory and its rugged topography.

2.1 ISKANWAYA BETWEEN PLATFORMS AND CREEKS

The Iskanwaya ruins, located at an altitude of 1672 meters above sea level, are the most significant testimonies of the Mollo culture. Located in a complex topography between ravines and headwaters of the Llika river, the citadel housed around 2,500 to 3,000 inhabitants in 95 structures found to date.

The dominance of the landscape and surrounding natural environment is reflected in the site's integration of the topography, through the use of natural slopes between streams and complex stone structures located on artificial platforms contained by retaining walls made of flagstone shale and earth mortar. The site can be divided into three clearly defined sections, herein named as A, B, and C.

The citadel was arranged on a steep hillside where the slopes sometimes reach 45° angles, so the inhabitants and expert builders reduced these steep slopes by building retaining walls that supported artificially-lowered esplanades or platforms, making the setting a true urban complex. Javier Escalante Moscoso describes the citadel as an urban center that seems to hang from a precipice. Likewise, the structures dominate the natural landscape as defensive structures due to the presence of walls in the deep ravines and ravines that are located around the platforms. (ESCALANTE MOSCOSO, 1997, pág. 301)

These buildings, located on 13 hectares, display a mastery of the lithic material and a management of the slopes used to house residential, military, and political structures. The residential buildings in Section A have an egalitarian character; an appreciable distinction of hierarchies or gender does not exist. In contrast, the structures in Section B present more ceremonial and larger features.

The construction characteristics show walls composed of a trapezoidal shape, which reproduce a fabric imitating the emplecton rig from rows of flagstone placed with a rope and tag, linking the wall to the ground and back to the same wall. These sections vary in their dimensions and depend on the quality of

Fig.1 MOLLO CULTURE DEVELOPMENT AREA IN THE REGION OF THE MESOTHERMAL VALLEY OF THE DEPARTMENT OF LA PAZ. SOURCE: GOOGLE MAP.

Fig.2 AERIAL VIEW OF THE ARCHAEOLOGICAL SITE OF ISKANWAYA, SECTION C, B AND IN THE BACKGROUND SECTION A. © The author

Fig.3 ROOM WALL SECTION WHERE THE COMPOUND WALL IS OBSERVED. © The author

the ground, since they also fulfill the leveling function for the distribution of the loads of the structural support section.

According to archaeological evidence, these are fed by a network of ditches that distributed drinking water, the section of which forms a "V" made with small slab stones or slates about 15 centimeters deep. The interior was waterproofed with clay to prevent the seepage of the water element. These channels transported water from a semi-circular pond 4 meters in diameter built of slate stone and utilizing mud as mortar.

The causes of the decline of the Mollo culture are not yet clearly established. Some specialists, historians, and archaeologists maintain that it was absorbed by the Inca incursion, during the domination of the gold-bearing territories in La Paz. But others claim that, according to the excavations and the stratigraphic position of the isolated Inca remains that have been found, the extinction or destruction of the Mollo culture predated the arrival of the Incas. Ponce Sanginés (1981) has speculated that even the Mollo culture would have been populated by migrants from the highlands.

Finally, in addition to the Mollo sites corresponding to the Late Intermediate Period, there is ample evidence of Inca settlements in the region. This leads to the case of the Maukallajta site, on which a colonial reduction would have been founded and whose presence in this valley was influenced by the existence of gold mineral veins as well as highly productive agricultural territories. (PONCE SANGINÉZ, 1980).

2.2 MAUKALLAJTA THE COLONIAL CITY OF STONE

Since pre-Hispanic times, and especially during the colonial period, the valleys of the Muñeca province have witnessed mining activity. In this particular case, the city of Maukallajta, which in the Quechua language means “Old Town,” is a clear example of the exploitation of gold by the Spanish colonies.

This mining city was established by the Spanish expansion on the gold deposits of the region. It corresponds to the oldest settlement of Santa Rosa de Aucapata, which was attacked during the indigenous rebellion at the end of the 16th century and its inhabitants were forced to move. (SANTOS ESCOBAR, 1990) At present this reduction is in ruins, although some of the pre-Hispanic urban forms can be distinguished. Maukallajta adapted to the topography of the region, including high mountains at the foot of the mine mouths, and comprised an area of approximately two hectares – similar to its predecessor, the Iskanwaya citadel, but smaller.

The city attempted to comply with the layout in accordance with the Royal Ordinance of Settlers of 1573, an edict imposed on Spanish colonies that culminated in the Indian laws issued by Felipe II in 1680. The topography of the region prevented its full development. The main square located in the center of the urban space is still visible. It was later used as a field until the disappearance of the town and the church as a landmark, of which only the tower (the Torrejata) remains standing. As Guillermo Lohmann points out:

“The Hispanic-American city was raised from a Plaza Mayor surrounded by streets and squares, rather than a set of houses and streets around a main square, and it is that symbolic assessment that, together with the values of its use, ratified its urban identity of the community as a reference for the whole city. Thus, giving him, later, a concern for the baroque scenography, loaded with symbolic and ritual content, which would consolidate the monumentality of the space.” (LOHMANN VILLENA, 1985)

The houses distributed from the mine entrances surrounded the main square, which gave priority to the extraction of mining and marked the main roads and grinding spaces . The structures maintain the tradition of flagstone walls combined with mud walls, a characteristic of the colony, producing the particular thickness of the buildings of the time. The two-level structures around the inner courtyard give way to the mine entrances, which are closely related because each Spaniard was assigned to a plot on which he built his house but which is on or adjacent to the mine.

3.THE TRANSMISSION OF THE SPACE AND CONSTRUCTIVE MEMORY

The Mollo culture presented various spatial characteristics with respect to the location, functionality, and management of the land , as seen in urban centers and known settlements . The main economic activity was agriculture followed by the extraction and milling of gold minerals. These activities marked the spatial formation of the Iskanwaya citadel and above all the functionality of the houses settled around the forecourt, which became the social space for daily activities.

The housing units settled on the platforms were contained by retaining walls imitating agricultural platforms, communicated through interior stairways and narrow streets that passed through the structures and retaining walls. The entire citadel had water management systems through V-shaped channels that transported water from ponds located in the upper parts of the citadel.

These previously detailed characteristics were preserved in the memory of the settlers. After the abandonment of the citadel and the foundation

Fig.4 DETAIL OF THE RETAINING WALL SHOWS THE LEVELING AND LOADING SECTIONS. © The author

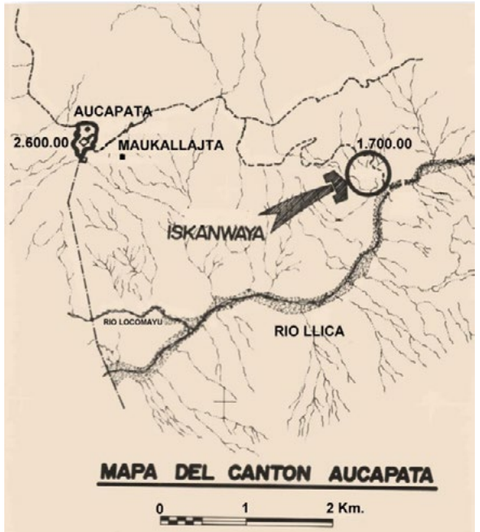

Fig.6 ISKANWAYA AND MAUKALLAJTA LOCATION MAP
SOURCE: HUGO BOERO ROJO 1992: 95

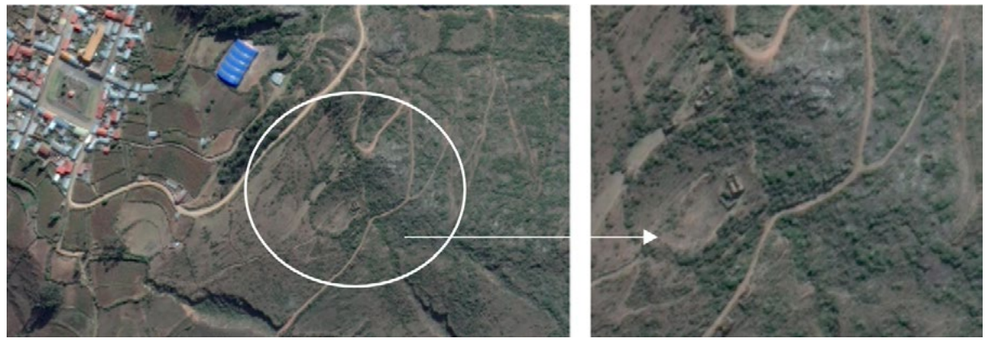

Fig.5 SATELLITE PHOTO OF THE COLONIAL SITE OF MAUKALLAJTA SOURCE: GOOGLE MAP

of the reduction, the construction techniques in stone, by means of leveling and loading locks together with the handling of the mortar of mud, were replicated in the new constructions and acquired a symbiosis of the pre-Hispanic and colonial typology. The forecourt was retained as a social element and the trapezoidal geometry in the walls and openings, as well as the ornamental elements of flagstone corner shelves, remained. However, a second level with adobe and/or mud walls was added and this new space had an independent entrance.

The new buildings in the city of Maukallajta are associated with the housing structures of Iskanwaya in the spatial management of housing and functionality, which in this case is associated with the extraction of gold metal. They preserve the handling of clay plasters with red ochre, a characteristic of the clay soils of the region with a high iron content. The deposits are maintained in the subsoil and especially the domain of the water through channels, which help with the mining work.

The spatial distribution of the city is framed by the Laws of the Indies, but they respond above all to the management of the topography inherited by the Mollos. The landscape was dominated with elevated constructions on platforms and mines which were accessed by stone stairs, similar to those of the Iskanwaya citadel.

4. CONCLUTIONS

Historical documentation and specialized research in the area recognize the importance of the Iskanwaya citadel as the most representative site of the Mollo culture, a culture that has been transmitted over time by the preservation of its construction techniques, its mastery of topography, and especially its management of water as an essential resource for daily activities. The memory of the inhabitants was transmitted and reproduced above all in the construction techniques of retaining walls with a stone as fragile as slab schists. The mastery of clay mortar as the only fixing element and the management of color within it display an ability to employ the natural elements and resources of the region.

Finally, the spatial management of the territory is clearly observed in the location of Maukallajta, which allows access to populations near Lake Titicaca and to the lowlands of the Bolivian Amazon. The diversity of management of crop terraces, as well as mining techniques, illustrate an economic and commercial boom in the region.

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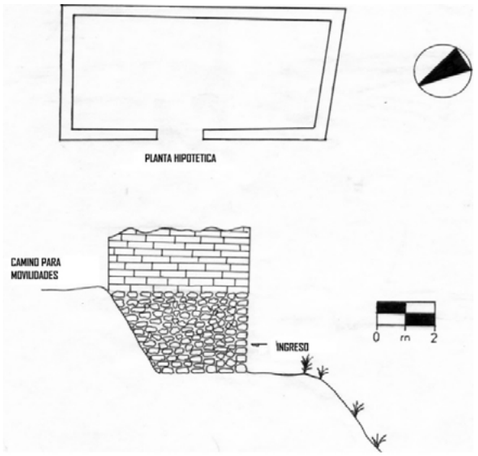
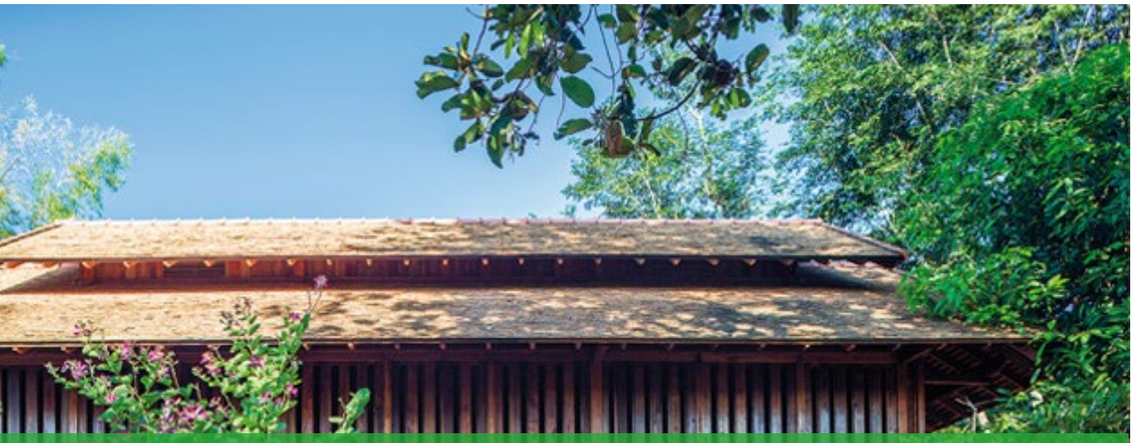


Fig.8 FLOOR AND HYPOTHETICAL ELEVATION OF A HOUSE IN MAUKALLAJTA SOURCE: DELFOR ULLOA - GOLD MINING AT THE MAUKALLAJTA SITE

Fig.7 RUINS OF THE HOUSES OF THE REDUCTION OF MAUKALLAJTA. © The author



The Integration of Vetiver Adobe Bricks with Industrial Materials as an Alternative for Modern Vernacular Architecture in Northeast Thailand

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1. Introduction

Along with the development and improvement of modern technology and living standards nowadays, most people have gradually lost interest in constructing their buildings with suitable materials by themselves. In rural areas of Thailand, people usually prefer building dwellings with fast and easily accessible materials (e.g. wooden, iron sheet). However, some of these architectural materials are not durable, for example, a wooden building is subjected to destruction by termites or rots away, while the one made of corrugated galvanized iron (abbreviated CGI) sheet is easy to rust. Moreover, the micro-environment of the building makes it uncomfortable for daily life due to the high temperature and humidity it brings, besides a lack of aesthetics.

Additionally, there are local temples scattered in the northeastern region of Thailand that were built with adobe materials in a vernacular style. Nowadays, the walls of some chapels retained as architectural heritages are dilapidated (Fig 1). Thus, a kind of alternative building materials should be taken into consideration to repair the wall enclosure in order to inherit the chapels' beauty.

An adobe building is the result of the longtime development and heritage of architectural civilization, owing to its green, environmentally friendly, and ecological architecture. Nevertheless, besides religious buildings and traditional Chinese shophouses in the past, adobe bricks are seldom used in construction in Thailand. Thus, there are not enough relevant experimental standards and design specifications. Therefore, through integration of the local economic and cultural characteristics of Northeast Thailand, the study intends to combine the traditional technique and materials with a small number of industrial building materials, to produce the modified adobe brick at low-cost with energy efficiency and lower the labour-intensive level during the material's production process. An experimental building was built to examine the microenvironment parameters including the temperature and relative humidity. The study aims to make the modified adobe brick as an alternative building material to promote modern vernacular architecture, repair or renovate the existing vernacular heritage in local areas. This will help the low-income people to have their own affordable houses or any other kind of building under the concept of using local and ecological resources with appropriate material, construc-tion technique and design.

2. Materials and Methods

A building is a structure that gives its resident "the foothold of existence", and a concretization of existing space. In Northeast Thailand, the vernacular architecture does not only refer to a dwelling with local materials and styles that are consistent with the climate conditions but also a religious building in Buddhist temples in most communities.

This study proposed a building model with modified adobe brick as an alternative material of construction and renovation for the modern vernacular architecture and vernacular heritage, especially in the hot humid climate. It aimed to seek a realistic and practical way to work with modified adobe bricks and learned experiences, as well as lessons from the process of material production and construction to achieve thermal comfort, which should meet the ecological and economic conditions in practice. The experimental process was as follows:

Step 1. To prepare the modified adobe brick and test their properties

The adobe brick used locally available clay and sand from the Northeast of Thailand. Lime and ce-ment were obtained from standard brands in the market, and the vetiver grass (Chrysopogon

Fig.1 The old Chapel of Pho Chai Temple in Khon Kaen prov-ince, built around 1824. © The author

Fig.2 Some of experimental bricks. © The author

Fig.3 Two experimental build-ings built in 2013. © The author

zizanioides) was from a plantation in Khon Kaen province. Based on the proportion of different components, twenty-two adobe bricks were made and dried in the sun in January 2013. The length, width, and height of the bricks were respectively 30x15x12 cm. They were divided into four groups: A, B, C, and D, and all were tested in the laboratory of the Faculty of Engineering, Khon Kaen University. The testing list included their strength, porosity, water absorption, and moisture content (Fig 2). In the end, through calculations for the cost, weight, and accessibility, the rational and feasible component proportions of adobe bricks were selected.

Step 2. To build the experimental building

Based on the objectives of the study, two experimental buildings of 2x4x2 m were built on a site in Ban Na Nok Khao village, Sakon Nakhon province in 2013 (Fig 3). The first was enclosed with adobe bricks. The second was built with CGI sheets, which are commonly used in local construction among low-income people. The wooden floor was raised 1 meter over the ground.

Step 3. To collect data on the comfort of the indoor environment

Thailand is divided into three seasons, cool, hot, and rainy season. The data were respectively collected on January 15 -29, April 5 -19, and July 12-26, 2014 to track the change of indoor thermal environment in the experimental building in different seasons by using data loggers to collect temperature and relative humidity.

Step 4. To compare the comfort of the indoor environment with other buildings in the village

The study also compared the indoor environment of the experimental building (No.3) with other existing buildings with wooden boards (No.1) and CGI sheets (No.2) as the wall enclosure in order to acquire more data from different building materials (Fig 4). The selected building was to be located in the similar environment with the experimental building. The main criteria were considered as follows: First, there were no obstructions around these buildings, so that there was no effect related to the flow of air. Second, the length, height and width of these buildings were similar, and the stilt style was adopted. Third, the building as a whole and the doors were generally oriented towards the similar direction (Southeast). Fourth, for distinctively comparing the performance of the adobe brick with other materials as the wall enclosure, the roof materials were all made of the CGI sheet, which is popular among the local people, to keep the roof under the same condition and minimize the impact on the experimental data.

3. Results and Discussion

Through the analysis of laboratory testing data, the study intended to find the maximum strength of the experimental adobe bricks according to the proportion of clay, sand, lime, cement, and vetiver grass. By using the clay of high viscosity, reducing the proportion of sand, adding an appropriate amount of chopped vetiver grass, and cement, the study showed that the compressive strength, porosity, water absorption of the adobe brick could be improved, and the micro-cracking due to drying shrinkage could be controlled. For the production cost, weight, and accessibility of building materials; the property of C9 was the best in performance(Table 1). Therefore, the C9 proportion was used to produce the brick for constructing the experimental building. Then the thermal comfort parameters were measured during three periods of a year. From the collected data, it could be concluded that the thermal comfort of the adobe wall was better on average than the one with a CGI sheet at the same site and better than the other two in the village with wooden boards and CGI sheets during the same period of the year.

Fig.4 The wooden building (No.1), CGI building (No.2) in the village and the experimental buildings (No.3). © The author

3.1 Testing compressive strength of modified ado-be brick

Before compression testing, any surplus moisture of the specimen was drained out at room tem-perature. During compression testing, the specimen was placed horizontally with flat surfaces (12x30 cm) as the driving faces. The mortar-filled surface faced upwards between two or three plywood sheets, each of which was 3 mm. in thickness and was care-fully cantered between the plates of the testing machine. The load was applied axially at a uniform rate of 1.43 Kg/mm2 per minute until failure occurred. The maximum load at failure was recorded. The load at failure was considered the maximum strength at which the specimen failed to produce any further increase in the indicator reading on the testing machine. The results are shown in Table 1.

· From the data, the maximum compressive strength of the sample was relatively higher in Group A (except for A1) due to the use of vetiver grass fibre. But the fibre may be difficult to acquire in most cases due to the cost of fibre separation process, which would add to the difficulty in production, and thus would not be used by any common people in real life.

· The maximum compressive strength of adobe bricks in Group D was the lowest. With the increase of vetiver grass, the compressive strength also correspondingly decreased.

· Overall, it could be seen that the maximum compressive strength of bricks made with red clay was higher than the one without red clay in Groups A, B, and D because the viscosity of the red clay was stronger than the ordinary clay. But red clay can only be found in a specific area of Khon Kaen Province, which contradicts the concept that construction materials should be commonly available. Therefore, the use of ordinary clay in the modified adobe brick could be justified.

The maximum compressive strength of brick with an appropriate proportion of cement was higher than the one without cement by comparing D16 to B8 and D13 to B7, although there was the same proportion of other components.

· As a whole, the compressive strength of the samples was higher in Group C compared to other groups, and it was obvious that the compressive strength would decrease accordingly along with the increase of vetiver grass in this group.

In general, the maximum compressive strength of the sample brick is related to the type of the clay, the amount of sand and cement. It is advisable to practice with a large amount of clay in order to reduce the amount of sand, and to maintain the proper amount of cement. Considering the operability of the adobe brick, it is recommended that the component proportions of C9 and C10 be used. Through consideration of the overall factors, especially maximum strength, C9 was the best in performance.

3.2 Testing porosity, moisture content, and water absorption

Porosity is related to the shape, structure, and arrangement of solid particles in the porous media. In ordinary nonbio porous material, the porosity of coal, cement, limestone, and dolomite is lower, i.e., between 2% and 4%; 12-34% for underground sand-stone, 43-54% for soil, and 12-34% for brick. From laboratory testing, the porosity of Group C was controlled at about 18%, so the performance was reliable in anti-permeability and heat insulation conditions,

Table.1 Compressive strength of experimental adobe bricks with Vetiver grass

Code	Component proportion (volume: Clay/sand/lime/cement/Vetiver)	Compressive Weight(kg)	Max strength kg/cm²
A1	5:3:2:1:4	530	1.46
A2	5:3:1:1:4f	700	2.04
A3	5:3.5:1.5:0.5:4f	800	2.23
A4	5R:3.5:1.5:0.5:4f	900	2.53
B5	5:3:2:0:4	300	0.85
B6	5:3:1:0:4	340	0.95
B7	5:3.5 :1.5:0:4	200	0.58
B8	5R:3.5:1.5:0:4	250	0.70
C9	5:3:1:1:4	760	2.14
C10	5:3:1:1:6	750	2.12
C11	5:3:1:1:8	510	1.43
C12	5R:3:1:1:6	700	1.94
D13	5:3.5:1.5:0.5:4	250	0.70
D14	5:3.5:1.5:0.5:6	150	0.42
D15	5:3.5:1.5:0.5:8	200	0.56
D16	5R:3.5:1.5:0.5:6	320	0.91

Remark: "f" means adding Vetiver's fibre, "R" means red soil, the cement is not added into Group B.

Table.2 The maximum strength, porosity, moisture content, and water absorption of the experimental modified adobe blocks in Groups C and D.

Code	Max strength (kg/cm2)	Poros-ity%	Moisture content (%)	Water Ab-sorption (%)
C9	2.14	15.1	1.88	17.73
C10	2.12	17.9	2.10	21.70
C11	1.43	17.5	1.66	21.02
D13	0.70	16.2	1.07	18.65
D14	0.42	17.4	1.57	21.30
D15	0.56	19.5	1.75	24.13

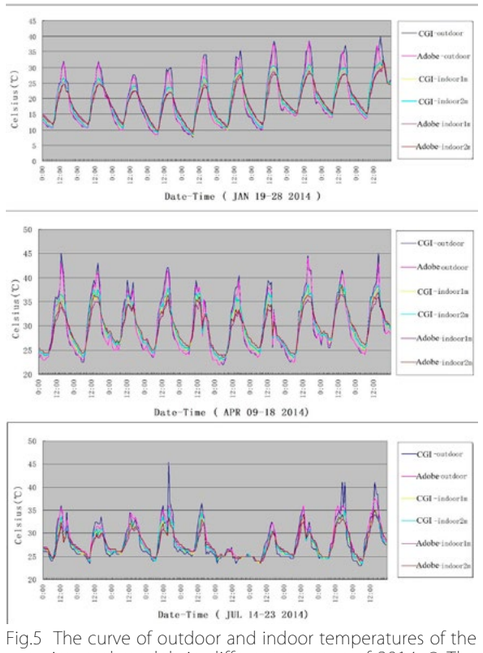

Fig.5 The curve of outdoor and indoor temperatures of the experimental models in different seasons of 2014. © The author

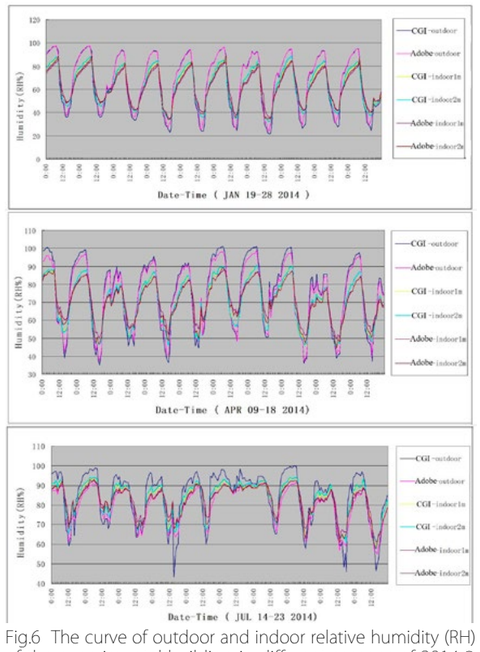

Fig.6 The curve of outdoor and indoor relative humidity (RH) of the experimental building in different seasons of 2014.© The author

especially C9, for its porosity reached 15.1%.

According to the result of maximum compressive strength, Groups C and D were chosen to test the moisture content and water absorption. The proportion of sand and vetiver grass was closely related to the two properties. It was found that the moisture content was controlled under 2% in Groups C and D. The moisture content of Group D was lower than that of Group C as a whole. Because the amount of lime had been added in Group D, the moisture-proof performance was greater.

The water absorptions of Groups C and D were controlled to reach about 20%, but that of Group C was lower than Group D. The ratio of water absorp-tion of C9 was the lowest in Groups C and D which met the requirement of building materials(Table 2).

3.3 Determining the optimal component propor-tion of modified adobe brick

The proportions of Components 1, 2, and 3 in volume (of clay, sand, lime, cement, and vetiver grass) were 5:3:2:1:4, 5:3:1:1:4, and 5:3.5:1.5:0.5:4, respectively. In terms of the weight and production cost, Components 2 and 3 were more accessible and practical than Component 1. For Component 2, particularly, the weight of a brick was only 5.78 kg, with the cost of 3.4 THB (USD 0.11). The proportion of Component 2 is the same as C9. That is to say, the weight and cost of C9 are lower than the other test samples.

An interlocking block, a kind of modified adobe in Thai architectural market, is commonly used in daily life in Thailand. The size is 25x12.5x10 cm, and the weight is about 5kg; while the market price is about 8 THB in 2014 and 12 THB (0.32 USD) in 2021. As for C9, its size is 30x15x12 cm; its weight and cost are more affordable. Thus, owing to the per-formance, cost, weight, and accessibility of building materials, the component proportion of C9 was chosen for the next process.

3.4 Comparing the performance of the experimental adobe building and CGI one during three seasons

During the daytime, the outdoor and indoor temperatures (1m and 2m over the floor) of the two experimental buildings changed as follows (Fig 5). On the whole, the indoor temperature (IT) in the adobe building was lower 2-3 ℃ than the CGI one. Especially during the hot season, the highest IT of the adobe building was 5-6℃ lower than outdoor. During the night time, the IT change of the two buildings did not show significant difference. But the indoor temperature of the adobe building was slightly higher than the CGI one in the cold season.

In terms of relative humidity (RH) during the daytime, the indoor RH of the two buildings changed obviously. The outdoor RH was lower than the indoor humidity. The indoor humidity was between 50-80% in the cool and hot seasons, but the adobe building absorbed a lot of heat in the daytime, especially at noon, so the RH decreased. In the rainy season, the indoor RH of the two buildings was between 65-85%. During the nighttime, the indoor and outdoor RH of the two buildings did not change obviously. The indoor RH of the two buildings was between 60-70% in the cool and hot seasons, and between 80-90% during the rainy season (Fig 6).

Generally, according to the data collected during the three seasons, the magnitude of change of IT and RH in the abode building had not shown more severe fluctuation compared with CGI one, and it had better performance on passively adjusting temperature than the CGI one.

4. Conclusion

Through onsite examining of the micro-environment parameters including the temperature, and relative humidity in three seasons of a year; the experimental adobe building had better performance on passively adjusting these parameters than the CGI one. In the meantime, the advantage of thermal comfort of the modified adobe wall had been shown through comparison with the walls made of other materials (wooden and CGI ones), which were built in the same village. It can be said that the temperature and relative humidity of the modified adobe brick in the experimental building meet the demand for thermal comfort. The results also indicate that the properties of the material are reliable and practical and reach the goal of energy efficiency, environment-friendly characteristic and sustainable development.

The material has greater advantages over the other common materials in passive cooling and reducing humidity, hence suitable for use in hot and humid regions like Thailand. It is an alternative material for local peasants to solve the durable problem of wooden board or CGI sheet as the enclosing material. Although the exterior walls in the experimental adobe building look less refined in the aesthetic sense, the same clay material without vetiver grass can be used for plastering.

With the attempt to develop modified adobe, more experiences have been accumulated for local people to build affordable house(Fig 8), which provides more empirical references for the development of adobe buildings in Thailand. In response to natural and social issues at present, e.g., global warming, urbanrural income gap, etc., the concept of materials that is locally available, affordable, self-supporting and environmentally friendly, becomes increasingly important, necessitating more improvement and development of adobe bricks. At the same time, the material still needs to meet people's aesthetic acceptance, as well as the demand for varieties and sustainability.

Acknowledgements

The research was funded by Office of the Royal De-velopment Projects Board (ORDPB) in 2013.

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Honorary Member

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Education Background

Academic studies:

2010- Bioclimat pour professionnels, Contech Montréal.

1993- Maîtrise M.Sc.A.(R.R.R.) en Aménagement Université de Montréal.

1988- Auto Cad, Cégep Montmorency, Laval.

1987- Certificat en conservation de l'énergie de l'Université du Québec à Montréal.

1975 – Architect and urban planner of the University of Chili in Santiago Chili.

Special recognition, prices:

2012- Prix du patrimoine, Ville de Gatineau

2007- Prix d'excellence de la Fonction Publique (Publics Works Canada)

Charte :

1997- Charte de partenariat pour les services souterrains de l'édifice du Centre à la Cité Parlementaire Ottawa, Canada

Paper & Publications

Designing a Test Blasting Program for an Underground Building on Parliament Hill, that became a guide for future blasting near existing buildings in Canada and in USA.

Les mortiers de rejointoiement pour la conservation des maçonneries anciennes done with NRC in March 2007. Solution constructive 67 and 68 with NRC related to historical mortars that done in March 2008.

All the revisions done to the to CSA A-179 Masonry Mortars for Canada that were used to inspire the RILEM, a commitee for historical mortars in Europe,etc.

Experience

2020 (Winter period)- Professor: Vernacular architecture around the world at the Architectural school of the Laval University in Québec for the third grade of architectural students.

2014 till now- Senior heritage conservation architect. Call by the Conseil des métiers d'art du Québec (MAESTRIA), to give presentations to the artisans in heritage conservation related to the conservation of heritage masonry and historical mortars in a cold weather context.

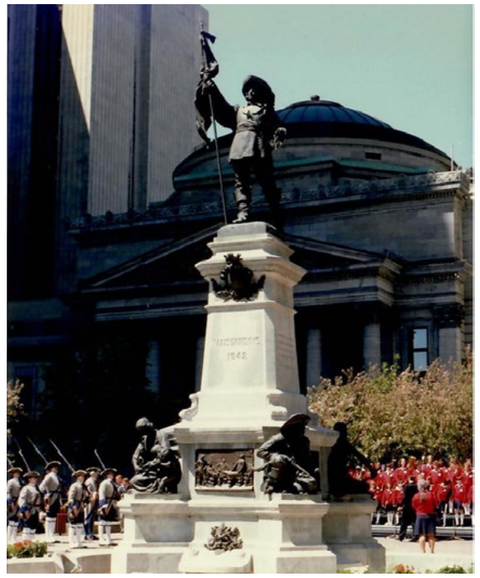
1992 to 2013 Principal senior architect in heritage conservation and technical advisor for the Heritage Conservation Directory for Canada (HCD-TPSGC) and abroad for Canadian's heritage monuments. Leadership, orientation, advise, direction and expert assessment to multidisciplinary teams in heritage conservation for Canada heritage maters and abroad. Participation and creation of a team in Research of historical mortars for the Canadian climate, with the National Research Council of Canada (NRC) in Ottawa and the Canadian Standard Association for the CSA A179 masonry mortar standard. Functional expertise in the evaluation of interventions on Federal heritage's buildings (FHBRO). Participation in the revision of the Standards and guidelines for the conservation of the historic places in Canada, Law for the protection of the historical railway stations, General Strategy for the conservation of the Prime minister's graves. Assistance to Parcs Canada in the maintenance and conservation of the historical and national parcs with the historical buildings (vernacular) and the land. Conservation assistance to several countries (Chili).

1991-1988- Architect: Ville de Montréal- In charge of the historical buildings and monuments. Responsible for the restauration of the Maisonneuve monument at Place d'armes à Montréal. Designer of the guerites (access) for the Jardin Botanique of Montréal and recycling of various buildings for new use, downtown Montréal (Marché Bonsecours, Bain Maisonneuve etc.).

Projects

From the big picture to the details (water drain missing in the model) © María Inés Subercaseaux

Restoration of the historical fences, Vaux Walls & North Wall. Masonry maintenance of West, East & Centre Block , restoration of some interior's rooms © María Inés Subercaseaux



Mértola. Architecture in the town and its territory © Miguel Reimão Costa

Restoration of Maisonneuve Monument in the city of Montréal

Maisonneuve Monument is a monument done by the sculptor Louis- Philippe Hébert, built in 1895 in Place d'Armes in Montréal. The monument was unveiled as part of the celebrations for the 250th anniversary of the founding of the city.

The monument was restored by the city of Montréal with the winners of an international competition in 1990. I was the architect in charge of the restoration. L.M.C. Corp, les métalliers champenois, from France was in charge of the restoration of the bronzes, out side of the site. The masonry was restored by Larivière et Frères from Montréal and a new way to support the statues was implemented. The restored monument was presented to the city in the spring of 1991, with a big celebration with the Compagnie Franche de la Marine.

Vernacular architecture and landscape in the mountain regions of Morocco © Miguel Reimão Costa

BU-Ranch, near Longview, Alberta

Evaluation of the potential of the site to be a National Historic Site and condition assessment of the buildings and land in 1992 to Parcs Canada by a group of architects, engineers, and landscape architects. We were supported by a team of very knowledge people from the site, to guide us on the typical ranch construction of that part of the country, as well as the way to use the land. It was very important to conserve the heritage value of the site, and the land because this site was the beginning of the Canadian cowboy life in Alberta. Today the Calgary Stampede is a not-for- profit community organization that preservers and celebrates their western heritage, culture and community spirit.

The ranch was founded by Fred Stimson between 1881 and 1902, whose North West Cattle Company kept cattle on 147,000 acres. The site was to sell since 1991. Since then, the site was both by Parks Canada. Since 1995 the site has been opened to the public as a National Historic Site.

Letter To CIAV

Dear members,

Many thanks for thinking on me to be an honorary member of CIAV, I am very proud for that.

Since my first meeting in Santorini Grece in 2000 till know, I have been inspired by the spirit of doing more with less of the CIAV.

We have seen differents countries, habitats and differents way of living arround the world and the common factor is that the land inspire all the countries and their people. The way that humans protect themselves from the hot or the cold weather is unic for each country.

We have learnt a lot till know, but with these climate's changes that we see now, we have to be awared that this existing balance could change so, we have to continue investigating the best way to adapt ourselves to these changes.

I hope you all the best for the future and keep in touch..

María Inés Subercaseaux OAQ, M.Sc.A.

Senior conservation architect

Historic District of Old Québec.
© UTFUN_UTM

New Member

Paola Lizett Carvallo Elvira, from Bolivia

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Education Background

Architecture licenciate, Nuestra señora de la paz university, 2005

Postgraduate in restoration and rehabilitation of the built heritage, Nuestra señora de la paz university, 2006

Postgraduate in fundamentals for university teaching with a focus on design, 2007 and postgraduate in cultural management, 2008, Nuestra señora de la paz university

Master in conservation of cultural heritage, University of san andres, 2011– 2013

Master in cultural management on going simón bolívar andean university, 2020-2021

Postgraduate in evolving heritage and historic urban passage flacam unesco and fundation cepa.

Experience

April 2008 - July 2014, Municipal government of la paz, specialist supervisor in built heritage

January 2011 - February 2011, Cultural foundation of the central bank of bolivia, consultant by product.

March 2015 - July 2019, Municipal government of la paz / spanish agency for international cooperation for development aecid - (la paz workshop school).

June 2009- December 2021, Lithic restoration specialist / Iskanhuaya

Projects

Restoration project and construction management of the Tambo Quirquincho museum

The museum is a colonial building dating from the founding of the city of La Paz in 1548. Project that included the restoration of the tile roof, fitting of adobe walls and replacement of the earth plasters and lime paint, traditional technique and the cleaning and consolidation of stone arches. intervened by the students of the La Paz workshop school.

Restoration project and construction management of the Tambo Quirquincho museum. © Paola Lizett Carvallo Elvira

Conservation and enhancement of the doors of the Metropolitan Cathedral of La Paz city

Direction of the work of conservation and enhancement of the doors of the Metropolitan Cathedral of La Paz city, symbol of the religious power, one of the most important neoclassical building. The intervention on the main bronze doors included the removal of the painting and the recovery of the figures in high relief. Carried out with the students who graduated from the La Paz workshop school.

The doors of the Metropolitan Cathedral. © Paola Lizett Carvallo Elvira

Restoration of the lithic elements of the Villa de Paris) © Paola Lizett Carvallo Elvira

Lskanwaya © Paola Lizett Carvallo Elvira

Elaboration of the project for the restoration of the lithic elements of the Villa de Paris property

The Villa de Paris property is a colonial property located in the historic center of the city of La Paz, belonging to the National Museum of Art. The project contemplated the recovery of the lithic elements, such as the stone arches of the main courtyard and the restoration of the main stone portal from 1768.

Conservative architect of the archaeological ruins of Iskanwaya

Lskanwaya belongs to the Mollo culture located in the Muñecas province of the Department of La Paz, an archaeological site declared a national monument, of great historical value for the region. The restoration and conservation work minimally intervenes in the architectural structures through traditional construction techniques of the Mollo culture.

Restoration of the lithic elements of the Villa de Paris)
© Paola Lizett Carvallo Elvira