

The Church of Santiago de Kuño Tambo

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***Abstract:** In this paper we will discuss the collaboration between the Carleton Immersive Media Studio and the Getty Conservation Institute for their Earthen Architecture Initiative's - Seismic Retrofitting Project. Identified as a prototype building for this project, the Church of Santiago de Kuño Tambo, Peru was selected.*

The Church of Kuño Tambo is in a 17th century village in Peru. Members of the Carleton Immersive Media Studio travelled to Peru in 2013 to take part in the project where the primary goal was to assess the historic wall paintings on the interior of the church.

We will discuss the phases of work that were carried out including orthographic photography, a deterioration glossary, and our graphic condition assessment. In addition, we will discuss our collaboration efforts with the Getty Conservation Institute, wall painting specialists, and the Ministerio de Cultura del Perú.

We will outline the technologies we used as well as the challenges of working in a secluded landscape. We will present our condition assessment of the church and speak of its value in Perú, Latin America, and for worldwide heritage conservation.

INTRODUCTION

As part of the Earthen Architecture Initiative, the Seismic Retrofitting Project was launched in 2011 by the Getty Conservation Institute (GCI).

“The project aims to design and test historical and new seismic retrofitting techniques for historic earthen buildings; provide guidance on implementing the techniques to architects, engineers, and conservators; and work with building regulation authorities to gain acceptance of these techniques” (Cancino, 2012).

Located in Kuño Tambo, Peru, the Church of Santiago sits over 4000 metres above sea level in the

Peruvian Andes, southeast of Cusco in the province of Acomayo. The remote village is home to approximately 500 residents and is almost entirely constructed in adobe brick. The Church of Santiago de Kuño Tambo was selected as one of four prototype buildings during the first phase of the Getty Conservation Institute Seismic Retrofitting Project. The materials and design features of the church are representative of rural earthen ecclesiastical structures built in seventeenth-century Latin America. Constructed in 1681, the thick mud-brick structure is identifiable by a main door with two leaves, a wood-frame gable roof, an original rubble stone foundation, and two adobe pilasters in the interior. The interior walls of the earthen structure

contain original frescoes dating back to the 17th century.



Hanley, Crystal. *The Village of Kuño Tambo*. January, 2013. Carleton Immersive Media Studio.



Santana-Quintero, Mario. *The Church of Santiago de Kuño Tambo*. June, 2013. Carleton Immersive Media Studio.

Designated as a national historic site in Peru, the Church of Santiago de Kuño Tambo has never been restored. It is vulnerable to seismic damage due to its location and has already incurred significant water damage caused by a leaking roof, compromised or complete loss of structural elements, and settlement

due to erosion. Preliminary mitigation strategies put in place will aid in the performance of the church.

In January 2013, members from the Carleton Immersive Media Studio (CIMS) joined the Earthen Architecture Initiative of the Getty Conservation Institute to collaborate on the documentation and condition assessment of these wall paintings necessary prior to retrofitting work as part of the Seismic Retrofitting Project at the GCI.

DOCUMENTATION PROCESS

PHOTOGRAMMETRY

The initial phase of the project involved creating orthographic photographs of each interior elevation and determining the deterioration conditions present on the wall paintings. Photogrammetry was chosen as the primary documentation method as “the models can be accessed, manipulated, and adjusted by the local conservation team without the need for expensive hardware beyond any [moderate] digital camera” (Percy et al, 2013) and Photoscan software produced by Agisoft. Digital models produced can be used to create sections or verify third party architectural drawings, and to its further application as historic record photography.

VISUAL GLOSSARY

The walls were analyzed, and eighteen deterioration conditions were identified and categorized as either structural, plaster, paint, surface conditions, or previous interventions – all of which significantly affect the original wall paintings.



Crystal Hanley (Carleton Immersive Media Studio) and Leslie Rainer (The Getty Conservation Institute) analyze the 17th century wall paintings of the Church of Santiago de Kuño Tambo. [Santana-Quintero, Mario. January, 2013. Carleton Immersive Media Studio].

A visual glossary was created to define each of the distinctive conditions found in the church. A series of technical photographs were taken to identify an example of each condition. The conditions were described in both English and Spanish to articulate the various states of deterioration of the paintings equally to everyone involved in the project.

Graphic symbols were then created using the limited palette of available overhead transparency markers in the region - red, blue, green and black, and to correspond to the definitions derived from the visual glossary. These symbols (both digitally and manually generated) were essential to the subsequent phase of the project to thoroughly map the deterioration conditions of the interior wall surface in its entirety.

| CONDITION STRUCTURAL | | |
|--|---|---|
| 1. SYMBOL | DESCRIPTION | EXAMPLE |
|  CAD | STRUCTURAL CRACKS Fissure that extends into the earthen wall support, to a depth of at least one adobe |  |
|  HAND DRAWN | GRIETA ESTRUCTURAL Fisura que se extiende dentro del muro de soporte en tierra a una profundidad de al menos un adobe | |

OCCURENCE IN CHURCH
 Sector D
 West Wall
 Photo: _MG_6132.CR2

Hanley, Crystal. *Condition Assessment (Structural cracks)*. August, 2013. Property of the Getty Conservation Institute.

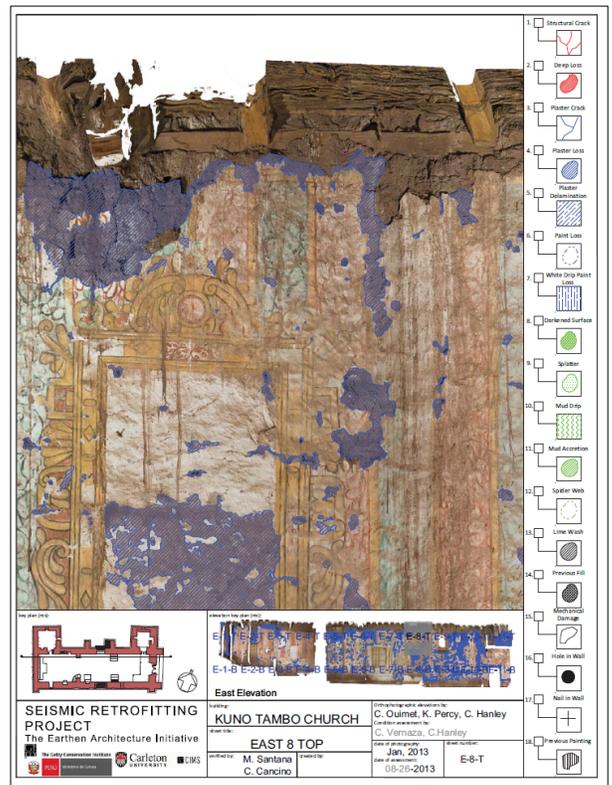
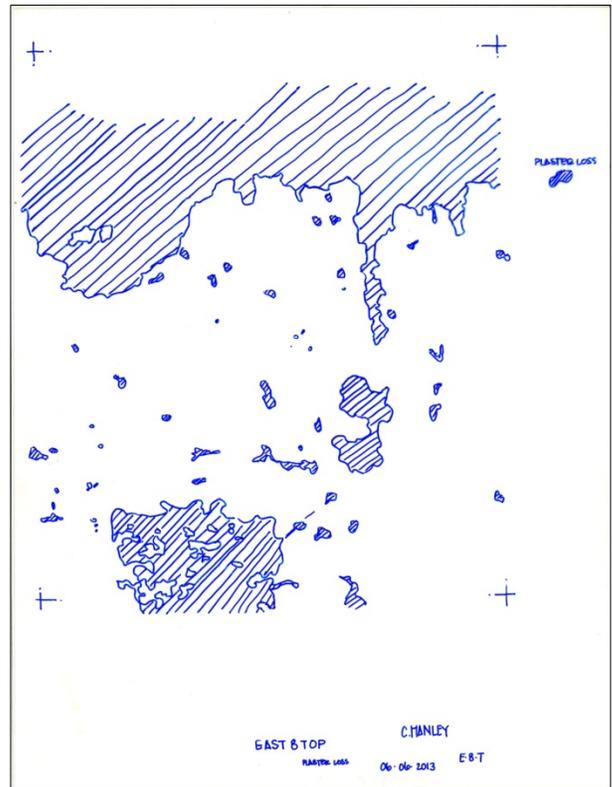
CONDITION ASSESSMENT

In June 2013, members of the CGI, the CIMS, a wall painting specialist, the Ministerio de Cultura in Peru, and residents of Kuño Tambo collaborated on the second phase of the project. The priority of phase two was to map the previously defined conditions of the wall paintings.

The orthographic photographs of the wall painting surfaces were divided into roughly sixty sections of scaled images. Each of the high resolution image sections were printed on 8 ½ x 11" sheets of paper for logistical and practical purposes. Availability of paper size in the region limited the image size but also accommodated side-by-side work of the documentation team during the condition assessment. The paper copies were taken to the site along with ample amounts of transparency paper.

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 Carleton University Heritage Conservation Symposium 2014
 Ottawa, March 22 2014

On-site, each section of the wall painting surfaces was meticulously analyzed. The transparency sheets were overlaid on the images to allow for each of the eighteen conditions to be traced.



Example of “Plaster Loss” Section East-8-Top - Church of

Santiago de Kuño Tambo condition assessment..August, 2013.
Property of the Getty Conservation Institute.

Scaffolding structures were transported from the nearby village of Rondocán. These elements were strategically constructed and reconstructed within the church throughout the condition assessment to give access to the upper portions of the walls. Scaffolding was carefully placed to avoid the wall surface and interior structural elements.

Lighting was critical to the completion of the condition assessment. Due to limited access to electricity within the village and limited daylighting within the church, floodlights and headlamps were used.



Santana-Quintero, Mario. *Wall painting condition assessment field work*. June, 2013. Carleton Immersive Media Studio

Working on-site had apparent limitations to the work. While it was initially anticipated that work could be carried out in part using a PC tablet computer, it was soon realized that it did not provide an efficient work flow. Documenting the conditions by hand proved to be far more efficient and manageable. The on-site constraints made communication and collaboration

between all members of the team of the particular importance.

The full condition assessment is an important element for the future seismic retrofit initiative of the Getty Conservation Institute to ensure the conservation of the historic wall paintings.

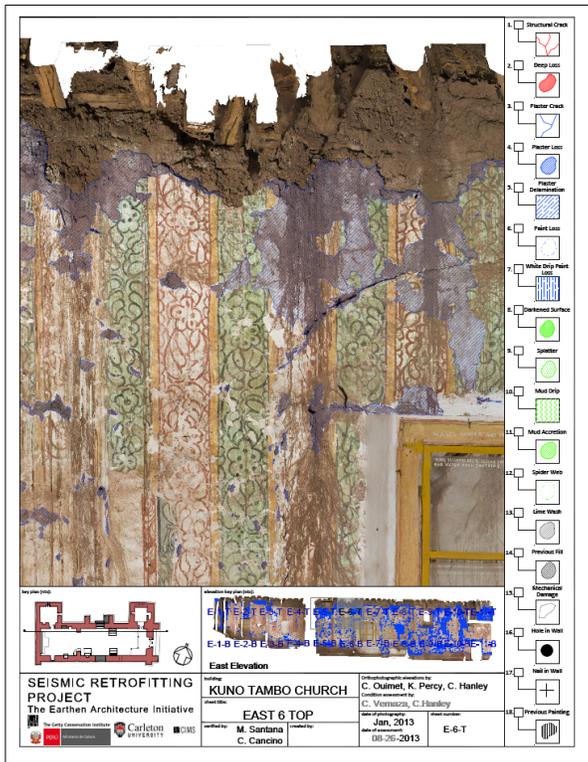
PROCESSING

The hand drawn documentation required a digital translation of the information upon returning to the CIMS research lab in Ottawa.

Separate AutoCAD files were created for each interior wall elevation. Each of the hand drawn assessments on transparency paper were scanned and imported into the AutoCAD files and carefully aligned to the previously created orthographic photographs. Individual layers were created within each file to correspond to each condition. The scanned images were meticulously digitally traced in AutoCAD using various line weights to clearly distinguish different deterioration conditions.

DISSEMINATION

The final deliverable clearly distinguished each condition documented over the orthographic photographs for each section of each wall.



valuable asset to the community. As such, the collaboration with the Ministerio de Cultura de Peru and the residents of Kuño Tambo was imperative. Members of the Ministerio de Cultura de Peru took part in the recording of the deterioration conditions of the wall paintings and members of the community of Kuño Tambo participated in the on-going site work.

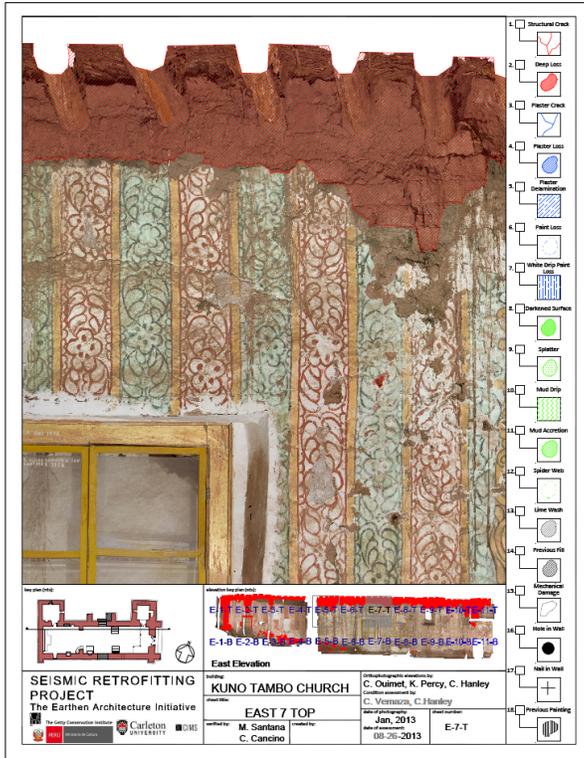
The conservation efforts garnered the attention of the Minister of Culture of Peru and a visit was arranged through the GCI. The community of Kuño Tambo arranged a celebration in honour of his monumental visit to the site, marking the importance of both the culture of Peru, and the conservation of the historic site.

CONCLUSIONS

The project brought together a multidisciplinary team comprised of professionals from across the globe and from a variety of institutions. Project director Claudia Cancino of the Getty Conservation Institute noted this collaboration as a critical aspect of the Earthen Architecture Initiative: to engage our work with local professionals on site (Earthen Architecture Initiative, 2013).

The documentation of the Church of Santiago de Kuño Tambo goes far beyond the tangible final deliverable of a condition assessment of historic wall paintings. It represents more than an assessment of existing structural conditions. It is a collaboration of professions, technologies, institutions, cultures, and values that is not limited to the distinct condition of Kuño Tambo. Its application has the potential to go beyond Latin America and represents a documentation method applicable to earthen architecture globally.

The church is a prominent landmark for Kuño Tambo and despite its weathered state of decay it remains a



ACKNOWLEDGEMENTS

The authors would like to thank the Getty Conservation Institute, the community of Kuño Tambo, and the Ministerio de Cultura in Peru for the opportunity to collaborate in this valuable contribution to the conservation of historic sites in Peru and around the world.

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