

**Session Track:** Climate and Early Design and Construction  
**Session Code:** CS05a

**Paper:** La Quincha en el Perú

**Presented by**

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**Speaker(s) Biography**

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**Abstract**

La Quincha, sistema constructivo propio del litoral, o costa peruanos, donde los recursos de cañas y barro eran relativamente abundantes y las condiciones climáticas propicias para su empleo, fue utilizada desde épocas prehispánica, siendo esta tecnología bastante elemental, resultando edificaciones simple y rústicas para viviendas de los campesinas.

El armazón estructural formado por rollizos y troncos de árboles, unidos por fibras vegetales. Servía de soporte para trenzar las cañas para armar las paredes y, con esteras con una ligera capa de barro, o sin ella se, formaba el techo. La quincha pre-hispánica tuvo su origen en la costa del Perú. Su difusión se realizaba a través de una relación de adiestramiento entre maestro y discípulos.

Llegados los españoles al Perú, la quincha de la época precedente siguió empleándose con sus características en las zonas rurales, perdurando hasta nuestros días.

La quincha virreinal fue más evolucionada y compleja, lográndose finos acabados. Se la empleó en obras monumentales y casas urbanas. La madera utilizada era en escuadría, algunas veces labrada usándose las técnicas de la carpintería con uniones mediante clavos, ensambles y empalmes. En esta época se introdujeron nuevas herramientas y materiales. Entre las primeras se incluyen las de carpintería y albañilería y entre los materiales, el empleo del yeso, cal, clavos, etc.

Constructivamente y formalmente, se divulgó el empleo de nuevas maneras de cubrir grandes luces mediante el empleo del arco, la bóveda y la cúpula, y también la utilización de las mal llamadas “falsas bóvedas” o “bóvedas fingidas”, de quincha, que representaron el máximo “atrevimiento” estructural del sistema.

El término “quincha” se aplica en el Perú actual, tanto a la rústica pared de barro y cañas o troncos delgados, como a las partes de una determinada edificación, sea esta urbana o rural, estructuradas mediante unos bastidores o nervaduras de madera, sobre las cuales se encuentra clavada, amarrada o trenzada a modo de membrana de caña, y sobre ella, extendido por una o ambas caras un revoque de barro, yeso u otro material.

Los factores que influyeron en el empleo de la quincha fueron:

- Sísmicos.- Su flexibilidad y baja masa resistían mejor los movimientos telúricos que otros sistemas.
- Climáticos.- Escasez de lluvias en la Costa, permitiendo una fácil y económica adaptación del sistema constructivo.
- Abundancia de algunos materiales que intervienen en su fabricación.- Cañas, barro, yeso y cal, aunque la madera escuadrada tenía que importarse desde lejos.
- Escasez de determinados materiales.- Que podrían haber constituido una alternativa al empleo de la quincha, como la piedra o ladrillo.
- Tradición constructiva local y autóctona del sistema.
- Económicos: Permitía construcciones con economía de recursos y tiempo.

Actualmente se están construyendo viviendas con el sistema de quincha mejorada, basándose en la quincha tradicional y sus materiales como madera, caña y barro. Para mejorar el sistema constructivo tradicional se emplean materiales que refuerzan y aumentan durabilidad y resistencia en las construcciones, siendo éstos el cemento, la arena, piedra y hormigón. Estos materiales se utilizan en diversas proporciones y combinaciones para el cimiento, sobrecimiento, falso piso, embarrado y enlucido.

La introducción de mejoras al sistema “quincha”, permite que las viviendas resistan mejor terremotos, inundaciones y ventarrones.

**Session Track:** Climate and Early Design and Construction  
**Session Code:** CS05b

**Paper:** Preservation by Using Natural Resources: Detailed Investigation Toward the Applicability of BADGIR in the Preservation of Internal Material

**Presented by**

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**Speaker(s) Biography**

**Abstract**

During the time that natural resources were the main source of energy, human beings were thinking and using natural resources more intelligently than today. Nowadays the use of irreversible fossil energy has resulted in the forgetting of methods of adaptation with nature and using natural resources properly. Looking to historic remnants, we will realize there are many solutions that our ancestors found to cope with environmental conditions. Some examples of these solutions are as follows: Innovations in using closely available materials in building magnificent and glorious monuments, which could last for several centuries,

A number of very good solutions to cope with climatic conditions in various climatic zones, This paper will review all these regional solutions, which have been used in the traditional buildings of the hot-dry climatic zone of Iran to give the maximum comfort to the humans living inside them. Particularly this paper will introduce the architectural element, BADGIR , which circulates the fresh cool air inside the building.

The revival of the functionality of this element will lead to the thermal comfort inside the building, as well as harmony with the material and other external factors. The paper will introduce a sample of buildings with working active BADGIR and a sample without it, with the BADGIR system damaged and replaced with other cooling systems. The second group of buildings with damaged BADGIR shows more deterioration in the internal material and overall form of the building. This can be generalized and this paper proposes the idea that giving back the original functionality of the architectural elements, or in other words, using the natural resources, could preserve the monuments from decay and exacerbation.

1 A tall projected architectural element from the roof that circulates the fresh cool air inside the building

**Session Track:** Climate and Early Design and Construction  
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**Paper:** 18th and 19th-Century Sustainable Construction Techniques in the Eastern United States

**Presented by**

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**Speaker(s) Biography**

Lisa M. Tucker has been a practicing architect and interior designer for 20 years with a specialization in historic preservation. She has owned her own firm since 1998. In addition to being a licensed architect and NCIDQ interior designer, Ms. Tucker is a LEED accredited professional. She teaches fulltime in the Interior Design program at Radford University including courses on historic preservation, lighting, building systems, residential design and sustainability. Ms. Tucker has been instrumental in reformatting the building construction courses and materials and resources courses to reflect a sustainable approach to building design including vernacular traditions. The focus of the residential studio is sustainable housing design. Most recently, her undergraduate residential studio participated in the C2C housing design competition which was selected as one of 217 projects to be on display following the competition. Ms. Tucker has given several presentations to the Interior Design Educator's Council on historic preservation, sustainability in design, and the relationship between the two. These presentations include topics such as bridging the gap between sustainability and preservation, teaching sustainability to interior design students and tomorrow's interior design educators. In addition to presenting papers on sustainable design, Ms. Tucker received the National IDEC Special Project's grant in 2005 to study what member schools are doing with regard to sustainable design education. She recently served as chair of the IDEC Task Force on sustainability, Board Member-at-Large of the Va. Board of ASID and the Virginia Chapter working group for sustainable design. She was also involved in the formation of the Association for Preservation Technology's committee on sustainability in historic preservation.

Ms. Tucker has served as a reviewer for several organizations including USGBC's "Greenbuild" Conference (2005, 2006, and 2007), as both a national and regional reviewer for IDEC (Interior Design Educators Council), APT (Association for Preservation Technology) paper reviewer.

**Abstract**

A survey of historic buildings in the eastern part of the United States provides an excellent overview of sustainable design practices that were once in use. This paper will look at one plan type, the single-pile, center-hall plan, as used in the 18th and 19th centuries in the eastern United States. Building examples show that local craftsmen and builders followed vernacular practices that led to cooling in the summer, heating in the winter and the use of locally available materials which were plentiful. Multiple examples from across the rural landscape demonstrate self-supporting and self-contained complexes that maximized location specific features.

The call for sustainable practices within the design fields today—including the construction of homes--often focuses on the use of new technologies to solve the problems we have created with regard to our natural resources. An excellent article which describes several of the different theoretical frameworks for thinking about sustainability is "Reinterpreting Sustainable Architecture: The Place of Technology"

by Simon Guy and Graham Farmer. In the article, Guy and Farmer provide six different frameworks they have identified as to how people approach sustainable building design. The six typologies are as follows: eco-technic, eco-centric, eco-aesthetic, eco-cultural, eco-medical and eco-social. Each type considers one area emphasis to be of predominant concern.

Integrated technology and a scientific approach to design and building characterize the Eco-technic approach to sustainable architecture. An Eco-centric approach emphasizes harmony with nature and its systems. The Eco-aesthetic paradigm calls for a new understanding of ecological knowledge and an expanded consciousness about nature. Vernacular local traditions highlight the Eco-cultural method of architecture. Eco-medical stresses a nontoxic emphasis focused on health and well-being while Eco-social involved community participation to achieve an organic, decentralized and democratic architecture.

This paper looks to eco-cultural, vernacular day-lighting and ventilation strategies, plan organization, porch placement and other technologies as a readily available solution to current material and construction deficits in the construction of new homes.

Using the LEED for new homes and other sustainable guidelines for sustainable design of new homes, this research will demonstrate how traditional, vernacular practices meet current needs. Shortcomings of the sustainable guidelines with relationship to site specific building will also be addressed in the presentation. Comparisons between today's vernacular homes and those of the 18th and 19th century will illustrate the loss of meaningful methods for solving specific problems inherent in home design and construction.

#### Bibliography

Guy, S. and Farmer, G. (2001). Reinterpreting Sustainable Architecture: The Place of Technology. *Journal of Architectural Education*. Volume 54:3, 140-148.