QUIPUSTRUCTURE

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Abstract

"Modern engineers can create more sustainable structures if they devote careful attention to nature."

- Brandlin, Daniela & Schexnayder, Cliff.

The QUIPUSTRUCTURE Project goal is to create a tensegrity system based on Inca's ancient lightweight construction technology.

The use of local materials like bamboo and junco rope combined with the braiding techniques developed by the Incas have demonstrated great structural performance with low carbon footprint [1]. This ancient technology is being lost, as only two bridges of the Inca´s road system ,"Qapac Ñam", remain: Q'eswachaka [2] y Pukayacu [3]

The QUIPUSTRUCTURE Project employs this techniques and materials together with tensile fabric and PLA (polylactic acid) joints to achieve a lightweight, modular and sustainable structure for creating shading devices.

To test the system, a shading device prototype was fabricated using the "Quipu" mnemotechnical Incas´ artifact as inspiration. This prototype have been developed according to tests and load analysis to achieve a better structural behavior

The use of reed and bamboo on the project generates a low enviromental impact and reduces manufacturing and transport cost. On the cultural level, the project gives the ancient andean communities the opportunity to teach ancestral techniques and constructive philosophy to be used on the fabrication of modular lightweight and deployable structures.

Keywords: Junco, bamboo, lightweight, sustainability, deployable, tensegrity, hybrid, quipu, inkas, tensile fabric, easy assembly, modular, constructive philosophy.

References

[1] Brandlin, D & Schexnayder, C. *Lessons in Sustainability from the Inca Empire.* Boston: Massachusetts Institute of Technology – MIT, 2004

[2] Condori, L. *El puente Q'eswachaka: ingeniería y tradición andina.* Lima: Pontificia Universidad Católica del Perú – PUCP, 2014

[3] Bernabé, J. & Orellana, G. *Renovación de un Puente de Fibra en el Camino del Chinchaysuyu.* Lima: Ministerio de Cultura: Repositorio Nacional, 2016