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SHORT SPAN MODULAR BRIDGES OF GUADUA ANGUSTIFOLIA BY SELF-CONSTRUCTION, A SUSTAINABLE ALTERNATIVE

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This paper presents the evaluation of an alternative for the construction of short bridges with Guadua angustifolia Kunth as structural material. In the proposed model, the construction of bridges must be as easy as possible, in order to be developed by the community in a short time, taking advantage of existing guadua in the area. The bridges are composed by structural modules with a length of 5m, which can be precast composed of two planar trusses which are connected using horizontal members that support the board and give stability to the structure. The design was made considering that live loads will be applied inside the structure, on the bottom chord of the trusses. Load values specified by the Colombian Bridges Code have been used for the footbridge design.

An experimental program was carried out to test the performance of the bridge. Firstly, a study of mechanical properties of materials was made, especially for the Guadua a. used in the research. Secondly, in a later stage load test, the strengths of joints and primary structural members were determined. Finally a real scale prototype of the bridge composed of four structural modules was built and tested, first under service loads, then it was loaded up to failure. In conclusion this modular structure allow us to construct a bridge with a span up to 30 m in 6 weeks, that has sufficient strength to support the loads listed on the Colombian Code of Bridges for pedestrian bridges, and that eventually can operate as a provisional vehicular bridge to deal with an emergency, as long as the traffic is composed of low weight vehicles.

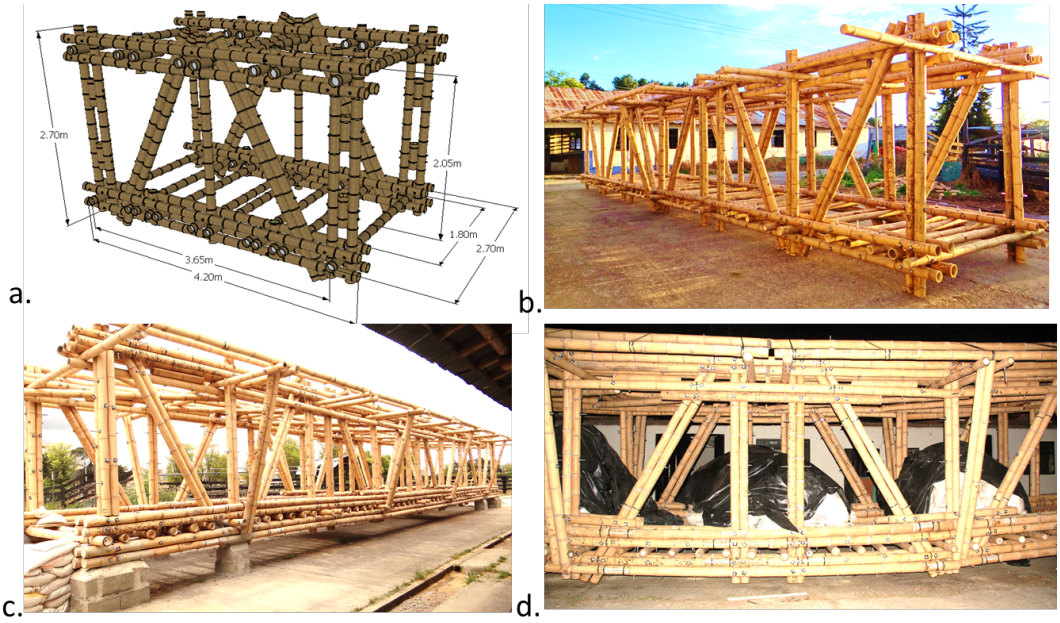

Fig. 1. Modular bridge a. Proposed model, b.,c.Real scale prototype of the bridge, d. Load Test

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