



BridgeTOOL – Design and Construction of Rural Suspension Footbridges

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Summary

Arup began working with US-based charity Bridges to Prosperity (B2P) in 2010, with the objective to produce a simple design tool to support the design and construction of rural suspension footbridges anywhere in the world. B2P's vision is that of a world "where poverty caused by rural isolation no longer exists". Three years later, Arup have produced the "BridgeTOOL" – a design tool and learning resource that enables the rapid design of suspension footbridges, coupled with documentation to both support the construction process and B2P's training programs worldwide. Part of the process in developing BridgeTOOL has been to try it out in the field. A 50 m pilot suspension bridge in Rwanda was entirely designed using BridgeTOOL. The purpose of this project was to both validate and feed lessons-learned back into the tool's development, and is in itself a success story for the rural community, benefitting thousands of local inhabitants.

Keywords: Suspension footbridge, learning resource, community empowerment, sustainable, young engineers, parametric design tool, Rwanda, Bridges to Prosperity, B2P, Arup, humanitarian engineering.

1. Background

1.1 Rural Footbridges – A Brief History

Swiss-run organization Helvetas Nepal have developed cable supported bridge designs since the 1980's [1], and has completed over 3500 projects throughout Nepal. US-based charity Bridges to Prosperity (B2P), founded in 2001 with the mission to expand bridge building beyond Nepal, has specialised over the years in the design and construction of suspended (or stress ribbon) pedestrian footbridges (Fig.1). These are the simplest and most cost-effective bridges to build, and are most appropriate in locations with steep valley sides. The supporting cables typically run below the cross beams and the deck, being directly anchored into reinforced concrete ground anchor blocks.



Fig. 1 Suspended Bridge Example, in Cyamutunda, Rwanda



Fig. 2 Suspension Bridge Example, in Cuatro Cayos, Guatemala