

Contact author: Peter Nugent, Peter.Nugent@BuroHappold.com

A new workflow for the efficient design and construction of architectural footbridges

Authors: Peter NUGENT

Affiliation: Engineer, BuroHappold Ltd, UK

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Architectural footbridges have become increasingly complex because of advances in how structures are analysed and the ability to achieve high quality fabrication. The timescales required to deliver these ambitious bridges have not lengthened, and in many cases the programmes have become shorter. This has driven engineers and architects to seek new workflows that are more efficient and allow more transparency, in particular tackling the challenge of interoperability.

The bridge team at BuroHappold have implemented the Buildings and Habitats Object Model (BHoM) in to a new workflow involving object models and parametric scripts.

The BHoM is an open source common object definition that provides:

1. Common object definitions that are agnostic of any software
2. Dynamic and transparent frameworks for others to contribute to
3. A solution to the challenge of interoperability

This new workflow has been demonstrated across a variety of projects from the competition stage and during the latter stages of a project. This has included developing constructors to parametrically generate complete finite element models for bridge configurations using the architect's model as an input. Bespoke scripts have been developed to aid in generative design, marrying the architectural and engineering workflows.

The use of the BHoM and the workflows implementing it have achieved the following:

- Greater flexibility in responding to changes in the geometry and parameters of the bridge
- The ability to prototype different structural configurations and architectural forms
- Reducing time spent creating local models or detailed global models (i.e. shell models)
- Improved workflows and transparency between architect and engineer

This paper will provide details of the workflows used on a variety of projects demonstrating the benefits of using visual and object programming in footbridge design.

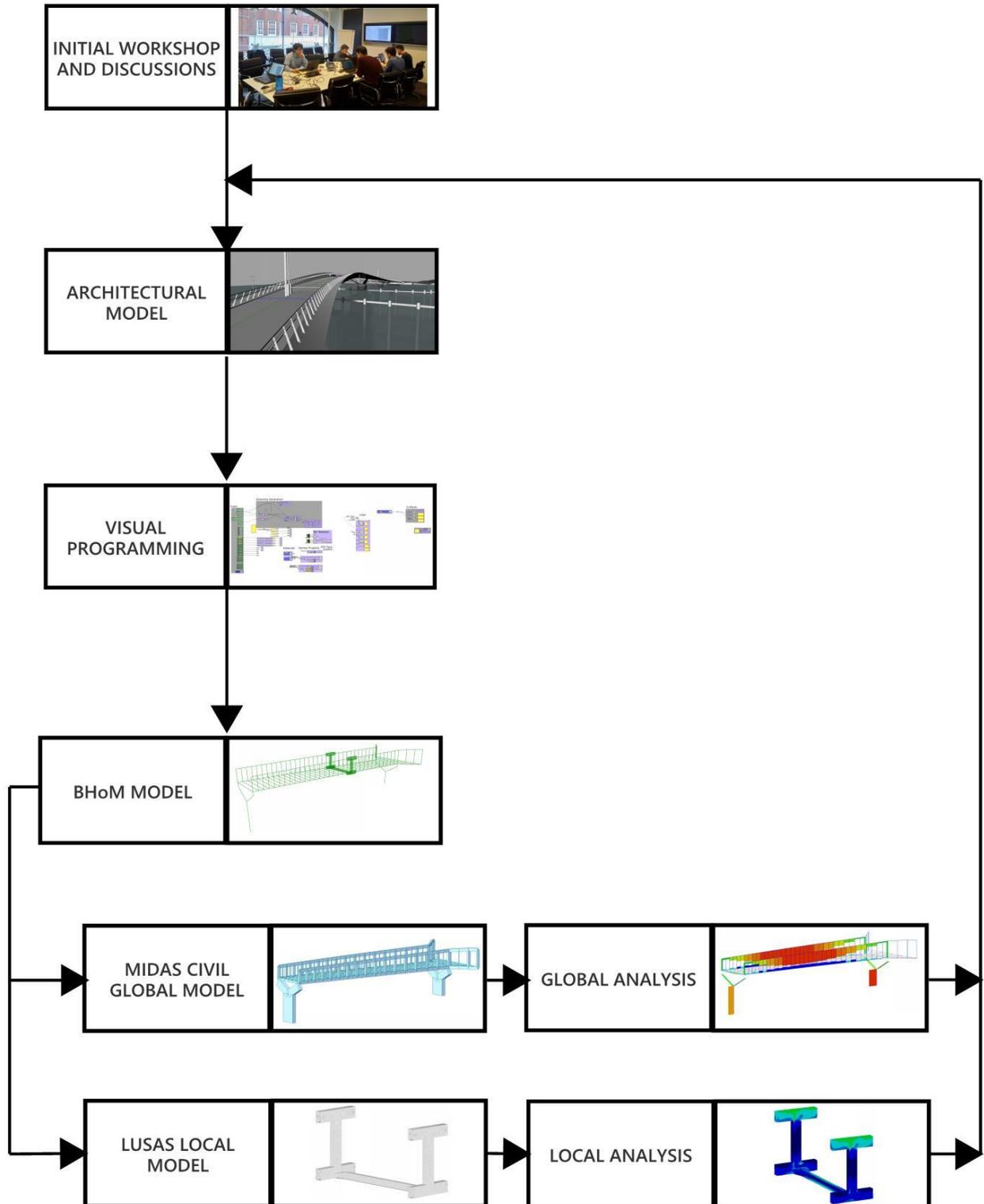


Fig. 1. Diagram showing the workflow principles making use of visual and object programming