

# WALK THROUGH THE EYE OF A NEEDLE

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## Summary

Pedestrian bridge design is becoming more demanding and challenging as architects and engineers utilize the full measure of design capability available with current design software. This is particularly evident in the design of cable supported pedestrian structures. The innovative and creative concepts require a more detailed review of demands and specifically dynamic analysis of potential vibrations of the lightweight structures.

The Dublin Link is one such example of innovative pedestrian bridge design. The structure is a suspension bridge with cable support on one side of the deck and it has a geometrically challenging pylon. Based on lessons learned from past cable supported pedestrian bridges, more in-depth analyses were developed for the design of this bridge. Additionally, to evaluate the fatigue performance of the supplied cables, a new fatigue testing regimen was required. The cable fatigue testing required by the project specifications included new testing parameters which are intended to verify that the manufactured cables are fit for the unique demands of this structure. Design of tuned mass dampers for the lateral movements of the bridge will be presented.

This presentation will review the analysis and design process for the more unique aspects of this suspension bridge. It will also cover the cable fatigue testing required, the testing process, testing issues and challenges and results. Design fabrication and testing of specialty equipment is reviewed and how these components impact project cost and schedule. The presentation will conclude with lessons learned during the design process. The lessons learned from the design of this bridge will form the basis of recommendations for the enhanced design and testing specifications for cable in cable supported bridges.

**Keywords:** Suspension; aesthetics; dynamics; fatigue testing; lateral vibration; response; damping.