ENHANCEMENTS FOR RAPIDLY DEPLOYABLE SUSPENDED FOOTBRIDGES

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Summary

Walking networks can be damaged during disasters such as floods and leave people stranded. By utilizing a rapidly deployable bridge, a walking network can be quickly restored. The objective of this paper is to describe ways to improve upon an established method for rapidly deploying suspended footbridges when only one side of a crossing is initially accessible. The established method consists of using a drone to fly a pilot line around a far side anchor. The bridge structure is then pulled over the crossing using the pilot line. Fig. 1 shows a footbridge constructed using this method. This established method requires that the drone operator have a clear view of the far side anchor. Additionally, the established bridge design provides little adjustability in terms of span length and utilizes a flexible net as a deck.

The deployment method improvements described in this paper include augmenting the drone visuals during the flight, designing the bridge's components to accommodate various spans, and increasing the deck's stiffness. Incorporating a second drone equipped with a video camera into the deployment provides the drone operators with a larger field of view and multiple vantage points to utilize during flight. Accommodating various spans can be done by examining the adjustability the bridge already has from its variable-length components. Increasing the stiffness of the deck in order to make the bridge easier to walk on without significantly increasing the weight of the structure and/or the deployment time can be achieved by adding a semirigid inlay. These improvements have the potential to enhance the versatility of rapidly deploying suspended footbridges in a range of environments.

Fig. 1. A rapidly deployed suspended footbridge

Keywords: Suspended footbridge; rapid deployment; drone construction; polyester rope; disaster relief.

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