

# Engineering Application of Self-anchored Integrated CFRP Cables

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## Abstract

Carbon fiber reinforced polymer (CFRP) materials have the advantages of a high strength/weight ratio, corrosion resistance. Bridge construction with CFRP cable rather than steel cables has a wider span, better load capacity, and longer life span. Due to the anisotropy of the CFRP materials, achieving effective anchorage for CFRP cables is challenging. To address this problem, a self-anchored integrated CFRP cable has been proposed. Recently, the novel cable was adopted in a truss bridge in Shanghai. The utilization of the novel cable contributed to rapid construction and ensure structure safety, which is quite attractive for future bridge construction.

**Keywords:** carbon fiber reinforced polymer (CFRP); cable; anchorage; engineering application, truss bridge.

## 1 Introduction

Carbon fiber reinforced polymer (CFRP) materials have the advantages of a high strength/weight ratio, corrosion resistance. Therefore, the CFRP cable has good mechanical performance, durability and ease of transportation and construction. Bridge construction with CFRP cable rather than steel cables has a wider span, better load capacity, and longer life span. Due to the anisotropy of the CFRP materials, achieving effective anchorage for CFRP cables is challenging. Various CFRP cables with different configurations have been proposed in recent years [1-3]. To achieve more effective anchorage, a self-anchored integrated CFRP cable (as shown in Fig.1) was proposed and studied by the authors [4,5]. In the manufacturing process,

the carbon fiber prepregs were wound continuously on steel shafts at both ends, forming a ring-shaped member similar to a conveyor belt. This paper introduces the first engineering application of the novel cables in bridge engineering, which has achieved rapid construction and installation with better performance.

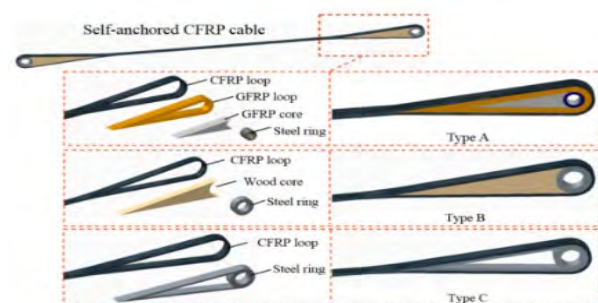


Fig.1 Conceptual diagram of self-anchored integrated CFRP cable