Bridge-in-a-Backpack Technology

Kleinfelder is the world's first engineering company to incorporate a pioneering yet transferable technology in its design of four bridges in Maine. The Bridge-in-a-Backpack superstructure is composed of lightweight carbon-fiber tube arches that are filled with concrete onsite. It's efficiency, cost-effectiveness, quality, and sustainability underscores Kleinfelder's surface transportation innovation and expertise.

SOLUTION BENEFITS

The Bridge-in-a-Backpack solution saves time and money without sacrificing the integrity or lifespan of the bridge structure. With hundreds of bridges worldwide needing repair or replacement, using carbon fiber technology in bridge structures could result in more expedient openings of bridge replacement projects.

Location:
Maine (statewide)

Owner:
Maine Department of Transportation

REDEFINING BRIDGE DEVELOPMENT AND REPLACEMENT

The Bridge-in-a-Backpack arch tubes are so compact and lightweight that they can theoretically be transported onsite in a backpack. The bridge components can be placed by hand or with light equipment, avoiding the need for heavy machinery. Fiberglass reinforced plastic decking, also light enough to be installed by hand, is attached to the arches and eventually topped with a cast-in-place reinforced concrete overlay and membrane waterproofing. Integrating this new technology with an ingenious design—incorporating abutments and headwalls to support both horizontal and vertical forces—now makes this technology available for everyone.

APPLYING NEW TECHNOLOGY FOR CLIENT DELIVERY

The Maine Department of Transportation asked Kleinfelder to investigate a variety of foundation systems for this innovative new bridge system to determine the best and most cost-efficient solution. Kleinfelder's bridge engineers evaluated foundations with piles and with spread footings and designed multiple headwall systems, including a true-tie composite headwall system with materials similar to the composite used for the tubes. This space-age material is lightweight, making it easy to install, and has a long, useful life for sustainable bridge design and replacement.

Caribou Underpass Bridge - Caribou, Maine

Jenkins Bridge - Bradley, Maine

KLEINFELDER
Bright People. Right Solutions.