Fiber-reinforced polymer (FRP) reinforcement consists of a continuous fiber, such as a glass, carbon, or aramid, embedded in a resin matrix, such as epoxy, polyester, vinyl ester, or phenolics. FRP reinforcement may be used as reinforcing bars, prestressing strand, or post-tensioning tendons. These types of reinforcement do not corrode, can be nonconductive, and are lighter to ship and install than steel reinforcement. However, tests have shown that some FRP bars can lose tensile strength in a highly alkaline solution.

Nonprestressed Reinforcement

In a 2016 survey, 17 of 42 transportation agencies in the United States and Canada reported that they had used FRP reinforcement in cast-in-place concrete bridge decks. However, its use is not mainstream; epoxy-coated steel reinforcement continues to be the dominant material for deck reinforcement.

Prestressing Strand

Several demonstration projects have shown the potential of FRP prestressing applications in bridges, but its use has not become generally accepted. One hurdle has been the lack of a design document by the American Association of State Highway and Transportation Officials. This challenge should be remedied now that National Cooperative Highway Research Program Project 12-97, Guide Specifications for the Design of Concrete Bridge Beams Prestressed with Carbon Fiber-Reinforced Polymer (CFRP) Systems, has been completed and approved.

Key Resources


YOU CAN HAVE IT ALL.

Structural integrity, speed, and beauty. Precast concrete is the preferred material solution for transportation. You don’t have to sacrifice aesthetics to achieve structural integrity. And off-site construction of components means faster install on-site. Precast concrete checks all the boxes: it’s cost effective, durable, and beautiful.