

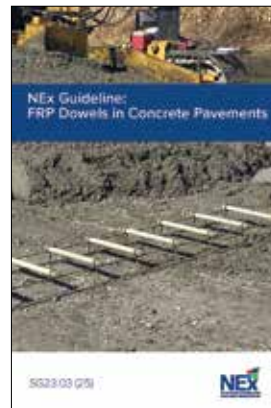
New Document on FRP Dowels in Concrete Pavements

Fiber-reinforced polymer (FRP) dowels are lightweight and non-corrosive and show promise as alternatives to traditional metal bars in highway pavements. Some contractors favor FRP dowels in concrete pavement construction because they are lighter, easier to handle, and require no coating repairs. However, potential issues include the need for proper surface texture or lubrication to meet pullout force requirements, susceptibility to displacement during concrete consolidation requiring proper anchoring, and challenges with dowel attachment to nonmetallic baskets. Field performance of FRP dowels shows that vinyl ester dowels perform better than polyester, and larger FRP dowels with higher fiber content are needed for long-term performance. FRP dowels generally exhibit lower load transfer efficiency (LTE) and may lose LTE more quickly than steel dowels, though closer spacing can reduce this difference. Despite higher relative deflections and potential abrasion wear, FRP dowels typically show comparable performance in terms of pavement distress, joint faulting, and ride quality to steel dowels. Feedback from agencies and contractors using FRP dowels highlights benefits such as improved safety, reduced labor, and economic competitiveness.

Some agencies have adopted specifications for FRP dowels in jointed concrete pavement projects, and a guide specification has been developed based on research and existing standards. However, there is a lack of comprehensive guidelines for the use of FRP dowels in concrete pavement construction. In light of this, NEX: An ACI Center of Excellence for Nonmetallic Building Materials has announced a newly published document SG23.03 (25): NEX Guideline: FRP Dowels in Concrete Pavements.

The project was launched due to the increasing demand for innovative, durable materials that enhance the efficiency and performance of concrete pavements. The work was performed by Mark B. Snyder, Pavement Engineering and Research Consultants (PERC), LLC, Bridgeville, PA, USA, who created a comprehensive guideline for the use of FRP dowels in concrete pavement construction, aligning with existing steel dowel standards. Peter C. Taylor, Director of the National Concrete Pavement Technology Center (CP Tech Center) at Iowa State University, Ames, IA, USA, was the Principal Investigator.

Snyder, an expert in pavement engineering with extensive



New SG23.03 (25): NEX Guideline: FRP Dowels in Concrete Pavements



Mark Snyder delivering the presentation to industry professionals

experience in the field, contributes valuable insights into the design and application of innovative materials like FRP dowels for concrete pavement construction. To further advance NEX's project findings, Snyder recently delivered two presentations on FRP dowel designs in concrete pavements. The first presentation on "Dowels: New Specifications and Performance Concerns" was delivered to approximately 280 participants at the 2025 WCPA (Wisconsin Concrete Pavement Association) Annual Concrete Pavement Conference in Appleton, WI, USA, on February 13-14, 2025. The second presentation on "New Dowel Technology: Specifications, Products and Performance" was delivered to approximately 450 participants at the 45th Annual Portland Cement Concrete Pavement Conference that was organized by the American Concrete Pavement Association (ACPA) Missouri/Kansas Chapter and held in Kansas City, MO, USA, on February 24-26, 2025.

NEX thanks Aramco for its generous sponsorship of this project, as well as all reviewers of the document, ACI, and NEX's member companies for their unwavering support and valuable contributions, which are instrumental to the success of NEX initiatives.

For more information about this project and to download a free copy of the guideline, visit www.nonmetallic.org/publications.