

Design and evaluation of jointed plain concrete pavement with fiber reinforced polymer dowels



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(Paula Gutkowski)

DESIGN AND EVALUATION OF JOINTED PLAIN CONCRETE PAVEMENT WITH FIBER REINFORCED POLYMER DOWELS



No binding. Book Condition: New. This item is printed on demand. Original publisher: McLean, Va. : U. S. Dept. of Transportation, Federal Highway Administration, Research, Development, and Technology, Turner-Fairbank Highway Research Center, 2009 OCLC Number: (OCoLC)729724599 Subject: Fiber-reinforced plastics -- Testing. Excerpt: . . . CHAPTER 1. INTRODUCTION GENERAL REMARKS U. S. highways and roads made of jointed plain concrete pavement (JPCP) use load transfer devices, called dowels, across joints of a series of contiguous concrete slabs. Joints allow the movement and deformation of pavement to occur under mechanical loading and thermal variations. Joints may either be parallel to traffic (longitudinal joints) or perpendicular to traffic (transverse joints). Typical problems of jointed concrete pavement without an effective load-transfer device include faulting, pumping, and corner breaks. As the American Association of State Highway and Transportation Officials (AASHTO) reported, pavement joints supported with dowels have a longer service life than joints without (1) dowels. Over time, traffic traveling over a joint may crush the concrete surrounding the dowel bar and cause voids due to excessive bearing stresses between the dowel and surrounding concrete. Concrete crushing may take place due to stress concentration where the dowel contacts concrete at the joint face directly above and below the dowel. Looseness of dowel support can (2) decrease the load transfer efficiency (LTE) across the joint and accelerate pavement damage. Corrosion of the dowel bar can potentially bind or lock the joint. When locking of the joint occurs, no thermal expansion is allowed, and new cracks parallel to the joint are formed directly behind the dowel bars in the concrete. As temperature decreases, contraction of the concrete widens the new cracks, leading to reduction of load transfer. Once there is no load...



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