

# Detecting Seasonal Changes in Load-Carrying Capabilities of Flexible Pavements

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## ABRIDGMENT

•THE MAIN EFFORT of this research was directed toward finding an instrument capable of measuring—with speed, accuracy, and economy—seasonal changes in the strength of flexible pavements and showing how it could be used in a program to protect pavements from overloading during critical periods. The instrument selected was the Dynaflect, a trailer-mounted device that loads the pavement dynamically and indicates the corresponding deflection at several points on the surface. Operated by one man and towed by a passenger car, the Dynaflect appears to meet the requirements for the job. Tests were made with the Dynaflect on pavements at locations ranging from Springfield, Ill., northward to Duluth, Minn. The tests revealed that the annual strength history of pavements in northern climates is divisible into four distinct periods: (a) a period of deep frost and high strength, (b) a period of rapid strength loss, (c) a period of rapid strength recovery, and (d) a period of slow strength recovery. The second and third periods together constitute the critical period for flexible pavements.

A series of correlation studies indicated that Dynaflect measurements could be used with reasonable accuracy to predict the results of plate bearing tests and Benkelman beam deflection tests as well as the curvature of the pavement in the vicinity of a heavy wheel load. Thus, the Dynaflect apparently could be substituted for other instruments being used to detect seasonal changes in strength. In addition, the Dynaflect, although not the most economical to operate, proved to be more sensitive than the other instruments to changes in strength. The research resulted in suggested warrants for deciding when, where, and how long to impose reduced load limits, and what those load limits should be. It appears that if these warrants were used to control the placement and removal of load restrictions, some reduction in the duration of the restricted period might result.