

## TECHNICAL REPORT TITLE PAGE

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Air Content and Permeability of PCC Pavements: 1909 to 2006	Final Report, March 2007

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**8. ABSTRACT**

Portland cement concrete pavements have given excellent service history for Iowa. Many of these pavements placed during the 1920's and 1930's are still in service today.

Many factors go in to achieve a long term durable concrete pavement. Probably the most important is the durability of the aggregate. Until the 1930's, pit run gravel was the most predominant aggregate used. Many of these gravels provided long term performance and their durability is dependent upon the carbonate fraction of the gravel.

Later, limestone (calcium carbonate) and dolomite (calcium, magnesium carbonate) sources were mined across Iowa. The durability of these carbonate aggregates is largely dependent upon the pore system which can cause freeze thaw problems known as D-cracking, which was a problem with some sources during the 1960's. Also, some of these carbonate aggregates are also susceptible to deterioration from deicing salts. Geologists have identified the major components that affect the durability of these carbonate aggregates and sources are tested to ensure long term performance in Portland cement concrete.

Air entrainment was originally put in concrete to improve scaling resistance. It is well known that air entrainment is required to provide freeze thaw protection in concrete pavements today. In Iowa, air entrainment was not introduced in concrete pavements until 1952. This research investigates properties that made older concrete pavements durable without air entrainment.

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