

ABSTRACT

The objectives of this research were the collection and evaluation of the data pertaining to the importance of concrete mixing time on air content and distribution, consolidation and workability for pavement construction.

American Society for Testing and Materials (ASTM) standard C 94 was used to determine the significance of the mixing time on the consistency of the mix being delivered and placed on grade. Measurements of unit weight, slump, air content, retained coarse aggregate and compressive strength were used to compare the consistency of the mix in the hauling unit at the point of mixing and at the point placement.

An analysis of variance was performed on the data collected from the field tests. Results were used to establish the relationship between selected mixing time and the portland cement concrete properties tested. The results were also used to define the effect of testing location (center and side of truck, and on the grade) on the concrete properties.

Compressive strength test concepts were used to analyze the hardened concrete pavement strength. Cores were obtained at various locations on each project on or between vibrator locations to evaluate the variance in each sample, between locations, and mixing times. A low-vacuum scanning electron microscope (SEM) was used to study air void parameters in the concrete cores. Combining the data from these analysis thickness measurements and ride in Iowa will provide a foundation for the formulation of a performance based matrix.

Analysis of the air voids in the hardened concrete provides a description of the dispersion of the cementitious materials (specifically flyash) and air void characteristics in the pavement. Air void characteristics measured included size, shape and distribution.