

# Referee Test for Flexural Strength Acceptance

**S**pecifications from the Federal Aviation Administration (FAA), some highway departments, city and county engineers, and consulting engineers include requirements for flexural strength based on beam tests. Because results of beam tests are extremely variable, many highway departments and consulting engineers use only compressive strength requirements in their specifications, or allow in-place flexural strength to be estimated based on concrete cylinder compressive strength tests.

Specifications that require beam testing often contain no provisions for referee testing. This is unusual in the concrete industry because for many years ACI 318, “Building Code Requirements for Structural Concrete,” and ACI 301, “Specifications for Structural Concrete,” have included core testing as the referee method when cylinder strength test results are low.

When project specifications include requirements for flexural strength based on beam testing, the specifications should also provide guidance for investigation of low beam strength test results. The investigation should include a review of the testing procedures, a consideration of whether the low-strength beam represents a significant reduction in load-carrying capacity of the pavement or slab, and the effect on overall load-carrying capacity of slab thicknesses and k-values that exceed the design requirements. A referee method of testing, such as compressive

strength tests of drilled cores, should also be stated. A commonly stated specification clause is that core test results must meet the requirements of ACI 318 or ACI 301 for structural adequacy.

ASCC agrees with the following recommendations from the American Concrete Pavement Association (ACPA) publication “Methods of Concrete Strength Evaluation of Pavement Acceptance,” June 1997, and the National Ready Mixed Concrete Association (NRMCA) publication “Flexural Strength of Concrete,” CIP 16, 2000:

- Compressive strength should be used for acceptance testing;
- Mix-specific correlation between compressive strength and flexural strength should be used; and
- Contract specifications should clearly include referee testing provisions, including what and how the referee testing will be done.

When project specifications include pay factors based on beam strengths, it is especially important that the specifications also include procedures for investigating low beam-strength test results and for a referee method of testing when the test results are low. ASCC concrete contractors will work with specifiers in developing specifications that address these issues. If you have any questions, contact your ASCC concrete contractor or the ASCC Technical Hotline at (800) 331-0668.