1996 Automotive Technology Development
Contractors Coordination Meeting

LIFE PREDICTION CODES FOR USE OF CERAMICS IN AUTOMOTIVE ENGINES

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ABSTRACT

Two separate life prediction codes are currently under development for prediction of ceramic component reliability for use in automotive applications. This is being accomplished by NASA and AlliedSignal Engines.

The NASA CARES integrated design software series was developed as an innovative design tool that provides a costeffective approach to systematically optimize the design of brittle material components using probabilistic reliability analysis techniques. This software enables the use of high value-added advanced structural ceramic and other brittle material systems in critical structural components subjected to thermomechanical stresses.

The AlliedSignal Engines code consists of two components (CERAMIC and ERICA) which have been developed to perform specimen data analysis and component risk integration. The benefits of these codes are (1) reduced testing and data generation, due to comprehensive data pooling capabilities, and (a) accurate prediction of ceramic component reliability early in the design process, resulting in better designs and shortened development cycles.