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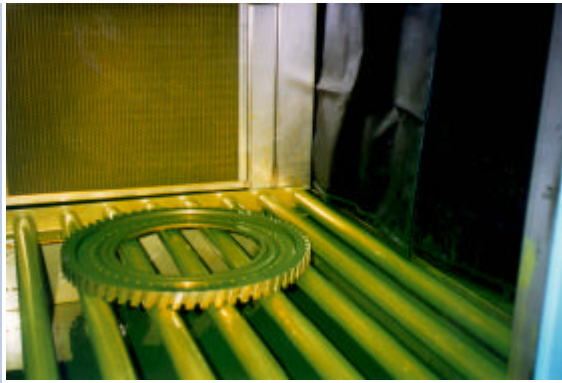
FPI Research - Glowing Bright at ISU

The Federal Aviation Administration (FAA) recently awarded a \$3.5M, 54-month program to the Center for Aviation Systems Reliability (CASR) program at ISU. CASR program manager, Lisa Brasche, worked closely with commercial airlines, aircraft and engine manufacturers, and the FAA to define a program which supports research needs for fluorescent penetrant inspection (FPI). Fluorescent penetrant inspection is a widely-used inspection method for surface crack detection in both aircraft and engine components with applications in both production qualification and inservice assessment. In a recent survey of airworthiness directives from 1995-1999, FPI was the third most frequent inspection called out behind visual and eddy current inspection methods. In the late 1990s, FAA-CASR worked with the FAA Chief Scientist-Technical Advisor for NDE Dr. Al Broz to organize and facilitate discussion with the commercial aviation industry in defining research needs to improve the implementation and effectiveness of the FPI method. A literature survey was completed as part of earlier CASR efforts and is available from the author, [Brian Larson](#). The literature survey identified over 40 factors that impact the effectiveness of FPI. Although patented in 1941, significant changes have occurred in the chemicals/chemistry associated with the process, in many cases as a result of environmental considerations. The new program initiated in September 2001 will determine the most relevant factors for which existing data is insufficient to make engineering decisions regarding applications, assess the parameter ranges that provide acceptable performance for typical aircraft and engine components, and document the results of these studies. In commenting about the start of this new effort, Dr. Broz stated, "It is time to transform fluorescent penetrant inspection from a poorly performed and poorly understood baptismal ceremony to a viable and credible inspection modality."

The program team includes CNDE staff partnered with Boeing Commercial Airplane Company, Boeing Phantom Works, Rolls Royce, Pratt & Whitney, Delta Airlines, United Airlines, Sherwin Inc., and D&W Enterprises. Program plans and results will be coordinated with industry partners to ensure they are applicable to aerospace practices and relevant specification modifications will be supported through participation in standards committees, such as SAE Committee K. A website will be established to document results and place them in the public domain.

CNDE staff members are excited about this new opportunity to work with industry partners and the potential the program holds to improve inspection practices in the aviation industry and ultimately provide safer air transport.

For further information, contact [Lisa Brasche](#), CASR Program Manager.



Left photo: Typical engine component undergoing FPI in an airline shop.

Right photo: FPI facilities at CNDE. Capability includes multiple penetrant processes, controlled drying ovens, and spotmeters for use in completing a quantitative assessment of FPI brightness.

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