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RIAC Success Story

RIAC Conducts Rotor Blade Protection Evaluations

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Customer:	NAVAL AIR SYSTEMS COMMAND
Challenge:	During recent deployments to arid regions around the world, the U.S. military discovered that the material systems protecting the rotor blades and fixed–wing leading edges in U.S. helicopters and fixed-wing aircraft, were failing prematurely. The blades and edges were not designed to withstand repeated collision with sand particles, commonly found in these arid regions. Frequent exposure to these conditions leads to increased erosion of the protective applique material and eventual damage to the underlying substrate. As a result, the number of maintenance hours and the overall maintenance cost for these systems greatly increased.
Approach:	Reliability Information Analysis Center (RIAC) Subject Matter Experts (SMEs) developed a methodology for assessment of sand particle erosion on the protection films of polyurethane mounted on the leading edges of rotor blades. The methodology involved conducting detailed studies and developing mathematical models, which evaluated the effects of the sand particle size, angle of impact and speed of particle impact with the rotor blade. This combination enabled RIAC SMEs to thoroughly evaluate the impact of the sand particle size,

	angle of impact, and overall particle speed on the durability of the rotor blade. RIAC SMEs worked in concert with U.S. Navy Fleet Readiness Center personnel and key academic and industry experts to meet the challenge head on.
Value:	RIAC discovered that the optimized use of protective films will reduce unnecessary maintenance and repair of rotor blades. It will also increase aircraft availability, reduce spare parts and improve safety. A Department of Defense estimate in 2003 estimated the total cost of rotor blade repair/replacement at over $189 million dollars a year. The policy and tools that RIAC is working to develop is estimated to reduce that cost by at least one percent. That would result in an annual savings of $18.9 million in addition to the increased availability and safety.

RIAC is operated by a team led by Wyle under contract HC1047-05-D-4005.