

Low Cost Lightweight Structures Manufacturing Technology Objective

PROBLEM / OBJECTIVE

Weight, part count and assembly are primary cost factors in both manufacturing and operation of Army helicopters. Current rotorcraft fuselage structures consist of a large number of detailed parts that need complex fixtures for assembly using metallic mechanical fasteners. As a result, the cost associated with the design and fabrication of assembly fixtures and labor to install the detail parts drives up the purchase price of current rotorcraft designs. In addition, lightly loaded, highly contoured structures are invariably more expensive to produce putting further pressure on acquisition budgets. The high cost is associated with forming the stiffening and support structures for complex contours that interface with primary structures and equipment access panels while maintaining tight tolerances and holding down weight.

The objective of this effort is to reduce manufacturing costs, operational costs, and reduce weight in two of the Army's Force Modernization helicopters; i.e., CH-47 Chinook and the UH-60 Black Hawk.

ACCOMPLISHMENTS / PAYOFF

Process Improvement:

Recent activities on the Black Hawk tailcone program include developing a Common UH/MH design and incorporation of the Common Missile Warning System (CMWS) and Joint Technical Radio System (JTRS) into the tailcone baseline configuration. UH60M Upgrade design features and a composite tailrotor driveshaft have also been incorporated. Test articles are being fabricated now and the certification testing will begin 1Q FY07.

The Affordable Rotorcraft Secondary Structures task was initiated with the objective to demonstrate advanced low cost manufacturing technologies for application to secondary structures. The demonstration component is CH-47 forward pylon as it represents a high cost secondary structure and has an established baseline with which to compare the advanced technology. A detailed design analysis of existing pylon configuration to determine variations between aircraft installations has been done as part of the effort. Solid modeling of the forward pylon's various parts, forward/aft fairing, work platform and upper deck (MRL 6) has also been completed along with the preparation of a draft Pylon Re-Design Certification Plan.



Implementation and Technology Transfer:

The Black Hawk and Chinook each have on-going upgrade programs supported by this effort. The PMs are actively seeking manufacturing improvements and technologies that offer cost reduction for their system upgrade requirements. The PM's commitment and identification of technology insertion points for each weapon system production schedule have been modified due to funding and performance issues. The Affordable Rotorcraft Secondary Structures (ARSS) CH-47 forward pylon has completed fit check at Ft Campbell and is waiting for flight test under the F Model 2012 Multi-Year 2 Program. Sikorsky has completed a redesign of the UH-60 Common Composite Tailcone to increase ballistic tolerance. Additional funding is required to fabricate and test the redesigned article to put the tailcone back on track for incorporation into the UH-60 fleet.

Expected Benefits:

The Common Composite Tailcone and Composite Pylon technological developments from this program will supply affordable lightweight structures that enable:

- Larger payloads = Less Sorties
- Longer Mission capability
- Increased time on target
- Increased readiness and faster repairs
- Reduced O&S costs

TIME LINE / MILESTONE

Start Date	October 2003
End Date	September 2007

FUNDING

U.S. Army ManTech	\$9.9M
Project Managers	\$4.3M
Government /Industry	\$15.5M
Total	\$29.7M

PARTICIPANTS

U.S. Army ARMDEC
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