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14. ABSTRACT Air Methods Corporation, Englewood, CO, manufactures litter pans (platforms) used in the UH-60Q MEDEVAC (Medical Evacuation) variant of the UH-60 Black Hawk interior that are machined aluminum pieces designed to support litter-borne patients. These platforms also serve as attachment points for the ambulatory patient seats. The original platforms were designed to meet civil crash requirements. However, with the pending introduction of the HH-60M, the platforms must meet stricter Army crash requirements, and the loads on the platforms themselves have increased. Reducing the weight of the medical interior increases the performance margin on the aircraft. This translates into icreased "payload" capacity, better performance, better fuel efficiency, and longer aircraft life. Air Methods Corporation requested that the National Center for Defense Manufacturing and Machining (NCDMM) review a proposed stiffener design and develop a manufacturing process capable of producing a complex stiffener geometry that will reduce the weight of the platform along with increasing its "payload" capacity.						
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PROBLEM / OBJECTIVE

Air Methods Corporation, Englewood, CO, manufactures litter pans (platforms) used in the UH-60Q MEDEVAC (Medical Evacuation) variant of the UH-60 Black Hawk interior that are machined aluminum pieces designed to support litter-borne patients. These platforms also serve as attachment points for the ambulatory patient seats. The original platforms were designed to meet civil crash requirements. However, with the pending introduction of the HH-60M, the platforms must meet stricter Army crash requirements, and the loads on the platforms themselves have increased.

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ACCOMPLISHMENTS / PAYOFF

Process Improvement

The NCDMM reviewed the proposed stiffener geometry and began developing tool paths for the "proof-of-concept" demonstration using Mastercam software. During the development, tool path optimizations along with advanced techniques were used including thin wall machining, as well as high speed machining.

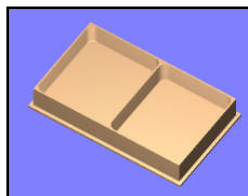


Figure #1
Solid Part Model

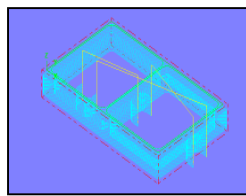


Figure #2
Tool Path

The improved strength stiffener geometry required a recessed wall with radii blending the top of the wall to the larger contact surface, as well as a radius

blending the bottom of the recess to the floor. This feature required the use of a special ground form tool. Once a process plan was in place a "proof-of-concept" demonstration was performed in the NCDMM testing and development lab.



Figure #3
Form Tool

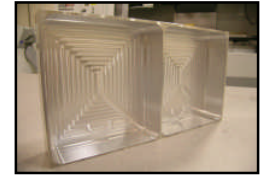


Figure #4
"Proof-of-Concept"

Implementation and Technology Transfer

The following process and tool recommendations were made to Air Methods:

- Tooling used for roughing was a .500" diameter end mill, coated for the application.
- The custom ground form tool was a modified end mill.
- A report detailing the methodology behind High Speed Machining along with Thin Wall Machining.

Expected Benefits

This manufacturing process can be transferred to Air Methods production facility. This new stiffener design could potentially reduce the weight of the platform by 30%, in some areas. This new design will also allow for a 50% increase on the contact surface over the old, straight wall design. This would help allow for the increased load demands on the UH-60Q Platform.

TIME LINE / MILESTONE

Start Date..... March 06
Recommendations Made..... August 06

PROJECT FUNDING

NCDMM funding \$12K

PARTICIPANTS

Air Methods Corporation
CNC Software, Inc. (Mastercam)
Com 1 Information Technologies (Predator)
Haas Automation, Inc.
Kennametal Inc.

For additional information concerning this project, contact the NCDMM at www.ncdmm.org