AFRL creates safer-than-steel synthetic winch cable for cargo aircraft

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Personnel from the Air Force Research Lab, Wright-Patterson Air Force Base, Ohio and Samson Rope, Ferndale, Wash., demonstrate proposed items for the C-17 Globemaster III fleet Jan. 30, 2018, on Dover Air Force Base, Del. Maintenance personnel from the 736th Aircraft Maintenance Squadron set up an aircraft and back-shop facilities to gather additional data for synthetic rope

chains and winch cable usage. Credit: U.S. Air Force photo/Roland Balik

The C-17 Globemaster III aircraft fleet currently uses winch cables made of steel to pull pallets, vehicles and other items onto the aircraft from the ground via the aft ramp.

The current steel cable experiences dangerous snapback upon breakage, which can injure personnel and damage aircraft. The synthetic cable eliminates that danger since it does not snap back if it were to fracture.

The Air Force Research Laboratory's Advanced Power Technology Office is changing this material to one that is lighter and safer.

APTO has successfully designed, developed and tested a synthetic winch cable for the aircraft. The new cable replaces existing cables while being 40% cheaper and significantly lighter.

Measuring 280 feet, the current steel cable weighs in at a hefty 80 pounds compared to the new synthetic cable's 14 pounds, equating to an 83% lighter cable. Removing excess weight results in less fuel consumption and improved mission capabilities.

"It's about creating a safer winch cable for the C-17," said Ed Clark of the APTO Office. "Serious injury occurs when a steel cable breaks, eliminating those injuries is imperative."

"The change from steel to a synthetic material is most noteworthy in the significant weight difference," said Senior Master Sgt. Jeff Witherly, C-17 evaluator loadmaster, Scott Air Force Base, Illinois. "The cable is simply easier to move, maneuver and manipulate around the cargo compartment. The fact that it does not retain energy when it breaks is a

huge safety advantage as it will not whiplash if it were to fail."

During the first quarter of 2020, six sets of cables will be installed on two aircraft at three different operational bases. The Air Mobility Command and the C-17 Program Office will evaluate them for approval as a suitable substitute.

Samson Rope Company is working with the crew to design the system. They manufacture industry-specific synthetic rope that is engineered to meet various demands.

Upon approval, the fleet will be upgraded with the new synthetic cables and will become an Air Force-approved, commercially available item that can be procured for all C-17 aircraft.

Provided by Air Force Office of Scientific Research