



CH-47 Helicopter Takes Off At the Flip of A Switch

Location Details:

United States

Segment:

Military Rotocrafts

Problem:

To replace the manual hand pump system.

Solution:

EPUSHA, or electric pump for utility system hydraulic accumulator.

Results:

Enhanced safety and resource reduction as well as aircraft readiness.

The EPUSHA electric accumulator recharge system can be initiated simply by the flip of a switch to pressurize the accumulator in less than two minutes – a tenth of the time it took for the manual process.

Background

Imagine you're a member of a Chinook CH-47 helicopter crew. You've received orders to deploy, and as always, time is of the essence. Within minutes all positions are manned and your squadron is ready to fly.

But before the helicopter can get off the ground, you and a fellow soldier must spend an intense 20 minutes hand-pumping the accumulator to start the auxiliary power unit in order to start the main engines.

For a modern military force that aims for 24/7 readiness

and rapid response, the last sentence seems out of place. But until recently this time- and labor-intensive step was part of the normal start-up sequence for the CH-47.

Challenges

The Army recognized that the requirement to manually pressurize the accumulator was diverting manpower and resources from critical missions and causing costly delays, not to mention increasing the potential for personnel injuries.

Their search for a faster, easier and safer start-up mechanism for the CH-47 ended successfully with a system developed by Eaton called EPUSHA, or electric pump for utility system hydraulic accumulator.

Solution

The EPUSHA electric accumulator recharge system can be initiated simply by the flip of a switch to pressurize the accumulator in less than two

minutes – a tenth of the time it took for the manual process.

"This improvement provided by Eaton makes life a lot easier for our soldiers," said Sgt. Paul Phillips, Alabama Air National Guard. "It enhances safety and resource reduction as well as aircraft readiness, which is of utmost importance in supporting our operations. When they need the aircraft, it's ready to go."

Results

Eaton's Aerospace Group supplies the EPUSHA system which consist of an electric motorpump and an electronic control box.

In the old process, at least two people had to go to the back of the helicopter to hand-pump the accumulator in an up-and-down motion, like a car jack, for 18 to 20 minutes until pressure reached 3,200 psi.

With EPUSHA, one person flips a momentary toggle switch on the control box to start the elec-



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tric motor pump, which pressurizes the hydraulic start accumulator in less than a minute and a half. The rest of the start-up process is done automatically. When the auxiliary power unit is up and running, it turns a starter pump that provides hydraulic power to starters on the main engines.

"The beauty of the accumulator re-charge system is that with a full battery charge it can be done up to four times before having to return to hand-pumping," said Chris Carson, product support manager, Eaton. "That's four flips of a toggle switch to start the APU as opposed to manual pumping that takes 20 minutes each time."

The addition of EPUSHA also provides a redundant accumulator start-up system for the aircraft. If EPUSHA is unavailable for any reason, such as motor pump low voltage, the hand-pump can still be used.

With direction from the Army, Eaton started developing the new accumulator start-up system in 2005, and in less than three years the EPUSHA system was ready for testing.

The Army has now made EPUSHA a condition of deployment for its entire fleet of CH-47 helicopters. The technology is being integrated into new production and back-fitted into older models.

Other helicopter groups in the armed forces have also accepted EPUSHA for their aircraft, including the U.S. Marine Corps' CH-46 Sea Knight, and it is currently under review for incorporation into the H-60 Black Hawk fleet.

"Eaton developed a great technical solution that can be easily

transferred from one helicopter to another and be used by different branches of military service," said Mike Ruple, military account manager, Eaton. "We've also been working with Boeing to qualify EPUSHA for international users."

The improved time-to-start provided by EPUSHA matches a multitude of advanced capabilities that make the CH-47 one of the world's most successful heavy-lift helicopters.

The CH-47 fulfills crucial service roles around the world, not only moving troops and equipment but also flying missions for medical evacuation, aircraft recovery, firefighting, parachute drops, heavy construction, civil development, disaster relief and search and rescue.

"We are excited about our teamwork with the Army in developing an improved start-up feature on the CH-47, as well as the impact it has made in supporting U.S. troops," said Eric Alden, director of customer support, Eaton. "I congratulate Eaton employees for their skill and ingenuity in developing the EPUSHA technology. This is yet another example of their focus on customer satisfaction and their desire to deliver quality and value."



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