# THE MAGIC BOX

by Don Porter

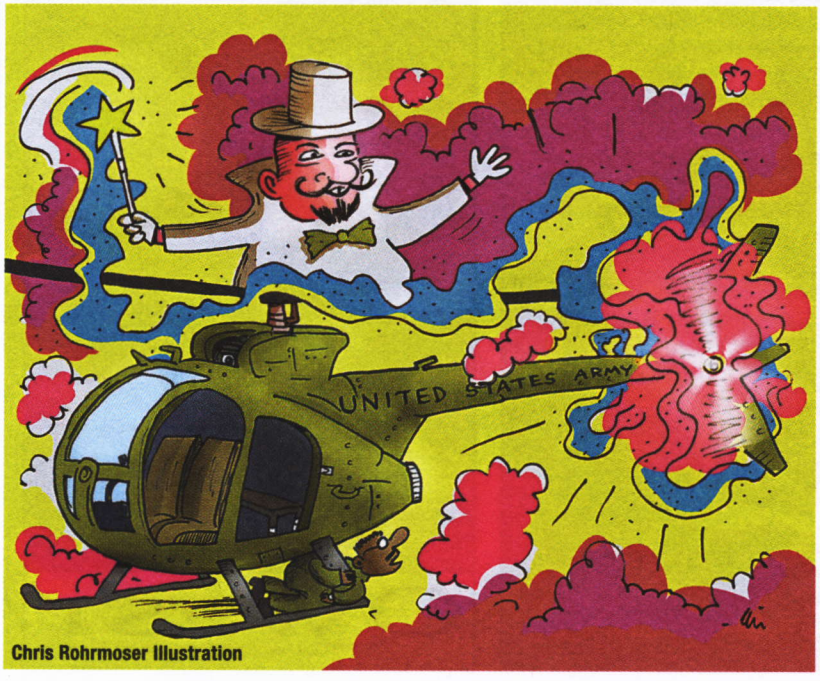
**IT WAS MARCH 1969.** I was in the inhospitable Central Highlands of Vietnam, assigned to the headquarters of the 7th squadron, 17th Cavalry, of the U. S. Army's 4th Infantry Division. Carved from the forested terrain south of Pleiku, my new home was a mile-square plot of flat land called Camp Enari.

From where I stood at the entrance to the squadron maintenance office, I could see three OH-6As parked on the PSP about 300 feet away. I was a technical representative with the aircraft division of the Hughes Tool Company, manufacturer of the OH-6A, and my task was to eliminate the vibrations that had grounded those machines. As a newly minted tech rep, I hoped I was up to the challenge.

The troops nicknamed the OH-6A the "Loach," a creative contraction of light observation helicopter. From 1967 to 1971, Loaches racked up almost 1.2 million hours in the air over Vietnam. A progenitor of today's MD 500 series, the teardrop-shaped machine won praise for its maneuverability and crashworthiness — but, due to its high-risk scout mission, it was also accident-prone. Fortunately, when Loaches did go down, many of their crews walked away unscathed.

The vibration issue had come to light the previous evening, when I overheard a pilot complaining about "damn Loach vibrations" while sipping a beer at the officers club. Having arrived at Enari only weeks earlier, I listened intently. Major Frank Meegan, the squadron's maintenance officer and the man who signed my time-card, was also listening. Turning to me, he said, "You'd better look into this."

The cause of the vibrations was already known — it was a glitch in the design of the two-bladed tail rotor. And this was just one of several issues pilots faced with the aircraft's anti-torque system. While flying in a tail wind, if a right-hand turn was made in a slow-flying, heavily laden Loach, the conditions were ripe for ending up in what was known as a "Hughes tailspin" — the small-diameter tail rotor didn't develop enough thrust to stop the turning. An abrupt spin to the right was another surprise in store for pilots if a tail wind blew the V-shaped tail upward and forced the helicopter's nose down.



Chris Rohrmoser Illustration

If pilots flew the ship by the book, they'd stay out of trouble. But it was wishful thinking for young warrant officers who lived minute-to-minute, flying mere feet over the treetops that hid the bad guys. They had only survival on their minds.

To counteract spins and prevent anti-torque system failures, a more reliable tail rotor with larger blades was needed. Because the helicopter had been designed to be as light as possible, the original blades were constructed of thin fiberglass skin wrapped around a steel spar. The skin would crack, with its bonding peeling apart at the leading and trailing edges. If lucky, pilots ended up with an annoying high-frequency vibration in the pedals. Many weren't so lucky. Losing anti-torque control over the wilds of Vietnam meant spinning into enemy-infested territory. To minimize vibrations and prevent catastrophic failure, a balanced tail rotor was a must, assuming the assembly was worth saving.

The permanent fix was to replace the fiberglass blades with metal ones, and the engineers at Hughes were working on it. The blades would have improved durability, a different camber, and increased chord to develop at least 25 percent additional thrust for more control authority to stop spins. But for now, we were stuck with the fiberglass blades.

When a tail rotor vibrated, mechanics would try adjusting it, but often gave up and replaced the entire assembly. In a few weeks I was handed a better solution. Developed by Hughes and the Chadwick-Helmuth Company, the revolutionary device could dynamically balance a tail rotor while it revolved on the helicopter. It was hooked up to a strobe-type main rotor blade tracking kit.

After I was successful with the device during a practice balancing session, word traveled fast that I was the go-to guy for fixing vibrating Loaches. Only Hughes tech reps were given balancing kits, providing my company an edge in maintaining amiable relationships with unit commanders.

Back to that day at the squadron maintenance office in 1969. As I entered the room, Frank called me over. "Those three ships are waiting for your magic balancing box," he said. "They've all got bad vibrations."

On the flight line, the Loaches were lined up like toy soldiers, waiting for the Hughes man and his magic box. The first rotor balanced without a hitch. Likewise with the second. My luck was holding up — but not for long. The third was a basket case: worn bearings and scratched skin for starters. I told the crew chief to fetch a new assembly, but none were available. Dripping in sweat from the hot, steamy day, I struggled for hours to balance the rotor. After what seemed like an eternity, the problematic assembly suddenly came into acceptable balance.

Getting the three ships back into the air made me a hero of sorts around the flight line — and I didn't pay for a single drink that night. To the OH-6A's credit, variants of the original helicopter continue in production half a century later.