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OPERATORS' REPORT: THE ROBINSON R44

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OPERATORS' REPORT

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R44

Operators overwhelmingly send the Robinson R44, the four-seat descendant of the R22, to the head of the light piston helicopter class.

By Ernie Stephens and Bill Richards

It's been called everything from a "kiddie copter" to the best all-around helicopter ever designed. See it once, and you will not mistake it for anything else. Fly it once, and you will not forget it. But whatever you do, do not call the Robinson R44 a stretched R22. That would be like calling a tiger a stretched house cat. The R44 and R22, while sharing the same general appearance, are two entirely different animals.

Rotor & Wing contacted dozens of Robinson R44 operators and spoke to more than 40 pilots to get their opinion of the helicopter that is showing up in more hangars than any other ever built.

R44's Report Card

Performance	B
Reliability	A
Engine Performance	B+
Response to AOG Issues	B+
Flight Handling	A
Cabin Comfort/Visibility	B+
Engine Support	A
Aircraft Support	B+
Maintenance	A
Costs	B+

The R44's Lineage

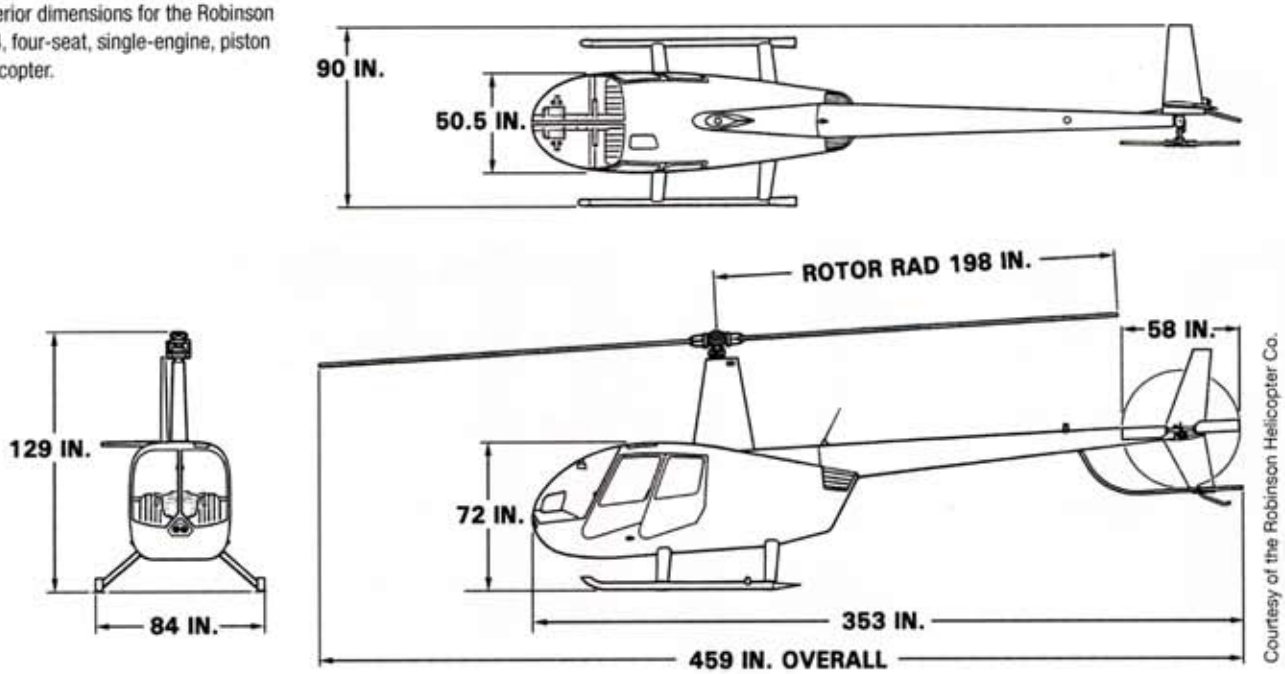
Any discussion about the four-seat R44 must begin with an examination of the two-seat R22, the first design to emerge from the then small hangar of the Robinson Helicopter Company (RHC) in southern California.

RHC was founded by Frank Robinson, an aeronautical engineer hired by Hughes Helicopter to design tail rotor systems. It was during his time at Hughes that he noticed a hole in the industry where a small, inexpensive helicopter for the average man should be. He pitched his idea to his employer, but when they showed no interest, he left the company to work full time designing a rotorcraft that would bear his own name. That was 1973.

Deliveries of his first aircraft design, the tiny Robinson R22 helicopter, began in 1979 with mixed reviews. It was smaller than the Hughes 269—the forerunner of the Schweitzer 300, now the Sikorsky 300—and lacked the stability and payload most pilots had become accustomed to in the days when an entry-level helicopter was taller and longer than his aircraft. Its size, its overly sensitive handling characteristics, and its peculiar T-shaped, pivoting cyclic control made it the laughing stock of pilots.

But it wasn't long before Robinson's 1,300-pound helicopter found its own loyal following of flight school owners, who discovered that the affordable aircraft's sensitivity bred pilots with better seat-of-the-pants aircraft control skills. Newly

Exterior dimensions for the Robinson R44, four-seat, single-engine, piston helicopter.



Courtesy of the Robinson Helicopter Co.

licensed pilots, smitten with the aircraft, also found its wallet-friendly cost to buy and rent far more attractive than the higher-priced Hughes 269 and the bigger, older Bell 47.

By the mid-1980s, Robinson had already begun designing a larger version of the R22 that would satisfy the pleas of entry-level pilots and frugal potential aircraft owners who wanted something big enough for more than two people. It would be the Robinson R44.

Introduced in 1990 and first sold in 1993, the R44 Astro took on some of the features of its older but smaller brother, the R22, such as the tall, shrouded main rotor mast, thinly-split windscreen and the T-shaped cyclic that everyone loved to hate. But it also sported a stretched cabin that accommodated two more forward-facing passengers seated in the back.

It was taken for granted that the R44 would have more power, since it had to carry more people aloft, and it did. Instead of the four-cyclinder Lycoming O-320 or O-360 engine that was derated to deliver 124 shp (continuous) in the R22 and its eight variants, the Astro's blood was pumped by a six-cyclinder Lycoming O-540 piston engine derated to develop 205 shp (continuous). The beefier rotor system of the larger helicopter helped give the R44 a control feel that many pilots compared to the Bell 206B, sans the smoothness of the JetRanger's turbine engine.

It didn't take long for the R44 Astro to gain popularity among the people who cut their rotorcraft-flying teeth on the R22, since both cockpits were laid out nearly the same. And with both aircraft being priced well below their closest competition, the R44, like its two-place brother, elbowed its way into the hangars of small flight operations, modest commercial businesses and even the homes of a few private owners with $250,000 to spend.

Soon, the R44, like the R22, had variants that progressively joined the fleet as the years passed. The next R44 was the Clipper, which came with fixed floats. Later, a law enforcement version and a news-gathering version came into service, taking away one of the rear seats and replacing it with a stowage area to hold all of the extra electronics the two types of mission platforms required. In 2000, the R44 Raven I joined the fleet with advanced systems, followed by the fuel-injected Raven II in 2002. Frank Robinson, who is still active as president and engineering guru of his privately held company, is awaiting certification of the R66, a turbine-powered helicopter that is slightly larger than the R44, but maintains a striking resemblance.

Grading

R&W contacted more than two dozen current operators of various models of the Robinson R44, posing a specific set of questions to pilots who had at least 50 hours in type. They were asked to rate each aspect given on a scale from 1 to 10, with 10 meaning they were very happy with that aspect, and a one representing complete dissatisfaction. They were then allowed to elaborate. In cases where respondents were not familiar with maintenance items, mechanics and operations managers were allowed to answer.

To ensure honest, thoughtful answers, each respondent was promised anonymity. Therefore, their names, employers, genders, companies or references that could lead to their identification have been excluded.

The Results

Performance

Generally, the respondents were pleased with the performance of all variants of the R44, giving it eights, nines and tens. The Raven II made pilots especially happy, thanks to its fuel-injected engine and redesigned tail rotor system. All were able to carry two adults and two children with ease, but needed extra vigilance to keep the gages out of the red when carrying the weight of four adults.

One person surveyed gave the helicopter a five for performance. "It just doesn't carry as much as we hoped it would," said the participant. Further explanation revealed that the aircraft was being operated out of a base with a field elevation in the four-digit range.

Reliability

Reliability won the highest marks in this survey, drawing comments such as, "It just never quits," or "It will never let you down," and even, "You just can't kill the thing."

Such glowing comments explain why responses to later questions on emergency parts availability resulted in shrugs. Very few respondents ever had unexpected, unscheduled maintenance issues, because, according to them, their R44s never broke down.

Engine Performance

As with overall aircraft performance, the operators and pilots we spoke to praised the power delivered by the Robinson R44 across the entire model line, with special accolades being given to the responsiveness of the fuel-injected Lycoming IO-540 engine. But also in keeping with the responses given when asked about overall performance, the same pilot who gave the R44 a rating of five there repeated the scoring here. "I wish it had more power," the person said.

Aircraft on Ground (AOG)

In aviation, work orders and requests for aircraft parts stamped AOG are given priority over all other requests, because it means the aircraft is unflyable, usually due to an unexpected failure of a component. Manufacturers understand that most helicopters are used to generate revenue for their owners, so they know that the sooner they can get parts in the hands of the mechanic, the sooner that aircraft can start earning its keep again. (They also know that keeping the customer waiting will sometimes make him or her turn to the competition when it's time to by a new aircraft!)

Most companies try to deliver AOG parts the same working day the request is received, using the fastest overnight method of shipping available. In the contiguous 48 United States and Canada, that often means an AOG part ordered on Monday will arrive at the sick helicopter's hangar on Tuesday afternoon. Although less than half of those surveyed for this report ever had a need to order parts AOG, they reported reasonably fast service. One respondent, however felt the wait was entirely too long for a specific part, which *R&W* will not divulge to protect the operator's identity.

Two pilots suggested that with the number of Robinson helicopters in operation worldwide, the company would do well to get away from having one parts depot at Robinson's headquarters and factory in Torrence, Calif., and build additional parts distribution centers around the globe.

Flight Handling

The R44 was given high marks for its manners in the air. Pilots with time in the Bell JetRanger insist that it handles more like that aircraft than the Robinson R22, calling it stable, smooth and "not squirrelly."

SPECIFICATION	RAVEN II	RAVEN I
Engine Type	**Lycoming IO-540 fuel injected**	**Lycoming O-540 carbureted**
Cylinders	6	6
Gross Weight	2,500 lb	2,400 lb
Empty Weight Equipped (including oil & avionics)	1,500 lb	1,442 lb
Standard Fuel (30.6 gal)	184 lb	184 lb
Auxiliary Fuel (18.3 gal)	110 lb	110 lb
Passengers and Baggage with Standard Fuel	816 lb	774 lb
Cruise Speed[1]	up to 135 mph (117 kts)	up to 130 mph (113 kts)
Maximum Range (no reserve)[1]	up to 350 miles	up to 350 miles
Hover Ceiling IGE @ Gross Weight	8,950 ft	6,400 ft
Hover Ceiling OGE @ 2300 lb	7,500 ft	4,000 ft
Rate of Climb	over 1,000 fpm	over 1,000 fpm
Maximum Operating Altitude	14,000 ft	14,000 ft
7-Hole Instrument Panel	standard	standard
Electrical System	28V	14V
Air Conditioning	optional	not available

[1] *For comparison purposes only, actual results may vary.*

Photo Courtesy of Andre Hutchings, L.A. Helicopters

Los Angeles Helicopters' fleet of R44s includes this snorkel dipping trainer.

Photo by Ernie Stephens

Frank Robinson's T-handle cyclic was designed to reduce weight and offer passengers an easy entry and exit.

Turns don't feel forced, nor do pitch changes, allowing the aircraft to be maneuvered around a point or held on glide slope almost effortlessly. "It feels like you're wearing it," commented one high-time R44 pilot. "Just think about what you want it to do, and she'll do it," said another.

Many people attend the Robinson R44 Pilot's Course, a transition school, so to speak, designed to give both novice and experienced pilots extensive, hands-on training in the aircraft. Factory instructors give each student several opportunities to perform autorotations in company trainers, so they can become familiar with the aircraft's temperament in the unlikely event of an engine failure.

Pilots are surprised to see how gently the R44 glides to the ground during an autorotation, as well as how relatively easy it is to keep the rotor system "in the green" from start to finish. Students quickly learn that the R44's semi-rigid, tri-hinge rotor system can store enough inertia during descent to allow the pilot to do a full-touchdown autorotation, then raise the collective, fly another 10 feet, and do a second nicely cushioned touchdown without bringing the engine back online.

Cabin Comfort and Field of View

Cabin comfort ranked well in our survey with pilots calling the interior "nice," considering the size of the aircraft. "It's not going to be as roomy as [a Sikorsky] S-76," joked one medium-time pilot. "But I like the seats and how much I can see around me."

What few points the R44 lost in the category of comfort were lost because of the back seat. "It's okay for children and short, thin adults," said one commercial operator. "I'd like to see that area made a few inches bigger."

"What I like most is how much I can see," replied one pilot. "The instrument panel is big enough to see, but doesn't eat up a lot of [viewing] space like other helicopters do." Another operator said taking

Courtesy of the Robinson Helicopter Co.

These Robinson R44s await delivery at the company's plant in Torrence, Calif.

the doors off made it feel like you could "see the entire world."

Engine Support

Lycoming is the sole supplier of R44 engines. It's horizontally-opposed, six-cyclinder, normally-aspirated O-540 has been a mainstay in general aviation for many years, seeing service aboard Beech, Cessna and Piper airplanes. The F1B5 model of the O-540 is the powerplant used for the R44, which respondents all called a "good" to "great" engine.

Everyday support from Lycoming in the way of manuals and technical help was said to be good, with just one respondent giving support a weak four on the scale. The reason given in that case was over difficulty finding a technical representative in the region to help with a particularly hard-to-resolve problem.

There were no reports of total losses of power among anyone surveyed.

Aircraft Support

Aircraft support received high marks, generating comments such as "Those [Robinson] guys are right there when you need them," and "Frank [Robinson] really stands by his helicopters."

The only complaint voiced was, as mentioned in the AOG portion of this survey, that Robinson Helicopters does not have parts distribution centers around the globe. "It's not like a company with only a few helicopters out there," said one annoyed owner of multiple Robinson helicopters. "There are so many Robbies out here, we should be able to get parts from more places."

Maintenance

Airframe and powerplant mechanics said working on the R44 is pretty straight forward. Scheduled maintenance is logical and easy to accomplish, though one mechanic said that trying to track and balance rotor blades can "drive you crazy sometimes."

"Of all those surveyed...the R44 [is] the 'best bang for the buck.'"

Typical problems with R44s, we were told, were minor in nature, and included seatbelts that wouldn't payout or reel in very easily; electrical switches that would go bad, and oil leaks that discolor the bottom of the aircraft. Even then, respondents told us minor problems were rare.

Of course, anything made by humans will suffer from problems, so it is only logical to believe that there are R44s that have needed major, unscheduled repairs. The random sampling of people contacted for this survey, however, did not reveal any.

With regard to service providers, airframe and powerplant mechanics—known as engineers in Canada—who have received factory authorization to work on Robinsons are easier to find in some areas than other, one respondent said. "I used to live where the nearest [factory-authorized] mechanic was 300 miles away," said another. "Where I am now, there are a couple of places I can get to easier."

Cost

According to Robinson's latest price guides, dated January 15, 2009, the suggested retail price for a new R44 Raven I is $333,000. The Raven II checks in at $404,000. Either ship can be ordered with fixed floats—which turns it into the Clipper variant—for an additional $21,000. Total direct operating cost hovers around $170 per flight hour.

Of those surveyed, all gave good marks for initial acquisition cost, calling the R44 the "best bang for the buck" in small helicopters. But some of those surveyed confessed that they rated it below a 10 because they believe everything in the helicopter industry is priced much higher than it needs to be.

This survey was narrowly and specifically about the R44, but many of the people we talked to while gathering information expressed excitement and curiosity about the turbine-powered, five-seat Robinson R66, which has been conducting test flights since April 2008. In their minds, the success of the R22 and R44 are solid indicators that Frank Robinson can't miss with his newest design, which should receive FAA certification within the next year or two. And while speculation about the purchase price of the R66—projected to be more than $400,000 and less then $1.3 million—is running rampant, R44 and R22 lovers whole-heartedly believe that a turbine Robbie will be a bargain and a hot, hot seller.

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