United States Department of the Interior

National Business Center

Aviation Management

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DOI AM INFORMATION BULLETIN NO. 05-02

To: All DOI Aviation Operations

From: Robert H. Lewis, Acting Associate Director, Aviation Management

Subject: R-44 Helicopters (Supersedes OAS IB No. 02-02)

The Robinson Helicopter Company has manufactured two R-44 models to date, the R-44 and R-44 II. This bulletin is to familiarize the user with the R-44 characteristics and operating limitations.

We have several R-44s in the procurement system and continue to have interest in this aircraft for resource work; however, the end user may expect the same or similar performance and payloads as a light turbine helicopter. The economics of the R-44 is an attractive alternative to the higher cost turbine-powered helicopters. Its lower hourly rates and high cruise speed make it cost effective for some natural resource flight requirements; it is well suited for missions such as passenger transport to prepared low altitude locations and low level visual reconnaissance. However, it is not suited for all DOI helicopter flight profiles requiring maximum power output, abrupt control inputs, and/or accelerated maneuvering. DOI bureaus choosing this aircraft must consider how it fits into their aviation programs. Aviation managers should provide written guidance to their users detailing the R-44's suitability in meeting aviation requirements.

R-44 and R-44 II Characteristics and Operating Limitations

1. The R-44 is powered by a six-cylinder piston engine, rated at 225 horsepower. The R-44 II engine is rated at 245 horsepower.
2. The R-44 has three passenger seats. Due to mission requirements and/or environmental conditions, the number of passengers may be less than seats available.
3. The average equipped weight per aircraft is approximately 1,490 lb for the R-44 and 1,510 lb for the R-44 II.
4. The maximum gross weight is 2,400 lb for the R-44 and 2,500 lb for the R-44 II.
5. The fuel consumption is approximately 15 gph of 100-octane low lead aviation gasoline (100LL Avgas).
6. The fixed weight reduction for load calculation purposes has been established at 75 lb.
7. Sample payload: Pilot (200 lb), fuel for 1 hour and 30 minutes and reserve (approximately 171 lb), *plus* survival kit (20 lb) *equals* 391 lb. Note: These figures are based on sea level performance. Increases in altitude and temperature will decrease the allowable payload and performance. Do not use these figures for actual flight. SAMPLE ONLY.

R-44		R-44 II	
Maximum gross weight	2,400	Maximum gross weight	2,500
Pilot, fuel, survival kit	-391	Pilot, fuel, survival kit	-391
Aircraft equipped weight	-1,491	Aircraft equipped weight	-1,510
Fixed weight reduction	-75	Fixed weight reduction	-75
Allowable payload	444	Allowable payload	524

Vigilance must be exercised when operating this aircraft in any of the following conditions:

1. At or near maximum gross weight (due to reduced aircraft performance).
2. More than two passengers (due to reduced aircraft performance, weight, and reduced fuel supply).
3. At pressure altitudes above 4,000 feet (due to reduced aircraft performance) (Safety Tip 13).
4. Any natural resource flights that involve landings at locations other than prepared sites due to fire danger (Safety Notice SN-17).
5. Flights that require abrupt control inputs or accelerated maneuvers (Safety Tip 17).
6. Single skid, toe-in, or step-out landings will not be approved due to the design of the landing gear and lateral center of gravity limitations (Safety Notice SN-13).

Due to the number of accidents in the history of this make and model, the Federal Aviation Administration issued a **Special Federal Aviation Regulation** (SFAR No. 73-1). This SFAR increases pilot flight time and currency requirements, in addition to the requirements of 14 CFR Part 61. No other aircraft has this restriction.

In addition to the SFAR, the Robinson Helicopter Company has published a number of Safety Tips and Safety Notices. These items directly affect the use of this aircraft in "natural resource" operations. The following are excerpts from those Tips and Notices:

Safety Tip 13. When operating at higher altitudes (above 3,000 or 4,000 feet), the throttle is frequently wide open and the RPM must be controlled with the collective.

Safety Tip 15. Never land in tall dry grass. The exhaust is low to the ground and very hot; a grass fire may be ignited.

Safety Tip 17. With hydraulic controls, use special caution to avoid abrupt control inputs or accelerated maneuvers. Frequent or prolonged high-load maneuvers could cause premature, catastrophic failure of critical components.

Safety Notice SN-13. DO NOT ATTACH ITEMS TO THE SKIDS. The landing gear strut elbows have cracked on several helicopters when the pilot attempted to carry an external load strapped to the landing gear skids. The landing gear is optimized to take high "up" loads. Consequently, it has a very low strength in the opposite or "down" direction.

Safety Notice SN-17. NEVER LAND IN TALL GRASS. The engine exhaust is very hot and can easily ignite tall grass or brush. One R22 was completely destroyed by fire after a normal landing in tall grass.

Safety Notice SN-30. LOOSE OBJECTS CAN BE FATAL. A recent fatal accident occurred when the pilot allowed her kneeboard to go out the left door and strike the tail rotor. Any loose object striking the tail rotor can cause failure of the tail rotor blade.

1. Walk completely around the aircraft checking fuel caps, tail rotor, and for anything which could catch a skid, such as a connected static line.
2. Stow or secure all loose objects in the cabin.
3. Firmly latch all doors.
4. And, never fly with a left door removed. (Remove only the right door for ventilation.)

Safety Notice SN-37 EXCEEDING APPROVED LIMITATIONS CAN BE FATAL. Many pilots do not understand metal fatigue. Each time a metal component is loaded to a stress level above its fatigue limit, hidden damage occurs within the metal. There is no inspection method which can detect this invisible fatigue damage. The first indication will be a tiny microscopic crack in the metal, often hidden from view. The crack will grow with each repetition of the critical stress until the part suddenly breaks. Crack growth will occur quite rapidly in drive system parts from the high frequency torsional loads. It will also occur rapidly in rotor system components due to the high centrifugal force on the blades and hub. Damaging fatigue cycles occur with every revolution of an overloaded drive shaft or rotor system.

If a pilot exceeds the power or airspeed limits on a few occasions without failure, he may be misled into believing he can safely operate at those high loads. Not true. Every second the limitations are exceeded, more stress cycles occur and additional fatigue damage can accumulate within the metal. Eventually, a fatigue crack will begin and grow until a sudden failure occurs. If the pilot is lucky, the part will have reached its approved service life and be replaced before failure. If not, there will likely be a serious or fatal accident.

WARNING

1. Always operate the aircraft well below its approved VNE (never exceed speed), especially in turbulent wind conditions.
2. Do not operate the engine above its placarded manifold pressure limits.
3. Do not load the aircraft above its approved gross weight limit.
4. **The most damaging conditions occur when flying or maneuvering at high airspeeds combined with high power settings.**

/s/Robert H. Lewis

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