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Federal Aviation Administration

Memorandum

ACTION: Flight Standardization Board (FSB) Report, Robinson R-66 Helicopter

Date: October 13, 2010

To: Manager, Air Transportation Division, AFS-200
THRU: General Aviation & Commercial Division, ASF-800

From: Manager, Fort Worth Aircraft Evaluation Group, FTW AEG

Prepared by: Steven Sorich, 817-222-5274

As requested, the revised Flight Standardization Board Report for the Robinson , Model R-66, turbine powered helicopter is attached. Please this revised report for concurrence, and return the cover sheet to the Fort Worth Aircraft Evaluation Group.

Attachment: Flight Standardization Board Report, R-66

Cc: Shawn Wildman, AFS-250

R 66

Robinson Helicopter Company, Ldt.
Robinson R66 Single Engine Turbine Helicopter
Original I

APPROVED: Steven M. Sorich 10/13/2010
Steven M. Sorich, Chairman DATE

CONCUR: 10-13-10
Mark C. Fletcher, Manager DATE
Fort Worth Aircraft Evaluation Group

CONCUR: 10/1/10
MANAGER, DATE
Air Transportation Division AFS-200

CONCUR: 10-25-10
MANAGER, DATE
General Aviation & Commercial Division
AFS-800

Robinson Helicopter Company, Ltd.
Robinson R66 Single Engine Turbine Helicopter
Original I

Part I

1. Purpose and applicability:

The purpose of this report is to validate FAA master training, checking, and currency requirements applicable to airmen operating the Robinson R-66 helicopter under FAR Part 91, and Part 135. Additionally this FSB report was developed to aid Part 61, Part 141 Air Agencies, and FAA Principal Operations Inspectors in the use of applicable training programs. Attached is the Robinson Helicopter Company ground and flight training program outline.

The Robinson R-66 is listed on the FAA Type Data Certificate R00015LA The FSB conducted specified evaluations of the R-66 in accordance with special detailed information guidelines and the reference material from Advisory Circular 120-53A as applicable.

The R-66 is being certificated for VFR, day and night operations in non icing conditions with a minimum crew of one pilot. It may be used in on-demand operations under FAR Part 135, student training and additional rating instruction, and corporate and private transportation under FAR Part 91. Other possible uses include agricultural operations under Part 137 and external load operations under Part 133.

The Robinson R-66 Flight Standardization Board met in Torrance, California, on August 24 through 27, 2010. Inspectors Steven M. Sorich, Shawn Wildman, Steve L. Ford, and Flight Test Pilot Rick Simmons were members of the Flight Standardization Board.

This is the original FSB report relative to the Robinson R-66. Provisions of this report are effective until amended, superseded, or withdrawn by subsequent FSB determinations.

2. Pilot Type Rating Requirements:

The Robinson R-66 is certificated in accordance with 14 CFR Part 27, and a gross weight less than 12,500 pounds. The board determined a pilot type rating is not required.

3.Master Common (MCR's) N/A

4.Master Differences Requirements (MDR's) N/A

5.Acceptable Operator Difference Requirements Table. N/A

6.FSB Specifications for Training.

The Robinson R-66, free to teeter and cone, rigid in plane rotor system has characteristics which are consistent, and typical of other similar rotor systems. Pilot awareness of certain aerodynamic factors with this type of rotor systems is essential. This includes awareness of low "G" operations and recovery techniques, rotor blade stall potential, energy management, and low rotor RPM recovery techniques. It was the consensus of the Flight Standardization Board that the R-66 performance and flight characteristics were typical and unremarkable compared to other Part 27 helicopters of similar rotor design, therefore the R-66 does not require specific training for unique flight characteristics. Additionally the board determined that the R-66 inclusion in SFAR 73 is not appropriate, and the R-66 should not be used for credit in compliance to SFAR 73 for persons operating the R-22 or R-44 helicopters.

Initial Ground training consisted of 12 hours of classroom and self study covering the operation of aircraft systems. The flight training was conducted concurrently with Functionality and Reliability testing being performed by Robinson Helicopter Company and the LAACO for the aircraft certification requirements of the Administrator. The board members received a various amounts of flight training, from a maximum of 12 hours, to a minimum of 4 hours. This was evaluated as adequate for all airmen, experienced or otherwise. This includes airmen beginning initial training, airmen who already hold rotorcraft category and helicopter class ratings on their airman certificates, and flight instructors certificated in rotorcraft-helicopters. Certificated flight schools under FAR Part 141 and operators conducting training under FAR Part 61 are affected.

7.FSB Specifications for Checking.

All flight checks required by part 135.293(b) must be accomplished in make and model according to instructions in the appropriate practical test standards, and supplemented with guidance in FAA handbook 8900.1, and FAA Order 8900.2.

8.FSB Specifications for Currency.

All pilots who wish to act as pilot in command of a Robinson R-66 aircraft must complete a flight review as required by FAR Part 61.56

9.Aircraft Regulatory compliance Checklist. N/A

10. FSB Specifications for Devices, and simulators.

14 CFR Part 60 – Flight Simulation Training Device Initial and Continuing Qualification and Use, outlines specifications for helicopter simulator and flight training devices. No simulator or flight training device exists for this make and model rotorcraft.

11. Application of FSB Report.

All relevant parts of this report are applicable to all operators on the effective date of this report.

12. Alternate Means of Compliance. N/A

13. Miscellaneous. N/A

Robinson Helicopter Company, Ltd.
Robinson R66 Single Engine Turbine Helicopter
Original I

Part II

1.0 Backround:

Beginning August 24, 2010 through August 27, 2010 a Flight Standardization Board (FSB) was convened for the evaluation of the Robinson R-66 single engine turbine helicopter. All ground and flight training was conducted at the Robinson Helicopter, Ltd. facility at Torrance Airport, California.

This rotorcraft is capable of being utilized for On-demand operations under Part 135. Additionally Private carriage under Part 91, and pilot training under Part 61 are included. Other possible uses would include operations conducted under Part 133, and Part 137.

2.0 FSB Composition:

At the outset board members were selected to offer a broad range of helicopter operational experience. The intent was to provide the board with input from a balanced perspective of both highly experienced Robinson pilots, and pilots with minimal Robinson flying experience.

Chairman – Steven M. Sorich, Operations Inspector, Fort Worth Aircraft Evaluation Group

Board Member- Steve L. Ford, Operations Inspector, Los Angeles Aircraft Evaluation Group

Board Member- Shawn Wildman, Operations inspector, AFS-250

Board Member- Rick C. Simmons, Flight Test Pilot, Rotorcraft ACO, ASW-170

3.0 Ground and Flight Training.

Initial Ground training consisted of 12 hours of classroom and self study covering the operation of aircraft systems. The flight training was conducted concurrently with Functionality and Reliability testing being performed by Robinson Helicopter Company and the LAACO for the aircraft certification requirements of the Administrator. The board members received a various amounts of flight training, from a maximum of 12 hours, to a

minimum of 4 hours. Each board member received flight time they considered adequate to evaluate the training program, and the operational suitability of the R-66. The initial training program had provisions for up to 5 hours of flight time for certificated helicopter pilots transitioning to the R-66. All areas of operation, and maneuvers, were evaluated as specified in the Commercial Pilot Practical Test Standards FAA-S-8081-16A.

4.0 Type Rating, Crew Qualification tests, and FSB determinations.

Flight checks are to be conducted in accordance with the instructions and guidance contained in the appropriate Practical Test Standards, and supplemented by guidance in FAA Orders 8900.1 and 8900.2

5.0 Public Meeting Record and Resolution Of Comments: N/A

6.0 Summary and Conclusions:

The Robinson R66 is a variant and enhancement of the Robinson R-44 helicopter. The R66 cabin is 8 inches wider, and main rotor mast is 8 inches taller than the R-44. Gross weight is increased to 2,700 pounds. The Main rotor blades have a larger chord and are heavier than the R-44 components. Additionally a Rolls Royce, RR300, turbine engine replaces the 6 cylinder piston engine. Many of the R-66 components are similar to those of the R-44 with additional material added for strength in critical areas.

Of primary concern to the Flight Standardization Board in evaluation of the Robinson R-66 is the published Special Federal Aviation Regulation Number 73 specifying training, testing and checking requirements for the Robinson R-22 and R-44 helicopetrs. Because the R-66 is a growth variant of the R-44 and R-22 make and model helicopters, the FSB elected to evaluate the R-66 for operation suitability, specific flight characteristics, and specific training, testing and checking requirements for pilots.

The board determined that the R-66 did not demonstrate unique or unusual handling chacteristics in the subject areas specified in the SFAR 73: (I) Energy Management, (II) Mast Bumping, (III) Low Rotor RPM and Blade Stall, (IV) Low G Hazards, and (V) Rotor RPM Decay. The R-66 proved unremarkable, and consistent, with other rotor systems of similar design. Pilot awareness of certain aerodynamic factors with this type of rotor systems including, low "G" operations and recovery techniques, rotor blade stall potential, energy management, and low rotor RPM recovery techniques are essential. It was the consensus of the Flight Standardization Board that because the R-66 performance and flight characteristics were typical and unremarkable compared to other helicopters of similar rotor design the R-66 does not require specific training for unique flight characteristics. Additionally the board determined that the R-66 inclusion in SFAR 73 is not appropriate, and the R-66 should not be used for credit in compliance to SFAR 73 for persons operating the R-22 or R-44 helicopters.

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ROBINSON R-66 COURSE OUTLINE (ATTACHMENT)

Course Objectives

- The objective of this course is to qualify a helicopter pilot/instructor to be able to act as pilot in command and/or instruct in the Robinson R66 helicopter.
- COURSE COMPLETION STANDARDS:
    - This course will be complete when the pilot/instructor passes the end of course written examination with a score of at least 80% and has satisfactorily completed the end of course flight evaluation.
- COURSE PREREUISITES:
    - This course is intended for pilots/instructors who hold a rotorcraft - helicopter category rating on their pilot certificate and/or flight instructor certificate.
- COURSE CONTENT:
    - This course consists of five hours of ground training and five hours of flight training. This flight and ground training can be accomplished concurrently.

Ground Training Outline

- Lesson 1:
    - Basic Specifications
    - Systems & Features
    - Required Documents
    - Handling & Maintenance
- Lesson 2:
    - Limitations
    - Normal & Emergency Procedures
    - Performance
    - Weight & Balance
    - Safety Tips/Safety Notices
- Lesson 3 (at aircraft):
    - Preflight Procedures
    - Use of Checklist
    - Cautions
- Lesson 4:
    - Written Exam

Flight Training Outline

- Lesson 1: Normal Flight Maneuvers
- Lesson 2: Advanced Maneuvers
- Lesson 3: Maneuver Review
- Lesson 4: Confined Area/ Ridgeline Ops.
- Lesson 5: Flight Examination

Flight Lesson 1 Content

1. Before engine starting
2. Engine starting
3. Engine run-up
4. Air Work
    a. straight & level
    b. turns
    c. climbs/descents
5. Hovering
    a. forward, rearward, sideward
    b. turns
    c. hover taxi
    d. air taxi
    e. quick-stops
6. Takeoffs
    a. to a hover
    b. normal takeoff
    c. crosswind takeoff
    d. maximum performance takeoff
7. Approaches
    a. normal approach
    b. crosswind approach
    c. steep approach
    d. shallow approach
    e. go-around
8. Landings
    a. from a hover
    b. slope landings
    c. running landings
9. Traffic patterns
10. Autorotations
    a. straight in autorotations
        1) power recovery
        2) touchdown
    b. hovering autorotations

Flight Lesson 2 Content

1. Review normal maneuvers from lesson one
2. 180 degree autorotations
3. Maneuvering in autorotation
    a. Turns
    b. Varying airspeed
    c. Using pedals
4. Simulated engine failure (forced landing)
5. Settling with power/vortex ring state
6. Low rotor speed recovery (oral discussion only)

Flight Lesson 3 Content

1. Review all maneuvers as necessary

Flight Lesson 4 Content

1. Confined area operations
2. Pinnacle/ridgeline operations
3. Platforms

Flight Lesson 5 Content

- One-hour flight examination covering:
  1. Normal maneuvers
  2. Advanced maneuvers
  3. Autorotations

LESSON 1

- Basic Specifications
- Systems & Features
- Required Documents
- Handling & Maintenance