



OPERATIONAL EVALUATION REPORT

SIKORSKY S-64 AIRCRAFT

(ERICKSON, ICAO S64)

MODELS S-64E AND S-64F

RIO DE JANEIRO, BRAZIL

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SIKORSKY S64


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1. INTRODUCTION

This Operational Evaluation Report aims to determine the Sikorsky S-64 Type Rating, as well as establish the Training Program and degree of aircraft compliance to the operational requirements of the Brazilian regulation.

Since there was no specific operational evaluation conducted by the Federal Aviation Administration (FAA) or any other civil aviation authority [i.e. European Agency for Safety Assessment (EASA)], Erickson Air Crane (EAC) operational publications were used as a reference, as well as a technical visit conducted by GAAS / ANAC in the period from August 30 to September 03, 2010.

1.1. Purpose

This report:

- Analyzes type rating characteristics needed for S-64 pilots.
- Analyzes the requirements for training, examinations and recent experience for crew.

1.2. Applicability

This report serves as a guideline for RBHA 91 and 135 operators, ANAC operations inspectors, Training organizations certified under RBAC 142 – Training Centers requirements and other training providers. Covers operations under RBAC 133, but does not address the operations under RBAC 137. The S-64 aircraft DOES NOT perform operations under RBAC 121.

2. BRIEF AIRCRAFT DESCRIPTION

2.1. General Information

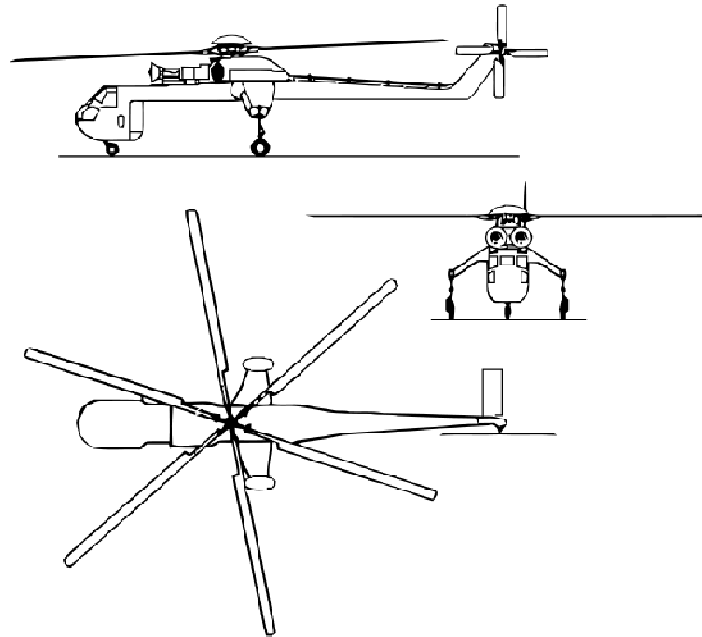
The S-64 is a bi-turbine helicopter certified for VFR operations and to be used as an "industrial flying crane". It has a minimum flight crew of two pilots, and, in some operations, it may need a third pilot to operate the aircraft from the rear cockpit (Aft Seat) increasing thus the accuracy of the work. The helicopter can be configured with a firefighting module (used for firefighting and hydroseeding), with a winch (used to lift loads on buildings or wood logging), with a hook (for external load operations with "long line"), or several other modules cargo (characterized as external load class A).

A unique characteristic of the aircraft is the division of tasks among the crew. Unlike other helicopters, in some operations, Pilot in Command (PIC) fly the aircraft from the left seat using vertical reference while looks the external load through the bubble type side window, while the Second in command (SIC) monitors the operation of the systems and is responsible for taking control of the aircraft in case of emergencies.

The S-64 does not perform RNP or RNAV operations. The S-64 only allows the transport of crew and technicians directly related to the operation of the aircraft. It is NOT allowed to carry passengers.

| | |
|----------------------|---|
| Minimum Crew | Two Pilots |
| Seats | Short Cabin - 4 seats Long Cabin – 5 seats 3 pilot seats (one of the is the auxiliary control station), 1 jump seat, and the fifth seat (at Long Cabin aircrafts) is for an observer. |
| Maximum Weight | S-64E: 42000 lb S-64F: 47000 lb |
| Engines | S-64E: 2 Pratt & Whitney JFTD12A-4A (4500 SHP) S-64F: 2 Pratt & Whitney JFTD12A-5A (4800 SHP) |
| Altitude Limitations | S-64E: 10000ft S-64F: 16000ft |

2.2. Views



3. PILOTS TYPE RATING

Since the beginning of the operation, FAA has considered this aircraft as a Type Aircraft, and established the type rating as “SK64” for both models (S-64E and S-64F) regardless of analog or digital cockpit.

The FAA requires two pilots properly qualified to operate the aircraft.

Some operations are conducted with a pilot operating the aircraft from the auxiliary control station (Aft Seat). This station contains a seat, a joystick to control the aircraft’s cyclic command, a collective command and some controls related to the load, and a manual control to control the aircraft pedals that can be disabled.

In external load operations that require great precision, it is usual to use this operator. However, this is not an FAA requirement. It's not required as well that this operator held a SK64 Type Rating. However, there are only 8 operators with experience at EAC to conduct operations from the auxiliary control station, all of which have SK64 Type Ratings, and are the most experienced pilots of EAC. Following EAC standards one of the important points for the operation from the auxiliary control station is that the pilot has experience in vertical flight reference and is experienced in the model and in external load operations.

The vertical flight reference training is required for external load operations and for using the "pound snorkel" to fill water tank fire fighting module in small water sources (reservoirs smaller than the helicopter size).

From the study of different possible operations with the aircraft and from information obtained in flight familiarization and interviews with the Chief Pilot of Erickson Air Crane (David A. Ford) and the company's Head of Education (Randy Erwin), it was found that the aircraft has the basic operation characteristics common to other large helicopters, which require normal operations and emergencies specific trainings. Should be noted that the unusual size of this helicopter requires special adaptation since pilot seats are located in very high position, modifying, thus, visual references of hovering within ground effect and landing. The large dimensions also demand learning about the special characteristics of taxi and ground maneuvers, since while in the hovering, S-64 produces winds incompatible with the presence of other aircraft or light objects nearby.

In other hand, the routine operations conducted by S-64 are very complex, and require much accuracy and training. These operations can be divided into two main groups: external loads and firefighting.

Additionally, the pilot's qualification to operate each of the four variants (S-64E and S-64F with analog and digital cockpits) has specific details which should be covered in training.

Considering the training needs and the complexity of some operations, the AEG-SK64 suggests that the aircraft is defined as a Type Aircraft.

The type rating definition for the S-64 should make it clear that a pilot qualified in a particular variant of the S-64 is not immediately eligible for other variants with a registration note or remark of specific operational restrictions. Thus, the Aircraft Type Rating Table update proposal would be as follows:

| MANUFACTURER (1) | AIRCRAFT (2) | | OBS (3) | RATING (4) |
|---|----------------|----------|---------|------------|
| | MODEL | NAME | | ANAC |
| <i>XIV – Type Rating (Helicopter) – Multi Engine Operation (Turbo-shaft Engine)</i> | | | | |
| Erickson Air Crane | SK64-E analog | AirCrane | D | SK64 |
| | SK64-E digital | | | |
| | SK64-F analog | | | |
| | SK64-F digital | | | |

4. MASTER DIFFERENCE REQUIREMENTS (MDR)

The Master Difference Requirements (MDR) was not presented by manufacturer.

5. PILOTS TRAINING SPECIFICATIONS

5.1. Attendance requirements

In order to be eligible for the training program to obtain SK64 Type Rating as a Second in Command, pilot must:

- Have Airline Transport Pilot License (Helicopter).
- Have been qualified in twin-engine medium-heavy helicopter (up to 2,5 ton.) with wheels landing gears.

In order to be eligible for the training program to obtain SK64 Type Rating as a Pilot in Command, pilot must:

- Have experience of 100 hours as S-64 Second in Command.
- Be qualified in, at least, one S-64 operational mode (firefighting, external load).

In order to be eligible for the training program to obtain SK64 Type Rating as a Pilot in Command without previous SK-64 SIC experience, pilot must:

- Have Airline Transport Pilot License (Helicopter).
- Have experience of 1000 hours as twin-engine heavy helicopter (up to 8 ton.) Pilot in Command.
- Be qualified in, at least, one heavy helicopter operational mode (firefighting, external load).

5.2. Type Rating Training

In order to obtain SK64 Type Rating, the pilot must complete the training described at "Training Course Outline for SK64 Type Rating" manual, whose summary is found on Table 1. For additional details, please consult Annex 1.

| | |
|---|-----------------|
| Ground Training | 36 Hours |
| Aircraft Systems Descriptions and Operation | 20 hour |
| Normal, Abnormal, and Emergency procedures | 8 hours |
| SK-64 Approved Rotorcraft Flight Manual | 8 hours |
| Flight Training | 10 Hours |

Table 1 – Summary of Type rating training

5.3. Operational Mode Training

In order to operate the S-64 in one operational mode (firefighting, external load), the pilot must receive specific training for this purpose.

Therefore, the training described in "SK64 Aircrew Training Manual" manual, in ANNEX 2, must be completed for each required mode.

5.4. Difference Training

It is recommended that in a transition between digital to analog cockpits, or vice versa, a specific training to operate the new aircraft panel be provided (containing, at least, one training flight).

It is recommended that in a transition between S-64 models (S-64E to S-64F or vice versa), a specific ground training about operational differences is provided.

Each operator interested in providing training differences should develop the program and submit for ANAC approval.

6. EXAMS SPECIFICATIONS

A proficiency check ride must be conducted after successful completion of initial training program described in section 5.2 to obtain the license type as required by RBHA 61.

Proficiency check ride is not needed for changing between other variants.

7. CURRENCY SPECIFICATIONS

If the pilot has completed the training differences concerning analog and digital cockpits, recent experience in a variant (analog or digital) warrants recent experience in another.

Regarding the difference between the S64E and S64F variants, it is recommended that the pilot performs a revision of the aircraft operational limitations.

8. OPERATIONAL RESTRICTIONS

It's not recommended the use of NVG during operations.

The third pilot shall only operate auxiliary control station with two other pilots in their proper positions. The AEG-SK64 does not recommend that the SIC leave his position to assume auxiliary control station.

The AEG-SK64 recommends that, if there is need for an observer to the external load, it can occupy the aft-seat since the flight controls are not used by this non-pilot crew.

It is recommended that auxiliary control station pilot be, at least, S-64 PIC, with proper training to operate the aircraft from this position.

9. COMPLIANCE WITH RBHA 91 AND 135

Erickson Air Crane submitted a compliance declaration to RBHA 91 and 135, which were acceptable to the AEG-SK64.

10. MANUALS

10.1. Minimum Master Equipment List - MMEL

The SK64 Brazilian MMEL, approved by GGCP/SAR (ANAC type certification office), must be used by Brazilian operators as a base in order to develop their own Minimum Equipment List (MEL).

10.2. Rotorcraft Flight Manual – RFM

The SK64 Brazilian RFM, approved by GGCP/SAR (ANAC type certification office), must be used by Brazilian operators as a base in order to develop their own operation manuals.

11. ANNEXES

The following annexes are classified as reserved. They can be obtained from the Superintendence of Operational Safety or from Erickson Air Crane.

ANNEX 1

SK64 TRAINING PROGRAM

(RESERVED)

ANNEX 2

AIR CREW TRAINING MANUAL

(RESERVED)

ANNEX 3

RBHA 91 AND 135 COMPLIANCE DECLARATIONS

(RESERVED)