FLTS. 1, 2, 4, 5, 6

N612AZ CG	WEIGHT	ARM	MOMENT
N612AZ	13073	261.9	3423818.7
PILOT	225	88.6	19935
TEST PILOT	165	88.6	14619
C6 STA OPERATOR	270	167	45090
C7 STA OPERATOR	160	201	32160
FWD FUEL	900	203.9	183510
AFT FUEL	900	305.9	275310
CTR FUEL		264.8	0
LOAD ON HOIST	600	154	92400
C16 BALLAST	300	439	131700
A/C TOTAL WEIGHT	16593	254.2362864	4218542.7
CG Range 16000 & under 254.0-280			
16500 = 254.7- 279.3			
17000 = 255.3 - 278.7			
17500 = 256.0 - 278.0			
18000 = 256.6 - 277.4			

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FLT. 3

N612AZ CG	WEIGHT	ARM	MOMENT
N612AZ	13073	261.9	3423818.7
PILOT	225	88.6	19935
TEST PILOT	165	88.6	14619
C6 STA OPERATOR		167	0
C7 STA OPERATOR		201	0
FWD FUEL	600	203.9	122340
AFT FUEL	600	305.9	183540
CTR FUEL		264.8	0
LOAD ON HOIST		154	0
C16 BALLAST		439	0
A/C TOTAL WEIGHT	14663	256.7177726	3764252.7
CG Range 16000 & under 254.0-280			
16500 = 254.7- 279.3			
17000 = 255.3 - 278.7			
17500 = 256.0 - 278.0			
18000 = 256.6 - 277.4			

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FLT. 7

N612AZ CG	WEIGHT	ARM	MOMENT
N612AZ	13073	261.9	3423818.7
PILOT	225	88.6	19935
TEST PILOT	165	88.6	14619
C6 STA OPERATOR		167	0
C7 STA OPERATOR		201	0
FWD FUEL	300	203.9	61170
AFT FUEL	300	305.9	91770
CTR FUEL	0	264.8	0
LOAD ON HOIST	600	154	92400
C16 BALLAST	125	439	54875
A/C TOTAL WEIGHT	14788	254.1647079	3758587.7
CG Range 16000 & under 254.0-280			
16500 = 254.7- 279.3			
17000 = 255.3 - 278.7			
17500 = 256.0 - 278.0			
18000 = 256.6 - 277.4			
18500 = 257.3 - 276.7			
19000 = 258.0 - 276.0			

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FLT. 8

N612AZ CG	WEIGHT	ARM	MOMENT
N612AZ	13073	261.9	3423818.7
PILOT	225	88.6	19935
TEST PILOT	165	88.6	14619
C6 STA OPERATOR	270	167	45090
C7 STA OPERATOR	160	201	32160
FWD FUEL	1400	203.9	285460
AFT FUEL	1300	305.9	397670
CTR FUEL	1600	264.8	423680
LOAD ON HOIST	600	154	92400
C16 BALLAST	400	439	175600
C15 BALLAST	300	405	121500
A/C TOTAL WEIGHT	19493	258.1404966	5031932.7
CG Range 16000 & under 254.0-280			
16500 = 254.7- 279.3			
17000 = 255.3 - 278.7			
17500 = 256.0 - 278.0			
18000 = 256.6 - 277.4			
18500 = 257.3 - 276.7			
19000 = 258.0 - 276.0			
19500 = 258.0 - 275.8			
20000 = 258.0 - 275.6			

5/5

TO: ZOE KELINER

310-380-5666

ENCLOSED, PLEASE FIND:

- CARSON COMPANY FLIGHT TEST REPORT (7 PAGES)
- FLIGHT LOG (1 PAGE)
- WT. & BALANCE DATA (5 PAGES)

PLEASE CALL ME AT [redacted] IF I CAN BE OF ADDITIONAL ASSISTENCE.

[redacted]

[redacted]

Subject: Company Flight Test Report

1. INTRODUCTION:

Flight tests were performed on a S-61N modified with a Goodrich Rescue Hoist System Model 44311-10. Tests were conducted at the Carson Flight Facility, Perkasie, PA from August 14 to 17, 2007. Prior to completing the flight evaluation, the aircraft was deployed to Texas for hurricane Dean support. The flight evaluation was resumed and completed August 28 to 29, 2007.

2. TEST AIRCRAFT CONFIGURATION:

The test aircraft was S61N N612AZ, Serial Number 61297, a standard long body aircraft with Carson Composite Main Rotor Blades and sponson landing gear. The aircraft was weighed prior to the flight evaluation. Weight and balance data is in the Appendix. The flight evaluation was conducted in accordance with Flight Test Plan Attachment to CS61-001-011, dated June 3, 2007, and Revised August 14, 2007. The aircraft was ballasted to the forward cg limit. Pilots were Bob Boyd (PIC) and Dave Thomas (DER).

The hoist installation features an a-c powered motor and 290 feet of usable cable length. The cockpit controls are the same as originally certified by Sikorsky, using a d-c powered hoist. The hoist location is the same as originally certified. Cabin features consist of a 30 amp a-c circuit breaker, a Goodrich control panel, a portable pendant, and an emergency manual cable cutting tool tethered by a lanyard. The hoist external configuration also includes a flood light which is adjustable by the hoist operator. Cable speed is constant (100 fpm) using the pilot hoist switch and the control panel switch, but variable (up to 250 fpm) using the pendant control. The control panel has a dimmer rheostat to control the backlighting of the control panel, as well as the digital readout of the pendant. The pendant includes a two position trigger switch for ICS and radio transmissions and a cable length digital readout. Photographs are in the Appendix showing the various components.
The hoist load was 600 pounds of ballast loaded and secured in a rescue basket.

3. TEST RESULTS:

3.1. The cockpit controls, switches and circuit breakers were the same as originally certified. Accessibility, lighting, labeling and operation was satisfactory. The cabin circuit breaker is located at the bottom of the control closet bulkhead and is easily accessible and properly labeled, but unlit. All circuit breakers were checked for proper function.

However cabin lights and the hoist flood light provide adequate illumination of the circuit breaker. The hoist control panel is located just aft of the forward door. It is well designed, easily accessible, has an adjustable light rheostat control, and is adequately labeled.

The pendant is located just under the control panel and is normally secured to a mounting plate. It is removed for use by raising the pendant assembly. It is practical to use, and is adequately labeled.

3.2. Operational Evaluation:

a. With the hoist cable retracted and stowed, the aircraft was flown through normal helicopter maneuvers. The pilot is unaware of the hoist installation. The aircraft was slowly accelerated at 2,000 feet Hp from 60 KIAS to 145 KIAS with the hoist operator observing the hoist installation. No vibration or movement was reported. The pilot did not sense any vibration or unusual aircraft flight characteristics.

b. With 600 pounds of ballast in the rescue basket, the following was accomplished:

(1) With the load extended about 10 feet a slow acceleration to 30 K left sideward flight, as indicated by the installed GPS, was conducted. At 30 K adequate lateral control remained to generate a responsive left roll. The aircraft heighth was approximately 30 feet.
With the load extended 150 feet, and the aircraft approximately 200-250 feet, a slow acceleration was accomplished to 30 K left sideward flight. Adequate lateral control remained to generate a responsive left roll.

(2) With the load extended 150 feet at a hover, a slow acceleration to 65 KIAS was performed, and a 30 degree banked left turn accomplished. Proper coordination is required to control the hoist load and to prevent cable contact with the 'rub strip' on the side of the fuselage below the cargo door. The AFMS hoist procedures recommend close coordination between the pilots and hoist operator to control the cable and load. In addition, hoist operations should be conducted at a hover or as slow as possible to make it easier for the hoist operator to control and recover the load.

(3) While in an OGE hover with a 600 pound load on the hoist cable at door level, the #1 ac generator was failed. The load was lowered to full cable length and retrieved, using the pendant high speed control.

The hoist operated normally on the #2 ac generator. Aircraft ac systems were activated, such as engine anti-ice, windshield anti-ice, heater blower, etc. The loadmeter increased approximately 7-8 amps during hoist operation, and generally read less than 20 amps total per phase. The ammeter scale goes to 75 amps, with no red line. The ac generators are driven by the transmission accessory gearbox.

(4) No hoist cable slippage was encountered during the full evaluation, including level flight at 65 KIAS with the 600 pound load at 150 feet. The load was not retracted at 65 KIAS, being deemed impractical.

(5) With a 600 pound load at 15 feet cable length, a rapid collective application to a 1000 fpm climb was performed. No cable slippage was encountered. This was followed by a 700 fpm descent with a rapid recovery. Again, no cable slippage was noted.

(6) While in a 400 foot hover, six full 290 feet hoist cycles were performed in succession with no interruptions. The first was conducted using the pilot collective switch, at a fixed 100 fpm. The second was conducted using the hoist panel switch, at a fixed 100 fpm. The remaining four cycles were conducted using the high speed pendant control. No overheat caution condition was encountered. OAT was 20 degrees C, and Hp was about 1200 feet.

3.3 Evaluate the proposed RFM Supplement

The proposed RFM Supplement is being forwarded with a recommendation for approval.

4.0 Test Results of Non Flight Test Plan Items.

a. On two different days the 'validity' of the 2 ½ minute OEI OGE WAT chart was checked. The aircraft was 100-200 pounds heavier than the predicted weight to be able to hover OGE at @ 2½ minute power, but stable hover was established. One flight was to specifically check it, the other was during the dynamic engine failure evaluation.

b. The following rescue devices were evaluated:
   (1) Lifesaving Systems Rescue Basket - empty and with 600#
   (2) Lifesaving Systems Penatrator - empty
   (3) Lifesaving Systems Quick Strop - empty
   (4) Lifesaving Systems Tri-Sar Harness - empty
   (5) Lifesaving Systems 'Stokes' Litter - empty and with 220#
   (6) Empty hoist cable

Three devices were only evaluated empty because no simulated person 'dummy' was available, and it could not be 'loaded' with improvised weight without damaging the device, or being otherwise not advisable. Experience with the other devices showed much better stability and speed capability when loaded.

The flight profile was to place the device at three different cable lengths, (12, 150 and 250 feet), and beginning in a hover make a slow climb and acceleration, then establish level flight and accelerate to a limiting speed, but no faster than 65 KIAS. At that speed, or slightly slower, conduct a coordinated left turn to a limiting bank angle. Then descent and establish a hover, and retract the device. Limiting speed and bank angle were determined when the cable/load nearly touched any part of the fuselage or landing gear. Left turns were determined to be more critical than right turns. The evaluation was conducted over a remote ridge line, between 1500 to 2500 ft. Hp, with an OAT of 22 degrees C. Wind was calm.

This profile was flown first with no load and for the stokes litter and rescue basket with a load in the device. The loaded devices were much more stable and controllable than when empty. The stokes litter rotated at about 50 rpm when at 12 ft, and continued to rotate until 50 to 70 feet cable length. When rotating, it was discovered that the rotation stopped when passing translational lift. The rescue basket did not exhibit the rotating characteristic. The stokes litter rotation was probably due to the padding and strapping at the head end of the litter.

The penetrator without load was stable and well behaved, due to its design and weight.

The two unloaded harness devices were light in weight and responded to airflow more vigorously at 12 ft cable length. They did lightly contact the sponson/gear, but cannot do any damage due to their light weight and webbing design. When lowered they became less active and were satisfactory.

The hoist cable with nothing attached was also checked. It was stable at all cable lengths.

It was found that 150 and 250 cable length results were similar.

The following table summarizes the evaluation results.

Device	Load	Cable Length	Vmax	Bank Angle	Comment
Stokes Litter	0	12	45	10	Rotated about 50 rpm at 20-30 ft. Stopped @ translation.
	0	250	50	10	Fairly stable
	240	12	65	30	Stable
	240	250	65	20	Stable
Rescue Basket	0	12	55	20	Stable at all lengths & loads
	0	250	50	15	
	600	12	65	20	
	600	250	65	20	
Penetrator	0	12	60	20	Stable both lengths
	0	250	40	15	
Tri-sar	0	12	15	-	Rapid oscillations
	0	250	35	20	Fairly stable
Quick Strop	0	12	40	-	Moderate oscillations
	0	250	35	15	Fairly stable
Cable only	0	12	65	20	Stable both lengths
	0	250	35	20	

c. Dynamic engine cuts were performed to determine height loss during a sudden engine failure while hovering IGE and OGE with a 600 pound load on the hoist. For IGE, a four foot rope was secured to the landing gear. The load was at about 5 feet. For OGE, a 30 foot rope was secured to the rescue basket which was at full cable length. Normal pilot reaction time was used. Gross weight was 14788 pounds at takeoff. 2 ½ minute OEI OGE WAT chart for -2 engines,

showed a weight of 14,500 pounds. Landing gross weight was 14,530 pounds. The IGE maneuver was performed first. Hp was 400 feet and OAT was 20 degrees C and the wind was calm. The IGE cut resulted in about a 1 foot loss, which was quickly regained. The OGE cut resulted in about a 2 foot loss, which was quickly regained.

APPENDIX

Carson Rotorcraft Flight Manual Supplement No. 8 (19 pages)

Flight Log (1 page)

Weight and Balance Data (5 pages)

Photographs

FLIGHT LOG

S-61 N N612AZ S/N 61297

Flt. No.	Date	Takeoff	Flt.Time	Comments
1	08/14/07	1520	0.6	Familiarization, 60-145 KIAS
2	08/15/07	1555	1.3	Six cycles of hoist
3	08/16/07	0810	0.3	2 1/2 minute OEI OGE demo
4	08/16/07	0950	0.6	30k left IGE and OGE,
5	08/17/07	0950	1.2	EMC
6	08/28/07	1350	0.7	Gen. Fail, EMC, Rapid climb/dec
7	08/29/07	0805	0.3	Dynamic engine failure IGE/GE
8	08/29/07	0915	2.9	Hoist rescue devices demo