Haverfield Corporate Manual
Rotorcraft External Load Operations Manual
Excerpts, and Operational Documents

CHAPTER I

CORPORATE MANUAL

HAVERFIELD

PERFUNCTIONEM VIGORE

APRIL 2019

NTSB Investigation: ERA20LA160

J. SMOKING

1. No person may smoke or carry a lighted cigarette, cigar, or pipe:
    a) In or on company aircraft (owned or leased).
    b) Within 100 feet of an aircraft during refueling operations.

K. AIRCRAFT MINIMUM FUEL STANDARDS

HAVERFIELD AIRCRAFT MINIMUM FUEL STANDARDS

AIRCRAFT	FUEL CAPACITY (GALLONS)	UNUSABLE FUEL (GALLONS)	AVERAGE GALLONS/HOUR CONSUMPTION	AVERAGE FLIGHT HOURS	LANDING MINIMUM
MD500D/E	64	1.9	29 Gal/Hour	1.6	100 lbs.
UH-1H	208.5	2.0	90 Gal/Hour	1.8	300 lbs.
HAWK	2400	0.5	Varies depending on the power setting	Approx 2.2	30 minutes of fuel remaining

L. QUICK TURNAROUND

1. A pilot may use a quick turnaround operation to avoid delays and to minimize stop/start cycles of the engine. During the quick turnaround procedure, pilots sometimes leave the cockpit while the engine and rotors are turning. If possible, the pilot should remain at the flight controls whenever the engine is running and rotors are turning. However, if it is necessary for the pilot to leave the controls of a running machine, the pilot shall observe the following safety precautions:
    a) Ensure that wind conditions will allow such an operation to be conducted safely.
    b) Ensure that all controls are secured in accordance with the aircraft flight manual.
    c) Reduce the rotor and/or engine rpm to ground idle or minimum recommended settings.
    d) Ensure that no unauthorized person(s) approach the aircraft unless properly escorted.
2. The pilot shall stay in close proximity to the aircraft while it is running.

M. HOT – REFUELING

1. Procedures and Precautions
    a) It shall be the responsibility of the Pilot-In-Command to ensure that refueling operations are conducted in accordance with the list of procedures and safe operating practices in general.

IV. TASK # 6004: PERFORM EXTERNAL LOAD OPERATIONS (CLASS B AND CLASS C)

A. CONDITIONS

1. In a Hughes 500 helicopter, with hookup man and signalman, with before-takeoff and power check completed.

B. STANDARDS

1. Crew/mission briefing completed.

2. Skid Mounted Mirror Removed (Class B Operations).

3. Correct inspection of slings, ropes, cables, shackles, and any miscellaneous hardware.

4. Correct inspection and test of cargo hook and cargo release mechanisms performed.

5. Radio transmitter keyed prior to hookup.

6. During hover –

a. Maintain altitude of load 3 feet AGL +/- 1 foot.

b. Drift not to exceed 3 feet.

7. Clear the aircraft.

8. Takeoff prior to 100 feet AGL –

a. Maintain takeoff heading +/- 5 degrees.

b. Maintain ground track aligned with takeoff direction.

c. Maintain an attitude that will result in a smooth acceleration to desired airspeed.

d. Maintain power required to establish a climb without exceeding helicopter limits, as the altitude is established that will permit safe obstacle clearance.

9. Above 100 feet AGL –

a. Maintain aircraft in trim.

b. Maintain desired airspeed +/- 5 KIAS.

c. Maintain appropriate altitude +/- 50 feet.

d. Maintain appropriate ground track.

10. Cargo release switch circuit breaker out passing 300 feet AGL.

11. Maintain appropriate approach angle.

12. Cargo release switch circuit breaker in at 300 feet AGL.

C. DESCRIPTION

1. Cargo Hook/Release Mechanism Preflight.

a. Inspect cargo hook visually.

b. Check operation manual release mechanism.

c. Check installation of the bumpers and placards.

d. Battery switch – ON.

e. Cargo hook circuit breaker – IN.

f. To accomplish the cargo hook check, one crewmember is required under the aircraft to exert pressure on the hook; and at least one crewmember must be in the cockpit to operate the releases. Check pilot's electrical release by pressing the switch, in turn, while approximately 5 pounds of pressure is being exerted on the hook. Each time the switch is pressed, the hook should open and must be reclosed prior to the next test. Perform the same check of the pilot's manual release. With the hook in the CLOSED position and no releases being activated from the cockpit, give the hook lip assembly a sharp pull downward with your hand. The hook should not open. Check operation of the external release knob (located on the left side of the cargo hook body). Move pilot's cyclic to extreme positions. Cargo hook must remain locked and external release knob must not rotate. With a load ring in the cargo hook, swing the hook to the limits of travel in all directions. Hook must remain in the closed position.

g. Battery – OFF.

2. Hookup. Hover aircraft over the load by following signals from the signalman or radioman. Remain vertically clear of, and centered over,

the load by application of cyclic, collective, and pedals, as required. Once the signalman or radioman indicates that the load is hooked up, apply collective slowly until all slack is taken out of the sling or line. Make necessary corrections with cyclic to remain centered over the load. Maintain heading with the pedals. Apply additional collective to raise the load vertically to 3 feet AGL, monitoring aircraft instruments to remain within aircraft limitations.

3. **Takeoff.** After receiving takeoff signal from signalman or radioman, apply forward cyclic pressure smoothly and gradually while simultaneously increasing collective pitch to begin a coordinated acceleration and climb. Adjust pedal pressure as necessary to maintain the desired heading. Maximum torque available can be applied without exceeding helicopter limits as the helicopter attitude is established that will permit safe obstacle clearance. The climbout is continued at that attitude and power until the obstacle is cleared. Above 100 feet of obstacle clearance, adjust attitude and collective pitch as required to establish a climb at the desired rate and airspeed. Minimal control movements are desired to prevent load oscillation. After passing 300 feet AGL, pull the cargo hook circuit breaker out.

4. **Approach and Load Delivery.** When the approach angle is intercepted, decrease collective to begin the descent. Maintain entry airspeed until apparent groundspeed and rate of closure seems to be increasing. When passing 300 feet AGL, push the cargo hook circuit breaker in. Progressively decrease rate of descent and forward airspeed until a stationary hover is attained with the load 3 feet above the intended release point. Reduce collective slowly until the load rests completely on the ground and the line or sling is slack; then, release the load. If ground personnel are not available to indicate that the load is released, slowly increase collective and bring aircraft to an altitude in excess of the sling length to "feel" that the load is no longer attached before moving away from the load.

NOTE 1: **60/70 knots airspeed is recommended for a normal load. However, the airspeed may be adjusted, as necessary, depending on the load configuration. Consult the External Load VNE placards.**

NOTE 2: **During hover, takeoff, and approach, orientation of the aircraft to the load will be accomplished by the pilot leaning his head out the door and monitoring the load. (Vertical reference.)**

NOTE 3: **Prior to sling load operations, the pilot in command will brief all personnel involved on the actions to be taken in the event of an engine failure during load hookup and delivery. The following procedures will be followed: The pilot will attempt to perform a hovering autorotation to the left of the load; the hookup man will move in the opposite direction and position himself face down on the ground; and the signalman will remain in place, face down on the ground.**

NOTE 4: **If aircraft is flown below 300 feet AGL, the cargo hook circuit breaker will remain in. Avoid flight over congested areas. (See FAR 133.33 (d).)**

NOTE 5: **A hover "power" check will be performed or confirmed prior to the execution of this task whenever a change in environmental or loading conditions could affect aircraft performance.**

CAUTION:

TO AVOID ACCIDENTAL LOAD RELEASE, DO NOT PUSH THE HOOK CIRCUIT BREAKER TO THE "IN" POSITION UNTIL YOU HAVE VISUALLY ASCERTAINED THAT YOU ARE NOT TOUCHING THE CYCLIC RELEASE SWITCHES.

D. REFERENCES

1. Pilot's Flight Manual.

2. Rotary Wing Flight.

3. Haverfield 133 Operations Manual.

VIII. TASK # 6008: PERFORM FLIGHT UTILIZING HELICOPTER HUMAN EXTERNAL CARGO

NOTE 1: HAVERFIELD AVIATION POLICY ON SHORT HAUL or HUMAN EXTERNAL CARGO

1. The proposed flight may only be approved by the following personnel:

a.) Vice President of Operations

b.) Director of Flight Operations

c.) Chief Pilot

2. Only specially trained and current personnel will perform HEC flights.

3. Short Haul HEC flights will never be used just to expedite a job, when other methods of transport would suffice.

4. All training will be in accordance with the Haverfield HEC Training Program, the ARS Manual.

5. The HEC system will be inspected in accordance with manufacture or equivalent instructions, prior to use. Haverfield will have a qualified person inspect on a basis equivalent to the manufacturers recommended frequency. All system usage shall be recorded in the HEC Usage log.

A. CONDITIONS

1. In a Hughes 500 helicopter, with approved HEC system installed, trained pilot, lineman with before-takeoff and power check completed.

B. STANDARDS

1. Crew/mission briefing completed. Review HEC Training Manual prior to HEC operations. Brief the Crew to remind them that in the Transmission corridor, that all structures must assume to be strung with wire at all times and for all operations.

a. Including a high and low recon flight of the work area.

2. Skid Mounted Mirror at the pilot's discretion if it should be installed or removed.

3. Correct inspection of HEC equipment IAW the HEC Training Manual.

4. Check communications between all crewmembers. Review and confirm all hand and head signals.

5. Inspection and test of aircraft cargo hook, manual cargo release mechanism, and HEC Belly band "3-Ring" mechanism performed.

6. Pull cargo hook circuit breaker (pilots discretion).

7. Lineman (external load) must wear SPH type helmet with a plug-in radio capable of communicating with the pilot or a Petzyl helmet and portable FM Radio.

8. Petzyl helmet must have + on top of the helmet, in contrasting color, visible to the pilot.

9. Entire crew must be trained and shall operate IAW the HEC Training Manual.

10. During hover –

a. Maintain altitude of +/- 3 feet.

b. Drift not to exceed 5 feet.

11. Clear the aircraft.

12. Maintain proper tension to avoid dragging the lineman.

a. Utilize standard VRLL techniques.

b. Maintain an attitude that will result in obstacle avoidance of terrain and vegetation.

c. Lineman (External Load) shall aid the pilot in obstruction clearance and avoidance, by using standard head or hand signals.

d. Maintain power required to establish a steady controlled takeoff or approach, without exceeding helicopter limits, as the altitude is established that will permit safe obstacle clearance.

13. Complete HEC Usage Log on completion of HEC operations. Clean, inspect, dry, and store the HEC system. Correct discrepancies before further use.

C. DESCRIPTION

1. Cargo Hook/Release mechanism and HEC "Three Ring Release" mechanism, Preflight check.

a. Inspect cargo hook visually.

b. Check operation of the manual release mechanism.

c. Check installation of the bumpers and placards.

d. Battery switch – ON.

e. Cargo hook circuit breaker – IN.

f. To accomplish the cargo hook check, one crewmember is required under the aircraft to exert pressure on the hook; and at least one crewmember must be in the cockpit to operate the releases. Check the pilot's electrical release by actuating the switch, in turn, while approximately 5 pounds of pressure is being exerted on the hook. Each time the switch is pressed, the hook should open. The hook must be closed, prior to the next test. Perform the same check of the pilot's manual release.

g. With the hook in the CLOSED position: Move pilots cyclic to extreme positions. Cargo hook must remain closed during this check. With a load ring in the cargo hook, swing the hook to the limits of travel in all directions. Hook must remain in the closed position.

h. Cargo Hook Circuit Breaker – PULLED OUT.

i. Battery – OFF.

2. Pickup. Hover aircraft over the load. Remain vertically clear of, and centered over, the load by application of flight controls. Once the lineman indicates that he is hooked up, apply collective pitch slowly until all slack is taken up. Make necessary corrections with flight controls, to remain centered over the load. Maintain aircraft heading. Apply additional collective, to raise the load vertically to 3 feet AGL, monitoring aircraft instruments to remain within aircraft limitations.

Installation, Inspection, Operation, Acceptance/Rejection (Pilots & Crewmembers):

- The HEC system will be inspected in accordance with manufacture or equivalent instructions, prior to use. Haverfield will have a qualified person inspect on a basis equivalent to the manufacturers recommended frequency. All system usage shall be recorded in the HEC Usage log.
- Lineman harnesses and other associated equipment will be inspected per manufacture recommended instructions.
- Inspection and test of aircraft cargo hook, manual cargo release mechanism, and HEC Belly band "3-Ring" mechanism performed.
- Inspect cargo hook visually.
- Check operation of the manual release mechanism.
- Check installation of the bumpers and placards.
- To accomplish the cargo hook check, one crewmember is required under the aircraft to exert pressure on the hook; and at least one crewmember must be in the cockpit to operate the releases. Check the pilot's electrical release by actuating the switch, in turn, while approximately 5 pounds of pressure is being exerted on the hook. Each time the switch is pressed, the hook should open. The hook must be closed, prior to the next test. Perform the same check of the pilot's manual release.
- With the hook in the CLOSED position: Move pilots cyclic to extreme positions. Cargo hook must remain closed during this check. With a load ring in the cargo hook, swing the hook to the limits of travel in all directions. Hook must remain in the closed position.
- Cargo Hook Circuit Breaker – PULLED OUT.
- Battery – OFF.

Hazard Identification, Risk Analysis and Mitigation (Pilots & Crewmembers):

- Crew/mission briefing completed. Brief the Crew to remind them that in the Transmission corridor, that all structures must assume to be strung with wire at all times and for all operations.
- Preform a high and low recon flight of the work area.
- Maintain an attitude that will result in obstacle avoidance of terrain and vegetation.
- Lineman (External Load) shall aid the pilot in obstruction clearance and avoidance, by using radio, standard head or hand signals.
- Maintain at least 100 feet of obstacle clearance during transitional flight. All efforts will be made to cross at the structure.

DEFINITIONS

As used in this manual supplement the following definitions apply:

"External Load" means a load that is carried, or extends, outside of the aircraft fuselage.

"Rotorcraft-load combination" means the combination of a rotorcraft and an external load, including the external load attaching means. Rotorcraft-load combinations are designated as Class A, Class B, Class C, and Class D, as follows:

(1) "Class A rotorcraft-load combination" means one in which the external load cannot move freely, cannot be jettisoned, and does not extend below landing gear.
(2) "Class B rotorcraft-load combination" means one in which the external load is jettison able and is lifted free of land or water during the rotorcraft operation.
(3) "Class C rotorcraft-load combination" means one in which the external load is jettison able and remains in contact with land or water during the rotorcraft operation.
(4) "Class D rotorcraft-load combination" means one in which the external load is other than a Class A,B, or C, and has been specifically approved by the administrator for that operation.

"External-load attaching means" means the structural components used to attach an external load to an aircraft, including external-load containers, the backup structure at the attaching points, and any quick-release device used to jettison the external load.

The above definitions are the same as those found in FAR Part 1.

"The Company" means Haverfield Aviation, Inc.

"Human External Cargo (HEC)" means a Class B rotorcraft-load combination in which a person who is a flight crewmember is carried as part of the external load and is suspended from beneath the aircraft.

"Conductor Cart" means a device or apparatus used to transport a workman in a Class B rotorcraft-load combination for the purpose of performing maintenance functions on a powerline. The conductor cart is capable of being delivered and retrieved from a powerline.

"Powerline Basket" means a device or apparatus used to transport a workman in a Class B rotorcraft-load combination for the purpose of performing maintenance functions on a powerline while being suspended beneath the aircraft.

"Aerial Saw" means an apparatus used to trim or cut vegetation and trees in a Class B rotorcraft-load combination.

OPERATING LIMITIATIONS

MDHC HELICOPTER MODEL 369D AND 369E

Class A rotorcraft-load combination:

See Operating Limitations set forth in Appendix A and B

Class B rotorcraft-load combination:
Class C rotorcraft-load combination:

(1) The total weight of this aircraft and load combination shall not exceed 3550 pounds gross take-off weight.
(2) The location of the center of gravity for this type aircraft and load combination shall be within the center of gravity range established during type certification under FAR Part 27.
(3) The total weight of this aircraft and load combination shall not exceed 3550 pounds (demonstrated).
(4) This aircraft shall be operated, as much as possible, within its limiting height-speed envelop, if any, but average speed shall not exceed 80 knots. Extreme caution shall be exercised when carrying external loads as controllability may be affected due to the size and shape of the cargo.
(5) The class B external load shall not exceed 2000 pounds (hook limit).
(6) Class C rotorcraft-load combination:
   a. The magnitude and direction of the loading force must be established at those values for which the effective location of the center of gravity remains within its established range.
   b. Always start any Class C external load with a full tank of fuel. As the aircraft leans over in a steep bank to the right, this may easily uncover the fuel sump. There should be a maximum of one hour of flight time while performing any Class C external load.
   c. Using either a full 21-gallon Fargo or 30-Gallon Soloy aux tank can extend flight time as follows.
   d. 40 minutes for a Fargo tank, 60 minutes for a Soloy tank.
   e. The PIC must be supplying to the main tank no later than 50 minutes after the start of the Class C external load and must observe an increase in the fuel level of the main tank.

Crew Resource Management and Communication (Pilots & Crewmembers):

- Check communications between all crewmembers. Review and confirm all hand and head signals.
- Lineman (External Load) shall aid the pilot in obstruction clearance and avoidance, by using radio, standard head or hand signals.

Normal/Abnormal and Emergency Procedures for Class B HEC Operations (Pilots Only):

- The decision to jettison the Human External Cargo in the event of an engine failure or tail rotor failure will be the decision of the pilot in command and the nature of the emergency situation. In the interest of preserving human life, it is recommended that the Pilot in Command avoid HEC load jettison if at all possible or jettison the load at or near ground level.
- Use a full flare landing so as to eliminate dragging the human external cargo or load on the ground prior to touchdown.

Fuel Management (Pilots & Crewmembers):

- Must land with no less than 100 pounds (approx. 30 min) of fuel indicated for all operations.
- Ground crew will assist the pilot with keeping track of there time in flight based on the fuel they had onboard at time of takeoff.

RECURRENT TRAINING:

- Pilot recurrent training will be at completed annually by the Chief Pilot or Chief pilot's qualified designee.

RECENT EXPERIENCE:

- In the event that a pilot has not performed any HEC operations within a six month period, that pilot shall be required to perform precision VRLL (non human) operations to become current with such procedures, skills and techniques before conducting HEC operations.

QUANTA AVIATION

Helicopter
JHA / Work Procedure

HAVERFIELD

Helicopter Record Sheet

Helicopter Registration	9159F/369D	Power Check:	Degrees Cool (if reading is Hot, work shall stop) 28 ↑28		
Helicopter Type					
Pilot Preflight/ Aircraft Release:			**Inspected**		**Inspected**
Load Security/ Evaluation:	☒ COMPLETE	Handles / Straps	☐	Platform Connections	☐
Task/ Risk reviewed:	☒ COMPLETE	Bonding Wand	☐	Platform Bonds	☐
Long Lines Inspected	Length / Serial #	Side pull / pin	☐	Cargo Hook	☒
Inspected By:		Fly Ropes	☐	Com Cord	☐
HEC ☒	BLL075/15091	PSD / Bridle	☒	Blue Tooth	☐
HEC ☒	BLL075/15093	Shackles / Rings	☒	Grapple Hook	☐
☐	/	Needle	☐	Reverse Grapple	☐

Additional Helicopter Check off

☒ Mechanic has briefed PIC on previous day maintenance completed or maintenance due

☒ PIC has briefed mechanic on operational plans

☒ Flight dispatch notification complete (phone/e-mail)

☒ Work area reconnaissance completed **(Pilot and Foreman)**

Fuel Check Off and Limitations

☒ Fuel Truck Sump Complete and Inspected

☒ Helicopter Fuel Sample Complete and Inspected

Fuel Checks Completed by: Dan / Bernie

Helicopter Fuel Minimum (Flight Following):

☒ **MD500:** 100 lbs. Landing Minimum

☐ **UH-1 HUEY:** 300 lbs. Landing Minimum

☐ **K-MAX:** 300 lbs. Landing Minimum

☐ **BK 117:** 265 lbs. Landing Minimum

☐ **MD500:** Wire / Rope Pull and Wreck Out Operations: Maximum 1hr (45 min F / FF) flight time with max fuel load

☐ **UH-60 Black Hawk:** 425 lbs. Landing Minimum

External Helicopter Awareness / Emergency Brief

☒ Helicopter rotor awareness

☒ Head Protection with 3-point chinstrap

☒ LZ Housekeeping standards (Secure all lose items)

☒ Ear / Eye Protection

☒ Helicopter Emergency / Accident Response

☒ No Smoking within 100' of helicopter or fuel truck